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CONTROLLER INSTALLATION MANUAL

IMC-AC
IMC-AC-R

This manual is for IMC-AC Controllers with Release 4 software

Part # 42-02-2204 Revision C.9 March 2010

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IMPORTANT PRECAUTIONS & NOTES

We strongly recommend that you read this manual carefully before proceeding with installation. Throughout this manual you will see icons followed by a WARNING, CAUTION or NOTE. These icons denote the following:

WARNING: Operating procedures and practices which, if not done correctly, may result in personal injury or substantial damage to equipment.

CAUTION: Operating procedures and practices which, if not observed, may result in some damage to equipment.

NOTE: Procedures, practices or information which are intended to be immediately helpful and informative.

The following general rules and safety precautions must be observed for safe and reliable operation of your system.

The controller may be shipped without the final running program. However, you may install the unit, hookup and run the elevator on Inspection operation. Call MCE approximately one week before you are ready to turn the elevator over to full automatic operation so the running program can be shipped to you. If you need to change a program chip on a computer board make sure you read the instructions and know exactly how to install the new chip. Plugging these devices in backwards may damage the chip.

Elevator control products must be installed by experienced field personnel. This manual does not address code requirements. The field personnel must know all the rules and regulations pertaining to the safe installation and operation of elevators.

This equipment is an O.E.M. product designed and built to comply with ASME A17.1, National Electrical Code, CAN/CSA-B44.1/ASME-A17.5 and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with all local codes and is installed in a safe manner.

“This equipment is suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes, 600 Volts maximum.” The 3 phase AC power supply to the Drive Isolation Transformer used with this equipment must originate from a fused disconnect switch or circuit breaker which is sized in conformance with all applicable national, state and local electrical codes, in order to provide the necessary motor branch circuit protection for the Drive Unit and motor. Incorrect motor branch circuit protection will void warranty and may create a hazardous condition.

Proper grounding is vitally important to the safe and successful operation of your system. Bring your ground wire to the system subplate. You must choose the proper conductor size and minimize the resistance to ground by using the shortest possible routing. See National Electrical Code Article 250-95, or the applicable local electrical code.

For proper operation of the VVVF AC Drive Unit in your controller, you must make sure that 1) A direct solid ground is provided in the machine room to properly ground the controller and motor. Indirect grounds such as the building structure or a water pipe may not provide proper grounding and could act as an antenna to radiate RFI noise, thus disturbing sensitive equipment in the building. Improper grounding may also render any RFI filter ineffective. 2) The incoming power to the controller and the outgoing power wires to the motor are in their respective separate grounded conduits.

Before applying power to the controller, physically check all the power resistors and other components located in the resistor cabinet and inside the controller. Components loosened during shipment may cause damage.

This equipment contains voltage which may be as high as 1000 volts. Use extreme caution, do not touch any of the components such as resistors, circuit boards, power devices or electrical connections, etc., without insuring that high voltage is not present.

You must **not** connect the output triacs **directly** to a hot bus (2, 3 or 4 bus). This can damage the triacs. PIs, direction arrows, and terminals 40 & 42 are examples of outputs that can be damaged this way. Note: miswiring terminal 39 into 40 can damage the fire warning indicator triac.

The HC-PI/O and HC-CI/O boards are equipped with quick disconnect terminals. During the initial installation, you may want to remove the terminal connector, hook up the field wires, test for no shorts to ground (1 bus) and to 2, 3 and 4 terminals before plugging these terminals back into the PC boards.

ENVIRONMENTAL CONSIDERATIONS: Keep the machine room clean. Controllers are generally in NEMA 1 enclosures. Do not install the controller in a dusty area. Do not install the controller in a carpeted area. Keep room temperature between 32° F to 104° F (0° to 40°C). Avoid condensation on the equipment. Do not install the controller in a hazardous location or where excessive amounts of vapors or chemical fumes may be present. Make sure power line fluctuations are within ± 10%.

CONTROLLER OR GROUP ENCLOSURES WITH AIR CONDITIONING

If your controller or group enclosure is equipped with an air conditioning unit, observe the following precautions (failure to do so can result in water condensation inside the enclosure):

- Ensure the integrity of the NEMA 12 or 4 enclosure is maintained by using sealed knockouts and by sealing any holes created during installation.
- Do not run the air conditioner unit when the doors are open.
- To avoid damaging the compressor, if the air conditioner is turned off while it is running, wait at least five minutes before turning power on again.
- Observe the manufacture's recommended maintenance and optimum thermostat setting of 75° F (see Operator's Manual).
- Ensure the air conditioner unit's drain hose remains open.

LIMITED WARRANTY

Motion Control Engineering (manufacturer) warrants its products for a period of 15 months from the date of shipment from its factory to be free from defects in workmanship and materials. Any defect appearing more than 15 months from the date of shipment from the factory shall be deemed to be due to ordinary wear and tear. Manufacturer, however, assumes no risk or liability for results of the use of the products purchased from it, including, but without limiting the generality of the forgoing: (1) The use in combination with any electrical or electronic components, circuits, systems, assemblies or any other material or equipment (2) Unsuitability of this product for use in any circuit, assembly or environment. Purchasers' rights under this warranty shall consist solely of requiring the manufacturer to repair, or in manufacturer's sole discretion, replace free of charge, F.O.B. factory, any defective items received at said factory within the said 15 months and determined by manufacturer to be defective. The giving of or failure to give any advice or recommendation by manufacturer shall not constitute any warranty by or impose any liability upon the manufacturer. This warranty constitutes the sole and exclusive remedy of the purchaser and the exclusive liability of the manufacturer, AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY AS TO MERCHANTABILITY, FITNESS, FOR PURPOSE SOLD, DESCRIPTION, QUALITY PRODUCTIVENESS OR ANY OTHER MATTER. In no event will the manufacturer be liable for special or consequential damages or for delay in performance of this warranty.

Products that are not manufactured by MCE (such as drives, CRT's, modems, printers, etc.) are not covered under the above warranty terms. MCE, however, extends the same warranty terms that the original manufacturer of such equipment provide with their product (refer to the warranty terms for such products in their respective manual).

ADDENDUM TO THE IMC-AC MANUALS
PART NUMBERS 42-02-2204 AND 42-02-2205

0.0 GENERAL

This addendum applies to IMC-AC controllers. The following information is modified or added to the IMC-AC Controller Installation Manuals, part numbers 42-02-2204 and 42-02-2205.

0.1 MAGNETEK DRIVE SERIAL COMMUNICATION

Serial communication with the MagneTek HPV 900 AC drive is currently not available. Drive parameters must be adjusted using the drive keypad as described in Section 3.5.2.2 in the IMC-AC Controller Installation Manual.

Disregard the instructions in Section 3.5.2.1 regarding use of the MagneTek drive parameter screens for parameter adjustment. Table R.12 *Quick Reference for HPV 900 Drive Parameters* provides a complete listing of MagneTek drive parameters. Where MagneTek parameters P1 thru P204 are mentioned in the manual text, refer to table R.12 to determine the correct Digital Operator Display parameter name and location. Then make the parameter adjustments using the drive keypad.

0.2 TORQMAX DRIVE SERIAL COMMUNICATION

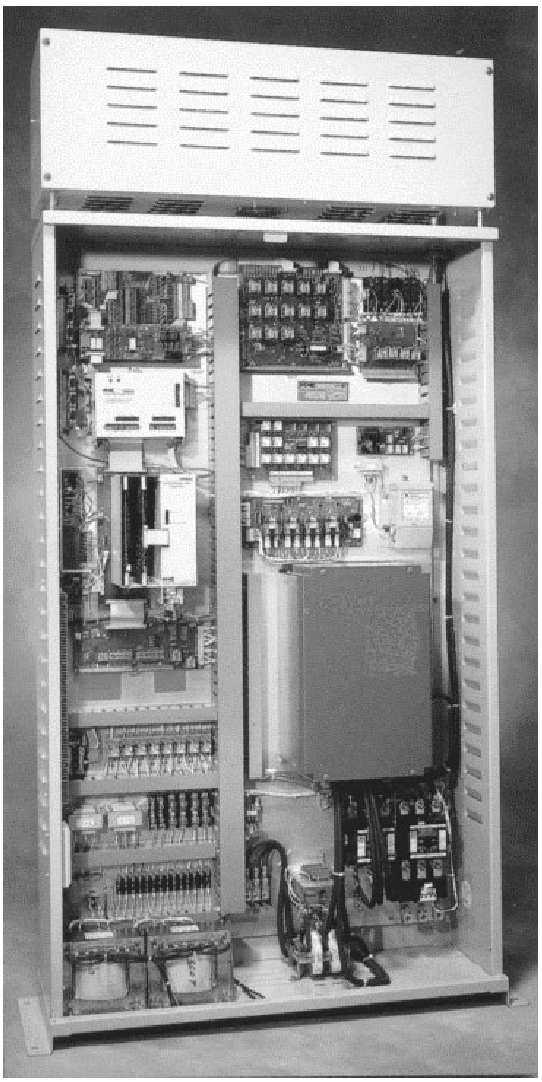
Serial communication with the TORQMAX AC drive is currently not available.

SECTION 1
PRODUCT DESCRIPTION

1.0 GENERAL INFORMATION

Intelligent Motion Control (IMC) provides the latest in digital elevator control technology. IMC-AC with Flux Vector "Field Oriented" technology brings premium performance to elevators using AC motors. The digital Intelligent Motion Control system employs powerful processing algorithms that eliminate the need for trimpots. All parameters are adjusted numerically via keyboard and stored digitally in the system computer.

The IMC controller continually creates an idealized velocity profile. Knowledge of the exact car position and speed in the hoistway is maintained using a sophisticated distance and velocity feedback system. The AC drive is integrated with the IMC controller providing access to all drive variables via the keyboard. The 32-bit processor provides smooth pattern generation for any application including short floors. The regenerative IMC-AC model is ideal for higher speeds and gearless applications.

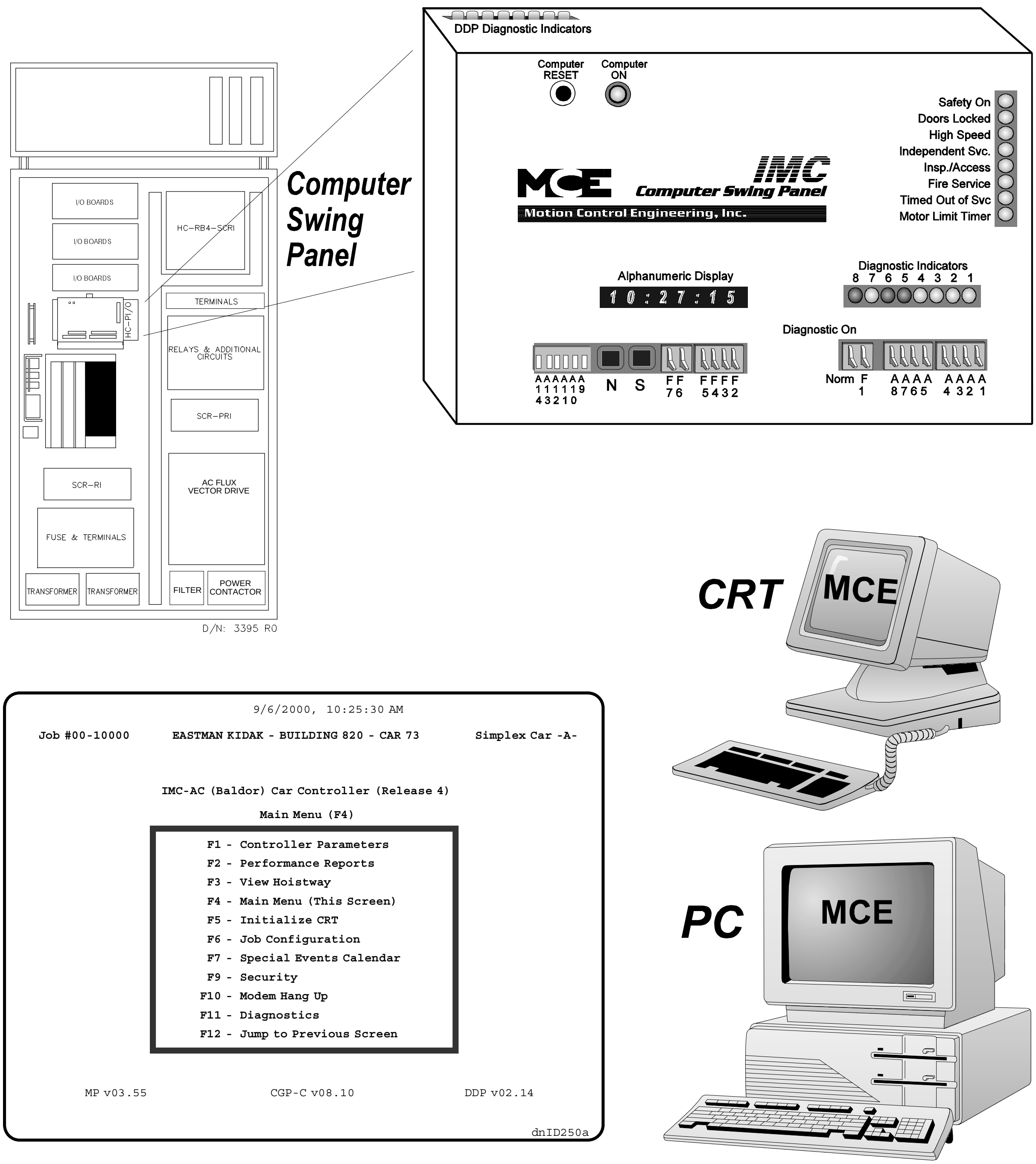


IMC-AC SPECIFICATIONS	
Car Speed	Up to 700 fpm (2.5 m/s)
Jerk	15 ft/sec^3 (7.620 m/sec^3), maximum 8 ft/sec^3 (2.438 m/sec^3), nominal 1 ft/sec^3 (.305 m/sec^3), minimum
Acceleration	10 ft/sec^2 (3.048 m/sec^2), maximum 4 ft/sec^2 (1.524 m/sec^2), nominal 1 ft/sec^2 (.305 m/sec^2), minimum
Number of Stops	64 (maximum)
Number of Cars in Group	12 (maximum)
Floor Leveling Accuracy	+/- .25 inch (6.350 mm), guaranteed +/- .125 inch (3.175 mm), typical
Minimum Time Floor-to-Floor	4.8 seconds for 12-foot (3.66 m) floor heights if rotating equipment is capable of delivering the necessary torque
Environment Limits	32° to104° F (0° to 40° C) ambient 12,000 ft (3,658 m) altitude 95% relative humidity (non-condensing)

The IMC-AC traction controller consists of a Car Controller, a Drive Isolation Transformer (if used), a Cartop Selector (landing system), diagnostic tools and peripherals (Swing Panel, CRT terminal or PC) and if the controller is part of a group, a Group Supervisor. The computer peripherals and Group Supervisor controller are covered in detail in separate manuals.

IMC-AC controller diagnostics and adjustments are performed through the Computer Swing Panel and the CRT terminal or a PC running terminal emulation software or MCE's Central Monitoring System (CMS for Windows) software. The CRT terminal or PC can be connected to the controller directly or through a modem. The controller can also be monitored from a remote location using MCE's Central Monitoring System (CMS) software.

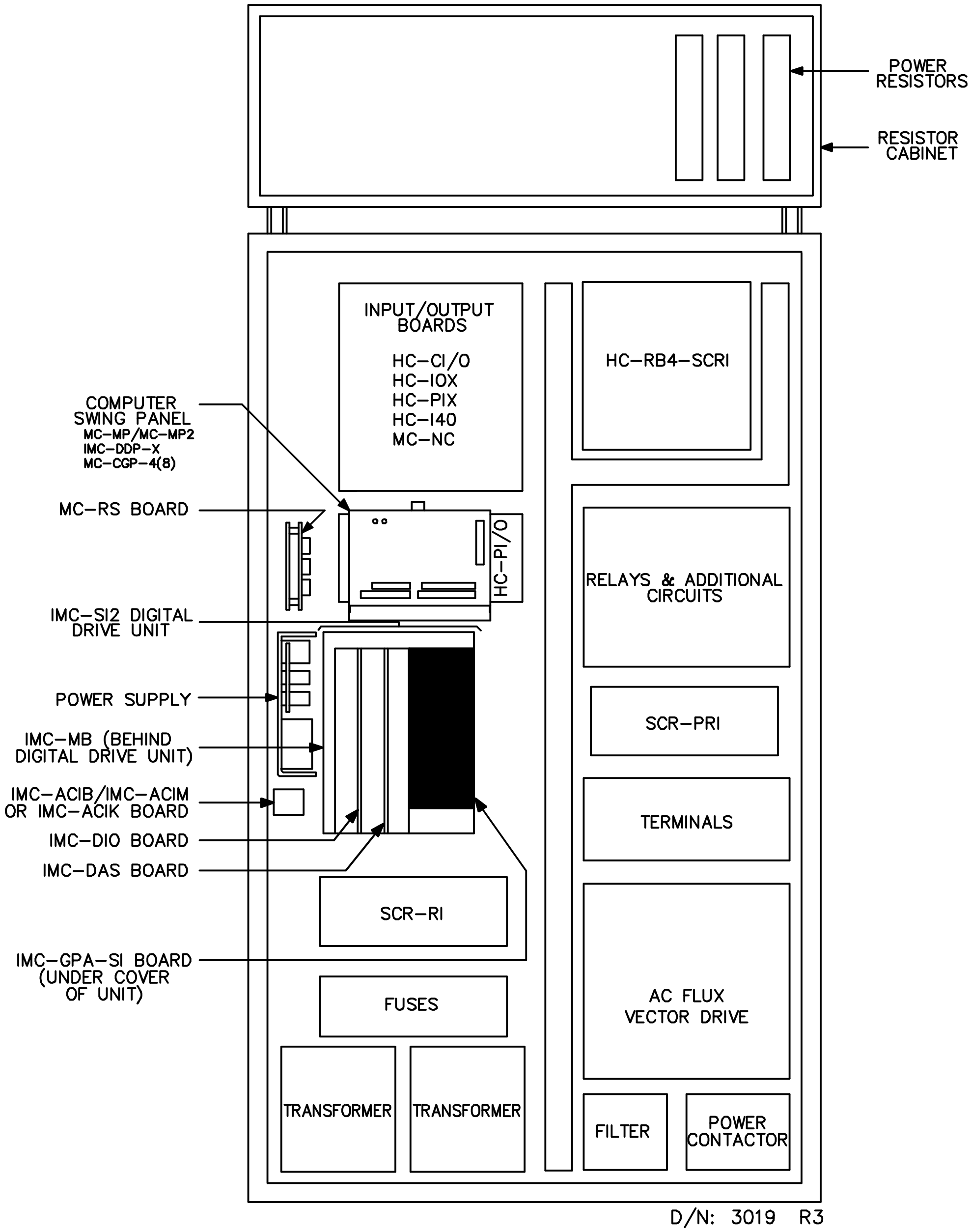
FIGURE 1.1 Controller Diagnostic and Adjustment Tools



1.1 CAR CONTROLLER PHYSICAL LAYOUT

Figure 1.2 shows a typical layout of the car controller in a standard cabinet. The following is a brief description of the different parts of the controller. For Controllers with the SmartLINK for Car Operating Panel option, please also see Appendix L.

FIGURE 1.2 IMC-AC Controller Cabinet Layout (typical)



POWER SUPPLY - The power supply is a triple output linear power supply that provides +5 VDC for the processor boards in the Computer Swing Panel, the IMC-DAS and IMC-DIO boards, and ±15 VDC for the IMC-DAS and IMC-GPA-SI boards.

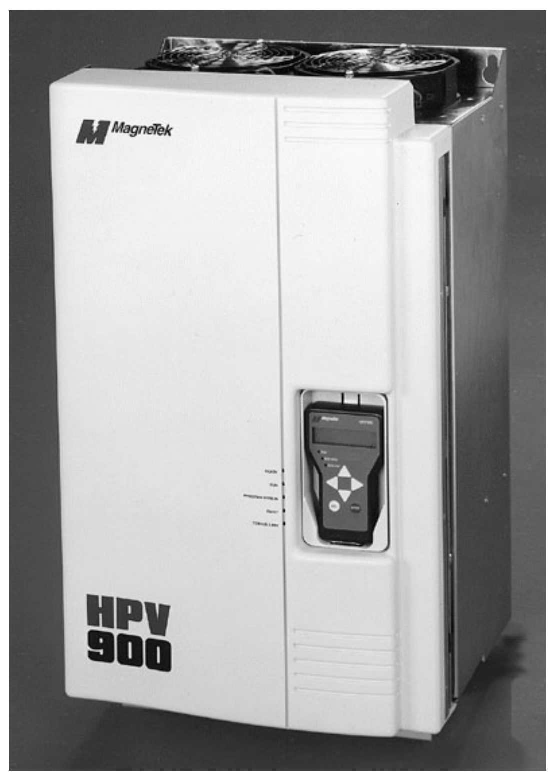
RELAYS, FUSES, TERMINAL BLOCKS, ETC. - Additional relays, fuses, and terminals are provided as required for other additional functions such as door operation, safety functions, etc.

TRANSFORMERS - Transformers are provided as necessary, according to the power requirements of each individual load and the available AC line voltage.

RESISTOR CABINET - The resistor cabinet is located on top of the controller cabinet and contains the power resistors. The power resistors, such as the door or dynamic braking resistors, generate significant heat.

FIGURE 1.3 AC Flux Vector Drive

Picture provided courtesy of Baldor

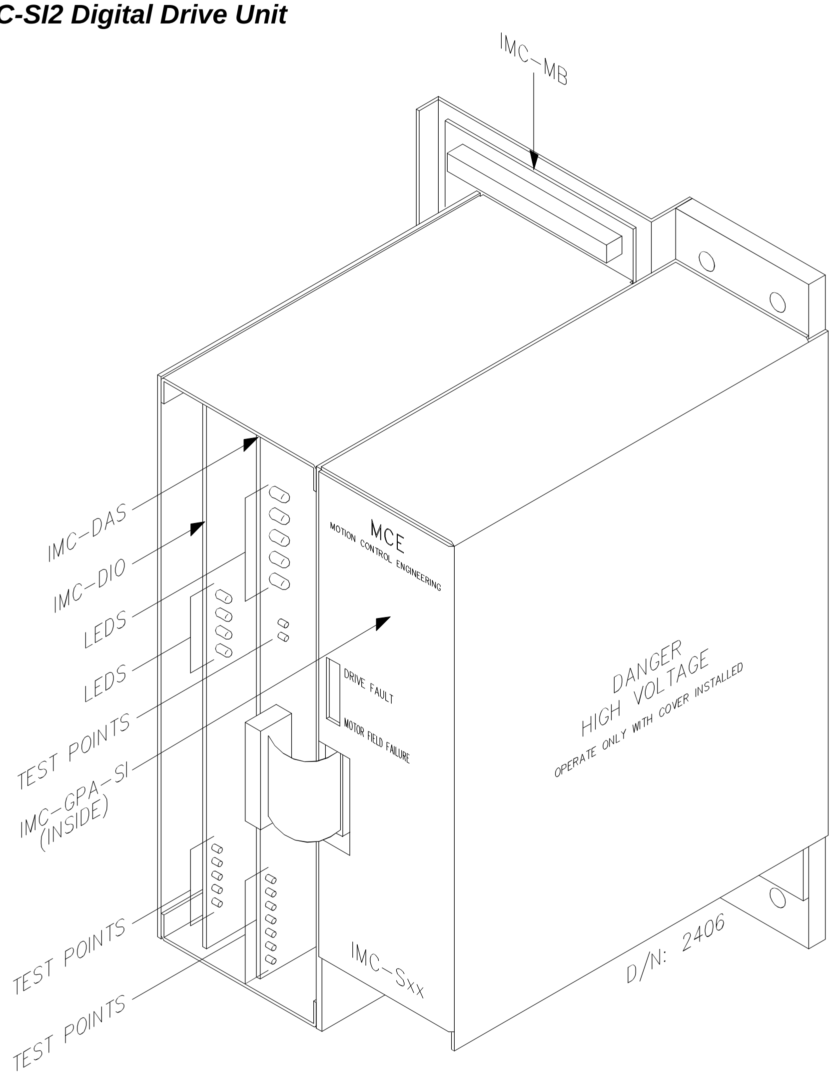


Picture provided courtesy of MagneTek

AC FLUX VECTOR DRIVE - The AC Drive control uses flux vector technology. Flux vector technology (sometimes referred to as Field Oriented Control) is a closed loop scheme using an algorithm to adjust the frequency and phase of the voltage and current applied to a three phase induction motor. The vector control separates the motor current into it's flux and torque producing components. These components are independently adjusted and vectorially added to maintain a 90 degree relationship between them. This produces maximum torque from base speed down to and including zero speed. Above base speed, the flux component is reduced for constant horsepower operation. In addition to the current, the electrical frequency must also be controlled. The frequency of the voltage applied to the motor is calculated from the slip frequency and the mechanical speed of the rotor. This provides instantaneous adjustment of the voltage and current phasing in response to speed and position feedback from an encoder mounted to the motor's shaft. The drive responds to the applied pattern (speed command) and control signals to run the elevator at the desired speed.

DIGITAL DRIVE SUBSYSTEM - This subsystem includes the IMC-SI2 Digital Drive Unit and the SCR-RI and SCR-PRI Relay Interface boards. The subsystem's main function is to provide safety functions, control the brake, and to interface with the AC Flux Vector Drive.

FIGURE 1.4 IMC-SI2 Digital Drive Unit

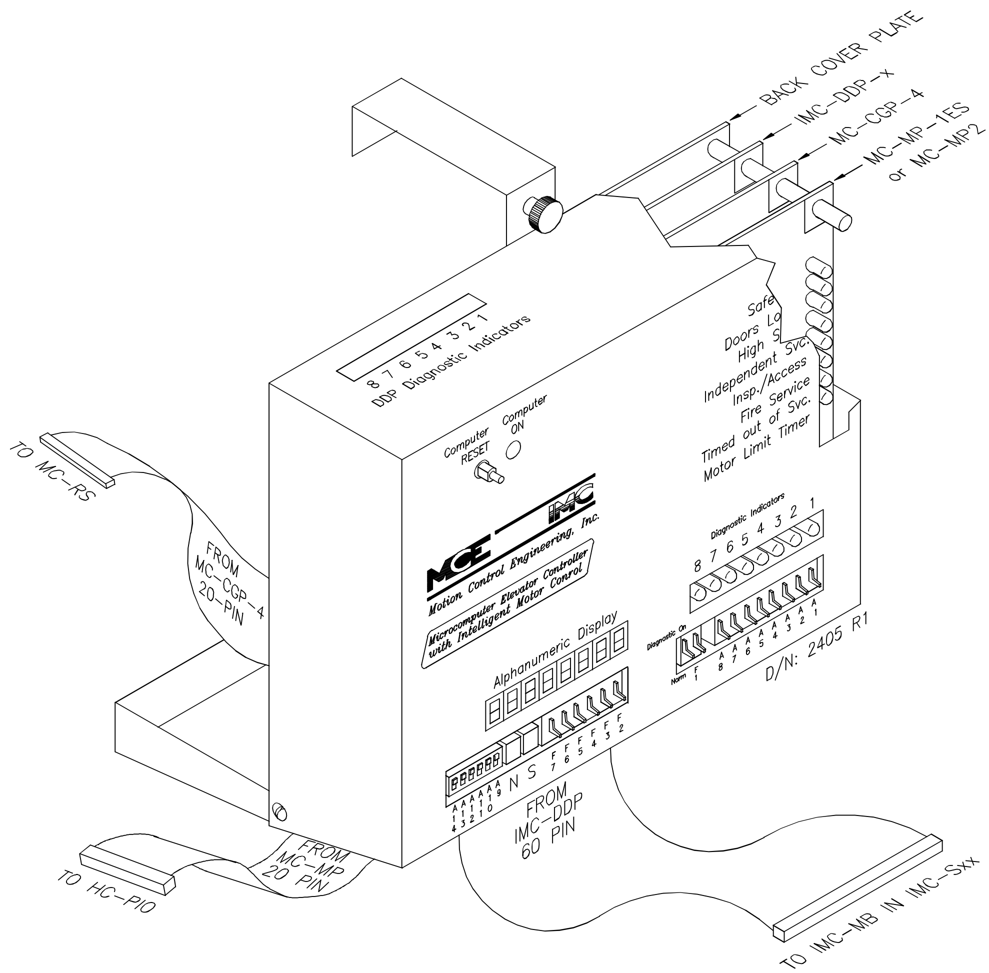


IMC-SI2 - This is the label given to the Digital Drive Unit, including the cover, the IMC-DIO, IMC-DAS, IMC-MB, IMC-GPA-SI boards, and any fuses, capacitors, diodes, etc. contained within this unit. The Drive Unit cover reveals two LEDs from the IMC-GPA-SI board.

COMPUTER SWING PANEL -The Computer Swing Panel is composed of three interacting computer circuit boards. Each board performs a specific task, while it shares resources with the other computer circuit boards through a common memory block. The Computer Swing Panel is used in conjunction with the CRT terminal or PC for diagnostics and adjustments. Section 5, Onboard Diagnostics, describes the diagnostics and adjustments available through the Computer Swing Panel.

Through the front of the panel, the user can see eight vertical LEDs (Status Indicators), eight horizontal LEDs (Diagnostic Indicators), an alphanumeric display, two push-buttons, a Computer RESET button, a Computer ON LED, and 22 function and address switches. These items are actually located on the MC-MP-1ES or MC-MP2 Main Processor board. The top of the Swing Panel has eight horizontal LEDs (DDP Diagnostic Indicators) and the back of the panel has a DDP RESET and DDP Computer ON LED from the IMC-DDP-x board. The MC-CGP-4(8) Computer ON LED can be seen through the right side of the Swing Panel.

FIGURE 1.5 IMC-AC Computer Swing Panel

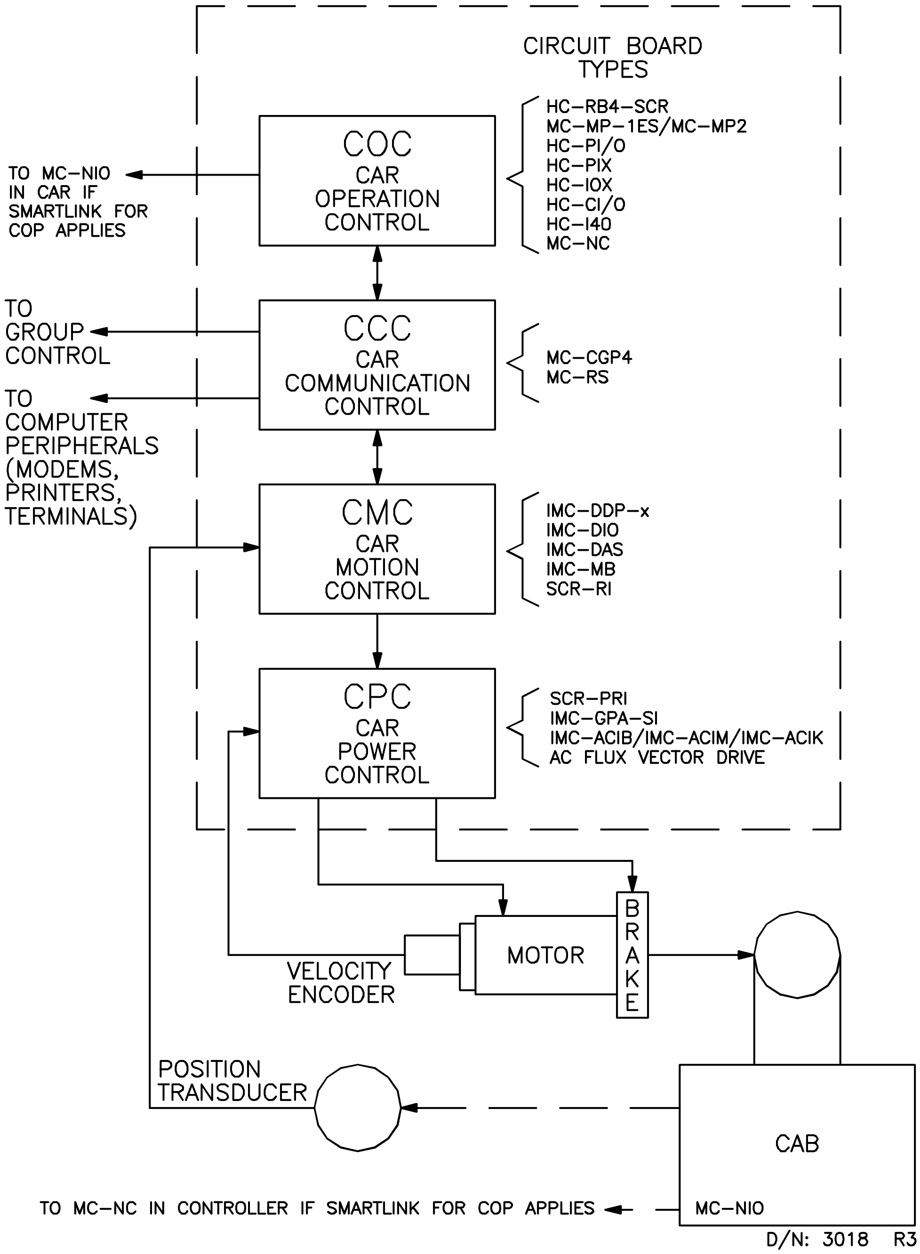


CAR OPERATION CONTROL SUBSYSTEM - This subsystem includes the MC-MP-1ES or MC-MP2 Main Processor (housed inside the Computer Swing Panel) and the input/output boards that connect to the Main Processor board in a “daisy-chained fashion” (using ribbon cables). A typical IMC-AC controller will include one HC-PI/O board, one or more HC-IOX boards, and one or more HC-CI/O boards. The HC-RB4-SCRI Main Relay board, which provides a portion of the input conditioning circuit as well as terminals for connecting input and output signal field wires, is connected to the HC-PI/O board.

1.2 OPERATIONAL OVERVIEW

The car controller has four primary functions. Figure 1.6 shows these functional blocks and lists the circuit boards associated with each function.

FIGURE 1.6 Car Controller Functional Layout



Car Operation Control (COC) - This functional block covers logical car operation such as operation of the doors and response to hall and car call demands. This block also covers special operations such as Inspection/Access, Fire Service, etc. Additional special operations are provided as required per specifications.

Car Communication Control (CCC) - This functional block coordinates the flow of information between the car controller and other equipment, such as terminals, modems, printers, AC Drive and Group Supervisor.

Car Motion Control (CMC) - This functional block is responsible for three different tasks: (1) developing an idealized speed pattern; (2) ensuring that the elevator follows the idealized speed pattern command by producing the necessary outputs to the rotating equipment; (3) independently monitoring the car velocity during Normal operation, Inspection operation, and during car slowdown at terminal landings. It stops the car if a failure or unsafe condition is detected.

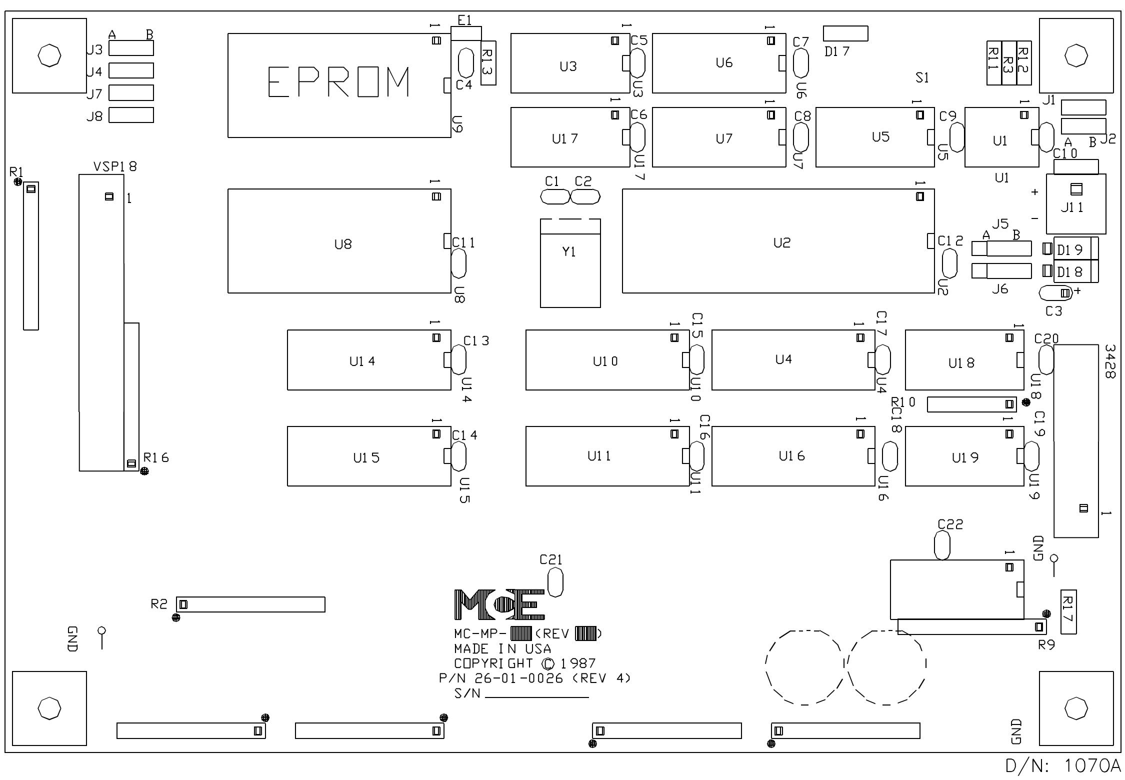
Car Power Control (CPC) - This functional block generates the necessary voltages for the motor and brake. The AC Flux Vector Drive ensures that the elevator follows the idealized speed pattern commanded by producing the necessary output to the operating equipment.

1.2.1 CAR OPERATION CONTROL (COC) COMPONENTS

Car Operation Control involves such things as door operation, response to hall and car calls, plus special operations such as Inspection/Access and Fire Service. The following boards are involved in the COC functions:

- MC-MP-1ES or MC-MP2, Main Processor Board
- HC-RB4-SCRI, Main Relay Board
- HC-PI/O, Power Input/Output Board
- HC-PIX, Position Indicator Board
- HC-CI/O, Call Input Output Board
- HC-IOX, Input/Output Expander Board
- HC-I40, Input/output Expander Board
- MC-NC, Neuron control Board

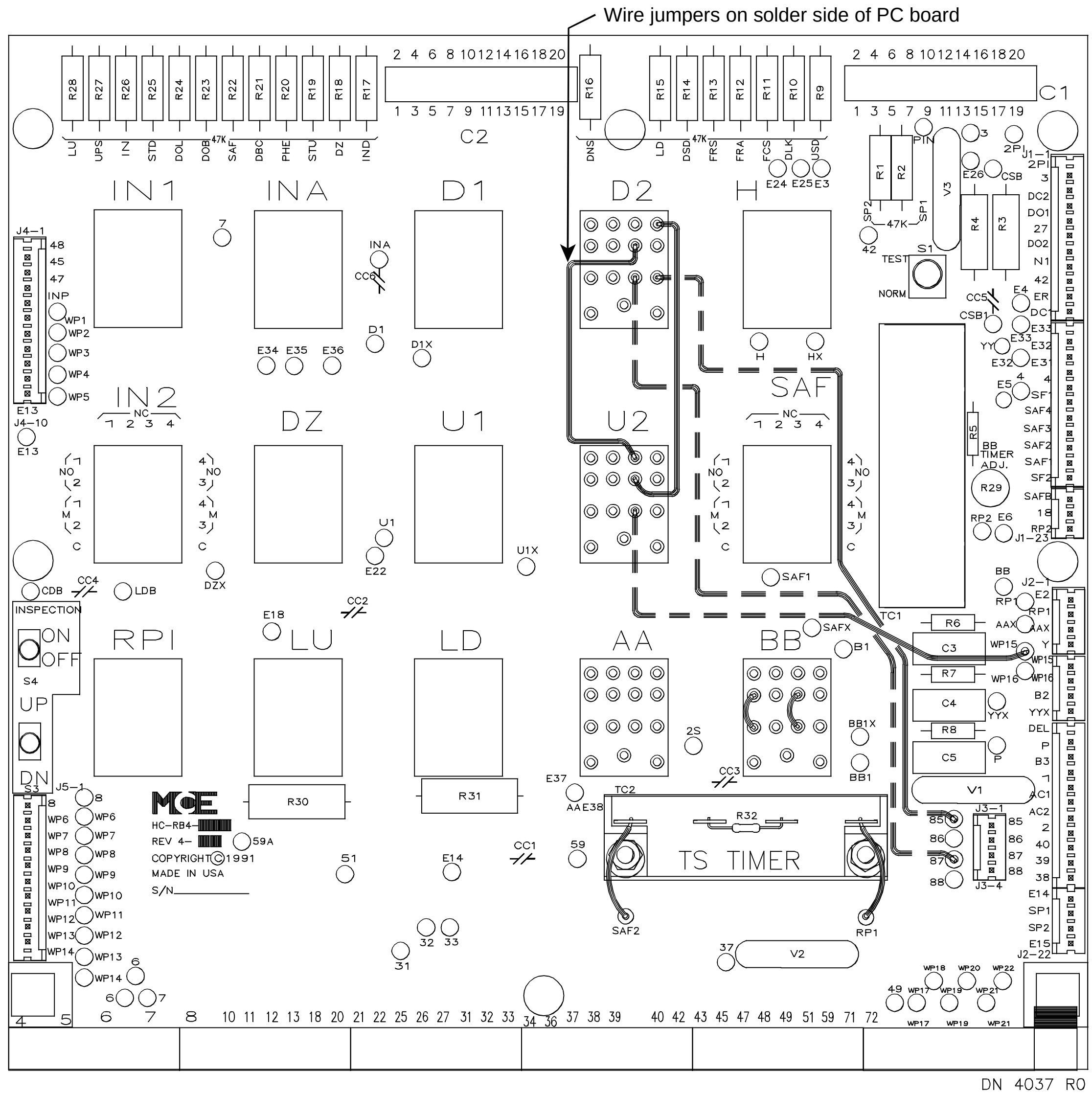
FIGURE 1.7 MC-MP-1ES Main Processor Board



MC-MP-1ES or MC-MP2 Main Processor Board - The Main Processor board is located within the Computer Swing Panel and is responsible for Car Operation Control. This board is also responsible for the Onboard Diagnostics that provide interactive communication with the elevator mechanic. The board contains the alphanumeric display and all the LEDs, switches, and buttons found on the front of the Computer Swing Panel.

MAIN PROCESSOR SUBSYSTEM - This subsystem consists of many different input/output circuit boards. The layout and arrangement of these boards may vary from controller to controller. The following boards are typically included:

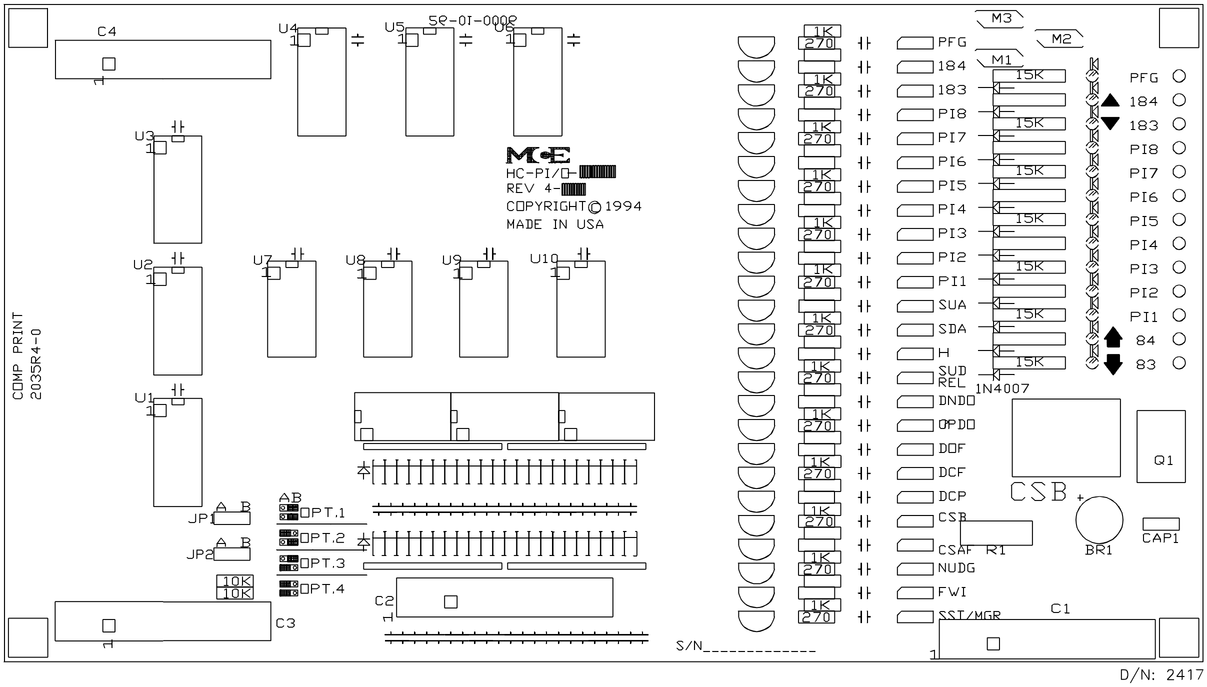
FIGURE 1.8 HC-RB4-SCRI Main Relay Board



HC-RB4-SCRI Main Relay Board - This board satisfies many of the code requirements for relay contact redundancy and for normal terminal stopping devices. It also provides the necessary circuitry for running the car on Inspection or Access operation. This board, in conjunction with the HC-PI/O board, comprises the high voltage interface between the Main Processor and the individual car logic functions such as door operation, direction outputs, direction sensing, main safety circuits, leveling circuitry, etc.

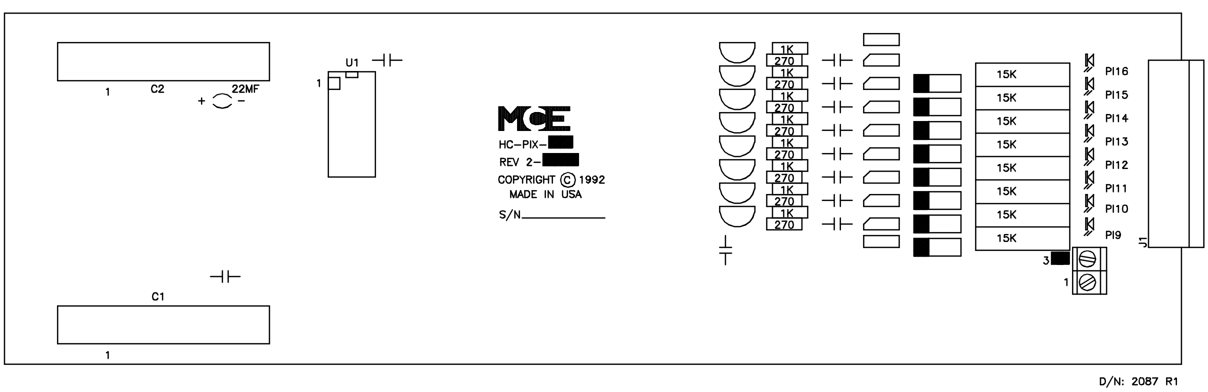
There are typically 13 four-pole relays, plus terminals at the bottom of the board for field wiring. Test pads surround each relay for ease of troubleshooting. This board includes the INSPECTION ON/OFF switch, the inspection car movement UP/DN switch and the TEST/NORM switch.

FIGURE 1.9 HC-PI/O Power Input/Output Board



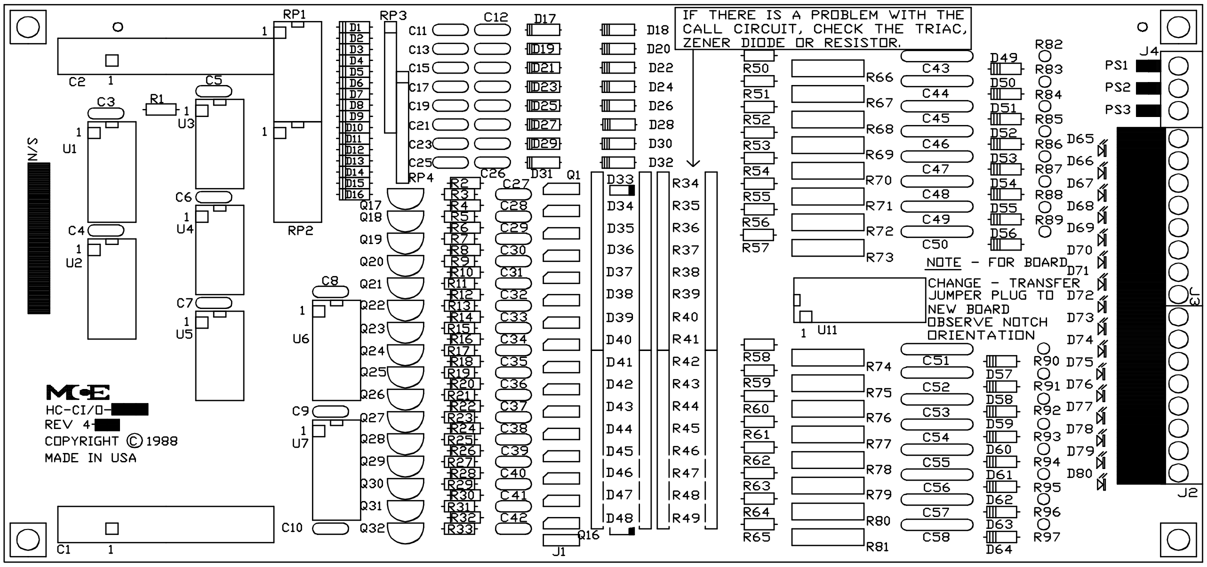
HC-PI/O Power Input/Output Board - This board is typically located behind the Computer Swing Panel. The main function of this board is to receive inputs and provide outputs for individual car functions such as door operation, limit switches, direction sensing, position indicators, direction arrows and arrival gongs.

FIGURE 1.10 HC-PIX Position Indicator Expander Board



HC-PIX Position Indicator Expander Board - This board provides additional PI outputs which are needed if there are more than eight floors in the building.

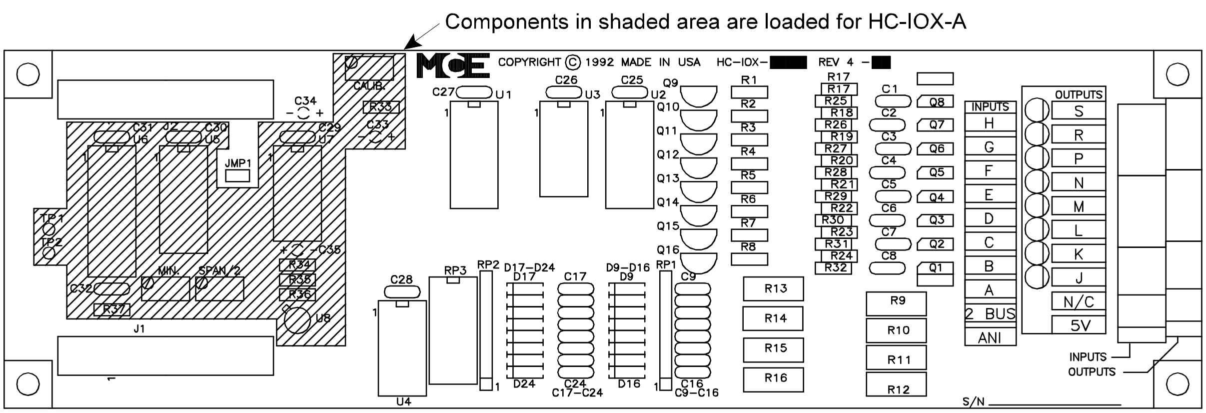
FIGURE 1.11 HC-CI/O Call Input/Output Board



DN 1071 R1

HC-CI/O Call Input/Output Board - This board processes hall call and car call inputs, call acknowledgment outputs, and displays the status of each call.

FIGURE 1.12 HC-IOX-A Input/Output Expander Board



DN 2088 R2

HC-IOX-A Input/Output Expander Board - This is a multipurpose input/output board. Some installations have the HC-I4O board instead. Its functions are similar to the HC-IOX and HC-IOX-A.

HC-RD Rear Door Board - This board provides the necessary logic required when an additional independent rear door is present (board not pictured).

MC-NC Neuron Controller Board (optional) - Control board for the SmartLINK for Car Operating Panel option (board not pictured). See Appendix L, *Option* SmartLINK for Car Operating Panel if applicable.

MC-NIO Neuron Input/Output Board (optional) (board not pictured) - Located in the car, the MC-NIO board transfers COP signal values to and from the car controller node as network packets. COP signals include call buttons, door open button, door close button, call lockouts, etc. See Appendix L, *Option* SmartLINK for Car Operating Panel if applicable.

1.2.2 CAR OPERATION CONTROL (COC) INPUTS AND OUTPUTS

COC INPUTS - This section describes the main signals received by the MC-MP-1ES or MC-MP2 Main Processor board.

The COC module is responsible for the “logical operation” of the elevator control system. For example, the COC may decide that the car should travel from one floor to another in response to a car call, but leaves the “speed control” (acceleration, deceleration, etc.) to the CMC module. The fundamental inputs that are required for the logical control of the elevator come to the Main Processor board through two boards: the HC-PI/O board (power input/output board) and the HC-CI/O board (call input/output board). Each IMC-AC control system has one HC-PI/O board, and as many HC-CI/O boards as are required to accommodate the number of calls in the particular installation. Additional “miscellaneous” inputs come to the Main Processor board through the HC-IOX or HC-I4O board (I/O expansion board, also as many as needed).

Primary Power inputs - HC-PI/O board

- **Door signals** - The HC-PI/O board receives the door-related signals through the main relay board (HC-RB4-SCRI). The door related signals include the door reopening devices (photo eye, safe edge), car operating panel buttons (door open button, door close button), and the door position contacts (door open limit, door lock).

- **Landing system signals** - The HC-PI/O board receives some of the signals generated by the landing system through the main relay board (HC-RB4-SCRI). The landing system signals read by the COC module are the door zone, level up and level down signals.

- **Operational mode signals** - The HC-PI/O board receives a few of the operational and safety mode signals through the main relay board (HC-RB4-SCRI). These signals include the safety string status, the inspection operation status, and the independent service status. Additionally, some of the fire service signals are also received by the HC-PI/O board through the relay board (fire sensors, in-car fire service switch).

- **Direction sensing inputs** - Two direction sensing inputs (up sense and down sense) are read by the COC processor (again through the HC-PI/O and HC-RB4-SCRI) and are used to process the car position indicator logic and motor protection timing logic.

Call inputs (car call and hall call) - HC-CI/O board

The call buttons and call indicators are wired to the control system and read by the COC Processor through the call board(s) (HC-CI/O and/or MC-NC). The connection to the call board is a single wire connection for both the button and the indicator (the terminal acts as both an input and output terminal). In multi-car group arrangements, “system” hall calls are wired to the Group Supervisor control panel (also to HC-CI/O boards), but “swing car” hall calls are wired to the call board of the individual car controller, along with the car calls.

COC OUTPUTS - This section describes the main signals generated by the Main Processor board.

The fundamental outputs that are required for the logical control of the elevator emerge from the Main Processor board through the same two boards described above: the HC-PI/O board (power input/output board) and the HC-CI/O board (call input/output board). Additional “miscellaneous” outputs emerge from the Main Processor board through the HC-IOX or HC-I4O

I/O Expansion boards (as many as are needed) and some “specialty” output boards which may be used to drive specific devices.

Primary Power Outputs - HC-PI/O board

- **Position indicators, direction arrows, and arrival fixture signals** - Eight position indicator outputs are provided on the HC-PI/O board. Should the particular installation have more than eight landings, additional position indicator outputs are provided through the use of HC-PIX boards (position indicator expansion boards). The up and down direction arrow indicators and the up and down arrival lantern outputs are also provided on the HC-PI/O board. The output terminals for these indicator outputs are located on the HC-PI/O board.

- **Fire service operation signals** - Two outputs associated with fire service operation are generated on the HC-PI/O board, and are routed through the main relay board. The fire warning indicator output generates the visual/audible signal in the elevator during a fire phase I recall, and the in-car stop switch bypass output is used for rendering the in-car stop switch inoperative, also during a fire phase I recall.

- **Door control signals** - Four signals are generated by the COC module to control the operation of the doors. These outputs are generated on the HC-PI/O board, but are routed through the main relay board for connection to external relays. These signals are the door open function, door close function, door close power, and nudging outputs. Should the installation have a floor with both front and rear openings, a rear door logic board (HC-RD) is used to generate the corresponding outputs for the rear door.

- **Car movement signals** - Four signals are generated by the COC module to perform the “logical control” of car movement. In hydraulic applications these signals directly control the valve solenoids to cause the car to move up and down and at high and low speeds. In IMC applications, however, these outputs are read by the CMC module, which creates the proper speed profile for the type of run “requested” through these outputs. The four signals generated by the COC are up direction, down direction, high speed, and relevel speed. As an example, a high speed run in the up direction would be “requested” by the COC by generating the high speed and up direction outputs.

Call outputs (car call and hall call) - HC-CI/O board

The call buttons and indicators are connected to the control system through the HC-CI/O call board(s) (see NOTE). Outputs to the indicators are generated by the COC, through the HC-CI/O board(s). The connection to the call board is a single wire connection for both the indicator and the call button (the terminal acts as both an input and output terminal). In multi-car group arrangements, “system” hall calls are wired to the Group Supervisor, but “swing car” hall calls are wired to the call board of the individual car controller, along with the car calls.

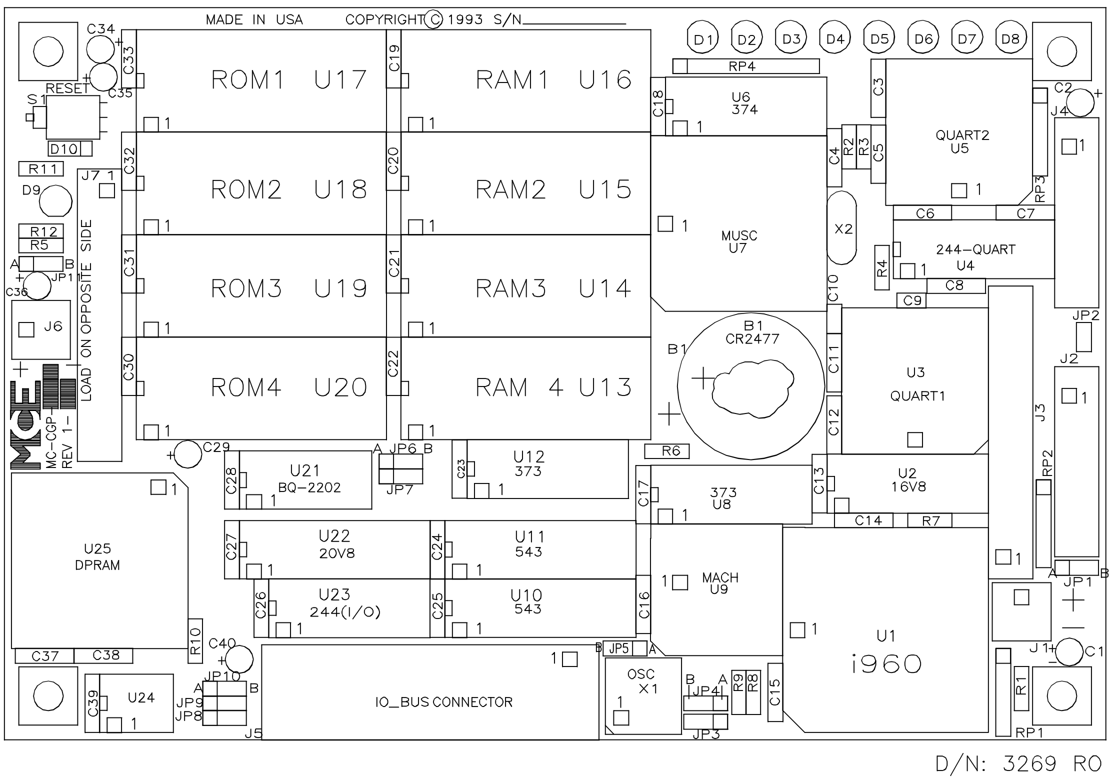
NOTE: With the optional SmartLink Serial Communication for Car Operating Panel (COP), the call buttons and indicators are wired to the MC-NIO board in the COP and the signals are sent via serial link to and from the MC-NC board in the controller cabinet (see Appendix L for more information).

1.2.3 CAR COMMUNICATION CONTROL (CCC) COMPONENTS

The flow of information between the car controller and other equipment such as CRT terminals, modems, printers or Group Supervisor is controlled by the following boards:

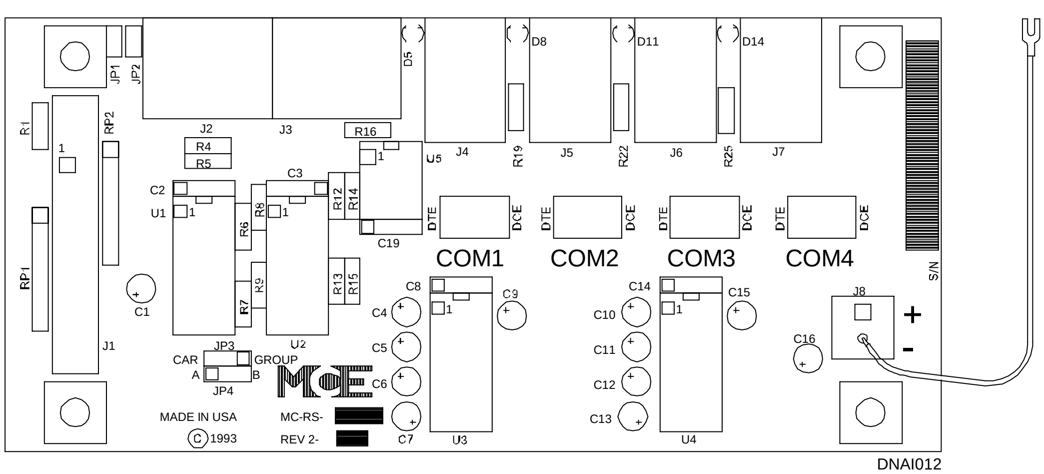
- MC-CGP-4(8), Communication Processor Board
- MC-RS, Communication Interface Board

FIGURE 1.13 MC-CGP-4(8) Communication Processor Board



MC-CGP-4(8) Communication Processor Board - This board contains a very powerful 32-bit embedded RISC microcontroller, and is sandwiched between the MC-MP-1ES or MC-MP2 and IMC-DDP-x boards. The primary function of this board is to co-ordinate the flow of information between the car controller and other equipment and peripherals.

FIGURE 1.14 MC-RS Communication Interface Board



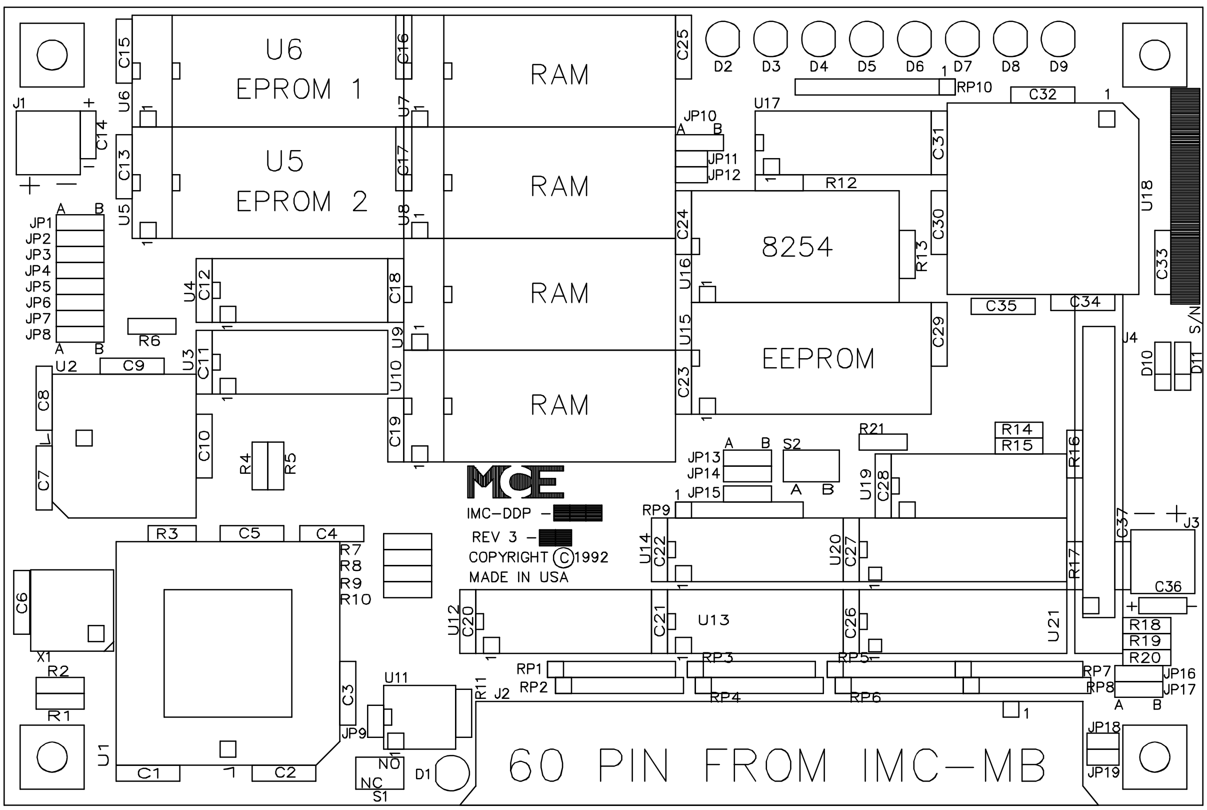
MC-RS Communication Interface Board - This board provides a high-speed RS-422 serial link between the individual car controller and the M3 Group Supervisor. It also provides four industry standard RS-232C serial ports to interface the car controller with a standard computer or data terminal, such as a printer, modem or CRT terminal. Communication port four (COM 4) is a dedicated port for AC Drive serial communication.

1.2.4 CAR MOTION CONTROL (CMC) COMPONENTS

Car Motion Control is comprised of three tasks: (1) developing the idealized speed pattern; (2) ensuring that the elevator follows the idealized speed pattern by producing the necessary outputs to the rotating equipment; (3) monitoring the car velocity during Normal operation, Inspection operation and during slowdown at terminal landings and stopping the car if a failure or unsafe condition is detected. The following boards are involved in the CMC functions:

- IMC-DDP-x, Digital Drive Processor Board
- IMC-DAS, Data Acquisition System Board
- IMC-DIO Digital Input/Output Board
- IMC-MB, Mother Board
- SCR-RI, Relay Interface Board

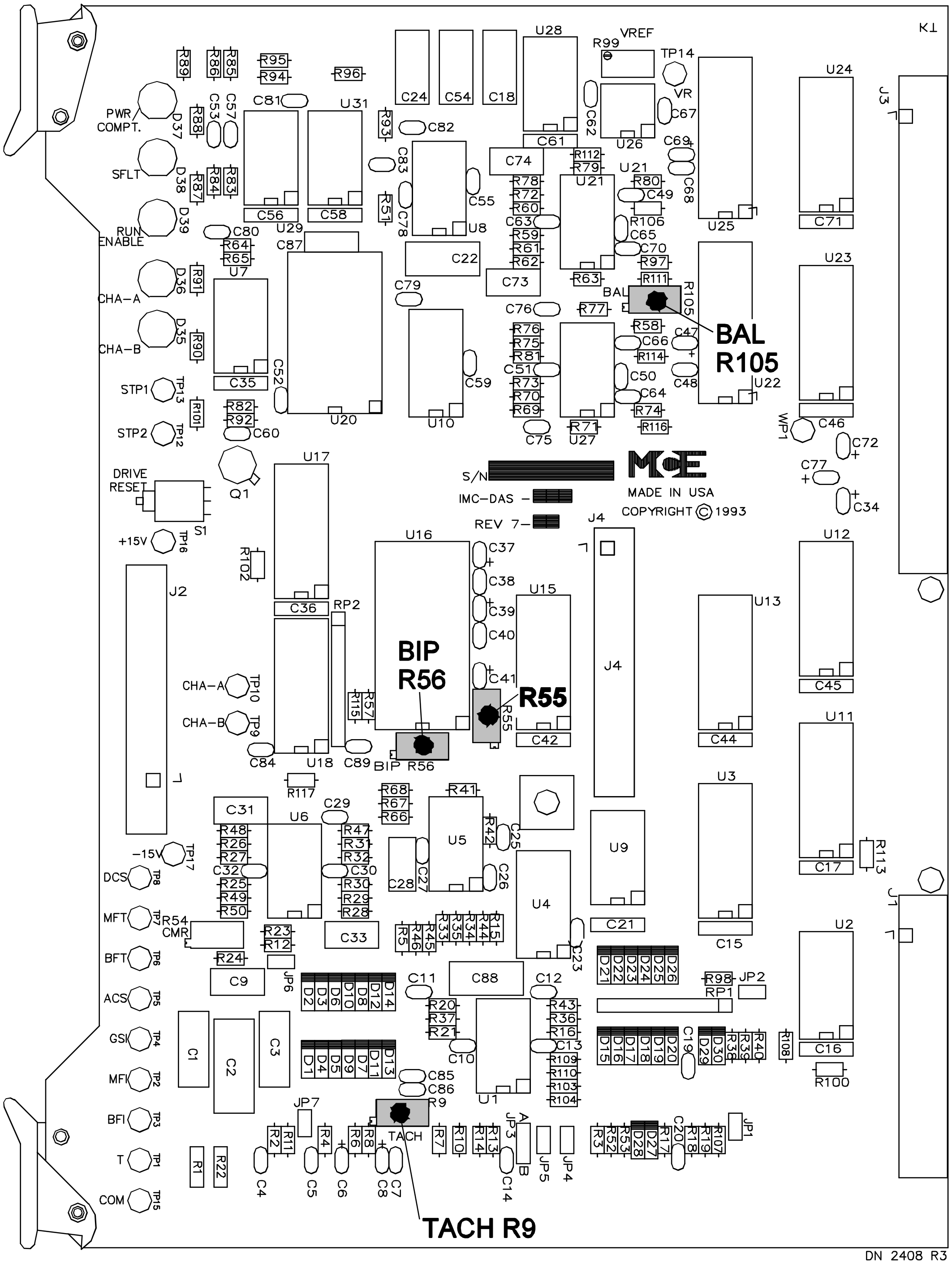
FIGURE 1.15 IMC-DDP-x Digital Drive Processor Board



D/N: 1279 R2

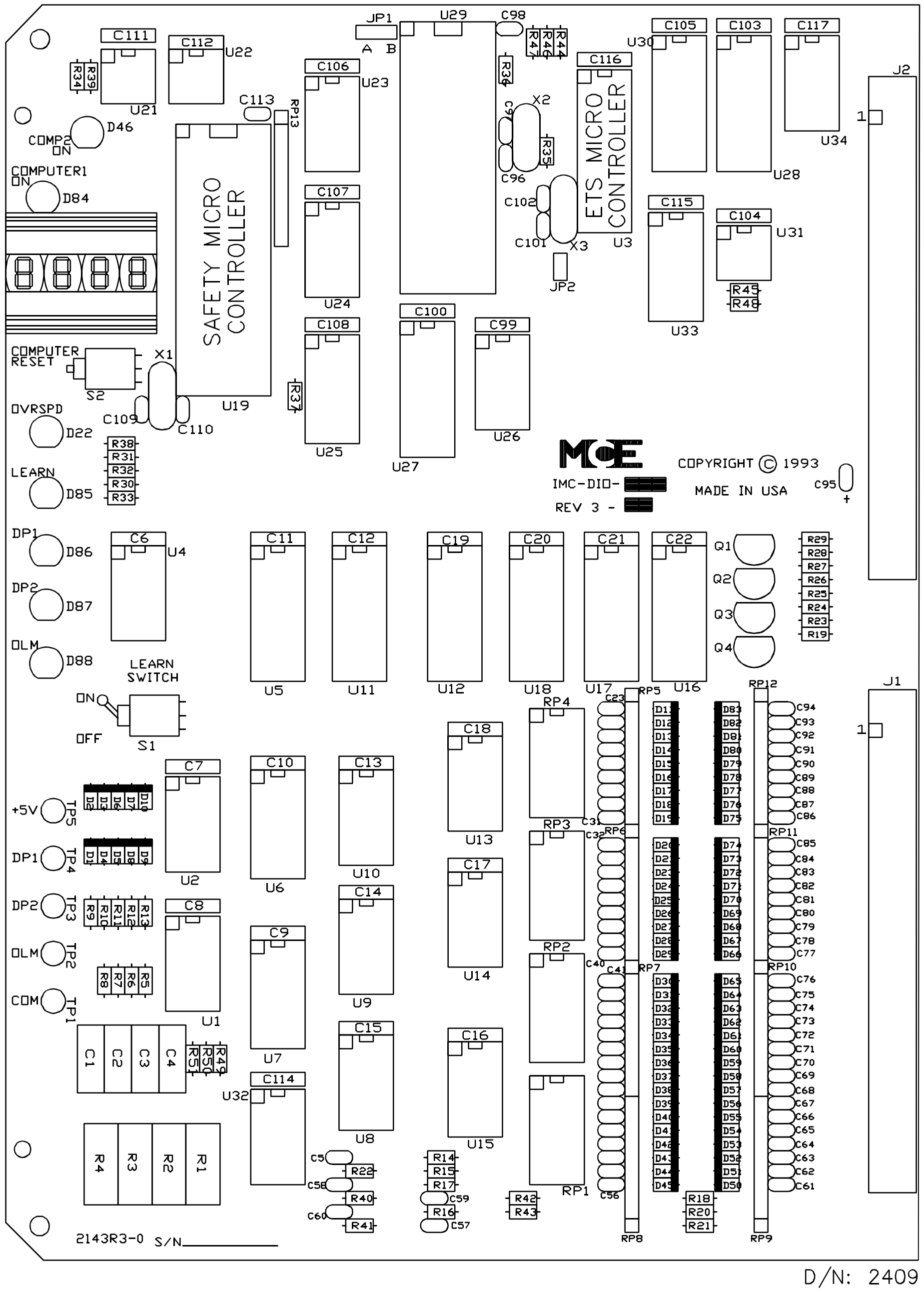
IMC-DDP-x Digital Drive Processor Board - The Digital Drive Processor board is located within the Computer Swing Panel and performs three specific tasks: (1) it uses the signals produced by the hoistway transducers to create a speed pattern; (2) it generates speed command signals for the AC Drive using the pattern and feedback signals from the rotating equipment so that the car speed closely matches the ideal speed pattern and; (3) it performs some safety functions. This board also contains the LEDs and RESET button seen on the top and back of the Computer Swing Panel.

FIGURE 1.16 IMC-DAS Data Acquisition System Board



IMC-DAS Data Acquisition System Board - Located inside the IMC-SI2 Digital Drive Unit, the IMC-DAS board converts the analog signals to digital data and vice versa to provide an interface between the rotating equipment and the IMC-DDP-x processor. Besides data collection, the IMC-DAS board generates reference signals for power devices located in the drive subsystem. The board contains the following test points: COM, T, BFI, MFI, GSI, ACS, BFT, MFT, DCS, CHA-B CHA-A, STP2 and STP1 . It also contains the following LED indicators: PWR/COMPT, SFLT, RUN ENABLE, CHA-A, CHA-B, and the DRIVE RESET button (see Troubleshooting section for details about these test points and LEDs). Note: Test Points T, MFI, GSI, MFT, CHA-A and CHA-B are not used for IMC-AC controllers.

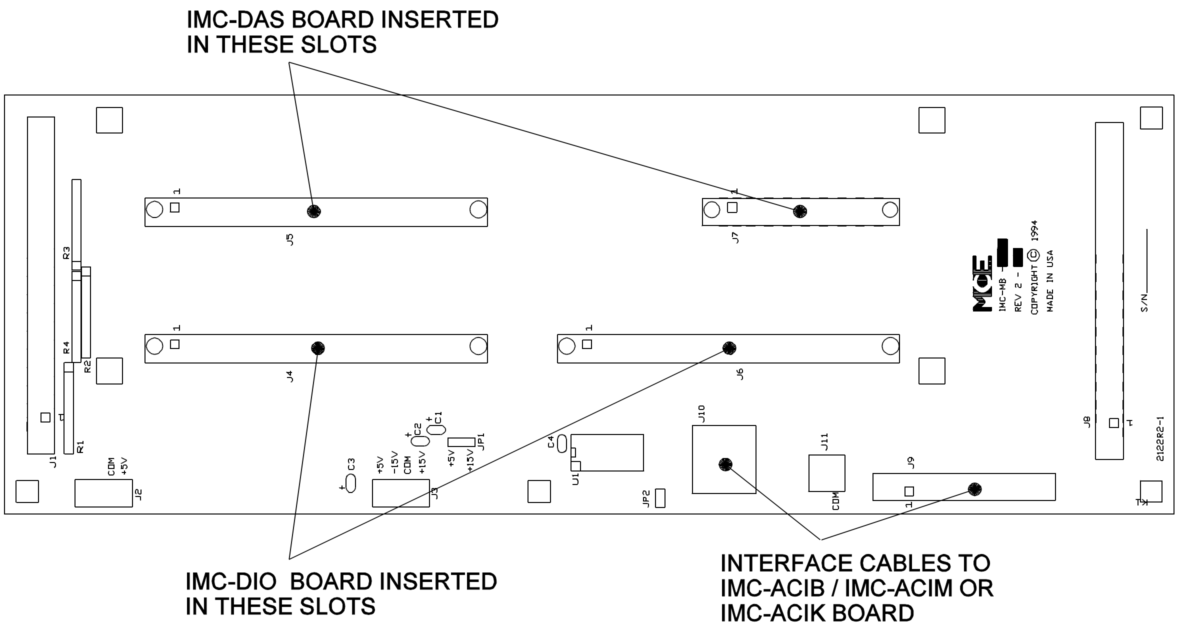
FIGURE 1.17 IMC-DIO Digital Input/Output Board



IMC-DIO Digital Input/Output Board - This board, located inside the IMC-SI2 Digital Drive Unit next to the IMC-DAS board, provides the inputs and outputs to the Digital Drive Processor. It also includes two dedicated safety processors. The first safety processor independently performs two major safety functions: (1) it monitors the car speed during normal operation and while on Inspection; (2) it compares learned car speed with actual car speed as the terminal slowdown limit switches are opened. The second safety processor monitors car speed and compares learned car speed with actual car speed as the emergency terminal limit (ETS) switches open. Through this board, the IMC-DDP-x board receives car position information.

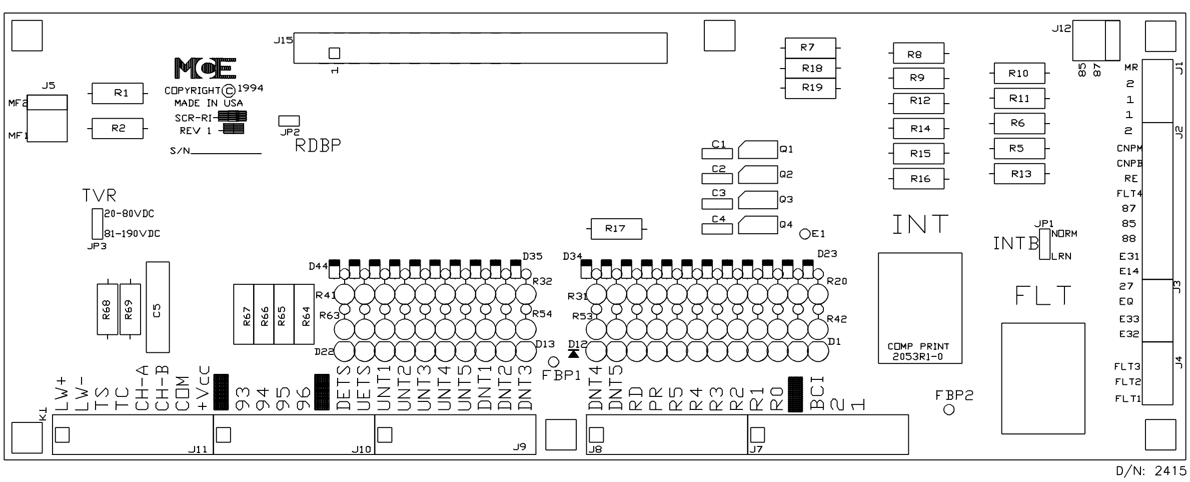
This board has an alphanumeric display which shows the car speed and learn messages. It has the following test points: DP1, DP2, OLM, and COM. There are seven LEDs on this board: COMPUTER1 ON, COMP2 ON, OVRSPD, LEARN, DP1, DP2 and OLM. The IMC-DIO board also contains the LEARN SWITCH and COMPUTER RESET button (refer to the Troubleshooting section for details about these test points and LEDs).

FIGURE 1.18 IMC-MB Mother Board



IMC-MB Mother Board - This board is part of the IMC-SI2 Digital Drive Unit which is mounted on the controller cabinet subplate. The IMC-DAS and IMC-DIO boards plug into this board. Through the Mother board, the IMC-DDP-x passes information to and from the IMC-DAS, IMC-DIO, IMC-GPA-SI, SCR-PRI, SCR-RI, and IMC-ACIB / IMC-ACIM / IMC-ACIK.

FIGURE 1.19 SCR-RI Relay Interface Board



SCR-RI Relay Interface Board - The function of the Relay Interface board is to convert high voltage signals to low voltage signals. This board receives signals from the HC-RB4-SCRI and SCR-PRI Relay boards, the rotating equipment, and the field wiring. It converts these signals from high to low voltage levels so that they can be used by the IMC-DDP-x processor. This Relay Interface board is located below the IMC-SI2 Digital Drive Unit. This board also contains terminals for the binary floor code, position pulser or position encoder, tachometer or velocity encoder, loadweigher, normal terminal switches, and emergency terminal switches. Note: Terminals TS, TC, CH-A, and CH-B are not used for the IMC-AC controller.

1.2.5 CAR MOTION CONTROL (CMC) INPUTS AND OUTPUTS

CMC INPUTS This section describes the main signals received by the IMC-DDP-x Processor board.

- **Quadrature signal** - The IMC-DIO board receives the quadrature signal from the encoder wheel (LS-QUIK-1) or from the hoistway transducer which reads the holes on a perforated steel tape (LS-QUAD-2). The IMC-DIO then sends the position information, which locates the car in the hoistway within 0.1875" (4.7625 mm) accuracy, to the IMC-DDP-x board.

- **OLM signal** - The Outer Leveling Marker (OLM) signal informs the IMC-DDP-x processor that the car is exactly 12" (304.8 mm) from the floor.

- **Terminal switches** - For each terminal landing, up to five terminal switches can be brought to the IMC-DIO board. The safety computer on this board compares the car speed with a reference speed for each terminal switch. In addition, the IMC-DDP-x processor verifies the position of the car at each terminal switch. When it is determined that the car is overspeeding or appears to be at a wrong position when a terminal switch is encountered, the IMC-DDP-x processor discontinues the normal speed pattern and substitutes an alternate pattern that forces the car to rapidly reduce speed and then move at a reduced speed to the next available landing.

- **Car status** - Specific signals, such as direction, high speed, leveling, inspection, etc. are sent to the IMC-DIO board to allow the pattern generator to create the appropriate speed pattern. The pattern information is then sent to the Digital Drive which controls the car's motion.

- **Floor encoding** - When the car stops at a landing, the car top landing system generates and sends, to the IMC-DDP-x processor, a maximum of eight signals that provide the absolute floor number. A parity check is done to verify the floor encoding data.

- **Speed signal** - The raw speed output signal from the AC Drive is connected to the Tachometer (TACH) terminal on the IMC-ACIB / IMC-ACIM / IMC-ACIK board, which supplies this signal to the IMC-DAS board. This signal is then sent to the IMC-DDP-x processor where the signal is compared with the ideal velocity pattern to ensure the proper motion of the car.

- **Brake contact (Optional)** - This input is used by the IMC-DDP-C processor to determine that the brake has lifted. The car will not be allowed to run if the brake has failed to lift.

CMC OUTPUTS This section describes the main signals generated by the IMC-DDP-x Processor board.

- **Speed command signal** -The speed command generated by the IMC-DDP-x processor is sent to the IMC-DAS board. This signal is applied to the AC Drive through the IMC-ACIB / IMC-ACIM / IMC-ACIK board. The main control board in the AC Drive Unit controls the drive output to move the car at the desired speed.

- **Run enable (RE)** - The run enable signal, generated by the IMC-DDP-x processor, allows motion. After receiving a direction signal, with no failure detected in the PT and PM relay contacts and after verifying AC Drive Ready, the IMC-DDP-x processor generates the signals to energize the RE and PT relays on the SCR-PRI board. Enabling these relays provides power to the Drive Unit. This signal also indicates that the drive is ready for motion.

- **Fault (FLT)** - The fault output is generated by the IMC-DDP-x processor, as well as by the two safety processors on the IMC-DIO board. This signal energizes the FLT relay on the SCR-RI board. The output is enabled during normal operation, thereby picking the FLT relay. When the IMC-DDP-x or IMC-DIO processors detect a failure in the drive system or unsafe operation such as overspeed, the fault output is disabled, thereby de-energizing the FLT relay. Dropping the FLT relay will de-energize the main safety relays (SAF, SAFB, SAFM, etc.), unless the FLT relay has been bypassed. The IMC-DDP-x automatically restores the fault output when the fault condition no longer exists, thereby resetting the FLT relay. However, if four faults occur within 7 normal runs, or if a single Emergency Terminal Switch fault (ETS) is detected, the fault output will not be automatically restored. The DRIVE RESET button on the IMC-DAS board must be pressed to clear the fault.

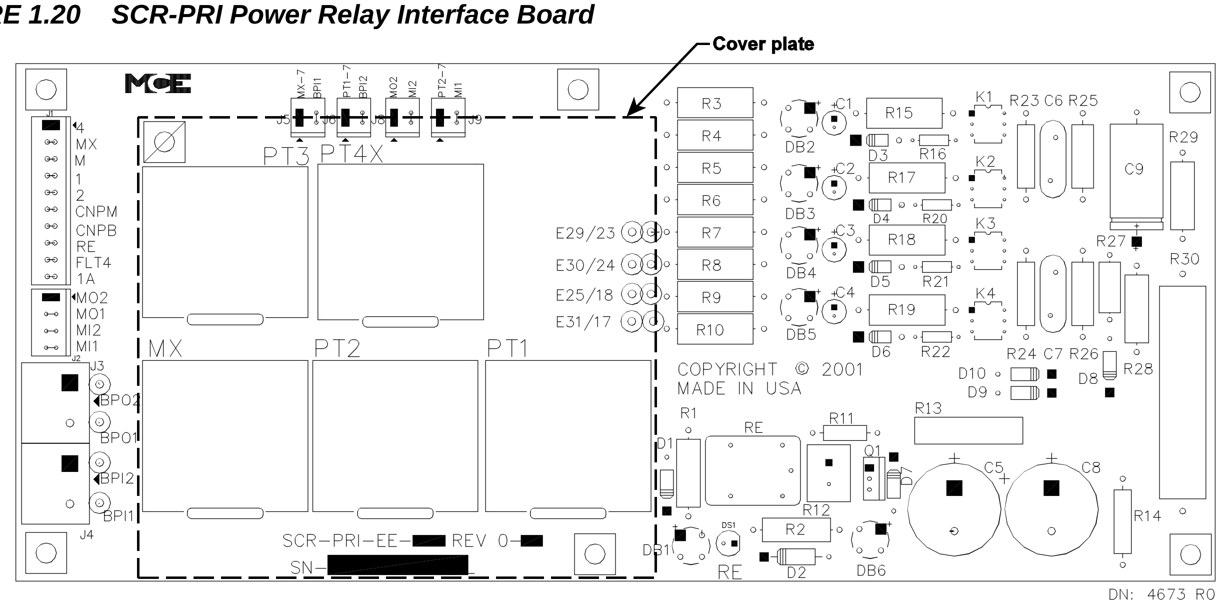
- **Intermediate speed (INT)** - The IMC-DDP-x board generates this signal to indicate that the car is traveling at a speed that is greater than MINT, Leveling Inhibit Speed. This output is used by the Car Operation Control (COC) to make logical decisions regarding door operation and the stopping of the car at a landing. MINT is adjustable. The INT output energizes the INT relay which disables the LU and LD relays.

1.2.6 CAR POWER CONTROL (CPC) COMPONENTS

The voltages required by the motor and brake are generated by the Car Power Control components, including:

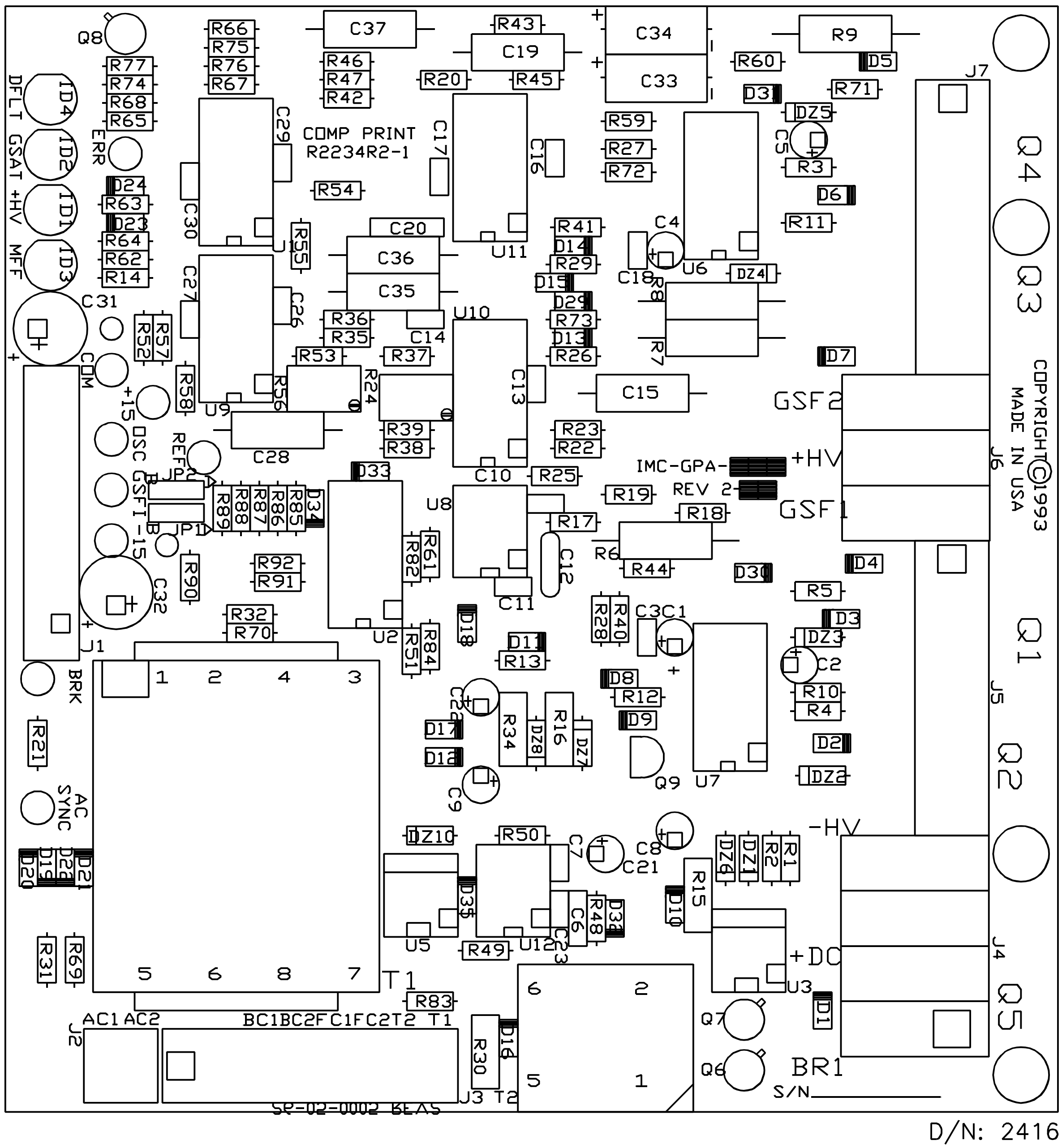
- IMC-GPA-SI, General Power Adapter Board
- SCR-PRI, Power Relay Interface Board
- IMC-ACIB / IMC-ACIM / IMC-ACIK, AC Flux Vector Drive Interface Board
- AC Flux Vector Drive

FIGURE 1.20 SCR-PRI Power Relay Interface Board



SCR-PRI Power Relay Interface Board - This board provides power to the brake and PM contactors if direction and RE (run enable) signals are present. Any failure in the drive will disable relays PT1, PT2, PT3 and MX on this board. The IMC-DDP-x processor does a redundancy check on each of these relays.

FIGURE 1.21 IMC-GPA-SI General Power Adapter Board



IMC-GPA-SI General Power Adapter - This board is mounted under the cover of the Digital Drive Unit. It converts the brake command signal from the IMC-DDP-x to a high voltage signal for the rotating equipment. The IMC-GPA-SI also processes the feedback current from the brake coil and sends it to the IMC-DDP-x board. The DRIVE FAULT LED shows through the Digital Drive Unit cover.

IMC-ACIB / IMC-ACIM / IMC-ACIK AC Flux Vector Drive Interface board - The IMC-ACIB board is used with the Baldor drive, the IMC-ACIM board is used with the MagneTek drive and the IMC-ACIK board is used with the TORQMAX drive. This board provides the interface between the IMC controller and AC Flux Vector Drive. It receives the 24 volt status signals from the AC Flux Vector Drive and converts them to 5 volt signals used for IMC logic. It gives the run enable signals and command pattern to the AC Flux Vector Drive.

FIGURE 1.22 IMC-ACIB AC Flux Vector Drive Interface Board

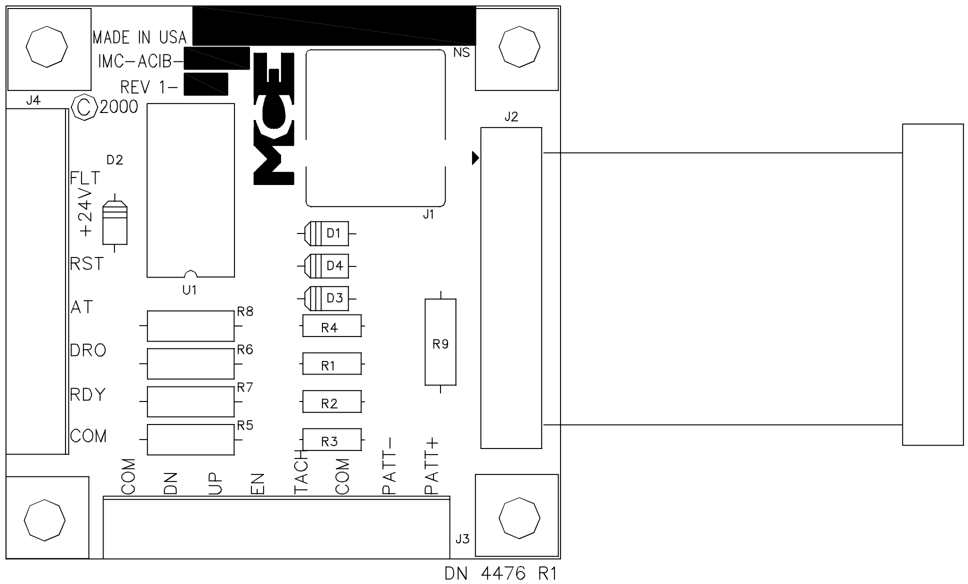


FIGURE 1.23 IMC-ACIM AC Flux Vector Drive Interface Board

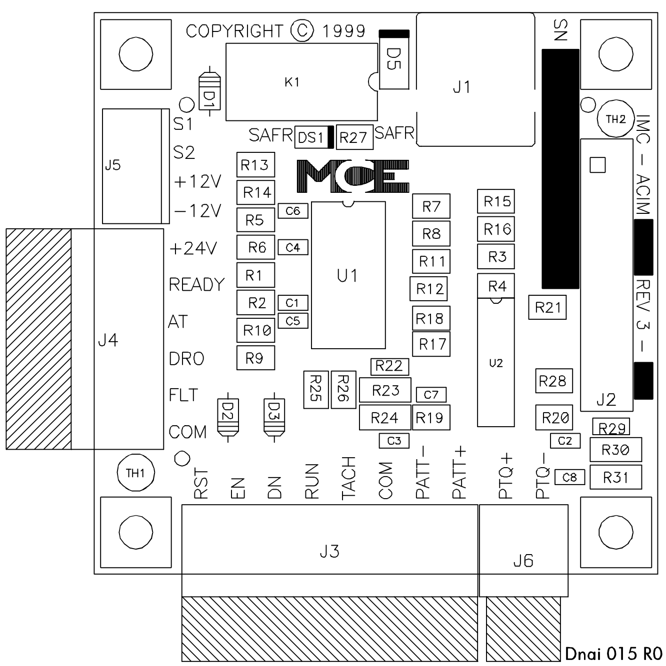
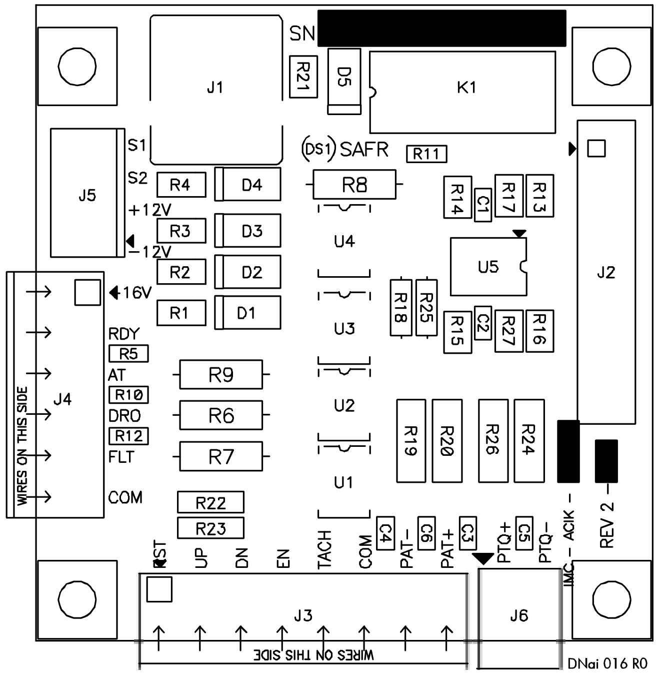


FIGURE 1.24 IMC-ACIK AC Flux Vector Drive Interface Board



1.2.7 CAR POWER CONTROL (CPC) INPUTS AND OUTPUTS

Car power control applies AC voltage to the hoist motor and DC voltage to the brake. The components that supply power to the AC motor are located inside the AC drive. The components for supplying power to the brake are located inside the IMC-SI2 Digital Drive Unit.

COC INPUTS

- **Control signals** - Control signals that originate in the IMC-DDP-x processor are routed to the AC Flux Vector Drive and IMC-SI2 via the IMC-ACIB / IMC-ACIM / IMC-ACIK, IMC-MB, IMC-DIO, IMC-DAS, SCR-RI, SCR-PRI and IMC-GPA boards. Main Processor board control signals are routed through the HC-PI/O, HC-RB4-SCRI, SCR-RI, IMC-DIO and SCR-PRI boards.

- **AC Power** - AC power is applied to terminals AC1 and AC2 of the IMC-SI2 Unit. The SCR-PRI board routes AC power to the IMC-SI2 Unit for the brake field supply. The SCR-PRI also routes power to the PM1 and PM2 contactors that connect the motor stator circuit to its source of voltage (AC Drive).

Sequence of Operation - When demand for motion is placed into the system, the Run Enable (RE) relay on the SCR-PRI board will prepare the potential relays PT1, PT2 and PT3 to engage. The direction signal supplied by the HC-RB4-SCRI board completes the circuit to pick up the potential relays.

The subsequent picking of contactors PM1 and PM2 is monitored via auxiliary contacts that provide voltage to relay MX. Finally relays MX and PT1 provide AC voltage to the IMC-SI2 drive to allow the brake to pick. The detection of brake current, by the IMC-DDP-x, allows the pattern generator to begin the speed profile output.

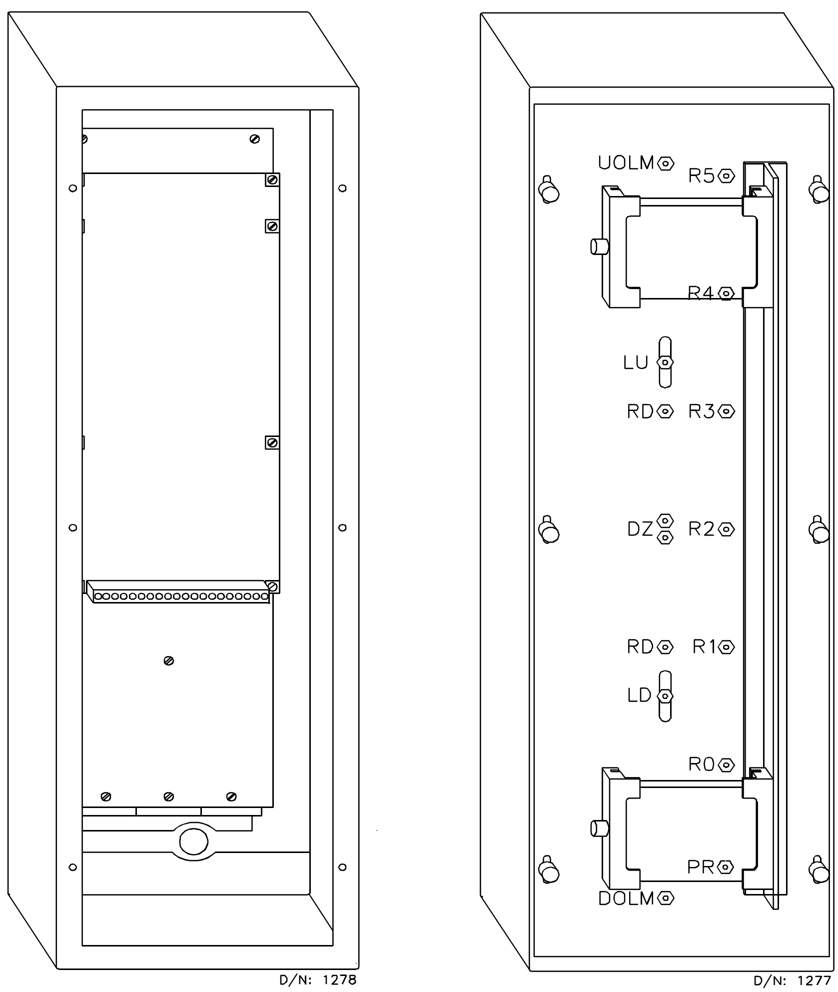
Once the Car arrives at the target floor, relays PT1, PT2, PT3, MX, PM1 and PM2 remain energized for one full second. This is to allow the power components time to phase off all voltage and current prior to opening of any contacts.

1.3 LS-QUAD-2 LANDING SYSTEM

The LS-QUAD-2 Landing System includes the following:

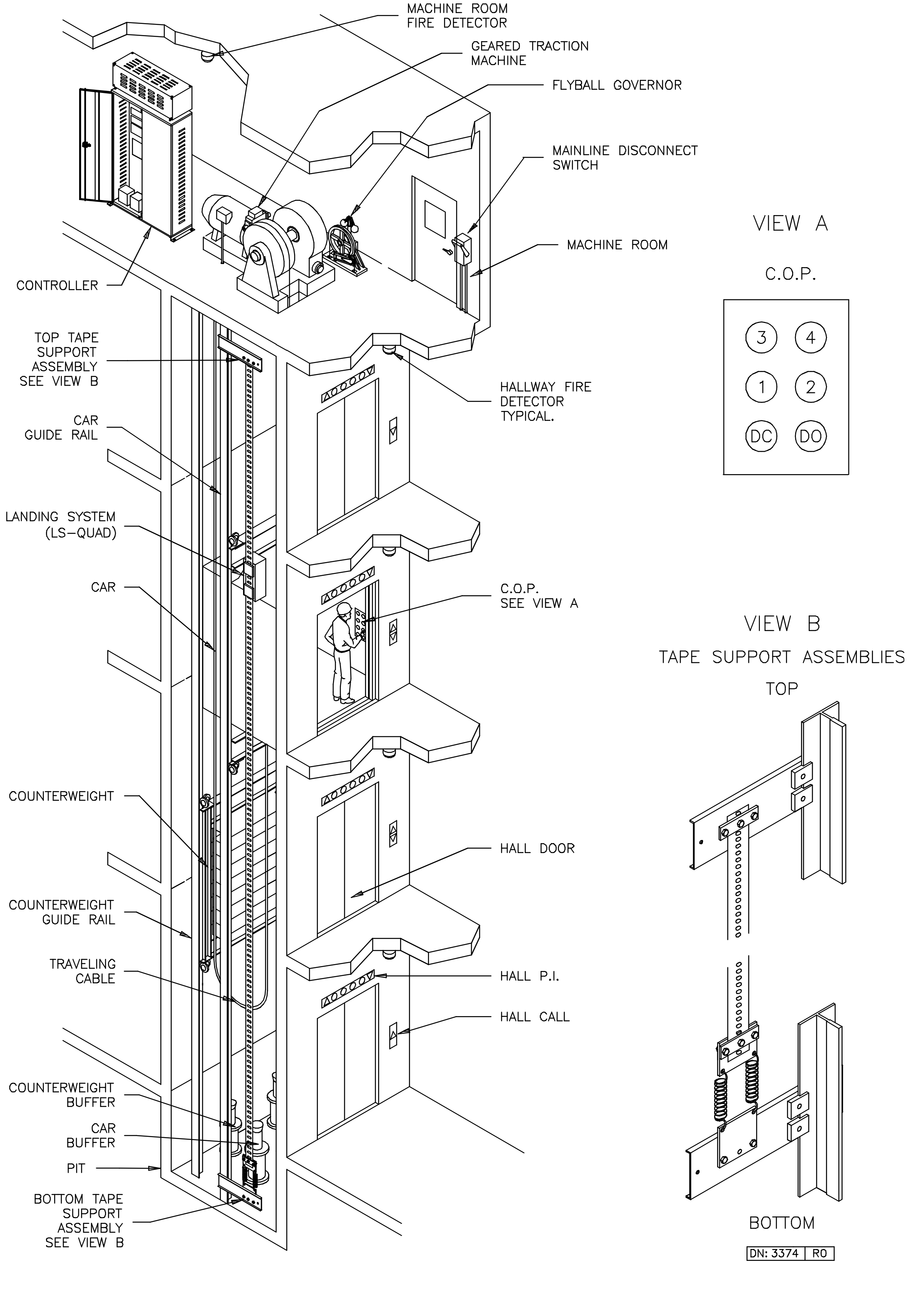
- Two sets of tape guides that hold the perforated steel tape precisely with respect to the control box.
- A pair of optical transducers (DP1 and DP2) that provide a quadrature signal for car position.
- Leveling (LU and LD), Door Zone (DZ) and the Outer Leveling Marker (OLM) using magnetic proximity sensors.
- Magnetic proximity sensors for absolute floor encoding (RD, PR, R0, R1, R2, R3, R4 and R5).
- A circuit board (HC-DFLS) to process the sensor signals to be sent to the elevator controller. All sensors have indicators on this circuit board. The quadrature signals and Outer Leveling Markers (OLM) are 50VDC; all other signals are 115VAC.

FIGURE 1.25 LS-QUAD-2 Car Top Control Box (Front and Back View)



The LS-QUAD-2 Landing System Control Box is designed to be mounted on the car top. Figure 1.26 shows the position of the steel tape and LS-QUAD-2 Landing System Control Box.

FIGURE 1.26 Elevator with LS-QUAD-2 Landing System



1.4 LS-QUIK LANDING SYSTEM

The LS-QUIK Landing System Control Box (Figure 1.27) is designed to be mounted on the car top and contains the following parts:

- Leveling (LU, LD) and Door Zone (DZ) optical sensors.
- Optical sensors for absolute floor position encoding (PR, R0, R1, R2, R3, R4, R5).
- A circuit board (HC-DFQ) to process the sensor signals to be sent to the elevator controller. All optical sensors have indicators on this circuit board. The quadrature signals and Outer Leveling Markers (OLM) are 50VDC; all other signals are 115 VAC.
- An encoder and follower wheel which provide a quadrature signal for car position.

FIGURE 1.27 LS-QUIK Landing System

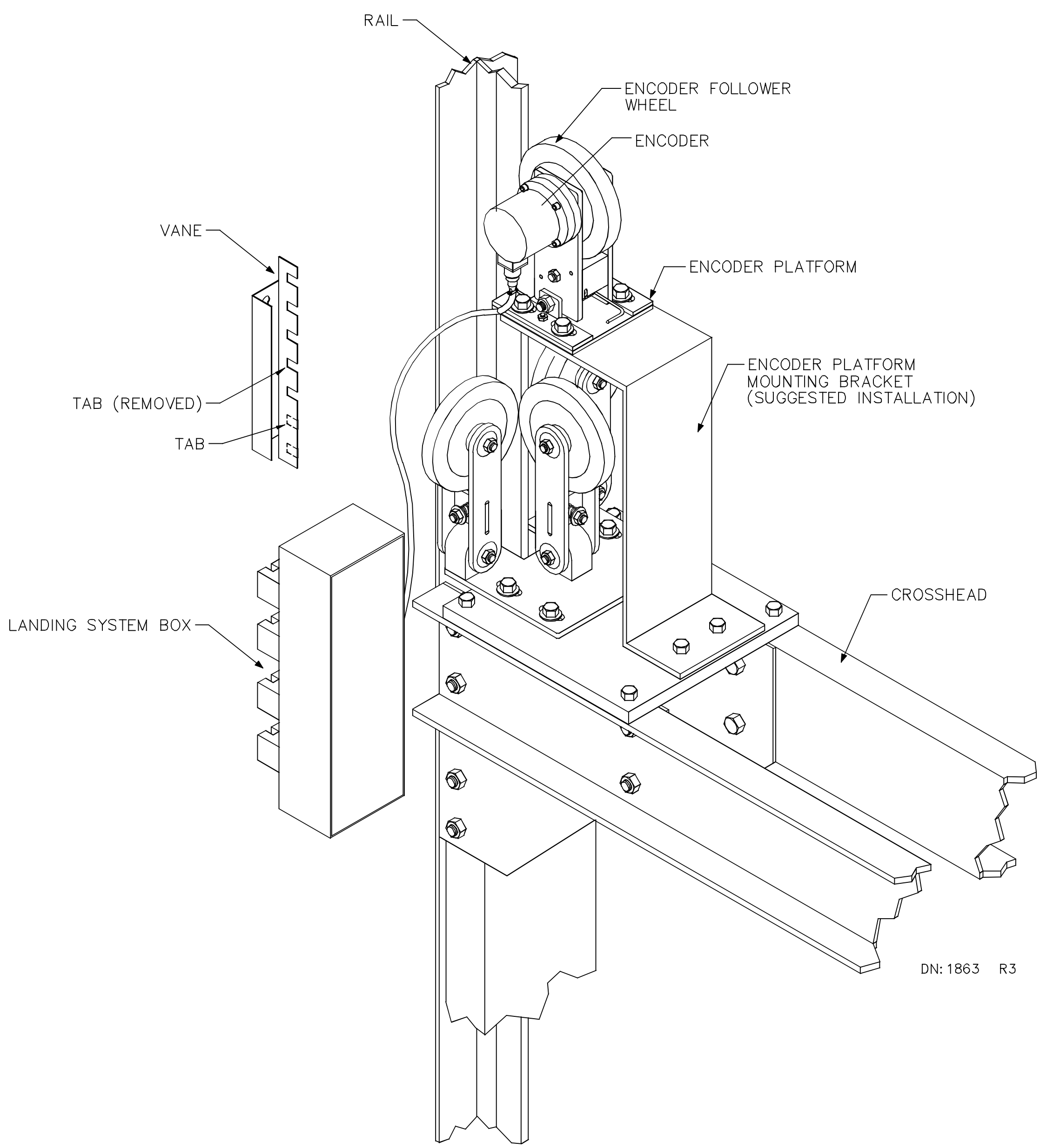
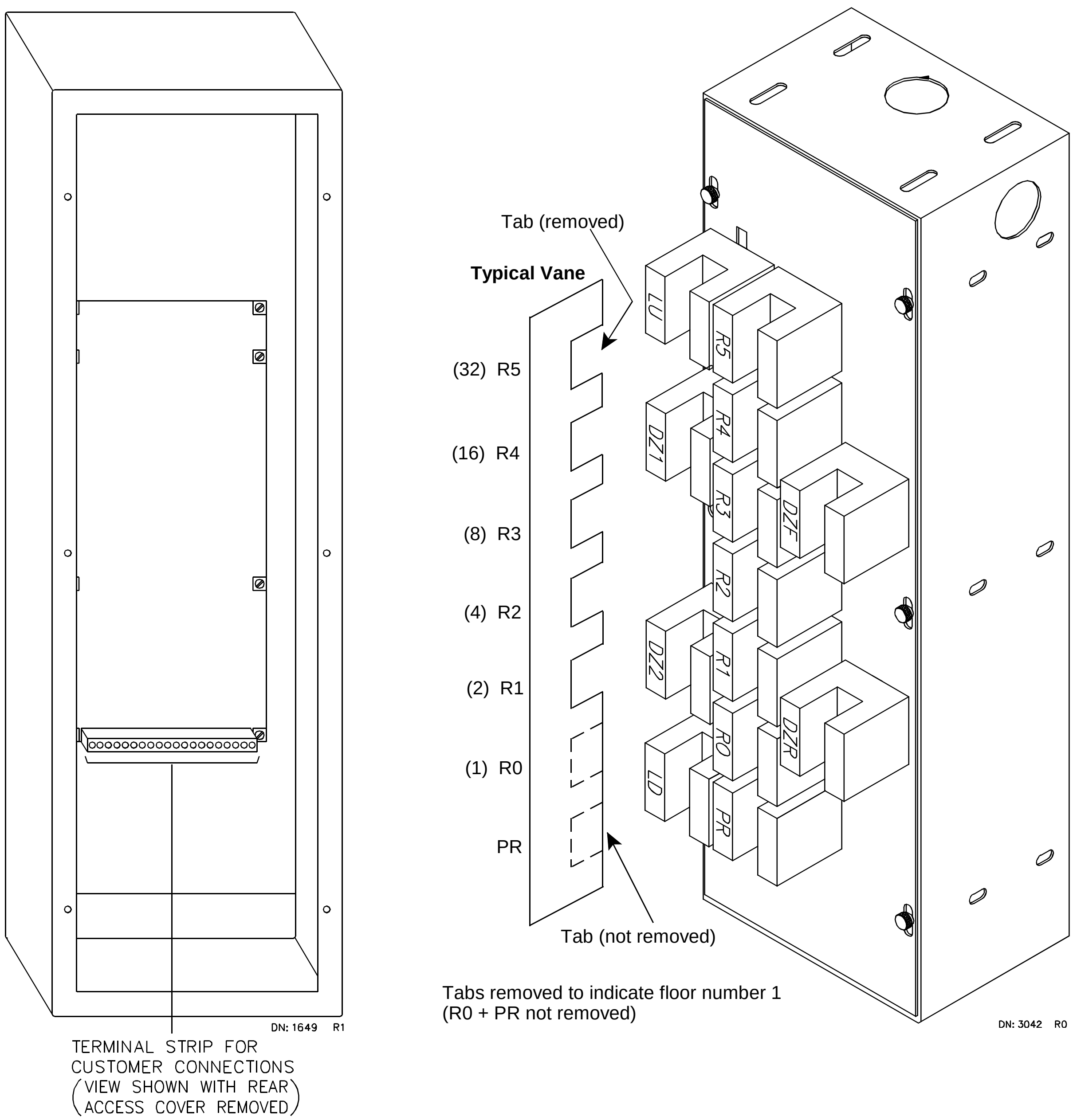


FIGURE 1.28 LS-QUIK-1 Car Top Control Box (front and rear view)



With the LS QUIK landing system, RD is reported when DZ1 and DZ2 are ON but LU and LD are OFF. The LU sensor is used to detect both UOLM and LU. The LD sensor is used to detect both DOLM and LD.

1.5 LOAD WEIGHING SYSTEM (Optional)

The IMC-AC controller uses load weighing information to make intelligent dispatching decisions. If the load weight is very light, the controller can be programmed to limit the number of car calls allowed (anti-nuisance). The controller can be programmed so that at a certain load weight the lobby landing door timer is reduced, thereby initiating the process of moving the car out of the lobby. When the load weight exceeds a preprogramed value, the controller can be instructed to bypass hall calls. And, if the load weight exceeds a predefined maximum at which it is considered unsafe to move the elevator, the controller can prevent movement. This application typically includes a visual or audible warning to the passengers that the elevator is overloaded.

Load Weigher - Isolated Platform (LW-MCEIP) is used for elevators with isolated platform cars, (see Appendix M, MCE Load Weigher Installation and Adjustment). Load Weigher - Crosshead Deflection (from K-Tech International) is used for elevators with non-isolated platform cars. The load weigher signal is sent to the SCR-RI board.

SECTION 2
INSTALLATION

2.0 GENERAL INFORMATION

This section contains important instructions and recommendations pertaining to site selection, environmental considerations, wiring guidelines and other factors that will ensure a successful installation.

2.0.1 SITE SELECTION

In choosing a proper location for the control equipment, the factors listed below should be considered.

- Provide adequate working space for comfort and efficiency.
- Make sure the equipment is arranged logically, taking into consideration the location of other equipment in the machine room and proper routing of electrical power and control wiring. Note that MCE controllers do not require rear access.
- Do not install equipment in a hazardous location.
- Provide space for future expansion, if possible.
- Installing a telephone in the machine room is desirable as it makes remote diagnostics and adjustment assistance easily available.
- If any areas in the machine room are subject to vibration, they should be avoided or reinforced to prevent equipment from being adversely affected.
- Provide adequate lighting for the control cabinets and machines. A good working space such as a workbench or table should also be provided.
- The location of the Drive Isolation Transformer (if used) is flexible, however, wiring is reduced if it is located near the controller.

2.0.2 ENVIRONMENTAL CONSIDERATIONS

The following are some important environmental considerations that will help to provide for the longevity of the elevator equipment and reduce maintenance requirements.

- The ambient temperature should not exceed 32° to 104° Fahrenheit (0° to 40° Celsius). Higher ambient temperatures are possible, but not recommended because it will shorten the life of the equipment. Adequate ventilation and possibly air conditioning may be required.
- The air in the machine room should be free of excessive dust, corrosive atmosphere or excessive moisture to avoid condensation. A NEMA 4 or NEMA 12 enclosure would help meet these requirements. If open windows exist in the machine room, it is preferable to place cabinets away from these windows so that severe weather does not damage the equipment.

- Very high levels of radio frequency (RF) radiation from nearby sources should be avoided. RFI may cause interference with the computers and other parts of the control system. The use of hand-held communication devices close to the computers may also cause interference. Interference from permanently installed radio transmitting antennas is normally rare.

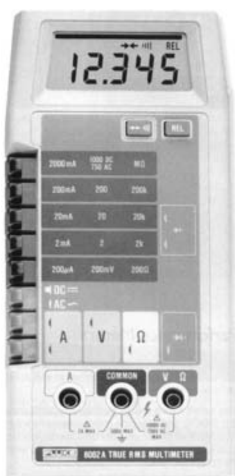
- Power line fluctuation should not be greater than ±10%.

2.0.3 RECOMMENDED TOOLS AND TEST EQUIPMENT

For proper installation, it is recommended that the following tools and test equipment be used:

- Digital multi-meter, Fluke series 75, 76, 77 or equivalent.
- Oscilloscope, preferably storage-type (a storage scope is mandatory for high speed gearless adjustment).
- Hand-held tachometer.
- AC clamp-on ammeter.
- Telephone.
- Hand held radios.
- Assorted soldering tools, rosin flux solder, electronic side cutters, long-nose pliers, flashlight and the MCE screwdriver provided with controller.
- Test weights

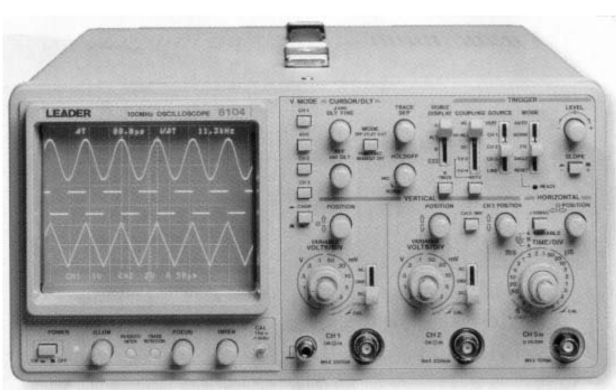
DIGITAL MULTIMETER



AMP-PROBE

MEGOHMETER

OSCILLOSCOPE

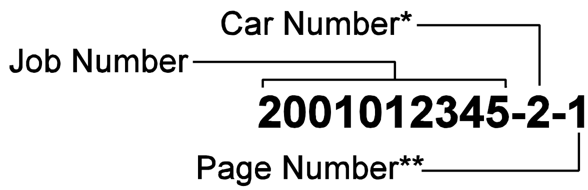


TELEPHONE

2.0.4 WIRING PRINTS

Become familiar with the following information as well as the wiring prints provided with this control system.

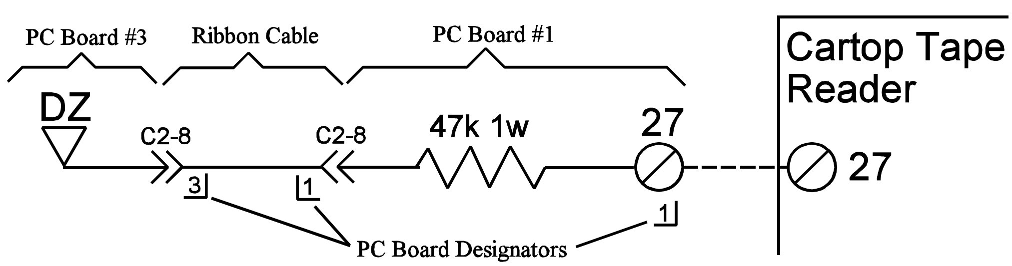
DRAWING NUMBER FORMAT - Each print has a drawing number indicated in the title block. The drawing number is comprised of the job number, car number and page number (see examples). In this manual the drawings will often be referred to by the last digit of the drawing number (page number). The following is the drawing number format currently in use.



* Car Number “G” = Group Controller
** Page Number “D” = Drive page
** an “X” after the page number = auxiliary page

> **NOTE:** DRAWING NAME - Some drawings have a drawing name directly above the title block or at the top of the drawing. The drawing name may be used to refer to a particular drawing.

NOMENCLATURE - The following is an example of the schematic symbols use to indicate that a signal either enters or exits a PC board.



A listing of PC boards and their designator numbers plus other schematic symbols used in the wiring prints can be found at the beginning of the Job Prints and in Appendix E of this manual.

- Become familiar with “Elevator Car Wiring Print” (drawing number 1).
- Become familiar with “Elevator Hoistway Wiring Print” (drawing number 2).
- Most of the power connections and non-Drive related power supplies are shown in drawing number -3.
- Group interconnects to individual car cabinets (two or more cars) are shown on the drawing titled “Group Interconnects to Individual Car Cabinets.”
- Review any additional wiring prints and details that may be provided.
- Pages -D, DX and DY of the job prints include detailed drawings of the IMC-AC control system.
- Refer to a specific part of the schematic by the Area Number which can be found at the left-hand margin of the schematic.

2.1 CONTROLLER INSTALLATION

> **NOTE:** It is strongly recommended that you review the wiring guidelines in sections 2.1.1 and 2.2 before bringing wires into the controller.

Mount the controller(s) securely to the machine room floor and cut holes to permit bringing the wires into the cabinet as shown in Figure 2.2. There may be labels in the cabinet to help identify locations for wiring holes. Note that the standard MCE car control cabinet does not require rear access. Also, the doors are reversible and removable for ease of wiring.

> **CAUTION:** Do not allow any metal chips to fall into the electronics.
>
> Keep the covers on the AC Drive and IMC-Sxx Drive while wiring to prevent damage to the components.

2.1.1 CONTROLLER WIRING GUIDELINES

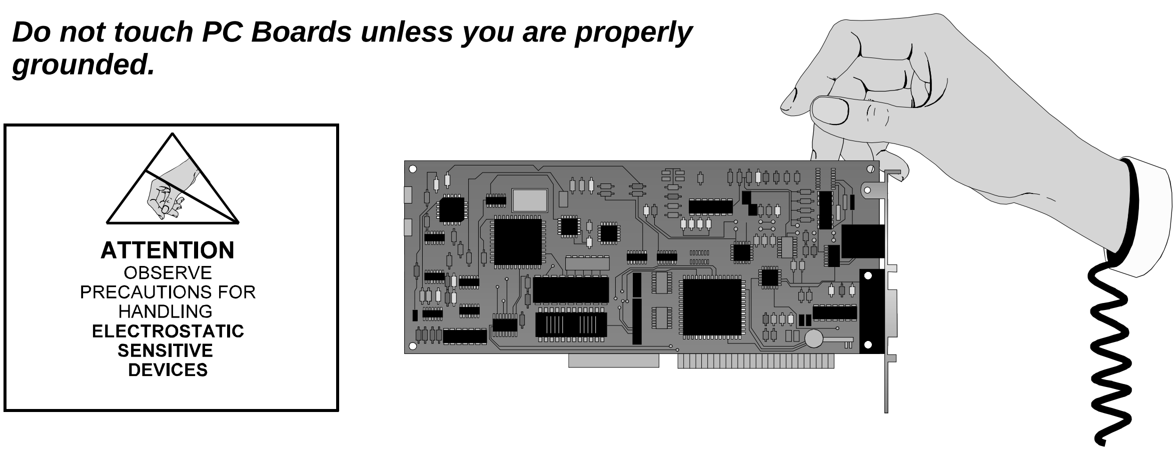
> **CAUTION:** All conductors entering or leaving the controller must be run in conduits. High voltage, high current conductors, such as power conductors from the fused disconnect or isolation transformer, must be separated from the control wires. It is essential that the Tachometer/Velocity Encoder control wires be placed in a separate conduit, away from these high current conductors.

Figure 2.2 shows the recommended routing for the field wiring. Observe the following:

a. PC boards can be easily damaged by Electrostatic Discharge (ESD). Use a properly grounded wrist strap, as shown in Figure 2.1, when touching the PC boards.

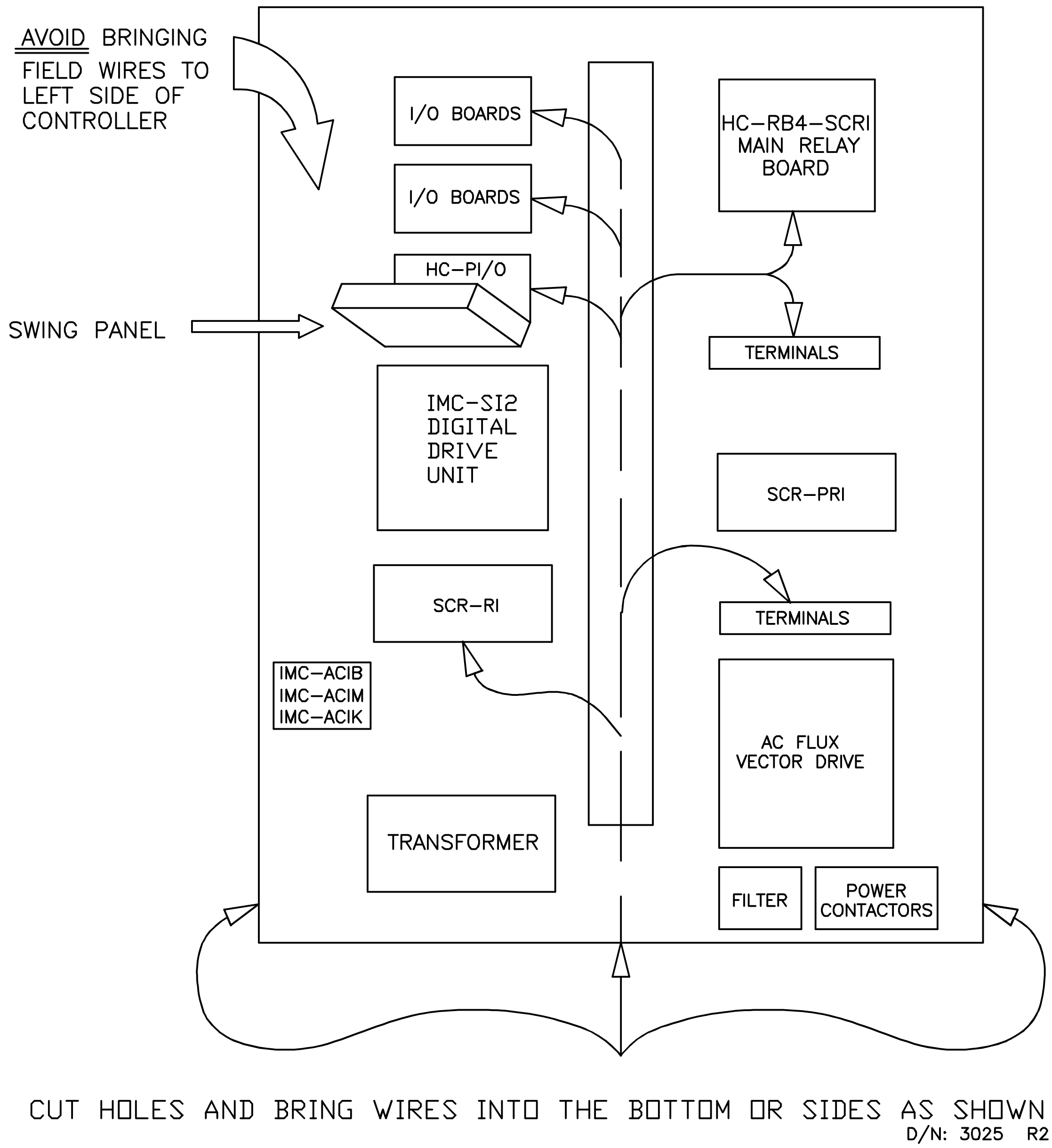
FIGURE 2.1 ESD - Electrostatic Sensitivity of PCBs

Do not touch PC Boards unless you are properly grounded.



b. Bring the wires in from a location that would allow use of the wiring ducts inside the cabinet. The terminals are located conveniently near wiring ducts.

FIGURE 2.2 Example of a Typical Controller Layout



- Call terminals are located on the HC-CI/O board(s). Inputs and outputs are located on the HC-IOX and/or HC-I4O boards.
- All position indicators, arrows and gong enable terminals are located on the HC-PI/O and HC-PIX boards or, if a gong board is provided, position indicators are also provided on the gong board (HC-GB).
- Terminals for the door operator are on respective door boards or on separate terminal blocks.
- Several 1 and 2 bus terminals are provided in different locations.
- Other terminals may be supplied on separate terminal blocks.
- OLM, position pulser and absolute floor encoder signals are terminated into the SCR-RI board.

c. When routing field wiring or power hookups, avoid the left side of the HC-CI/O and HC-PI/O boards.

d. When it is time to connect the wires, connect the wires according to the wiring prints.

e. Proper motor branch circuit protection in the form of a fused disconnect switch or circuit breaker must be provided for each elevator according to applicable electrical code. Each disconnect or breaker must be clearly labeled with the elevator number. The electrical contractor must determine the wire size for the main AC power supply and for the wiring from the disconnect or breaker to the Drive Isolation Transformer.

f. If the car is part of a group system, there are a number of details relating to the wiring of the interconnects between the individual cars. They are as follows:

1. If a group controller cabinet is provided, refer to the drawing titled “Group Supervisor Field Wiring Print” in the job prints. Power for the M3 Group Supervisor cabinet comes from the local Car Controllers as shown in Controller drawing (-2). The main AC power supply wiring size must be determined by the electrical contractor.

WARNING:	Connecting the Group Supervisor directly to the building AC supply may cause damage to PC boards. Also, **connecting out-of-phase power *will* cause damage**. Check the “phasing” of the individual car 2-bus lines before connecting them to the Group Supervisor. With a voltmeter set to AC Volts, measure between adjacent car 2-bus terminals. The meter must read less than 10 VAC. If the reading is higher, reverse the power leads going to the car's T1 transformer at L1 and L2, and measure again.

2. A separate conduit or wiring trough must be provided for the high speed serial link from each car controller to the Group Supervisor cabinet. The wiring details for the high speed communication link are fully detailed in the print titled "Instructions for Connection of High Speed Communication Cables." The wiring details should be followed exactly. Again, note the requirement for routing the high speed interconnect cables through a separate conduit or wiring trough.

3. If applicable, also wire according to the print titled "Group Interconnects to Individual Car Cabinets." Be sure to ground all cabinets according to Section 2.2.1.

4. The field wiring to the Group Supervisor cabinet is found in the print titled "Group Supervisor Field Wiring Print."

2.2 GENERAL WIRING GUIDELINES

Basic wiring practices and grounding requirements are discussed in this section.

2.2.1 GROUND WIRING

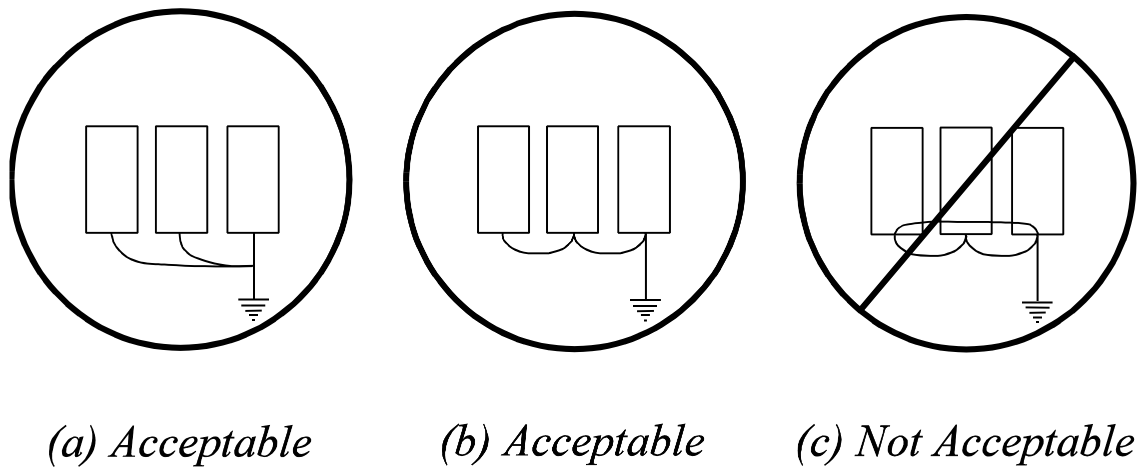
To obtain proper grounding, quality wiring materials and methods should be used.

All grounding in the elevator system must conform to all applicable codes. Proper grounding is essential for system safety and helps to reduce noise-induced problems. The following are some grounding guidelines:

- The grounding wire to the equipment cabinet should be the same gauge (diameter) or larger than the primary AC power feeders for the controller and should be as short as possible.

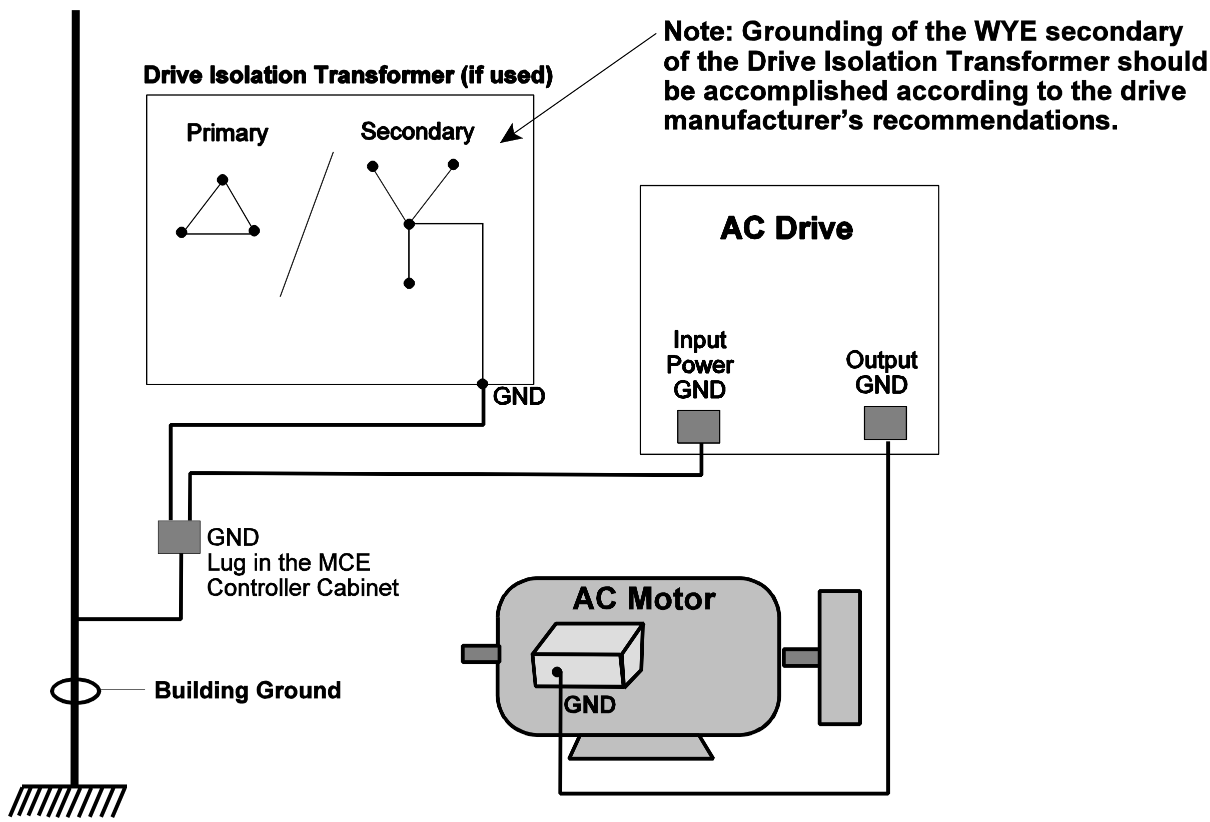
- The grounding wire between equipment cabinets may be branching or a daisy chain, but the wire must terminate at the last controller and NOT loop back (see Figure 2.3.

FIGURE 2.3 Ground Wiring to Controller Cabinets



- Provide a direct, solid ground to the controller and motor. An indirect ground, such as the building structure or a water pipe, may not provide proper grounding and could act as an antenna radiating RFI noise, thus disturbing sensitive equipment in the building.
- The conduit containing the AC power feeders must not be used for grounding.

FIGURE 2.4 Ground Wiring



2.2.2 AC HOIST MOTOR AND BRAKE WIRING

NOTE:
- Incoming power to the controller and outgoing power wires to the motor must be in their respective grounded conduit.
- It is very important that the AC motor wires be kept separate from any control wires either inside or outside the control enclosure. The speed sensor wiring must use a separate grounded conduit. The use of a shielded power cable between the MCE controller and the AC Motor is recommended to reduce RFI/EMI noise (Siemens Protoflex - EMV or equivalent). *Keep the AC power wiring separate from the control wires*.
- The brake wires should not be mixed with the AC motor wires or the Encoder wires.

a. If this installation is reusing existing rotating equipment, do the following:

- Disconnect all motor and brake wires from the old controller.
- Perform an insulation test between these wires and the frame of the related equipment using a Megohm meter to subject the insulation to the same high voltages that would be encountered in normal use.
- Correct any insulation problems before proceeding, as this may suggest a serious problem in the equipment.

b. Refer to drawing -D in the job prints. This drawing shows the AC Flux Vector Drive and the connection to the rotating equipment. Make sure to follow any notes on the schematic regarding wire sizes and any specific motor wiring connections.

c. The wiring of the brake is shown on page -2 or -DY of the job prints.

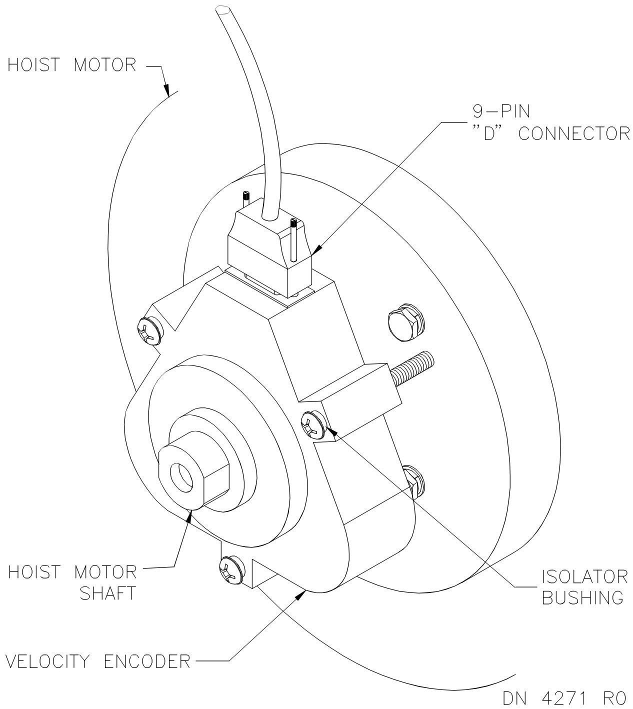
2.2.3 ENCODER INSTALLATION AND WIRING

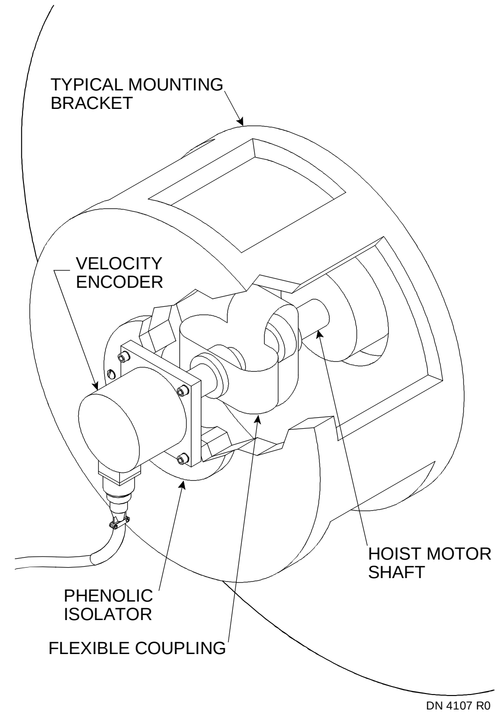
a. The encoder must be mounted on the motor shaft and the encoder wiring should be completed according to the drawing. The purpose of the encoder is to determine the exact shaft speed and position. Do not place the encoder or its wiring close to a magnetized area (the motor or brake coils), as this may induce AC in the encoder signal output. This can cause the Drive to miscount and cause erratic speed control at lower speeds. Inside the controller cabinet, if control wires must cross power wires, they must cross at right angles.

NOTE: The Encoder wiring must use a separate grounded conduit. Make sure that the encoder housing is electrically isolated from the machine (ground). To check this, place one ohmmeter lead on the frame of the machine and one lead on the case of the encoder.

b. It is *very* important that the encoder does not slip, wobble, bounce, or vibrate due to poor installation of the shaft extension, coupling or encoder mounting. It is also important that the encoder housing be *electrically insulated* from the motor, machine or other grounds if the encoder is manufactured by BEI. An insulated encoder mount has been furnished with the BEI encoder. This type of mount, however, may not be practical for this application. Predicting which type of mounting will work best for all installations is impossible, therefore, the best method for mounting the encoder and coupling it to the motor must be determined at the job site.

FIGURE 2.5 Typical Encoder Installations





b. Connect the Encoder to the AC Flux Vector Drive using the *shielded* cable provided (see drawing -D in the job prints). Run this cable to the controller in a *separate* conduit. Connect the cable to the Encoder using the connector provided. Connect the other end of the cable to the AC Drive using the phoenix terminals provided. The cable shield will *not* be connected to any ground or case, but connected as shown on print -1-D.

CAUTION: Do not coil excess Encoder cable near high voltage components as noise may be induced. It is recommended that the cable be shortened at the Drive end to remove excess, but do not cut and re-splice in the middle of the cable or shorten at the Encoder end.

2.2.4 BRAKE SWITCH INSTALLATION AND WIRING

All IMC-AC controllers have a Brake Pick Switch (BPS) input that is used to monitor the status of the brake. The controller will prevent the operation of the elevator in the event that the brake fails to release in the intended manner. When this happens, a Brake Pick Failure message will flash on the Diagnostic Indicators on the front of the Swing Panel. This is an additional feature not required by code, which enhances the reliability of the system.

The brake switch is needed for the brake monitor circuit that will shut down the car in case of a brake failure. A switch contact must be attached to the brake assembly if one doesn't already exist. The contact must open when the brake is lifted and it should be rated for at least 1/4 Amp 125 VAC. There are many microswitches suitable for this application. Unfortunately there is no way to anticipate all of the methods for mounting them. Take all necessary precautions not to interfere with the normal brake design or operation.

2.3 HOISTWAY CONTROL EQUIPMENT INSTALLATION

This section covers the recommended procedures for installing the perforated steel tape (LS-QUAD-2) or vanes (LS-QUIK-1) with mounting brackets, hoistway limit switches, hoistway terminal strips and their wiring as shown on the prints.

2.3.1 INSTALLING THE PERFORATED STEEL TAPE (LS-QUAD-2 LANDING SYSTEM)

Refer to the prints titled “Top Tape Support Assembly” and “Bottom Tape Support Assembly” and follow these assembly procedures. Note that the tape can be hung in any of three positions (distance from the rail). Determine the best location on the car top to mount the landing system control box in relation to the available tape positions. This should be done with the car at the top landing so that the tape will be able to run smoothly through the tape guides without binding or excessive friction.

2.3.2 INSTALLING THE LS-QUIK-1 LANDING SYSTEM

Refer to the drawings titled "LS-QUIK-1 Vane Encoding & Installation," "LS-QUIK-1 Landing System Box and Encoder Platform Mounting," and "LS-QUIK-1 Landing System Encoder Platform, Landing System Box, & Vane" and follow the assembly procedures shown. Note that the rotary encoder is normally mounted to the car top so that the encoding wheel runs on the rails. If this is not possible, a special version of the LS-QUIK-1 encoder may be mounted in the machine room so that the encoder runs on the governor, or it may be mounted to run on the deflector sheave. Determine the best physical location for your application. Reference the above drawings for the car top mounted encoder box and rail mounted vane detail.

NOTE: For a machine room mounted encoder it is critical that the encoder be driven by a surface that is concentric with the hoist or governor ropes.

2.3.3 INSTALLING THE HOISTWAY LIMIT SWITCHES

- Be sure that the cam operating the limit switches keeps the slowdown limit switches depressed until the normal direction limit switch is broken.
- Be sure that both the normal and final limit switches are held depressed for the entire run-by travel of the elevator.
- For faster elevators, the surface of the cam that operates the limit switches must be sufficiently gradual so that the impact of the switch rollers striking the cam is relatively silent.

2.3.4 INSTALLING THE HOISTWAY TERMINAL STRIPS AND TRAVELING CABLES

The traveling cable must have at least one twisted shielded pair to be used for the position pulser quadrature signal from the landing system box (terminals 95 and 96). The shielded cable should be used all the way to the controller. If there are two or more shielded pairs still available, route the two OLM signals from terminals 93 and 94 in the landing system box through a shielded pair (especially if this building has more than eight floors). It is best to ground the shield only at the controller.

2.4 ELEVATOR CAR CONTROL EQUIPMENT INSTALLATION

This section covers the recommended procedures for installing and wiring the landing system box (LS-QUAD-2 or LS-QUIK-1), magnetic strips on the steel tape (for the LS-QUAD-2), leveling/absolute floor encoding vanes and encoder (for the LS-QUIK-1), TM switches on the car top (if used) and diode installation for certain door operators.

2.4.1 INSTALLING THE LANDING SYSTEM CONTROL BOX

Refer to the following prints: "Option #1 For Mounting Landing System Box to Elevator Crosshead", "Option #2 For Mounting Landing System Box to Elevator Crosshead", "Option #1 For Conduit Knockout" and "Option #2 For Conduit Knockout."

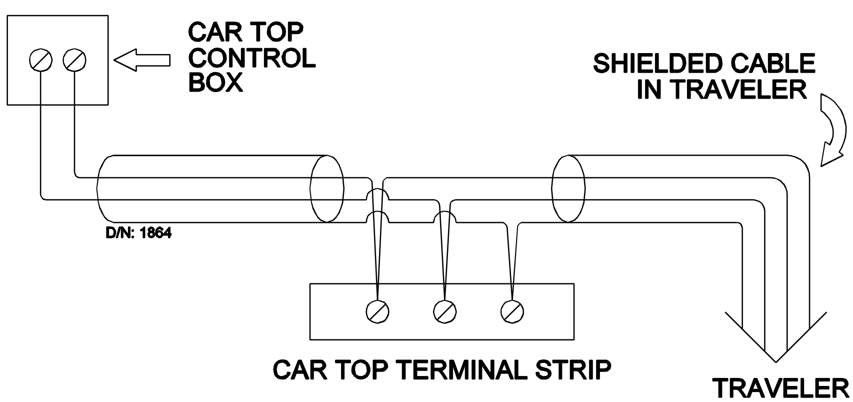
a. The location for the landing box should be selected, with the car at the top landing so that the tape will run smoothly through the guides without binding or excessive friction.

b. Holes are available on both sides, and on the bottom of the landing system box for mounting to any support brackets or structural channels. The mounting of the box should be very firm and solid so that knocking it out of alignment is difficult. Use ¼" diameter screws with 20 threads per inch.

c. Be sure to refer to the controller print: "Option #1 for Conduit Knockout" and "Option #2 for Conduit Knockout" for connecting conduit to the LS-QUAD-2 or LS-QUIK-1 landing system box. Be sure to follow the instructions closely. Use pre-punched knockout holes if provided.

d. If the shielded cable for the quadrature signal is brought to a car top terminal strip, another piece of shielded cable must be used to connect the car top terminal strip to the terminal strip on the circuit board in the landing system box. The shield must be connected to ground *only* at the controller, not at the car top terminal strip or at the landing system box. See Figure 2.6.

FIGURE 2.6 Position Pulser Shielded Cable Wiring



2.4.2 INSTALLING THE STEEL TAPE ON THE LS-QUAD-2 LANDING SYSTEM BOX

a. To install the steel tape into the tape guides on the LS-QUAD-2 landing system box, remove the two thumbscrews on the two guide assemblies. Then insert the tape and reinstall the guides with the thumbscrews (tighten firmly).

b. After inserting the steel tape into the tape guides, check the position of the landing system box. The car should be at the top of the hoistway to make it easy to see if the box alignment is causing any stress or binding on the tape guides. **Make sure the box is absolutely vertical** from side-to-side and front-to-back to allow easy tape movement. This will also help avoid excessive wear on the tape guides (using a level is helpful). Careful adjustment here is critical to avoid premature failure of the tape guides.

> **NOTE:** Notice that the face-plate of the LS-QUAD-2 (which contains the sensors and tape guides) is held in place by 6 thumbscrews, and that this face-plate can be moved up and down. Be sure that the face-plate of the LS-QUAD-2 is in the middle of its side-to-side and up and down range of movement when the car is near the top of the hoistway. It is also important to ensure that the unit is exactly vertical so that there is no binding of the tape in the guides.

c. Move the elevator from the top to the bottom of the hoistway to check for smooth tape movement and to ensure that excessive pressure on the guides is avoided. Correct problems immediately.

d. If the OLM signals from terminals 93 and 94 in the landing system box are routed through the shielded cable, as suggested above, and if the shielded cable for the quadrature signal is brought to a car top terminal strip, their wiring method should also be similar to that shown in Figure 2.5.

2.4.3 INSTALLING THE MAGNETIC STRIPS FOR THE LS-QUAD-2 LANDING SYSTEM

> **NOTE:** The magnetic strips provided with the LS-QUAD-2 landing system may be either north or south pole types (usually south). The poles marked indicate the side away from the adhesive side. The magnets should always be attached to the steel tape from the adhesive side.

a. Carefully read and follow the Target Installation instructions in the prints, but also read the rest of these instructions before proceeding.

b. Before installing the magnets, clean the steel tape thoroughly with an appropriate solvent. No oil should be left on the tape as it will interfere with the adhesive backing on the magnets.

c. There are normally two lanes of magnets installed on the side of the perforated tape facing the car. One lane consists of only the individual floor magnets (leveling magnets) which are all 6″ in length. The other lane consists of magnets (absolute floor position encoding magnets) which are all multiples of 2½″ in length (i.e., 2½″, 5″, 7½″, and 10″). The EDGE and PRESET magnets are all multi-pole magnets and are used only as installation guides.

d. Do not permanently install the floor magnets operating the LU, DZ, and LD sensors. Do not remove the adhesive cover strip on the back of the magnet. The magnet's position may have to be adjusted later. For now, use clear adhesive tape to attach the magnet temporarily. Adhesive tape covering the magnet will not interfere with its performance.

2.4.4 INSTALLING THE LEVELING/ABSOLUTE FLOOR ENCODING VANES AND CAR TOP WHEEL DRIVEN ENCODER (LS-QUIK-1 LANDING SYSTEM)

Install the encoder on the car top, typically above the roller guide assembly. Install one leveling/absolute floor encoding vane at each landing and break out the appropriate tabs to code the particular floor. Refer to the "LS-QUIK-1 Vane Encoding & Installation" and "LS-QUIK-1 Landing System Encoder Platform, Landing System Box & Vane" prints.

2.4.5 WIRING AND ADJUSTING THE TM SWITCH (IF USED)

Refer to the "Elevator Car Wiring Print" for details on the wiring and setting of each contact in the TM switch. Carefully examine the functioning of this switch, especially if copper-to-carbon contacts are used. The current levels are quite low and may not be enough to burn the oxide off the contacts.

2.4.6 INSTALLING THE DOOR OPERATOR DIODE (IF USED)

Certain door operators, such as G.A.L. model MOM or MOH, require the installation of diodes in the door operator on the car top. See the "Elevator Car Wiring Print" for special instructions regarding these diodes.

2.4.7 INSTALLING THE LOAD WEIGHER (OPTIONAL)

Information regarding the installation of the load weigher used for isolated platform elevator cars (LW-MCEIP) is provided in *Appendix M, MCE Load Weigher Installation and Adjustment*. Information regarding the installation of the load weigher used for non-isolated platform elevator cars is provided with the Load Weigher supplied by K-Tech International.

2.4.8 DOOR POSITION MONITOR SWITCH (IF USED)

If you are in a jurisdiction where ASME A17.1 - 1996 or later is being enforced, Door Position Monitor switch(s) connected to the DPM and/or DPMR inputs, must be added to monitor the position of the closed doors. This must be a separate physical limit switch that makes up approximately 1 to 2 inches before the doors lock.

SECTION 3
START-UP

3.0 GENERAL INFORMATION

This section provides instructions for preparing the car for use by construction personnel so that they may complete the cab installation process. After completing the steps in this section, basic car movement is available on Inspection operation. This section covers the application of power to the controller and associated components, verifying voltage levels for the AC hoist motor and brake, and the preliminary adjustment of the system.

WARNING: This equipment contains voltage which may be as high as 1000 V and rotating parts of motors and driven machines. The combination of high voltage and moving parts can cause serious or fatal injury. Only qualified personnel who are familiar with this manual and driven machinery, should attempt to start up or troubleshoot this equipment. Please observe the following precautions:

1. *Use extreme caution - do not touch* any circuit boards, resistors or motor electrical connection without ensuring that the unit is properly grounded and no high voltage is present. *Do not* apply AC power before grounding the equipment in accordance with applicable local codes and instructions contained in this manual.

2. *Be certain* that any possible violent motion of the motor shaft and driven machinery, caused by improper control operation, will not cause personal injury or damage. Peak torques of up to ten times rated motor torque can occur during a control failure.

3. *High voltage may be present* on motor and AC Drive whenever AC power is applied, *even if motor is not rotating*.

4. *Before starting the work, read these instructions all the way through in order to become familiar with the procedure.* Proceed cautiously. These instructions assume adequate electrical troubleshooting experience. Follow the procedure carefully and if the elevator does not respond correctly, check the circuits and obtain necessary assistance.

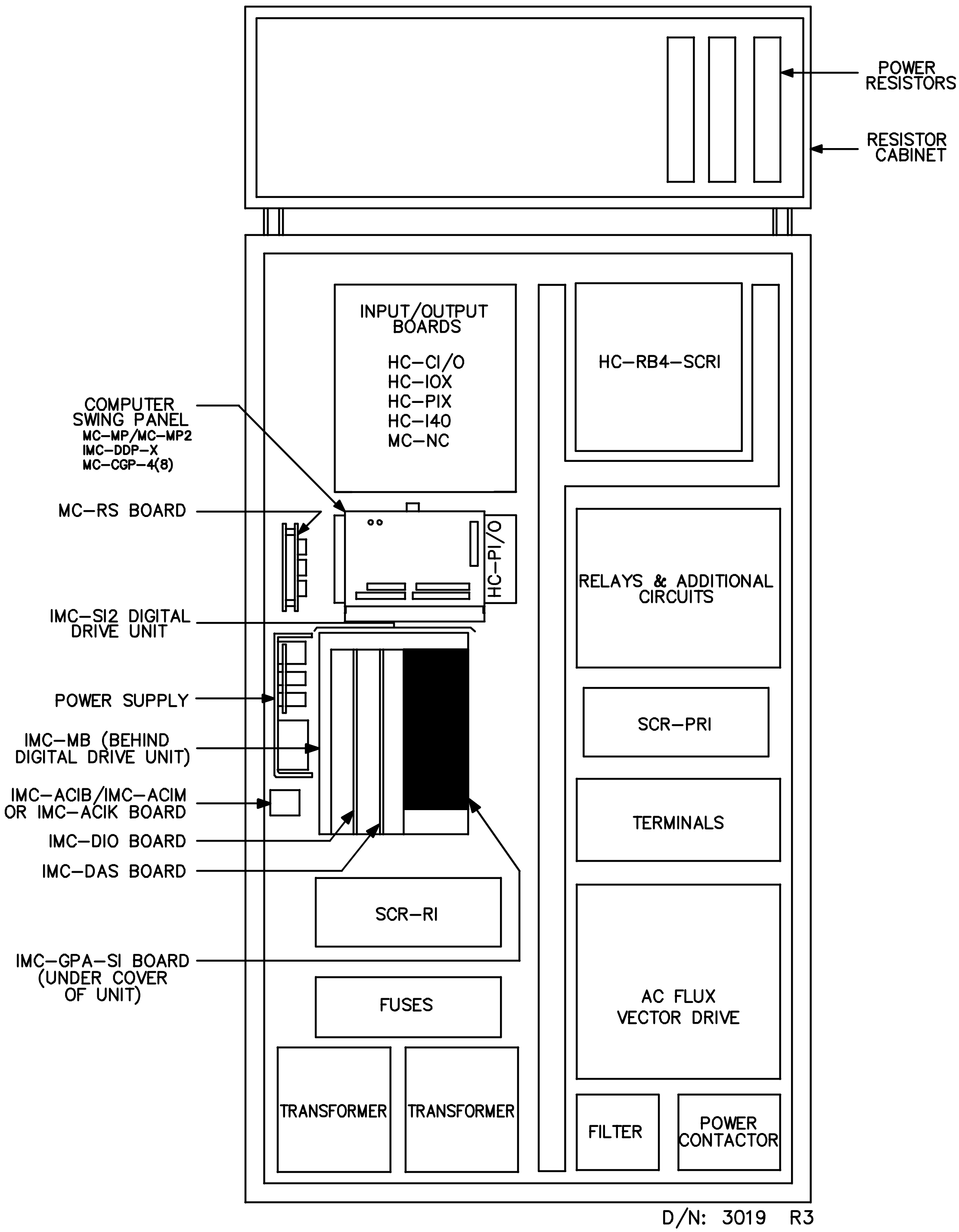
NOTE: At this time, the controller safety circuits, motor and brake, Inspection circuits, door locks and encoder wiring must be complete. Make sure the field wiring is correct before proceeding further.

3.1 CHECKING FOR IMPROPER GROUNDS

Do a ground test before powering up the system. Power should be OFF at the main disconnect. Refer to Figure 3.1 to help find items as they are referred to in the ground check. If any grounds are found in the following steps, they must be corrected before proceeding.

NOTE: A short to ground is defined as having a resistance of less than 20 ohms between the 1-bus (common) and the terminal being checked.

FIGURE 3.1 IMC-AC Controller Cabinet Layout



a. Remove fuse F4 from the controller cabinet. Consult the job prints and remove the fuses that power terminals 2H and 2F (These may be in the group control cabinet).

b. Check for shorts to ground on all the terminals on the HC-PI/O, HC-CI/O, SCR-RI, and HC-RB4-SCRI boards.

c. If a G.A.L. MOD door operator is provided, check for shorts to ground on terminals F1, F2, A1, A2 and D5. Look for their location on page -3 of the job prints. Remove the door fuses. Refer to the job prints to determine which fuses to remove and then check the appropriate terminals for shorts to ground.

d. Check for shorts to ground on motor power terminals T1, T2, and T3. Also, check for shorts to ground on brake terminals B1 and B2.

e. The encoder body should be electrically isolated from the motor body and from ground. The resistance between the motor and the encoder body should be measured in megohms using an ohm-meter.

3.2 VERIFYING PROPER VOLTAGES

3.2.1 BEFORE APPLYING POWER

NOTE: Before applying power to the controller, physically check all of the power resistors, connecting cables and any other components located in the resistor enclosure and inside the controller. Any components loosened during shipment may cause damage.

WARNING: These instructions assume the elevator mechanic has adequate electrical troubleshooting experience. Follow the procedures carefully and if the elevator does not respond correctly, check the circuits and use the troubleshooting section in this manual (Section 6). Proceed cautiously. To become familiar with the procedure, read these instructions all the way through before starting the work.

a. The primary devices for operating all of the rotating equipment, brake, and certain safety features on this controller are the IMC-DDP-x Processor board located inside the Swing Panel, the IMC-SI2, and the AC Flux Vector Drive unit. The interconnections of the Drive Units and the IMC-AC controller, with the elevator equipment, are shown on Drive pages -D, -DX and -DY of the job prints.

b. In the following instructions it is assumed that the sling is suspended from the hoist ropes, all hoistway doors are closed but not necessarily locked, and the hoistway and machine room wiring is complete. The car safety *must* be adjusted to the manufacturer's specifications and the governor installed and roped. Test the safety by hand to ensure it will hold the car. Correct any malfunctions before continuing.

c. Unplug the screw terminal blocks from the HC-PI/O and HC-CI/O boards by moving the blocks toward the right (away from the board edge), thereby disconnecting the field wiring. This is to avoid damaging the boards.

d. Be sure that any special instructions on pages -D, -DX, and -DY of the job prints regarding arrangement of the connections of the input power, motor, brake, and encoder have been followed.

e. Remove fuses FB1 and FB2. Then, remove fuse FC1. These fuses can be found on page -DY or -3 of the job prints. This disconnects all power from the IMC-SI2 Drive Unit.

f. Remove fuses FL1, FL2, FL3 (if present), FMC, F2, and F4. Their location can be found on page -3 of the job prints. This disconnects power from the controller logic circuits and power supply.

3.2.2 APPLYING POWER

a. On the HC-RB4-SCRI board, turn the TEST/NORM switch to TEST, and turn the INSPECTION OFF/ON switch to ON. Temporarily, remove and insulate any wire in terminal 59 and label it so that it may be reinstalled later. Install a temporary jumper from terminal 2 to terminal 59 **to bypass the Inspection Switch (COP Access Enable)**.

> **WARNING:** If the wire to terminal 59 is *not* removed (step 'a' above) and the jumper is installed between terminals 2 and 59, **this will bypass the complete safety string**.

b. Check the controller input voltage after the disconnect to see that all three legs are at the correct voltage. Then compare this voltage with the drawings, motor name plate, and drive rating (it must be within 5% of this value).

c. Turn power OFF at the main disconnect and re-install fuses F2, FL1, FL2, and FL3 (if present). Restore power, but do *not* turn ON the power to the doors. If the job has freight doors, allow the retiring cam to operate.

d. Verify 120 VAC (+5%, -10%) between the top of fuse F2 and 1 bus.

e. Verify +5 VDC, -15 VDC, +15 VDC at connector J3 on the IMC-SI2 Drive Mother Board (see Figure 1.18).

3.3 INSTALLING AND USING THE CRT TERMINAL/EMULATOR

Instructions for connecting and setting up the CRT terminal or terminal emulator and for programming the controller's communication ports are provided in Appendix P *CRT Terminal and Terminal Emulator Setup*. Appendix P contains setup instructions for the following:

- Esprit 250C Terminal Emulator . . . . Section P.2
- ADDS 260LF Terminal Emulator . . . . Section P.3
- Link MC5 Monochrome Terminal . . . . Section P.4
- Wyse WY-325ES Color Terminal . . . . Section P.5
- Wyse WY-370 Color Terminal . . . . Section P.6

3.3.1 ACCESSING THE MENU SCREENS

The CRT terminal or terminal emulator should initialize automatically when power to the controller is turned ON. The F5 key on the keyboard can be used to begin the initialization process should automatic initialization fail to occur. The terminal screen will go blank and may flash a couple of times before coming up with a readable display. Once the terminal has been initialized, there are prompts to guide the user to the Main Menu.

If the screen continues to flash for more than one minute after initialization has begun, or the display changes but is not readable, refer to Appendix P *CRT Terminal and Terminal Emulator Setup* for proper terminal parameter settings. Later, should any later problems arise in the terminal functions due to power surges or line noise, reinitializing using the F5 key will usually clear the problem. It is remotely possible that a voltage surge may require reestablishing the correct terminal parameter settings as described in the Computer Peripherals Manual.

After power up and initialization, the MCE logo screen is displayed with the flashing prompt **`Press any key to begin.`** Press any key to display the Main Menu screen (Figure 3.3). This menu can also be accessed from any other menu by pressing F4.

FIGURE 3.3 CRT Main Menu

```
                         9/6/2000,  10:25:30 AM

Job #00-10000     EASTMAN KODAK - BUILDING 820 - CAR 73     Simplex Car -A-


                 IMC-AC (Baldor) Car Controller (Release 4)

                              Main Menu (F4)

                    F1 -  Controller Parameters
                    F2 -  Performance Reports
                    F3 -  View Hoistway
                    F4 -  Main Menu (This Screen)
                    F5 -  Initialize CRT
                    F6 -  Job Configuration
                    F7 -  Special Events Calendar
                    F9 -  Security
                   F10 -  Modem Hang Up
                   F11 -  Diagnostics
                   F12 -  Jump to Previous Screen


      MP v0x.xx                CGP-C v09.xx               DDP v0x.xx

                                                              dnID250a
```

To access the Controller Parameters Menu press F1 while the Main Menu is displayed.

FIGURE 3.4 Controller Parameters Menu

```
                        12/22/2000,  10:25:30 AM,  F4=Main Menu


                          Controller Parameters (F1)

                1 -  General
                3 -  Brake
                4 -  Pattern
                5 -  Baldor Drive / MagneTek Drive Adjustment
                6 -  Safety
                7 -  Switches
                8 -  Floor Heights
                9 -  Modem Setup
                A -  Car Operations
                C -  Change Parameter Access Password
                D -  Baldor Drive Direct Access
                E -  Enable Parameter Edit Mode
                M -  MagneTek Drive Configuration
                R -  Baldor / MagneTek Drive Parameter Reset

                                                              dnID189a
```

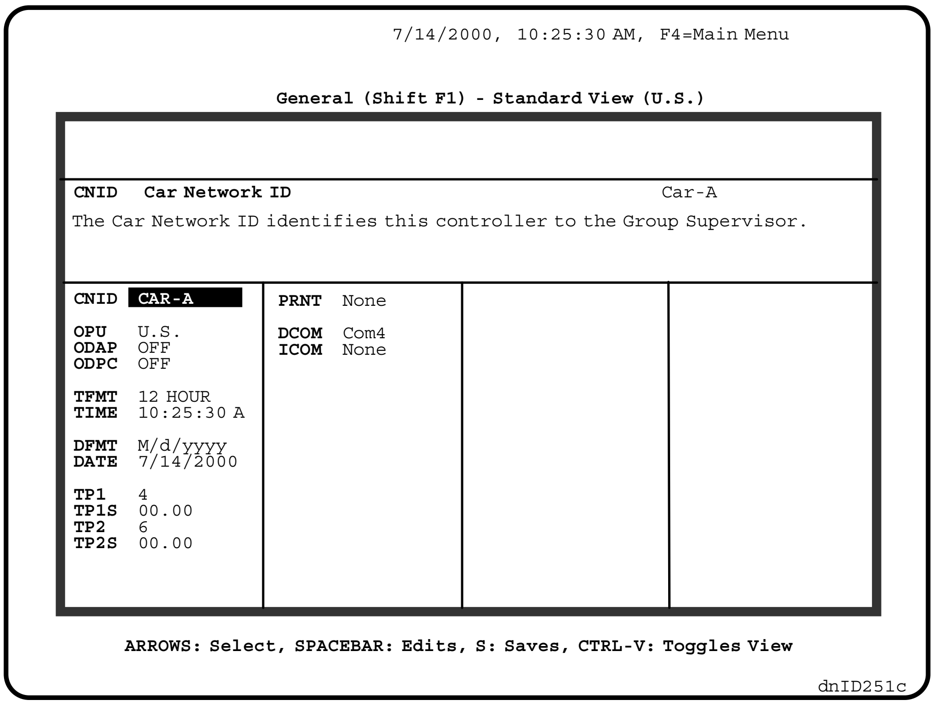
Note: Items 5, D, M and R are not applicable to the TORQMAX Drive.

3.3.2 EDITING CONTROLLER PARAMETERS

The Controller Parameters can be accessed and adjustments can be made using selections on the Controller Parameters (F1) Menu. Adjustments to parameters on these screens can be made at any time, but will not go into effect until the car has stopped (no direction is active). The Switches (Shift F7) screen displays the learned velocity and position information for these switches, but the values cannot be changed.

SELECTING PARAMETERS FOR EDITING - Display the screen listing the parameter you wish to edit. For example, to change the **TIME**, the General (Shift F1) screen must be displayed. From the Main Menu press **F1** and from the Controller Parameters menu press **1**, or press **Shift F1** from any screen. To access the Brake screen press F1 and then 3 or press Shift F3.

FIGURE 3.5 General (Shift F1) Screen



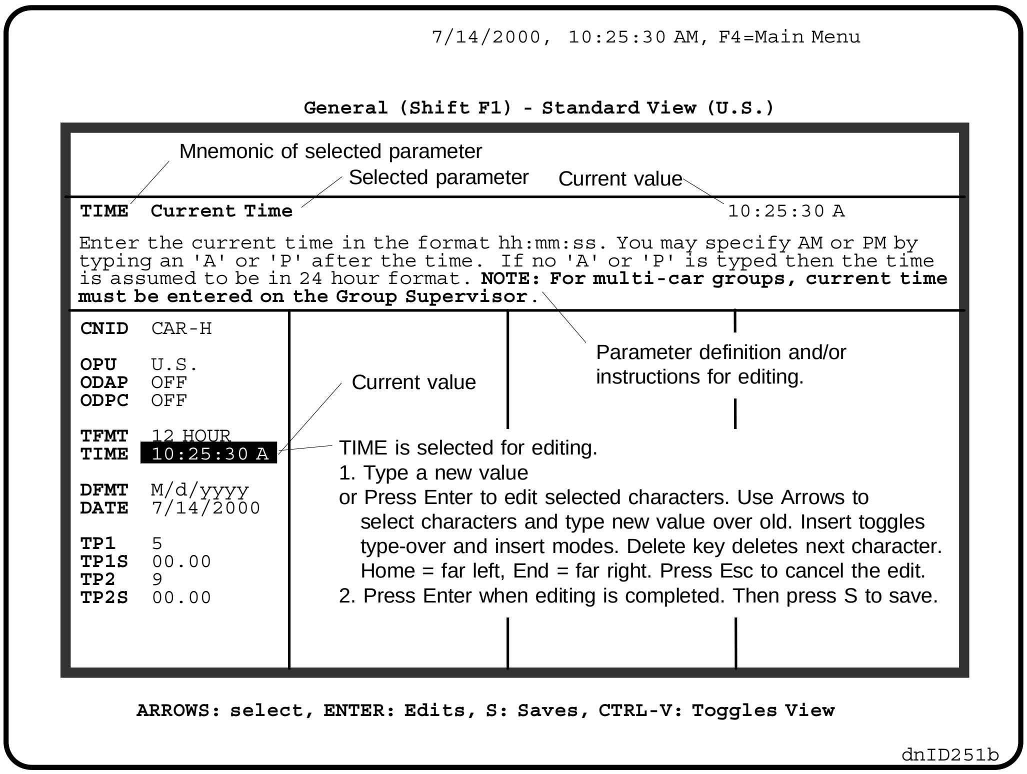
In Figure 3.5 the highlighted value for the **CNID** parameter is selected for editing. Press the **Arrow** keys to select the desired parameter. In our example, select TIME by pressing the Down Arrow until the value of TIME is highlighted (displayed in reverse video - see Figure 3.6). Notice that the full parameter name for TIME, **Current Time**, is displayed in the box above the columns and the current value is also displayed to the right in the same box. Below that are instructions for editing the TIME.

EDITING METHODS - There are two methods of modifying the parameter value once the desired value is highlighted.

1. Type the new value using the **number keys** on the top of the keyboard or on the number keypad with Num Lock ON. When the desired value is displayed, press **Enter**. If the parameter is listed with two or more values in parenthesis, such as OPU, Parameter Units (U.S. / METRIC) use the **Space Bar** or (**+ / -**) keys to toggle the value. Then press **Enter**. If an arrow key is pressed to select another parameter, the edited parameter value is displayed in **bold** type. It will remain bold, to indicate that the value was changed, until the new value is *saved* as described below. The new value does not become effective until it is saved.

2. Press the **Enter** key to select the value for editing. At this point virtually all of the normal text editing keys are active. The **Arrow** keys allow selection of a single character to be changed. **Type** a new character to replace the selected character. The **Delete** key deletes the next character after the selected character. The **End** key moves the cursor to the far right and the **Home** key moves the cursor to the far left. The **Insert** key toggles between type-over and insert modes. When you have finished editing, press **Enter**. Press **Esc** to cancel the edit and return the to the previous value.

FIGURE 3.6 Editing TIME on the General (Shift F1) Screen



SAVING THE CHANGES - Edited parameter values do not become effective until they are *saved*. Save the changes by pressing the **S** key. A confirmation message, **`Save Changes? (Y/N)`**, is displayed. Press **Y** to save or **N** to not save. If you exit the parameter screen without saving, the message, **`Save Changes? (Y/N)`**, will be displayed. If **N** is pressed, a confirmation message, **`Parameters were NOT saved`**, is displayed. If **Y** is pressed, a confirmation message, **`Saving...`**, and then, **`Save Complete`**, is displayed. If there is a problem the message **`*** ERROR Saving Parameters ***`** is displayed. If any new value is outside the acceptable range for that parameter, the computer will substitute the closest acceptable value, and that value will be saved and displayed.

NOTE: On the IMC-DDP-x board, the S2 Switch/Jumper must be in the **A** position to ***save*** parameter changes. Write protection is provided with S2 in the **B** position and attempts to save will result in the **`Saving...`** message being displayed indefinitely. Press **Esc** to exit this message.

SAVING ALL PARAMETERS - If parameters have been changed, pressing the **S** key will save *only* those parameters that were changed. If no parameters have been changed, pressing the **S** key will save *all* parameters on the screen. Some parameters are saved in more than one location. Saving all parameters is a feature that is used initially to ensure that the parameters are correct in all locations.

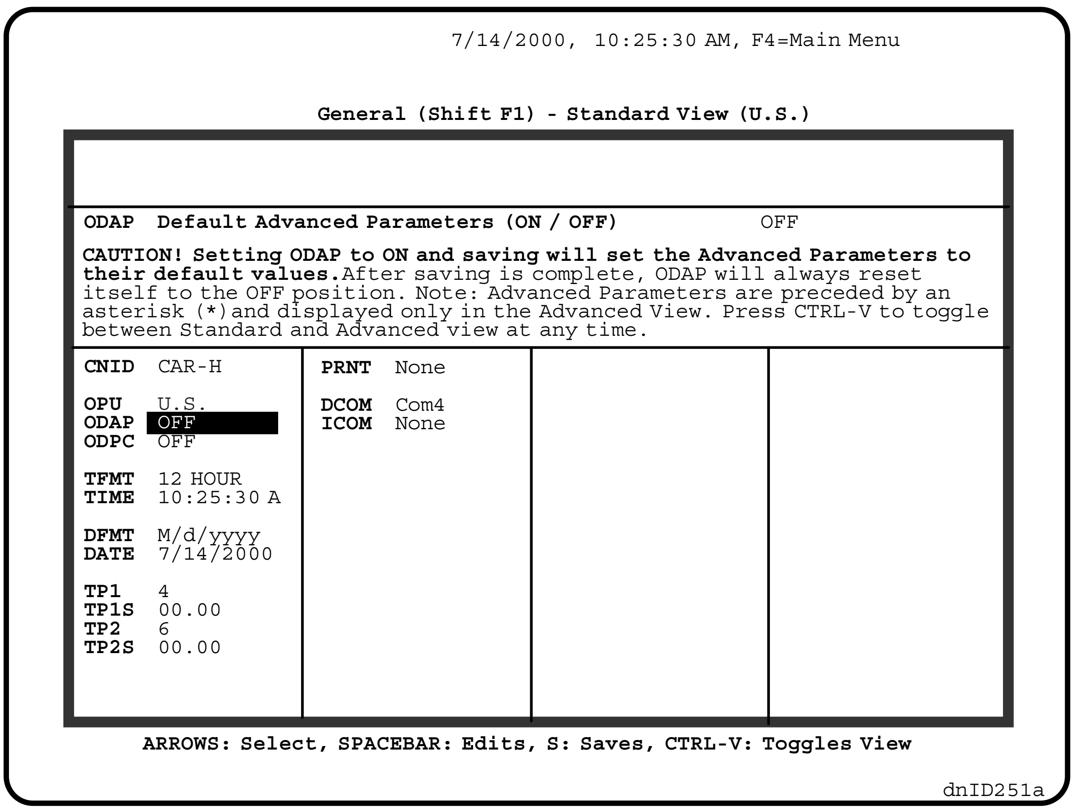
3.4 VERIFYING THE INITIAL PARAMETER VALUES

During testing at MCE, initial setup values are entered for many of the Controller Parameters. These initial setup values must be verified before running the car on Inspection operation. Refer to the parameters tables, R.1 thru R.8, in the Reference Section of this manual. Notice that a Preset Value as well as a value range are shown in the tables. A Default Value of "XX" is shown for some parameters. These parameters are specific to the job and may have to be entered or at least they must be verified. When the elevator is completely adjusted and running smoothly the parameter values should be entered into the "User Adj." column in the tables for future reference.

3.4.1 SETTING THE ADVANCED PARAMETERS TO THEIR DEFAULT VALUES

The Advanced Parameters are those that are preceded by an asterisk (*) and displayed on the parameter screens in the Advanced View only. Press **Ctrl-V** (Ctrl and V) to toggle between the Standard View and the Advanced View.

FIGURE 3.7 General (Shift F1) screen with ODAP - Default Advanced Parameters selected



Select *ODAP Default Advanced Parameters (ON/OFF)*. Press the **Space Bar** to toggle the value to ON and press **Enter**. Then press the **S** key to save and **Y** for yes. The message **`Saving...`** will be displayed during the save process. When the values have been saved, **`Save Complete`** is displayed and the ODAP parameter will change back to OFF.

3.4.2 VERIFYING THE INSTALLATION SPECIFIC PARAMETER VALUES

Reasonable machine/installation specific parameter values must exist before the car can run. These parameters are shown in the “Default Value” column of Tables R.2 and R.3 with the designation “XX”. When the controller was tested at MCE, values were entered for these parameters based on the field survey form. Verify these parameters described in Table R.3 on the Brake (Shift F3) screen, and the parameters described in Table R.4 on the Pattern (Shift F4) screen,.

3.4.3 VERIFYING THE INITIAL PATTERN PARAMETER VALUES

Table 3.1 lists the recommended starting values for the pattern parameters. During final adjustment the values may be changed, but these values provide a good starting point for adjustment. Substitute the values shown in Table 3.1 in the column appropriate for the Contract Speed of this job, for the values shown on the Pattern (Shift F4) screen.

TABLE 3.1 Recommended Starting Values for Pattern Parameters

PATTERN (SHIFT F4) SCREEN						
CONTRACT SPEED	**200 fpm**	**350 fpm**	**400 fpm**	**500 fpm**	**600 +**	**UNIT**
J1 - Phase One Jerk	6.00	6.00	5.00	5.00	6.00	ft/s^3
J35L - Phase 3/5 Jerk - High Speed	6.00	6.00	5.00	5.00	4.00	ft/s^3
J35H - Phase 3/5 Jerk - One Floor Run	6.00	6.00	5.00	5.00	4.00	ft/s^3
J7 - Phase Seven Jerk	2.50	2.50	2.50	2.50	2.50	ft/s^3
A2 - Phase Two Acceleration	2.40	3.20	3.40	3.60	3.80	ft/s^2
A6 - Phase Six Deceleration	2.20	2.90	3.20	3.30	3.50	ft/s^2
VH - Contract Velocity	200	350	400	500	600	fpm
VHL - High Leveling Velocity	030	040	045	045	045	fpm
VIL - Intermediate Leveling Velocity	015	015	015	015	015	fpm
VFL - Final Leveling Velocity	005	005	005	005	005	fpm
DL - Leveling Distance	00.25	00.25	00.25	00.25	00.25	in
DFL - Final Leveling Distance	00.25	00.25	00.25	00.25	00.25	in
VRL - Releveling Velocity	008	008	008	008	008	fpm
VCR - Correction Velocity	050	050	050	050	050	fpm
ACR - Correction Accel./Decel.	2.00	2.00	2.00	2.00	2.00	ft/s^2
VINH - Inspection Velocity - High	050	050	050	050	050	fpm
MRSR - Rope Stretch Relevel Distance	0.60	0.60	0.60	0.60	0.60	in
MPER - Position Encoder Resolution	✳	✳	✳	✳	✳	ppr
✳ Set MPER to “0" if LS Quad landing system or “25" if LS Quick landing system						
NF - Number of Floors	per job	per job	per job	per job	per job	N/A
TP1 - Test Point One	04	04	04	04	04	N/A
TP2 - Test Point Two	06	06	06	06	06	N/A
SAFETY (SHIFT F6) SCREEN						
STDR - Terminal/Danger Slowdown Rate	7.00	7.00	7.00	7.00	7.00	ft/s^2

3.5 VERIFYING THE AC DRIVE PARAMETERS

For controllers with the Baldor drive, see Section 3.5.1.
For controllers with the Magnetek drive, see Section 3.5.2.
For controllers with the TORQMAX F4 drive, see Section 3.5.3.
For controllers with the TORQMAX F5 drive, see Section 3.5.4.

3.5.1 VERIFYING THE BALDOR AC DRIVE PARAMETERS

Each controller is shipped with completed parameter sheets. Based upon the field survey information provided, all of the field adjustable parameters have been entered into the drive unit and noted on the parameter sheets. However, **it is essential to verify all of the drive parameter settings before start up.** These values can be verified using the Baldor Drive and/or Baldor Drive Direct Access screens (see Section 3.5.1.1) or the drive keypad (see Section 3.5.1.2).

3.5.1.1 USING THE BALDOR DRIVE PARAMETER SCREENS - The Baldor Drive (Shift F5) and the Baldor Drive Direct Access (F1, D) screens can be used to verify the drive parameters with the Drive Parameter sheet shipped with the controller and the motor name plate data. Many of the Motor Parameter values are taken directly from the nameplate of the equipment used with this installation. Other values must be measured accurately. Failure to enter the correct values may damage the drive and rotating equipment, or result in car overspeed or poor performance.

FIGURE 3.8 Baldor Drive (Shift F5) screen (Example of 15 HP, 230 volt motor)

```
                          9/28/2000, 10:25:30 AM, F4=Main Menu

              Baldor Drive (Shift F5) - Advanced View (U.S.)

2501  Motor Voltage                              230      volts
Motor name plate voltage.

 2501 230       1601  01160    2003  01160    TP1   06
 2502 049.0     1602  003      2004  120.0    TP2   04
 2503 01160     1603  FWD      2005  12.0
 2504 060       1604  020
 2505 014.00    1605  050      2202  ON
 2506 01024     1606  014
                1607  003
 2601 004.0     1610  02.00
 2602 4800.0
                1506  320
                1507  1160

        ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View
                                                                dnID267a
```

Parameters on the Baldor Drive (Shift F5) screen are edited as described in Section 3.3.5.

The initial values for the AC Drive parameters are set at the factory. These parameters must be verified with the motor name plate and the parameter sheet filled out at the factory and shipped with the controller before the car can be moved on Inspection.

> **NOTE:** Parameter P2602 Resistor Watts is in kilowatts for the Baldor drive model ZD18HXXXL-DEX (with DSP control board) and in watts for drive model ZD18HXXXL-EX.

FIGURE 3.9 Baldor Drive Direct Access (F1, D) Screen

```
                                                                    Esc = Exit
                            BALDOR DRIVE DIRECT ACCESS
*************************************************************************
                You are now accessing the Baldor drive software.
                     Press ESC to return to MCE's program.

To view the current value of a parameter, i.e. P1104, type HP1104 and press
Enter.  The current plus maximum, minimum and default values are displayed.

To change a parameter value, i.e. to change P1104 to 1, note the current value
for reference, then type P1104 1 and press Enter (space before new value).

*************************************************************************
TABLE: 0

P1001 = 0      P1002 = 0      P1003 = 0      P1004 = 0      P1005 = 0
P1006 = 0      P1007 = 0      P1008 = 0      P1009 = 0      P1010 = 0
P1011 = 0      P1012 = 0      P1013 = 0      P1014 = 0      P1015 = 0
P1101 = 0.10   P1102 = 0.10   P1103 = 1      P1104 = 3      P1105 = 3
P1106 = 0      P1201 = 10     P1202 = 1.00   P1203 = 1.00   P1204 = 6
P1301 = 1      P1302 = 1      P1303 = 0      P1304 = 0      P1305 = 0
P1306 = 0      P1401 = 5      P1402 = 1      P1403 = 0      P1404 = 0.0
P1405 = 0.00   P1501 = 0      P1502 = 2      P1503 = 9      P1504 = 6
P1505 = 10     P1506 = 100    P1507 = 0      P1508 = 0      P1509 = 16
P1510 = 100    P1511 = 100    P1512 = 6      P1601 = 0      P1602 = 3
P1603 = 1      P1604 = 20     P1605 = 50     P1606 = 10     P1607 = 1.00
P1608 = 0      P1609 = 0      P1610 = 1.23   P2001 = 3      P2002 = 0
P2003 = 0      P2004 = 0.0    P2005 = 12.2   P2006 = 0.000  P2101 = 5
P2102 = 0      P2103 = 0      P2201 = 1      P2202 = 1      P2203 = 1
P2204 = 1      P2301 = 0      P2302 = 0      P2303 = 0      P2304 = 0
P2305 = 0      P2306 = 1024   P2401 = 0      P2402 = 0      P2403 = 23597
P2501 = 460    P2502 = 0.0    P2503 = 0      P2504 = 0.0    P2505 = 0.00
P2506 = 1024   P2507 = 0      P2601 = 0      P2602 = 0      P2701 = 9
P2702 = 0      P2703 = 9      P2704 = 0.0    P2705 = 0.0    P2706 = 1
P2707 = 0      P2708 = 0.00   P2709 = 0      P2710 = 1      P2711 = 1
P2712 = 1024
_
                                                                    dnID161a
```

Access the Baldor Drive Direct Access (F1, D) screen. TABLE:0 will appear on the screen which shows the parameters P1001 through P2712 and their current settings. All of the AC Drive Parameter values are in numerical numbers.

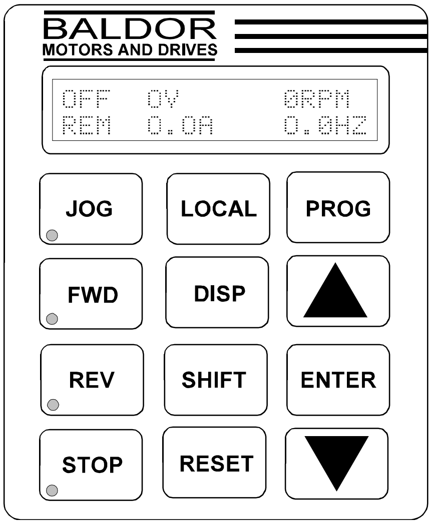
- To verify the current value of a parameter (for example, P1104), type HP1104 and press Enter. The screen will display:

  ```
  P1104    ACCEL TIME #2        =       3.0        SEC
  Min value = 0.0, Max value = 1839.0, Default value = 3.0
  ```

- **Note the value of parameter P1104 for reference.**
- To change a parameter value (for example, to change P1104 to 1), type P1104 1 and press Enter (There must be a space between the parameter number and its value).
- To verify that the parameter has been changed, type HP1104 and press Enter. The new value for P1104 will be displayed, along with the maximum, minimum and default values.
- **Change the value of P1104 back to its original default setting.**

3.5.1.2 USING THE BALDOR DRIVE KEYPAD - At this point it is strongly recommended to become familiar with the AC Flux Vector Drive manual, specifically the sections describing the key pad and display functions, and how to change the display to show output voltage, current, frequency and rpm.

FIGURE 3.10 Baldor Drive Keypad



LOCAL - Press LOCAL to change between the local (keypad) and remote operation. When in the local mode all other external commands to the J1 terminal strip will be ignored with the exception of the external trip input.

DISP - Press DISP to return to display mode from programming mode. Provides operational status and advances to the next display menu item, including the diagnostic screens.

RESET - Press RESET to clear fault messages (in local mode). Can also be used to return to the top of the block programming menu without saving parameter changes.

PROG - Press PROG to enter the program mode. While in the program mode the PROG key is used to edit a parameter setting.

▲ - (Up Arrow) Press ▲ to increment the value of the parameter displayed to the next greater value. When the fault log or parameter list is displayed, ▲ will scroll upward through the list.

▼ - (Down Arrow) Press ▼ to decrement the value of the parameter to the next lesser value. When the fault log or parameter list is displayed, ▼ will scroll downward through the list.

ENTER - Press ENTER to save parameter value changes and move back to the previous level in the programming menu.

SHIFT - Press SHIFT in the program mode to control cursor movement. Pressing SHIFT once moves the blinking cursor one character position to the right. While in program mode, a parameter value may be reset to the factory preset value by pressing the SHIFT key until the arrow symbols at the far left of the keypad are flashing, then press an arrow key. In display mode the SHIFT key is used to adjust the keypad contrast.

JOG, FWD, REV - These keys are active in the local mode but are not used in this application.

STOP - Press STOP to stop the hoist motor; it also changes to local mode if not on local mode.

3.5.2 VERIFYING THE MAGNETEK AC DRIVE PARAMETERS

For controllers with the Baldor drive, see Section 3.5.1.
For controllers with the TORQMAX F4 drive, see Section 3.5.3.
For controllers with the TORQMAX F5 drive, see Section 3.5.4.
For IMC-AC-R controllers with the POWERBACK Regenerative Drive, see Appendix O.

Each controller is shipped with completed parameter sheets. Based upon the field survey information provided, all of the field adjustable parameters have been entered into the drive unit and noted on the parameter sheets. However, **it is essential to verify all of the drive parameter settings before the start up.** These values can be verified using the Magnetek Drive and Magnetek Drive Switches screens (see Section 3.5.2.1) or the drive keypad (see Section 3.5.2.2).

3.5.2.1 USING THE MAGNETEK DRIVE PARAMETER SCREENS - The Magnetek Drive Adjustment (Shift F5) and Magnetek Drive Configuration (F1, M) screens can be used to verify the drive parameters with the Drive Parameter sheet shipped with the controller and the motor name plate data. Many of the Motor Parameter values are taken directly from the nameplate of the equipment used with this installation. Other values must be measured accurately. Failure to enter the correct values may damage the drive and rotating equipment, or result in car overspeed or poor performance.

FIGURE 3.11 Magnetek Drive Adjustment (Shift F5) screen

```
                              9/25/2000, 10:25:30 AM, F4=Main Menu

                MagneTek Drive (Shift F5) - Advanced View (U.S.)

P1  Contract Car Spd                              0000.0     ft/min
This parameter ses the elevator contract speed.

  P1   0000.1    | *P26   0.10    | *P63   3.00     | *P95   80
  P2   1130.0    | *P27   1.00    | *P64   08.0     | *P96   80
  P3   10.0      |  P28   250.0   | *P65   08.0     | *P97   00.0
  P4   02.00     | *P29   250.0   |                 |  P98   230
  P5   02.0      | *230   075     | *P70   0000.0   |
  P6   100       | *P31   00.0    | *P71   0000.0   |  P110  MCE TEST
  P7   100.0     | *P32   00.0    | *P72   0000.0   |  P111  005.0
 *P8   00.0      | *P33   01.0    | *P73   0000.0   |  P112  460.0
 *P9   80        | *P34   01.0    | *P74   0000.0   |  P113  060.0
 *P10  0.20      | *P35   005     | *P75   0000.0   |  P114  006.80
 *P11  0.50      | *P36   03      | *P76   0000.0   |  P115  6
 *P12  0.00      |                | *P77   0000.0   |  P116  1130.0
 *P13  0.00      | *P50   7.99    | *P78   0000.0   |  P117  35.0
 *P14  125.0     | *P51   7.99    | *P79   0000.0   | *P118  09.0
 *P15  1.00      | *P52   00.0    | *P80   0000.0   | *P119  09.0
  P16  100.0     | *P53   00.0    | *P81   0000.0   | *P120  01.5
  P17  01024     | *P54   03.00   | *P82   0000.0   | *P121  00.5
  P18  10.0      | *P55   03.00   | *P83   0000.0   | *P122  01.0
 *P19  1.00      | *P56   00.0    | *P84   0000.0   | *P123  110
 *P2P  20.0      | *P57   08.0    |                 | *P124  060.0
 *P21  0.00      | *P58   3.00    | *P90   1.00     | *P125  075
 *P22  1.00      | *P59   3.00    | *P91   0.30     | *P126  000
 *P23  0.00      | *P60   08.0    | *P92   1.00     |  P127  050
 *P24  01.00     | *P61   08.0    | *P93   0.30     |
 *P25  0.00      | *P62   3.00    |  P94   10.0     |

        ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View
                                                                dnID267
```

FIGURE 3.12 Magnetek Drive Configuration (F1, M) screen

```
                              12/22/2000, 10:25:30 AM, F4=Main Menu

              MagneTek Configuration (F1, M) - Advanced View (U.S.)

P140  Speed Command Src                           MULTI-STEP
This parameter ses the speed command source.

 *P140  MULTI-STEP   | *P159  NONE        | *P190  SPD CMMAND |
 *P141  EXTERN TBL   |                    | *P191  FDBACKRR   |
 *P142  INTERNAL     | *P170  DRIVE ENBL  |                   |
 *P143  ELEV SPD RR  | *P171  RUN         | *P204  U.S.       |
  P144  FWD          | *P172  UP/DWN      |                   |
 *P145  RG RELEASE   | *2173  FLT RESET   |                   |
 *P146  NONE         | *P174  STP RF B0   |                   |
 *P147  NONE         | *P175  STP RF B1   |                   |
 *P148  NOT LTCHED   | *P176  STP RF B2   |                   |
 *P149  EXTERN TB1   | *P177  STP RF B3   |                   |
 *P150  EXTERN TB1   | *P178  S-CURVE S0  |                   |
 *P151  EXTERN TB1   |                    |                   |
 *P152  INTERNAL     | *P180  SPD DEV LW  |                   |
 *P153  NONE         | *P181  SPD DEV LW  |                   |
 *P154  INTERNAL     | *P182  SPD RG RLS  |                   |
 *P155  NONE         | *P183  FAULT       |                   |
 *P156  EXTERN TB1   | *P184  FAULT       |                   |
 *P157  DISABLE      | *P185  SPD RG RLS  |                   |
 *P158  DISABLE      |                    |                   |

        ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View
                                                                dnID268
```

3.5.2.2 USING THE MAGNETEK DRIVE KEYPAD - At this point it is strongly recommended to become familiar with the AC Flux Vector Drive manual, specifically the sections describing the key pad and display functions, and how to change the display to show output voltage, current, frequency and rpm.

The Magnetek HPV 900 parameters are grouped under six major menus as shown in Figure 3.13. The currently selected menu is shown on the top line of the keypad display when the SUB-MENU LED is not lit (Figure 3.14). Table R.12 provides a complete listing of Magnetek Drive parameters. Note that the parameter *numbers* (P1 thru P204) are displayed *only* on the CRT screen. The parameter *names* are shown on the drive keypad display.

FIGURE 3.13 HPV 900 Parameter Menu Trees

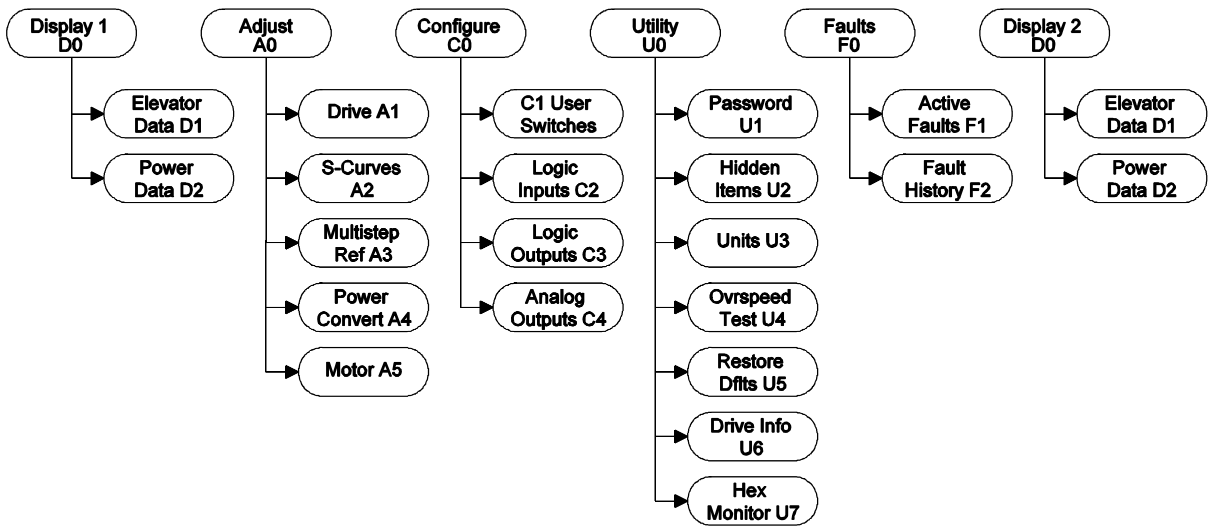
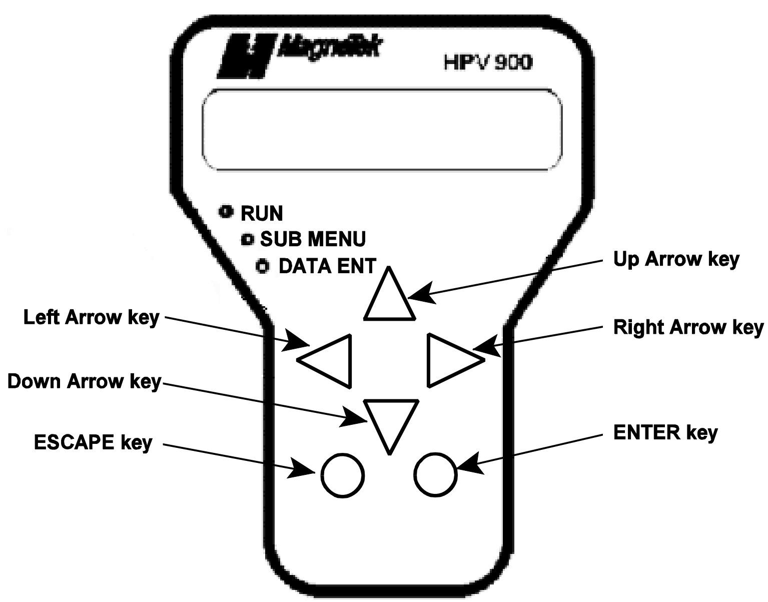


FIGURE 3.14 Magnetek Drive Keypad



The digital operator keys operate on three levels, the menu level, the sub-menu level and the entry level. At the menu level, they function to navigate between menus or sub-menus. At the sub-menu level they navigate between menu items. At the entry level, they are used to adjust the values or select options.

Figure 3.14 shows the six keys used to navigate, adjust values and make selections. How these keys operate is dependent on the “level” (i.e., main menu, sub-menu or entry level). In general, the ENTER and ESCAPE keys control the level. The ENTER key is used to move to a lower level and the ESCAPE key is used to move to a higher level. The ARROW keys control movement. The up and down arrow keys control the vertical position and the left and right arrows control the horizontal position. For more information refer to Section 3, *Parameter Adjustments* in the Magnetek HPV 900 AC Vector Elevator Drive Technical Manual.

3.5.3 VERIFYING THE TORQMAX F4 AC DRIVE PARAMETERS

For controllers with the Baldor drive, see Section 3.5.1.

For controllers with the Magnetek drive, see Section 3.5.2.

For controllers with the TORQMAX F5 drive, see Section 3.5.4.

For IMC-AC-R controllers with the POWERBACK Regenerative Drive, see Appendix O.

NOTE: The TORQMAX drive parameters are not available from the CRT terminal. Use the drive keypad to verify the parameters.

Each controller is shipped with completed parameter sheets. Based on the field survey information provided, all of the field adjustable parameters have been entered into the drive unit and noted on the parameter sheets. However, ***it is essential to verify all drive parameter settings before startup.*** These values can be verified using the TORQMAX drive parameter screens (not available at this time) or using the TORQMAX drive keypad (see Section 3.5.4.2)

The Caution box below lists critical drive parameters which must be verified before startup. The remaining drive parameters must be verified with the Quick Reference for TORQMAX R4 Drive Parameters which was shipped with the controller. This complete listing of drive parameters can also be found in the Reference Section Table R.13 of this manual.

CAUTION: Do not change drive parameters while the elevator is running. The following are critical TORQMAX F4 Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02** Operating Mode **= 4** (± 10V)
- **LF.04** Motor-Selection **= 0** (induction motor)
- **LF.07** Unit System **= US**
- **LF.10** Rated Motor Power (HP).
- **LF.11** Rated Motor Speed (RPM).
- **LF.12** Rated Motor Current (Amp).
- **LF.13** Rated Motor Frequency (Hz).
- **LF.14** Rated Motor Voltage.
- **LF.17** Encoder Pulse / Rev (PPR)
- **LF.20** Contract Speed (FPM)
- **LF.21** Traction Sheave Diameter (inches)
- **LF.22** Gear Reduction Ratio
- **LF.23** Roping Ratio
- **LF.24** Load (LBS)
- **LF.30** Control Method **= 2** (closed loop)
- **LF.31** Kp Speed (proportional gain)
- **LF.32** Ki Speed (integral gain)
- **LF.36** Maximum Torque (LB/ft.)
- **LF.42** High Speed (FPM)
- **LF.79** Delay to turn OFF the motor current - after direction is dropped.

3.5.4 VERIFYING THE TORQMAX F5 AC DRIVE PARAMETERS

For controllers with the Baldor drive, see Section 3.5.1.

For controllers with the Magnetek F4 drive, see Section 3.5.2.

For controllers with the TORQMAX F4 drive, see Section 3.5.3.

For IMC-AC-R controllers with the POWERBACK Regenerative Drive, see Appendix O.

NOTE: The TORQMAX drive parameters are not available from the CRT terminal. Use the drive keypad to verify the parameters.

Each controller is shipped with completed parameter sheets. Based on the field survey information provided, all of the field adjustable parameters have been entered into the drive unit and noted on the parameter sheets. However, ***it is essential to verify all drive parameter settings before startup.*** These values can be verified using the TORQMAX drive parameter screens (not available at this time) or using the TORQMAX drive keypad (see Section 3.5.4.2)

The Caution box below lists critical drive parameters which must be verified before startup. The remaining drive parameters must be verified with the Quick Reference for TORQMAX R5 Drive Parameters which was shipped with the controller. This complete listing of drive parameters can also be found in the Reference Section Table R.14 of this manual.

CAUTION: Do not change drive parameters while the elevator is running. The following are critical TORQMAX F5 Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02** Signal Operating Mode **= ASpd**
- **LF.04** Motor-Selection (see US.10)
- **LF.10** Rated Motor Power (HP).
- **LF.11** Rated Motor Speed (RPM).
- **LF.12** Rated Motor Current (Amp).
- **LF.13** Rated Motor Frequency (Hz).
- **LF.14** Rated Motor Voltage.
- **LF.27** Encoder Pulse / Rev (PPR)
- **LF.20** Contract Speed (FPM)
- **LF.21** Traction Sheave Diameter (inches)
- **LF.22** Gear Reduction Ratio
- **LF.23** Roping Ratio
- **LF.24** Load Weight(LBS)
- **LF.30** Control Method **= 2** (closed loop)
- **LF.31** Kp Speed (proportional gain)
- **LF.32** Ki Speed (integral gain)
- **LF.36** Maximum Torque (auto set)
- **LF.42** High Speed (FPM)
- **LF.79** Current Hold Time - Delay to turn OFF the motor current - after direction is dropped.

CAUTION: (For F5 software $\geq$ V1.51) Do not change drive parameters while the elevator is running. The following are very critical TORQMAX Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02 = ASpd** (Signal Operating Mode)
- **LF.04 = 0** (Induction motor)
- **LF.10** Rated motor power (HP).
- **LF.11** Rated motor speed (rpm).
- **LF.12** Rated motor current (Amp).
- **LF.13** Rated motor frequency (Hz).
- **LF.14** Rated motor voltage.
- **LF.20** Contract speed (fpm)
- **LF.21** Traction sheave diameter (inches)
- **LF.22** Gear Reduction ratio
- **LF.23** Roping Ratio
- **LF.24** Load Weight (lbs)
- **LF.30** Control Method **= 2** (closed loop)
- **A.LF.31** Kp Speed Accel: Proportional gain
- **d.LF.31** Kp Speed Decel: Proportional gain
- **A.LF.32** Ki Speed Accel: Integral gain
- **d.LF.32** Ki Speed Decel: Integral gain
- **A.LF.33** Ki Speed Offset Accel: Low speed gain
- **d.LF.33** Ki Speed Offset Decel: Low speed gain
- **LF.42** High Speed (FPM)
- **LF.79** Delay to turn OFF the motor current - after direction is dropped.

3.5.4.1 USING THE TORQMAX DRIVE PARAMETER SCREENS

> **NOTE:** Serial communication is not available for the TORQMAX drive at this time. See Section 3.5.3.2 *Using the TORQMAX Drive Keypad* to access and verify the drive parameters.

3.5.4.2 USING THE TORQMAX DRIVE KEYPAD - At this point it is strongly recommended to become familiar with the AC Flux Vector Drive manual, specifically the sections describing the keypad and display functions, and how to change the display to show output voltage, current, frequency and rpm.

The TORQMAX parameters are grouped as shown below:

Parameter Structure

Parameter Groups

LF - Parameter: LF. 0...LF.C5
ru - Parameter: ru. 0...ru. 32
In - Parameter: In. 0...In. 57
Fr - Parameter: Fr. 0

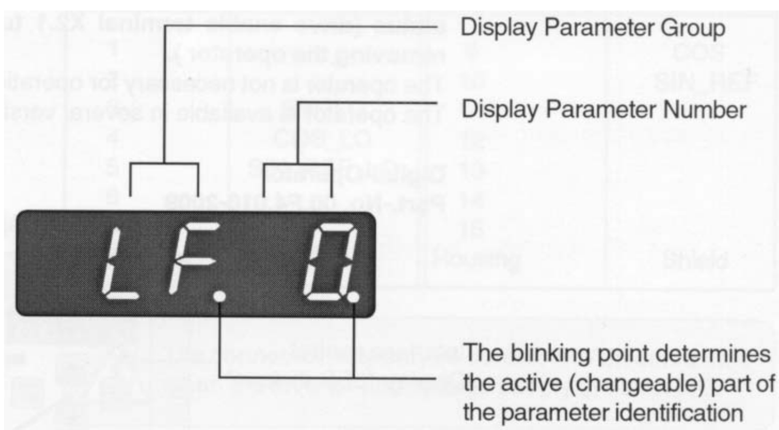
Read-Only Parameters
can be read but not changed

LF.76, LF.80...LF.A0
ru.0...ru.04, ru.09...ru.11,
ru.18...ru.24, ru.26...ru.32,
In.0...In.57

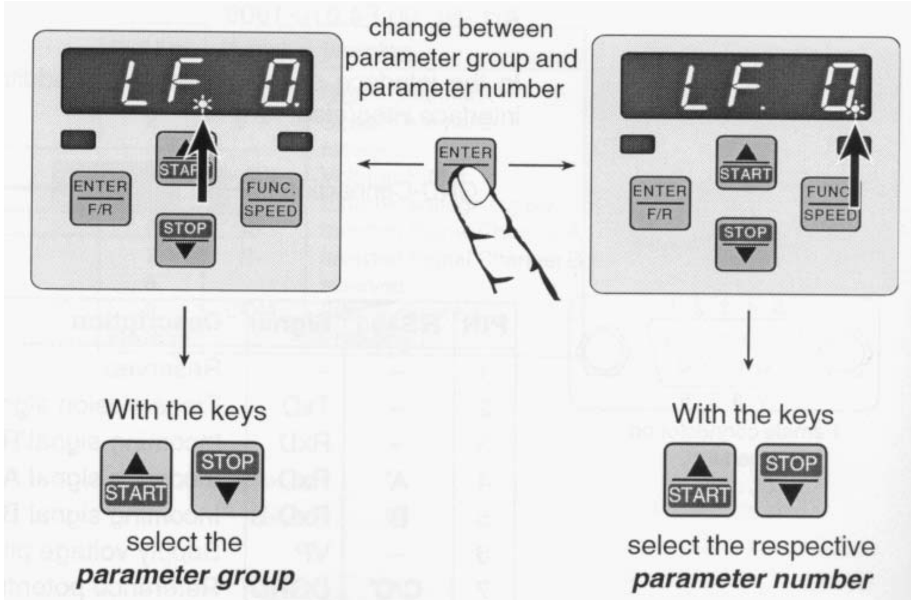
Programmable Parameters
can be changed

LF.0...LF.75, LF.77, LF.78,
LF.A1...LF.C5
ru.8, ru.12, ru.25, Fr.0

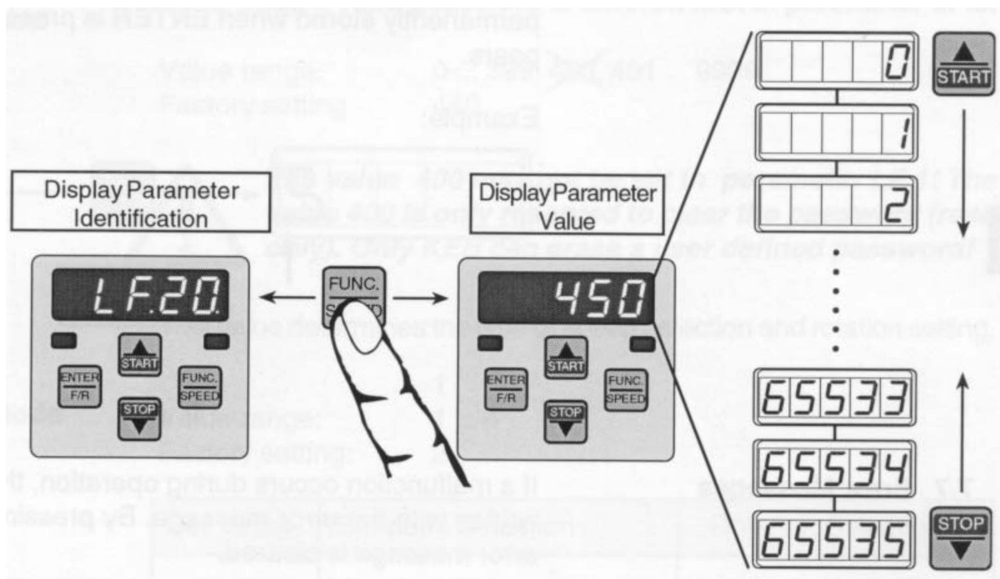
Parameter Identification



Parameter Selection

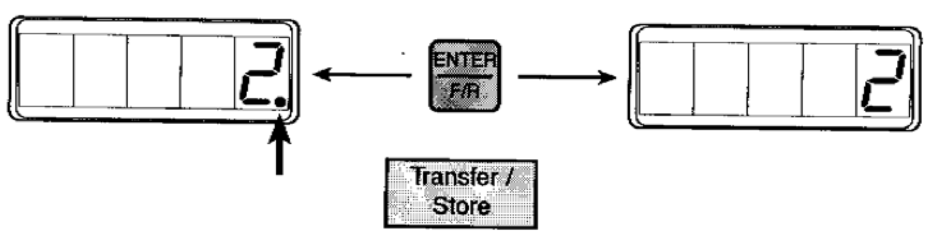


Changing Parameter Values



Storing Parameter Values

If the parameter value is changed, a point appears behind the last position in the display. The adjusted parameter is transferred and permanently stored when **ENTER** is pressed, and the point disappears.

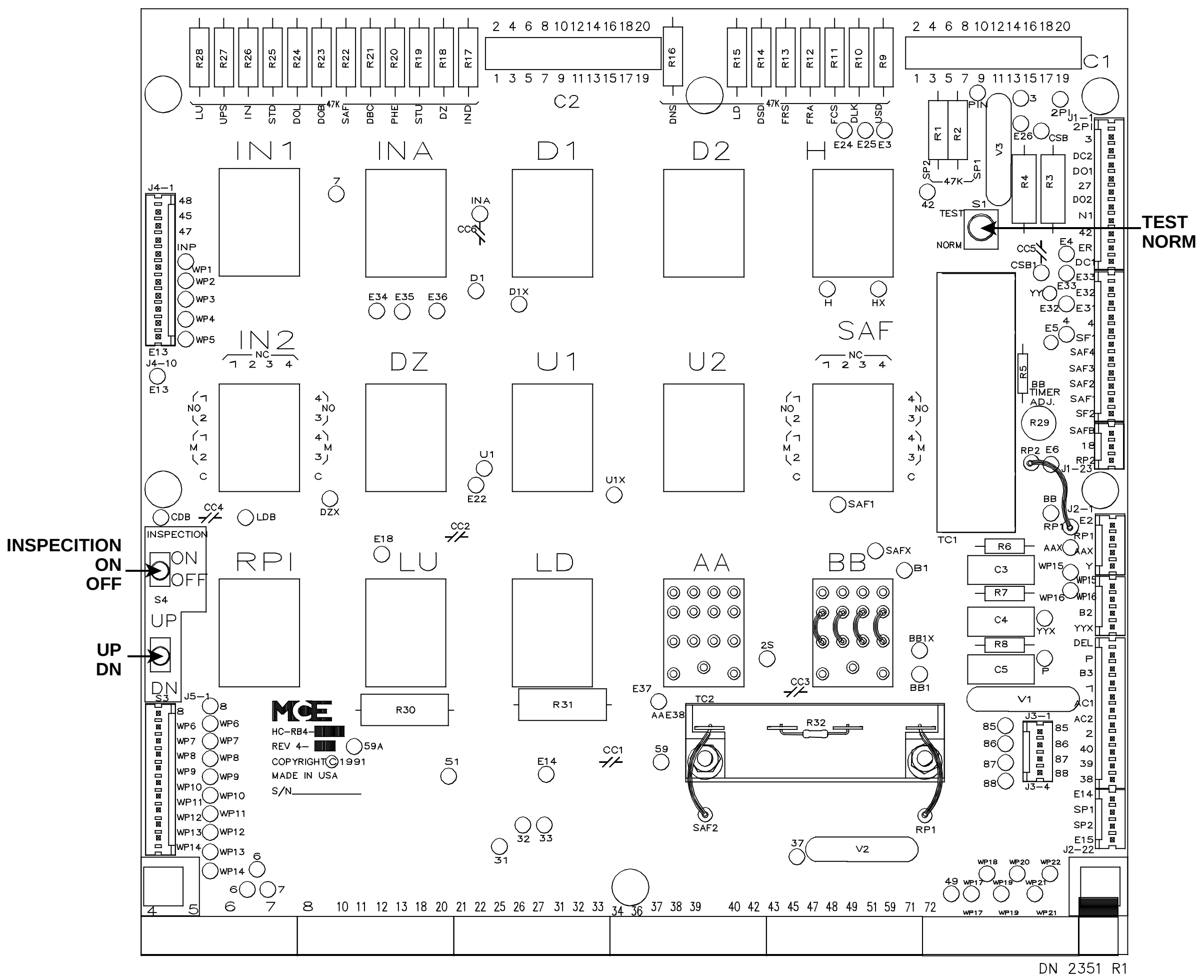


3.6 VERIFYING THE SAFETY CIRCUITS AND RELAYS

3.6.1 VERIFYING THE SAFETY CIRCUITS

After making the parameter adjustments on the CRT screens, turn power OFF at the main disconnect. Then verify the safety circuits. To do this, check the pit switch, buffer switches, car and cartop stop switches, and any other safety switches to confirm that they are all in a closed position.

FIGURE 3.15 HC-RB4-SCRI Board



a. Turn the Cartop Inspection switch ON. At this point, the wire should have already been pulled out of terminal 59 on the HC-RB4-SCRI board and the end should be taped with electrical tape for protection. The wire to terminal 59 should have been removed and a jumper should already in place between terminals 2 and 59 **to bypass the Inspection Switch (COP Access Enable)**. Close the car doors. Leave the hall doors closed, and lock the doors that are accessible to the public.

WARNING:	If the wire to terminal 59 is *not* removed (step 'a' above) and the jumper is installed between terminals 2 and 59, **this will bypass the complete safety string**.

b. Connect a jumper wire to terminals 4 and 8 on the HC-RB4-SCRI board to **override the gate switch and the door locks** (see Figure 3.15). If the car is on the up final limit, connect a jumper between terminals 2 and 16 on the subplate **to bypass the hoistway safety functions**, but **remove this jumper as soon as possible for safety reasons**.

c. On the SCR-RI board, there are two single pin terminals, FBP1 and FBP2, used to bypass the Drive safety monitors. Use a jumper wire to connect terminal FBP1 to terminal FBP2 **(bypass the drive safety functions)**. NOTE: The AC Drive faults, safety functions, Drive not ON (DRO), brake output circuit failure (BOF), parameter initialization error (PIE), and emergency terminal limit switches (UET and DET) are not bypassed by the jumper between terminals FBP1 and FBP2.

3.6.2 VERIFYING RELAY OPERATION AND CHECKING VOLTAGE

a. Verify the following items before moving the car on Inspection:

- Power is OFF at the main disconnect.
- The INSPECTION ON/OFF switch on the Main Relay board is in the ON position and the TEST/NORMAL switch is in the TEST position.
- The encoder is coupled to the motor shaft and its wiring is complete according to drawing -D. The encoder body is electrically isolated from the motor body.
- If the brake switch is connected to terminal BPS on the controller, remove the wire and label it; it will be replaced later. Remove the brake wire from terminal B1 to disable the brake.
- Motor connections are complete according to drawing -D and -DY. Check for any loose connections on the motor terminals.

b. Turn power ON at the main disconnect. After initialization, check the F3 screen. Verify that there are no faults highlighted (bold) in the Fault block, with the possible exception of FLTB, SWC, LOD, LOP, OLD, RDS, and PRS. The AC Drive keypad should display the following:

```
OFF   0V   0RPM
REM   0.0A  0.0HZ
```

Baldor Drive

```
SPEED COMMAND
D1        0.0
ft/min
```

Magnetek Drive

```
  n o P
```

TORQMAX Drive

If there are any faults, refer to Section 6 of this manual.

c. The AC Drive Parameters on the Drive (Shift F5) screen must match the motor name plate and the parameter sheet filled out for the specific controller and shipped with the controller (not applicable to the TORQMAX drive - use the drive keypad to verify the parameters).

d. On the Pattern (Shift F4) screen, reduce PG Pattern Scaling to zero (0.00). This will limit the input command pattern for the AC Drive to zero when the direction is picked on Inspection.

e. To check the encoder, loosen the encoder coupling from the motor end and rotate the encoder shaft. The RPM value on the drive keypad must change (for TORQMAX drive, select parameter LF.89 to see RPM). If the RPM value changes, it proves that the encoder is working. Tighten the encoder coupling to the motor shaft. Turn power OFF at the main disconnect.

f. Reinstall fuses F4, FB1, FB2, FC1 and FMC (see page -3 of the job prints). Turn power ON at the main disconnect. There should be 120 VAC between terminals 1 and 2.

g. After 10 seconds, the following relays will be energized: SAF (on the HC-RB4-SCRI board), SAFB, SAFM, SAFRE and SAFX (if present) on the subplate.

- If the SAF relay on the HC-RB4-SCRI board is not energized, check the jumper from terminals FBP1 to FBP2 on the SCR-RI board **(bypasses the drive safety functions)**. Also, briefly connect a jumper between screw terminals 2 (on the subplate) and 20 on the HC-RB4-SCRI board **(bypass the safety string)**. If the SAF relay energizes after connecting the jumper between 2 and 20, then the trouble is in the safety contact string. Remember, there is a several second delay from the time power is applied to when relay SAF energizes.

- If the SAF relay still does not energize, check the FLT relay on the SCR-RI board. If the FLT relay is not energized and FBP1, FBP2 are jumped together, make sure the COMPUTER1 ON and COMP2 ON LEDs on the IMC-DIO board are solidly lit. This will verify that the two independent safety processors are functioning (check the DDP Computer ON LED to verify that it is ON, as well). Also, check the ribbon cable from the Computer Swing Panel to the IMC-SI2 unit and the ribbon cable from the IMC-SI2 unit to the SCR-RI board.

h. With the INSPECTION ON/OFF switch in the ON position, move the INSPECTION UP/DN switch on the HC-RB4-SCRI board to the UP position and hold it there to pick the UP direction relays (Note: The car-door bypass and hoistway-door bypass switches must be OFF to run on relay panel inspection). Some relays will energize, but the car should not move and the brake should not lift. Verify that the following relays are energized:

RELAY	LOCATION
SAF, U1, and U2	HC-RB4-SCRI board
RE, PT1-PT3, MX	SCR-PRI board.
SAFB, SAFM, SAFX (if any)	the subplate
PM1, PM2	the subplate
SAFRE	IMC-ACIM or IMC-ACIK board or on the subplate

If PM1 and PM2 are not energized, make sure that the PT1, PT2, PT3 and SAFM relays are picked, and the voltage between the FMC fuse (bottom of the fuse) and 1 bus is 120 VAC. Note: If a DRO fault is indicated on the View Hoistway (F3) screen or a “No Response to Run Request” message is reported on the Special Events Calendar (F7, F7) screen, refer to Section 3.7 and 3.7.1 for corrective action.

3.7 MOVING THE CAR ON INSPECTION

Perform the following in preparation for moving the car on Inspection:

a. Turn power OFF at the main disconnect. Connect the brake wire which was removed from terminal B1. Then turn power ON at the main disconnect.

b. On the Pattern (Shift F4) screen, set:
   - VINH Inspection Velocity - High = 30 fpm
   - PG Pattern Scaling = 1.00

c. On the Brake (Shift F3) screen, verify that:
   - BPV Pick Voltage and BHV Hold Voltage are set to the brake pick voltage.
   - TBPD Pick Delay = 0.40 or greater
   - TSPD Speed Pick Delay = 0.50 or greater

d. On the TORQMAX drive, verify that Speed Pick Delay LF.70 = 0.300 and Current Hold Time LF.79 = 0.300

Move the car to the middle of the hoistway to allow for uncontrolled motion. An alternative is to ease the car onto the buffer, bypassing the appropriate overtravel limit switch, and run the car away from the terminal landing.

3.7.1 VERIFYING THE PICKING OF THE BRAKE

On the HC-RB4-SCRI board, turn the INSPECTION ON/OFF switch ON and the UP/DN switch to DN to run the car in the down direction (or in a direction away from the terminal landing). Contactors PM1 and PM2 should pick and the brake should lift. If the brake lifts, proceed to 3.7.2, 3.7.3, 3.7.4 or 3.7.5. If the brake does not lift, check the following:

a. If PM1 and PM2 do not pick, check the RE relay LED on the SCR-PRI board and the RUN ENABLE LED on the IMC-DAS board to make sure that they are ON. If both are OFF, check the following:

   - Verify that D1 and D2 on the HC-RB4-SCRI board are energized. If they are not, check relays SAF and FLT.

   - Verify that DRIVE READY is displayed, and the RDY, DSR, and ADR flags are highlighted in the CONTROL section of the F3 screen.

   - Check the fault flags on the F3 screen. The following are some of the flags which will prevent RUN ENABLE: AC Drive fault, CNPM, MR, CNPB, PIE, and FBLT (see Section 6 for more details).

b. If the RUN ENABLE LED on the IMC-DAS board is ON and the RE relay on the SCR-PRI board does not pick, check the RE triac (Q1) on the SCR-RI board. Also, check the connectors and wires from the SCR-RI board to the SCR-PRI board.

   Note that the RE relay LED normally turns OFF approximately one second (adjustable timer) after the direction relays U1 and U2 or D1 and D2 drop. The RE relay LED will turn ON and the RE relay will pick and remain picked if the direction is picked, if there is no fault in the AC Drive Unit, and if the AC Drive turns ON the Drive ON output signal connected to input terminal DRO on the IMC-ACIB / ACIM / ACIK board, the relay will pick and remain picked.

If the Drive ON output (ADO flag on the F3 screen) does not turn ON in the specified time, then the main contactor will drop, the DRO fault flag will be highlighted on the F3 screen and the fault message NO RESPONSE FOR RUN REQUEST will be logged in the Special Event Calendar (F7) screen. To eliminate this problem, increase TBPD Brake Pick Delay and then increase TSPD Speed Pick Delay to coordinate the application of the speed pattern with the picking of the brake, to prevent rollback and achieve a smooth start. Increasing TSPD Speed Pick Delay helps to build up excitation in the motor which, in turn, causes the Drive ON output to be turned ON.

c. If the brake still does not lift, check the following:

- Measure the voltage between panel-mounted terminals B1 and B2. Verify that the measured voltage is close to the value specified for the BPV Pick Voltage on the Brake (Shift F3) screen.

- If there is no voltage between terminals B1 and B2, check to see that fuses FB1 and FB2 are good and that relays PT1, PT2, PT3 and MX on the SCR-PRI board are energized.

- Measure the AC input voltage to the brake circuit between terminals BPI1 and BPI2 on the SCR-PRI board and verify that the voltage is the same as that shown on page -D of the job prints.

3.7.2 VERIFYING PROPER CAR MOVEMENT AND MOTOR CURRENT (BALDOR DRIVE)

For Magnetek drives, refer to Section 3.7.3. For TORQMAX F4 drives, refer to Section 3.7.4. For TORQMAX F5 drives, refer to Section 3.7.5.

If the brake lifts and contactors PM1 and PM2 pick, the car should move in the correct direction.

a. If the car moves in the opposite direction and draws normal current, change the P1603 Encoder Align parameter on the Baldor Drive (Shift F5) screen from Forward to Reverse or vise versa and interchange A+ with A- or B+ with B- on connector J1 on the Baldor Drive Unit. Follow the encoder interconnection drawings and observe the following warning.

> **WARNING:** Turn the power OFF at the main disconnect and wait 5 minutes for the DC bus voltage to bleed off before taking the drive cover off. Do not touch any terminals without ensuring that high voltage is not present.

b. If the car moves in the correct direction, then monitor the motor current on the drive keypad (preferred) or on the F3 screen. If the value of current drawn is the normal value, then verify the car speed. The car speed should be the same as the value of VINH Inspection Velocity - High on the Pattern (Shift F4) screen. If the car speed is the same as VINH, proceed to 3.7.5.

c. If the car moves at a slower speed in the correct direction, then monitor the motor current on the drive keypad (preferred) or on the F3 screen. If motor draws excessive current, change the P1603 Encoder Align on the Baldor Drive (Shift F5) screen from Forward to Reverse or vise versa.

If the car still moves at a slower speed in the correct direction and draws normal current, check the following:

1. RPM, on the drive keypad should display a value other than zero when the car is moving. If the displayed RPM value is zero when the car is moving, there is a problem with the Encoder feedback.

2. On the Baldor Drive (Shift F5) screen verify:
   - P1610 Slip Frequency
   - P2003 Maximum Output Speed
   - P2503 Motor Rated Speed

3. Check the commanded pattern voltage to the Baldor Drive which can be measured between the PATT+ and PATT- terminals on the IMC-ACIB board (10 volts DC = contract speed, '+' = UP and '-' = DOWN).

4. If the pattern voltage is correct, adjust P1606 Speed Prop Gain to between 10 and 40. A higher value of this parameter may cause oscillation in the car.

5. If everything checks out OK in steps 1 thru 4 and the car speed is still not the same as VINH Inspection Velocity -High, **refer to Section 3.8 'o' to correct the car speed**.

The car should now be running at the correct speed in the desired direction. If the car drifts far enough to open an overtravel limit and/or open a buffer switch (if provided), then temporarily override the safety circuit by placing a jumper between terminals 2 and 16 on the subplate **(bypass the hoistway safety functions)**. Remove the jumper after bringing the car out of the safety switches.

3.7.3 VERIFYING PROPER CAR MOVEMENT AND MOTOR CURRENT (MAGNETEK DRIVE)

For Baldor drives, refer to Section 3.7.2. For TORQMAX F4 drives, refer to Section 3.7.4.

For TORQMAX F5 drives, refer to Section 3.7.5.

For IMC-AC-R controllers with the POWERBACK Regenerative Drive, see Appendix O.

If the brake lifts and contactors PM1 and PM2 pick, the car should move in the correct direction.

a. If the car moves in the opposite direction and draws normal current, change P144 Motor Rotation on the Magnetek Drive Switches (F1, S) screen from Forward to Reverse or vise versa.

b. If the car does not move, oscillates, does not accelerate to inspection speed or draws high current, this could be caused by incorrect phasing of the encoder signal and motor rotation. To correct this problem, turn the power OFF and switch (interchange) two of the motor leads. Observe the following warning.

WARNING:	Turn power OFF at the main disconnect and wait 5 minutes for the DC bus voltage to bleed off before removing the drive cover. Do not touch any terminals without ensuring that high voltage is not present.

c. If the car draws normal current and moves in the correct direction but slower than the commanded speed, correct this problem by verifying the following parameters on the Magnetek Drive (Shift F5) screen:

- P1 Contract Car Spd
- P2 Contract Mtr Spd
- P110 thru P127 Motor parameters

3.7.4 VERIFYING PROPER CAR MOVEMENT AND MOTOR CURRENT (TORQMAX F4 DRIVE)

For Baldor drives, refer to Section 3.7.2. For Magnetek drives, refer to Section 3.7.3. For TORQMAX F5 drives, refer to Section 3.7.5.

If the brake lifts and contactors PM1 and PM2 pick, the car should move in the correct direction.

a. If the car does not move, oscillates or trips an E.ENC fault, set LF.18 = ON or OFF (change from the previous value). This parameter will swap the encoder channels internally in the drive. It is not recommended to change the external encoder connection as the drive has the capability of changing them through the software. If the car moves in the correct direction, go to step c below.

b. If the car moves in the opposite direction and draws normal current (motor current can be verified by displaying parameter ru.9), then do the following:

   1. Turn the power OFF and wait until there is no voltage present at the DC bus (see Warning). Then interchange two of the motor leads.

> **WARNING:** Turn power OFF at the main disconnect and wait 5 minutes for the DC bus voltage to bleed off before removing the drive cover. Do not touch any terminals without ensuring that high voltage is not present.

   2. Turn the power ON. Try to run the car on Inspection. If the drive still trips on E.ENC fault, set parameter LF.18 = ON or OFF (change from the previous value). The car should now move in the correct direction and draw normal current.

c. If the car draws normal current (looking at parameter ru.9) and moves in the correct direction but slower than the commanded speed, correct this problem by verifying the following parameters on the TORQMAX drive:

- LF.02 Operating Mode = 4 (± 10 VDC)
- LF.04 Motor Selection = 0 (induction motor)
- LF.11 IM - Rated Motor Speed (RPM)
- LF.17 IM - Encoder Pulses / Rev (PPR)
- LF.20 Contract Speed (FPM)
- LF.21 Traction Sheave Diameter (inches)
- LF.22 Gear Reduction Ratio*
- LF.30 Control Method = 2 (closed loop)
- LF.31 IM-Kp Speed (proportional gain) = 3000 to 4000
- LF.32 IM-Ki Speed (integral gain) = 1000
- LF.34 IM-Kp Current (proportional gain) = 1500
- LF.35 IM-Ki Current (integral gain) = 500
- LF.79 Delay to turn OFF the motor current after direction is dropped = 0.300

* <u>If the gear reduction ratio is not available from the machine name plate</u>, calculate the value by first measuring the motor revolutions using a marker on the motor shaft or brake drum. Reduce the inspection speed by decreasing LF.43, then determine the number of motor shaft revolutions required to complete one revolution of the sheave. Calculate the gear reduction ration using the formula: **Gear reduction ratio = Motor RPM / Sheave RPM**. Enter the calculated value in parameter LF.22.

Note: The drive has the capability of estimating the gear reduction ratio. Run the car on inspection and read the value of parameter LF.25, the gear ratio estimated by the drive. The value of LF.25 can be used for LF.22. However, the correct value of LF.22 is critical for overall system performance, therefore MCE/TORQMAX recommends calculating or measuring the gear reduction ratio and entering the calculated value in parameter LF.22 if it is not available from the machine name plate.

3.7.5 VERIFYING PROPER CAR MOVEMENT AND MOTOR CURRENT (TORQMAX F5 DRIVE)

For Baldor drives, refer to Section 3.7.2. For Magnetek drives, refer to Section 3.7.3. For TORQMAX F4 drives, refer to Section 3.7.4.

Auto-Tuning Induction Motors - For best performance with induction motors it is recommend to first perform the auto-tuning procedure as follows:

a. Make sure that the rated motor power (LF.10), rated motor speed (LF.11), rated motor current (LF.12), rated motor frequency (LF.13), rated motor voltage (LF.14) and rated power factor (LF.15) are entered into the drive before you begin. If the power factor is not on the name plate, use 0.90 as the value.

b. On the Brake (F1 - 3) screen, record the values of Pick Voltage (BPV), Hold Voltage (BHV) and Relevel Voltage (BRV). Set the Pick Voltage (BPV) = 005 volts (minimum) to prevent the brake from picking. Observe that the Hold Voltage (BHV) and Relevel Voltage (BRV) are also reduced to the same value.

c. On the Pattern (F1 - 4) screen set Pattern Scaling (PG) = 0.000.

d. On the TORQMAX F5 drive keypad, set parameter LF.3 = S Lrn. This will start the learn process. The display will change to StArt.

e. With the controller on machine room inspection, pick and hold Up direction. The motor contactor should pull in and the brake should not pick. Motor current will begin to flow, an audible noise in the motor will be heard, and the drive display will change to LS103.

   The drive will measure various parameters in the motor as well as in the drive's own power stage. During each measurement the display will change to signify what is being measured. In the event of problems during the measurement phase, the factory can use the codes to determine what is happening. Continue to hold the inspection switch ON until the drive displays "done".

f. In the event that the drive cannot complete the measurements, two error messages may occur:
   - FAILd - the drive is not able to begin measurements due to a configuration error. Consult the factory to resolve.
   - FAIL - the measurement sequence was interrupted, e.g., the inspection switch was released prematurely, electrically the motor was not properly connected. Try the measurement again.

g. When "done" is displayed, release the inspection switch. The drive will finish by making several calculations, CALC is displayed, and updating the parameter values with the measured values.

h. Return the values of Pick Voltage (BPV), Hold Voltage (BHV) and Relevel Voltage (BRV) to their previous values and set Pattern Scaling (PG) = 1.000.

Verifying proper car movement and motor current: If the brake lifts and contactors PM1 and PM2 pick, the car should move in the correct direction.

a. Run the car on Inspection in both up and down directions. If the motor runs out or control, at the wrong speed or direction, or the current to the motor is greater than the motor FLA (see parameter LF.93), the encoder is reversed. This can be corrected by changing parameter LF.28 from 0 to 1.

b. Run the car again in both up and down directions. The motor should now be running in a controlled manner but possibly in the wrong direction. Parameter LF.28 can also be used to correct this. If LF.28 = 0, change the value to 2. If LF.28 = 1, change the value to 3. Now the motor should be controlled and running in the correct direction.

c. If the car draws normal current (see parameter LF.93) and moves in the correct direction but slower than the commanded speed, correct this problem by verifying the following parameters on the TORQMAX drive:

- LF.02 Signal Operating Mode = ASpd
- LF.04 Motor Selection (see US.10)
- LF.11 Rated Motor Speed (RPM)
- LF.27 Encoder Pulses / Rev (PPR)
- LF.20 Contract Speed (FPM)
- LF.21 Traction Sheave Diameter (inches)
- LF.22 Gear Reduction Ratio*
- LF.30 Control Method = 2 (closed loop)
- LF.31 Kp Speed (proportional gain) = 3000 to 4000
- A.LF.31 Kp speed accel: Proportional gain = 3000 (F5 software ≥ V1.51)
- d.LF.31 Kp speed decel: Proportional gain = 3000 (F5 software ≥ V1.51)
- LF.32 Ki Speed (integral gain) = 1000
- A.LF.32 Ki speed accel: Integral gain = 350 (F5 software ≥ V1.51)
- d.LF.32 Ki speed decel: Integral gain = 250 (F5 software ≥ V1.51)
- LF.79 Delay to turn OFF the motor current after direction is dropped = 0.300

* <u>If the gear reduction ratio is not available from the machine name plate</u>, calculate the value by first measuring the motor revolutions using a marker on the motor shaft or brake drum. Reduce the inspection speed by decreasing LF.43, then determine the number of motor shaft revolutions required to complete one revolution of the sheave. Calculate the gear reduction ration using the formula: **Gear reduction ratio = Motor RPM / Sheave RPM**. Enter the calculated value in parameter LF.22.

Note: The drive has the capability of estimating the gear reduction ratio. Run the car on inspection and read the value of parameter LF.25, the gear ratio estimated by the drive. The value of LF.25 can be used for LF.22. <u>However, the correct value of LF.22 is critical for overall system performance, therefore MCE/TORQMAX recommends calculating or measuring the gear reduction ratio and entering the calculated value in parameter LF.22 if it is not available from the machine name plate.</u>

3.7.6 CORRECTING A DIFFERENCE IN UP VERSES DOWN CAR SPEED

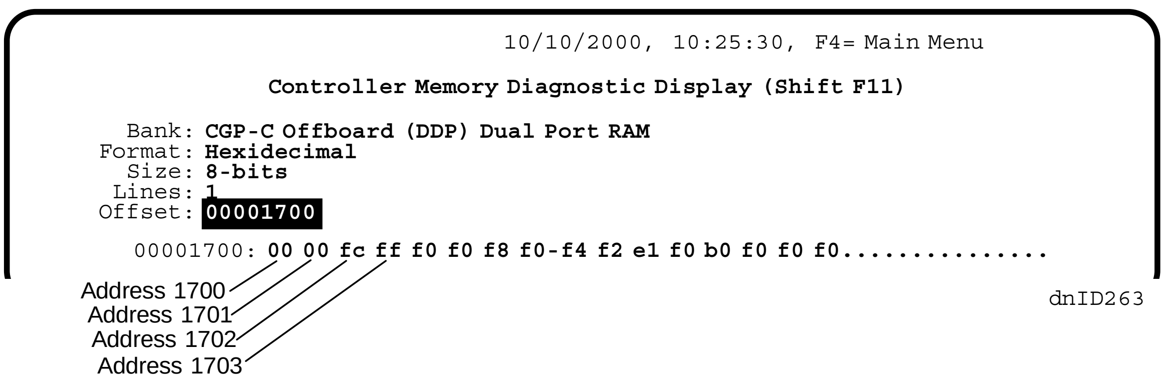
It is assumed that, at this point, the car runs in the correct direction and draws normal current. Using a hand held tachometer verify that the UP and DOWN speeds of the car are the same. If the Inspection UP and DOWN speeds are the same, proceed to 3.7.6. If the UP and DOWN speeds are different, perform the following:

a. Place the Inspection ON/OFF switch on the HC-RB4-SCRI board in the ON position but do not move the UP/DN switch.

b. Measure the DC voltage between terminals PATT+ and PATT- on the IMC-ACIB / IMC-ACIM / IMC-ACIK board. If this voltage is less than ± 10 mV, proceed to step 'd' below. If this voltage is greater than ± 10 mV (close to 0.0mV is preferred), adjust the BIP and BAL trimpots on the IMC-DAS board as follows:

BIP Trimpot - Input voltage offset trimming. Access the Controller Memory Diagnostic Display (Shift F11) screen. With the cursor on the *Bank* line, use the Space Bar to select **CGP-C Offboard (DDP) Dual Port RAM**. Move the cursor to the *Offset* line, type **00001700** and press **Enter** (see Figure 3.16).

FIGURE 3.16 CGP-C Onboard (MP/CGP-D) Dual Port Ram - Base Address 1700



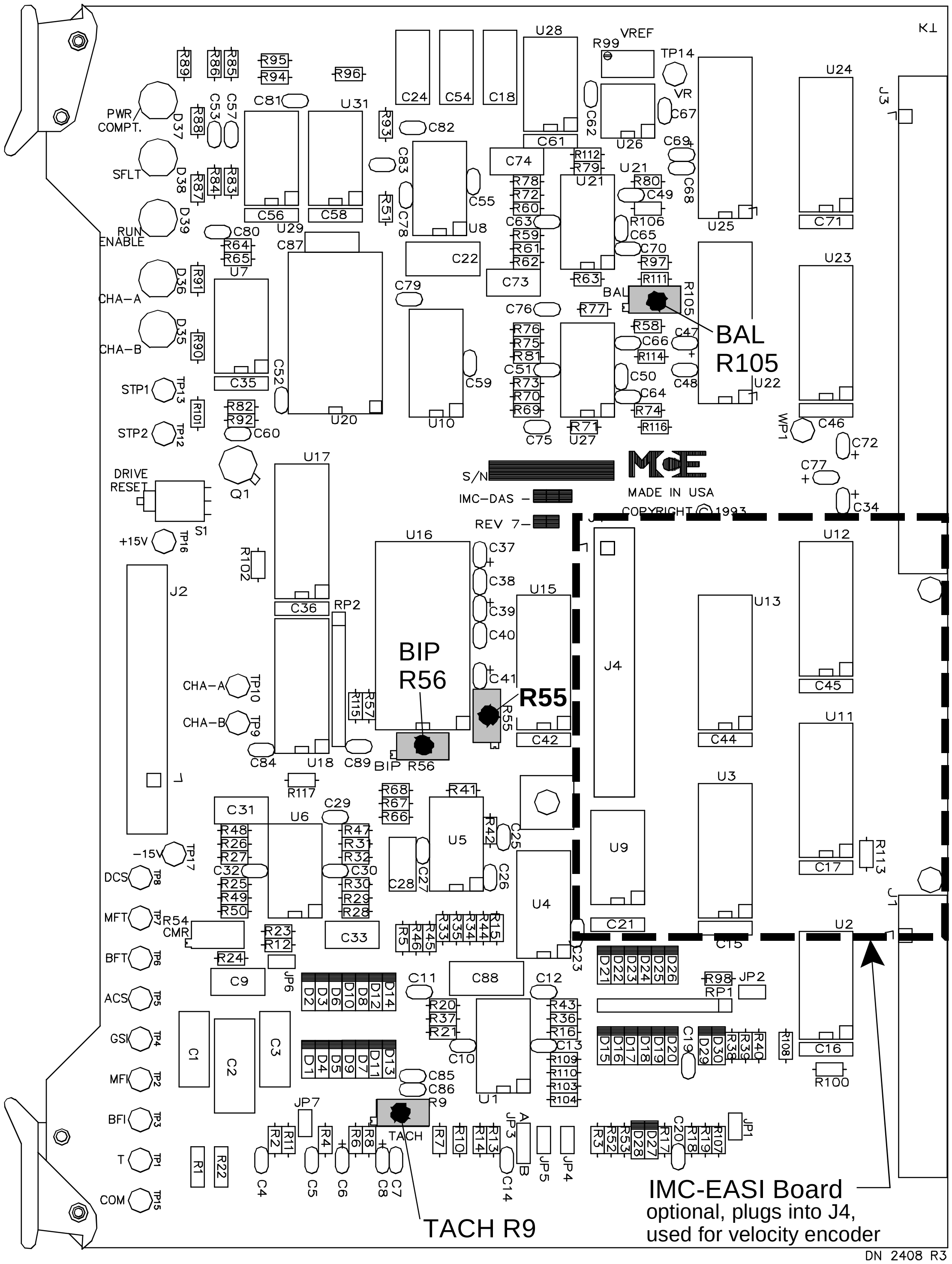
c. Verify that the values in addresses 1700 and 1701 are zero 00 (see Figure 3.17). If the values are not zero, adjust trimpot R55 until the values in addresses1700 and 1701 are 00 (see Figure 3.18 for trimpot locations).

Verify that one of the following is true (see Figure 3.17):

- address 1702 = FB, FC, FD, FE or FF and address 1703 = FF, or
- address 1702 = 00, 01, 02, 03, 04 or 05 and address 1703 = 00.

If neither of the above is true, first adjust trimpot R56 - BIP (fine adjustment) until the above is true and addresses 1700 and 1701 are still 00. If necessary, adjust trimpot R55 (coarse adjustment), but try R56 - BIP (fine adjustment) first.

FIGURE 3.17 Trimpots on the IMC-DAS Board



> **NOTE:** On IMC-DAS boards Rev. 6.11 or greater, trimpots can be adjusted with the board in place using a long flat blade screwdriver. On earlier revision boards an extender card can be used to gain access to the trimpots. When removing PC boards, turn the power OFF and use a grounding wrist strap to prevent ESD damage.

BAL Trimpot - Output voltage offset trimming. Connect a DVM (set to DC volts on mV scale) to the DCS test point located on the IMC-DAS board (just below the ribbon cable). This signal must be below ± 10 mV and preferably below ± 5 Mv. If not, locate the R105 (BAL) trimpot near the top of the IMC-DAS board (Figure 3.17). Notice that this trimpot is very sensitive, 1/8 of a turn has a great effect. If the value is positive, turn trimpot BAL clockwise to reduce.

NOTE: If it becomes necessary to change the IMC-DAS board, follow the procedure outlined in Appendix B, *Changing PC Boards, EPROMS or Microcontrollers.*

d. Check the UP and DOWN speed of the car again. If the UP and DOWN speeds are the same proceed to 3.7.6. If the UP and DOWN speeds are different, again measure the DC voltage between terminals PATT+ and PATT- on the IMC-ACIB / IMC-ACIM / IMC-ACIK board. If this voltage is greater than ± 5 mV perform step 'b' above again. **The closer to 0.0mV the better.** If the voltage is less than ± 5 mV perform the following:

- *Magnetek Drive* - If the voltage between PATT+ and PATT- is less than ± 5 mV and the UP and DOWN car speeds are still different, adjust P21Spd Command Bias on the Magnetek Drive (Shift F5) screen to the measured value. If the UP and DOWN speeds are the same, do not change this parameter from the zero value.

- *TORQMAX F5 Drive* - Perform the following:
  1. Verify that all of the parameters in Section 3.7.5.c are correct.
  2. Verify that LF.88 (Motor Set Speed) has equal value in both directions. If not, verify that the applied pattern between PATT+ and PATT- on the IMC-ACIK board is equal in both directions.
  3. Verify that LF.89 (Actual Motor Speed) is equal in both directions. If it is not, verify that parameter LF.36 (Maximum Torque) is not limiting the current to the motor. Increase LF.36 to 300 if required.

- *TORQMAX F4 Drive* - Perform the following:
  1. Verify that all of the parameters in Section 3.7.4.c are correct.
  2. Verify that LF.87 (Commanded motor RPM) has equal value in both directions. If not, verify that the applied pattern between PATT+ and PATT- on the IMC-ACIK board is equal in both directions.
  3. Verify that LF.88 (Actual motor speed RPM) is equal in both directions. If it is not, verify that parameter LF.36 (Maximum motor torque) is not limiting the current to the motor. Increase LF.36 to 300 if required.

- *Baldor Drive* - perform the command offset adjustment. There are two methods of adjusting the command offset. Method 2 will give the best results:

  Method 1 - Using the Drive Direct Access (F1, D) screen, adjust the P1404 ANA CMD OFFSET to achieve the same speed in both directions. This parameter can be increased or decreased by entering a positive or negative value.

  Method 2 - Verify that the Inspection switch on the HC-RB4-SCRI board is in the ON position (do not pick UP or DN direction). Using the keypad on the Baldor Drive (Figure 3.18), follow the steps in Table 3.2 to perform the CMD Offset Trim Test.

CAUTION:	You must be familiar with the Drive key pad functions. Do not perform any other auto tuning test except the CMD OFFSET TRIM TEST PROCEDURE described below.

FIGURE 3.18 Baldor Drive Keypad

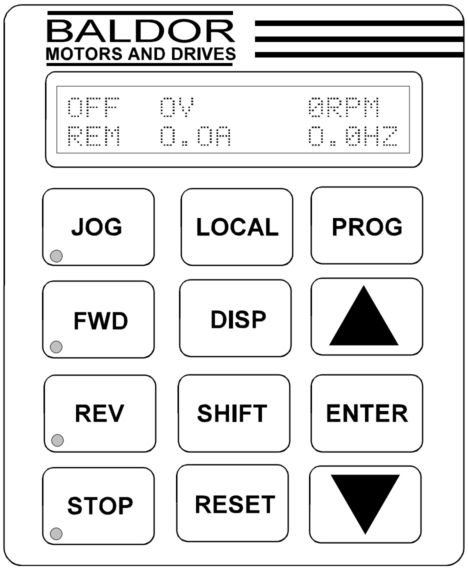


TABLE 3.2 CMD Offset Trim Test Procedure

CMD OFFSET TRIM TEST PROCEDURE		
Action	**Description**	**Display**
Begin	Verify the normal display shown................	OFF 0V 0RPM REM 0.0A 0.0HZ
Press **PROG**	Display shows..	PRESS ENTER FOR PRESET SPEEDS
Press ▲ or ▼	Scroll until display shows..........................	PRESS ENTER FOR LEVEL 2 BLOCKS
Press **ENTER**	Display shows..	PRESS ENTER FOR OUTPUT LIMITS
Press ▲ or ▼	Scroll until display shows..........................	PRESS ENTER FOR AUTO TUNING
Press **ENTER**	Display shows (**Do not Press ENTER**).....	CALC PRESETS P: NO
Press ▲ or ▼	Display shows...	CMD OFFSET TRM P: PRESS ENTER
Press **ENTER**	Display shows...	ENTER LOCAL MODE PRESS ENTER
Press **LOCAL**	Display shows...	ENTER LOCAL MODE PRESS ENTER
Press **ENTER**	Display shows...	CMD OFFSET TRM P: PRESS ENTER
Press **ENTER**	Display shows..	PRESS ENTER TO START THE TEST
Press **ENTER**	After a few moments display shows..........	TEST PASSED PRESS ENTER

Press **ENTER**	Display shows (**Do not Press ENTER**).....	CUR LOOP COMP P: PRESS ENTER
Press ▲ or ▼	Scroll until display shows.........................	PRESS ENTER FOR MENU EXIT
Press **ENTER**	Display shows...	PRESS ENTER FOR AUTO TUNING
Press ▲ or ▼	Scroll until display shows........................	PRESS ENTER FOR PROGRAMMING EXIT
Press **ENTER**	Display shows...	STP 0V 0RPM LOC 0.0A 0.0HZ
Press **LOCAL**	Display shows normal display..................	OFF 0V 0RPM REM 0.0A 0.0HZ

Now verify the car UP and DOWN speed on Inspection. The speed should be equal in both directions.

3.7.6 CALIBRATING THE BRAKE

The measured voltage between terminals B1 and B2 must be the same as the displayed voltage for the brake on the F3 screen. If not, verify that DBR Brake Resistance on the Brake (Shift F3) screen is correct. Adjust CBV Brake Calibration Factor on the Brake (Shift F3) screen until these voltages are almost the same (no worse than ±10%, or better where possible). **Later, if the RB1 resistor value is changed, the calibration must be repeated.**

Change the value of BHV Hold Voltage to the *actual* brake hold voltage, if there is one. Place the UP/DN switch on the HC-RB4-SCRI board in the DN position. The measured brake voltage between panel mounted terminals B1 and B2 will transition to the brake holding voltage a few seconds after the brake lifts (the brake voltage will transition to brake hold voltage *only* if the voltage first reaches the brake pick voltage).

Measure the DC voltage between test points BFI and COM on the IMC-DAS board. If this voltage exceeds 6.0 volts during pick voltage, move jumper JP1 from position B to position A on the IMC-GPA-SI board inside the IMC-SI2 Drive Unit. Repeat the calibration if the jumper position is changed.

3.7.7 COMPLETING THE INSPECTION OPERATION CHECKS

It is assumed that the car is now running on Inspection in the correct direction, with proper motor current and with equal speed in both UP and DOWN directions. Perform the following final Inspection operation checks:

a. Remove any jumpers in the safety circuit between terminals 2 and 16, 18, or 20 on the subplate. **These jumpers bypass various portions of the safety string.**

b. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.0 and adjust VINH Inspection Velocity - High to the desired value (maximum Inspection speed is 150 fpm). Stop the car so that the car-top can be accessed from the top hall door. Remove any jumpers from the safety circuits, including the jumper between terminals 4 and 8 on the HC-RB4-SCRI board **(overrides the gate switch and door locks)**.

c. Verify that the car will not run when the doors or gate are open.

d. Remove the previously installed temporary jumper wire from terminals 59 and 2 **(bypasses the Inspection Switch (COP Access Enable)**. Locate the wire for terminal 59 that was previously disconnected and labeled in Step 3.3 'a'. Do not install the wire yet. Measure the voltage from this wire to terminal 1. Verify 120 VAC when the Car Top Inspection switch is OFF (Normal) and close to 0.0 VAC when the Car Top Inspection switch is ON (Inspection). Install the wire into terminal 59. NOTE: Car Top Inspection operation automatically overrides the Relay Panel Inspection operation. Next, run the car from the Car Top Inspection station, checking the UP and DOWN buttons and the stop switch.

e. While running the car, check clearances and door locks. When all doors are locked, remove any jumpers from door lock terminals.

f. Verify the operation of the directional limit switches and the final limit switches, and arrange them according to page -2 of the job prints. Ideally, the distance between the two switches should be greater than the distance required to stop the car after the direction command is removed when the car is on Inspection operation.

g. Verify that the brake has sufficient tension to hold the car under **all** conditions likely to be encountered during the installation phase.

h. If it has not already been done, now is the time to install the landing system vanes or tapes and magnets. Refer to Sections 2.3 and 2.4 for instructions. It is desirable to open the car door about a foot to check sill heights when installing vanes or magnets. **Bypass the car gate switch** during installation of vanes and magnets by connecting a jumper between terminals 6 and 7 on the HC-RB4-SCRI board (or terminal 4 to GS if present). Refer to the job prints for locations. **Be sure to remove the jumper between terminals 6 and 7 (or 4 and GS) when this step is complete**.

i. The initial adjustment process should be completed, the vanes or tapes and magnets installed, the counterweight balanced, etc. When leaving the job site, shut down power at the main disconnect. At this time, one or more of the status indicators on the front of the Drive Unit (IMC-SI2) may be lit. For now, this is not important because the associated safety monitors have not been adjusted. Furthermore, the temporary jumper from terminal FBP1 to FBP2 on the SCR-RI board keeps the Drive Unit running in spite of the safety monitors being activated, except for any AC Drive faults, Drive ON (DRO), brake output circuit failure (BOF), parameter initialization error(PIE), and emergency terminal limit switches (UET and DET).

3.8 PREPARATION FOR FINAL ADJUSTMENT

a. The door operator on the car must be working properly before final adjustments can be made. Install the door fuses which were removed in Section 3.1(c). Remove the jumper(s) connecting terminals 6 and 7 (**the car gate bypass**), or any door lock terminals. All door equipment clutches, rollers, etc., must be properly adjusted with correct running clearances. Check the controller prints to make sure instructions have been followed regarding the installation of diodes on the door operator of the car (especially for G.A.L. door operators).

b. Verify that all hoistway and car doors are closed and locked. Run the car through the hoistway on Inspection to make sure the hoistway is completely clear.

c. Verify that the landing system magnets are installed according to the instructions. Place the car in the center of the hoistway.

d. On the HC-RB4-SCRI Relay board, turn the TEST/NORM switch to the TEST position.

e. To prevent nuisance tripping, leave the jumper between terminals FBP1 and FBP2 on the SCR-RI board . **This bypasses the IMC-SI2 Drive's electronic safety shutdown** until final adjustment is complete.

f. At this point, the car should be on Inspection operation and running without oscillation. There may be substantial rollback when the car first starts.

g. Monitor the pattern voltage with an accurate voltmeter (preferably digital) between test points DCS and COM on the IMC-DAS board. On the Pattern (Shift F4) screen set the PG Pattern Scaling to 1.0 and VINH Inspection Velocity - High to 10% of contract speed (maximum is 150 fpm). Run the car on Inspection and check the voltage present between DCS and COM on the IMC-DAS board. If 10.0 VDC pattern voltage equals contract speed, then the voltage at DCS should be equal to 1.00 VDC (±0.05 VDC), which corresponds to 10% of contract speed.

h. Next, use a hand-held tachometer, or if the landing system is installed and working, and the LEARN switch on the IMC-DIO board is OFF, the speed can be read in fpm on the 4-digit display on the IMC-DIO board.

i. Set VINH Inspection Velocity - High on the Pattern (Shift F4) screen to 50 fpm. Put *125%* of a full load in the car at or near the bottom landing to check the ability of the brake to hold this load.

WARNING: The car may slide into the pit during loading so use extreme caution!

Use the Relay Panel Inspection Switch to run the car DOWN at Inspection speed. Then turn the stop switch to OFF to make the brake apply while the car is still moving. Adjust the brake as necessary to stop and hold the load.

j. Remove the weights and perform the following with the car empty.

k. In the following steps, adjust the response of the car to reduce the empty car rollback while avoiding the oscillations that can occur if too much feedback is adjusted into the system. For these adjustments, use a storage oscilloscope capable of a 1 centimeter per second sweep rate, or a strip chart recorder (a storage oscilloscope is by far the preferable instrument). Monitor test points DCS and STP1 with respect to COM on the IMC-DAS board. Assign the *Speed with direction* signal to STP1 by setting the TP1 Test Point One on the Shift F3 screen to option 07.

l. The empty car will probably drift up due to counterweighting even when an attempt is made to move it down. Perform the following:

Baldor Drive - Adjust P1606 Speed Prop Gain and P1607 Speed Int Gain to get the best response from the car. Too much gain will cause oscillation in the car. While increasing P1606, note a narrowing of the difference between pattern and tach signals.

Magnetek Drive - Verify that the gain parameters have the following values:

- P3 Response = 10 to 15
- P5 Inner Loop Xover = 10

TORQMAX Drive - Verify the drive gain parameters:

- LF.31 Kp Speed (proportional gain) = 3000 to 4000
- A.LF.31 Kp speed accel: Proportional gain = 3000 (F5 software $\geq$ V1.51)
- d.LF.31 Kp speed decel: Proportional gain = 3000 (F5 software $\geq$ V1.51)
- LF.32 Ki Speed (integral gain) = 1000
- A.LF.32 Ki speed accel: Integral gain = 350 (F5 software $\geq$ V1.51)
- d.LF.32 Ki speed decel: Integral gain = 250 (F5 software $\geq$ V1.51)
- LF.34 Kp Current (proportional gain) = 1500 [auto calc on F5 drive]
- LF.35 Ki Current (integral gain) = 500 [auto calc on F5 drive]

m. On the Brake (Shift F3) screen, adjust TBPD Brake Pick Delay and TSPD Speed Pick Delay to coordinate the application of the speed pattern with the picking of the brake to avoid movement of the car under the brake or rollback of the car. A DRO fault may occur if TBPD is reduced to a value lower than 0.30. Generally TBPD is set to 0.40 and TSPD is set to 0.50 or slightly more. For TORQMAX drives:

- *TORQMAX F4 drive* - verify that LF.70 Brake Release Time = 0.300
- *TORQMAX F5 drive* - verify that LF.78 Brake Drop Delay = 0.50.

n. Experiment with improving response. A little rollback at this point is not critical as other adjustments later will compensate for it.

o. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.00. Check the car speed with a hand tachometer or, if the landing system has already been installed, the correct car speed is displayed in the SAFETY section of the View Hoistway (F3) screen. Verify that the measured speed matches VINH Inspection Velocity -High on the Pattern (Shift F4) screen.

If the elevator is running above Inspection speed:

- *Baldor Drive* - Decrease P2003 Max Output Speed on the Baldor Drive (Shift F5) screen.
- *Magnetek Drive* - Decrease P2 Contract Mtr Spd on the Magnetek Drive (Shift F5) screen.
- *TORQMAX F4 Drive* - First verify that the Gear Reduction Ratio (LF.22) is set correctly (see Section 3.7.4 c). Then, if the speed is still high, decrease LF.20 Contract Speed.
- *TORQMAX F5 Drive* - First verify that the Gear Reduction Ratio (LF.22) is set correctly (see Section 3.7.5 c). Then, if the speed is still high, decrease LF.20 Contract Speed.

If the elevator is running slower than Inspection speed:

- *Baldor Drive* - Increase P2003 Max Output Speed on the Baldor Drive (Shift F5) screen. P2003 can be adjusted up to +/- 5% of the Motor rated F.L. RPM without having much effect on the performance.
- *Magnetek Drive* - Increase P2 Contract Mtr Spd on the Magnetek Drive (Shift F5) screen. P2 can be adjusted up to +/- 5% of the Motor rated F.L. RPM without having much effect on the performance.
- *TORQMAX F4 Drive* - First verify that the Gear Reduction Ratio (LF.22) is set correctly (see Section 3.7.4 c). LF.20 (Contract Speed) and LF.42 (High Speed) can be adjusted up to +/- 5% of the rated speed without having much effect on the performance.
- *TORQMAX F5 Drive* - First verify that the Gear Reduction Ratio (LF.22) is set correctly (see Section 3.7.5 c). LF.20 (Contract Speed) and LF.42 (High Speed) can be adjusted up to +/- 5% of the rated speed without having much effect on the performance.

p. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.00. Then set GTC Tach/Encoder Scaling on the Pattern (Shift F4) screen so that *Encoder:* in the VELOCITY section of the F3 screen displays the correct Inspection speed value. Note: Adjusting the value of GTC does not change the actual car speed, it is only used to calibrate the Encoder value which is displayed and used to generate the TE Speed Error fault.

NOTE: If the car is not completely wired (temporary), check the following:
- wire removed from panel mount terminal DCL
- wire removed from terminal 47 on the HC-RB4-SCRI board
- jumper from 2 bus to terminal 36 on the HC-RB4-SCRI board
- jumper from 2 bus to terminal 38 on the HC-RB4-SCRI board
- jumper from 2 bus to panel mount terminal EPI (if present)

q. Verify *proper counterweight balancing*. On modernizations, the weight of the car is often changed, but compensating adjustments to the counterweight are sometimes overlooked. Place a balanced load (specified percentage of full load, typically 40%) in the car, run the car on Inspection in the *middle* of the hoistway, and verify equal motor current in both UP and DOWN directions on the Drive keypad display. Equal current readings on the keypad display indicate that the counterweight is *close* to the correct value. Take whatever steps are necessary to achieve *proper* counterweighting. For a drum machine, follow the manufacturer's counterweighting recommendations and test the drum machine's limit switches.

WARNING: For safety it is best to **remove the drive fault bypass jumper** between terminals FBP1 and FBP2 before proceeding. If this is not possible, exercise extreme caution while making the final adjustments.

r. Preparations for final adjustment should now be complete. Reinstall the fuses that power terminals 2H and 2F.

SECTION 4
FINAL ADJUSTMENT

4.0 GENERAL INFORMATION

This section describes the sequence of steps that need to be taken to make the final adjustments of the elevator system. At this point, all the steps in Sections 2 and 3 should have been completed, including installation of the floor encoding magnets on the perforated tape as instructed in Section 2.4.2 and 2.4.3 (or break-out tabs for LS-QUIK-1, see Section 2.4.4). Please review Section 5 before proceeding; it explains the adjustment and troubleshooting tools provided by the Enhanced On-Board Diagnostics on the computer Swing Panel. For IMC-AC-R controllers with the POWERBACK Regenerative Drive, see Appendix O.

4.1 LEARNING THE BUILDING FLOOR HEIGHTS

Learning the building involves determining the location of each floor in the building relative to the bottom floor, to within 0.1875" (4.7625 mm) accuracy. This is accomplished by reading the holes in the perforated tape on the LS-QUAD-2 landing system or by counting the pulses from the position encoder on the LS-QUIK-1 landing system as the elevator travels the entire length of the hoistway from the bottom to the top. The following steps describe the procedure for learning the building floor heights.

NOTE: This procedure must be successfully performed prior to running the elevator on Normal operation.

4.1.1 VERIFYING THE QUADRATURE PULSE SEQUENCE AND ENCODER RESOLUTION

Position Encoder Resolution - Verify that MPER Position Encoder Resolution, on the Pattern (Shift F4) screen, is set to the correct value, typically 25 ppr for the LS-QUIK-1 landing system. If the LS-QUAD-2 landing system is used, verify that MPER Position Encoder Resolution = 0 ppr.

Quadrature Pulse Sequence - The quadrature pulse sequence must be verified before the hoistway can be learned. Use the INSPECTION UP/DN switch on the HC-RB4-SCRI board to run the car up on Inspection. The quadrature signals can be verified on the View Hoistway (F3) screen by looking at the *Absolute* value in the POSITION section and the QPR flag in the FAULT section. The Absolute value must *increase* while the car is moving *up* and must *decrease* while the car is moving *down*. If the quadrature is reversed, the QPR flag will turn ON after the car moves about two feet. If the QPR flag turns ON, the DP1 and DP2 signals are reversed and the wires at terminals 95 and 96 on the SCR-RI board must be swapped to correct this problem.

If the *Absolute* distance on the F3 screen does not change and if the DP1 and DP2 LEDs on the IMC-SI2 Unit do not flash, check the wiring at terminals 95 and 96 on the SCR-RI board. There should be 50 VDC between terminal 1 and terminals 95 or 96. This voltage toggles between 0 VDC and 50 VDC as the car moves (see Appendix C, Inspecting the Quadrature Position Pulses on the LS-QUAD-2 or Appendix D, Inspecting the Quadrature Position Pulses on the LS-QUIK-1).

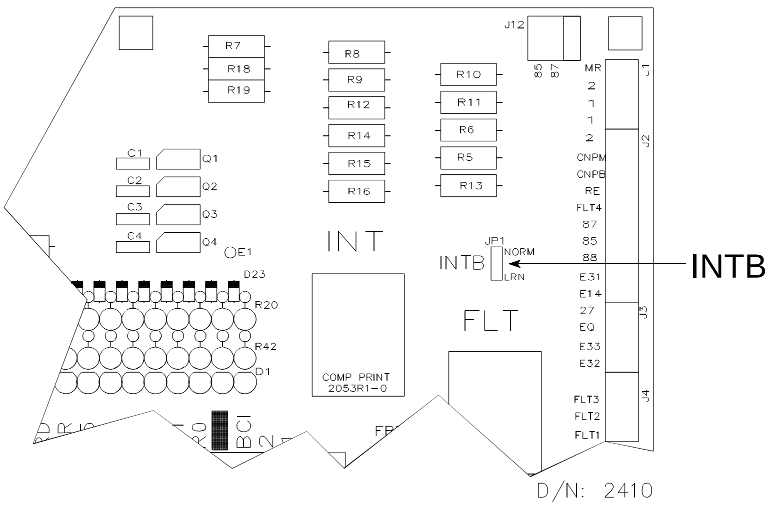
4.1.2 FLOOR HEIGHT LEARN PROCEDURE

The speed at which the car learns the hoistway can be changed by adjusting VLR Learn Velocity on the Pattern (Shift F4) screen. It is recommended that the learn speed be set to less than or equal to 50 fpm (0.254 m/s). Lower learn speeds, typically 35 fpm (0.178 m/s), result in higher accuracy of the learned floor height values. The following steps describe how to perform the learn operation.

a. Turn the power OFF at the main disconnect switch. Remove the “level down” wire from terminal 25 at the bottom of the HC-RB4-SCRI Relay board (if Rope Stretch Relevel is implemented, disconnect the “level down” wire at terminal 25X on the sub-plate instead).

b. On the SCR-RI board, place the jumper plug on the LRN side of the INTB jumper (Figure 4.1). Turn the power ON at the main disconnect.

FIGURE 4.1 SCR-RI Board Cutout showing the location of INTB



c. Bring the car 4" to 6" (101 to 152 mm) below the bottom landing by connecting a jumper between terminals 8 and 12 on the HC-RB4-SCRI board (***bypass the down normal limit***) and by connecting a jumper between panel mount terminals 2 and 16 (***bypass the primary safety circuit***).

CAUTION: Connecting the jumpers in step 'b', bypasses the **Down Normal Limit** switch and the **Primary Safety Circuit**.

Check the status of the flags using the MP Input/Output (F11, 7) screen. The status of the flags must be as follows:

• USD (Up Slowdown)	ON
• DSD (Down Slowdown)	OFF
• LU (Level Up)	ON
• DZORDZ (Front or Rear Door Zone)	OFF

d. Display the Pattern (Shift F4) screen on the CRT. The values for VH Contract Velocity and NF Number of Floors must be correct for the installation before proceeding with the learn function.

> **NOTE:** If your installation has an "express zone", i.e., an area of travel without openings in excess of about 30 feet or 9 meters, you may have "false floors" installed in the express zone which are stopping/reversing locations without door openings. You must include these "false floors" in the total Number of Floors (NF). To find your total number of floors, identify the job prints containing information on the LS-QUAD-2 or the LS-QUIK-1 landing system and determine the number of floor vanes or floor magnets that need to be installed. Set the NF parameter equal to this number.

f. Place the car on Learn operation by following the instructions in Table 4.1. The switches are located on the Computer Swing Panel. Then display the View Hoistway (F3) screen. This screen displays car motion and the distance to each floor while the car is learning the building. It will also display any error messages that may occur while on Learn operation. Do not be concerned with error messages, like FHL, regarding the EEPROM since most of these error messages are due to the fact that the car has not yet learned the building.

TABLE 4.1 Placing Car on Learn Operation

Switch	Position	Purpose/Alphanumeric Display
Diagnostic On	Down	For access to System mode
F7	Up	For System mode of operation
F1-F6	Down	PASSWORD is displayed
A1-A8 or A1-A8	Down	If no password is needed
	Various	To be set to password value
S push-button	Press ½ second	*SYSTEM* is displayed
F4	Up	LN READY is displayed

g. If the system is *not* ready to learn, the alphanumeric display on the front of the Computer Swing Panel will read LRN ERR. The Diagnostic Indicators on the lower right-hand corner of the Swing Panel will flash the code for the error that is causing the LRN ERR message. In case of an error indication, refer to:

- View Hoistway (F3) screen - see Section 6.2, View Hoistway (F3) screen for a description of any error flags displayed.
- Diagnostic Indicators on the front of the Swing Panel - see Table 6.8, MC-MP Status and Error Messages and Table 6.10, Status and Error Messages, for a description and recommended response for any messages displayed.
- DDP Diagnostic Indicators on top of the Swing Panel - see Table 6.9, IMC-DDP Status and Error Messages and Table 6.10, Status and Error Messages, for a description and recommended response for any messages displayed.

When all error conditions are eliminated, the alphanumeric display will display LN READY. In case of difficulty in achieving the LN READY display, turn switches F4 and

F7 on the Computer Swing Panel OFF, wait 10 seconds and then re-enter the learn mode.

h. With LN READY on the alphanumeric display, the car is ready to learn the floor heights. Access the View Hoistway (F3) screen. Monitor this screen as the car learns the hoistway and verify that the floor heights update at each floor and that the new values are displayed correctly when the learn operation is complete.

The car must travel the full length of the hoistway to learn the floor heights. Do this by holding the INSPECTION UP/DN switch on the HC-RB4-SCRI board in the UP direction. *Do not release* this switch until the word LEARNED appears on the alphanumeric display. Premature release of the UP switch will cause a learn error (LRN ERR). If this occurs, exit the Learn operation (F4 switch down), move the car to the bottom of the hoistway and reinitiate the learn procedure. If you have a very long hoistway, an alternative to holding the UP/DN switch is to temporarily pull the wire out of terminal 59 (relays IN1, IN2 not picked) and jumper terminal 32 to terminal 34 to run the car up.

NOTE: If the Up Normal Limit switch is positioned too low in the hoistway, the car will not be able to move high enough to complete the Learn operation. The Up Normal switch should not open until the car is above the top landing by at least 1" to 2" (25.4 to 50.8 mm). If not sure, temporarily jumper terminals 8 to 10 (***bypass the Up Normal Limit***) on the HC-RB4-SCRI board.

i. After LEARNED appears on the alphanumeric display on the Swing Panel, wait a few seconds to allow the IMC-DDP-x to store the learned data into computer memory. The F3 screen may still show some error messages but the only important one at this point is the error message FHL (floor height learn error). If FHL is ON (light blue or bold) this indicates a failed Learn operation.

j. Exit the Learn operation by moving the F4 and F7 switches on the front of the Swing Panel to the OFF position.

k. Turn the power OFF at the main disconnect and re-connect the “level down” wire to terminal 25 on the HC-RB4-SCRI board (or terminal 25X on the sub-plate).

l. Remove any jumpers between panel mount terminals 2 and 16 (also 8 and 10 and/or 8 and 12 on the HC-RB4-SCRI board, if present). Reinstall the wire on terminal 59, if you removed it. Turn the power ON at the main disconnect switch.

WARNING: Failure to remove the jumpers bypassing the **Down Normal Limit** switch and the **Primary Safety Circuit** may result in personal injury or substantial damage to equipment.

4.2 VERIFYING ABSOLUTE FLOOR NUMBERS

a. Place the Diagnostic On/Normal switch on the Computer Swing Panel in the ON position. The INTB jumper plug on the SCR-RI board should still be in the LRN position as in Section 4.1.

b. Display the View Hoistway (F3) screen in order to view the R0-R5, PR, and RD flags in the CONTROL window.

c. Move the car on Inspection to the top landing. Stop the car so that the RD indicator is ON. This shows that the RDU and RDD sensors on the LS-QUAD-2 landing system are centered within ±.5" (12.7 mm) of the floor (see Figure 4.2). On the LS-QUIK-1 landing system, DZ1 and DZ2 must be ON and LU and LD must be OFF (see Figure 4.3).

d. Beginning at the top of the hoistway, using the INSPECTION UP/DN switch, run the car to each floor. At each floor, verify three things:

   1. While moving the car through the floor, view the LU, DZ and LD indicators from the View Hoistway (F3) screen. If the input is active, the corresponding indicator will be highlighted. You can also observe the LU, DZ and LD relays on the HC-RB4-SCRI board.

   2. Stop the elevator at each floor with the RD indicator ON. In the CONTROL section of the View Hoistway (F3) screen, verify that the Absolute Floor Code flags (PR plus R5 - R0) match those for that floor in Table 4.2.

   2. Verify that every time the RD flag is ON (CONTROL section of the View Hoistway (F3) screen), the DZ relay on the HC-RB4-SCRI Relay board is energized (or DZR relay on the HC-RDRB Rear Door Relay board if this job has rear doors). Some IMC series controllers may not have the HC-RDRB board, in which case the DZR relay is mounted separately.

Do not proceed beyond this step until achieving the exact readings shown in Table 4.2. Failure to do so will result in incorrect floor position and erratic operation.

If there is difficulty getting the proper diagnostic reading for floor encoding, the most likely causes are missing magnets, wiring mistakes, or a floor encoding vane with improperly removed break-out tabs, improper vane alignment or possibly a defective sensor or switch.

- Test for a defective sensor by manually moving a magnet near the sensor and observing the corresponding LED indications inside the LS-QUAD-2. To more easily verify operation of the RDU and RDD sensors, prove that placement of a magnet next to *both* sensors is necessary to turn on the RD indicator, which shows proper RD output. Similarly, verify operation of the DZU and DZD sensors by proving that placement of a magnet next to *both* sensors is necessary to turn on the DZ indicator, which shows proper DZ output.

- Test the LS-QUIK-1 switches by running a piece of stiff cardboard or metal through the associated VS-1L switch and viewing the indicators inside the landing system box. Verify operation of the DZU and DZD switches by proving that blocking *both* switches is necessary to turn ON the DZ indicator, which shows proper DZ output.

TABLE 4.2 Absolute Floor Code Indicator Listing **(● = ON ○ = OFF)**

	RD	PR	R5	R4	R3	R2	R1	R0		RD	PR	R5	R4	R3	R2	R1	R0
Floor #1	●	●	○	○	○	○	○	●	**Floor #33**	●	○	●	○	○	○	○	●
Floor #2	●	●	○	○	○	○	●	○	**Floor #34**	●	○	●	○	○	○	●	○
Floor #3	●	○	○	○	○	○	●	●	**Floor #35**	●	●	●	○	○	○	●	●
Floor #4	●	●	○	○	○	●	○	○	**Floor #36**	●	○	●	○	○	●	○	○
Floor #5	●	○	○	○	○	●	○	●	**Floor #37**	●	●	●	○	○	●	○	●
Floor #6	●	○	○	○	○	●	●	○	**Floor #38**	●	●	●	○	○	●	●	○
Floor #7	●	●	○	○	○	●	●	●	**Floor #39**	●	○	●	○	○	●	●	●
Floor #8	●	●	○	○	●	○	○	○	**Floor #40**	●	○	●	○	●	○	○	○
Floor #9	●	○	○	○	●	○	○	●	**Floor #41**	●	●	●	○	●	○	○	●
Floor #10	●	○	○	○	●	○	●	○	**Floor #42**	●	●	●	○	●	○	●	○
Floor #11	●	●	○	○	●	○	●	●	**Floor #43**	●	○	●	○	●	○	●	●
Floor #12	●	○	○	○	●	●	○	○	**Floor #44**	●	●	●	○	●	●	○	○
Floor #13	●	●	○	○	●	●	○	●	**Floor #45**	●	○	●	○	●	●	○	●
Floor #14	●	●	○	○	●	●	●	○	**Floor #46**	●	○	●	○	●	●	●	○
Floor #15	●	○	○	○	●	●	●	●	**Floor #47**	●	●	●	○	●	●	●	●
Floor #16	●	●	○	●	○	○	○	○	**Floor #48**	●	○	●	●	○	○	○	○
Floor #17	●	○	○	●	○	○	○	●	**Floor #49**	●	●	●	●	○	○	○	●
Floor #18	●	○	○	●	○	○	●	○	**Floor #50**	●	●	●	●	○	○	●	○
Floor #19	●	●	○	●	○	○	●	●	**Floor #51**	●	○	●	●	○	○	●	●
Floor #20	●	○	○	●	○	●	○	○	**Floor #52**	●	●	●	●	○	●	○	○
Floor #21	●	●	○	●	○	●	○	●	**Floor #53**	●	○	●	●	○	●	○	●
Floor #22	●	●	○	●	○	●	●	○	**Floor #54**	●	○	●	●	○	●	●	○
Floor #23	●	○	○	●	○	●	●	●	**Floor #55**	●	●	●	●	○	●	●	●
Floor #24	●	○	○	●	●	○	○	○	**Floor #56**	●	●	●	●	●	○	○	○
Floor #25	●	●	○	●	●	○	○	●	**Floor #57**	●	○	●	●	●	○	○	●
Floor #26	●	●	○	●	●	○	●	○	**Floor #58**	●	○	●	●	●	○	●	○
Floor #27	●	○	○	●	●	○	●	●	**Floor #59**	●	●	●	●	●	○	●	●
Floor #28	●	●	○	●	●	●	○	○	**Floor #60**	●	○	●	●	●	●	○	○
Floor #29	●	○	○	●	●	●	○	●	**Floor #61**	●	●	●	●	●	●	○	●
Floor #30	●	○	○	●	●	●	●	○	**Floor #62**	●	●	●	●	●	●	●	○
Floor #31	●	●	○	●	●	●	●	●	**Floor #63**	●	○	●	●	●	●	●	●
Floor #32	●	●	●	○	○	○	○	○									

e. Once the floor encoding has been verified, move the INTB jumper plug from the LRN to NORM position on the SCR-RI board and proceed to Section 4.3. **Failure to place the plug on the NORM side of the INTB jumper will prevent automatic operation of the car.**

4.3 VERIFYING ONE FLOOR RUN OPERATION

In the next sections, the final adjustments of the elevator system will be discussed. This includes checking contract speed, door operation, and all other functions provided for proper elevator operation. The first step in verifying normal one floor run operation is to verify proper correction and stopping.

4.3.1. VERIFYING CORRECTION AND STOP

The following procedure is used to verify proper correction and stopping of the car:

a. Arrange the elevator for empty car conditions.

b. Set Pattern Scaling (PG) on the Pattern (Shift F4) screen to approximately 0.5. This setting represent 50% of contract speed.

c. Move the car on Inspection to a location between floors, more than one foot away from a landing, so that no leveling sensors are engaged.

- *Baldor drive* - verify that P2004 AC Drive Peak Current Limit on the Baldor Drive (Shift F5) screen is set above 250% of the hoist motor full load current.
- *MagneTek drive* - verify that P28 Mtr Torque Limit on the MagneTek Drive (Shift F5) screen is set above 250% of the hoist motor full load current.
- *TORQMAX drive* - verify that parameter LF.36 Maximum Torque = 300.

d. Next, turn the TEST/NORM switch on the HC-RB4-SCRI board to TEST and turn the INSPECTION ON/OFF switch to OFF. The car should start moving toward a landing at a fraction of the Correction Velocity, level into the floor and stop. If proper correction and stop *does* occur, proceed to Section 4.3.2, Initiating a One Floor Run.

NOTE: If the car is not completely wired (temporary), check the following:
- wire removed from panel mount terminal DCL (if present)
- wire removed from terminal 47 on the HC-RB4-SCRI board
- jumper from 2 bus to terminal 36 on the HC-RB4-SCRI board
- jumper from 2 bus to terminal 38 on the HC-RB4-SCRI board
- jumper from 2 bus to panel mount terminal EPI (if present)

IF PROPER CORRECTION AND STOP DO NOT OCCUR...

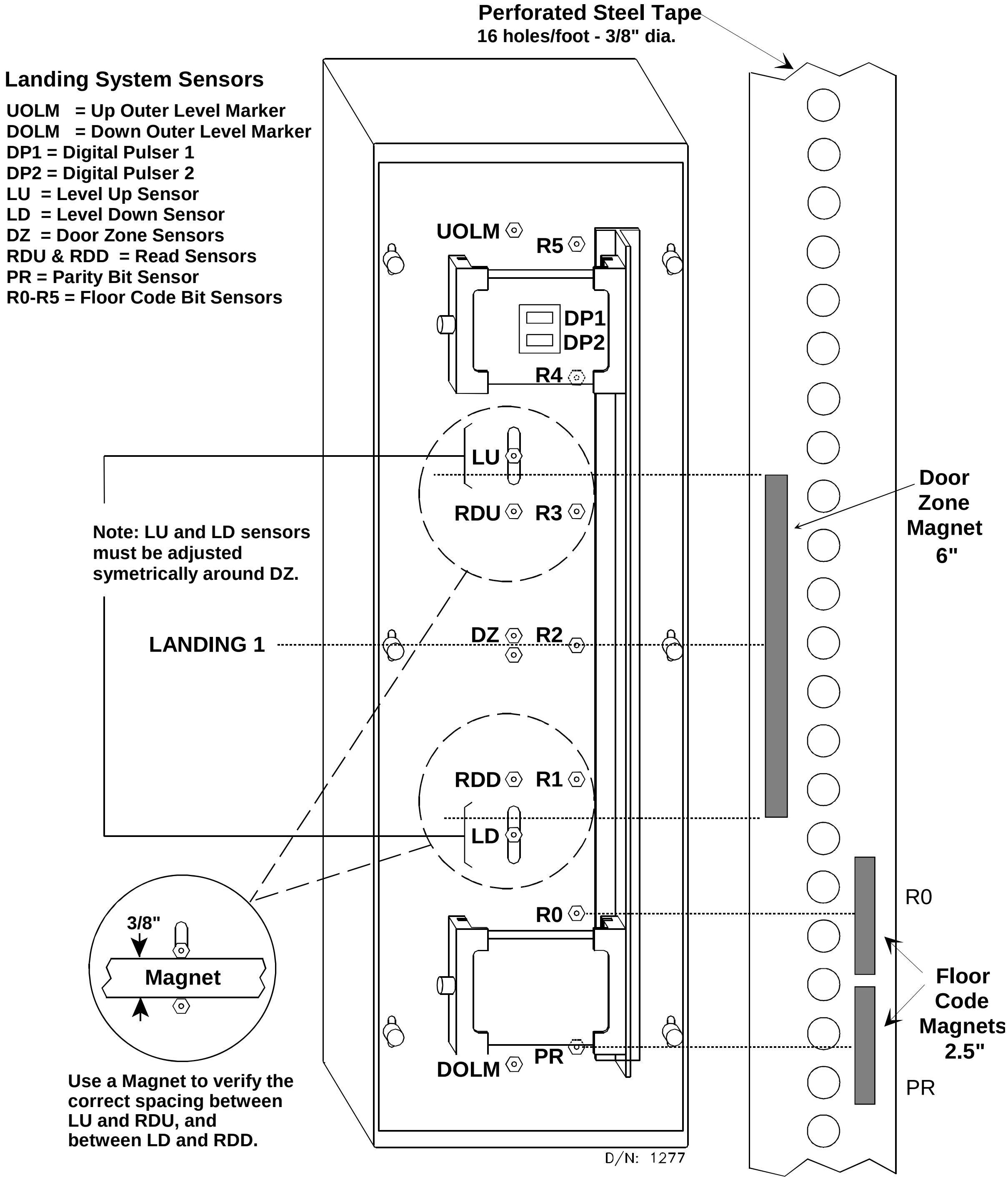
a. If proper correction and stop *does not* occur, check the vertical row of indicator LEDs on the front of the Swing Panel. You should see:

- Safety ON - safety string is made up.
- Doors Locked ON - all doors are locked.
- Insp./Access OFF - not on Inspection operation.
- Fire Service OFF - not on Fire service operation.

b. If the car is leveling up and down repeatedly, spread the LU and LD sensors apart on the LS-QUAD-2, LS-QUAD-2R (see Figure 4.2) or LS-QUIK-1 (see Figure 4.3) landing system car top box. The leveling sensors on the LS-QUAD-2 and 2R are designed to be movable by sliding them up or down from outside the box using fingers or a screwdriver. It is not necessary to get inside the landing system box to move the sensors. On the LS-QUIK-1 landing system it is necessary to remove the rear cover and loosen the nuts holding the VS-1L vane switches used for LU and LD in order to move them.

CAUTION:	While adjusting the LU and LD sensors, place the INSPECTION OFF/ON switch in the ON position to prevent the car from moving.

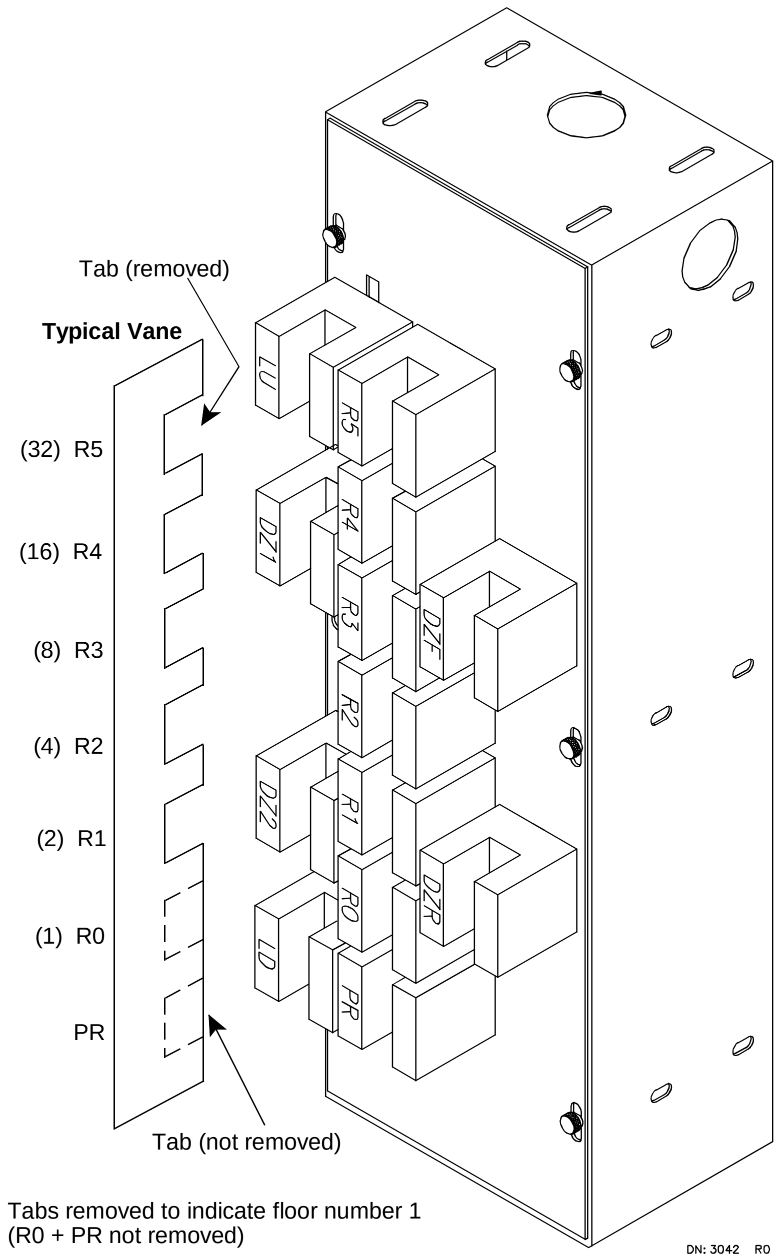
FIGURE 4.2 LS-QUAD-2 Car Top Box Detail



The floor code magnets in Figure 4.2 are positioned to indicate floor number one (R0 + PR).

NOTE: For LS-QUAD-2 and LS-QUIK-1 installations, LU and LD sensors must remain symmetrical in relation to DZ (as well as RD) in order to ensure that the PGR flag is ON after every run. Move them in equal amounts but opposite directions - that is, if LU is moved up 1/16" then the LD must be moved down by the same amount. The distance from sensors LU to RDU must be the same as from LD to RDD on the LS-QUAD-2. On the LS-QUIK-1, the distance from the LU switch to the DZ1 switch must be the same as from LD to DZ2. **Accurate vane and/or sensor alignment is critical to proper system performance.**

FIGURE 4.3 LS-QUIK-1 Car Top Box Detail



On the front or faceplate of the LS-QUAD-2, there are six thumbscrews (or thumbnuts), which when loosened, allow the faceplate to slide on its enclosure. These thumbnuts serve the following purposes:

(1) To allow for the overall vertical alignment of *all* sensors on the LS-QUAD-2 making it possible to compensate for being too high or too low at *all* floors.

(2) To allow precise orientation of the faceplate of the LS-QUAD-2 parallel with the steel tape. The horizontal movement built into the LS-QUAD-2 will allow for a smooth floating action, thereby minimizing wear on the tape guides. Check to see that this action is possible. Notice that if all six thumbnuts are loosened (on units with floating heads), the movements described here and in (1) above can be made at the same time. Therefore, be sure that when performing one adjustment, the other is not being upset.

4.3.2 INITIATING A ONE FLOOR RUN

The car should now be at the floor with the DZ relay ON, and the LU and LD relays OFF. Register a car call one floor above or below the current car position using the View Hoistway (F3) screen. The *High Speed* indicator LED on the front of the Computer Swing Panel should illuminate as the car attempts to start. If this occurs proceed to Section 4.3.3, Verifying a One Floor Run.

IF THERE IS A PROBLEM INITIATING A ONE FLOOR RUN...

If there is trouble getting the car to move, check the vertical row of indicator LEDs on the front of the Swing Panel. You should see:

- Safety ON - safety string is made up.
- Doors Locked ON - all doors are locked.
- Insp./Access OFF - not on Inspection operation.
- Fire Service OFF - not on Fire service operation (120 VAC on terminal 38 on the HC-RB4-SCRI board).

a. If the LEDs are in the above state and car still does not move, verify that the direction relays U1, U2, (or D1, D2), and H on the HC-RB4-SCRI board and relay RE on the SCR-PRI board are all picked. If these relays are not picked, check the following:

- If the INTB jumper on the SCR-RI board is on the LRN position, the car will not run. It must be on the NORM position. See the explanation of the IBJ flag in Section 6 (Table 6.10) if you need more information.

- If the door logic is trying to open the doors, DOI flag = ON (F11, 7 screen) this will prevent the car from leaving the floor. This will occur when the Photo Eye input is ON, PHE flag = ON (F11, 7 screen) or the Safety Edge input is ON, SE flag = ON (F11, 7 screen). This is discussed in detail in Section 6.4.1, Door Logic.

- The Pattern Generator Ready (PGR) flag on the View Hoistway (F3) screen must be highlighted. If it is not, the car cannot run on automatic operation, and there are several items to check:

1. The Safety Processor Ready (SPR) flag on the View Hoistway (F3) screen must be highlighted. If it is not, it may be due to the following:

   - The IMC-DIO board or the EEPROM chip on the board has been changed, and you need to learn the terminal landings.

   - Safety processor malfunction. If possible, swap out the IMC-DIO board.

   If you cannot get the Safety Processor Ready (SPR) flag ON, you can temporarily get automatic operation by putting the LEARN SWITCH on the IMC-DIO board in the ON or up position. This allows the car to run on automatic for just 10 minutes. If you need to run for 10 more minutes, turn the LEARN SWITCH to OFF, then ON again, etc.

WARNING: The LEARN SWITCH should be ON only if the TEST/NORM switch on the HC-RB4-SCRI board is in the TEST position to prevent door operation.

   LEARN SWITCH EXPLANATION - When the LEARN SWITCH on the IMC-DIO board is ON, the system (safety and terminal processors) ignores the terminal slowdown switches, allowing operation to any floor, including the terminal landings, under any conditions. Terminal slowdown safety monitoring is *not* active. Also, the alphanumeric display on the IMC-DIO board will *not* display car speed while the LEARN SWITCH is in the ON position. After an elapsed time of 10 minutes the message LRNT appears on the alphanumeric display on the IMC-DIO board and the car is prevented from leaving the floor. Therefore, if possible, it is preferable to run the car with the LEARN SWITCH OFF.

   When the LEARN SWITCH is OFF, the car runs normally and the alphanumeric display shows car speed. The terminal slowdown safety monitoring is active, however, the values for the terminal switches may not be correct. When the controller is shipped from the factory, the IMC-DIO board has already gone through the learning process on a simulator. The LEARN process must be performed at your site.

   If there is no need to run the car to the terminal landings then there is no need to learn the terminal landings at this time. However, if there is a need to run the car to the terminal landings, the requirement to have the LEARN SWITCH in the ON position can be eliminated by learning the terminal limits at the current reduced speed as described in Section 4.10. This will force some values into the IMC-DIO and will allow placing the LEARN SWITCH in the OFF position, until higher speeds require re-learning the terminal landings again.

2. The ETS Processor Ready (EPR) flag on the View Hoistway(F3) screen must be highlighted. This flag indicates the status of the emergency terminal switch monitoring processor. If the flag is not highlighted it is likely that the terminal landings have not been learned as described in Section 4.10. If the emergency terminal switch monitoring processor does not appear to be learning the emergency terminal switch speeds, simultaneously reset the DDP and ETS processors by pressing the reset switch on the IMC-DDP board and the computer reset switch on the IMC-DIO board before relearning the switches. If

this does not resolve the problem you may have a bad ETS processor. If possible, swap out the IMC-DIO board.

3. The SI2 Drive Ready (DSR) AC Drive Ready (ADR) and System Ready (RDY) flags must be highlighted on the View Hoistway (F3) screen. If RDY is not highlighted, it may be due to a fault originating in the IMC-SI2 unit. If ADR is not highlighted, it may be due to a fault originating in the AC Drive. If you have a jumper from FBP1 to FBP2, only the following failures can cause the FLT relay to drop out: AC Drive Fault, Brake Output Failure (BOF) or Drive ON (DRO) fault. If the jumper from FBP1 to FBP2 has been removed, other fault conditions can cause the DSR and/or ADR flags not to be highlighted and cause the FLT relay to drop out.

4. The Pattern Generator Updated (PGU) flag on the View Hoistway (F3) screen must be highlighted. If it is not, there are 5 possible reasons, which are:

   - There is a Checksum Error - Pattern (PPC). Check the F3 screen to see if the FHC Checksum Error - Floor Height and/or PPC Checksum Error - Pattern flags are highlighted. Refer to Table 6.6, View Hoistway (F3) screen - FAULT, and Table 6.10, Status and Error Messages for more information on these flags.

   - There is an invalid code for floor encoding. Verify that the RD flag on the F3 screen is highlighted when the car is at a floor (RDS will be highlighted if there is an RD sensor error). Also verify that the floor encoding matches an entry in Table 4.2 (PRS is highlighted if there is a parity error).

   - The pattern generator Door Zone (DZP) flag must be highlighted on the F3 screen. This indicates that the PG processor sees the DZ flag. See Table 6.1, View Hoistway (F3) screen - CONTROL for more information.

   - The pattern profile parameters that have been chosen are not valid and/or do not fit inside the available distance between floors. If flags SSO, OFH, TFH, VC, VS, FHL, and/or CPL are highlighted on the View Hoistway (F3) screen, refer to Table 6.6, View Hoistway (F3) screen - FAULT, and Table 6.10, Status and Error Messages for more information on these flags. You will have to change the pattern parameters as recommended by the information in Table 6.10 for each highlighted fault flag, so that finally, none of the above flags are highlighted. Note: When you try to save the parameters on the pattern parameters screen, and the parameters have generated a fault flag, you will get a momentary display of the PARAMETERS INVALID message at the bottom of the screen.

   - The VC, VS or OFH flags may be the result of negative learned floor heights due to a reversal of the quadrature pulses. To test, run the car UP on Inspection continuously for at least 5 feet and observe the Quad Pulser Relation (QPR) flag in the FAULT section of the F3 screen. If the flag turns ON (bold or light blue), swap the wires in terminals 95 and 96 on the SCR-RI board and repeat the test. If the QPR flag remains OFF, re-learn the hoistway.

5. The Pattern Generator Active (PGA) flag in the CONTROL section of the View Hoistway (F3) screen must be highlighted. If not, an ETS fault has occurred. Resetting the IMC-DDP processor will remove the fault.

b. If the car is out of service and car calls are not accepted, verify that the horizontal LEDs (Diagnostic Indicators) are scrolling. If the car is on Independent Service, the Independent Service message may be flashing which will mask the display of other messages. Remove the car from Independent Service temporarily, by placing the TEST/NORM switch on the HC-RB4-SCRI board in the NORM position, to allow other active messages to be displayed.

4.3.3 VERIFYING A ONE FLOOR RUN

When the car starts, note that the PI changes to the next floor before the middle point of the run. The car will decelerate to a point 6" (152.4 mm) before the floor where the LU or LD sensor will operate the LU or LD relay. The car will continue until it reaches a point 3" (76.2 mm) before the floor, then the DZ relay will energize (DZR relay may pick if this installation has rear doors). The elevator will continue to level into the floor and stop. The final leveling speed should be programmed to be 2 to 8 fpm (.01 to .04 m/s), but your actual speed will be a fraction of that since Pattern Scaling (PG) on the Pattern (Shift F4) screen is 0.50 at this time.

a. Before you can proceed with the high speed adjustment, the car should be running without any severe oscillation. If your control is very poor at this point, you may try:

- *Baldor drive* - increase P1606 Speed Proportional Gain on the Baldor Drive (Shift F5) screen
- *MagneTek drive* - increase P3 Response on the MagneTek Drive (Shift F5) screen, but reduce it if you get oscillation
- *TORQMAX drive* - to increase the car response, use the drive keypad and increase the value of LF.31 Speed Proportional Gain and LF.32 Speed Integral Gain (for F5 software $\geq$ 1.5, A.LF.31 accel, d.LF.31 decel, A.LF.32 accel, d.LF.32 decel), but reduce the values if you get oscillations in the car.

b. **From this point on, you must use a storage oscilloscope.** This is **essential** for **professional** results. Monitor test points DCS and STP1 with respect to COM on the IMC-DAS board. Assign the Velocity with Direction (Directionalized Speed) feedback signal to STP1 by setting the TP1 Test Point One parameter to option 07. The Test Point parameters are found on the Brake (Shift F3) screen. The DCS test point monitors the Drive Command Signal (Pattern). Connect an oscilloscope to the pattern signal as follows:

- Isolate the ground pin on the power cord of the oscilloscope with a ground isolator device. The ground pin must not be connected. The case of the oscilloscope must be allowed to float at its own potential.
- On the IMC-DAS board, hook up the ground side of the probe to test point COM and the hot side of the probe to test point DCS (Drive Command Signal). The full speed pattern signal on test point DCS equals ±10 VDC (+) = UP, and (-) = DOWN.
- Set the sweep rate on the scope to 1 centimeter per second, and vertical sensitivity to 2 VDC per centimeter (later, 5 VDC per centimeter to accommodate the 10 VDC full speed signal).

c. Run the car between floors to any landings that are not terminal landings. Observe that the car starts, accelerates, then decelerates into the floor and stops. If the car overruns a floor, the relevel function will be activated. The Final Leveling Velocity (VFL) on the first approach to a floor and the Releveling Velocity (VRL) are two separately programmable values. Look up these values on the Pattern (Shift F4) screen.

d. Make the car overrun the floor at least once and observe the releveling operation. This is done by jumping terminals 26 to 18 for LU (or 25 to 18 for LD) when LU (LD) picks at the end of the run and holding the jumper on until the opposite leveling relay LD (LU) picks. Then release the jumper, which will allow releveling. During this test you may get a “Leveling Sensor Failure” error message on the Swing Panel Diagnostic Indicators. This error occurs when both LU and LD are activated at the same time. Toggle the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to clear the fault.

Monitor the brake voltage on terminals B1 to B2. Make sure that a relevel brake voltage exists, to prevent stalling or excessive current drawn by the AC Drive during a relevel operation. Gearless machines are intended to drag the brake during a relevel, so a partial pick is appropriate. Note, however, that if the brake did not drop fully before the relevel, the reduced brake voltage may still hold the brake fully picked. Do not spend a lot of time here working on the brake, just be sure the brake does not stall the motor on a relevel.

e. Place the LEARN SWITCH on the IMC-DIO board to the ON position. Place a car call for the bottom landing. After the car stops, observe the LD relay to see if it is still energized. If it is, move the Down Normal Limit switch, shown in “area 10" of the job prints (terminal 8 to 12), so that the limit switch is not opened until the car is below the bottom landing by at least one to three inches. (Note: MCE recommends that the Up or Down Normal Limit Switches should NOT be on the TM switch assembly unless the cam in the hoistway has the “stepped” piece of metal which causes a large movement in the roller as the car is just 1" to 2" [25.4 - 50.8 mm] past the terminal landing.)

Place a call for the top landing, (you may have to turn the LEARN SWITCH to OFF, then ON again to be able to run) and after the car stops, see if the LU relay is still energized. If so, move the Up Normal Limit switch, shown in “area 9" of the job prints (terminal 8 to 10), so that the limit switch is not opened until the car is above the top landing by at least one to three inches.

4.4 REACHING CONTRACT SPEED

NOTE: Be sure to read this entire section before performing the following steps.

4.4.1 FINAL ADJUSTMENTS BEFORE RUNNING AT CONTRACT SPEED

The following adjustments must be made in preparation for contract speed operation.

a. Arrange the elevator for no load (empty car) conditions.

b. Verify the motor parameters with the motor name plate. The following parameters must be set according to the motor name plate data for proper operation of the elevator:

Baldor Drive (Shift F5 screen)
- P2501 Motor Voltage (Motor name plate voltage)
- P2502 Motor Rated Amps (Motor Full load current).
- P2503 Motor Rated Spd (Motor Full load RPM).
- P2504 Motor Rated Freq.
- P2505 Motor Mag Amps (Motor no load current).
- P1610 Slip Frequency (Motor Slip Frequency).

MagneTek Drive (Shift F5 screen or drive keypad)
- P111 Rated Mtr Pwr (Motor HP)
- P112 Rated Mtr Volts (Motor name plate voltage)
- P113 Rated Excit Freq (Motor Frequency)
- P114 Rated Motor Curr (Motor Rated Full Load Current)
- P115 Motor Poles (Number of motor Poles)
- P116 Rated Mtr Speed (Motor Full load RPM)
- P117 % No load current (Normally 30 - 40 % of Motor Full load current)

TORQMAX F4 Drive
The following are critical TORQMAX F4 drive parameters. Drive parameters are not accessible from the CRT screens. Use the drive keypad to verify the drive parameters with the completed parameters sheet which was shipped with the controller.

CAUTION: Do not change drive parameters while the elevator is running. The following are critical TORQMAX F4 Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02** Operating Mode **= 4** (± 10V)
- **LF.04** Motor-Selection **= 0** (induction motor)
- **LF.07** Unit System **= US**
- **LF.10** Rated Motor Power (HP).
- **LF.11** Rated Motor Speed (RPM).
- **LF.12** Rated Motor Current (Amp).
- **LF.13** Rated Motor Frequency (Hz).
- **LF.14** Rated Motor Voltage.
- **LF.17** Encoder Pulse / Rev (PPR)
- **LF.20** Contract Speed (FPM)
- **LF.21** Traction Sheave Diameter (inches)
- **LF.22** Gear Reduction Ratio
- **LF.23** Roping Ratio
- **LF.24** Load (LBS)
- **LF.30** Control Method **= 2** (closed loop)
- **LF.31** Kp Speed (proportional gain)
- **LF.32** Ki Speed (integral gain)
- **LF.36** Maximum Torque (LB/ft.)
- **LF.42** High Speed (FPM)
- **LF.79** Delay to turn OFF the motor current - after direction is dropped.

TORQMAX F5 Drive

The following are critical TORQMAX F5 drive parameters. Drive parameters are not accessible from the CRT screens. Use the drive keypad to verify the drive parameters with the completed parameters sheet which was shipped with the controller.

CAUTION: Do not change drive parameters while the elevator is running. The following are critical TORQMAX F5 Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02** Signal Operating Mode **= ASpd**
- **LF.04** Motor-Selection (see US.10)
- **LF.10** Rated Motor Power (HP).
- **LF.11** Rated Motor Speed (RPM).
- **LF.12** Rated Motor Current (Amp).
- **LF.13** Rated Motor Frequency (Hz).
- **LF.14** Rated Motor Voltage.
- **LF.27** Encoder Pulse / Rev (PPR)
- **LF.20** Contract Speed (FPM)
- **LF.21** Traction Sheave Diameter (inches)
- **LF.22** Gear Reduction Ratio
- **LF.23** Roping Ratio
- **LF.24** Load Weight (LBS)
- **LF.30** Control Method **= 2** (closed loop)
- **LF.31** Kp Speed (proportional gain)
- **LF.32** Ki Speed (integral gain)
- **LF.36** Maximum Torque (auto set)
- **LF.42** High Speed (FPM)
- **LF.79** Current Hold Time: Delay to turn OFF the motor current - after direction is dropped.

TORQMAX F5 Drive with software ≥ V1.51 - The following are critical TORQMAX F5 drive parameters. Drive parameters are not accessible from the CRT screens. Use the drive keypad to verify the drive parameters with the completed parameters sheet which was shipped with the controller.

CAUTION: (For F5 software ≥ V1.51) Do not change drive parameters while the elevator is running. The following are very critical TORQMAX Drive parameters. Incorrect values for these parameters can cause erratic elevator operation:

- **LF.02 = ASpd** (Signal Operating Mode)
- **LF.04 = 0** (Induction motor)
- **LF.10** Rated motor power (HP).
- **LF.11** Rated motor speed (rpm).
- **LF.12** Rated motor current (Amp).
- **LF.13** Rated motor frequency (Hz).
- **LF.14** Rated motor voltage.
- **LF.20** Contract speed (fpm)
- **LF.21** Traction sheave diameter (inches)
- **LF.22** Gear Reduction ratio
- **LF.23** Roping Ratio
- **LF.24** Load Weight (lbs)
- **LF.30** Control Method **= 2** (closed loop)
- **A.LF.31** Kp Speed Accel: Proportional gain
- **d.LF.31** Kp Speed Decel: Proportional gain
- **A.LF.32** Ki Speed Accel: Integral gain
- **d.LF.32** Ki Speed Decel: Integral gain
- **A.LF.33** Ki Speed Offset Accel: Low speed gain
- **d.LF.33** Ki Speed Offset Decel: Low speed gain
- **LF.42** High Speed (FPM)
- **LF.79** Delay to turn OFF the motor current - after direction is dropped.

c. Before running the car at contract speed, PADL Pattern Acceleration/ Deceleration Rate Limiter on the Pattern (Shift F4) screen must be set. The purpose of PADL is to place a limit on how fast the pattern can change. This will establish a maximum limit on the peak acceleration or deceleration to which a passenger will be subjected. The value of PADL should be greater than A2 Phase Two Acceleration and A6 Phase Six Deceleration, but should be adjusted to provide smooth transition from H speed to zero speed in the case of emergency stop (try PADL > STDR > A2 & A6).

d. To achieve a proper start, without rollback or snapping away from the floor, a variable delay in the application of the speed signal has been provided. TSPD Speed Pick Delay on the Brake (Shift F3) screen affects how much delay occurs from the time the drive processor enables the RE relay on the SCR-PRI board to the time the pattern generator sends out the pattern value. TSPD must be adjusted so the brake just clears the brake drum as the car is beginning to accelerate. Make this adjustment with an empty car.

The correct setting can be determined by watching the drive sheave. (You may have to tolerate some rollback for now, but this will be corrected later). If the DRO fault on the F3 screen comes ON whenever direction is picked then, on the Brake (Shift F3) screen, delay the picking of the brake by increasing TBPD Pick Delay and then increase TSPD Speed Pick Delay for proper coordination of the application of the speed signal with the picking of the brake.

e. Using PG Pattern Scaling on the Pattern (Shift F4) screen, increase contract speed in 10% increments until the car is running at 80% of contract speed. Using an oscilloscope, monitor the car performance on test point DCS on the IMC-DAS board (Drive Command Signal or Pattern) and STP1 on the IMC-DAS board (with the TP1 parameter set to 07, Directionalized Speed feedback). Check to see if severe overshoot is occurring (excessive overshoot can trip the governor). If not, continue to increase car speed with PG (up to a maximum of 1.0) while checking to see if car speed is peaking no more than 3% over contract speed (10 fpm @ 350 fpm, 15 fpm @ 500 fpm, etc.).

   You can also monitor speed by turning the LEARN SWITCH on the IMC-DIO board OFF (avoid the terminal landings), which will allow the speed to be displayed on the 4 digit display on the IMC-DIO board. Otherwise, *Speed* on the F3 screen in the SAFETY section can be observed for overshoot (with the LEARN SWITCH OFF). In this way you can see if overshoot is causing the car to exceed contract speed, and you can increase the speed until the peak reaches not more than 3% over contract speed. If overshoot occurs, reducing J35L may help, however, a VC error will occur if J35L is reduced too much. Increasing the following will help in reducing overshoot:

   - *Baldor drive* - P1606 Speed Prop. Gain
   - *MagneTek drive* - P3 Response
   - *TORQMAX drive* - LF.31 Speed Proportional Gain (for F5 software $\geq$ V1.51, A.LF.31 accel, d.LF.31 decel).

f. On the Baldor / MagneTek Drive (Shift F5) screen, verify that the Baldor P2004 PK Current Limit [*MagneTek: P28 Motor Torque Limit*] is equal to or greater than 250% of the motor rated full load current.

g. Verify the car speed displayed in the SAFETY section of the F3 screen. Increase or decrease the following as needed to make the car run at *contract speed*:

   - *Baldor drive* - P2003 Max Output Speed on the Baldor (Shift F5) screen
   - *MagneTek drive* - P2 Contract Mtr Spd on the MagneTek (Shift F5) screen
   - TORQMAX drive - LF.42 High Speed parameter.

   Once the car is running at or near contract speed, it is necessary to re-learn the terminal landings as described in Section 4.10, *Learning the Normal (NTS and Emergency (ETS) Limit Switches*, in order to *safely* run the car to the terminal landings, which is required when performing the MagneTek Adaptive Tune procedure as described in Section 4.4.2.

4.4.3 FINE TUNING THE BALDOR DRIVE

The car (empty car) should now be running at or near contract speed. As contract speed is approached some speed overshoot may be experienced. Some releveling, and possibly *spotting* (hesitating at the end of deceleration, near the floor) may also be experienced. The Gain Parameters in the vector control block on the Baldor Drive (Shift F5) screen, such as P1606 Speed Prop Gain and P1607 Speed Int Gain should be adjusted if required. The original factory settings are good enough to run the elevator. A Vector Control Gain Parameter value that is too high may cause the car to oscillate. The following are reasonable values:

Parameter	Preferred Settings		Description
	ZD18HXXXL-**EX**	ZD18HXXXL-**DEX**	
P1606 Speed Prop Gain	10 - 40	10 - 60	This parameter regulates how closely the car tracks the commanded pattern. Increasing P1606 Speed Prop Gain will result in faster response, however, excessive proportional gain will cause overshoot and ringing. Decreasing the Speed Prop Gain will cause slower response and decrease the overshoot and ringing caused by excessive proportional gain.
P1607 Speed Int Gain	1.00 - 4.00	1.00 - 4.00	Increasing the value of P1607 Speed Int Gain increases the low frequency gain and stiffness of the controller. Excessive integral gain will cause oscillations in the car. This parameter helps in picking the full load, holding the car at zero speed and preventing roll back.
P1610 Slip Frequency	calculated value	calculated value	This parameter must be verified in the field. The value entered for this parameter is based on the motor name plate information given to MCE (refer to Table R.11, AC Drive Parameters table for Baldor Drive model #ZD18HXXXL-**DEX** for further details). Fslip = Rated Freq - $\frac{\text{(Rated F.L. RPM x Number of Poles)}}{120}$
P2505 Motor Mag Amps	30% to 50% of motor full load current.	30% to 50% of motor full load current.	This parameter sets no load (flux) current in the motor when the drive is enabled and the main power contactors are closed . The building of flux in the motor before the brake picks will help hold the car at zero speed to prevent roll back before the car starts moving, but too high a value can cause jerky starts and stops because the car is held electrically. This parameter also sets the motor voltage at contract speed provided that the motor slip parameter is set correctly. If the motor voltage (drive output voltage on the keypad) is not within 5% of the motor name plate voltage, decrease P1610 in small decrements (-0.10) from the calculated value until it is within 5%.

a. If the car speed, at high speed, is not the same in the UP VS DOWN directions, and if the drive gain parameters are set properly and the pattern voltage between PATT+ and PATT- on the IMC-ACIB board equals +10.00 VDC in the UP direction and - 10 VDC in the DOWN direction, then perform the adjustments described in Section 3.7.4.

b. The elevator should now be running at or near contract speed in both UP and DOWN directions. If the elevator is running above contract speed, decrease P2003 Max Output Speed on the Baldor Drive (Shift F5) screen. If the elevator is running slower than contract speed, increase P2003 Max Output Speed. P2003 can be adjusted up to the +/- 5% of the Motor rated F.L. RPM without having much effect on the performance.

   Now the UP/DOWN contract speeds must be the same or within the required limits. Call MCE Technical Support if they are still not the same.

c. At this point, overshoot at contract speed should be gone or greatly reduced. If you are running at contract speed, verify that PG Pattern Scaling is set to 1.00, and set GTC

Tach/Encoder Scaling on the Pattern (Shift F4) screen so that *Encoder* in the VELOCITY section of the F3 screen displays the correct contract speed value (you can use the speed indicator on the IMC-DIO board to monitor car speed). ***Note: Adjusting the value of GTC does not change the actual car speed, it is only used to calibrate the Encoder value displayed on the F3 screen.***

Once car is running at contract speed, relearn the terminal landings as described in Section 4.10 *Learning the Normal (NTS) and Emergency (ETS) Limit switches.*

4.4.2 FINE TUNING THE MAGNETEK DRIVE (ADAPTIVE TUNE)

To tune the MagneTek AC Drive for optimum performance, refer to Section 5.5, ADAPTIVE TUNE, in the MagneTek HPV 900 AC Vector Drive Technical Manual. Follow the instructions and complete all of the adaptive tune tests. Adaptive tuning automatically adjusts the no load current, slip, RPM (to run at contract speed) and inertia (to tune up the speed regulator). Update the AC Drive Parameters sheet for future use after performing the adaptive tuning. ***Note: In the adaptive tuning procedure, to achieve 70% of contract speed, adjust only the Pattern Scaling parameter PG = 0.7 on the Pattern (Shift F4) screen.***

At this point, overshoot at contract speed should be gone or greatly reduced. If you are running at contract speed, first verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.00. Then set GTC Tach/Encoder Scaling so that the *Encoder* VELOCITY displayed on the F3 screen is correct. Use the speed indicator on the IMC-DIO board to verify the car speed. Note: Adjusting GTC does not change the actual car speed, it only adjusts the Encoder speed displayed on the F3 screen.

Once the adaptive tuning is completed, relearn the terminal landings as described in Section 4.10, *Learning the Normal (NTS) and Emergency (ETS) Limit Switches*. Then perform the steps in Section 4.5 before fine-tuning the car's operation.

4.4.4 FINE TUNING THE TORQMAX DRIVE

a. If the car does not reach High Speed then:

- Verify that there is +10 VDC between PATT+ and PATT- terminals on the IMC-ACIK board. If the pattern voltage is not correct, refer to item b (below).

- Verify that drive parameters **LF.11, LF.20, LF.21, LF.22, LF.23, LF.42** described in section 4.4.1 c are set correctly.

b. If the car speed, at high speed, is not the same in the UP VS DOWN directions, then verify the following:

- Drive gain parameters LF.31 & LF.32 are set properly (F5 software > V1.51, A.LF.31 accel, d.LF.31 decel, A.LF.32 accel, d.LF.32 decel). To high values of gains may cause oscillation in the car.

- PG Pattern scaling = 1.00.

- Pattern voltage between PATT+ and PATT- on the IMC-ACIK board equals +10.00 VDC in the UP direction and - 10 VDC in the DOWN direction. If the UP/DN pattern voltage is different then perform the adjustments described in Section 3.7.4 & 3.7.5.

c. Use the hand held tachometer to verify the car speed. The elevator should now be running at or near contract speed in both UP and DOWN directions.

- If the elevator is running at a higher speed than contract speed parameter LF.20, decrease the vale of high speed parameter LF.42.

- If the elevator is running at a slower speed than contract speed parameter LF.20, provided LF.42 is set at the same value of LF.20 , then verify that the Gear Ratio Reduction Parameter LF.22 is set correctly. If the gear ratio is not correct then it is possible to increase the value of LF.22 in small increments (0.10) to reach the contract speed.

d. At this point, overshoot at contract speed should be gone or greatly reduced. If you are running at contract speed, verify that PG Pattern Scaling is set to 1.00, and set GTC Tach/Encoder Scaling on the Pattern (Shift F4) screen so that *Encoder* in the VELOCITY section of the F3 screen displays the correct contract speed value (you can use the speed indicator on the IMC-DIO board to monitor car speed). ***Note: Adjusting the value of GTC does not change the actual car speed, it is only used to calibrate the Encoder value displayed on the F3 screen.***

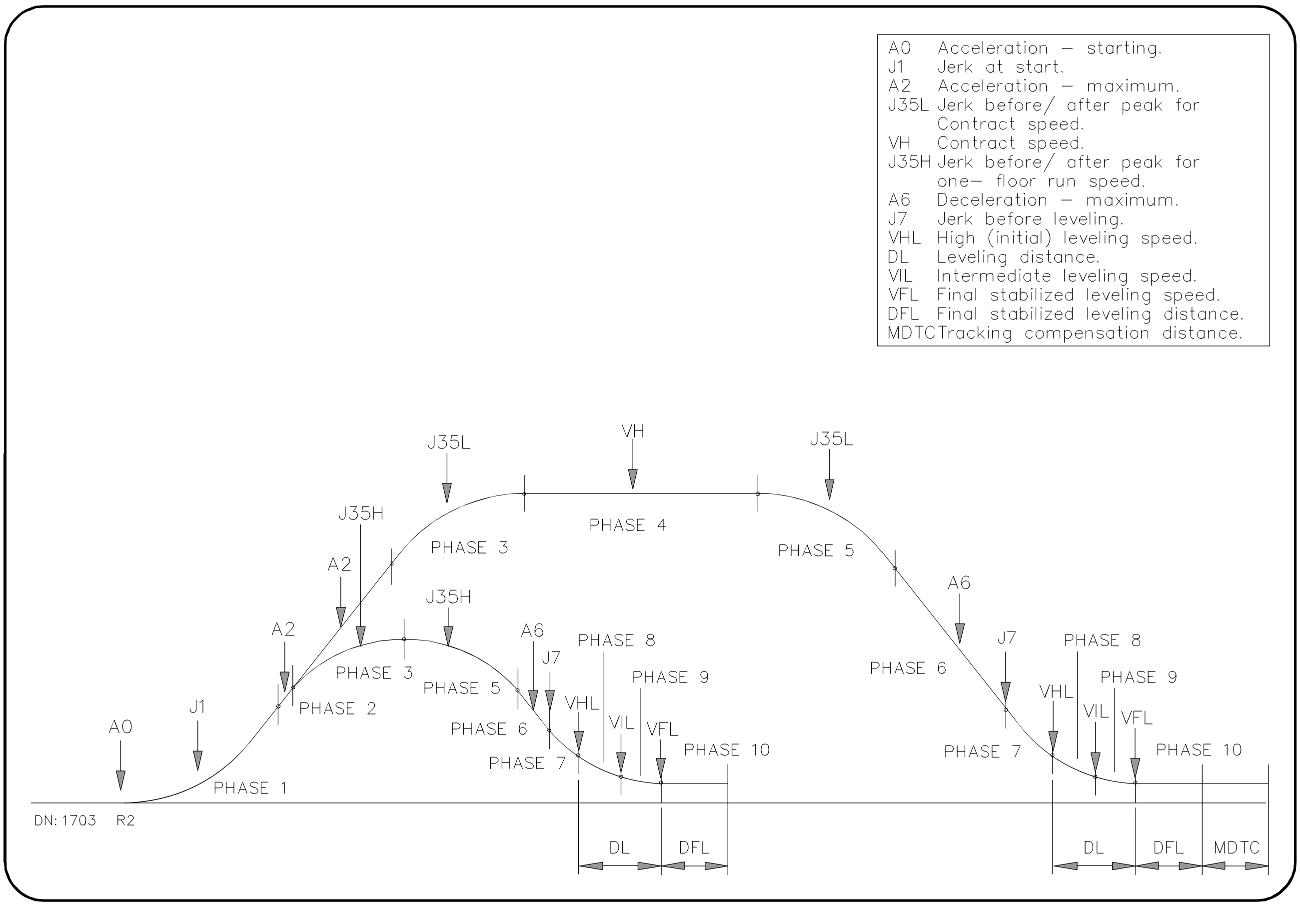
Once car is running at contract speed, relearn the terminal landings as described in Section 4.10 *Learning the Normal (NTS) and Emergency (ETS) Limit switches.*

4.5 SHAPING THE VELOCITY PROFILE

The profile of movement between any two landings has been divided into 10 programmable phases. On short runs, all 10 phases may not be used. Figure 4.4 illustrates all 10 phases that make up a typical velocity profile as the car travels through the hoistway. Table R.3 in the Reference section explains each of the Pattern Parameters that define the shape of the velocity profile. The value of the pattern parameters is very important in determining the quality of the ride and the overall performance of the elevator. Each phase is important, but the most critical phases are 7, 8, 9, and 10 since they define the final stop, and therefore greatly affect the time spent getting between floors. We will explain each phase in sequence, and give some insight into their relationship to some problems you may encounter.

For professional results, using a storage scope to view the intended pattern versus the actual car response **is mandatory**. Any large discrepancy between the idealized velocity profile and the actual car speed can be observed while the car is running by viewing the signals at test points DCS and STP1 on the IMC-DAS board (with TP1 = 07, Speed with direction).

FIGURE 4.4 Velocity vs. Time Graph



4.5.1 THE VELOCITY PROFILE PHASES

PHASE 1. This phase is defined as a time of transition from zero velocity to the constant acceleration of Phase 2. The rate of transition to full acceleration is defined as the J1 Phase One Jerk parameter. The A0 Phase Zero Acceleration parameter at the start of Phase 1 defines the starting value of acceleration. Values of J1 typically range from 4.0 to 8.0 ft/s^3

(1.219 to 2.438 m/s^3) with higher values resulting in a sharper start. The value of parameter A0 is usually 0.01 to 0.10 ft/s^2 (0.003 to 0.03 m/s^2) .

PHASE 2. This phase is defined as a constant acceleration rate which is determined by the value of the A2 Phase Two Acceleration parameter. This parameter determines the maximum current delivered by the AC Drive during acceleration. The maximum value of A2 is typically 4.0 ft/s^2 (1.219 m/s^2) and the minimum is usually not less than 2.5 ft/s^2 (0.762 m/s^2) . Values higher than 4.0 ft/s^2 (1.219 m/s^2) are possible but do not yield significant improvements in performance.

PHASE 3. This phase is defined as a time of transition from the maximum acceleration rate of Phase 2 to the constant speed of Phase 4. The rate of transition is defined by the rate of change of acceleration, or jerk parameters J35H and J35L. Typical values range from a minimum of about 4.0 ft/s^3 to a maximum of about 8.0 ft/s^3. Lower values are more commonly used for greater comfort, however, low values are harder to fit into the shortest one-floor-runs and can result in *short runs* typified by a slow run at the VSR Short Run Velocity. We recommend that you identify your shortest full height floor, and use it as a test when choosing parameter values. The J35H Phase Three/Five Jerk - One Floor Run parameter will determine the transition in this phase for the shortest floor that does not generate a *short run* profile. The J35L Phase Three/Five Jerk - High Speed parameter will determine the transition for profiles that reach contract speed.

PHASE 4. This phase is defined as the time spent at contract speed, and is characterized by the VH Contract Velocity parameter.

PHASE 5. This phase is defined as a time of transition from the constant speed of Phase 4 to the maximum deceleration rate of Phase 6. The rate of transition is defined by the rate of change of acceleration or deceleration, jerk parameters J35H and J35L, as in Phase 3. J35H will be the rate for the shortest floor that does not generate a *short run* profile and J35L will be the rate for profiles that reach contract speed. Typical values range from a minimum of about 4.0 ft/s^3 to a maximum of about 8.0 ft/s^3. Lower values are more commonly used for greater comfort, however, as with Phase 3, low values are harder to fit into the shortest one-floor-runs and can result in *short runs* typified by a slow run at the Short Run Velocity (VSR).

PHASE 6. This phase is defined as a constant deceleration rate which is determined by the value of the A6 Phase Six Deceleration parameter. The maximum value of A6 is typically 4.0 ft/s^2 and the minimum is usually not less than 2.0 ft/s^2 with more common values ranging from 2.75 ft/s^2 to 3.75 ft/s^2 (0.838 to 1.143 m/s^2). The value of A6 is usually slightly less than the value of A2, by 0.25 to 0.5.

PHASE 7. This phase is defined as a time of transition from the constant deceleration of Phase 6 to near zero velocity, or to the point defined by Phase 8. The rate of transition from full deceleration to near zero, or a lower value encountered in Phase 8 is defined as the J7 Phase Seven Jerk parameter. Reduction of this parameter is often used to reduce the tendency to spot or stall near the end of the deceleration, and/or to reduce any tendency for the deceleration rate, as experienced in the car, to bunch up (increase as the car approaches the floor). The limiting factor in the reduction of J7 is the inability to fit the profile into the shortest normal one-floor-run.

PHASE 8. This phase is defined as the first part of the last 3 phases that can be used to shape the final approach to the floor. It extends from the point where the VHL High Leveling Velocity parameter is encountered, to the point where the VIL Intermediate Leveling Velocity parameter is encountered.

PHASE 9. This phase is defined as the middle part of the last 3 phases that can be used to shape the final approach to the floor. It extends from the point where the VIL Intermediate Leveling Velocity parameter is encountered, to the point where the VFL Final Leveling Velocity parameter is encountered.

PHASE 10. This Phase is defined as the last part of the last 3 phases that can be used to shape the final approach to the floor. It is defined as the DFL Final Leveling Distance over which the VFL Final Leveling Velocity parameter is encountered.

4.5.2 SETTING THE PATTERN PARAMETER VALUES

a. **Starting Point for Pattern Parameters** - If you are not familiar with the effect of the pattern parameters, and you need a starting point for values, refer to Table 3.1, Recommended Starting Values for Speed Parameters in the Section 3. In many cases, your system is sent from the factory with reasonable values already entered for the pattern parameters. These values can be compared with the recommended starting values in Table 3.1, and if they are similar, you can simply use the preprogramed values.

b. **Parameter Selection and Short Runs** - Depending on the pattern parameter values, it is possible to get *short runs* on one-floor-runs, typified by a slow run at the VSR Short Run Velocity. Check the car operation on the *shortest* conventional one-floor-run. If you get a short run, it will be shown in the CONTROL area of the F3 screen, as PG Type: *Short*. Try to avoid short runs on floor heights of greater than about 8 feet (2.5 meters). Short runs are intended to be used for short distances between adjacent floors, such as between a front opening and an adjacent rear opening. The following facts will help you choose parameter values to eliminate short runs:

    1. The parameters having the greatest effect on short runs are A2, A6, and J35H. Parameters J7, VHL, and DL will also have a significant effect.

    2. Reduce A2 and/or A6. Reducing A2 below about 3.0 and reducing A6 below about 2.5 will result in runs that may feel too gradual or too slow for good efficiency.

    3. Increase J35H. Lower limits for J35H are about 2.5, otherwise the transition into and out of high speed may feel too gradual. Increasing J35H above about 8.0 may intensify speed overshoot and may feel too sudden in the car.

    4. Increase J7, increase VHL, or decrease DL. Unfortunately, each of these may have an adverse effect on the final slowdown, and may cause hesitation just before the floor.

c. **Contract Speed Overshoot and Current Limiting** -To prevent contract speed overshoot and/or current limiting from the AC Drive the A2 Phase Two Acceleration and J35L Phase Three/Five Jerk - High Speed parameters can be reduced. The jerk rate J35L has a slightly greater effect on overshoot at high speed than A2. The acceleration parameter A2 has the most effect on current limiting. Observe actual car response on test point STP1 on the IMC-DAS board (with the TP1 parameter = 07) to verify that there is no overshoot.

d. **Motor Current Limiting in Phase 3** - If running out of motor current near the end of Phase 3 becomes a problem, as is evidenced by the AC motor current on the F3 screen or on the Drive keypad during a full load UP operation:

- *Baldor drive* - verify that P2004 Peak Current Limit on the Baldor (Shift F5) screen is set to 250% of the motor rated full load current
- *MagneTek drive* - verify that P28 Mtr Torque Limit on the MagneTek (Shift F5) screen is set to 250% of the motor rated full load current
- *TORQMAX drive* - set parameter LF.36 Maximum Torque = 300. This will automatically adjust the current limit.

If this does not help, reduce the value of A2 Phase Two Acceleration. Another possibility is to decrease the value of J35L Phase Three/Five Jerk - High Speed so that there is a smooth transition from maximum acceleration to contract speed. Also verify that sufficient motor voltage is being developed at high speed.

e. **Slope of Acceleration / Deceleration** - Ideally, the slope of the acceleration in volts per second should be equal to or slightly greater than the slope of the deceleration, as viewed on an oscilloscope or chart recorder connected to test point STP1 and COM on the IMC-DAS board (with the TP1 parameter = 07). To get approximately equal acceleration and deceleration speeds in a system where the tracking accuracy is very good, A2 Phase Two Acceleration can be equal to A6 Phase Six Deceleration. If your tracking is less accurate, set A2 greater than A6 to get the same effective rate of deceleration as acceleration.

f. **Final Approach to the Floor** - The final approach to the floor can be customized in many different ways. If your tracking accuracy is very good, you can probably omit Phases 8 and 9 by programming as follows: VHL High Leveling Velocity = VIL Intermediate Leveling Velocity = VFL Final Leveling Velocity, your desired final leveling velocity, and DL Leveling Distance = 0.12 in. You can choose the DFL Final Leveling Distance in Phase 10 to be whatever is required. DFL can be as low as 0.12 in. if you want the quickest floor-to-floor time. If your tracking is not perfect, you can begin to introduce values in parameters VHL, VIL, and DL which allow you to mold the shape of the last few inches of approach to the floor. Some experimentation will be necessary at this point in order for you to be able to see the effect of these parameters.

g. **Excessive Motor Noise** - If there is excessive motor noise or if the acceleration or deceleration feels rough in the car, reduce A2 and/or A6 to provide the desired results. Also, verify that:

- *Baldor Drive* - P2005 PWM Frequency is 10 kHz or greater.
- *MagneTek Drive* - P94 PWM Frequency is 10 KHz or greater.
- *TORQMAX Drive* - At lower speeds the drive automatically selects a lower carrier frequency to produce more current from the drive. If required, adjust LF.38 Carrier Frequency = 0. This will set the carrier frequency to 8 KHz.

h. **Bunching up of Deceleration Rate** - If you are observing a bunching up of deceleration rate (an increase in the deceleration rate as you reach the last few feet of approach to the floor) it is generally due to:

1. The tracking is not as accurate as it should be. You must improve the accuracy or else you can lower the value of the J7 Phase Seven Jerk parameter. Remember that there are very real limits as to how low you can make J7 (1.75 is often as low as you can go). You will have to check the car operation on the shortest *conventional* one-floor run to avoid getting a *short run*, which is shown by the words “PG Type: Short” in the CONTROL area of the F3 screen.

2. The value for FRP Raw Pattern on the Pattern (Shift F4) screen, is too low. As long as you avoid values lower than 2.0, this should not be a significant contributor to this problem. If the FPP Processed Pattern value is less than 4.0, this can also contribute to the problem. FPP is usually at least twice the value of FRP. The default value for FRP Raw Pattern is 2.50 and the default value of FPP Processed Pattern is 5.

i. **Inspection Profile** - The inspection pattern profile is different from other profiles and has its own parameters. The maximum inspection speed is determined by VINH Inspection Velocity - High, and the transition from zero speed to maximum inspection speed is defined by AIN Inspection Acceleration on the Pattern (Shift F4) screen. A lower value for AIN will give a more gradual transition, with typical values of about 2.0.

j. **Correction Profile** - The correction pattern profile is used when beginning movement during automatic operation when starting in any location other than at a floor. It is different from other profiles and has its own parameters. The maximum correction speed is determined by VCR Correction Velocity on the Pattern (Shift F4) screen. The transition from zero to maximum correction speed, and from maximum correction speed to leveling speed is defined by ACR Correction Acceleration/ Deceleration on the Pattern (Shift F4) screen. A lower value for ACR will give a more gradual transition, with a typical value = 2.0.

k. **Terminal / Danger Profile** - This profile is used if the system requires a faster than normal deceleration transition down to correction speed or leveling speed. It is used during situations such as emergency slowdowns at terminal landings in response to the normal terminal stopping device being activated, or loss of the quadrature signal (positioning signal). The transition from any higher speed to correction speed or leveling speed is defined by STDR Terminal/Danger Slowdown Rate and STSS Terminal Slowdown Smoothing on the Safety (Shift F6) screen. STDR affects the deceleration rate while STSS acts to smooth the transition from deceleration (STDR) to correction or leveling speed. Lower values for STSS result in smoother, more gradual transitions. Typical values for STSS range from about 0.5 to 1.0. The system performance must be verified during testing.

l. **Earthquake Profile** - This profile is used if there is an earthquake being sensed by the elevator system during normal operation and results in the rapid transition from the existing velocity to the velocity defined by VEQ Earthquake Velocity on the Pattern (Shift F4) screen . The elevator then continues at the VEQ velocity until it reaches a certain distance from the floor defined by DEQ Earthquake Leveling Distance , where it transitions to VFL Final Leveling Velocity and the smoothness of this transition is governed by AEQ Earthquake Acceleration/ Deceleration. Lower values for AEQ (typically 2.0) result in slower and smoother transitions, however, excessively low values will cause the car to overshoot the floor. If you have earthquake operation you will verify proper operation during testing.

m. **Short Run Profile** - This profile is intended to be used for short distances between adjacent floors, such as between a front opening and an adjacent rear opening. Short runs are one-floor-runs, typified by a slow run at the Short Run Velocity (VSR). Try to avoid short runs on floor heights of greater than 8 feet or about 2.5 meters. The transition from short run velocity to the leveling velocity is defined by ASR Short Run Acceleration/Deceleration on the Pattern (Shift F4) screen. Lower values for ASR (typically 2.0) result in slower and smoother transitions, however, excessively low values will cause the car to overshoot the floor.

n. **Learn Profile** - The learn profile is used during hoistway learning. It is different from other profiles and has its own parameters. The maximum learn speed is determined by VLR Learn Velocity, on the Pattern (Shift F4) screen, with typical values of about 35 fpm. The transition from zero (or leveling velocity) to maximum learn velocity, and from maximum learn velocity to leveling velocity, is defined by ALR Learn Acceleration/ Deceleration. During hoistway learn operation this profile reduces its maximum learn velocity to final leveling velocity at the floor, to learn the floor position accurately. A lower value for ALR will result in a more gradual transition, with typical values of about 2.0.

o. **Other Advanced Parameters** - Some other advanced pattern parameters are MLI Leveling Inhibit Distance, MINT Leveling Inhibit Speed and MDTC Tracking Compensation Distance on the Pattern (Shift F4) screen. Only MDTC will possibly be adjusted later. The others will not be adjusted, but will be left at their default values: MLI = 6.00 in., MINT = 100 fpm, and MILO = 140 fpm. MDTC should be set to 0.00 in. as a starting point.

4.6 CONTROLLING INITIAL START OF CAR MOTION

Depending on the mechanics of the system, some gearless machines may exhibit rollback at the start of car motion. Geared machines rarely exhibit rollback. The IMC-AC control system allows the following alternatives to eliminate rollback at the start of car motion:

- Adjust motor control parameters specifically designed for the start of motion
- Accomplish a sophisticated adjustment of the brake

There are several parameters that can be adjusted to improve control during the start of motion (see Section 4.6.1, Adjustment of Initial Start Parameters). In addition, there are parameters that provide a great deal of sophistication in the operation of the brake (See Section 4.6.2, Additional Brake Adjustment for Gearless Equipment, and Section 4.6.3, Brake Parameter Adjustments). These parameters can be adjusted to give a smooth brake lifting operation, which will help to achieve a smooth start.

4.6.1 ADJUSTMENT OF INITIAL START PARAMETERS

Rollback at the start of motion may be a problem for gearless applications, and even for some geared applications. To correct this problem and have a smooth start of motion without rollback, the following adjustments can be utilized.

In AC vector drive applications, when RE is active, the MCE control system picks the main power contactors (PM1 and PM2) and enables the drive unit. The drive applies voltage to the AC motor to build up the magnetic flux. The amount of time that it takes to build up flux in the AC motor depends upon motor characteristics & temperature (from 200 ms to 500 ms). The AC Drive logic detects the build up of flux in the motor and generates the Drive ON output. At this time the motor may have developed enough torque to hold the load.

a. The motor no load current value is not high enough to hold the car at zero speed when the drive is enabled. The normal setting for no load current is 30% to 40% of full load current.

b. The TBPD Brake Pick Delay on the Brake (Shift F3) screen is used to coordinate the picking of the brake with the build up of flux. If the delay is not sufficient, the flux will not build up fully and a DRO fault will occur. *TORQMAX drive* - adjust LF.70 Speed Pick Delay = 0.300 (higher values will cause a DRO fault).

The TSPD Speed Pick Delay on the Brake (Shift F3) screen is used to delay the application of the pattern signal to the drive to prevent the car from moving under the brake. TBPD must be adjusted to achieve a smooth start and prevent any rollback and TSPD must be adjusted to prevent movement of the car under the brake.

4.6.2 ADJUSTING THE PRE-TORQUE ON GEARLESS AC APPLICATIONS

> **NOTE:** If pre-torque hardware (MCE or K-Tech load weigher) is *not* provided, set OTE Pre-Torque Enable = OFF and skip this section.

The connections from the AC Drive to the PTQ+ and PTQ- inputs on the Drive Interface board are only required for Gearless AC applications. For geared AC flux vector applications, pre-torque may not be necessary as the no-load current setting (30 to 40% of the motor FLA) is sufficient to hold the car at zero speed without any rollback.

On gearless AC applications, for pre-torque to work correctly, the following must be performed:

a. A load weigher must be properly installed and calibrated. If the Load Weigher- Isolated Platform (LW-MCEIP) is used, refer to Appendix M, MCE Load Weigher Installation and Adjustment). If a cross head deflection load weigher is used, refer to the instructions provided with the load weigher.

b. The load weigher learn operation described in Section 4.8, *Load Weigher Adjustment for Dispatching* must be performed.

c. Set the pre-torque parameters on the Pattern (Shift F4) screen as follows:

   OTE Pre-Torque Enable = ON
   GT Pre-Torque Gain = 1.00
   GTPC Pre-Torque Position Compensation = 0.0
   GBAL Pre-Torque Balance = 4.00

d. Set the AC Drive parameters as follows.

   TORQMAX Drive:
   LF.67 Pre-Torque Gain = 1.0
   LF.68 Pre-Torque Offset = 0
   LF.69 Pre-Torque Direction (0 = positive, 1 = negative)

   MagneTek Drive:
   Pre-Torque Source = Analog input (C1 User Switches)

e. Set the following parameters on the Brake (Shift F3) screen:

   TBPD Brake Pick Delay = 0.4 to 0.5
   TSPD Speed Pick Delay = 1.0

   TSPD is increased to allow enough delay between when the brake picks and when high speed is applied so that rollback will occur unless the load is balanced or the drive holds the load (maintains zero speed).

f. Put a balanced load in the car. Move the car to the middle of the hoistway and verify that there is approximately 4.0 VDC between terminals LW+ and LW- on the SCR-RI board. If not, verify that the load weigher has been properly calibrated.
   - With a balanced load in the car (and 4.0VDC between LW+ and LW-) there should be zero volts across PTQ+ and PTQ- on the IMC-ACIK or IMC-ACIM board.
   - If the voltage at LW+ and LW- is higher than 4.0 VDC there will be positive voltage across PTQ+ and PTQ- on the IMC-ACIK or IMC-ACIM board.
   - If the voltage at LW+ and LW- is less than 4.0 VDC there will be negative voltage across PTQ+ and PTQ- on the IMC-ACIK or IMC-ACIM board.

g. Run the car UP and DOWN on inspection. If the car is truly balanced, there will not be any rollback. Next, from one landing below the top floor, make a one-floor-run down and observe any roll-back. With a truly balanced car, there should not be any roll-back. If there is roll-back, the load must be adjusted.

h. At the top landing, with a balanced load in the car, connect the DC voltmeter between the test points STP1 and COM on the IMC-DAS board. Adjust GBAL Pre-Torque Balance on the Drive (Shift F5) screen to make the voltmeter reading as low as possible (less then 0.5 VDC if possible). Run the car and verify that there is no rollback.

i. Remove the weights from the car. From one floor below the top landing, with an empty car, make a one-floor-run DOWN. If there is rollback, increase GT Pre-Torque Gain on the Drive (Shift F5) screen and repeat the one-floor-run DOWN from one floor below the top landing until there is no rollback. Then verify that there is no rollback on a one-floor-run going UP, starting one floor below the top landing.

j. Run the car to the bottom landing. Make a one-floor-run UP and then DOWN. If there is rollback, adjust GTPC Pre-Torque Position Compensation on the Drive (Shift F5) screen until there is no rollback during one-floor-runs UP or DOWN in the lower hoistway area. If the result of the adjustment of GTPC is the opposite of what is needed, use the minus key (-) to provide negative values. Note: The GTPC parameter has a range of -50.00 to +50.00. Adjust as required to achieve no rollback.

k. With an empty car, verify that there is no rollback anywhere in the hoistway.

l. Now put a full load in the car, and verify that there is no rollback anywhere in the hoistway. If necessary increase GT Pre-Torque Gain on the Drive (Shift F5) screen.

m. Again, remove all weights from the car and verify that there is no rollback anywhere in the hoistway. If some rollback has been introduced by adjusting for no rollback with a full load, optimize the system for empty car conditions, since a full load is the less frequent condition.

n. Reduce TSPD Speed Pick Delay on the Brake (Shift F3) screen to a value higher than TBPD which allows the brake to lift fully before motion starts. You shouldn't feel the car pulling out from under the brake. The brake should be fully lifted *before* motion starts, but avoid *unnecessary* delay in the start of movement. Note: Never set TSPD less than TBPD. Set TBPD = 0.3 or higher which will allow the drive to respond to pre-torque.

4.6.3 ADDITIONAL BRAKE ADJUSTMENT FOR GEARLESS EQUIPMENT

The purpose of this adjustment procedure is to achieve a gradual release of the brake, thereby avoiding rollback and the feeling of "popping" out from under the brake. This procedure is most commonly needed with gearless equipment. Some installations will never need it, but some will benefit greatly from it.

Items That Affect Brake Operation - There are several items that will have a substantial effect on the quality of brake operation. Check these items *before* attempting to adjust for smooth brake lifting:

a. **New Linings** - If you have replaced the brake linings or if you have a new machine, *verify* that the entire area of the lining is making contact with the braking surface. If not, you *must* do whatever is appropriate to correct the lack of proper contact, and you must do this *before* adjusting brake tension or clearance. New linings that do not conform to the braking surface will often cause very rough starts.

b. **Smooth Mechanical Operation** - The brake must not bind, it must operate smoothly and freely. Inspect it and correct any mechanical defects. Also, inspect the linings and verify that they are not contaminated.

c. **Brake Tension** - Brake tension must be adjusted according to the requirements of the applicable elevator code. This often means being capable of stopping and holding 125% of maximum capacity. Excessive or insufficient brake tension can seriously affect brake performance.

d. **Clearance** - The clearance between the shoes and the braking surface must be adjusted to the correct values. Excessive clearance will interfere with this procedure, and insufficient clearance will damage the brake linings.

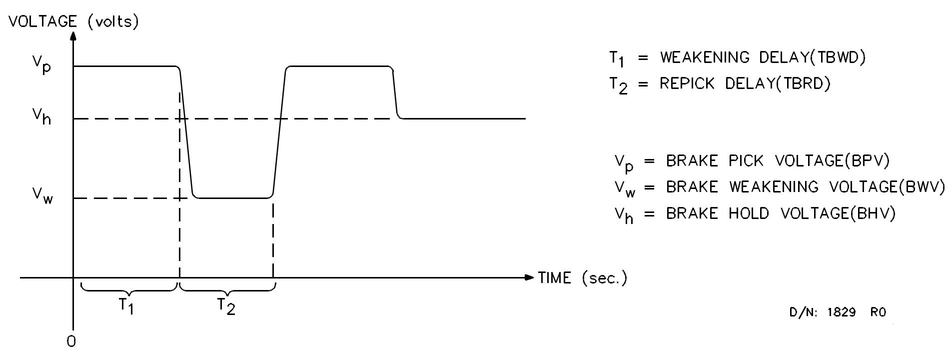
4.6.4 BRAKE PARAMETER ADJUSTMENTS

At this point the brake should be in good working order and properly adjusted, mechanically. For the next steps, refer to Figure 4.5. Adjustment of the braking parameters for smooth operation consists of the following:

a. First, find the level of brake excitation that results in a very gradual but *complete* picking of the brake. This is done as follows:

   1. Place the car on Inspection by turning the INSPECTION ON/OFF switch on the HC-RB4-SCRI board ON. Set PG Pattern Scaling on the Pattern (Shift F4) screen to 0.10, to give an inspection speed of about 10 to 15 fpm.

FIGURE 4.5 Brake Timing Diagram



2. Display the Brake (Shift F3) screen and record the original parameters before making any changes. Verify the following settings:

   - Weakening Delay (TBWD) = 0.00
   - Repick Delay (TBRD) = 0.00

3. Set the Pick Voltage (BPV) and the Hold Voltage (BHV) to ½ of the original value of BPV . Verify that the brake picks completely. The idea is to increase or decrease *both* BPV and BHV identically until the brake just barely picks all the way. Then add 5 or 10 volts and verify that the brake still has a very slow and smooth picking motion, taking 1 to 1.5 seconds to pick. The goal is to find a brake voltage that allows the brake to transition slowly through the pressure-releasing part of the movement.

4. Set the Weakening Voltage (BWV) to the same value as BPV and BHV.
   - Note: For geared applications, if the Brake Holding Voltage is not specified, set BWV and BHV = BPV.

b. Next, apply a maximum value of brake voltage, very briefly, at the start of movement. This gets the brake quickly to the point in the lifting process where a substantial amount of tension is released. This is done as follows:

1. Set BPV Pick Voltage back to the original value, to allow a high initial value of brake voltage.

2. Set TBRD Repick Delay to 1.00 second, to allow a slow transition of the brake through the pressure-releasing part of the movement, after which the brake voltage briefly returns to a high value to ensure that the brake fully picks.

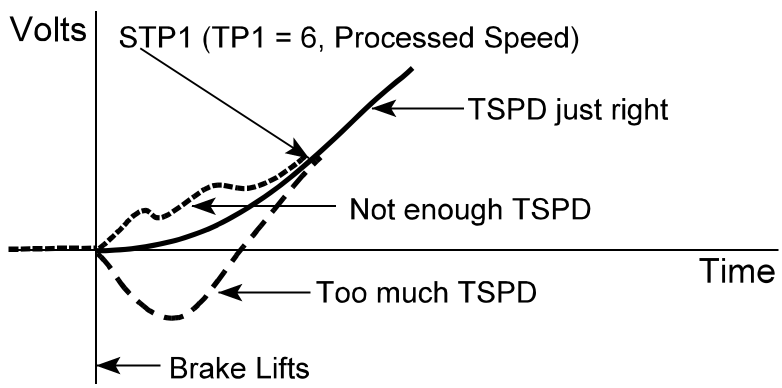
3. Now increase the value of TBWD Weakening Delay in 0.05 second increments until you see the brake move more quickly in the first part of its movement, so it can reach the part of the movement where the pressure is starting to be released. Typical values are between 0.10 to 0.45 second. The final result will often look as if the brake is lifting at a fairly constant rate, even though the initial voltage is high. This overcomes the natural tendency for a gearless brake to start lifting slowly, and then more quickly the further it lifts.

c. It is important to realize that full brake Pick Voltage (BPV) is *automatically* applied for about a second at the end of the brake Weakening Delay (TBWD), just after the brake has cleared the braking surface, thereby guaranteeing full lifting after the smooth transition through the zone of pressure release. After the brief return to full brake voltage, the brake voltage will *automatically* drop to the BHV Hold Voltage, but must not allow the brake to sag back onto the braking surface. Verify the manufacturers recommended value for the brake holding voltage and set BHV Hold Voltage to that value. If this information is not available, experiment with BHV to determine the voltage necessary to hold the brake up, and then add in a little extra margin.

d. At this point, a storage oscilloscope or chart recorder is required in order to get the best result from your adjustments. A digital storage ‘scope is recommended over a chart recorder because you can burn up a lot of paper adjusting some parameters. Connect the scope to test points STP1 and COM on the IMC-DAS board (with the TP1 parameter set to option 06) to view the car velocity response. Set the horizontal sweep to about 0.5 to 0.2 second per division and increase the vertical gain until you can see a microscopic view of the breakaway at the start of movement. A rough start is characterized by jaggedness at the beginning of the curve, and a smooth start is characterized by a smooth transition from the horizontal line to the acceleration curve. By using this method you can touch up the parameters, such as TSPD in the next step.

e. On the Pattern (Shift F4) screen, set PG Pattern Scaling back to 1.00. The next step is to coordinate the start of the car with the operation of the brake. This is done by *increasing* TSPD Speed Pick Delay on the Brake (Shift F3) screen until you begin to see rollback at the start of an empty car DOWN run at the top floor. TSPD is then decreased until the rollback just disappears (see Figure 4.6). It may be helpful to have the J1 Jerk parameter reduced to 5.00 or 4.00 to help give a smooth start. Also remember that *any* change in the brake parameters, pattern parameters J1 or A0, or any of the gain parameters relating to the velocity loop, will probably affect the coordination of the starts. Therefore, you must readjust TSPD after any such changes.

FIGURE 4.6 Effect of Speed Pick Delay (TSPD) on the Start of Car Motion



Become familiar with the correlation between what is seen on the scope and what is felt in the car at the start of car motion. Then use the scope to adjust the brake parameters to give smooth starts. If the car has *sleeve bearings*, be sure to evaluate starts *without letting too much time pass between runs*, or you will not get accurate information on the avoidance of rollback. Once you see the effect of the various parameters on the car operation you will see how important it is to have the brake properly adjusted. You will also notice how powerful a tool the oscilloscope is in helping you to get the best possible operation, particularly at the start of motion.

f. The value of the Repick Delay (TBRD) on the Brake (Shift F3) screen can be reduced, but doing so will reduce the time that the brake spends accomplishing a slow lift with the Weakening Voltage (BWV) applied, and this will eventually cause the brake to start lifting rapidly again. Typically TBRD will not be less than 0.50 seconds.

4.7 ADJUSTING LEVELING AND FINAL STOP

4.7.1 FINAL APPROACH TO THE FLOOR AND LEVELING - Observe the operation of the elevator by looking at the hoist motor and by observing the car response on test point STP1 to COM on the IMC-DAS board (with the TP1 parameter = 07). The final approach to the floor can be customized in many different ways.

a. If your tracking accuracy is very good, you can probably omit Phases 8 and 9 by programming as follows: VHL = VIL = VFL (your desired final leveling velocity), and DL = 0.12 in. You can choose the final leveling distance DFL (Phase 10) to be whatever is required. DFL can be as low as 0.12 in. if you want the quickest floor-to-floor time. Setting higher values for J7 is also possible.

b. If your tracking is not perfect or jerks can be felt during deceleration, you can begin to introduce values in parameters VHL, VIL, VFL, DL, and DFL which allow you to mold the shape of the last few inches of approach to the floor. Note: Adjusting VHL = VIL = VFL will remove any transition from the commanded speed. Some experimentation will be necessary in order to see the effect of these parameters. The use of a digital storage oscilloscope is essential. The goal is for the speed pattern shape to flare out and blend the deceleration into the final leveling speed. It is possible to modify the pattern to obtain a lot of stabilized leveling or to decelerate the elevator all the way into the floor to obtain the best brake-to-brake times. It is here that most of the performance and perceived quality of the ride will be determined. Try the full load range to be sure the stops are consistent.

c. You may notice a difference between the way a car approaches the floor on a one-floor-run compared to a two, or more, floor run. This can be equalized by adjusting MDTC Tracking Compensation Distance (bipolar parameter) on the Pattern (Shift F4) screen until you see the shape of the approach to the floor (and the time spent in leveling) become identical on a one-floor-run compared with a two, or more, floor run.

4.7.2 FINAL STOP - There are many items to consider in establishing a smooth and accurate stop, and each item contributes to the final result:

a. **Brake Drop Delay** - First adjust TBDD Brake Drop Delay on the Brake (Shift F3) screen to provide too much delay in dropping the brake, so you can clearly see the complete electrical stopping characteristics of the hoist motor. Keep this in mind as you continue with these adjustments, since it may be necessary to change TBDD more than once to continue to be able to see the results clearly. It is most important to never drop the brake on a moving motor.

b. **Brake Release Time** - The TORQMAX drives have an adjustable parameter which determines how long the drive will keep current flowing to the motor when the car reaches zero speed and the direction input is removed. This allows the motor to hold the load while the brake engages. The parameters are:

- *TORQMAX F4 drive* - LF.70 Release Time. The normal setting is 0.300 second, but it should always be kept below 0.800 second.
- *TORQMAX F5 drive* - LF.78 Brake Drop Delay. Factory setting is 0.50 seconds.

c. **Final Leveling Speed** - If this speed is too high, a quick transition to zero speed is required. This results in a bump at the stop, or can cause overshoot at the floor resulting in a releveling operation. If the final leveling speed is too slow, the car will stop very close to the edge of the dead zone, which will cause the system to relevel frequently.

Reasonable values of Final Leveling Velocity (VFL) on the Pattern (Shift F4) screen range from 3 to 6 fpm. Before setting the dead zone, the selection of VFL must be completed, so that you are satisfied with the complete final approach to the floor. If releveling occurs frequently, you may have to spread the LU and LD sensors an equal distance apart on the landing system (see CAUTION).

CAUTION: The distance from sensors LU to RDU must be the same as from LD to RDD on the LS-QUAD-2. The distance from the LU switch to the DZ1 switch must be the same as from LD to DZ2 on the LS-QUIK-1. If this is not done, you may not get a read (RD) input at the floor, which will prevent you from running. **THIS IS ABSOLUTELY CRITICAL TO SYSTEM PERFORMANCE.** Also, **DO NOT** move LU or LD to get the car to stop level with the floor (the 6 thumbscrews holding the faceplate on the landing system are for this purpose; see section 4.7.5).

d. **Dead Zone** - The purpose of the dead zone is to ensure that the elevator stops at the same point whether approaching a particular floor from above or below. The dead zone is defined as the area at a floor, between leveling zones, where no leveling sensors are engaged, typically 0.25 inch (6 mm) to 0.75 inch (18 mm) in length. Ideally, the elevator stops in the *center* of the dead zone. Both the LU and LD sensors (and therefore, the LU and LD relays) *must be de-energized* when the car is stopped at the floor. For LS-QUAD-2 and LS-QUIK-1 installations, the LU and LD sensors must remain *symmetrical* in relation to DZ (and also RD) to ensure that the RD input, and therefore the PGR flag, is ON after every run. Move them in *equal amounts* but *opposite directions* - that is, if LU is moved up 1/16" then the LD must be moved down by the same amount.

Set the dead zone as follows:

1. Select a floor in the middle of the hoistway as a test floor.

2. Approach the test floor from above, and mark exactly where the car stops. Then approach the test floor from below, and mark exactly where the car stops.

3. Move the LU and LD sensors or switches closer together or further apart by equal amounts so the car stops at exactly the *same* point whether approaching from above or below. (It does not matter if this point is not exactly level with the floor.) Don't forget the importance of keeping LU and LD symmetrical, as noted above.

e. **Brake Coordination for Smooth Stops** - Proper operation of the brake and coordination of the setting of the brake is very important in obtaining a smooth stop. The following items will help in achieving proper performance:

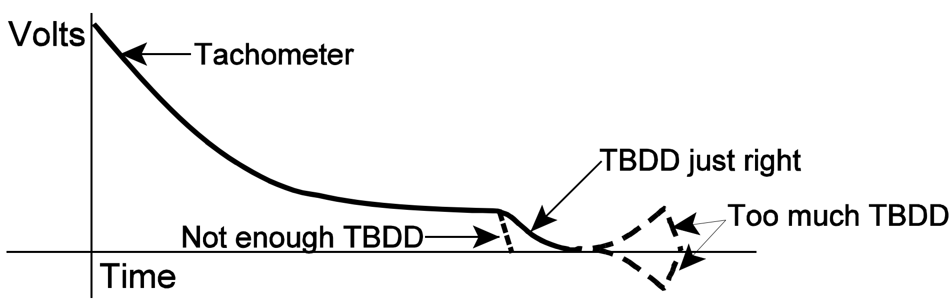
1. Before starting, the brake must be operating properly and to your satisfaction. Geared machine brakes are usually very simple, however, the brake on a gearless machine usually requires detailed adjustments to obtain proper operation. This will be covered in Section 4.7.4. For now, *be sure* to adjust the brake to hold 125% of a rated load (or the value required by your local code authorities). To establish a holding voltage for a brake in a geared installation, refer to the manufacturer's recommended value. If this information is not available, experiment with BHV Hold Voltage on the Brake (Shift F3) screen to find the voltage necessary to hold the brake up, and then add a little extra margin.

2. There is a resistor labeled RB, RB1 or RB2, between terminals BR1 and BR3 on the IMC-SI2 unit (refer to page -DY of the job prints to find this resistor). This resistor is mounted in the resistor cabinet and controls how quickly the brake sets when power is removed. If needed, the value of this resistor can be decreased to give a gradual and softer brake application. This is a substitute for TBDD Brake Drop Delay and sometimes is *essential* in getting the best brake operation in *gearless* applications.

   If you have already adjusted the brake to the correct mechanical clearances, and the brake is still clunking down too hard on the braking surface when the car stops, this resistor adjustment will probably help. The only drawback is that lower resistor values slow the application of the brake, so you must verify that the brake sets firmly enough to hold 125% of a full load when the AC Drive releases control of the car, and also when any of the emergency stop switches are opened during high speed. **The value of the resistor between BR1 and BR3 should not be set to greater than 8 times the measured brake coil resistance.**

   An alternate way to achieve smooth dropping of the brake is to increase the value of the brake Voltage Decay Time (BRLD) on the Brake (Shift F3) screen, up to a maximum of 1 second.

FIGURE 4.7 Effect of Brake Drop Delay (TBDD) on the Stop of Car Motion



3. Next, coordinate the dropping of the brake with the instant that motion stops in the hoist motor. Some delay in dropping the brake is provided by the adjustment of resistor RB in step 2 above, and if that delay is too much, increase the value of that resistor.

   - The primary means of coordinating the brake with the stopping of the hoist motor is accomplished by adjusting TBDD Brake Drop Delay on the Brake (Shift F3) screen. The initial setting should be 0.00 seconds. Increase TBDD in increments of 0.10 second until the motor is clearly at zero velocity when the brake drops. The goal is to avoid dropping the brake on a moving motor, but also to avoid holding the brake up for longer than is necessary (see Figure 4.7).
   - *TORQMAX drive* - Adjust LF.79 (Current Hold Time) Delay in turning off the drive (delay to turn off the motor current after direction is dropped) which can hold the car electrically until the brake is dropped. Refer to Section 4.7.2 'b' for adjustment values.

4.7.3. RELEVELING OPERATION

To verify proper relevel operation, make the car overrun the floor at the end of the run as follows:

a. **Geared Installations** - Place a car call above the car. Near the end of the run, when the LU relay on the HC-RB4-SCRI board is energized, connect a jumper between terminals 18 and 26 to hold the LU relay energized until the LD relay also is energized. This should stop the car and allow the brake to set fully. Wait 3 seconds, then remove the jumper. This will cause the car to relevel down into the floor. Check to see that the relevel speed is OK (typically 6 to 8 fpm) and causes no oscillations or subsequent releveling operations. Start with VRL Relevel Velocity on the Pattern (Shift F4) screen, identical to VFL Final Leveling Velocity, and only change the releveling velocity as necessary to cause the car to stop at the same point as it would during a normal approach to the floor. During this test you may get a “Leveling Sensor Failure” error message on the Swing Panel Diagnostic Indicators. This error occurs when both LU and LD are activated at the same time. Toggle the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to clear the fault.

b. **Gearless Installations** - Set VRL Relevel Velocity to 5 fpm. Place a full load in the car. Check the full load releveling operation by first placing a car call below the car. Near the end of the run when the LD relay on the HC-RB4-SCRI board is energized, connect a jumper between terminals 18 and 25 to hold the LD relay energized until the LU relay also is energized. This should stop the car and allow the brake to set fully. Wait 3 seconds, then remove the jumper. This will cause the car to relevel up into the floor against the full load. During this test you may get a “Leveling Sensor Failure” error message on the Swing Panel Diagnostic Indicators. This error occurs when both LU and LD are activated at the same time. Toggle the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to clear the fault.

   Start with a low enough value of BRV Relevel Voltage on the Brake (Shift F3) screen, so that no rollback occurs on a relevel up. Repeating the test while increasing BRV until rollback begins to occur at the beginning of the releveling operation. Then reduce BRV until the rollback just disappears. The goal is to weaken the brake so it does not pick fully on a relevel, but so that the brake pressure is just partially removed, allowing a relevel without rollback under the brake. This procedure provides for the maximum amount of release of brake pressure without encountering rollback, but without fully lifting the brake. If this is done correctly, the least amount of hoist motor current necessary to accomplish proper releveling operation is required, and the Loop Overcurrent detector will not trip.

c. **Rope Stretch Releveling** - On high-rise applications, when the car is very low in the building with hundreds of feet of cable between the machine and the elevator, substantial movement can occur when the elevator load changes, thereby causing releveling operation. To make the system more tolerant of this movement, there is a special option which adjusts the amount by which the elevator must be away from the floor before the releveling operation is engaged. If the controller has the RSR relay (rope stretch relevel), this option has been included. The distance that the car must be away from the floor before engaging releveling is determined by MRSR Rope Stretch Relevel Distance on the Pattern (Shift F4) screen. The range of adjustment is from 0.00 to 3 inches, with a typical value being 0.72 inches.

4.7.4 CONTRACT SPEED UP AND DOWN

Check contract speed in both UP and DOWN directions with a hand held tachometer. Verify that the difference between the UP and DOWN speeds is not more than 2% (1% or less is typical). Verify that PZA Zero Pattern Adjust on the Pattern (Shift F4) screen is set to 0.0. *Adjusting this parameter will not help in making the UP/DN speed equal.*

If there is more than 2% difference in speed, there may be an encoder feed back problem. Perform the adjustments described in Section 3.7.4 to correct the speed difference.

4.7.5 ADJUSTING INDIVIDUAL FLOOR STOPS

The car should now be stopping smoothly, but may be stopping slightly above or below the floors.

a. If the car is stopping consistently high or low at all floors, loosen the thumbscrews on the faceplate of the landing system and move it up or down to adjust the stop at all landings.

b. If there are still individual floors that need adjustment, move the floor magnets or vanes at those floors as necessary to stop exactly level with the floor. For the LS-QUAD-2 landing system, be sure the horizontal movement of the floating part of the faceplate is still possible after re-tightening the thumbscrews.

Remove the temporary tape and permanently attach the floor magnets to the steel tape using the adhesive on the back of the magnets, if this has not already been done. If magnets or vanes were moved *more than about 3/16ths of an inch (5 mm.)*, relearn the hoistway as described in Section 4.1. Now put the car on Normal operation and stop the car at every floor. Verify that the RD flag is ON at every floor and that the car is stopping level within the desired tolerance.

4.7.6 RIDE QUALITY

If you are experiencing a ride quality that is not exactly an oscillation, but is best described as a rough texture, i.e., not a glass smooth feeling, it may be due to a variety of sources:

a. The value of FRP Raw Pattern filter on the Pattern (Shift F4) screen may be too high. This will result in insufficient filtering of the digital pattern value, which will allow you to feel every slight variation in the pattern signal.

b. With the TORQMAX drive, parameter LF.33 Ki Speed Offset (F5 software > V1.51, A.LF.33 Ki speed offset accel, d.LF.33 Ki speed offset decel) is used to allow a smoother transfer of the load from brake to motor, especially with high efficiency gears. The default setting is 1000 (A.LF.33 = 3000). Increase LF.33 in increments of 1000.

c. The values of the Baldor P1606 Speed Prop Gain and P1607 Speed Int Gain parameters [*MatgneTek: P3 Response and P5 Inner Loop Xover*] on the Baldor / MagneTek Drive (Shift F5) screen may be too high.

d. The encoder, attached to the motor shaft, may not be mounted securely, which may cause bouncing or a slight variation in the velocity feedback signal once every revolution. On a geared machine the coupling used between the tach or encoder and the motor can also be a source of vibration. In both cases the problem is observed by looking at the AC-coupled encoder speed signal on software test point STP1 on the IMC-DAS board (with TP1 set to option 06), where you will see the vibration frequency increase and decrease with car speed. This is *absolute* proof of a mechanical problem with the speed transducer. Electrically induced oscillations will be characterized by a frequency of oscillation that is constant (does not change significantly with speed).

4.8 LOAD WEIGHER ADJUSTMENT FOR DISPATCHING

4.8.1 INTRODUCTION AND THEORY OF OPERATION

The load weigher (isolated platform or crosshead deflection) provides a signal that corresponds to the perceived load. This signal is brought to the control system where it is conditioned, sampled and digitized, and the value is used to calculate the actual load *inside* the elevator. This load value is then used for logical operations such as anti-nuisance and hall call bypass.

With the isolated platform load weigher (MCE), the system simply learns the reference values of the empty and fully loaded car weight, which are then used to calculate the current load (as a percentage of full load). However, with the crosshead deflection load weigher (K-Tech), the magnitude of the signal generated by the load sensor represents the perceived load *at the crosshead*, which includes the weight of the car itself, the load inside the car, the traveling cable, and any compensation cables that might be attached to the car. Therefore it is necessary for the controller to use the measured load value in a calculation to determine the load inside the elevator (the raw load value cannot be used as is).

Due to the dynamics of the elevator system, the load represented by the traveling cable and compensation cables will vary with the position of the car in the hoistway. The load weighing system accounts for these variances by performing a process which learns empty car and full car load values at each floor in the building. The load in the car can then be determined by reading the value at a given floor and, using the learned values for that floor, performing a linear interpolation to approximate the load inside the car (as a percentage of full load). The calculated load percentage is then used to initiate logical operations, i.e., hall call bypass at 80% of capacity.

Logical operations that use the load information include: light load weighing (anti-nuisance), advance car dispatch (reduction of door dwell time), heavy load weighing (hall call bypass), and overloaded car detection. Each threshold is user-programmable, and will determine when each of these logical operations should be performed.

The measurement of the load will only take place when the car is stopped at a landing with the doors open. This is the only time that we would anticipate a change in load upon which a logical operation should be initiated. The measurement is not taken when the car is running because the acceleration and deceleration of the car would be interpreted as a change in load.

Functional Description of Load Thresholds - The four load thresholds are:

- **LLW** (Light load weigher threshold): This threshold value is used to define the load at which a limited number of car calls is to be registered. If the programmed number of car calls is exceeded, all car calls will be canceled.

  Example: LLW=20%. If the measured load in the car is less than 20%, the computer will only allow a certain number of car calls to be registered (defined by a field-programmable value LLCC). If LLCC is programmed at a value of three, the computer will only allow three calls to be registered if the load is less than 20%. If a fourth call is registered, all car calls will be canceled.

- **DLW** (Dispatch load weigher threshold): This threshold value is used to define the load at which the lobby landing door timer is reduced. This threshold should be set to a value (defined in many specifications as 60%) at which it is appropriate to initiate the process of moving the car out of the lobby.

- **HLW** (Heavy load weigher threshold): This threshold value is used to define the load value at which hall calls should be bypassed.

- **OLW** (Overloaded car threshold): This threshold value is used to define the load value at which it is considered unsafe to move the elevator. When this threshold is exceeded, the car will remain at the floor with doors open. Typically an application that requires OLW will use some type of visual and/or audible indicator to alert elevator passengers that the car is overloaded. This operation is overridden by Fire Service operation.

- **OLW2** (Overloaded car threshold 2): When on Fire Service, this threshold value is used instead of the OLW value (see OLW above).

Learn Modes - With the isolated platform load weigher (MCE), the system simply learns the reference values of the empty and fully loaded car weight. However, with the crosshead deflection load weigher (K-Tech), the system must learn the reference values of empty and fully loaded car weight at each floor. This is necessary because the perceived load at the crosshead varies with the position of the car in the hoistway due to the changing proportion of the traveling cable hanging beneath the car and the position of the compensation cables.

The reference values learned for the empty car and full car weight are used to calculate the current load (as a percentage of full load) when the car is positioned at a floor.

Learn Process - The learn process consists of three functions:

- Learning the measured load value for an empty car.
- Learning the measured load value for a fully loaded car.
- Establishing the load thresholds which will initiate the logical operations.

Each of these functions can be performed separately. All three functions must be performed before the load weigher system will perform properly. **To enter the learn function, the car must be placed on Independent Service.** If an independent service switch is available in the car, use it. If not, the car can be placed on Independent Service by connecting a jumper between terminals 2 and 49 on the controller main relay board. A further option is to use the TEST/NORM switch on the HC-RB4-SCRI relay board, but this will electrically disconnect the door open relays, and is therefore **not recommended**.

4.8.2 GETTING INTO LOAD WEIGHER LEARN MODE

b. Enter the SYSTEM mode of operation on the Computer Swing Panel by following these steps:

   1. Place all diagnostic switches on the Swing Panel in the OFF (down) position.

   2. Turn the **F7** switch ON (up).

   3. The computer should respond with the message PASSWORD on the alphanumeric display. If you do not see this, verify that all other diagnostic switches are turned OFF. If a password has been programmed, enter the password, otherwise go to step four.

   4. Press and hold the **S** push-button until the computer responds with the message ***SYSTEM*** on the alphanumeric display.

c. Once in SYSTEM mode, access the load weigher learn function by turning the **Diagnostic On** switch ON (the F7 switch should remain in the ON position). The computer will respond with one of three scrolling messages:

- *NOT USED* - The software has not been configured to provide the "analog load weighing function". Contact MCE if you believe this to be in error.
- *CAR NOT READY TO LEARN* - Verify that the car has been placed on Independent Service.
- *PRESS N FOR K-TECH CROSSHEAD OR S FOR MCE PLATFORM...* - Select the type of load weigher by pressing N for K-Tech crosshead deflection or S for MCE isolated platform load weigher.

The following message is then displayed:

- *ANALOG LOAD WEIGHER LEARN FUNCTION...PRESS N TO CONTINUE* - The system is ready to learn, you have successfully placed the elevator in "load weigher learn mode".

d. Once the elevator has successfully been placed in "load weigher learn mode" one or all three of the learn functions can be performed as described in sections to follow. The system will display one of three main prompts:

- *READY TO LEARN EMPTY CAR VALUES? PRESS S TO CONFIRM* - Press the S push-button to begin this process. The car must be empty before beginning. Press N to advance to the full load learn procedure.
- *READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM* - Press the S push-button to begin this process. Place the full load weights in the car before beginning. Press N to advance to the threshold adjustment procedure.
- *ADJUST THE LOAD WEIGHER THRESHOLDS? PRESS S TO CONFIRM* - Press the S push-button to adjust the load threshold values. Press N to advance to the empty car learn procedure.

Press the N push-button to cycle through these three different prompts. To exit the load weigher learn mode, turn the Diagnostic On function switch on the Computer Swing Panel to OFF.

4.8.3 LEARNING THE EMPTY AND FULLY LOADED CAR VALUES

Learning the empty and loaded car values is an automated process that requires only that the appropriate load be present in the car before beginning each process. **It is best to have two persons available, one in the machine room at the elevator controller and one positioned at a floor with test weights available.** The test weights must represent the full load value.

If the K-Tech crosshead deflection load weigher was selected, the learn process will automatically run the car from floor to floor, stopping at each landing. The car will first travel to the bottom landing, stop and pause there for a period of time. The car will then move in the up direction, stopping at each floor on the way to the car's highest landing served. Each time the car stops at a landing a value is learned for that landing (either the empty or full load value). Once all floors have been learned, the car will automatically return to its point of origin and open its doors. The learn process must be performed twice, once for empty car load and once for full car load.

Learning the Empty Car Load Values

a. With the system in “load weigher learn mode”, press the N push-button until the following prompt is displayed:

- *READY TO LEARN EMPTY CAR VALUES? PRESS S TO CONFIRM....*

b. Verify that the car is empty.

c. Press the S push-button to begin the empty car learn process.

1. When the S push-button is pressed, the car will automatically close its doors and commence the learn operation. During this process, the doors will remain closed and the car will not respond to car or hall call demand. If the K-Tech crosshead deflection load weigher was selected, the car will move to the bottom floor, record the empty car value and then move up, stopping at each floor to record the empty car value. When the top floor has been reached, the car will move back to the floor at which the Load Weigher Learn procedure was begun.

2. During the learn process the computer will display the scrolling message: *LEARNING EMPTY CAR VALUES...PRESS N TO ABORT....* The learn process may be aborted by pressing the N push-button any time during the process.

3. Once the learn process is completed for the empty car, the computer will briefly display the message: *EMPTY CAR LEARN PROCESS COMPLETED...*. At that time, the car should be positioned at the floor where the learn process was begun, with the doors fully open.

3. The computer will then display the message: *READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM....* Refer to the next section if you wish to learn the fully loaded car values. **[Do not press the S push-button at this time!]**

Learning the Fully Loaded Car Load Values

a. With the system in “load weigher learn mode”, press the N push-button until the following prompt is displayed: *READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM...*.

b. If the car is not already at the floor where the test weights are located, use a car call to call the car to the floor. Load the test weights that represent the full load value into the car.

c. Once the test weights have been loaded, press the S push-button to begin the full load learn process.

1. The process is identical to the empty car learn process described above. The computer will display the scrolling message: *LEARNING FULL CAR VALUES...PRESS N TO ABORT...*. The learn process may be aborted by pressing the N push-button any time during the procedure.

3. Once the learn process is completed for the fully loaded car, the computer will briefly display the message: *FULL CAR LEARN PROCESS COMPLETED....* At that time, the car should be positioned at the floor where the learn process began, with the doors fully open. The test weights may now be removed from the car.

4. The computer will then display the message: *ADJUST THE LOAD WEIGHER THRESHOLDS? PRESS S TO CONFIRM....* Refer to the next section if you wish to adjust the load weigher threshold values.

4.8.4 ADJUSTING THE LOAD THRESHOLDS

The load thresholds are preset, at the MCE factory, to values based upon the job specification. However, these thresholds are user-adjustable and may be changed at any time. To adjust these thresholds, enter the SYSTEM mode of operation as described above, and select the load weigher learn function. The car must be on Independent Service to enter the load weigher learn function.

a. With the system in the “load weigher learn mode”, press the N push-button until the computer responds with the scrolling message: *ADJUST THE LOAD WEIGHER THRESHOLDS? PRESS S TO CONFIRM...*.

b. Press the S push-button to adjust the thresholds.

c. Once the S push-button is pushed, the computer will respond by displaying mnemonics that represent the load values. The value shown next to the mnemonic is the current threshold value for that parameter expressed as a percentage of the full load value.

Dispatching Threshold	**Typical Value**	**Range**
• LLW = light load (anti-nuisance) threshold	20%	0 - 40%
• DLW = dispatch load threshold	50%	20 - 80%
• HLW = heavy load (hall call bypass) threshold	80%	50 - 100%
• OLW = overloaded car threshold	105%	80 - 125%
• OLW2 = overloaded car threshold 2	125%	100 - 140%

d. Choose the parameter to be adjusted by pressing the N push-button. The mnemonics and values will scroll as long as the N push-button is depressed.

e. The desired value may be adjusted by pressing the S push-button. The value will be incremented until the upper limit value is reached. The value will then roll over to the lower limit value. These limit values are predetermined at MCE, and must be modified with an EPROM change, if necessary.

f. After the last parameter is displayed, pressing the N push-button will cause the computer to display the prompt: DONE ADJUSTING THRESHOLDS? PRESS S TO CONFIRM... At this prompt, pressing the S push-button will exit the threshold adjustment function; pressing the N push-button will return the prompt to the first threshold parameter.

The thresholds can be set to the desired values, as a percentage of a full load. Setting the value to 00% will disable the corresponding function. Example: setting the HLW threshold to 00% will disable the hall call bypass function.

Exiting The Load Weigher Learn Mode

Exit the load weigher learn mode by placing the Diagnostic On/Normal switch in the Normal (down) position. Exit System Mode of diagnostics by turning the F7 switch OFF (down).

4.8.5 DIAGNOSTIC DISPLAY

In the Normal mode of operation, with the Diagnostic On/Norm switch on the computer Swing Panel in the Norm position, one of the default parameter displays will be shown on the alphanumeric display. The display may be changed from one parameter to another by pressing and holding the N push-button.

Time of day - The time of day is displayed in the following format:

[hour] : [minutes] : [seconds]

The time is expressed in military (24-hour) format. For example, 8:15 A.M. would be displayed as "08:15:00", whereas 8:15 P.M. would be displayed as "20:15:00".

Measured load - The measured load in the car is displayed in the following format:

LW=xxx% (where xxx is the measured value).

The measured load will not be displayed if the load weigher learn process has not yet been successfully performed. The computer has no reference values from which to calculate the load. Instead, the following status message will be displayed: “LOAD WEIGHER NOT YET LEARNED...”.

Trip counter - The trip counter indicates the number of runs or trips the elevator has made since the counter was last reset to zero. The format of this display is:

T=yyyyyy (where "yyyyyy" is the number of runs).

The trip counter may be reset to zero by pushing and holding the S push-button for five seconds.

Software Versions - On local car controllers the version number of the MP and CGP software is displayed. The messages are scrolled as follows:

MP VERSION NUMBER IS:	x.xx (where x.xx is the version number)
CGP VERSION NUMBER IS:	x.xx (where x.xx is the version number)
DDP VERSION NUMBER IS:	x.xx (where x.xx is the version number)

4.9 CALIBRATION AND VERIFICATION OF SAFETY FUNCTIONS

4.9.1 VELOCITY ENCODER FAILURE

This test compares the pattern signal with the velocity encoder signal and verifies that excessive error between the actual and intended car speed is detected, the Speed Error fault is tripped and the (TE) fault flag is displayed. Verify the car speed with a hand tachometer or, if the landing system has already been installed, the correct car speed is displayed in the SAFETY section of the View Hoistway (F3) screen. Verify the Inspection speed with a hand held tachometer. If the speed is different from the commanded speed, refer to Section 3.8.'o' to correct the problem.

Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.00. Then set GTC Tach/Encoder Scaling on the Pattern (Shift F4) screen so that *Encoder:* in the VELOCITY section of the F3 screen displays the correct Inspection speed value. Note: Adjusting the value of GTC does not change the actual car speed, it is only used to calibrate the Encoder value which is displayed and used to generate the Tach Error Fault.

a. Before beginning this test, reconnect the jumper on terminal FBP1 and FBP2. Set STE Maximum Speed Error on the Pattern (Shift F4) screen to 5%. Put a full load in the car and run the car up and down at full speed. Observe the TE flag on the F3 screen when the car is accelerating or slowing. Note: It is possible that the TE flag may not highlight due to very good control of the AC drive. It may be necessary to set STE lower then 5% in order to have the TE flag highlight.

   The TE flag will highlight if the Tach Error fault is detected by the system. Stop the car at a floor and clear the fault flags by pushing the DRIVE RESET button on the IMC-DAS board. Increase the value of STE. Repeat the above steps until the TE fault flag *does not* highlight when the car is accelerating or slowing. When the flag no longer becomes highlighted on acceleration or deceleration, add 5% to the STE value to permit a margin before tripping. For sleeve bearing or double-wrapped machines, it may be necessary to add more than 5% to prevent nuisance tripping of TE as the high friction may cause a greater accumulation of error before the machine starts to turn.

   - Make sure that TE does not trip during an emergency stop or door lock clip. The *FOLLOWING ERROR* in the Baldor Drive [*Speed Deviation fault on the MagneTek Drive*] might trip during deceleration, but it should reset itself.

WARNING:	Read step b all the way through before attempting to do this test.

b. This step verifies that the TE flag will highlight and the car will shut down even with a complete velocity encoder failure. Position the car at the bottom landing and then disconnect the wire from terminal TACH on the IMC-ACIB / IMC-ACIM / IMC-ACIK board. Tape the end of the wire for protection. **Remove the jumper connecting terminals FBP1 and FBP2 on the SCR-RI board**. Verify that the TEST/NORM switch on the HC-RB4-SCRI board is in the TEST position. Register a call at least two floors above the bottom landing. The car will run away very fast; **observe safety precautions**. The car should stop immediately when the TE flag highlights on the F3 screen. If the car passes contract speed, and the TE flag does not highlight, turn the Relay Panel Inspection switch on the HC-RB4-SCRI board to ON. Do this before the governor has tripped. When the car stops, reconnect the encoder. Press the DRIVE RESET button on the IMC-DAS board.

c. To check for velocity encoder loss, do the following:

> **NOTE:** Do not unplug or plug in the encoder connector when the AC Flux Vector Drive has power; wait for 5 minutes after turning the power OFF before plugging in or unplugging the encoder connector.

- Turn power OFF at the main disconnect. Unplug the velocity encoder cable connector on the encoder end.
- Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to the ON position. Turn power ON at the main disconnect. Pick the UP or DN direction on Inspection. The AC Flux Vector Drive should trip the “Encoder Loss”, “Overspeed” or TE fault and the error message should be displayed in the FAULTS section of the F3 screen next to “Drive:”. Drop the direction and press the DRIVE RESET button on the IMC-DAS board. Turn power OFF at the main disconnect and then plug in the encoder connector. Turn power ON at the main disconnect.

4.9.2 INSPECTION/LEVELING OVERSPEED

This test calibrates the inspection and leveling overspeed function.

a. Record the original value of VINH Inspection Velocity - High on the Pattern (Shift F4) screen. To verify the overspeed monitoring function for access, inspection, and leveling, set VINH to 150 fpm. Verify that there is no jumper between terminals FBP1 and FBP2 on the SCR-RI board. The overspeed monitoring will be bypassed if this jumper is in place. Also, verify that MILO Inspection/Leveling Overspeed on the Safety (Shift F6) screen is set to 140 fpm.

b. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.00. Run the car on Inspection operation from the controller. When the car speed passes 140 fpm, the FLT relay on the SCR-RI board will drop out and you should see the following:

- IOS will be displayed on the IMC-DIO board alphanumeric display.
- The ILO flag will be highlighted in the SAFETY section on the F3 screen and IOS will appear after *Speed:*, followed by the actual trip speed.
- The red OVRSPD LED on the IMC-DIO board will be illuminated.

c. After verifying overspeed, set VINH Inspection Velocity - High back to the original value.

4.9.3 CONTRACT OVERSPEED (BALDOR DRIVE)

This test verifies the high speed overspeed monitor. Bring the car to the bottom landing in preparation for this test. Verity that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.0. Set the TEST/NORMAL switch on the HC-RB4-SCRI board to TEST. If there is a jumper between FBP1 and FBP2 on the SCR-RI board, remove it.

a. Set P2203 Following Error on the AC Flux Vector Drive to OFF (0) as followings:

- Access the Baldor Drive Direct Access (F1, D) screen.
- On Baldor Drive Model # ZD18HXXXL-**EX**, type **P2203** 0 and press Enter.
- On Baldor Drive Model # ZD18HXXXL-**DEX**, type **P2204** 0 and press Enter.

- Verify that the Following Error parameter = 0 by typing HP2203 (Baldor Drive Model # ZD18HXXX**L**-EX) or HP2204 (Baldor Drive Model # ZD18HXXXL-**DEX**) and press Enter.

b. Record the value of P2003 Max Output Speed on the Baldor Drive (Shift F5) screen and then increase the value of P2003 by 10%.

c. Place a call far enough away from the terminal landing to allow the car to reach contract speed. Once the car reaches 107% of contract speed, the FLT relay on the SCR-RI board will drop out and you should see the following three indicators:

- COS will be displayed on the IMC-DIO board alphanumeric display.
- The COS flag will be highlighted in the SAFETY section of the F3 screen and COS will appear after *Speed:*, followed by the actual trip speed.
- The red OVRSPD LED on the IMC-DIO board will be illuminated.

d. Reset the Following Error Parameter on the AC Flux Vector Drive to ON (1) as follows:

- Access the Baldor Drive Direct Access (F1, D) screen.
- On Baldor Drive Model # ZD18HXXXL-**EX**, type **P2203** 1 and press Enter.
- On Baldor Drive Model # ZD18HXXXL-**DEX**, type **P2204** 1 and press Enter.
- Verify that the Following Error parameter = 1 by typing HP2203 (Baldor Drive Model # ZD18HXXX**L**-EX) or HP2204 (Baldor Drive Model # ZD18HXXXL-**DEX**) and press Enter.

e. Set P2003 Max Output Speed on the Baldor Drive (Shift F5) screen to its original value. Also, press the RESET button on the IMC-DAS board, in the IMC-S12 unit.

4.9.4 CONTRACT OVERSPEED (MAGNETEK DRIVE)

This test verifies the high speed overspeed monitor. Bring the car to the bottom landing in preparation for this test. Verity that the Pattern Scaling (PG) on the Pattern (Shift F4) screen is set to 1.0. Set the TEST/NORMAL switch on the HC-RB4-SCRI board to TEST. If there is a jumper between FBP1 and FBP2 on the SCR-RI board, remove it.

a. Set P16 Overspeed Mult on the MgneTek Drive (Shift F5) screen to 115%.

b. Enable the overspeed test by setting the U4 - Overspeed Test parameter to YES using the drive keypad (refer to Section 3.6.4 in the MagneTek drive manual).

c. Place a call far enough away from the terminal landing to allow the car to reach contract speed. Once the car reaches 107% of contract speed, the FLT relay on the SCR-RI board will drop out and you should see the following three indicators:

- COS will be displayed on the IMC-DIO board alphanumeric display.
- The COS flag will be highlighted in the SAFETY section of the F3 screen and COS will appear after *Speed:*, followed by the actual trip speed.
- The red OVRSPD LED on the IMC-DIO board will be illuminated.

d. Reset P16 Over speed Mult to 100%, and verify that the overspeed test is not active (U4 - Overspeed Test parameter = NO).

4.9.5 CONTRACT OVERSPEED (TORQMAX DRIVE)

This test verifies the high speed overspeed monitor. Bring the car to the bottom landing in preparation for this test. Verity that Pattern Scaling (PG) on the Pattern (Shift F4) screen is set to 1.0. Set the TEST/NORMAL switch on the HC-RB4-SCRI board to TEST. If there is a jumper between FBP1 and FBP2 on the SCR-RI board, remove it.

a. Record the value of LF.20 Contract Speed and LF.42 High Speed. Then set LF.20 and LF.42 = 115% of their original values.

b. Place a call far enough away from the terminal landing to allow the car to reach contract speed. Once the car reaches 107% of contract speed, the FLT relay on the SCR-RI board will drop out and you should see the following three indicators:

   - COS will be displayed on the IMC-DIO board alphanumeric display.
   - The COS flag will be highlighted in the SAFETY section of the F3 screen and COS will appear after *Speed:*, followed by the actual trip speed.
   - The red OVRSPD LED on the IMC-DIO board will be illuminated.

c. Reset LF.20 and LF.42 = their original value. Also, press the reset button on the IMC-DAS board in the IMC-SI2 unit.

4.10 LEARNING THE NORMAL (NTS) AND EMERGENCY (ETS) LIMIT SWITCHES

The Normal Terminal Slowdown Limit (NTS) and Emergency Terminal Limit (ETS) switch Learn operation is defined as recording the car velocity and position count at the time each of these terminal switches is encountered on a normal approach to either terminal landing. This Learn operation should be performed after all parameters have been fully adjusted.

WARNING: This procedure must be successfully performed before any passengers are allowed to use the elevator.

NOTE: Whenever Pattern or Profile Parameters are modified, this Learn procedure must be repeated so that the Safety Processors on the IMC-DIO board can relearn the velocities associated with the Terminal Limit Switches.

The following are the required steps to learn the normal velocities associated with each terminal landing.

a. Place the TEST/NORM switch on the HC-RB4-SCRI board in the TEST position.

b. Make sure that all the terminal limit switches are properly installed according to Section 2.3.3. Verify the proper operation of the terminal switches using the View Hoistway (F3) screen. In the SAFETY area, locate UT1-UT5 and DT1-DT5. Look at the job prints to determine which normal terminal limit (UNTx and DNTx) switches are required for this installation. During a full hoistway run, UP or DOWN, watch to see if these become highlighted. The flag is highlighted when the UTx or DTx, terminal switch is closed. The flag is not highlighted when the switch is open or not connected in this installation. The UET and DET flags on the View Hoistway (F3) screen indicate the status of the UETS and DETS switches. You can also look at the LEDs associated with these switch inputs on the SCR-RI board or you can verify the limit switch inputs by looking at the DDP Diagnostic Indicators on top of the Swing Panel at address 14 and 15 (see Table 5.14).

c. Bring the car to the bottom landing. Turn the LEARN SWITCH on the IMC-DIO board to ON. When the LEARN SWITCH is ON, if the alphanumeric display shows LRNT or LRNC, turn the LEARN SWITCH OFF and ON. The associated green LED on the IMC-DIO board will illuminate and the alphanumeric display should show LRN.

d. Make a full hoistway run to the top terminal landing using a car call. Notice as the car starts in the UP direction, the alphanumeric display on the IMC-DIO will display LRNU. As the car stops at the top terminal it will display LRN.

Now make a full hoistway run to the bottom terminal landing using a car call. The alphanumeric display will read LRND at this time. When the car stops at the bottom terminal landing, the IMC-DIO will display these in sequence:

LRNW	-	the IMC-DIO is writing the learned data into the EEPROM
LRNR	-	the IMC-DIO is reading the stored data back for verification
LRNC	-	the IMC-DIO Learn process is complete.

e. Return the LEARN SWITCH on the IMC-DIO board to the OFF position. The IMC-DIO board has now learned the speed of the car under normal conditions as the terminal switches are encountered on approach to each terminal landing. The IMC-DIO alphanumeric display will show the car speed as it moves, or it will display an error flag if any error conditions exist.

NOTE: Learned velocities for SAF and DDP may vary by as much as 10% due to the fact that each processor independently monitors the car velocity.

f. VERIFYING REASONABLE LEARNED VALUES FOR TERMINAL SLOWDOWN SWITCHES - Stop the car and verify the limit switch velocity values stored during a normal slowdown at the terminal landings on Switches (Shift F7) screen. If you have only UNT1 and DNT1, the learned values must be 95% of contract speed or less. If you have more UNTx and DNTx switches than just UNT1 and DNT1, it is permissible for UNT1 and DNT1 to have a learned speed of more than contract speed. However, all other UNTx and DNTx switches must have learned values of 95% of contract speed or less. For limit switches having learned speeds that are higher than needed, those specific limit switches will have to be moved closer to the terminal landings. Alternately, if you can tolerate the reduced performance, A6 Phase Six Deceleration may be reduced. If the switches are moved closer, STDR Terminal Danger Slowdown Rate and STSS Terminal Slowdown Smoothing on the Safety (Shift F6) screen must be increased.

4.10.1 VERIFYING OVERSPEED DETECTION

Now verify that the IMC-DIO will recognize an overspeeding car at a terminal landing. Perform preliminary tests as follows:

a. For each UNTx terminal landing limit switch, run the car UP at contract speed and remove each UNTx wire from its terminal on the SCR-RI board when the car is in the middle of the hoistway. (Repeat this test separately for each individual limit switch.) With the UNTx switches, the car must decelerate rapidly (at a rate determined by the

PADL parameter and also by STDR on the Safety (Shift F6) screen) and stop at the next floor. Note: Be careful about changing PADL, as this parameter must provide a steeper deceleration than that of STDR. Replace each wire when complete.

b. For the UETS limit switch, also run the car UP at contract speed and remove the wire from the UETS terminal on the SCR-RI board when the car is in the middle of the hoistway. With the UETS switch, the car will perform an emergency stop, and wait several seconds. Then it will proceed at correction speed to the next landing, let the people out, close its doors (door open button (DOB) remains active), and shut down (requiring a manual reset). The UEF flag in the FAULT section on the View Hoistway (F3) screen will be highlighted until the manual reset occurs. Press the DDP Reset button on the rear or the Computer Swing Panel to clear the fault.

c. Similarly, for each DNTx or DETS limit switch, run the car down at contract speed and remove each DNTx or DETS wire from its terminal in a manner similar to the above steps, while checking the operation. Reinstall each wire into the terminal when complete. The DEF flag in the FAULT section on the View Hoistway (F3) screen will be highlighted until the manual reset occurs. Press the DDP Reset button on the rear or the Computer Swing Panel to clear the fault.

4.10.2 VERIFYING PROPER DECELERATION USING THE NORMAL TERMINAL SWITCHES

It is necessary to verify proper deceleration into the terminal landings from contract speed using the normal terminal slowdown switches (UNTx, DNTx) under the condition of the car having incorrect location information. There are two ways to accomplish this test. Use the procedure appropriate for your building's size.

PROCEDURE FOR BUILDINGS WITH FOUR STORIES OR LESS

For testing the terminal slowdown switches, we must force the car to travel past the switches at a higher speed. The process follows:

a. Reduce A6 on the Pattern (Shift F4) screen by 50% and relearn the Normal Terminal Limit Slowdown switches.

b. Return parameter A6 to its original value.

c. **Top Terminal Verification** - Be sure the car is empty and at the bottom terminal landing. Place a call at the top terminal landing. The car must reach contract speed, and must accomplish a slowdown that will allow the car to stop before overrunning the top terminal landing. The deceleration rate will be higher than normal, but will still be relatively smooth in the car. Besides the switch location, the most common failure to slow at the top landing with an empty car is due to traction problems, so watch for rope slippage. The combination of high normal deceleration rates and no compensation cables or chains can cause traction problems with the emergency deceleration rate.

STDR on the Safety (Shift F6) screen is typically set so that the deceleration rate is approximately 150% of the deceleration provided for by parameter A6 on the Pattern (Shift F4) screen. Note that PADL must be greater than or equal to STDR. This process may have to be repeated several times to get the right adjustment. To do this, assign the Processed Speed feedback signal to Software Test Point STP1 by setting TP1 Test Point One to option 06. Connect oscilloscope probes to monitor DCS and STP1 on the IMC-DAS board. Run the car and observe the pattern and speed while decelerating into a floor. Adjust STDR and STSS as necessary to assure that the slope of deceleration and flare-out is sufficient to allow decelerating to leveling speed before the floor is reached. About 1 ft. or more of leveling is not unreasonable. Note that PADL must be greater than or equal to STDR.

NOTE: During this test, if the AC drive trips a fault and the car makes an emergency stop, the following adjustments may help to stop the car at the landing without tripping a fault:

- decrease the value of PADL and STDR
- *Baldor Drive* - increase the value of Speed Prop Gain (P1606) and Speed Int Gain (P1607)
- *MagneTek Drive* - increase the value of A1 - Response (P3) and A1 - Inner Loop Xover (P5)
- *TORQMAX Drive* - increase the value of LF.31 Kp Speed (proportional gain) and LF.32 Ki Speed (integral gain). For F5 software $\geq$ V1.51, A.LF.31 accel, d.LF.31 decel, A.LF.32 accel, d.LF.32 decel).

d. **Bottom Terminal Verification** - Be sure the car is fully loaded and at the top terminal landing. Place a call at the bottom terminal landing. The car must reach contract speed, and must accomplish a slowdown that will allow the car to stop before overrunning the bottom terminal landing. The deceleration rate will be higher than normal, but will still be relatively smooth in the car. Assign the Processed Speed to Software Test Point STP1 by setting TP1 Test Point One to option 06. Connect oscilloscope probes to monitor DCS and STP1 on the IMC-DAS board. Run the car and observe the pattern and speed while decelerating into a floor. Adjust STDR and STSS as necessary to assure that the slope of deceleration and flare-out is sufficient to allow decelerating to leveling speed before the floor is reached. About 1 ft. or more of leveling is not unreasonable. Note that PADL must be greater than or equal to STDR. Any problems will be due to switch location or possibly due to current limiting.

e. If not continuing to Section 4.10.3, relearn the Normal (NTS) and Emergency (ETS)Terminal Limit switches as described in Section 4.10 a thru e.

PROCEDURE FOR BUILDINGS WITH MORE THAN FOUR STORIES

For testing the top terminal slowdown switches, we must make the car think it is *lower* than it actually is. For testing the bottom terminal slowdown switches, we must make the car think it is *higher* than it actually is. This process must be set up as follows:

a. Temporarily disconnect the wires from terminals 93 and 94 on the SCR-RI board to bypass the OLM signal. During this test, the car must be placed on Inspection before changing the binary floor code. Once the floor code has been modified, take the car out of Inspection.

b. **Top Terminal Verification** - Be sure the car is *empty*. Choose a floor far enough below the top terminal landing to allow the car to reach contract speed. Refer to the job prints and Table 4.2 to choose a floor that will allow you to *remove one* of the wires (R0, R1, R2, etc.) and *change the parity signal* (PR) by removing the wire or jumpering the PR terminal to terminal 2 so that it will give a floor encoding signal that corresponds to a floor that is lower than the one where the car is stopped (as long as it is not the bottom terminal landing). Note: The floor chosen for stopping the car and *also* the floor faked by changing the wires, must both be floors where all functional terminal switches are active (120VAC).

c. Place a call at the top terminal landing. The car must reach contract speed, and must accomplish a slowdown that will allow the car to stop before overrunning the top terminal landing. The deceleration rate will be higher than normal, but will still be relatively smooth in the car. Besides the switch location, the most common failure to slow at the top landing with an empty car is due to traction problems, so watch for rope slippage. The combination of high normal deceleration rates and no compensation cables or chains can cause traction problems with the emergency deceleration rate. About 1 ft. or more of leveling is not unreasonable.

STDR on the Safety (Shift F6) screen is typically set so that the deceleration rate is approximately 150% of the deceleration provided for by parameter A6 on the Pattern (Shift F4) screen. Note that PADL must be greater than or equal to STDR. This process may have to be repeated several times to get the right adjustment. To do this, assign the Processed Speed feedback signal to Software Test Point STP1 by setting TP1 Test Point One to option 06. Connect oscilloscope probes to monitor DCS and STP1 on the IMC-DAS board. Run the car and observe the pattern and speed while decelerating into a floor. Adjust STDR and STSS as necessary to assure that the slope of deceleration is sufficient to allow decelerating to leveling speed before the floor is reached. Note that PADL must be greater than or equal to STDR.

NOTE: During this test, if the AC drive trips on a fault and the car makes an emergency stop, the following adjustments may help to stop the car at the landing without tripping on a fault:

- decrease the value of PADL and STDR
- *Baldor Drive* - increase the value of Speed Prop Gain (P1606) and Speed Int Gain (P1607)
- *MagneTek Drive* - increase the value of A1 - Response (P3) and A1 - Inner Loop Xover (P5)
- *TORQMAX Drive* - increase the value of LF.31Kp Speed (proportional gain) and LF.32 Ki Speed (integral gain). For F5 software $\geq$ V1.51, A.LF.31 accel, d.LF.31 decel, A.LF.32 accel, d.LF.32 decel).

d. **Bottom Terminal Verification** - Be sure the car is *fully loaded*. Choose a floor far enough above the bottom terminal landing to allow the car to reach contract speed. Refer to the job prints and Table 4.2 to choose a floor that will allow you to *jumper one* of the terminals (R0, R1, R2, etc.) to terminal 2 and *change the parity signal* (PR) by removing the wire or jumpering the PR terminal to terminal 2 so that it will give a floor encoding signal that corresponds to a floor that is higher than the one where the car is stopped (as long as it is not the top terminal landing). Note: The floor chosen for stopping the car and *also* the floor faked by changing the wires, must both be floors where all functional terminal switches are active (120VAC).

e. Place a call at the bottom terminal landing. The car must reach contract speed, and must accomplish a slowdown that will allow the car to stop before overrunning the bottom terminal landing. The deceleration rate will be higher than normal, but will still be relatively smooth in the car. Assign the Processed Speed feedback signal to Software Test Point STP1 by setting the TP1 Test Point One parameter to option 06. Connect oscilloscope probes to monitor DCS and STP1 on the IMC-DAS board. Run the car and observe the speed pattern and tach while decelerating into a floor. Any problems will be due to switch location or possibly due to current limiting. About 1 ft. or more of leveling is not unreasonable. Adjust STDR and STSS as necessary to assure that the slope of deceleration is sufficient to allow decelerating to leveling speed before the floor is reached. Note that PADL must be greater than or equal to STDR.

f. If not continuing to Section 4.10.3, reinstall wires 93 and 94 into their respective terminals on the SCR-RI board.

4.10.3 VERIFYING PROPER EMERGENCY STOP USING EMERGENCY TERMINAL SWITCHES

It is necessary to verify a proper emergency stop at the terminal landings from contract speed using the emergency terminal slowdown switches (UETS, DETS) under the condition of the car approaching either terminal landing with the UNTx and DNTx switches disabled. Perform the procedure appropriate for your building's size.

PROCEDURE FOR BUILDINGS WITH FOUR STORIES OR LESS

a. Reduce A6 on the Pattern (Shift F4) screen by 50% and disable the UNTx and DNTx switch inputs by removing all of the UNTx and DNTx wires from their terminals on the SCR-RI board. Temporarily jumper terminal UETS to UNT1 and terminal DETS to DNT1.

b. Relearn the Emergency Terminal Slowdown switches and return parameter A6 to its original value.

c. With an *empty* car at the bottom terminal landing, place a call at the top terminal landing. The car must reach contract speed, and must accomplish an **emergency stop** that will allow the car to stop before overrunning the top terminal landing. Besides the switch location, the most common failure to slow down at the top landing with an empty car is due to traction problems, so watch for rope slippage. Press the DDP Reset button on the rear or the Computer Swing Panel to clear the fault.

d. With a *fully loaded* car at the top terminal landing, place a call at the bottom terminal landing. The car must reach contract speed, and must accomplish an **emergency stop** that will allow the car to stop before overrunning the bottom terminal landing. Press the DDP Reset button on the rear of the Computer Swing Panel to clear the fault.

e. Remove all jumpers and re-install all of the UNTx and DNTx wires that were removed in step (a) above.

f. *Relearn the Normal (NTS) and Emergency (ETS) Terminal Limit switches* as described in Section 4.10 a thru e. Learned values can be verified on the Switches (Shift F7) screen.

PROCEDURE FOR BUILDINGS WITH MORE THAN FOUR STORIES

a. Temporarily disconnect the wires from terminals 93 and 94 on the SCR-RI board to bypass the OLM signal. During this test, the car must be placed on Inspection before changing the binary floor code. Once the floor code has been modified, take the car out of Inspection.

b. Disable the UNTx and DNTx switch inputs by removing all of the UNTx and DNTx wires from their terminals on the SCR-RI board. Temporarily jumper terminal UETS to UNT1 and terminal DETS to DNT1, and then learn the terminal landings.

c. Bottom terminal: Be sure the car is *fully loaded*. Choose a floor far enough above the bottom terminal landing to allow the car to reach contract speed. Refer to the job prints and Table 4.2 to choose a floor that will allow you to *jumper one* of the terminals (R0, R1, R2, etc.) to terminal 2 and *change the parity signal* (PR) by removing the wire or jumpering the PR terminal to terminal 2 so that it will give a floor encoding signal that corresponds to a floor that is higher than the one where the car is stopped (as long as it is not the top terminal landing). Note: The floor chosen for stopping the car and *also* the floor faked by changing the wires, must both be floors where all functional terminal switches are active (120VAC).

d. Place a call at the bottom terminal landing. The car must reach contract speed, and must accomplish an **emergency stop** that will allow the car to stop before overrunning the bottom terminal landing. Besides the switch location, the most common failure to slow down at the bottom landing with a fully loaded car is due to traction problems, so watch for rope slippage. Press the DDP Reset button on the rear of the Computer Swing Panel to clear the fault.

e. Top terminal: Be sure the car is *empty*. Choose a floor far enough below the top terminal landing to allow the car to reach contract speed. Refer to the job prints and Table 4.2 to choose a floor that will allow you to *remove one* of the wires (R0, R1, R2, etc.) and *change the parity signal* (PR) by removing the wire or jumpering the PR terminal to terminal 2 so that it will give a floor encoding signal that corresponds to a floor that is lower than the one where the car is stopped (as long as it is not the bottom terminal landing). Note: The floor chosen for stopping the car and *also* the floor faked by changing the wires, must both be floors where all functional terminal switches are active (120VAC).

f. Place a call at the top terminal landing. The car must reach contract speed, and must accomplish an **emergency stop** that will allow the car to stop before overrunning the top terminal landing. Besides the switch location, the most common failure to slow down at the top landing with an empty car is due to traction problems, so watch for rope slippage. Press the DDP Reset button on the rear of the Computer Swing Panel to clear the fault.

g. Remove all jumpers and re-install all of the UNTx and DNTx wires that were removed in step (b) above.

h. *Relearn the Normal (NTS) and Emergency (ETS) Terminal Limit switches* as described in Section 4.10 a thru e. Learned values can be verified on the Switches (Shift F7) screen.

i. Reinstall wires 93 and 94 into their respective terminals on the SCR-RI board.

Terminal limit switch testing has now been completed.

4.11 FINAL ELEVATOR INSPECTION

WARNING: The following tests should be performed only by qualified elevator personnel, skilled in final adjustments and inspections. The drive safety functions will be bypassed and extreme caution is required.

NOTE: Buffer, Governor and Limit Switch tests may cause the Load Weigher to go out of calibration. Verify the calibration after all Final Inspection tests have been performed (see Appendix M, *K-Tech LW-KK2 Load Weigher Calibration*, Appendix N, *MCE Load Weigher Installation and Calibration* or the instruction manual supplied with the K-Tech LW4202B Load Weigher).

4.11.1 CONTRACT SPEED BUFFER TESTS

a. **CAR BUFFER TEST** - To begin this test, put a full load in the car and move the elevator to the top landing. Then bypass the functions and set the parameters and switches listed below.

1. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to ON.

2. Connect a jumper between terminals FBP1 and FBP2 on the SCR-RI board. ***This will bypass the drive safety functions.***

3. If the final limit switches prevent a fully compressed buffer, use what ever method is acceptable in your local jurisdiction to ensure a fully compressed buffer.

4. Place a jumper between terminals 15B and 16 on the controller subplate. ***This will bypass the buffer switches.***

5. Connect a jumper between terminals 8 and 12 on the HC-RB4-SCRI board. ***This will bypass the Down Normal Limit.***

6. Turn the LEARN SWITCH on the IMC-DIO board to ON. ***This will bypass overspeed detection at the terminal landing.***

7. Set OBT Buffer Test on the Safety (Shift F6) screen to ON. This option must be set before each buffer test. Note: This parameter produces a high speed pattern profile on an Inspection run *one time only* and resets itself automatically. Therefore, repeating the buffer test requires setting OBT ON again.

8. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen equals 1.000. **Note:** If this job has reduced stroke buffers, set PG Pattern Scaling to a value that allows the car to run at the speed rating of the buffer.

9. After recording the original value for A2 Phase 2 Acceleration on the Pattern (Shift F4) screen, set A2 to 2 ft/s^2 or lower.

10. Make sure there is enough hoistway for the car to reach contract speed. Move the car down at contract speed by using the UP/DOWN direction switch on HC-RB4-SCRI board. Run the car down until the car lands on the buffer.

Check the hoist ropes to make sure they are still in their proper grooves before attempting to move the car again.

With all jumpers still in place, use the UP/DOWN direction switch to move the car away from the buffer. Remove the jumpers connecting terminals, 15B and 16 and 8 and 12. The car should be able to run on Inspection normally.

11. If PG Pattern Scaling, on the Drive (Shift F5) screen, was changed in step 8 above, return the value to 1.000.

12. If the Counterweight Buffer Test is to be performed next proceed to (b). If the Counterweight Buffer Test will not be performed next, the limit switches must be relearned. Since the normal and emergency terminal limit overspeed switches were bypassed for the buffer tests, the safety processor in the IMC-DIO board must relearn the speed for these switches. Complete the procedure outlined in Section 4.10.

b. **COUNTERWEIGHT BUFFER TEST** - Empty the car and move it to the bottom landing. Then bypass the functions and set the parameters and switches listed below.

1. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board to ON.

2. Connect a jumper between terminals FBP1 and FBP2 on the SCR-RI board. ***This will bypass the drive safety functions.***

3. If the final limit switches prevent a fully compressed buffer, use what ever method is acceptable in your local jurisdiction to ensure a fully compressed buffer.

4. Place a jumper between terminals 15B and 16 on the controller subplate. ***This will bypass the buffer switches.***

5. Connect a jumper between terminals 8 and 10 on the HC-RB4-SCRI board. ***This will bypass the Up Normal Limit.***

6. Turn the LEARN SWITCH on the IMC-DIO board to ON. ***This will bypass overspeed detection at the terminal landing.***

7. Set OBT Buffer Test on the Safety (Shift F6) screen to ON. This option must be set before each buffer test. Note: This parameter produces a high speed pattern profile on an Inspection run *one time only* and resets itself automatically. Therefore, repeating the buffer test requires setting OBT ON again.

8. Verify that Pattern Scaling (PG) on the Pattern (Shift F4) screen equals 1.000. **Note:** If this job has reduced stroke buffers, set PG Pattern Scaling to a value that allows the car to run at the speed rating of the buffer.

9. After recording the original value for the A2 Phase Two Acceleration on the Pattern (Shift F4) screen, set A2 to 2 ft/s^2 or lower.

10. Move the car up at contract speed by using the UP/DOWN direction switch on HC-RB4-SCRI board. Run the car up until the counterweight lands on the buffer. Check the hoist ropes to make sure they are still in their proper grooves before attempting to move the car again. With all jumpers still in place, use the

UP/ DOWN direction switch to move the counterweight away from the buffer. Remove the jumpers between terminals, 15B and 16 and 8 and 10. The car should be able to run on Inspection normally.

11. If PG Pattern Scaling, on the Drive (Shift F5) screen, was changed in step 8 above, return the value to 1.000.

12. Since the normal and emergency terminal limit overspeed switches were bypassed for the buffer tests, the safety processor in the IMC-DIO board must relearn the speed for these switches. Complete the procedure outlined in Section 4.10.

13. If there are no additional tests to be performed, remove the jumper from terminals FBP1 and FBP2 on the SCR-RI board to allow the safety functions to operate normally.

4.11.2 GOVERNOR TESTS

a. GOVERNOR ELECTRICAL OVERSPEED SWITCH TEST

1. Check to see that the INSPECTION ON/OFF switch on the HC-RB4-SCRI board is ON.

2. On the governor, manually trip open the electrical overspeed switch contact to verify that the main safety circuit drops out. Manually verify the actual electrical and mechanical tripping speeds, and make sure they conform to code requirements.

3. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board OFF.

b. GOVERNOR AND CAR SAFETY OVERSPEED TEST (BALDOR DRIVE)

For MagneTek drive see 4.11.2.c.

For TORQMAX drive see 4.11.2.d.

1. Put a full load in the car. Move the car to the top landing in preparation for over-speeding the car in the DOWN direction. Then bypass the functions and set the parameters and switches listed below.

2. Connect a jumper between terminals FBP1 and FBP2 on the SCR-RI board to **bypass the drive safety functions**.

3. Connect a jumper between terminal 15 on the HC-RB4-SCRI board and terminal 2 to **bypass the governor overspeed switch**.

4. In order to observe loss of traction (when the safety mechanism sets) connect a jumper between terminals 16 and 17 to ***bypass the safety plank (SOS) switch***.

5. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board ON.

6. Turn the LEARN SWITCH on the IMC-DIO board to ON. ***This will bypass overspeed detection at the terminal landing.***

7. Set OBT Buffer Test on the Safety (Shift F6) screen to ON. This option must be set before each test. Note: This parameter produces a high speed pattern profile on an Inspection run *one time only* and resets itself automatically. Therefore, repeating the test requires setting OBT ON again.

8. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.0. Set the Following Error parameter (P2204 - Baldor Model # ZD18HXXXL-**DEX**.) on the Baldor Drive Direct Access (F1, D) screen to ‘0' (0 = OFF).

9. Record the value of P2003 Max Output Speed on the Baldor Drive (Shift F5) screen and then change P2003 to 30% above motor contract speed RPM.

10. After recording the original value for A2 Phase Two Acceleration on the Pattern (Shift F4) screen, set A2 = 2 ft/s^2 or lower.

11. Make sure there is enough hoistway for the car to exceed contract speed. Move the car down by using the UP/DOWN direction switch on HC-RB4-SCRI board. Run the car down until the mechanical safety device operates.

12. Set P2003 Max Output Speed on the Baldor Drive (Shift F5) screen to its original value. Also, set the Following Error parameter (see Note above) on the Baldor Drive Direct Access (F1, D) screen back to ‘1' (1 = ON).

13. Using procedures applicable to the equipment, reset the governor overspeed switch, and the car safety device.

14. Return parameter A2 Phase Two Acceleration on the Pattern (Shift F4) screen to the originally recorded value.

15. **Remove the jumper from terminals 2 and 15** on the HC-RB4-SCRI board **which bypasses the governor overspeed switch**.

16. ***Remove the jumper from terminals 16 and 17 which bypasses the safety plank (SOS) switch***.

17. If there are no additional tests to be performed, ***remove the jumper from terminals FBP1 and FBP2*** on the SCR-RI board ***which bypasses the drive safety functions*** to allow the safety functions to operate normally.

18. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board OFF.

19. Since the normal and emergency terminal limit overspeed switches were bypassed for the overspeed test, the safety processor in the IMC-DIO board must relearn the speed for these switches. Complete the procedure outlined in Section 4.10.

c. **GOVERNOR AND CAR SAFETY OVERSPEED TEST (MAGNETEK DRIVE)**

For Baldor drive see 4.11.2.b.
For TORQMAX drive see 4.11.2.d.

1. Put a full load in the car. Move the car to the top landing in preparation for overspeeding the car in the DOWN direction. Then bypass the functions and set the parameters and switches listed below.

2. Connect a jumper between terminals FBP1 and FBP2 on the SCR-RI board to **bypass the drive safety functions**.

3. Connect a jumper between terminal 15 on the HC-RB4-SCRI board and terminal 2 to **bypass the governor overspeed switch**.

4. In order to observe loss of traction (when the safety mechanism sets) connect a jumper between terminals 16 and 17 to ***bypass the safety plank (SOS) switch***.

5. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board ON.

6. Turn the LEARN SWITCH on the IMC-DIO board to ON. ***This will bypass overspeed detection at the terminal landing.***

7. Set OBT Buffer Test on the Safety (Shift F6) screen to ON. This option must be set before each test. Note: This parameter produces a high speed pattern profile on an Inspection run *one time only* and resets itself automatically. Therefore, repeating the test requires setting OBT ON again.

8. Set the A1 - Overspeed Mult parameter on the Magnetek Drive to 125% or to the required tripping speed. If the trip point is greater than 150% of contract speed, it will be necessary to increase the A1 - Contract Mtr Speed parameter as well (note the original value).

9. Enable the over speed test by setting the U4 - OVERSPEED TEST parameter to YES using the drive key pad (refer to Section 3.6.4 in the AC drive manual). If the trip point is greater than the 150% of contract speed then use other means to over speed the car.

10. After recording the original value for A2 Phase Two Acceleration on the Pattern (Shift F4) screen, set A2 = 2 ft/s^2 or lower.

11. Make sure there is enough hoistway for the car to exceed contract speed. Move the car down by using the UP/DOWN direction switch on HC-RB4-SCRI board. Run the car down until the mechanical safety device operates.

12. Using procedures applicable to the equipment, reset the governor overspeed switch, and the car safety device.

13. Return A2 Phase Two Acceleration on the Pattern (Shift F4) screen to the originally recorded value.

14. Reset the A1 - Overspeed Mult on the MagneTek Drive to 100% and verify that the U4 - OVERSPEED TEST parameter = NO. Return the A1 - Contract Mtr Speed parameter to the original value (if changed).

15. ***Remove the jumper from terminals 2 and 15*** on the HC-RB4-SCRI board ***which bypasses the governor overspeed switch***.

16. ***Remove the jumper from terminals 16 and 17 which bypasses the safety plank (SOS) switch***.

17. If there are no additional tests to be performed, ***remove the jumper from terminals FBP1 and FBP2*** on the SCR-RI board ***which bypasses the drive safety functions*** to allow the safety functions to operate normally.

18. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board OFF.

19. Since the normal and emergency terminal limit overspeed switches were bypassed for the overspeed test, the safety processor in the IMC-DIO board must relearn the speed for these switches. Complete the procedure outlined in Section 4.10.

d. **GOVERNOR AND CAR SAFETY OVERSPEED TEST (TORQMAX DRIVE)**

For Baldor drive see 4.11.2.b.

For MagneTek drive see 4.11.2.c.

1. Put a full load in the car. Move the car to the top landing in preparation for over-speeding the car in the DOWN direction. Then bypass the functions and set the parameters and switches listed below.

2. Connect a jumper between terminals FBP1 and FBP2 on the SCR-RI board to **bypass the drive safety functions**.

3. Connect a jumper between terminal 15 on the HC-RB4-SCRI board and terminal 2 to **bypass the governor overspeed switch**.

4. In order to observe loss of traction (when the safety mechanism sets) connect a jumper between terminals 16 and 17 to ***bypass the safety plank (SOS) switch***.

5. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board ON.

6. Turn the LEARN SWITCH on the IMC-DIO board to ON. ***This will bypass overspeed detection at the terminal landing.***

7. Set OBT Buffer Test on the Safety (Shift F6) screen to ON. This option must be set before each test. Note: This parameter produces a high speed pattern profile on an Inspection run *one time only* and resets itself automatically. Therefore, repeating the test requires setting OBT ON again.

8. Verify that PG Pattern Scaling on the Pattern (Shift F4) screen is set to 1.0. Using the drive keypad, set LF.57 Speed Following Error = 0 (OFF).

9. Record the value of LF.20 Contract Speed and LF.42 High Speed. Then change LF.20 and LF.42 to 30% above contract speed FPM.

10. After recording the original value for A2 Phase Two Acceleration on the Pattern (Shift F4) screen, set A2 = 2 ft/s^2 or lower.

11. Make sure there is enough hoistway for the car to exceed contract speed. Move the car down by using the UP/DOWN direction switch on HC-RB4-SCRI board. Run the car down until the mechanical safety device operates.

12. After the above test, set LF.20 Contract Speed and LF.42 High Speed to their original values. Also, set LF.57 Speed Following Error = 1 (ON). **Note: If LF.57 is not set to 1 (ON), the car will not run again.**

13. Using procedures applicable to the equipment, reset the governor overspeed switch, and the car safety device.

14. Return parameter A2 Phase Two Acceleration on the Pattern (Shift F4) screen to the originally recorded value.

15. **Remove the jumper from terminals 2 and 15** on the HC-RB4-SCRI board **which bypasses the governor overspeed switch**.

16. ***Remove the jumper from terminals 16 and 17 which bypasses the safety plank (SOS) switch***.

17. If there are no additional tests to be performed, ***remove the jumper from terminals FBP1 and FBP2*** on the SCR-RI board ***which bypasses the drive safety functions*** to allow the safety functions to operate normally.

18. Turn the INSPECTION ON/OFF switch on the HC-RB4-SCRI board OFF.

19. Since the normal and emergency terminal limit overspeed switches were bypassed for the overspeed test, the safety processor in the IMC-DIO board must relearn the speed for these switches. Complete the procedure outlined in Section 4.10.

e. **GOVERNOR AND COUNTERWEIGHT OVERSPEED TEST** - The method for testing a counterweight safety and governor is similar to Section 4.11.2.b for the Baldor Drive (Section 4.11.2c for the MagneTek Drive), except that the car is overspeeding in the UP direction.

4.11.3 INSPECTION/LEVELING 150 FPM OVERSPEED TEST

For this test, refer to Section 4.9.2.

4.11.4 NORMAL TERMINAL LIMIT SWITCH TEST

For this test, refer to Section 4.10.2.

4.11.5 EMERGENCY TERMINAL LIMIT SWITCH TESTS

For this test, refer to Section 4.10.3

NOTE: Buffer, Governor and Limit Switch tests may cause the Load Weigher to go out of calibration. Verify the calibration after all Final Inspection tests have been performed (see Appendix M, *K-Tech LW-KK2 Load Weigher Calibration*, Appendix N, *MCE Load Weigher Installation and Calibration* or the instruction manual supplied with the K-Tech LW4202B Load Weigher).

WARNING: Before the elevator can be turned over to normal use, it is important that no safety function/circuit is bypassed. The items to be checked include, but are not limited to:

- No jumpers between terminals 2 and 16 or 18 (HC-RB4-SCRI).
- No jumper between terminal 8 and 10 (HC-RB4-SCRI).
- No jumper between terminal 8 and 12 (HC-RB4-SCRI).
- No jumper between 2 bus and terminals 36 and 38 (HC-RB4-SCRI).
- Wire installed in panel mount terminal DCL.
- Level Down LD field wire installed on terminal 25 (HC-RB4-SCRI).
- INTB jumper plug on location NORM (SCR-RI).
- Pattern Scaling (PG) on the Pattern (Shift F4) screen set to 1.0.
- All safety switches set to the OFF position.
- No jumper between FBP1 and FBP2 (SCR-RI).
- No jumpers on R0 through R5 and PR terminals (SCR-RI).
- LEARN SWITCH on the IMC-DIO set to OFF.
- On Baldor Drive Model # ZD18HXXXL-**DEX**, the Following Error (P2204) parameter set to ON, and the Max Output Speed (P2003) parameter set to the original value.
- The MagneTek P16 Overspeed Mult parameter = 100% and U4 - Overspeed Test parameter = No.
- The TORQMAX parameter LF.20 Contract Speed is set to its original value and LF.57 Speed Following Error = 1 (ON).

NOTE: If this is a local car, part of a group, it is necessary to set the car's address for communication with the Group controller. Initially the address is defaulted to 1 (Car A). To change the Car Address, set CNID Car Network ID, on the General (Shift F1) screen, to Car A, Car B or Car C etc.

Consult the M3 Group Supervisor Manual, MCE part # 42-02-G004 for instructions regarding the following:

- Installing the High Speed Communication Cable, Section 2.4.4.
- Balancing the High Speed Communication Cable and Verifying the High Speed Serial Communication Link, Section 3.9.

4.12 PARAMETER ACCESS PASSWORD

A password system has been included in IMC Controllers that prevents unauthorized persons from changing controller parameters. Once activated, a valid password must be entered in order to make changes to parameters. However, the parameter screens may still be viewed.

SETTING THE PARAMETER ACCESS PASSWORD - From the Controller Parameters (F1) screen, select Change Parameter Access Password (C). The screen will change to:

```
   Change Parameter Access Password (F1, C)
Enter Current Password: (none)
    Enter New Password: ■
  Confirm New Password:
```

The password may be up to ten letters, numbers or characters. Type the new password and press Enter. Asterisks (*) will be displayed in place of the new password. Confirm the new password by typing it again and press Enter. If the password has been accepted the following message will be displayed:

Password Successfully Changed.

If the passwords do not match, the following message is displayed:

New Password and Confirm Password mismatch

Repeat the process of entering and confirming the new password.

Once a password has been accepted, the parameter screens can be placed into VIEW ONLY MODE by turning the CRT terminal OFF and then ON again. While in VIEW ONLY MODE, parameters may not be edited.

ENABLE PARAMETER EDIT MODE - Once a password is accepted and the screen is placed into VIEW ONLY MODE, it is necessary to enable the parameter edit mode in order to change controller parameters. From the Controller Parameters (F1) screen, select Enable Parameter Edit Mode (E). The screen will change to:

```
Parameter Access Password: ■
```

Type the password and press Enter. Once accepted, controller parameters may be changed. The screens will remain in the EDIT MODE until the CRT terminal is turned OFF or the controller power is cycled OFF and ON.

CHANGING THE PARAMETER ACCESS PASSWORD - From the Controller Parameters (F1) screen, select Change Parameter Access Password (C). The screen will change to:

```
   Change Parameter Access Password (F1, C)
Enter Current Password: ■
    Enter New Password:
  Confirm New Password:
```

Type the current password and press Enter. Asterisks (*) will be displayed in place of the password. Type the new password and press Enter. Confirm the new password by typing it again and press Enter.

LOST OR FORGOTTEN PASSWORD - If you lose or forget the password, type a question mark (?) and press Enter. The following will appear on the screen:

```
MCE Security Reference #: xx
```

xx is a number between 0 and 15, randomly generated.

Call MCE Technical Support and tell them the reference number. They will give you a temporary password. Type in the temporary password and press Enter. If you make a mistake while typing the temporary password, try again. Then choose a new password, enter it and confirm it as described above.

SECTION 5
ONBOARD DIAGNOSTICS

5.0 GENERAL INFORMATION

The IMC-AC traction controller includes user-friendly diagnostic tools that help the mechanic install and service the equipment. The diagnostic tools include the CRT terminal, the Computer Swing Panel's Enhanced Onboard Diagnostics (EOD), and the IMC-DIO Onboard Diagnostics. The terminal provides easy-to-use menus for adjusting, servicing and troubleshooting the controller. More information about setting up and using the CRT terminal is available in Section 3, *Start Up*, Section 6, *Troubleshooting*, the *Reference Section* of this manual and MCE's Computer Peripherals manual, part # 42-02-CP00. This section covers the Computer Swing Panel's Enhanced Onboard Diagnostics and the IMC-DIO Onboard Diagnostics.

5.1 ENHANCED ONBOARD DIAGNOSTICS (EOD) OVERVIEW

The Computer Swing Panel provides the Enhanced Onboard Diagnostics (EOD). A quick look at the switches and LEDs provides an overview of the elevator and its functions. Once familiar with the equipment, an elevator mechanic can understand the current operating conditions of the elevator and diagnose a problem using the EOD. No external devices are required to view the status of the elevator and see what the elevator control system is actually trying to do. The Enhanced Onboard Diagnostics operate in three modes, Normal, System and Diagnostic. All three modes are discussed in detail in this section.

5.1.1 DESCRIPTION OF EOD INDICATORS AND SWITCHES

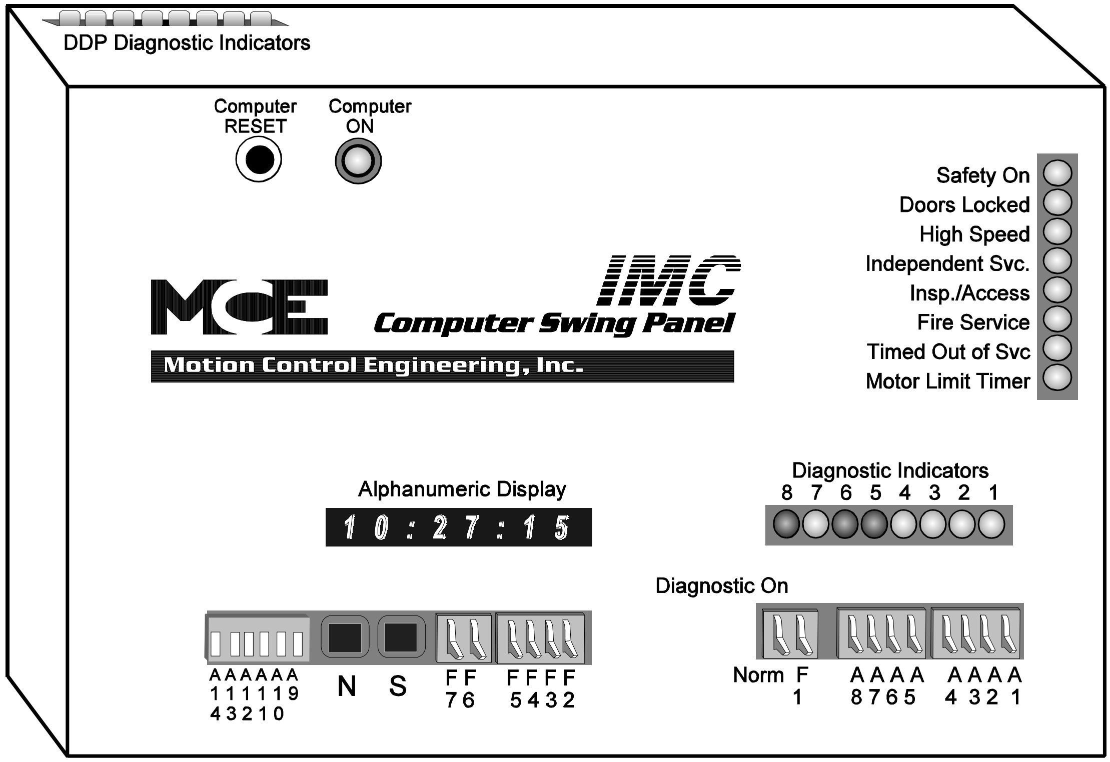
The following is a description of the EOD indicators and switches (see Figure 5.1)

COMPUTER ON LED - The Computer ON LED, when it is ON continuously, indicates that the MC-MP-1ES or MC-MP2 Main Processor board is functioning normally and is completing its program loop successfully. If the Computer ON LED flashes ON and OFF, it means that the program is not looping successfully and the Main Processor board is malfunctioning. Check the EPROM chip to make sure it is installed properly. Refer to Appendix A, *Disassembling the Computer Swing Panel* and Appendix B, *Changing PC Boards, EPROMS or Microcontrollers*.

COMPUTER RESET BUTTON - Pressing the Computer RESET button on the front of the Swing Panel causes the MC-MP-1ES or MC-MP2 (Main Processor board), MC-CGP-4 (Communication Processor board) and the IMC-DDP-x (Digital Drive Processor board) to reset. If the elevator is running, resetting drops the safety relay and brings the elevator to an immediate stop. The elevator then goes to the closest floor to correct its position before responding to any calls. Existing call and PI information is lost when the computer is reset.

Pressing the Computer RESET button turns the Computer ON light OFF and it will remain OFF while the RESET button is depressed. The Computer ON LED turns back ON when the RESET button is released. The MC-MP-1ES or MC-MP2 Main Processor board is also equipped with an auto reset feature that causes the elevator to go through a resetting process if, for any reason, the program loop cannot be completed. The computer will automatically reset and go back to normal operation, if the interference has not caused hardware damage, thereby preventing unnecessary trouble calls.

FIGURE 5.1 Computer Swing Panel, Front View



STATUS INDICATORS - (vertical LEDs on the front of the Swing Panel) - These lights indicate the elevator's status. When these lights are ON, they mean the following:

Safety On	-	the safety circuit is closed.
Doors Locked	-	the door lock contacts are closed.
High Speed	-	speed and direction have been generated.
Independent Svc.	-	the elevator is on Independent Service.
Insp./Access	-	the elevator is on Hoistway Access, Car Top or Relay Panel Inspection operation.
Fire Service	-	the elevator is on Fire Service operation.
Timed Out of Svc	-	the TOS timer has elapsed.
Motor Limit Timer	-	the Motor Limit Timer has elapsed.

DIAGNOSTIC INDICATORS - The eight horizontal diagnostic indicator lights (MP Diagnostic Indicators) have two functions. When in Normal mode, they indicate the current status or error condition (see Section 5.2.2) and when in Diagnostic mode, they indicate the contents of computer memory (see Section 5.4).

ALPHANUMERIC DISPLAY - The eight character alphanumeric display is used to provide user friendly interaction between the control equipment and the elevator mechanic by displaying alphanumeric messages (see Section 5.2.1).

ADDRESS SWITCHES (A1 - A8) - These switches enable the mechanic to look at the memory on the MC-MP-1ES or MC-MP2 Main Processor board (see Section 5.4.1) and IMC-DDP Digital Drive Processor board (see Section 5.4.2). They are also used for entering calls into the system (see Section 5.4.3). These switches are ON in the up position and OFF in the down position.

ADDRESS SWITCHES (A9 - A14) - These address switches are primarily used by MCE personnel for troubleshooting purposes only.

DIAGNOSTIC ON/NORMAL SWITCH - This switch puts the system into Diagnostic mode in the ON (up) position and in Normal mode in the NORM (down) position (see Section 5.4).

FUNCTION SWITCHES (F1 - F7) - These switches are used to access diagnostic information for viewing and changing settings in the Normal and System modes of operation (see Sections 5.2 and 5.3).

PUSHBUTTONS N AND S - These pushbuttons are used to scan through the choices available and to make selections when viewing and changing settings.

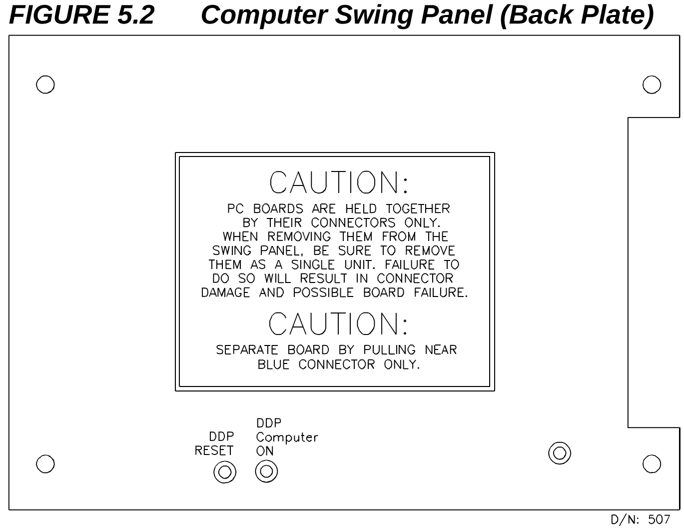
DDP DIAGNOSTIC INDICATORS - (row of eight LEDs on the top of the Swing Panel) The DDP Diagnostic Indicators have two functions. When in Diagnostic mode, they indicate the contents of the memory on the IMC-DDP-x board (see Section 5.4.2) and when in Normal mode, they indicate the prevailing status or error message related to the IMC-DDP-x Processor board (see Section 5.2.2).

DDP COMPUTER ON INDICATOR LIGHT - This light is located on the back of the Computer Swing Panel (Figure 5.2). When ON continuously, the DDP Computer ON light indicates that the IMC-DDP-x board is functioning normally and is completing its program loop successfully. If the DDP Computer ON light flashes ON and OFF, it means that the program is not looping successfully and the Processor board is malfunctioning. Check the EPROMs to make sure they are installed properly. Refer to Appendix A, *Disassembling the Computer Swing Panel* and Appendix B, *Changing PC Boards, EPROMS or Microcontrollers*.

DDP RESET BUTTON - Pressing the DDP RESET button, on the back of the Swing Panel, causes the IMC-DDP-x Processor board to reset. It drops the rotating equipment voltages and the brake, and opens the safety string. Do not reset the IMC-DDP-x Processor board while the car is in motion.

Resetting the IMC-DDP-x, turns the DDP Computer ON light OFF and it will remain OFF while the DDP RESET button is depressed. The IMC-DDP-x Processor board is also equipped with an auto reset feature that causes the IMC-DDP-x board to go through the reset process if, for any reason, the program loop cannot be completed. This prevents unnecessary trouble calls if the problem has not caused hardware damage. The auto reset process causes the DDP Computer ON light to turn OFF for a brief period while the auto reset takes place.

FIGURE 5.2 Computer Swing Panel (Back Plate)



MC-CGP COMPUTER ON INDICATOR LIGHT - This light is located on the right side of the Computer Swing Panel. When ON continuously, the MC-CGP ON light indicates that the MC-CGP-4 Communication Processor board is functioning normally and is completing its program loop successfully. The MC-CGP-4 board is equipped with an auto reset feature that will cause the elevator to go through a resetting process if, for any reason, the program loop cannot be completed.

5.2 NORMAL MODE (EOD)

The following is a description of the indicators and switches used in Normal mode, and the settings which can be viewed and changed. Begin with all switches in the OFF (down) position as shown in Figure 5.1. Specifically, the Diagnostic On/Norm and the F7 switches *must* be in the down position. In the Normal Mode, the F2, F4 and F5 switches are used to access and set the following:

- F2 - Adjustment of Elevator Timers (see Section 5.2.3)
- F4 - Setting the Real Time Clock (see Section 5.2.4)
- F5 - Viewing the MP Computer Variable Flags (see Section 5.2.5)
- F2 thru F7 - Resetting the MC-CGP parameters (see Section 5.2.6)

5.2.1 ALPHANUMERIC DISPLAY (DEFAULT DISPLAYS)

> **NOTE:** Upon power up, controllers with the MC-MP2 board scroll the message ***MP2 VERSION NUMBER: 8.xx.xx*** across the alphanumeric display. If the message ***PASSCODE REQUEST...*** is then scrolled across the display, refer to Section 5.3.6 *Setting and Resetting the Passcode Option*.

The alphanumeric display is used for a number of special diagnostic functions that are available on the controller. Depending on the configuration of the control system, the available displays include the following:

- scrolling status and error messages
- temperature (Celsius)
- temperature (Fahrenheit)
- measured load
- trip counter
- software versions
- time of day

To scroll through the available displays (change what is currently being displayed on the alphanumeric display), press and hold the N push-button.

N O R M A L   O P

STATUS AND ERROR MESSAGES - On controllers with the MC-MP2 Main Processor board, status and error messages are scrolled across the alphanumeric display. The message NORMAL OPERATION is scrolled when no other status or error condition(s) exist. Table 6.10 provides a list of scrolling messages and Table 6.11 *Status and Error Messages* provides descriptions and troubleshooting information.

Note that at any time, more than one status or error condition may exist. But the Alphanumeric Display can show only one message at a time. The message considered to be of highest priority will be displayed first. For example, if the car is on Independent Service *and* the safety circuit is open, the display will scroll SAFETY CIRCUIT IS OPEN. Once the problem with the safety circuit is corrected, the display will scroll the message INDEPENDENT SERVICE OPERATION. When Independent Service is turned OFF, NORMAL OPERATION will again be displayed.

TEMPERATURE (CELSIUS) - This mode displays the temperature in degrees Celsius. This mode is available only if the controller has been configured with the ability to connect a temperature sensor. In the examples, 45C represents 45° Celsius and -15C represents -15° Celsius.

T M P = 4 5 C

T M P = - 1 5 C

TEMPERATURE (FAHRENHEIT) - This mode displays the temperature in degrees Fahrenheit. This mode is available only if the controller has been configured with the ability to connect a temperature sensor. In the examples, 104F represent 104° Fahrenheit and -27F represents -27° Fahrenheit.

T M P = 1 0 4 F

T M P = - 2 7 F

MEASURED LOAD - This feature is only available for controllers that use an analog load sensing device (load weigher). In the example on the right, the measured value is 100% of the learned value. If the load weigher learn process has not yet been successfully performed, the measured load will not be displayed; the computer has no reference values from which to calculate the load. Instead, the following status message will be displayed: **LOAD WEIGHER NOT YET LEARNED**.

L W = 1 0 0 %

TRIP COUNTER - This mode provides the ability to view and/or reset a six-figure trip counter. The trip counter records the number of high speed runs made by the elevator since the last time the counter was reset to zero. The example on the right indicates that the car has made two thousand runs since the counter was last reset.

T = 0 0 2 0 0 0

RESETTING THE TRIP COUNTER - The trip counter may be reset to zero by pressing and holding the S pushbutton while the trip counter is displayed. Once the S pushbutton is pressed, the alphanumeric display will display **CLEAR: 5**, indicating that the counter will be cleared in five seconds. If the button is held for five seconds, the timer will count down from five to zero and the counter will be reset to zero. The five-second delay is provided to prevent an accidental reset of the counter. Once cleared, the counter will display the value zero.

T = 0 0 0 0 0 0

SOFTWARE VERSIONS - On local car controllers the version number of the MP Main Processor and CGP Communication Processor software are displayed. The following messages are scrolled across the alphanumeric display:

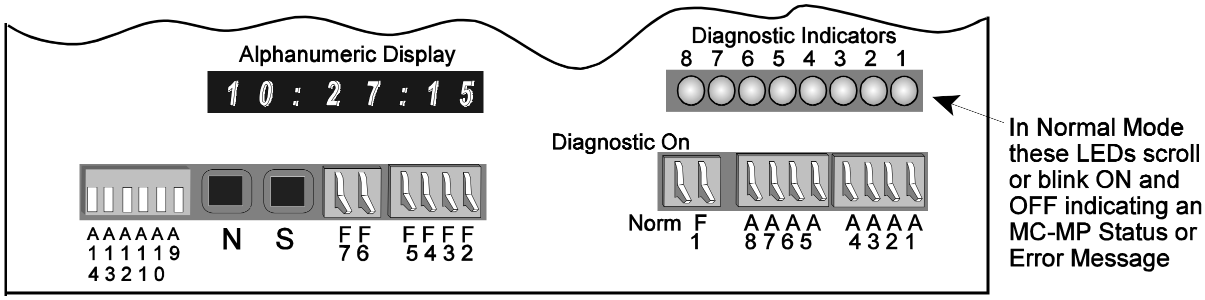
MP VERSION NUMBER:	X.XX.XX	(X.XX.XX is the version number)
CGP VERSION NUMBER:	X.XX.XX	(X.XX.XX is the version number)
DDP VERSION NUMBER:	X.XX.XX	(X.XX.XX is the version number)

TIME OF DAY - This mode displays the time of day in a 24-hour military format (hours, minutes and seconds). Refer to Section 5.2.4 to change or adjust the time. The example shown on the right represents the time 1:30 p.m.

1 3 : 3 0 : 0 0

5.2.2 DIAGNOSTIC INDICATORS

The Diagnostic Indicators are located on the front of the Computer Swing Panel.



During normal operation these lights scan from right to left (indicating that the MP program is looping properly) or flash ON and OFF to indicate an error or status condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

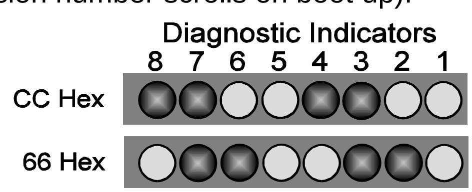
MC-MP-1ES DIAGNOSTIC INDICATORS - When troubleshooting, pay special attention to these indicators. The diagnostic indicators flash ON and OFF to indicate a status or error message which often points to the source of a problem. Table 6.8 provides a listing of the MC-MP-1ES Status and Error Messages, and Table 6.11 *Status and Error Messages* provides a description and troubleshooting tips.

Note that at any moment, more than one error or status condition may exist, but the Diagnostic Indicators can display only one message at a time. The message considered to be of highest priority will be displayed first. For example, if the car is on Independent Service *and* the safety string is open, all the lights will flash, indicating that the safety string is open. Once the problem with the safety string is corrected, the Diagnostic Indicators will flash the message for Independent Service. When Independent Service is turned OFF, the Diagnostic Indicators will scan normally.

MC-MP2 DIAGNOSTIC INDICATORS - During normal operation these lights scan from right to left (indicating that the MP2 program is looping properly) or flash ON and OFF to indicate a status or error condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

When a status or error condition exists, the Diagnostic Indicators flash one of several messages depending on the software version (MP2 version number scrolls on boot up):

- Software versions 8.02.00 or earlier flash the MC-MP-1ES messages (see Table 6.8).
- Software version 8.03.00 flashes CC Hex.
- Software versions 8.04.00 or later flash 66 Hex.

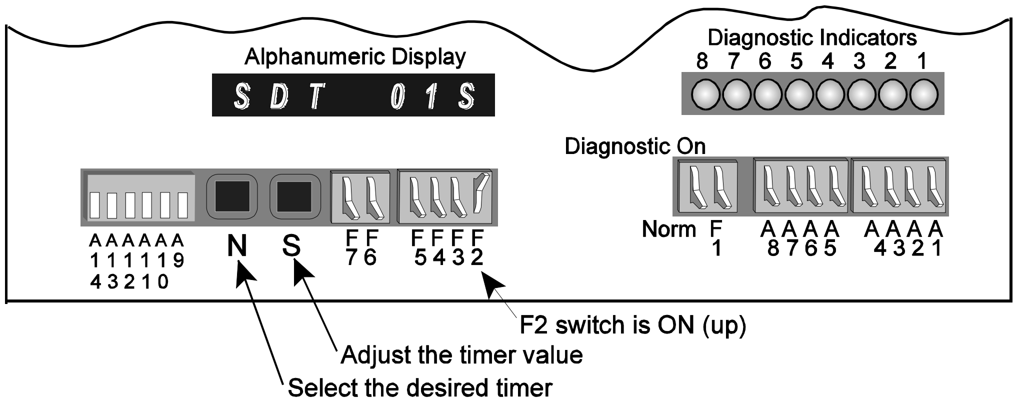


If the scrolling status or error message is not immediately displayed, press the N pushbutton until the scrolling message appears (see Section 5.2.1 ALPHANUMERIC DISPLAY - STATUS AND ERROR MESSAGES).

DDP DIAGNOSTIC INDICATORS - located on top of the Computer Swing Panel (see Figure 5.1). In Normal Mode these indicators scan from right to left (indicating that the DDP program is looping properly) or flash ON and OFF to indicate an error or status condition. When troubleshooting, pay special attention to these indicators, as they will often point to the source of the problem. Table 6.9 *IMC-DDP STATUS AND ERROR MESSAGES* provides a listing of the IMC-DDP Status and Error Messages and Table 6.11 in the Troubleshooting Section provides a description of the cause and Troubleshooting tips.

5.2.3 ADJUSTMENT OF THE ELEVATOR TIMERS

To view or adjust the elevator timing functions, set the switches as shown. When the F2 switch is ON the timer settings are displayed and the values can be changed.



For example, when the F2 switch is turned ON, the display reads **SDT 01S**. SDT is the flag for Short Door Dwell Timer. The number (01S) means that the Short Door Dwell Timer has been set for 01 second. If the value had been in minutes, the last letter displayed would be M instead of S. Pressing the N pushbutton (for next) advances the display to the next available programmable timer. Constant pressure on the N pushbutton causes the display to scroll through all the available programmable timers. Table 5.1 provides a listing of the programmable timers and their ranges.

Once a programmable timer has been selected using the N pushbutton, the timer can be adjusted to a desired value by using the S (for select) pushbutton. The adjustment range for each timer is pre-set (see Table 5.1). Constant pressure on the S pushbutton increases the timer value by one (second or minute) and causes the display to flash until the value reaches the upper limit, at which point it automatically starts over from the lower limit. When the A1 switch is placed in the ON (Up) position, pressing the S pushbutton causes the timer value to decrease. Release the S pushbutton when the desired value is displayed. When the S pushbutton is released, the display flashes for three seconds. After the display stops flashing, the new timer value has replaced the old value.

NOTE: Timers listed in Table 5.1 are not included if the corresponding inputs/outputs/options are not available on your controller.

*TABLE 5.1 Timers and their Ranges**

Timer	Description	Timer Range
ADAC	**ADA Car Call Door Dwell Timer.** This timer provides the minimum door dwell time when responding to a car call, as required by the ADA. This door dwell timer is not shortened by the activation of a button or door reopening device.	01-120 seconds
ADAH	**ADA Hall Call Door Dwell Timer.** This timer provides the minimum door dwell time when responding to a hall call, as required by the ADA. This door dwell timer is not shortened by the activation of a button or door reopening device.	01-120 seconds
ASTP	**Automatic Stop Door Dwell Timer.** This timer defines the amount of time the doors will stay open when the car has performed an “automatic stop”. This timer will only appear if the controller software has been configured to perform the “auto stop” function.	01-30 seconds
CCT	**Car Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to a car call.	01-120 seconds
DBT	**Door Buzzer Timer.** This timer indicates the length of time that the door buzzer output should be active before door closing is initiated.	0-30 seconds
DHLD	**Door Hold Timer.** This timer defines the amount of time the doors will stay open when the door hold button is pressed. This timer will only appear if the controller has been configured with a door hold button (DHLD input).	01-240 seconds
FLO	**Fan and Light Output Timer.** This timer defines the amount of time that the fan and light output (FLO) will keep the car fan and lights operative in the absence of demand on the car. This timer will only appear if the controller has been configured with a fan and light output (FLO output).	01-25 minutes
HCT	**Hall Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to a hall call.	01-120 seconds
HOS2	**In-car Hospital Service Timer.** This timer defines the amount of time that the car will remain at a floor in response to a hospital emergency call. If the timer elapses before the car is placed into “in-car hospital service”, the car will revert back to normal operation. This timer will only appear if the controller has been configured with hospital emergency service.	01-120 seconds
IDLE	**Idle Demand Timer.** This timer defines the amount of time that will pass before an idle car is automatically moved to the next floor. This feature is useful in applications where it is desirable to lubricate the bearings and/or exercise the brake mechanism periodically to prevent friction at initial car movement. This timer may be turned OFF to disable this function.	01-60 minutes
LOT	**Lobby Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to either a car call or a hall call at the lobby landing (as specified by the adjustable control variable “LBBY”).	01-120 seconds
MBWR	**Motor Blower Output.** This timer defines the amount of time that the Motor Blower output (MBWR) stays on after the car has stopped running.	01 - 26 minutes
MGT	**Motor Generator Shut Down Timer.** This timer defines the amount of time that will pass before the motor generator is turned off on a car that is idle.	01-10 minutes
PHEB	**Photo Eye Bypass Timer.** This timer defines the amount of time that will pass before an active optical door reopening device is ignored and/or nudging is activated. The computer monitors the PHE input for continuous activation and, should the PHE input remain active for the amount of time defined by the PHEB timer, the PHE input is ignored and/or nudging operation invoked (depending upon the controller configuration).	01-240 seconds
PRIS	**In-car Priority Service Phase II Timer.** This timer defines the amount of time that the car will remain at a floor in response to a Priority Service call. If the timer elapses before the car is placed into “In-car Priority Service”, the car will revert back to normal operation. This timer will only appear if the controller has been configured with In-car Priority Service.	01-120 seconds

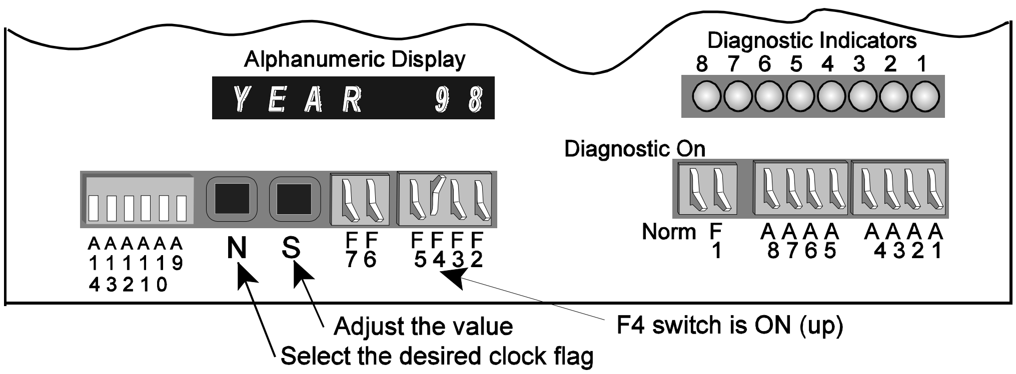
*TABLE 5.1 Timers and their Ranges**

Timer	Description	Timer Range
PRKD	**Parking Delay Timer.** This timer represents the amount of time that will pass before an idle car will park at the specified parking floor (if applicable).	01-120 seconds
SDT	**Short Door Dwell Timer.** This timer defines the door dwell time that will be provided when a door reopening device has been activated.	01-120 seconds
SEPT	**Mechanical Safe Edge Protection Timer.** This timer defines the amount of time that will pass before an active mechanical safe edge is ignored and/or nudging is activated. If a mechanical safe edge is used (as specified by the adjustable control variable MSAF), the computer monitors the SE input for continuous activation and, should the SE input remain active for the amount of time defined by the SEPT timer, the SE input is ignored and/or nudging operation invoked (if applicable).	01-240 seconds
TOS	**Timed Out of Service Timer.** This timer is used to determine that a car has been prevented from responding to a car or hall call demand. Once this timer elapses, the car's "in service" status is removed to allow hall calls assigned to the car to be reassigned to another car.	15-240 seconds

**Some timers are not included if the corresponding inputs/outputs/options are not programmed.*

5.2.4 SETTING THE REAL TIME CLOCK

To adjust the real time clock, set the switches as shown. The F4 function switch is used to access the clock parameters located on the MC-MP-1ES or MC-MP2 board.



Turning the F4 switch ON causes the alphanumeric display to show the current year. Table 5.2 lists all the adjustable clock parameters and their adjustment ranges.

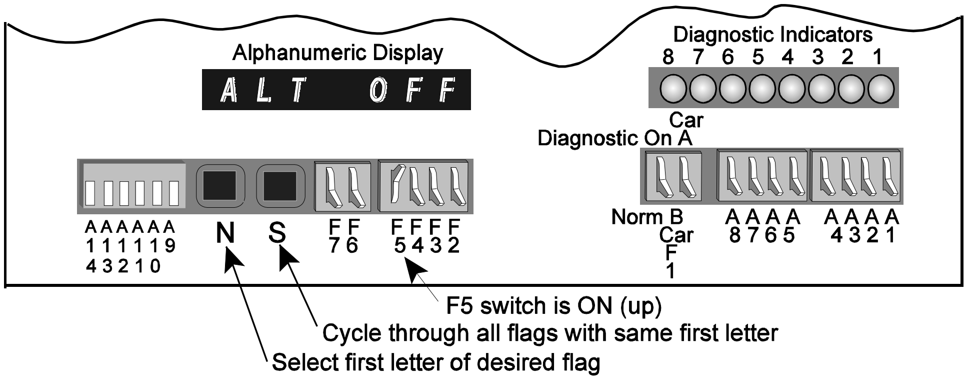
TABLE 5.2 Clock Parameters and Ranges

Parameter	Range	Parameter	Range
YEAR	00 - 99	DATE	01 - 31
MONTH	01 - 12	HOUR	00 - 23
DAY	MON. - SUN.	MIN (MINUTE)	00 - 59

Press the N pushbutton to select the next parameter. Constant pressure on the N pushbutton causes the display to scroll through all of the real time clock parameters. Once a parameter has been selected, the value can be changed by pressing the S pushbutton. Constant pressure on the S pushbutton increases the value by one, until the value reaches the upper limit, at which point it automatically starts over from the lower limit. Release the S pushbutton when the desired value is displayed. The new value is saved immediately. Return the F4 switch to the OFF (down) position to exit the clock parameter adjustment menu.

5.2.5 ALPHANUMERIC DISPLAY - VIEWING THE MP /MP2 INTERNAL FLAGS / INPUTS

This function is used to display the status of many of the input/output and internally generated flags related to the MC-MP-1ES or MC-MP2 computer. To access these flags, set the switches as shown.



MC-MP-1ES Flags - With the MC-MP-1ES software, after moving the F5 switch to the ON (up) position, the alphanumeric display shows the last selected flag and status, in this case ALT OFF. The first word (ALT) is the abbreviated name for the Alternate Service flag. The second word (OFF) is the status of the flag. For a listing of these flags, see Table 5.8.

To select a flag, press the **N** pushbutton until the first letter of the flag displayed is the same as the first letter of the desired flag. Release the **N** pushbutton and press the **S** pushbutton until the desired flag is displayed. The flag's current status, ON or OFF, is displayed.

MC-MP2 Flags - With the MC-MP2 software, after moving the F5 switch to the ON position, the alphanumeric display scrolls the message ***FLAGS STATUS...*** and then displays abbreviation and status of the first available flag beginning with the letter A.

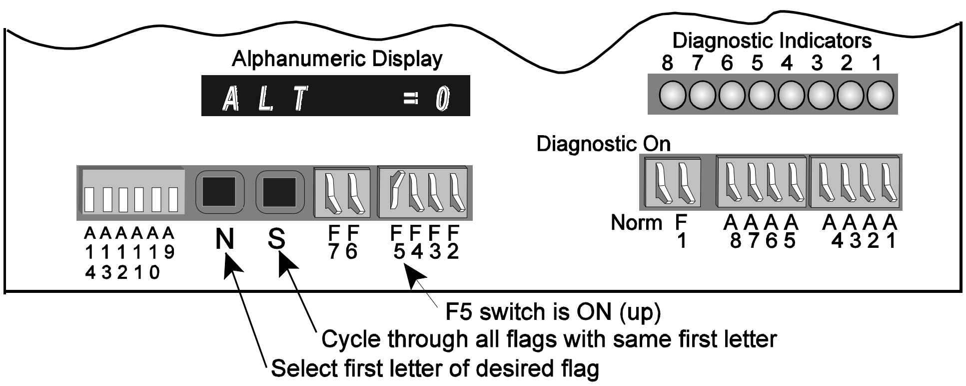


Table 5.8 provides a listing of the available flags. To select a flag, press the **N** pushbutton until the first letter of the flag displayed is the same as the first letter of the desired flag. Release the **N** pushbutton and press the **S** pushbutton until the desired flag is displayed. The flag's abbreviation and current status is displayed (0 = OFF, 1 = ON).

MC-MP2 Inputs - With the MC-MP2 software the status of many system inputs may be viewed on the alphanumeric display. To view the inputs, the F5 switch plus various additional switches must be placed in the ON (up) position as follows:

- F5, A9 — HC-PIO board inputs
- F5, A10 — HC-RD board inputs
- F5, A9, A10 — HC-IOX / HC-I4O board inputs
- F5, A11 — HC-CIO board inputs
- F5, A9, A11 — MC-NC board inputs
- F5, A10, A11 — SC-SB2K board inputs
- F5, A9, A10, A11 — SC-BASE board inputs
- F5, A9, A10, A11, A12 — SC-HDIO board inputs

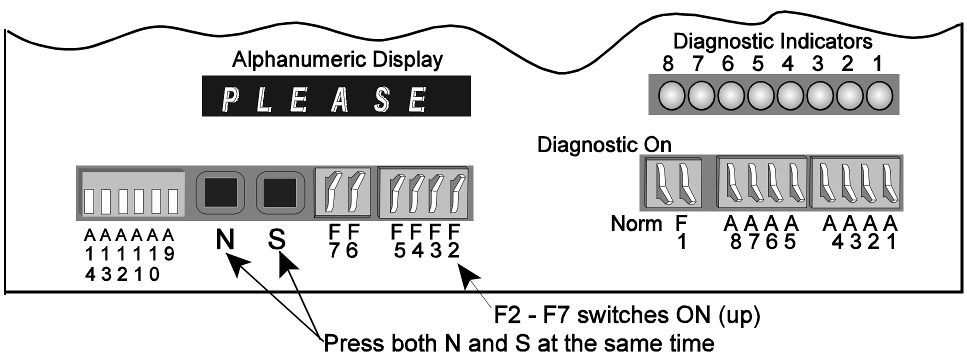
Press the **N** pushbutton to scroll through the inputs available for this job. They are displayed in the order they are arranged on the board. The abbreviation and status of each input is displayed (0 = OFF, 1 = ON).

5.2.6 RESETTING THE CGP PARAMETERS

When an MC-CGP-4(8) EPROM or PC board are changed it may be necessary to reset the CGP parameters to their default values. This can be done using either the optional CRT terminal or via the Computer Swing Panel.

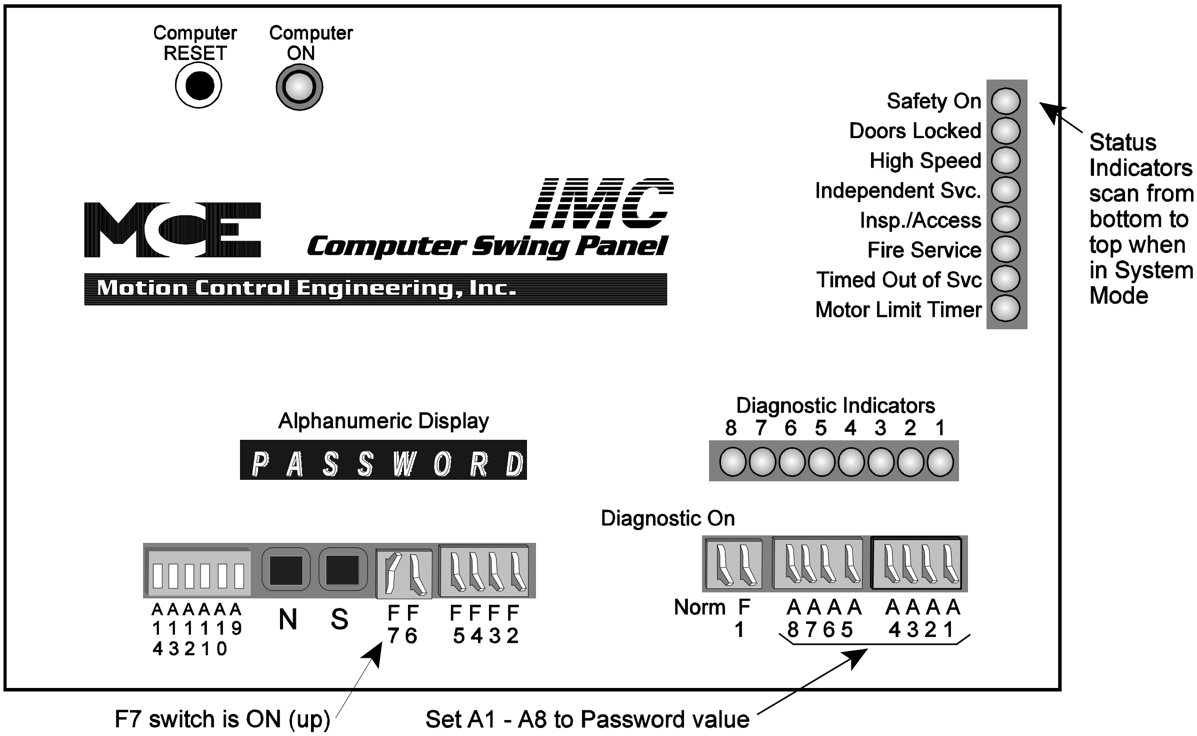
Using the optional CRT terminal - The optional CRT terminal connected to the local car controller may be used to reset the CGP parameters using ODPC Reset CGP Parameters. For instructions on using the CRT terminal, refer to the section in the Computer Peripherals Manual, MCE part #42-02-CP00 titled *Using the CRT Terminal*.

Using the Computer Swing Panel - The CGP parameters can be reset to their default values using the Computer Swing Panel. Set the toggle switches as shown, then press both the **N** and **S** pushbuttons at the same time.

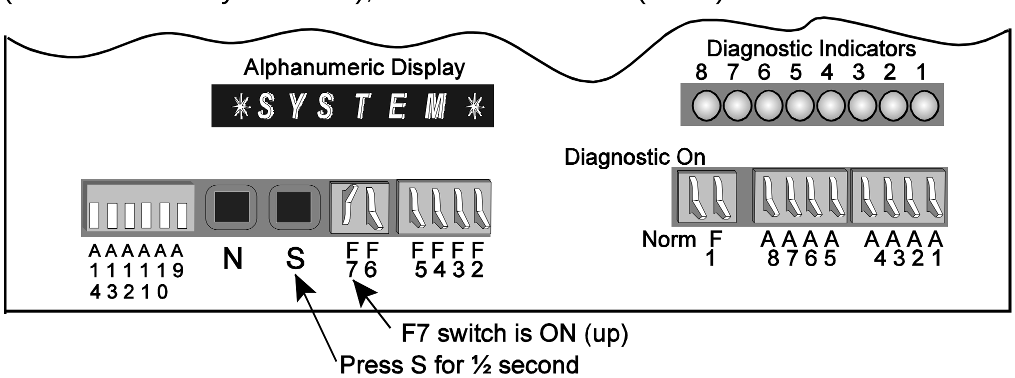


5.3 SYSTEM MODE (EOD)

The System Mode provides a level of security (if programmed) so that an unauthorized person cannot modify or change the system parameters either intentionally or by mistake. To enter the System Mode, set the switches as shown.



With the F7 switch in the ON position, the alphanumeric display shows **PASSWORD**. Set the A1 - A8 switches to the password value. If no password has been programmed for this job (which is normally the case), set A1 - A8 to OFF (down).



Press the **S** pushbutton for ½ second. The alphanumeric display changes to **SYSTEM**. While in System Mode, the group of eight vertical status LEDs scan from bottom to top indicating that System Mode is active. If no function switch is moved or pushbutton is pressed for a period of two minutes, the computer will automatically exit from System Mode and go into the Normal Mode of operation. Placing the F7 switch in the OFF (down) position also causes the EOD to exit the System Mode.

In System Mode, the Function Keys are used to access and set the following system parameters:

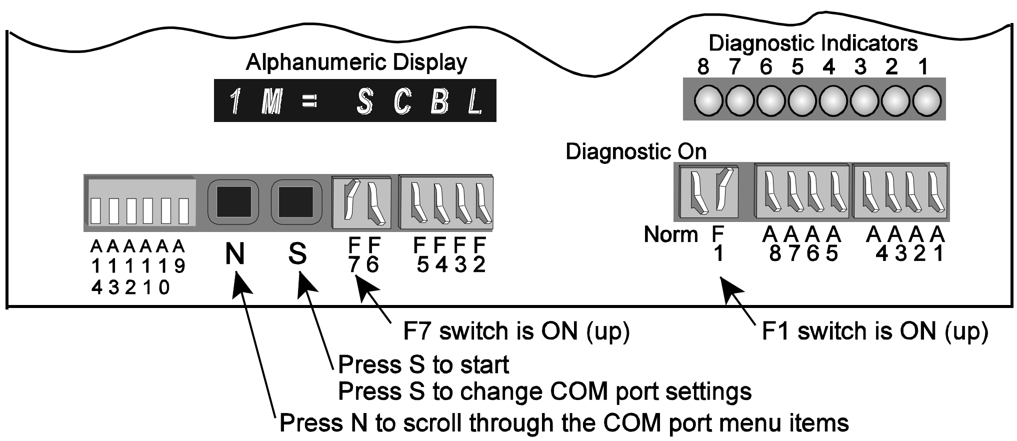
- F1 - Communication Port Settings (see Section 5.3.1)
- F2 - Internal use only
- F3 - Security Codes (see Section 5.3.2)
- F4 - Hoistway Learn Operation (see Section 5.3.3)
- F5 - MSK: Master Software Key (Simplex only) (see Section 5.3.4)
- F6 - Software Options - adjustable control variables (see Section 5.3.5)
- F7 - Turns System Mode ON and OFF
- Diagnostic On/Norm - Load Weigher Learn Operation (see Section 5.3.6)
- A8 Setting and Resetting the Passcode Option (see Section 5.3.7)

5.3.1 PROGRAMMING THE COMMUNICATION PORTS

The communication ports are field programmable through the Computer Swing Panel's Enhanced Onboard Diagnostics (EOD). Section 3.3.1, *Installation of the Terminal*, covers connecting a terminal to a COM Port on the MC-RS board and set-up of the terminal.

The communication ports were programmed (at the factory) for the original hardware, based on customer-provided information. It may be necessary to reprogram a communication port when changing from a monochrome to a color CRT, adding a lobby CRT or CRT with keyboard or adding a modem. The new hardware will not work correctly until the communication port is reprogrammed.

To reconfigure the communication port, enter the System Mode as described at the beginning of Section 5.3 and set the switches as shown.



When the F1 switch is placed in the ON (up) position, the alphanumeric display shows the following scrolling message: **COMPORT MENU PRESS S TO START**. Press the **S** pushbutton for ½ second and the display will show the current setting for the first item on the COM port menu, in this case **1M=SCBL**. The *1M* stands for *COM Port 1 Media* and *SCBL* stands for *Serial Cable* (see Tables 5.3 and 5.4) To change a communication port setting, press the **N** pushbutton to scroll through the Communication Port Menu until the desired item is shown on the alphanumeric display. Table 5.3 lists the items on the COM port menu.

CHANGING THE MEDIA SETTING - To change the *media* setting for COM Port #2, press the **N** pushbutton to scroll through the items on the Communication Port Menu (see Table 5.3) and release N when **2M** is displayed. Then press the **S** pushbutton to scroll through the Media Menu (see Table 5.4). Release S when the desired media is displayed. After selecting the desired media, press N to again scroll through the Communication Port Menu.

CHANGING THE DEVICE SETTING - To change the *device* setting for COM Port #2, press the **N** pushbutton to scroll through the Communication Port Menu and release N when **2D** is displayed. Then press the **S** pushbutton to scroll through the Device Menu (see Table 5.5). Release S when the desired device is displayed. After selecting the desired device, press N to again scroll through the Communication Port Menu.

SAVING THE CHANGES - When you have finished making changes, press the N pushbutton until, **SAVE?N/S** is displayed. Pressing **S** will save the changes and **SAVED...** will be displayed. If **N** is pressed the program will continue to scroll through the Communication Port Menu. To exit the Communication Port Menu, place the F1 switch in the OFF (down) position. If you exit the Communication Port Menu without choosing SAVE?N/S and pressing S, any changes made to settings will be ignored.

TABLE 5.3 Communication Port Menu

EOD Display	Description
NO COM	No COM port option has been enabled
1M	COM Port 1 Media
1D	COM Port 1 Device
2M	COM Port 2 Media
2D	COM Port 2 Device
3M	COM Port 3 Media
3D	COM Port 3 Device
4M	COM Port 4 Media (typically used for AC Drive communication)
4D	COM Port 4 Device (typically used for AC Drive communication)
SAVE?N/S	Save the changes? N for no or continue, S for save

TABLE 5.4 Media Menu

EOD Display	Description
NONE	NO MEDIA - Select when removing a computer terminal from a port.
SCBL	SERIAL CABLE - Select when setting up a CRT/terminal with a keyboard.
LDRV	LINE DRIVER - Used when setting up a CRT at a distance over 40 feet.
MODM	MODEM - Select when attaching a modem to a computer.

TABLE 5.5 Device Menu

EOD Display	Description
NONE	No Device
CRTMK	Use for these terminals or emulators with keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
CRTM	Use for these terminals or emulators without keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
PC	Personal Computer with CMS / MSD
PCGD	Personal Computer Graphic Display (no longer used)
CRTCK	Use for these terminals with keyboard (Link MC-70, Wyse WY-370)
CRTC	Use for these terminals without keyboard (Link MC-70, Wyse WY-370)

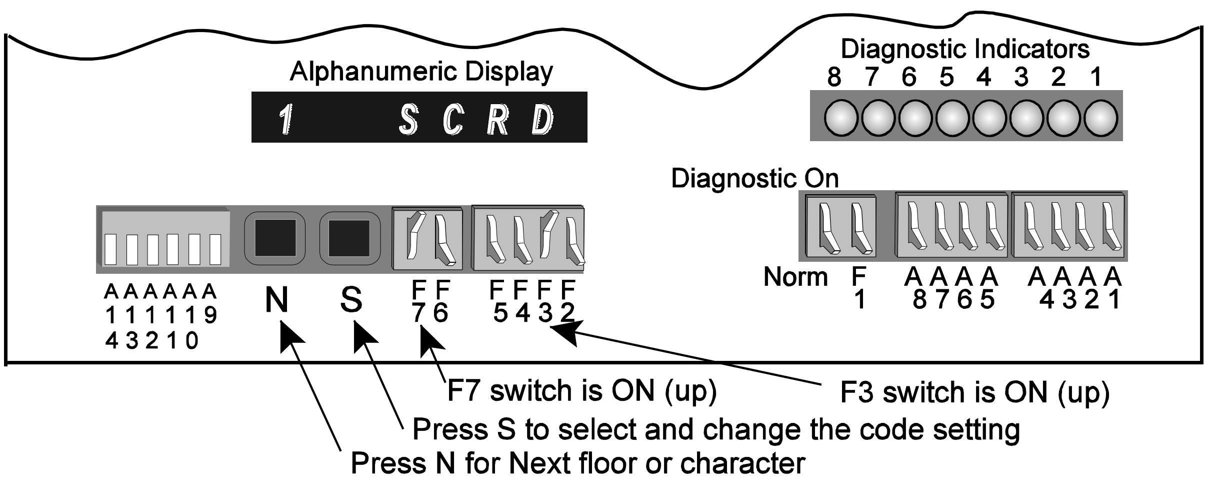
5.3.2 VIEWING AND CHANGING THE SECURITY CODES

For jobs with the MCE SECURITY, either Basic Security or Basic Security with CRT Option, this function allows the security codes to be viewed or changed. If the job does not have MCE SECURITY, the alphanumeric display will show ***NOT USED***.

With MCE's Basic Security, the Building Security Input (BSI) is used to turn security ON and OFF. Refer to the job prints to find the BSI input. When *Security* is ON, all car calls are screened by the computer and become registered only if: (1) the call is to a floor that is not a secured floor, or (2) the floor is a secured floor and its Security Code is correctly entered within 10 seconds.

With MCE's Basic Security with CRT Option, additional programming options are available via the CRT terminal. Refer to MCE's Elevator Security User's Guide, part # 42-02-S024, for additional information and programming instructions. For both Basic Security and Basic Security with CRT Option, the security codes for each floor are programmed as described below.

The Security Codes are viewed and changed using the Computer Swing Panel. To view and change the security codes, place the F3 Switch in the *On* or up position while in "System" mode. Not all elevator systems are equipped with the SECURITY option. If the system does not have Basic Security, the Alphanumeric Display will show *NOT USED* when the F3 switch is turned On.



The security code for each floor may consist of from one to eight characters, where each character is one of the floor buttons found in the elevator car. Each floor may have a different length code. Table 5.6, *Changing Floor Security Status and Security Code*, describes the steps required to view and change a floor’s security code. **A floor cannot be *Secured* unless a *Security Code* has been programed.**

The Appendix, *Security Information and Operation* in the Elevator Security User's Guide, provides instructions for elevator passengers who will be using the elevator while Security is ON. Space has been provided for listing the security codes for each floor.

TABLE 5.6 Changing the Floor Security Status and Security Code

Switch	Explanation	Alphanumeric Display
Step 1 **F3** switch **ON** (up)	**To begin, display the 1st floor's status** While in the *System* mode, turn function switch F3 ON (up).	**Example:** B NSCR B = basement NSCR = not secured
Step 2 **Press N**	**To display another floor's security status** Steps to the next floor's security status. Press N again for the next floor, etc.	**Example:** 1 SCRD 1 = floor #1 SCRD = secured
Step 3 **Press S**	**To select a floor to view or change a code** With the floor's security status displayed, press S. The first character of the floor's security code is then displayed.	**Example:** 2 1=3 For floor 2, the first character in the code is 3.
Step 4 **Press S**	**To change a code character** Steps through the available code characters. When the desired character is displayed, go to Step 5.	**Example :** 2 1=5 For floor 2, the first security character is now 5.
Step 5 **Press N**	**To display the next code character** Steps to the next character in the code. To change more characters, repeat steps 4 and 5. The last character of a code must be the word END if the code is less than eight characters long.	**Example 1:** 2 2=4 For floor 2, the second character in the code is 4. **Example 2:** 2 1=END For floor 2, the first character in the security code is the word END. Floor 2 is unsecured.
Step 6 **Press N**	**To end and save** If END is chosen as a code character or if this is the eighth character, when N is pressed the computer saves the code and displays the current floor's security status. To view or change the code for another floor, return to step 2.	**Example :** 2 NSCR If END was chosen for first character, this floor has no security code and is unsecured. Using END for any other character just ends that code, but the floor is still secured.
F3 and F7 switches OFF, down position	**To exit System mode** Every security code must end with the word END or be 8 characters long. If not, the processor remains in System mode.	**Example:** 11:04:27 The time displayed

5.3.3 HOISTWAY LEARN OPERATION

Since the IMC-AC traction controller operates under the assumption that its computer knows the exact floor and car positions in the hoistway, the IMC-AC processors must learn the building before an attempt is made to run the car in any way other than Inspection operation. This section describes how to put the system on Learn operation. For details on performing the learn operation see Section 4.1, Learning the Building Floor Heights.

To place the car on Learn operation, log into System Mode as described at the beginning of Section 5.3 and then place the F4 switch in the ON (Up) position. Once on Learn operation, the alphanumeric display, the Diagnostic Indicators on the front of the Swing Panel, and the DDP Diagnostic Indicators on the top of the Swing Panel display specific messages as described below. The rest of the indicators and switches are not used in this mode.

Alphanumeric Display - While on Learn operation the alphanumeric display indicates the Learn operation status by displaying the following messages:

LRN ERR	-	learn error
LN READY	-	learn ready
LEARNING	-	learning
LEARNED	-	learn complete

Diagnostic Indicators - When **LEARNING** appears on the alphanumeric display, the DDP Diagnostic Indicators on the top of the Computer Swing Panel will flash to indicate that the IMC-DDP-x computer is on a learn run. The Diagnostic Indicators on the front of the Computer Swing Panel will flash to indicate any setup errors (see Tables 6.8 and 6.10, “Learn Mode”).

5.3.4 SETTING MSK: MASTER SOFTWARE KEY

On a simplex car, the Master Software Key is used in conjunction with the Basic Security with CRT Option or Access Control for Elevators (ACE) Security. To view or change MSK, log into System Mode as described at the beginning of Section 5.3 and then place the F5 switch in the ON (up) position. If this is not a simplex car or if this job does not have the Basic Security with CRT Option or ACE Security enabled, the alphanumeric display will show NOT USED. Additional information about the Master Software Key (MSK) can be found in the Elevator Security Users Guide (MCE part # 42-02-S024).

5.3.5 SETTING THE SOFTWARE OPTIONS - ADJUSTABLE CONTROL VARIABLES

Table 5.7 provides a listing of the software options - adjustable control variables. Not all of the options are available on all controllers. To view or set the adjustable control variables, log into System Mode as described at the beginning of Section 5.3 and place the F6 switch in the ON (up) position.

The first available variable will be shown on the display. Press the **S** pushbutton to change the setting. Press the **N** pushbutton to scroll to the next available variable. Table 5.7 lists the variables in alphabetic order, not in the order in which they are displayed on the controller.

TABLE 5.7 Software Options

VARIABLE	NAME	DEFINITION
AFR	*Alternate Fire Floor Recall*	Determines the designated recall floor for alternate Fire Service Operation.
AFR2	*Second Alternate Fire Floor Recall*	Determines the designated recall floor for the second alternate Fire Service operation (Detroit Fire code).
AGNG	*Alternate Gong Option*	Causes an arrival lantern to be illuminated whenever the car's doors are open at a non-lobby landing. In the absence of actual call demand, the direction selected is a reflection of the car's last direction of travel. If the car is located at a terminal landing, the appropriate lantern will be illuminated.
APP1	*Alternate Primary (lower) Parking Floor*	When ON, the car will no longer park at the original parking floor (PPF). Instead the car will park at the first alternate parking floor specified by the landing stored in this variable.
APP2	*Alternate Primary (lower) Parking Floor #2*	When ON, the car will no longer park at the original parking floor (PPF). Instead the car will park at the second alternate parking floor specified by the landing stored in this variable.
CCBC	*Cancel Car Call Behind Car Option*	If ON, and if the car has a direction arrow (SUA/SDA), no car calls can be registered behind the car's current position. For example, if a car is at the fifth floor, moving down, then no car calls can be registered for any floors above the fifth floor.
CNID	Car Network ID	The Car Network ID identifies each local car controller to the Group Supervisor for communication purposes. With the latest MP Software versions, this parameter may now be set using this software variable, as well as via the CRT terminal.
CPPB	*Constant/Momentary Pressure Photo Eye/Safety Edge Bypass*	This option, when turned “OFF,” will disable photo eye/safety edge bypass logic for cars that are on Independent Service, Attendant Service, Hospital Service Phase 2, and any other non-automatic door closing conditions (CPCLOSE, MPCLOSE, etc.).
CSAR	*CSA Redundancy Check Option*	When ON, CSA redundancy checking logic is invoked. When OFF, the LSR, CNP and UDF inputs are ignored, and CSA redundancy checking logic is not performed.
DCFL	*Door Close Front Latch*	Maintains the Door Close Function on the front doors continuously as long as a door open command is absent.
DCRL	*Door Close Rear Latch*	Maintains the Door Close Function on the rear doors continuously as long as a door open command is absent.
DDOP	*Double Ding on Down Option*	When ON, the gong output dings twice for down direction travel and once for up direction travel. If OFF, the gong output will only ding once for both up and down direction of travel.
DDPO	*Door Lock Direction Preference Option*	Causes the car to hold its direction preference until the doors are closed. When OFF, the car will be allowed to change direction preference with the doors open (when the hall call door time elapses).
DGNG	*Door Lock Gong Option*	Determines when the arrival gong outputs are activated. The arrival gong outputs are activated after the doors begin to open. When OFF, the arrival gong outputs are activated when the car steps into the floor. This option should be OFF when hall mounted arrival fixtures are used and turned ON when car-riding arrival fixtures are used.
DOFL	*Door Open Front Latch*	Maintains the Door Open Function on the front doors continuously as long as a door close command is absent.
DORL	*Door Open Rear Latch*	Maintains the Door Open Function on the rear doors continuously as long as a door close command is absent.
FTLF	*Failure to Leave the Floor*	The value set in this option determines the maximum number of times H (High speed) may *pick* consecutively at the same landing before the car is shutdown with an MLT fault. Set this option to OFF to disable the shutdown due to this fault.
HNDZ	*Initiate high speed run while releveling (high speed while not in “dead zone”)*	This option is only available on those controllers which have been designed with a “rope stretch relevel” relay (RSR), which actively manipulates the “dead zone” perceived by the controller. Enabling this option will allow the controller to initiate a run while the car is still in the “releveling zone” (it will not have to relevel to “dead zone” before initiating a high speed run). The run is initiated only if the doors are locked and a car call has been registered.

TABLE 5.7 Software Options

VARIABLE	NAME	DEFINITION
HREO	*Reopen doors with hall button*	If enabled, this option will allow the activation of a hall call button to cause a car's doors to reopen (if in the process of closing). If the option is turned OFF, the doors will not reopen if the doors are closing and a car call has been registered for that car.
KCE	*Keyboard Control of Elevators*	MCE's Elevator Central Monitoring System software, CMS for Windows, allows monitoring of elevators and control of certain elevator functions using a PC. The CMS option, KCE can be enabled or disabled at the local car or group level by turning the controller's Adjustable Control Variable (KCE) ON or OFF. Changing the KCE setting in the individual car's controller affects only that car. Changing the KCE setting in the Group controller affects all of the cars in that group. Consult the CMS for Windows manual for additional information.
LBBY	*Lobby Floor*	Determines the location of the lobby floor for a simplex car and for a local car (part of a group system) when the car is operating independently of the Group Supervisor (i.e., Fire Service) or if there is a loss of communication with the Group Supervisor.
LGNG	*Lobby Alternate Gong Option*	Causes an arrival lantern to be illuminated whenever the car's doors are open at the lobby landing. In the absence of actual call demand, the up direction lantern will be illuminated.
LLCC	*Light Load Call Cancel*	When the light load input (LLI) is ON, this variable sets the threshold above which an additional car call will cause all previous calls to be canceled with the exception of the last call entered in the system.
MFR	*Main Fire Floor Recall*	Determines the designated recall floor for main Fire Service operation.
MSAF	*Mechanical Safety Edge*	Determines if the car has a Mechanical Safety Edge. This option must be turned ON if the car has Mechanical Safety Edge, otherwise it should be OFF, as when an infrared detector is used.
NPRE	*No Pre-opening Option*	When ON, prevents pre-opening of the doors on an approach to any landing. When OFF, the doors will start to open as soon as the car is 3" (76 mm) from level at the target floor.
PECC	*Anti-nuisance Call Cancel*	Sets the threshold for the number of car call stops without an interruption of the photo eye. If no photo eye interruption is detected when the car answers the fourth car call, the controller will cancel any additional car calls registered in the system. This function is normally referred to as anti-nuisance.
PHEP	*Photo Eye Protection*	When this variable is set to ON, it will prevent the photo eye from ever being bypassed except on Fire Service. When set to OFF, this option will enable the stuck photo eye protection logic and the photo eye will be bypassed after the car times out of service. This option must be turned ON for all jobs that use the PHE input for the door hold key switch.
PPF	*Primary (lower) Parking Floor*	Determines where the car will park in the absence of call demand. In group systems, this variable only takes affect when the car is operating independently of the group supervisor or if there is a loss of communication with the Group Supervisor.
RCCD	*Reversal CCD Option*	When ON, all registered car calls are canceled when the car reverses direction.

5.3.6 LOAD WEIGHER LEARN OPERATION

Some IMC controllers use a load weigher to determine the load in the car, as a percentage of full load, for the purpose of performing certain dispatching functions such as anti-nuisance call canceling, hall call bypass when fully loaded, and overloaded car detection. The Load Weigher Learn Operation is used to calibrate the load weigher. While in the SYSTEM MODE, the Diagnostic On/Norm switch is used to enter the Load Weigher Learn Mode. Section 4.8, *Load Weigher Adjustment for Dispatching*, provides a complete description of the dispatching options and the load weigher learn operation.

5.3.7 SETTING AND RESETTING THE PASSCODE OPTION (NOT ON ALL CONTROLLERS)

The Passcode Requested option can be used to require that a passcode be entered in order to run the car on any mode of operation other then Inspection. If a passcode has not been pre-programmed for the controller, the Passcode Requested option is not available and will not appear.

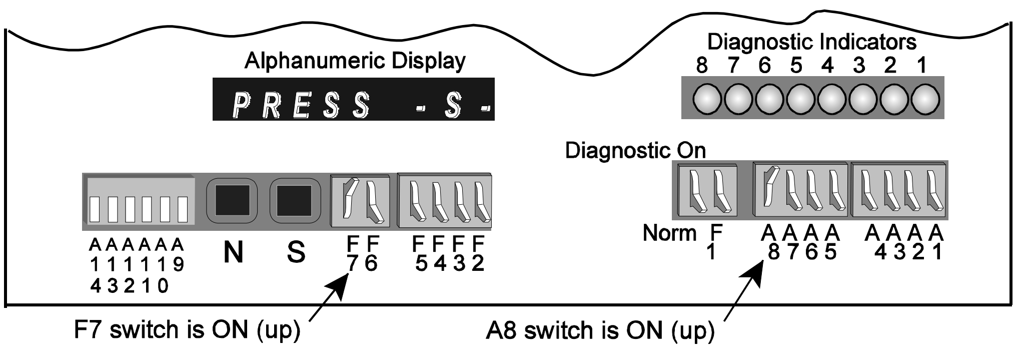
Upon power up, the message ***MP2 VERSION NUMBER: 8.00.0*** will scroll across the alphanumeric display. If a passcode has been pre-programmed and the Passcode Requested option has been activated, the message ***PASSCODE REQUESTED...*** is then scrolled. This means a passcode is required in order to run the elevator on any mode other than Inspection.

In order to set the passcode (to run the car on Normal operation) or clear the passcode (to activate the Passcode Requested option), the controller must first be placed in System Mode as described at the beginning of Section 5.3.

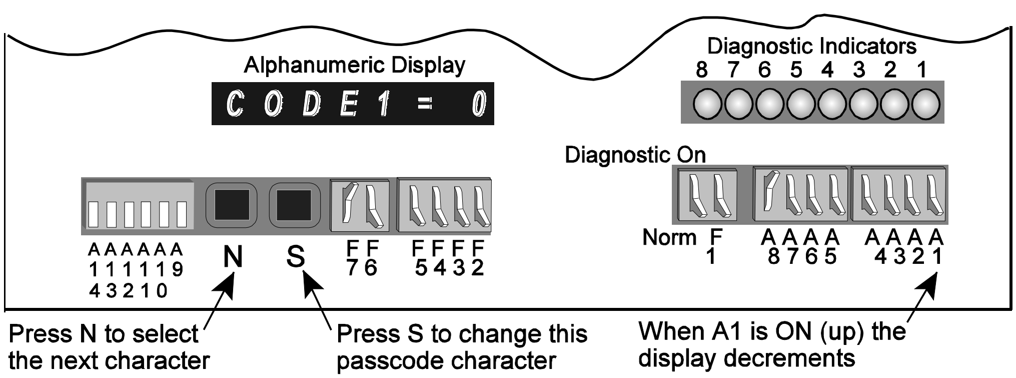
NOTE: PASSWORD is not the same as PASSCODE. The PASSWORD is used to limit access to System Mode. The PASSCODE, when activated, requires that a passcode be set in order to run on any mode other than Inspection.

5.3.7.1 SETTING THE PASSCODE

Once in System Mode, place the A8 switch in the ON (up) position as shown.



The message ***PRESS -S- TO SET PASSCODE OR -N- TO CLEAR PASSCODE...*** will scroll across the display. Press the **S** pushbutton. The message ***CODE 1 = 0*** is displayed.



The passcode consists of eight alphanumeric characters. The display indicates the value of code character #1. Press the **S** pushbutton to change the value. Press the **N** pushbutton to select the next passcode character. When the A1 switch is ON (up) the display will decrement when either **N** or **S** are pressed.

When the eighth passcode character is displayed, pressing the **N** pushbutton causes the display to change to ***SAVE? N/S***. Press **N** continue setting / changing the passcode. Press **S** to save the passcode. If the passcode is set correctly the display will show ***SAVED...***. If the passcode is not set correctly the message ***INVALID PASSCODE. PRESS N TO CONTINUE*** is scrolled across the display. Pressing **N** causes ***CODE1= (x)*** to be displayed so that the passcode can be corrected.

Once the passcode is set correctly and saved, exit System Mode by placing the F7 and A8 switches in the OFF (down) position. The car can then be run on Normal operation.

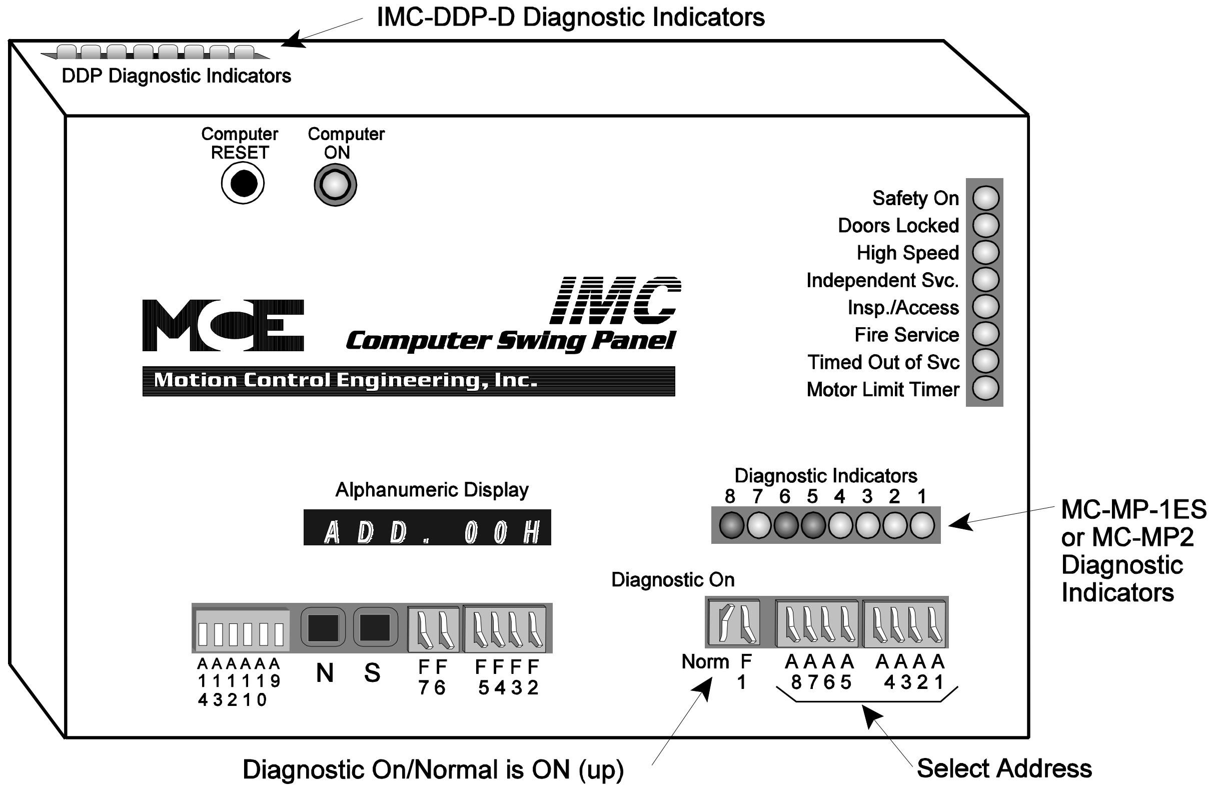
5.3.7.2 ACTIVATING THE PASSCODE REQUESTED OPTION

The Passcode Requested option can be re-activated by clearing the valid passcode setting. To clear the passcode, enter System Mode as described in Section 0.1 and place the A8 switch in the ON (up) position. Press the **N** pushbutton while the message ***PRESS -S- TO SET PASSCODE OR -N- TO CLEAR PASSCODE...*** is being scrolled. The display changes to ***CLEARED***. Exit System mode by placing the F7 and A8 switches in the OFF (down) position. The message ***PASSCODE REQUESTED...*** is scrolled across the display and the car is only allowed to run on Inspection operation.

5.4 DIAGNOSTIC MODE (EOD)

In the Diagnostic Mode, the A1 thru A8 switches allow access the MC-MP (MP2) and IMC-DDP computer memory locations. The Diagnostic Indicators and DDP Diagnostic Indicators show the status (ON or OFF) of the flags at those locations (refer to Figure 5.3). To access Diagnostic mode, set the switches as shown.

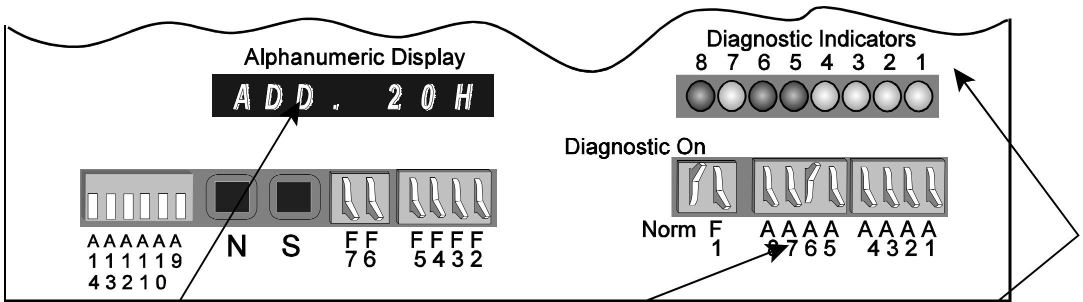
FIGURE 5.3 Diagnostic Mode (EOD)



5.4.1 VIEWING THE MC-MP COMPUTER VARIABLE FLAGS

The A1-A8 switches enable an elevator mechanic to view the status of the MC-MP Computer Variable flags when troubleshooting a problem. Figure 5.4 describes the procedure for viewing the computer flags, in this case at address 20H (selected from Table 5.9).

FIGURE 5.4 Viewing the flags at Address 20H (from Table 5.9)



MC-MP-1ES BOARD DIAGNOSTIC MODE ADDRESSES AND VARIABLE FLAGS									
Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
20		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED

DNmd 010

In this example, address 20 has been selected (see Table 5.9). The Diagnostic On/Norm switch and the A6 switch are ON (up); all other 'A' switches are OFF (down). The display reads ADD.20H. The flags that can be viewed from this address are listed on the right. A complete list of these flags can be found in Table 5.8. Check the Diagnostic Indicators on the front of the Swing Panel. If an LED is ON, it means that flag is ON. For example, if Diagnostic Indicator #6 is ON, this means the Door Zone Input (DZ) is ON.

LED	Flag	Description
8	DOLM	Door open limit memory flag
7	PHE	Photo eye input
6	DZ	Door zone input
5	DOL	Door open limit input
4	DBC	Door close button input
3	SE	Safety edge input
2	GEU	Gong enable up output
1	GED	Gong enable down output

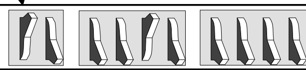
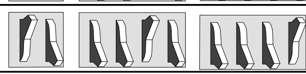
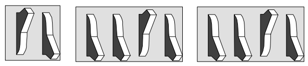
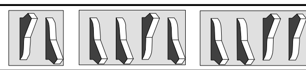
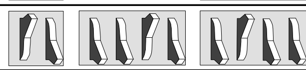
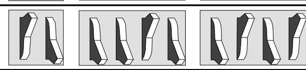
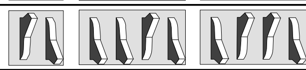
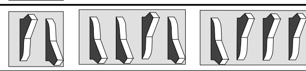
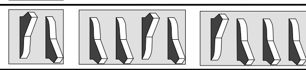
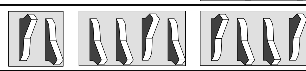
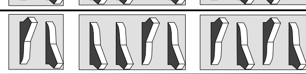
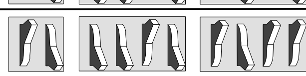
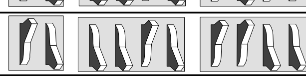
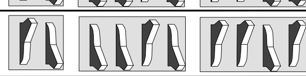
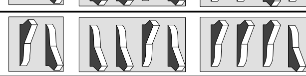
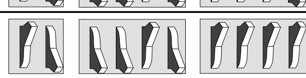
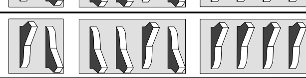
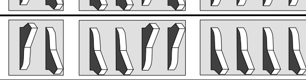
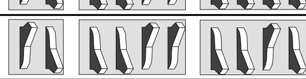
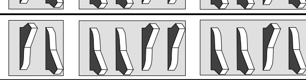
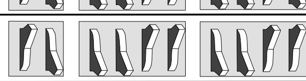
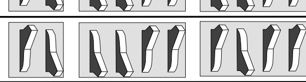
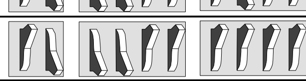
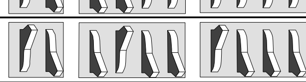
Table 5.8 provides a listing of the MC-MP (MP2) Computer Variable flags and the abbreviation assigned to each flag. Tables 5.9 and 5.10 show the memory address locations for the flags. Access a flag’s address by setting the A1 - A8 switches as shown in Table 5.9. Once an address has been selected, the Diagnostic Indicators, on the front of the Swing Panel, show the status of the flags at that computer memory address. Table 5.9 shows the abbreviations for the flags in the columns ❶ thru ❽ (corresponding to indicators 1 thru 8) in each row.

ALTERNATE ADDRESS SELECTION METHOD - There is an alternate way of selecting the computer memory address, without using the A1-A8 switches. To do so, regardless of the position of A1-A8 switches, press the N pushbutton. The alphanumeric display automatically reads **ADD. 20H**, which is the first diagnostic address for the MC-MP flags. The Computer Swing Panel's front Diagnostic Indicators indicate the contents of the address displayed. Constant pressure on the N pushbutton automatically increases the address shown on the alphanumeric display, and the state of the indicator lights changes respectively. Once the address reaches 33H, it automatically goes back to 20H. Releasing the N pushbutton holds the last address displayed on the alphanumeric display for an additional three seconds before changing the display to reflect the address selected by the A1-A8 switches.

TABLE 5.8 MC-MP(2) Computer Variable Flags

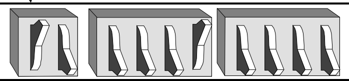
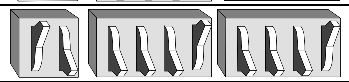
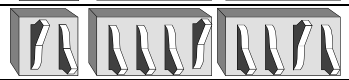
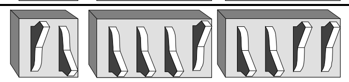
ABBREV	FULL NAME	ABBREV	FULL NAME
ADAC	ADA Car Call Timer	FRA	Alternate Fire Phase I Input
ADACR	Rear ADA Car Call Timer	FRC	Fire Phase II
ADAH	ADA Hall Call Timer	FRM	Fire Service Phase I
ADAHR	Rear ADA Hall Call Timer	FRS	Fire Phase I Input
ALT	Alternate Service	FWI	Fire Warning Indicator Output
ATS	Attendant Service Input	GED	Gong Enable Down Output
ATSF	Attendant Service Function	GEU	Gong Enable Up Output
BFD	Bottom Floor Demand	H	High Speed Output
CAC	Car Above Counterweight	HCDX	Hall Call Disconnect
CBC	Car Below Counterweight	HCR	Hall Call Reject
CC	Car Call	HCT	Hall Call Door Time
CCA	Car Call Above	HLD	Hold Input Fire Phase II
CCB	Car Call Below	HLI	Heavy Load Input
CCD	Car Call Disconnect	HLW	Heavy Load Weigher
CCT	Car Call Door Time	HML	Home Landing Select Input
CD	Car Done	HSEL	Hospital Emergency Select
CODE 3	Third Bit in Absolute PI Code	IN	Inspection or Access Input
CSAF	Computer safe	IND	Independent Service Input
CSB	Car Stop Switch Bypass Output	INT	Intermediate Speed Input
CTL	Car to Lobby Input	ISR	In Service and Ready
CTLF	Car to Lobby Function Flag	ISRT	In Service Truly
CWI	Counterweight Input	ISV	In Service
CWIL	Counterweight Input Latch	LD	Level Down Input
DBC	Door Button Close Input	LFP	Lower Floor Parking
DC	Down Call	LLI	Light Load Input
DCA	Down Call Above	LLW	Light Load Weigher
DCB	Down Call Below	LOT	Lobby Door Time
DCC	Door Close Complete	LU	Level Up Input
DCF	Door Close Function Output	MGR	Motor Generator Run Output
DCL	Door Close Limit	MLT	Motor Limit Timer
DCLR	Rear Door Close Limit	NSI	Non-Stop Input
DCLC	Door Closed Contact	NUDG	Nudging Output
DCLCR	Rear Door Closed Contact	PFG	Passing Floor Gong
DCP	Door Closed Power Output	PHE	Photo Eye Input
DDP	Down Direction Preference	PK	Parking
DELSIM	Delta Simulation	PSTX	Preliminary Stepping Function Complete
DHO	Door Hold Open	PTR	Permission To Run *(from Supervisor)*
DLK	Door Lock Input	PTS	Permission To Start *(from Supervisor)*
DMD	Demand Down	PUSD	Earthquake Power Up Shut Down
DMU	Demand Up	REL	Releveling Output
DNDO	Down Direction Output	RUN	Run
DNI	Down Direction Input	SAF	Safety String Input
DNS	Down Direction Sense Input	SD	Supervisory Down
DOF	Door Open Function Output	SDA	Down Direction Arrow Output
DOI	Door Open Intent	SDT	Short Door Time
DOL	Door Open Limit Input	SE	Safety Edge Input
DOLM	Door Open Limit Memory	SLV	Slaved
DPM	Door Position Monitor	STC	Stepping Complete
DPMR	Rear Door Position Monitor	STD	Step Down Input
DSD	Down Slow Down Input	STU	Step Up Input
DSH	Door Shortening (Car Call Button Pushed)	SU	Supervisory Up
DSHT	Door Shortening (Final)	SUA	Up Direction Arrow Output
DZ	Door Zone Input	TFD	Top Floor Demand
DZORDZ	Door Zone or Rear Door Zone	TOS	Timed Out of Service
ECRN	Emergency Power Running Car	UC	Up Call
EDS	Earthquake Direction Switch	UCA	Up Call Above
EPI	Emergency Power Input	UCB	Up Call Below
EPR	Emergency Power Return Function	UDP	Up Direction Preference
EPS	Emergency Power Select Input	UFP	Upper Floor Parking
EQA	Earthquake Function Active	UPDO	Up Direction Output
EQI	Earthquake Input	UPI	Up Direction Input
EQIND	Earthquake Indicator Output	UPS	Up Direction Sense Input
EQN	Earthquake Normal	USD	Up Slow Down Input
ESTE	Earthquake Stop Time Elapsed	YRQ	Wye Request
FCS	Fire Phase II Input	YSIM	Wye Simulation

TABLE 5.9 MC-MP(2) Diagnostic Mode Addresses and Computer Variable Flags

MC-MP(2) DIAGNOSTIC MODE ADDRESSES AND COMPUTER VARIABLE FLAGS									
Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active							
		8	7	6	5	4	3	2	1
20		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
21			DC	UC	CC			DHO	DOI
22		DCF	DCP	DOF	LOT		HCT	CCT	SDT
23				HSEL	CSB	DCC	NUDG		DSHT
24		INT/ DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
25				HLW	HLI			FWI	
26		LFP	UFP						
27				EQI	IND	IN		DEL SIM	YSIM
28		LLW	DLK		DZO RDZ			PK	LLI
29		DNDO	LD		DDP	UPDO	LU		UDP
2A		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
2C			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
2D						FRM			FRC
2E		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F*		HLD		EQA	ATSF		ECRN	CD	EPR
2F		HLD	EPI	EPR	SLV	ISR	YRQ	PTR	PTS
30						EPS	EPI	HML	ALT
32*		CAC	CBC	CWI		EDS	ESTE	EQN	PUSD
32		CAC	CBC	CWI	EQA	EDS	ESTE	EQN	PUSD
33			CWIL						
3B**				DCLR				DCL	
3F**				ADAHR	ADACR			ADAH	ADAC
48**				DPMR	DCLCR			DPM	DCLC

* Simpex Ver. 3.59 or earlier software ** MC-MP2 Ver. 8.0 or later software. DNmd 033

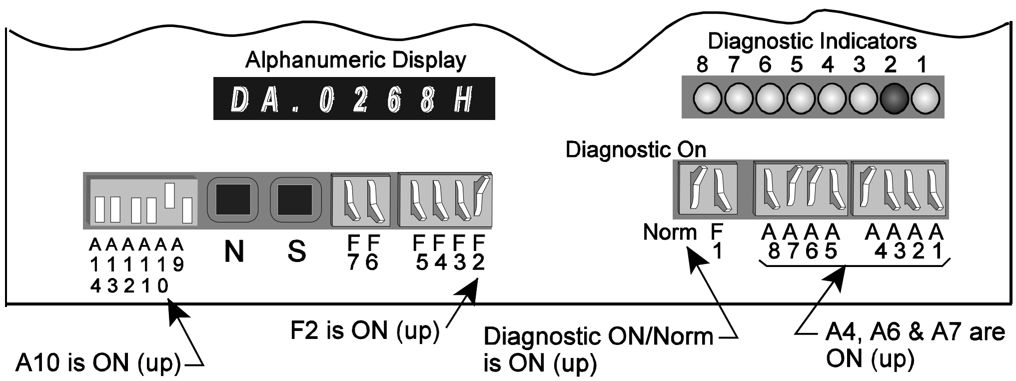
TABLE 5.10 MC-MP Diagnostic Mode Rear Door Addresses and Computer Variable Flags

MC-MP-1ES DIAGNOSTIC MODE REAR DOOR ADDRESSES AND VARIABLE FLAGS									
Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
10		DOLMR	PHER	DZR	DOLR	DBCR	SER	GEUR	GEDR
11			DCR	UCR	CCR			DHOR	DOIR
12		DCFR	DCPR	DOFR	LOTR		HCTR	CCTR	SDTR
13						DCCR	NUDGR		DSHTR

DNmd 011

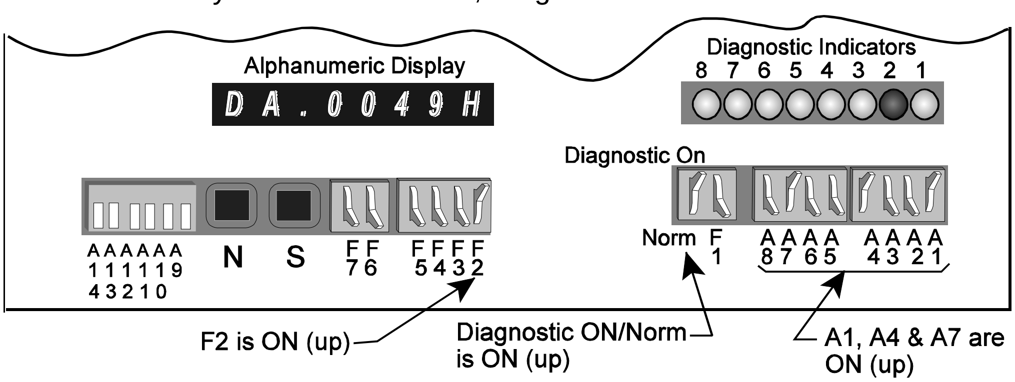
DOOR CLOSED LIMIT (DCL) AND REAR DOOR CLOSED LIMIT (DCLR) FLAGS

DCL INPUT - LOCAL TRACTION (MPOLTM software) - The memory flag for DCL is at external memory address 0268 Hex, Diagnostic Indicator #2. Set the switches as shown.

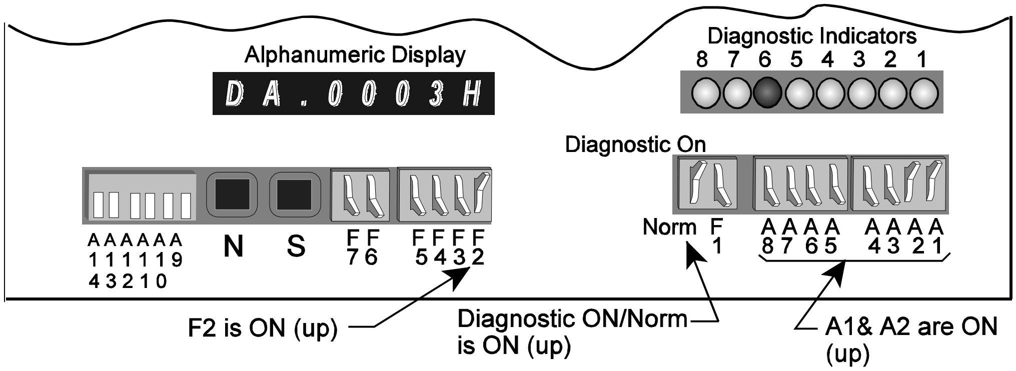


Switch F2 selects external memory. Switches A13 and A14 select the first digit (0), A9 thru A12 select the second digit (2), A5 thru A8 select the third digit (6) and A1 thru A4 select the last digit of the address (8). The Alphanumeric Display indicates that external memory address 0268 Hex is selected (DA.0268H). Diagnostic Indicator #2 shows the status of the DCL input (LED ON = high, LED OFF = low).

DCL INPUT - SIMPLEX TRACTION (MPODT software) - The memory flag for DCL is at external memory address 0049 Hex, Diagnostic Indicator #2. Set the switches as shown.



DCLR INPUT - (all software) - The memory flag for DCLR is at external memory address 0003 Hex, Diagnostic Indicator #6. Set the switches as shown.



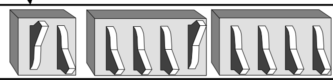
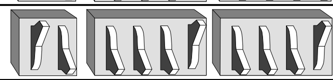
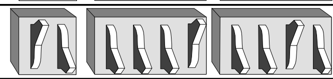
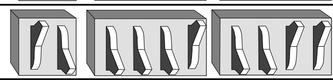
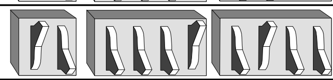
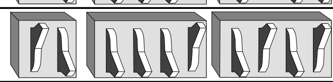
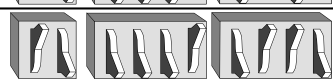
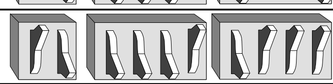
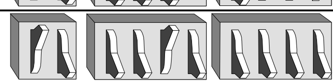
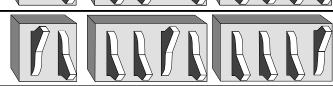
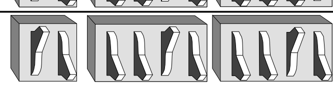
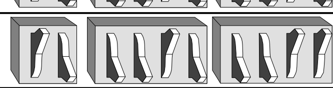
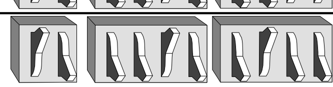
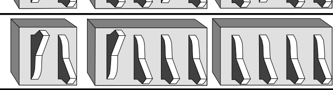
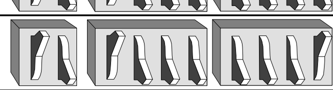
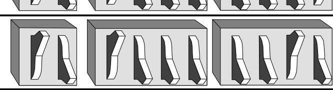
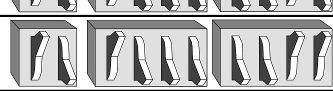
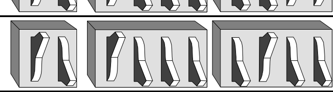
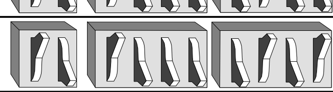
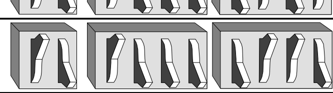
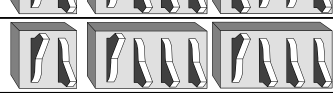
5.4.2 VIEWING THE IMC-DDP COMPUTER VARIABLE FLAGS

The A1-A8 switches also allow an elevator mechanic to view the status of the IMC-DDP Computer Variable flags when troubleshooting a problem. The method used to select the computer address is the same as in 5.4.1, however, the DDP addresses start at 10H and the status of the DDP computer addresses are shown on the DDP Diagnostic Indicators on top of the Computer Swing Panel (see Figure 5.3). Table 5.11 provides a listing of the IMC-DDP-x flags and Table 5.12 shows the memory addresses for the IMC-DDP flags. Note that the alternate method of selecting the address, using the N pushbutton, only allows access to locations 20H thru 33H. All other locations must be selected using the A1 - A8 switches.

TABLE 5.11 Flags for IMC-DDP-C Board

DDP PROCESSOR			
ADO	AC Drive ON	OLP	Error at OLM
ADR	AC Drive Ready Signal	ON	Global ON
AFLT	AC Drive Fault	ORG	Pattern Generator Run Grant
ASPD	At Speed Fault	ORR	Main Processor Run Request
A2000	ANSI 2000	PGA	PG Active
BF	Brake Failure	PGE	Pattern Generator Enable
BOF	Brake Output Failure	PGO	Pattern Generator ON
BRC	Brake Checksum Error	PGR	Pattern Generator Ready
BRE	Brake Enable	PGU	Pattern Generator Updated
BRP	Brake Pick	PIE	Parameter Initialization Error
CNPB	Contactor Proof Brake	PPC	Pattern Checksum Error
CNPM	Contactor Proof M Contactor	PPS	Pattern Profile Setup
CPI	Communications Processor ID Mismatch	PR	Parity Input
CPL	Communications Processor Looping	PRS	Parity Signal Error
CPP	C. P. Communication	PTC	Pre-Torque Checksum Error
DEF	Down Emergency Terminal Switch Error	QPR	Quadrature Pulse Reversed
DFLT	Drive Fault	R0	Floor Code Input 0
DRC	Drive Checksum Error	R1	Floor Code Input 1
DRO	AC Drive not ON	R2	Floor Code Input 2
DN	Debounced Down Direction	R3	Floor Code Input 3
DN_RAW	DDP Raw Down direction	R4	Floor Code Input 4
DSO	Drive ON	R5	Floor Code Input 5
DSR	Drive Ready	RD	Read Input
DZ	Door Zone	RDS	Read Signal Error
DZP	Pattern Generator Door Zone	RDY	Global Ready
EQ	Earthquake	RNE	Run enable
FBLT	Fault Bypass Limit Timer Error	RNF	Run Failure
FHC	Floor Height Checksum Error	RSR_M	MP Rope Stretch Logic
FHL	Floor Height Learned Error	RSR_P	DDP Rope Stretch Logic
FLC	Filter Checksum Error	SAF	Safety String Input
FLT	Fault relay Tripped	SFC	Safety Checksum Error
FLTB	Fault Bypass	SPC	Safety Processor Communication
H	High Speed	SPP	Safety Processor Protocol
IBJ	INT Jumper Error	SPR	Safety Processor Ready
IDC	ID Checksum Error	SPT	Safety Processor Tripped
IDM	ID Mismatch	SR	Short Run
INS	Inspection Operation	SSO	Step Signal Overlap
INT	Level Inhibit - INT Relay	STP	Stepping
INT_V	Velocity Level Inhibit	SWC	Terminal Switch Checksum
LD	Level Down	TA	Tach Active
LEV	Pattern Generator Level	TE	Tach Error
LI	Level Inhibit - Distance	TFH	Two Floor Height Error
LLT	Leveling Limit Timer	TPC	Test Point Checksum Error
LOD	Loss of Direction	TPS	Terminal Position Error
LOP	Loss of Position	TS	Tach Voltage Saturation
LRN	Learning Hoistway	UEF	Up Emergency Terminal Switch Error
LU	Level Up	UP	Debounced Up Direction
MR	Status of M Contactor	UP_RAW	DDP Raw Up direction
OFH	One Floor Height Error	VC	Contract Velocity Error
OLD	Excessive Error at OLM	VS	Short Velocity Error
OLM	Outer Leveling Marker		
SAFETY PROCESSOR			
COS	Contract Overspeed	NTS	Normal Terminal Switch Tripped
DET	Down Emergency Terminal Limit Switch	SPR	SP Ready
DT1	Down Normal Terminal Switch 1	SPT	SP Tripped
DT2	Down Normal Terminal Switch 2	TPL	Terminal Processor Learn
DT3	Down Normal Terminal Switch 3	UET	Up Emergency Terminal Limit Switch
DT4	Down Normal Terminal Switch 4	UT1	Up Normal Terminal Switch 1
DT5	Down Normal Terminal Switch 5	UT2	Up Normal Terminal Switch 2
EPR	Emergency Processor Ready	UT3	Up Normal Terminal Switch 3
EPT	Emergency Processor Tripped	UT4	Up Normal Terminal Switch 4
ILO	Inspection/Leveling Overspeed	UT5	Up Normal Terminal Switch 5

TABLE 5.12 IMC-DDP Diagnostic Mode Addresses and Computer Variable Flags

IMC-DDP-x BOARD DIAGNOSTIC MODE ADDRESSES AND VARIABLE FLAGS*									
Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	DDP Diagnostic Indicators Top of Swing Pannel LED *On* = variable flag is On or Active							
		8	7	6	5	4	3	2	1
10		RD	PR	R5	R4	R3	R2	R1	R0
11		STP	LI	INT	OLM	LEV	H	UP	DN
12		ORR	PGS	PGU	SPR	PGR	DSR	PGO	DSO
13		UP_RAW	DN_RAW			LRN	EQ	INS	DZ
14		UETS			UNT5	UNT4	UNT3	UNT2	UNT1
15		DETS			DNT5	DNT4	DNT3	DNT2	DNT1
16		SPR	SPT	TPL			OS	ILO	NTS
17						A2000	RSR_M	RSR_P	INT_V
20		DZPS							SR
21		QPR	TVS	IBJ	RST	PPS	IDM	PRS	RDS
22		OLD	RBK	LOD	LOP	TPS		OLP	LLT
23				FHL	VS	VC	TFH	OFH	SSO
24		ILO	COS	NTS	SPC	SPP	CPI	CPP	CPL
80			DRO		BRE	DSO		RNE	DSR
81				DRST	FLT	EBD		ETS	DFO
82		FLTB	FBLT	BCI		MR	CNPM	CNPB	SAF
83			DEF	UEF					TE
84								BF	
85									
86									
88									

* for IMC-AC controllers

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5.4.3 VIEWING AND ENTERING CALLS

This function allows the user to view all the calls registered per floor, and to enter calls as desired, without using the CRT terminal's F3 screen. To view or enter calls, set the switches as shown.

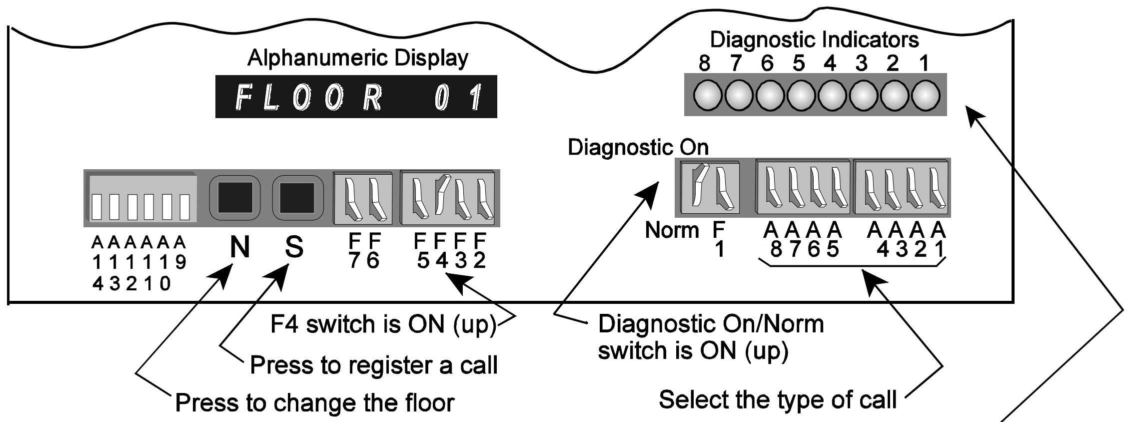


FIGURE 5.5 Viewing and Entering Hall & Car Calls via the EOD

Diagnostic Indicators show current calls	Diagnostic Indicators							
	❽	❼	❻	❺	❹	❸	❷	❶
Call type ➪	Hall Call UP Rear	Hall Call UP Front	Hall Call DOWN Rear	Hall Call DOWN Front			Car Call Rear	Car Call Front
To register calls, turn the address switch ON and press "S"	A8	A7	A6	A5	A4	A3	A2	A1
	Address Switches							

VIEWING CALLS - With the F4 switch in the ON position, the alphanumeric display shows **FLOOR 01** and the Diagnostic Indicators light up with the calls that have been registered. The format for the call indication is shown in Figure 5.5. To advance the floor number press the **N** pushbutton. The Diagnostic Indicator LEDs will show the calls entered at the floor shown in the alphanumeric display. When the top floor number is displayed, pressing N will cause the display to cycle to the bottom floor.

ENTERING CALLS - To enter calls, select the desired floor as described above. Use the A1-A8 switches to select the type of call to enter (see Figure 5.5). For example, set the A1 switch up to register a front car call. Then press and hold the ***S*** pushbutton until the call has been registered. Notes: (1) A call type which does not exist in the system cannot be entered, (2) if this car is part of a group, only car calls can be entered.

5.5 IMC-DIO ONBOARD DIAGNOSTICS

The IMC-DIO board includes two independent processors that monitor the car speed and operation as the car approaches a terminal landing. This board is equipped with its own Onboard Diagnostic tools. The IMC-DIO Onboard Diagnostics have three modes of operation:

- Start-Up operation
- Learn operation
- Normal operation

This section provides a brief description of the diagnostic tools available on the IMC-DIO board. It also gives a description for each of the three modes of operation.

5.5.1 DESCRIPTION OF IMC-DIO INDICATORS AND SWITCHES

Four Digit Alphanumeric Display - This display is located near the upper front portion of the IMC-DIO board (Figure 5.6). It displays the car speed, the prevailing board status, and error messages.

Learn Indicator - This is a single green LED below the alphanumeric display on the IMC-DIO board. When this LED is illuminated, it indicates that the IMC-DIO board is on Learn operation.

Computer on Indicators - There are two red LEDs right above the alphanumeric display. The LED labeled COMP2 ON is for the ETS processor. The LED labeled COMPUTER1 ON is for the safety processor. When these LEDs are ON, the processors are properly executing their programs. If either LED is OFF or is flashing ON and OFF, this indicates a processor malfunction.

Tell-tale Indicators - There are four red LEDs near the LEARN LED. These indicate the status of OLM (Outer Level Marker), the position pulser signals, and the overspeed fault.

Learn Toggle Switch - This toggle switch is located below the red OLM LED on the IMC-DIO board.

Computer Reset Button - This pushbutton is located right below the alphanumeric display. This switch is used to reset both processors on the IMC-DIO board. When this switch is depressed, the COMP2 ON and COMPUTER1 ON LEDs will turn OFF.

5.5.2 STARTUP OPERATION

When the system is turned ON or the COMPUTER RESET button is released, the processor on the IMC-DIO board will go through a 30 second self-test. If the self-test is successfully performed, the alphanumeric display shows the car speed as it runs. If the car is not running, it will indicate a zero speed. If the self-test fails, the alphanumeric display will show an error message. Refer to Section 5.5.4 to identify the problem that has caused the IMC-DIO to fail the self-test.

5.5.3 IMC-DIO LEARN OPERATION

Learn operation is intended only for the purpose of learning the normal terminal slowdown limit switches and ETS limit switches as described in Section 4.10, *Learning the Normal (NTS) and Emergency (ETS) Limit Switches*. Placing the LEARN SWITCH on the IMC-DIO board in the ON position will begin the Learn operation and the green LEARN LED will illuminate. As the IMC-DIO goes through Learn operation, the alphanumeric display will show the following messages:

- LRN IMC-DIO on Learn operation, car not moving
- LRNU Learning in the UP direction
- LRND Learning in the DOWN direction
- LRNW Writing the learned speed values to the EEPROM
- LRNR Verifying the speed values in the EEPROM
- LRNC Learning has been successfully completed
- LRNT On Learn operation for five minutes without completing Learn operation

The IMC-DIO should be removed from Learn operation as soon as the IMC-DIO has learned the proper velocities associated with each switch. In case the LEARN SWITCH is left in the ON position for longer than five minutes, the IMC-DIO will automatically exit Learn operation, and the alphanumeric display will indicate LRNT. If, at this time, the Learn operation is successfully completed, the car will be able to run normally. If the Learn operation is not completed and the EEPROM does not include valid data, the IMC-DIO board will prevent the car from running.

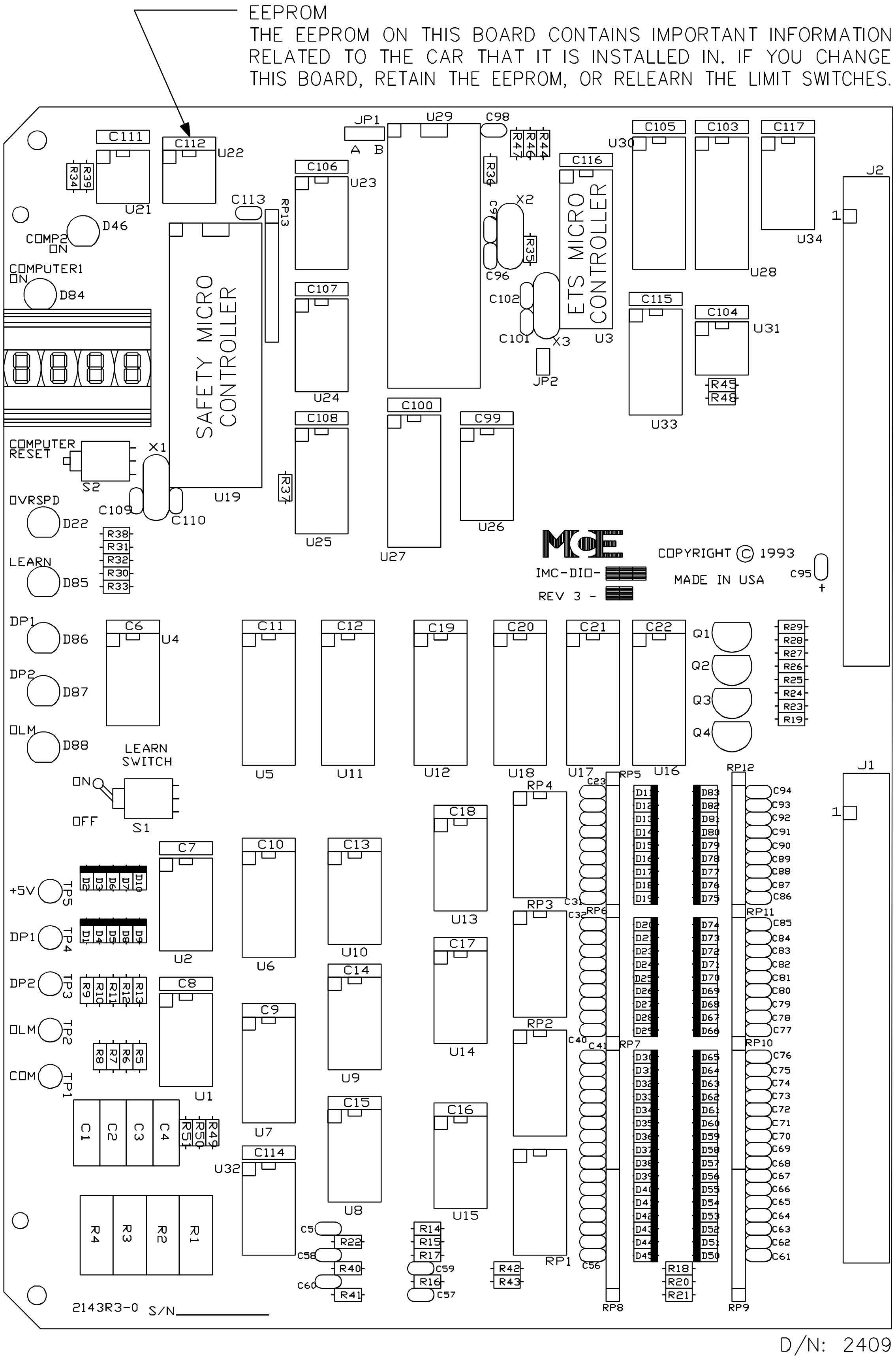
5.5.4 IMC-DIO NORMAL OPERATION

In this mode of operation, the alphanumeric display will constantly show the car speed as it is traveling in the hoistway. If at any time the IMC-DIO encounters any error conditions, the alphanumeric display will show one of the error conditions listed below.

- ERR1 EEPROM error - reset the IMC-DIO board. ✳
- ERR2 Not used
- ERR3 Not used
- ERR4 Not used
- ERR5 EEPROM checksum error - reset the IMC-DIO board. ✳
- ERR6 EEPROM handshake error - reset the IMC-DIO board. ✳
- ERR7 EEPROM write failure - reset the IMC-DIO board. ✳
- ERR8 Memory update error -reset the IMC-DIO board. ✳

✳ If the error is still present after resetting the IMC-DIO board by pressing the Computer Reset button on the IMC-DIO board, relearn the terminal limit switches as described in Section 4.10. If the fault persists the cause may be a faulty EEPROM.

FIGURE 5.6 IMC-DIO Board Layout



SECTION 6
TROUBLESHOOTING

6.0 GENERAL INFORMATION

IMC-AC controllers have features designed to speed up the troubleshooting process. The CONTROL and FAULT flags on the View Hoistway (F3) screen and the messages in the Special Events Calendar Fault Log (F7, 1) provide the most useful information. Often the controller will indicate the nature of the problem in the form of a Special Events Calendar message, the status of CONTROL and FAULT flags on the F3 screen, flashing Computer Swing Panel (MP) Diagnostic Indicators or the DDP Diagnostic Indicators. Table 6.11, *Status and Error Messages*, provides a complete listing of these messages, a description and recommended corrective actions to be taken. Tables 6.6, 6.7, 6.8, 6.9 and 6.10 provide a look-up for the flags and flashing diagnostic indicator messages, with a reference to Table 6.11, Status and Error Messages, for the full description.

The Computer Swing Panel Enhanced Onboard Diagnostics (EOD) and the CRT terminal Diagnostics, described in Section 5, can provide additional troubleshooting information. Troubleshooting often involves determining the status of specific inputs, outputs or computer variable flags. This information is stored in the controller's memory and the status of these memory locations can be viewed using the Computer Swing Panel Diagnostic Indicators, as described in Section 5, the View Hoistway (F3) screen and/or the MP Input/Output (F11, 7) screen.

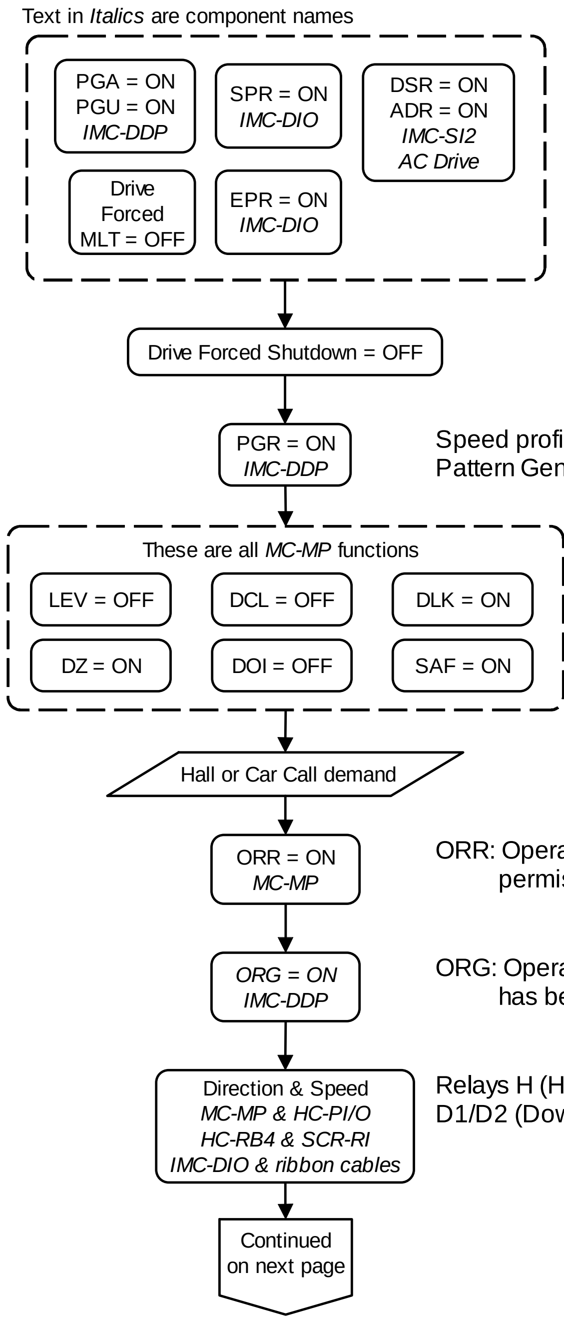
The Troubleshooting section is arranged as follows:

Troubleshooting Topic:	**Go to:**
Normal Operation Flowchart, Brake Control Flowchart and the View Hoistway (F3) screen CONTROL flag descriptions.	Section 6.1
Status and Error Messages table and look-up tables for the F3 screen FAULT flags, MP and DDP Diagnostic Indicator messages.	Section 6.2
How to use the Special Events Calendar and setup for reporting emergency messages to a PC running CMS software.	Section 6.3
Using the Diagnostic Screens	Section 6.4
Troubleshooting Car Operation Control (COC), Door Logic, Call Logic, and Quick References for the HC-PI/O and HC-CI/O boards.	Section 6.5
PC Board Quick References	Section 6.6
Troubleshooting the TORQMAX Drive	Section 6.7
Troubleshooting Using the MLT Data Trap	Section 6.8

6.1 NORMAL OPERATION AND CONTROL FLOWCHARTS

The normal operational flow for the IMC-AC controller is shown in Figure 6.1. Figure 6.2 is the process control flowchart for brake control. The flags mentioned in the flow charts are found on the View Hoistway (F3) screen (Figure 6.3). Tables 6.1 thru 6.5 describe the flags and indicators on the F3 screen, except for the FAULT and CAR OPERATION flags which are listed in Tables 6.6 and 6.7 and described in Table 6.11.

IMC-AC NORMAL OPERATION



Flags on the Graphic Display of Elevator (F3) screen.

ADR: AC Drive Ready
DSR: SI2 Drive Ready
EPR: Emergency Terminal Processor
PGA: Pattern Generator Ready
PGU: Pattern Generator Updated
SPR: Safety Processor Ready

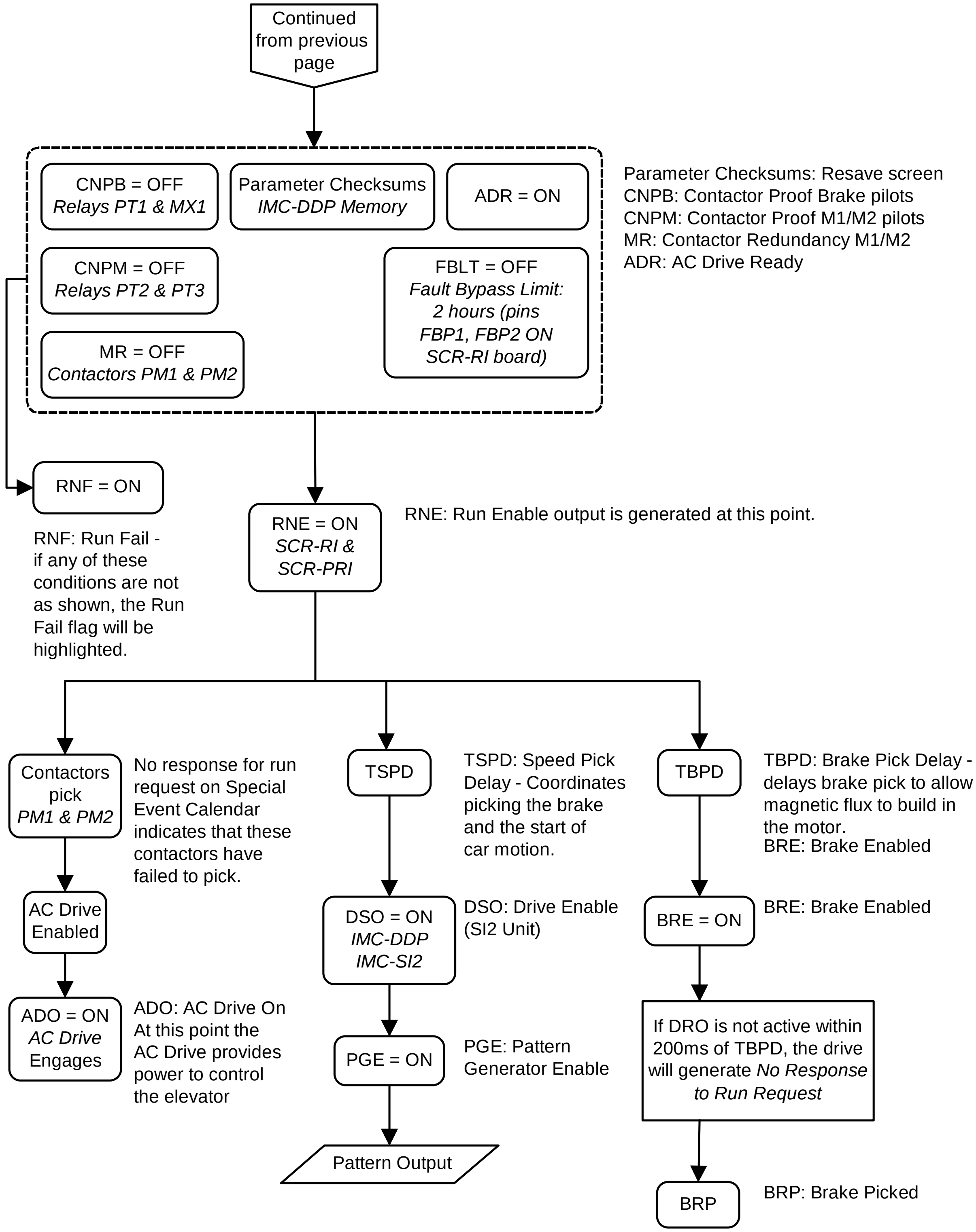
Speed profiles have been calculated and Pattern Generator is Ready (PGR).

<u>MC-MP Functions</u>
LEV: Is the car still Leveling?
DCL: Door Close Limit
DLK: Are the Doors Locked?
DZ: Is the car in Door Zone?
DOI: Door Open Intent - intention of the computer to have the doors open.
SAF: Safety string made up?

ORR: Operational Run Request - the MC-MP is requesting permission, from the IMC-DDP, to run the car.

ORG: Operational Run Granted - Permission to run the car has been granted by the IMC-DDP.

Relays H (High Speed) and U1/U2 (Up) or D1/D2 (Down) on the HC-RB4 board pick.



NOTE: Adjustment of TBPD and TSPD is required to accommodate the delay between enabling the AC Drive and receiving the DRO signal back from the AC Drive. The DRO output signal from the drive is motor dependent and varies from 0.5 to 1.0 seconds from the time the AC Drive is enabled, e.g. TBPD = 0.3 seconds, TSPD = 0.5 seconds.

- *TORQMAX drive:* verify LF.70 = 0.300 or less. Higher values may cause No Response to Run Request fault.

FIGURE 6.2 Brake Control Flowchart

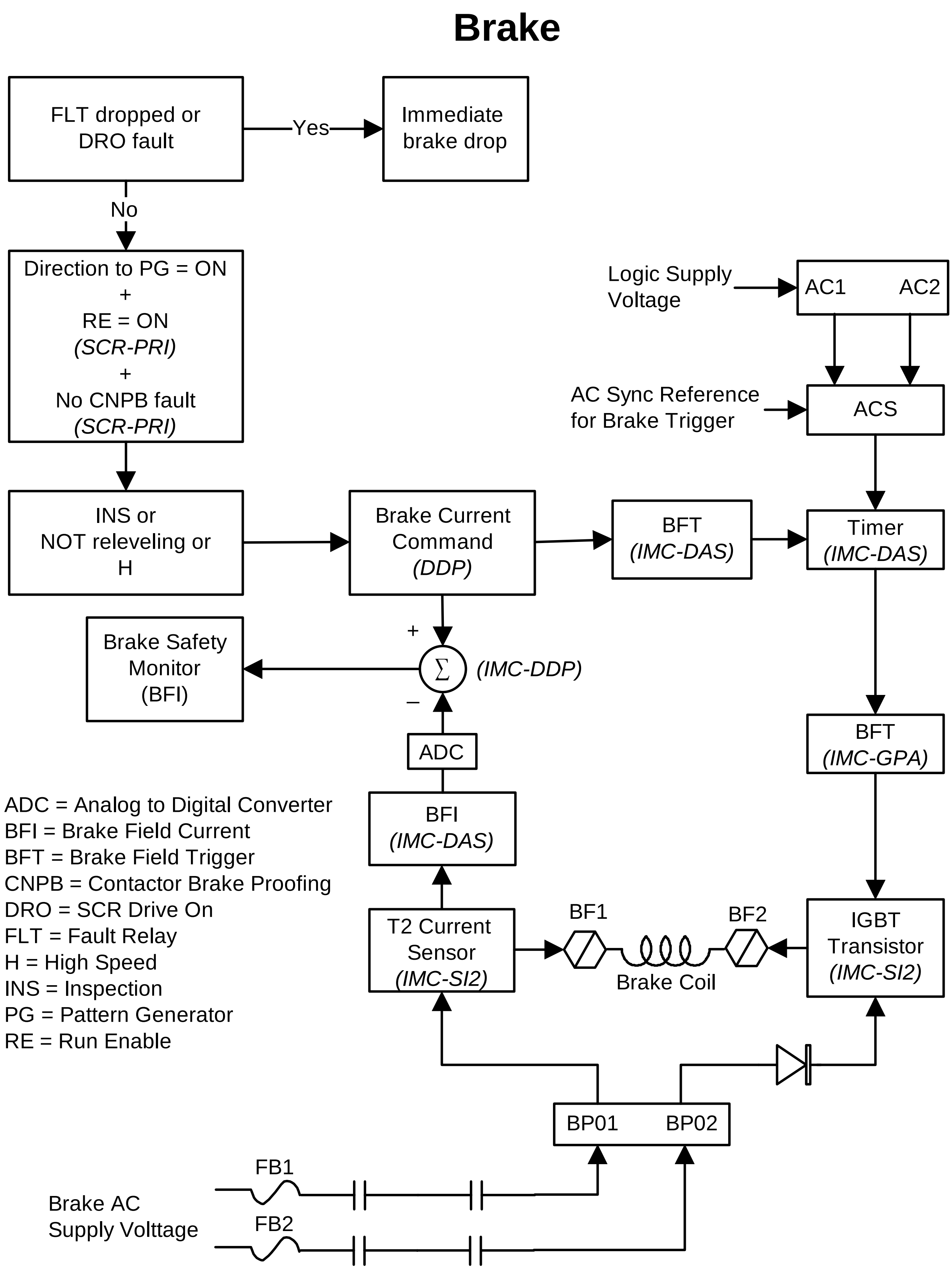


FIGURE 6.3 View Hoistway (F3) Screen

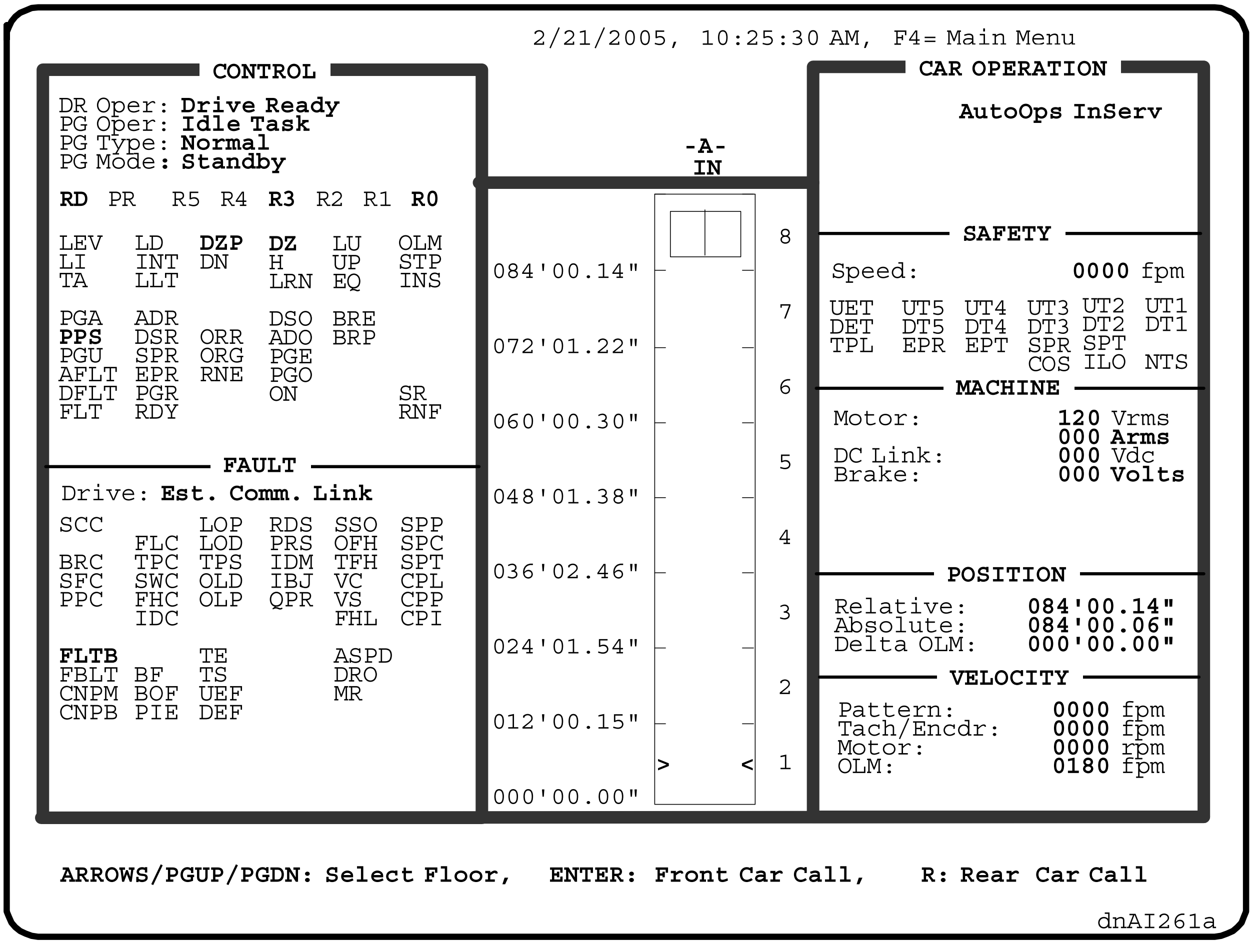


TABLE 6.1 View Hoistway (F3) Screen - CONTROL

OPERATION MODE	
DR Oper:	Indicates the current drive status (IMC-SI2 AC Drive).
PG Oper:	Indicates the name of the currently executing task.
PG Type:	Maximum - elevator will reach contract velocity during the run. Intermediate - elevator will not reach contract velocity during the run. Short - elevator will follow a short floor profile, etc.
PG Mode:	Indicates which phase of the current task is being executed.
CONTROL STATUS FLAGS	
ADO	*(AC Drive On)* - Indicates that the drive is ready for motion to be initiated. This signal must be active for the pattern generator to create a normal run profile.
ADR	*(AC Drive Ready Signal)* - When the ADR flag is highlighted, the AC Drive is ready. If this flag is not highlighted, the system will not run and the Baldor Drive keypad will display a drive fault.
AFLT	*(AC Drive Fault)* - Indicates that a hardware fault in the AC Drive has been detected by the IMC-DDP processor -FLT relay dropped. Check the FAULT section of the F3 screen for a Drive fault message and then refer to the troubleshooting section of the AC drive manual.
BRE	*(Brake Enable)* - This highlighted flag shows that the command has been provided by the IMC-DDP processor to lift the brake. To generate this flag, the drive must have already generated DSR, and RNE.
BRP	*(Brake Picked)* - A highlighted BRP flag reveals that the brake has been lifted. However, this flag is only valid when a brake contact switch is connected to the BCI input on the SCR-RI board. If no connection is made to the BCI input, the BRP flag will be activated whenever the BRE is enabled.
DFLT	*(DDP Fault)* - Indicates that a fault has been detected by the IMC-DDP processor - FLT relay dropped.
DN	*(Down Direction)* - If active, indicates that the IMC-DDP processor has received a request for motion. The H input signal must be active prior to or simultaneous with the activation of the DN signal in order for the pattern generator to execute a normal run profile.
DSO	*(Drive Enabled)* - Indicates that the drive is ready for motion to be initiated. This signal must be active for the pattern generator to create a normal run profile.

TABLE 6.1 View Hoistway (F3) Screen - CONTROL

CONTROL STATUS FLAGS	
DSR	*(Drive Ready)* - Indicates that the IMC-Sxx drive does not have any pending fault conditions. This signal must be active for the pattern generator to create a normal run profile.
DZ	*(Door Zone)* - If active, indicates that the elevator is level with the floor or within 3" [76 mm] of the floor.
DZP	*(Floor Level)* - If active, indicates that the elevator is level with a floor. Without DZP, the PGU status signal never activates.
EPR	(ETS Processor Ready) - Indicates that the ETS processor is ready.
FLT	*(System FLT output status)* - Indicates that the fault relay has been dropped. If AFLT or DFLT are active, and the FLT relay is not picked, check the FLT triac on the SCR-RI board.
EQ	*(Pattern Generator Earthquake)* - If active, indicates that the pattern generator has received an earthquake input signal. This signal is required by the pattern generator to execute an earthquake run profile.
H	*(High Speed)* - If active, indicates that the IMC-DDP processor should execute a normal run profile with the activation of the UP or DN signal.
INS	*(Pattern Generator Inspection)* - If active, indicates that the pattern generator has received an inspection input signal. This signal is required by the pattern generator to execute an inspection run profile.
INT	*(Intermediate Speed)* - If active, indicates that the MP processor should not drop direction. This signal, along with the LI signal, is the only IMC-DDP-C processor signal that prevents the MC-MP-1ES processor from dropping direction after the H signal is deactivated. The signal is user programmable via the MINT parameter under the Pattern (Shift F4) screen. Problems may arise if the MINT parameter is set to a velocity greater than the earthquake velocity (EQ).
LD	*(Level Down)* - If active, indicates that the LD sensor is on the DZ magnet (or vane) and that the elevator is above (within 6" [152 mm] for LS-QUAD-2 or 12" [305 mm] for LS-QUIK-1) the floor.
LEV	*(Leveling)* - If active, indicates that the LU or LD sensor is on the DZ magnet (or vane) and that the elevator is not level with the floor. Under normal circumstances, the LU or LD signal will generate a relevel into the floor. Under normal operation, a relevel may be the result of a narrow Dead Zone or poor adjustment of the pattern /drive parameters.
LI	*(Level Inhibit)* - If active, indicates that the MC-MP-1ES processor will not drop direction. This signal, along with the INT signal, are the only IMC-DDP-C processor signals that prevent the MC-MP-1ES processor from dropping direction after the H (High speed) signal is deactivated. The signal is user programmable via the MLI parameter on the Pattern (Shift F4) screen. This programmed distance is enforced by the program unless an unusual circumstance arises (i.e. the IMC-DDP-C processor loses the quadrature signal, a request to stop is issued, etc.). In addition, if the MLI parameter is set to a distance that is too large, the elevator may stop one floor short of the desired destination floor if the preceding floor is a short floor.
LLT	*(Leveling Limit Timer Warning)* - If active, indicates that the elevator is traveling at leveling speed for too long. In response, the pattern generator creates a correction run profile to the next floor. This warning is usually in response to other abnormal conditions. LLT usually activates after 10 seconds of leveling.
LRN	*(Pattern Generator Learn)* - If active, indicates that the pattern generator is on Learn operation. This signal is required by the pattern generator to execute a learn run profile and to learn the building floor heights.
LU	*(Level Up)* - If active, indicates that the LU sensor is on the DZ magnet (or vane) and that the elevator is below (within 6" [152 mm] LS-QUAD-2 or 12" [305 mm] for LS-QUIK-1) the floor.
OLM	*(Outer Level Marker)* - If active, indicates that the elevator is within 12" [305 mm] of a floor. The signal is used to determine whether there is a problem with the quadrature pulser signals by comparing the traveled distance with a value determined from the learned floor heights. The difference between these two calculations, represented by Delta OLM in the Position window on the F3 screen, should be less than 0.75" on any run.
ON	*(System On)* - If active, indicates that PGO, DSO and SDO are active.
ORG	*(Pattern Generator Run Granted)* - Indicates that the pattern generator has suspended all other tasks and is waiting for the Main Processor to generate all signals to initiate a normal run profile. This signal must be active for the pattern generator to create a normal run profile. This status signal will be deactivated if the PGR and/or ORR status signal is not active. No other profile requires this signal to be active.
ORR	*(Main Processor Run Request)* - Indicates that the Main Processor is requesting the pattern generator to ready itself to generate a normal run profile. This signal must be active for the pattern generator to create a normal run profile. No other profile requires this signal to be active.
PGA	*(PG Active)* - If inactive, indicates a shutdown command from the drive. A shutdown command is the result of another fault displayed on the F3 screen or Special Events Calendar. A UEF of DEF fault was generated.
PGE	*(PG Enable)* - If active, indicates a pattern enable signal from the drive. PGE is delayed by SPD time from ADO.
PGO	*(Pattern Generator On)* - Indicates that the pattern generator is generating a profile. This signal must be active for the pattern generator to create a normal run profile. This status signal will be deactivated if the DSO status signal is not active.
PGR	*(Pattern Generator Ready)* - Indicates that the pattern generator is ready to execute a normal run profile when requested. This signal must be active for the pattern generator to create a normal run profile. No other profile requires this signal to be active. This status signal will be deactivated if the PGU, DSR, EPR, PGA, and/or SPR status signals are not active. In addition, the IBJ + IDM + PPS fault flag will also deactivate the status signal.
PGU	*(Pattern Generator Updated)* - Indicates that the pattern generator has calculated all the pattern profiles from the current floor. This is the first in a chain of status signals that must be active for the pattern generator to create a normal run profile. The following faults will deactivate this status signal: FHC, IDC, SWC, FLC, PPC, SFC, BRC, SCC, TPC, RDS, PRS, SSO, OFH, TFH, VC, VS, and FHL plus the following states: DZ = OFF, DZP = OFF, LEV = ON, RD = OFF, INS = ON, UP = ON, DN = ON, ENCODER > 15 fpm.
PPS	*(Pattern Profile Setup Warning)* - If active, indicates that the pattern profile must be regenerated before a normal run profile will be executed. If PPS is active, PGU will be deactivated. PPS is generated when the elevator takes off from a floor via a normal run profile; however, the flag should be deactivated when the elevator stops at a floor.

TABLE 6.1 View Hoistway (F3) Screen - CONTROL

CONTROL STATUS FLAGS	
PR	*(Parity)* - Used to validate the floor code at each landing. Since even parity is used, an odd number of binary floor code signals (R0 through R5) will be active if PR is active. If this signal is inactive, the elevator is not level with the floor, the floor code requires the PR signal to be inactive (an even number of binary floor code signals are active), or the PR magnet has fallen off of the perforated steel tape (or VS-1L failure on LS-QUIK-1).
R(x)	*(Binary Floor Code)* - Determines the binary floor code for each floor. A comparison of the actual physical location of the elevator and the binary floor code generated for the floor will determine if one of the Rx signals is in error. Please note that the binary floor code is referenced only to the floors that the elevator can service. In addition, the code starts with a value of one (bottom floor code = R0 + PR).
RD	*(Read)* - If active, indicates that a valid floor code can be read. If the signal is inactive, the elevator is not at a floor, the dead zone of the landing system is too wide, the dead zone of the landing system is not symmetrical around the DZ sensor, or the DZ magnet has fallen off of the perforated steel tape (LS-QUAD) or a VS-1L sensor failure (LS-QUIK-1).
RDY	**(***System Ready)* - If active, indicates PGR, SPR, DSR and EPR are active.
RNE	*(Run Enable)* - This is highlighted after receiving the direction command and a successful verification of the contactor proof inputs (CNPB and CNPM). This flag shows that the potential (PT) relays are working properly, no drive parameter checksum errors, and the input voltages for the brake coil are at full strength.
RNF	*(Run Fail)* - A highlighted RNF flag shows that the contactor proof inputs (CNPB and CNPM) or PM1/PM2 contactor has failed and the car will not be allowed to make a normal run. Failure of the CNPB or CNPM inputs may be caused by malfunctioning PT relays (PT1-PT3) or RE relay on the SCR-PRI board; or bad brake fuses (FB1, and FB2). Check fuse FMC for PM1/PM2 contactor failure. Check the PM1/PM2 contactors in the controller.
SPR	*(Safety Processor Ready)* - Indicates that the safety processor is ready. This signal must be active for the pattern generator to create a normal run profile.
SR	*(Short Run)* - Parameters have been entered that will require use of the Short Run profile for a one-floor run between landings for, at least, the shortest floor height in the building.
STP	*(Step)* - If active, indicates that the pattern generator is at a point along the normal run profile where a determination has to be made to begin a deceleration to a floor or to continue to another floor. In order to stop at the correct floor, the H signal must deactivate before the STP signal deactivates. If this does not occur, the pattern generator will travel to at least the next available floor. For example, in order to generate a three floor run, the H signal should not deactivate until the third STP signal was generated.
TA	*(Tach Active*) - If active, indicates non-zero speed output voltage. If the car is stopped, this signal indicates noise on the speed output signal or incorrect BIP offset adjustment on the IMC-DAS board. The TA flag is active when the Encoder velocity on the F3 screen exceeds 15 fpm. When the car is stopped the Encoder value on the F3 screen should be less than 3 fpm.
UP	*(Up Direction)* - If active, indicates that the IMC-DDP-C processor has received a request for motion. The H input signal must be active prior to or simultaneous with the activation of the UP signal in order for the pattern generator to execute a normal run profile

TABLE 6.2 View Hoistway (F3) Screen - SAFETY

Speed:	Under Normal operation, displays the current car velocity. This velocity is the same as displayed on the alphanumeric display on the IMC-DIO board. When a fault condition is detected, however, a code representing the fault and the velocity at which the fault occurred is displayed.
UET	**Up Emergency Terminal Switch** - When highlighted, indicates that the emergency terminal switch contact is closed. The switch opens as the car approaches the top terminal landing.
UT(x)	**Up Terminal Switch x** - When highlighted, indicates that the normal terminal switch contact is closed. The switch opens as the car approaches the top terminal landing.
DET	**Down Emergency Terminal Switch** - When highlighted, indicates that the emergency terminal switch contact is closed. The switch opens as the car approaches the bottom terminal landing.
DT(x)	**Down Terminal Switch x** - When highlighted, indicates that the normal emergency terminal switch contact is closed. The switch opens as the car approaches the bottom terminal landing.
TPL	**Terminal Processor Learn** - When highlighted, indicates that the Learn Switch on the IMC-DIO board is in the ON position.
EPR	**Emergency Processor Ready** - When highlighted, indicates that the emergency processor is ready for normal operation. For this to occur, the processor must have learned the emergency terminal switches correctly.
EPT	**Emergency Processor Tripped** - When highlighted, indicates that the emergency processor (UETS / DETS) has detected an over-speed condition.
SPR	**Safety Processor Ready** - When highlighted, indicates that the safety processor is ready for normal operation. For this to occur, the processor must have learned the normal emergency terminal switches correctly and must be receiving the correct job identification code from the IMC-DDP-C processor.

TABLE 6.2 View Hoistway (F3) Screen - SAFETY

SPT	**Safety Processor Tripped** - When highlighted, indicates that the safety processor has detected an overspeed condition. The overspeed condition can be LOS, ILO, or NTS. See description below.
COS	**Contract Overspeed**
ILO	**Inspection/Leveling Overspeed**
NTS	**Normal Terminal Switch** - When highlighted, indicates that the car velocity exceeded a learned normal terminal switch velocity as the elevator was approaching a terminal landing.

TABLE 6.3 View Hoistway (F3) Screen - MACHINE

Motor :	AC motor voltage - VRMS AC motor current - ARMS
DC Link:	DC bus voltage in the AC Drive.
Brake:	Displays the brake coil voltage. The voltage is calculated from the current in the brake coil and the brake coil resistance provided on the Brake Parameters screen. Its accuracy is dependent upon the proper calibration of CBV on the Brake (Shift F3) screen.

TABLE 6.4 View Hoistway (F3) Screen - POSITION

Relative:	Reflects the total distance traveled to reach the destination floor from the starting floor. This value is always positive and should reflect the difference in height between the two floors. The difference based upon the learned floor heights should correlate with this value. This count value is stored with the drop of direction; the elevator will continue to travel a bit further before it comes to a complete stop.
Absolute:	Reflects the position of the elevator as referenced from the bottom landing. When the elevator comes to a complete stop, and the floor code of the destination floor is determined, the absolute distance displayed will be obtained from the learned floor heights. This is done to eliminate the accumulation of count errors as the elevator travels within the hoistway. Please note that the initial distance displayed upon power-up may be invalid if the elevator is not at a floor. Once the car moves to a floor, the correct value for the distance will be displayed. This value increases as the elevator travels up and decreases when the car travels down. If this is not the case, the quadrature pulser signals (95 and 96 on the SCR-RI board) may be reversed.
Delta OLM:	Reflects the error in distance between actual and learned floor distance obtained from the quadrature pulser signals when the OLM signal is activated at a destination floor. If the value is positive, the pattern generator believed the car was further away from the destination floor than it really was. If the value is negative, it thought the floor was closer. Since the OLM signal occurs 1 ft. (305 mm) away from a floor, the pattern generator is given the opportunity to modify the profile, if possible, in order to stop correctly at the destination floor.

TABLE 6.5 View Hoistway (F3) Screen - VELOCITY

Pattern:	Reflects the commanded velocity based on user parameters and the floor height distance between the start and destination floor.
Encoder:	Reflects the actual elevator velocity. Its accuracy is dependent upon proper calibration of GTC on the Pattern (Shift F4) screen. Note: Adjusting the value of the GTC parameter does not change the actual car speed. It is only used to calibrate the Encoder value which is displayed on the F3 screen and used to generate the Tach Error Fault.
Motor:	Reflects the actual hoist motor rpm.
OLM:	Reflects the actual elevator velocity when it is 1 ft. (305 mm) away from the destination floor. Again, its accuracy is dependent upon proper calibration. The correlation between elevator velocity and tachometer voltage, as entered by the adjuster, must be correct for proper display.

6.2 STATUS AND ERROR MESSAGES

There are six locations where status and error messages are reported. They are:

- The View Hoistway (F3) screen (Section 6.2.1)
- The Special Events Calendar Fault Log (Section 6.2.2)
- The Computer Swing Panel Status Indicators (Section 6.2.3)
- The Computer Swing Panel (MC-MP-1ES) Diagnostic Indicators (Section 6.2.3)
- The Computer Swing Panel DDP Diagnostic Indicators (Section 6.2.3)
- The Computer Swing Panel (MC-MP2) Alphanumeric Display (Section 6.2.4)

6.2.1 VIEW HOISTWAY (F3) SCREEN FAULT FLAGS

The View Hoistway (F3) screen provides a wealth of information about the status of the IMC -AC controller. Most of the flags and indicators on this screen are described in Section 6.1. The flags in the FAULT and CAR OPERATION sections of the F3 screen (see Figure 6.3) are listed in Tables 6.6 and 6.7 and a description and recommend troubleshooting actions can be found in Table 6.11, *Status and Error Messages*.

NOTE: Table 6.11, *Status and Error Messages*, provides a description of the fault flags shown in the FAULT and CAR OPERATION sections of the View Hoistway (F3) screen, including recommended troubleshooting actions to be taken. Refer to Table 6.6, *View Hoistway (F3) Screen - FAULT* and Table 6.7, *View Hoistway (F3) Screen - CAR OPERATION* to find the desired flag, then look for the fault message by name in Table 6.11.

TABLE 6.6 View Hoistway (F3) Screen - FAULT

Flag	Special Event Message	Flag	Special Event Message
ASPD	At Speed Fault	**OLD**	Excessive Position Error at OLM
BF	Brake Failure	**OLP**	Position Error at OLM
BOF	Brake Output Circuit Failure	**PIE**	Power Supply Fault
BRC	Checksum Error - Brake	**PPC**	Checksum Error - Pattern
CNPB	MX and PT1 Redundancy Failure	**PRS**	Parity Sensor Error (Floor Code)
CNPM	PT2 and PT3 Redundancy Failure	**QPR**	Quad Feedback Reversed
CPI	Communication Processor Identification Error	**RDS**	Read Sensor Error (Floor Code)
CPL	Communication Processor Looping Error	**SCC**	Checksum Error - System Configuration
CPP	Communication Processor Protocol Error	**SFC**	Checksum Error - Safety
DEF	Velocity Error at DETS	**SPC**	Safety Processor Communication Error
DRO	No Response for Run Request	**SPP**	Safety Processor Protocol Error
FBLT	Fault Bypass Timeout	**SPT**	Safety Processor Tripped
FHC	Checksum Error - Floor Height	**SSO**	Step Signal Overlap Error
FHL	Floor Height Learn Error	**SWC**	Checksum Error - Switches
FLC	Checksum Error - Filter	**TE**	Tach/Encoder Error
FLTB	Fault Bypass	**TFH**	Two Floor Height Error
IBJ	Learn Bypass Fault	**TPC**	Checksum Error - Test Point
IDC	Checksum Error - Identification	**TPS**	Position Error at DNTx or Position Error at UNTx
IDM	Identification Mismatch	**TS**	Tach Feedback Saturation
LOD	Loss of Direction	**UEF**	Velocity Error at UETS
LOP	Loss of Position Feedback	**VC**	Contract Velocity Error
MR	M Contactor Redundancy Failure	**VS**	Short Velocity Error
OFH	One Floor Height Error		

TABLE 6.7 View Hoistway (F3) Screen - CAR OPERATION

The flags appear only when the car condition exists.			
AlmNoDZ	Alarm - No Door Zone	**IndSrv**	Independent Service
AlmNoMv	Alarm - No Car Movement	**InServ**	In Service
AltFir1	Fire Service Alternate	**InspAcc**	Inspection
AntiNui	Anti-Nuisance Operation	**MLT**	MLT - Timer Expired
AttnSrv	Attendant Service Operation	**MnFire1**	Fire Service Main
AutoOps	Automatic Operation	**Nudging**	Nudging
BflrDem	Bottom Floor Demand	**OutServ**	Out of Service
Byp-HLW	Hall Call Bypass Operation	**SftyOpn**	Car Safety Device Open
EmrgPwr	Emergency Power	**SwngOpr**	Swing Car Operation
Eqactv	Earthquake	**TflrDem**	Top Floor Demand
FirePh2	Fire Service Phase 2	**TOS**	Timed Out of Service
HospEmr	Hospital Service		

6.2.2 SPECIAL EVENTS CALENDAR FAULT LOG

The Special Events Calendar can document the most recent 250 important fault conditions or events and display them in chronological order. Displayed data includes the type of event or fault, date and time the fault/event occurred, date and time the fault/event was corrected, as well as other information about the status of the elevator when the fault or event occurred. The event list may be printed from the Special Events Calendar Menu by pressing 8.

The Special Events Calendar is accessed from the Special Events Calendar Menu (F7) screen by pressing **1** or **F7**.

FIGURE 6.4 Special Events Calendar (F7 - 1) screen

```
                                    9/26/2000, 10:25:30 AM,   F4=Main Menu

                         Special Events Calendar (F7, F7)
STATUS                   SPEED (ft/Mmin)   VOLTAGE (volts)   CURRENT (amps)
Direction   : N/A        Command  : N/A    Armature : N/A    Armature : N/A
High Speed  : N/A        Tach/Enc : N/A    Motor Fld: N/A    Command  : N/A
Start Floor : N/A        Terminal : N/A    Brake    : N/A
Stop Floor  : N/A        Safety   : N/A
Step Floor  : N/A        Pattern  : N/A    SENSOR (volts)    POSITION (ft)
Switch      : N/A                          Motor Fld: N/A    Absolute : N/A
PI          : 7                            Brake    : N/A
Event Code  : 0x12 ( Operation, Communication )
This event indicates that all the system processors were reset.

DATE            TIME            DESCRIPTION
2/14/2000       10:05:28 AM     Sub-System (s) Reset
2/15/2000       10:07:37 AM     In Car Stop Switch
                2:36:18 PM      Position Error at DNT1
2/16/2000       2:36:20 PM      Brake Output Circuit Failure
                4:26:44 AM      Lost Door Lock During Run

   ARROWS: Move Cursor, HOME: Oldest, END: Newest, CTRL-T: Troubleshoot
                                                                 dnID208b
```

View Fault Log (F7, 1 or F7) - From the Special Events Calendar Menu (F7) screen press **1** or **F7** to display the events logged to the Special Events Calendar (Figure 6.4). This screen makes it possible to examine the documented faults and events. The latest 14 faults and events are displayed in the bottom half of the screen, including the date and time the event occurred.

When this screen is first displayed, the most recent event is displayed at the bottom of the screen. Use the **Up / Down Arrow** keys to scroll one event at a time, the **Page Up / Page Down** keys to scroll a page at a time, or the ***Home / End*** key to scroll to event 1 or 250.

As each event is selected (reverse video), the description of the event and any other logged data is displayed in the top half of the screen. Additional troubleshooting information for each event can be displayed by pressing **Ctrl + T**.

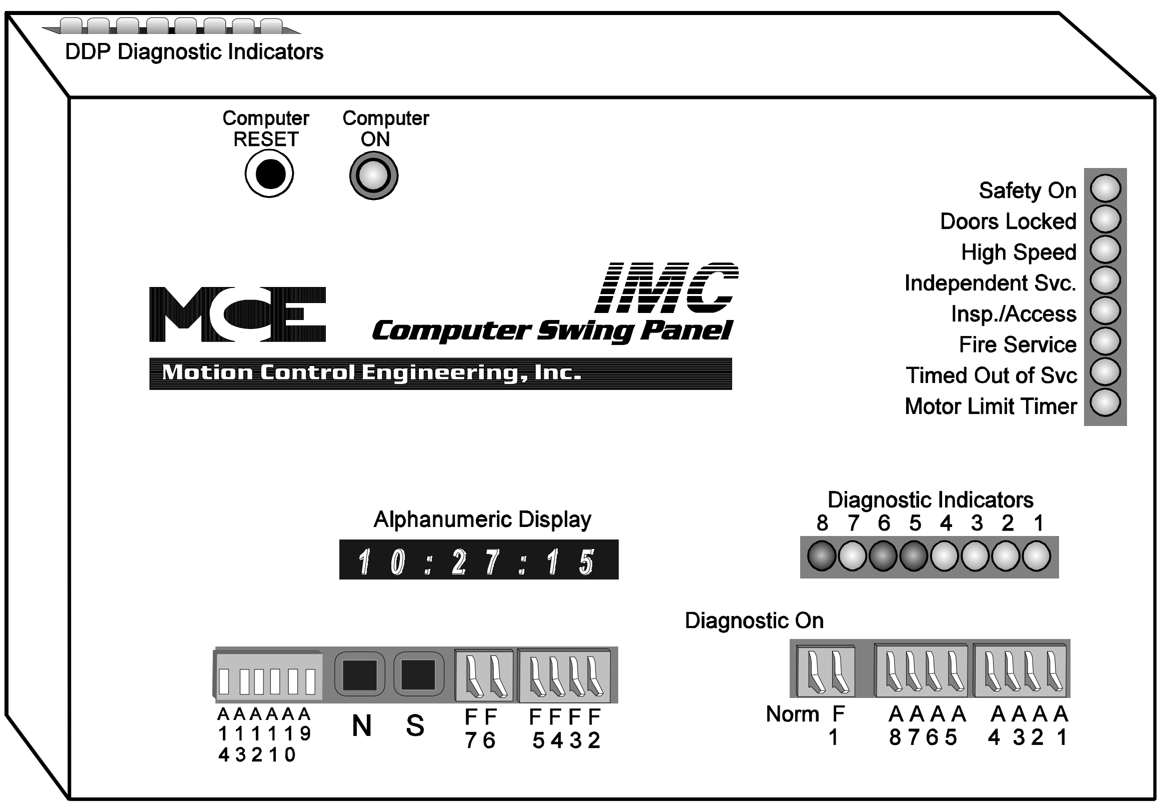
> **NOTE:** Table 6.11, *Status and Error Messages*, lists all of the events which can be recorded in the Special Events Calendar Fault Log, with a description of the event and the recommended troubleshooting actions to be taken.

Clear Fault Log (F7, 2) - While in the Special Event Calendar Menu (F7) screen is displayed, if the **2** key is pressed, the message `Delete All Events? (Y/N)` is displayed. Press **Y** to clear the Special Events Calendar Fault Log of all events.

6.2.3 COMPUTER SWING PANEL STATUS AND DIAGNOSTIC INDICATORS

The Computer Swing Panel has three sets of eight indicators that can provide status and error information (Figure 6.5). The Status Indicators (vertical row or eight LEDs) provide information on the current status of the controller.

FIGURE 6.5 Computer Swing Panel, Front View



MC-MP-1ES DIAGNOSTIC INDICATORS - (horizontal row of eight LEDs). During normal operation these LEDs scan from right to left (indicating that the MP program is looping properly) or flash ON and OFF to indicate a status or error condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

The MC-MP-1ES Diagnostic Indicators flash when a status or error condition exists. If your controller has the MC-MP-1ES Main Processor, refer to Tables 6.8, MC-MP-1ES Status and Error Messages, to find the message being flashed on the Diagnostic Indicators. Then look for the message by name in Table 6.11, *Status and Error Messages*.

TABLE 6.8 MC-MP-1ES Status and Error Messages **❍ = LED off ● = LED blinking**

Hex	Diagnostic Indicators	Mode	Status / Error Message
	Single LED scanning	Normal	Normal Operation - no errors or messages
01	❍ ❍ ❍ ❍ ❍ ❍ ❍ ●	Normal	Earthquake Normal Operation
02	❍ ❍ ❍ ❍ ❍ ❍ ● ❍	Normal	Earthquake Power Up Operation
03	❍ ❍ ❍ ❍ ❍ ❍ ● ●	Normal	Attendant Service Operation
07	❍ ❍ ❍ ❍ ❍ ● ● ●	Normal	The Hall Call Bus Fuse Blown
0F	❍ ❍ ❍ ❍ ● ● ● ●	Normal	The Car Call Bus Fuse Blown
11	❍ ❍ ❍ ● ❍ ❍ ❍ ●	Normal	Governor Switch Open
12	❍ ❍ ❍ ● ❍ ❍ ● ❍	Normal	Drive Temperature Sensor Fault
13	❍ ❍ ❍ ● ❍ ❍ ● ●	Learn	Car Not at Bottom Landing (setup error)
14	❍ ❍ ❍ ● ❍ ● ❍ ❍	Learn	Car Not On Level Up (setup error)
15	❍ ❍ ❍ ● ❍ ● ❍ ●	Learn	Car Not On Inspection (setup error)
16	❍ ❍ ❍ ● ❍ ● ● ❍	Learn	Car Not Below Door Zone (setup error)
17	❍ ❍ ❍ ● ❍ ● ● ●	Learn	Level Down On (setup error)
18	❍ ❍ ❍ ● ● ❍ ❍ ❍	Normal	Photo Eye Failure (Front) or Photo Eye Failure (Rear)
1F	❍ ❍ ❍ ● ● ● ● ●	Normal	Timed Out of Service
20	❍ ❍ ● ❍ ❍ ❍ ❍ ❍	Learn	Loss of IN During Learn (setup error)
22	❍ ❍ ● ❍ ❍ ❍ ● ❍	Learn	No Response from Pattern Generator (setup error)
22	❍ ❍ ● ❍ ❍ ❍ ● ❍	Normal	Hoistway Safety Device Open
23	❍ ❍ ● ❍ ❍ ❍ ● ●	Learn	PG Error, Loss of UP Direction (setup error)
24	❍ ❍ ● ❍ ❍ ● ❍ ❍	Normal	Car is Overloaded
29	❍ ❍ ● ❍ ● ❍ ❍ ●	Learn	Both Leveling Switches are ON (setup error)
32	❍ ❍ ● ● ❍ ❍ ● ❍	Normal	Drive Fault 1: Excessive Heat in SMB Unit or System 12
33	❍ ❍ ● ● ❍ ❍ ● ●	Normal	Brake Pick Failure
3C	❍ ❍ ● ● ● ● ❍ ❍	Normal	Level Down
3F	❍ ❍ ● ● ● ● ● ●	Normal	Door Open and Locked
42	❍ ● ❍ ❍ ❍ ❍ ● ❍	Normal	Pattern Generator Not Ready
44	❍ ● ❍ ❍ ❍ ● ❍ ❍	Normal	Car Safety Device Open
66	❍ ● ● ❍ ❍ ● ● ❍	Normal	Check Alphanumeric Display for scrolling message - see Section 6.2.4
71	❍ ● ● ● ❍ ❍ ❍ ●	Normal	Test Mode Operation
72	❍ ● ● ● ❍ ❍ ● ❍	Normal	Drive Fault 2 (in Table 6.10 see: Loss of Position Feedback, Parity Sensor Failure (Floor Code), Read Sensor Failure (Floor Code), Pattern Door Zone Failure, Position Error at DETS, Position Error at DNTx, Position Error at UETS or Position Error at UNTx)
73	❍ ● ● ● ❍ ❍ ● ●	Normal	Pre-test Mode
7E	❍ ● ● ● ● ● ● ❍	Normal	Security
7F	❍ ● ● ● ● ● ● ●	Normal	Independent Service
80	● ❍ ❍ ❍ ❍ ❍ ❍ ❍	Normal	Inspection

TABLE 6.8 MC-MP-1ES Status and Error Messages ❍ = LED off ● = LED blinking

Hex	Diagnostic Indicators	Mode	Status / Error Message
82	●❍❍❍❍❍●❍	Normal	Door Lock Contact Failure
83	●❍❍❍❍❍●●	Normal	Door Open Limit Failure
84	●❍❍❍❍●❍❍	Normal	Gate Switch Failure
85	●❍❍❍❍●❍●	Normal	Gate Switch Relay Redundancy Failure
86	●❍❍❍❍●●❍	Normal	Door Lock Relay Redundancy Failure
88	●❍❍❍●❍❍❍	Normal	In-car stop Switch
C0	●●❍❍❍❍❍❍	Normal	Fire Service Phase 2
C1	●●❍❍❍❍❍●	Normal	Door Lock Failure
C2	●●❍❍❍❍●❍	Normal	Door Close Protection
C3	●●❍❍❍❍●●	Normal	Level Up
C4	●●❍❍❍●❍❍	Normal	Doors Locked but not fully Closed - Front
C5	●●❍❍❍●❍●	Normal	Doors Locked but not fully Closed - Rear
C9	●●❍❍●❍❍●	Normal	Leveling Sensor Redundancy Failure
CA	●●❍❍●❍●❍	Normal	Landing System Redundancy Failure
CB	●●❍❍●❍●●	Normal	Contactor Proofing Redundancy Failure
CC	●●❍❍●●❍❍	Normal	Direction Relay Redundancy Failure
CD	●●❍❍●●❍●	Normal	Inspection/Leveling Overspeed
CF	●●❍❍●●●●	Normal	Elevator Shutdown
DB	●●❍●●❍●●	Normal	Bottom Floor Demand or Top Floor Demand.
E0	●●●❍❍❍❍❍	Normal	Fire Service Main
E1	●●●❍❍❍❍●	Normal	Emergency Power
E2	●●●❍❍❍●❍	Normal	MG Shutdown Operation/Shutdown Switch
E3	●●●❍❍❍●●	Normal	Car to Lobby
E4	●●●❍❍●❍❍	Normal	Priority/VIP Service Phase 1
E5	●●●❍❍●❍●	Normal	Priority/VIP Service Phase 2
E7	●●●❍❍●●●	Normal	Heavy Load
E8	●●●❍●❍❍❍	Normal	Light Load
E9	●●●❍●❍❍●	Normal	Aux. Inspection Access Fault
EA	●●●❍●❍●❍	Normal	2nd Landing Aux. Access Fault
EB	●●●❍●❍●●	Normal	Bottom Landing Aux. Access Fault
EC	●●●❍●●❍❍	Normal	DPM Redundancy Fault
ED	●●●❍●●❍❍	Normal	DPMR Redundancy Fault
F0	●●●●❍❍❍❍	Normal	Fire Service Alternate
F1	●●●●❍❍❍●	Normal	Hospital Service
F2	●●●●❍❍●❍	Normal	Hospital Service Phase 2
F3	●●●●❍❍●●	Normal	Door Zone Sensor Failure (active state)
F4	●●●●❍●❍❍	Normal	Leveling Sensor Failure (active state)
F5	●●●●❍●❍●	Normal	Leveling Sensor Failure (inactive state)
F7	●●●●❍●●●	Normal	Emergency Power Shutdown
F8	●●●●●❍❍❍	Normal	Motor Limit Timer (in Table 6.10 see: MLT - Excessive PI Correction, MLT - Excessive Releveling at Floor, MLT - Motor Limit Timer (LI), MLT - Motor Limit timer (INT) or MLT - Timer Expired)
F9	●●●●●❍❍●	Normal	MLT - Drive Forced
FC	●●●●●●❍❍	Normal	Earthquake
FD	●●●●●●❍●	Normal	MLT - Failed to Leave Floor
FE	●●●●●●●❍	Normal	Both USD and DSD are Open
FF	●●●●●●●●	Normal	Safety Relay Circuit Open

IMC-DDP DIAGNOSTIC INDICATORS - located on the top of the Computer Swing Panel. In Normal Mode these indicators scan from right to left (indicating that the DDP program is looping properly) or flash ON and OFF to indicate a status or error condition. When troubleshooting, pay special attention to these indicators, as they will often point to the source of the problem. Refer to Table 6.9, IMC-DDP Status and Error Messages, to find the message being flashed on the DDP Diagnostic Indicators. Then look for the message by name in Table 6.11, *Status and Error Messages*.

TABLE 6.9 IMC-DDP Status and Error Messages **❍ = LED off ● = LED blinking**

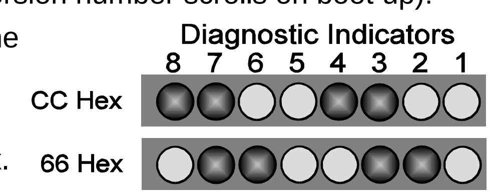
Hex	Diagnostic Indicators	Status / Error Message
	Single LED scanning	Normal Operation - no errors or messages
01	❍❍❍❍❍❍❍●	Loss of Position Feedback
03	❍❍❍❍❍❍●●	Position Error at DETS, Position Error at DNTx, Position Error at UETS, or Position Error at UNTx
0E	❍❍❍❍●●●❍	Communication Processor Looping Error
1F	❍❍❍●●●●●	Learn Run
24	❍❍●❍❍●❍❍	Drive Not Ready
3F	❍❍●●●●●●	Inspection Run
42	❍●❍❍❍❍●❍	Pattern Generator Not Ready
7E	❍●●●●●●❍	Identification Mismatch
80	●❍❍❍❍❍❍❍	Read Sensor Failure (Floor Code)
99	●❍❍●●❍❍●	Fault Relay
C0	●●❍❍❍❍❍❍	Contract Velocity Error, Short Velocity Error, One Floor Height Error, Two Floor Height Error, Step Signal Overlap Error, Safety Processor Tripped, Parity Sensor Error (Floor Code), or Safety Processor Protocol Error
C1	●●❍❍❍❍❍●	Parity Sensor Error (Floor Code)
C2	●●❍❍❍❍●❍	Safety Processor Protocol Error
EF	●●●❍●●●●	Correction Run
F0	●●●●❍❍❍❍	Checksum Error - Pattern
F8	●●●●●❍❍❍	Checksum Error - Floor Height
F9	●●●●●❍❍●	Floors Learned Error

6.2.4 MC-MP2 DIAGNOSTIC INDICATORS AND ALPHANUMERIC DISPLAY

MC-MP2 DIAGNOSTIC INDICATORS - During normal operation these lights scan from right to left (indicating that the MP2 program is looping properly) or flash ON and OFF to indicate a status or error condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

When a status or error condition exists, the Diagnostic Indicators flash one of several messages depending on the software version (MP2 version number scrolls on boot up):

- Software versions 8.02.00 or earlier flash the MC-MP-1ES messages (see Table 6.8).
- Software version 8.03.00 flashes CC Hex.
- Software versions 8.04.00 or later flash 66 Hex.



MC-MP2 ALPHANUMERIC DISPLAY - If the scrolling status or error message is not displayed when the Diagnostic Indicators flash, press the N pushbutton until the scrolling message appears (see Section 5.2.1 ALPHANUMERIC DISPLAY - STATUS AND ERROR MESSAGES). You can lookup the scrolling message in the index and then refer to Table 6.11 *Status and Error Messages* for a description and troubleshooting information, or you can find the scrolling message in Table 6.10 *MC-MP2 Scrolling Messages Lookup* and then find the associated Message in Table 6.11.

TABLE 6.10 MC-MP2 Scrolling Messages Lookup

Scrolling Message	Event Message (see Table 6.11)
2ND LANDING AUX. ACCESS FAULT *(non ASME-2000 only)*	2nd Landing Aux. Access Fault
ATTENDANT SERVICE OPERATION	Attendant Service Operation
AUX. INSPECTION ACCESS FAULT *(non ASME-2000 only)*	Aux. Inspection Access Fault
BOTH LEVELING SWITCHES ARE ON (SETUP ERROR), LEARN MODE (*IMC only*)	Both Leveling Switches are ON (Learn Mode Setup Error)
BOTH USD AND DSD INPUTS ARE ACTIVE	Both USD and DSD are Open
BOTTOM FLOOR OR TOP FLOOR DEMAND	Bottom Floor Demand or Top Floor Demand
BOTTOM LANDING AUX. ACCESS FAULT *(non ASME-2000 only)*	Bottom Landing Aux. Access Fault
BRAKE PICK FAILURE *(Traction only)*	Brake Pick Failure
CAR CALL BUS IS DISCONNECTED	Car Call Bus Fuse Blown
CAR IN TEST MODE	Test Mode Operation
CAR NOT AT BOTTOM LANDING (SETUP ERROR), LEARN MODE *(IMC only)*	Car not at Bottom Landing (Learn Mode Setup Error)
CAR NOT BELOW DOOR ZONE (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not Below Door Zone (Learn Mode Setup Error)
CAR NOT ON INSPECTION (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not On Inspection (Learn Mode Setup Error)
CAR NOT ON LEVEL DOWN (SETUP ERROR), LEARN MODE (IMC only)	Level Down ON (Learn Mode Setup Error)
CAR NOT ON LEVEL UP (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not On Level Up (Learn Mode Setup Error)
CAR SAFETY DEVICE OPEN	Car Safety Device Open
CAR TO LOBBY OPERATION	Car To Lobby
CONTACTOR PROOFING REDUNDANCY FAILURE	Contactor Proofing M Contactor Proofing Redundancy Failure MX and PT1 Redundancy Failure PT2 & PT3 Redundancy Failure
DIRECTION RELAY REDUNDANCY FAILURE	Direction Relay Redundancy Failure
DOL AND DLK BOTH ACTIVE	Doors Open and Locked
DOOR CLOSE FAILURE	Door Close Protection
DOOR LOCK FAILURE	Door Lock Failure
DOOR LOCK SWITCH FAILURE	Door Lock Contact Failure
DOOR OPEN LIMIT FAILURE	Door Open Limit Failure
DOOR ZONE SENSOR FAILURE	Door Zone Sensor Failure - On position
DOOR ZONE SENSOR FAILURE - OFF POSITION	Door Zone Sensor Failure - Off position
DPM REDUNDANCY FAULT	DPM Redundancy Fault
DPMR REDUNDANCY FAULT	DPMR Redundancy Fault
DRIVE FAILED TO RESPOND	Drive Failed to Respond
DRIVE FAULT 2 *(IMC only)*	Loss of Position Feedback Parity Sensor Failure (Floor Code) Pattern Door Zone Failure Position Error at DETS Position Error at DNTx Position Error at UETS Position Error at UNTx Read Sensor Failure (Floor Code)
DRIVE FORCED MOTOR LIMIT TIMER *(Traction only)*	Brake Failure Brake IGBT Failure MLT - Drive Forced MLT-Drive Forced (ALT) Pattern Detected Overspeed
DRIVE TEMPERATURE SENSOR FAULT *(IMC Traction only)*	Drive Temperature Sensor Fault
EARTHQUAKE OPERATION *(Traction only)*	Earthquake
EARTHQUAKE - REDUCED SPEED OPERATION *(Traction only)*	Earthquake Normal Operation
ELEVATOR SHUTDOWN SWITCH OR POWER TRANSFER INPUT ACTIVE	Elevator Shutdown or Power Transfer
EMERGENCY POWER OPERATION	Emergency Power
EMERGENCY POWER SHUTDOWN	Emergency Power Shutdown
EMERGENCY STOP INPUT 1 ACTIVATED	Emergency Stop Input 1 Activated
EMERGENCY STOP INPUT 2 ACTIVATED	Emergency Stop Input 2 Activated
ENTER SECURITY CODE	Security
EXCESSIVE HEAT IN SMB UNIT *(IMC Performa only)*	Excessive Heat in SMB Unit
EXCESSIVE HEAT IN SYSTEM 12 *(IMC SCR only)*	Excessive Heat in System 12
FAILURE TO LEAVE THE FLOOR	MLT - Failed to Leave Floor

TABLE 6.10 MC-MP2 Scrolling Messages Lookup

Scrolling Message	Event Message (see Table 6.11)
FIRE SERVICE PHASE 1 - ALTERNATE	Fire Service Alternate
FIRE SERVICE PHASE 1 - MAIN	Fire Service Main
FIRE SERVICE PHASE 2	Fire Service Phase 2
FLT RELAY DROPPED	FLT Relay Dropped
FRONT DOOR IS LOCKED BUT NOT FULLY CLOSED	Doors Locked but not fully Closed - Front
GATE SWITCH FAILURE *(non ASME-2000 only)*	Gate Switch Failure
GOVERNOR SWITCH OPEN *(Traction only)*	Governor Switch Open
HALL CALL BUS IS DISCONNECTED	Hall Call Bus Fuse Blown
HEAVY LOAD WEIGHER CONDITION	Heavy Load
HOISTWAY SAFETY DEVICE OPEN	Hoistway Safety Device Open
HOSPITAL PHASE 1 OPERATION	Hospital Service
HOSPITAL PHASE 2 OPERATION	Hospital Service Phase 2
IMC SUB-SYSTEM NOT READY *(IMC only)*	IMC Sub-System Error
IN CAR STOP SWITCH ACTIVATED	In-car Stop Switch
INDEPENDENT SERVICE OPERATION	Independent Service
INSPECTION / LEVELING OVERSPEED FAILURE *(IMC Traction only)*	Inspection/ Leveling Overspeed
INSPECTION OPERATION	Inspection
LANDING SYSTEM REDUNDANCY FAILURE *(non ASME-2000 only)*	Landing System Redundancy Failure
LEVELING DOWN	Level Down
LEVELING SENSOR FAILED - OFF POSITION	Leveling Sensor Failure (Inactive State)
LEVELING SENSOR FAILED - ON POSITION	Leveling Sensor Failure (Active State)
LEVELING SENSOR FAILURE	Leveling Sensor Redundancy Failure
LEVELING UP	Level Up
LIGHT LOAD WEIGHER CONDITION	Light Load
LOSS OF INSPECTION DURING LEARN MODE *(IMC only)*	Loss of IN During Learn (Learn Mode Setup Error)
MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED	MLT - Excessive PI Correction (*Traction*) MLT - Excessive Releveling at Floor- MLT - Timer Expired Motor Limit Timer (*Traction*) Motor Limit Timer (INT) (*Traction*) Motor Limit Timer (LI) (*IMC Traction*) Motor Limit Timer (LI & INT) (IMC *Traction*) External Motor Limit Timer (*Hydro*) Low Oil Switch (*Hydro*)
NO RESPONSE FROM PATTERN GENERATOR (SETUP ERROR), LEARN MODE (*IMC only)*	No Response from Pattern Generator (Learn Mode Setup Error)
NORMAL OPERATION	
OVERLOAD CONDITION	Car is Overloaded
PASSCODE REQUEST	Passcode Requested
PG NOT READY *(IMC Traction only)*	Pattern Generator not Ready
PHOTO EYE FAILURE	Photo-Eye Failure (Front) or Photo-Eye Failure (Rear)
PRESSURE SWITCH ACTIVATED *(Hydro only)*	Pressure Switch Activated
PRE-TEST MODE	Pre-test Mode
PRIORITY / VIP SERVICE - PHASE 1	Priority/VIP Service Phase 1
PRIORITY / VIP SERVICE - PHASE 2	Priority/VIP Service Phase 2
REAR DOOR IS LOCKED BUT NOT FULLY CLOSED	Doors Locked but not fully Closed - Rear
REDUNDANCY DOOR LOCK RELAY FAILURE	Door Lock Relay Redundancy Failure
REDUNDANCY GATE SWITCH FAILURE *(non ASME-2000 only)*	Gate Switch Relay Redundancy Failure
SAFETY CIRCUIT IS OPEN	Safety Relay Circuit Open
SHUTDOWN OPERATION	MG Shutdown Operation/Shutdown Switch
TIME OUT OF SERVICE	Timed Out of Service
VALVE LIMIT TIMER ELAPSED *(Hydro only)*	Valve Limit Timer Elapsed
VISCOSITY CONTROL FUNCTION ACTIVE *(Hydro only)*	Viscosity Control Function

3-1-05

6.2.5 STATUS AND ERROR MESSAGES TABLE

Table 6.11, Status and Error Messages provides a listing of the status and error messages from the following:

- Special Events Calendar Fault Log
- View Hoistway (F3) Screen - FAULT section
- View Hoistway (F3) Screen - CAR OPERATION section
- Computer Swing Panel Diagnostic Indicators - MC-MP-1ES flashing messages
- Computer Swing Panel Alphanumeric Display - MC-MP2 Scrolling Messages
- Computer Swing Panel DDP Diagnostic Indicators - flashing messages

FIGURE 6.6 Legend for Table 6.11, Standard Status and Error Messages

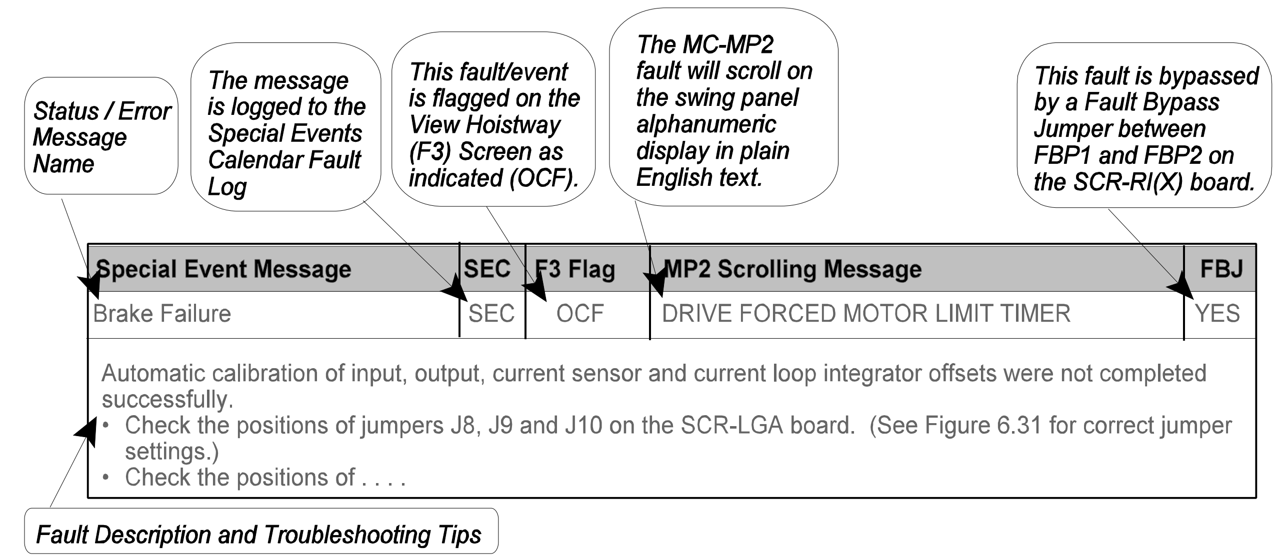


TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
+15V Power Supply Failure	SEC			
This fault indicates that failure of the +15V power supply was detected on the IMC-DAS board. Verify that the +15V power supply output and the +15V test point (on the IMC-DAS board) are correct.				
2nd Landing Aux. Access Fault				
The inputs “Second Landing Access Bypass” (2AB) and “Redundant Second Landing Access Bypass” (R2AB) are compared. The car is shut down and this fault is generated if both inputs have the same status.				
AC Drive Hardware Fault	SEC			
This fault indicates that there is a fault in the AC Drive. The Drive Fault output connected to the FLT ON terminal on the IMC-ACIB / IMC-ACIM / IMC-ACIK board is active.				
AC Drive Not Ready	SEC			
The Drive Ready output connected to the RDY ON terminal on the IMC-ACIB / IMC/ACIM / IMC-ACIK board is not active. Check for the following: • Power to the drive is OFF. • The drive software is not running. • There is a drive fault. Consult the keypad display and refer to the drive manual for troubleshooting information.				
Alarm - No Car Movement	SEC	AlmNoMv		
This status indicates that the alarm bell pushbutton was pressed when the car was not moving (ABI).				
Alarm - No Door Zone	SEC	AlmNoDz		
This status indicates that the alarm bell pushbutton was pressed when the car was not in door zone (ABIZ).				
Anti-Nuisance Operation		AntiNui		
This status indicates that the load weigher is detecting a minimal load in the car; therefore anti-nuisance logic is in effect allowing only a few car calls to be registered.				

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>At Speed Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the motor speed feedback is out of the range specified by the Speed Deviation Low Level (MagneTek parameter P18) / At Speed Band (Baldor Parameter P1506) / Speed Difference (TORQMAX parameter LF.58). This fault is logged when the drive At Speed Digital Output connected to the IMC-ACIM / IMC-ACIB / IMC-ACIK board is active.
• Verify that the AC drive gains are properly adjusted.
• MagneTek: Verify that MagneTek parameter P18 >9%.
• MagneTek: Verify that SPD deviation time (parameter P19) is >1 and <3 seconds.
• Baldor: Verify that Baldor parameter P1506 = 30-40% of motor full-load RPM.
• TorqMax: Verify that LF-58 (speed difference) is >10%.
• TorqMax: Verify that LF-59 (following error time) = 3.0 seconds for F4 drive or 1.0 seconds for F5 drive.</td></tr>
<tr><td>AtoD Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the A to D converter is not responding. See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Attendant Service Operation</td><td></td><td>AttnSrv</td><td>ATTENDANT SERVICE OPERATION</td><td></td></tr>
<tr><td colspan="5">This status indicates that the attendant service input (ATS) is activated. Attendant service is maintained as long as the ATS input is activated, and there are no “emergency service” (e.g., fire service) demands.
• Check the status of the ATS input. When the car is in Attendant Service operation the input should be high.</td></tr>
<tr><td>Automatic Operation</td><td></td><td>AutoOps</td><td></td><td></td></tr>
<tr><td colspan="5">This status indicates that the car is running on Automatic Operation.</td></tr>
<tr><td>Aux. Inspection Access Fault</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">The inputs “Inspection Access” (INA) and “Redundant Inspection Access” (RINA) are compared. The car is shut down and this fault is generated if both inputs have the same status.</td></tr>
<tr><td>Both Leveling Switches are ON (Learn Mode Setup Error)</td><td></td><td></td><td>BOTH LEVELING SWITCHES ARE ON (SETUP ERROR), LEARN MODE</td><td></td></tr>
<tr><td colspan="5">This fault indicates a faulty leveling sensor or leveling input (LU or LD).
• Make sure the INTB Jumper on the SCR-RI board is in the LRN positon.
• Position the car below the bottom landing.
• Make sure nothing is wired to terminals #25 and #26 on the HC-RB4-x board.
• Check the voltages on terminals #25 and #26 on the HC-RB4-x board. Terminal #25 should be low and #26 should be high.</td></tr>
<tr><td>Both USD and DSD Are Open</td><td>SEC</td><td></td><td>BOTH USD AND DSD INPUTS ARE ACTIVE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Up Slow Limit Switch (USD input) and Down Slow Limit Switch (DSD input) are simultaneously open. This usually indicates a problem with one of the terminal landing limit switches. The MP detects this condition when USD=0, DSD=0, DLK=1.
• Inspect both limit switches and associated wiring.
• Measure voltages at relay board terminals 11 (USD) and 13 (DSD). Reference the job prints and verify measured voltages against the status of the limit switches.
• If voltages are appropriate, possible causes may be a defective:
1. 147Kohm resistors on top of the main relay board, HC-RB4-x (for USD/DSD inputs).
2. C2 ribbon cable between HC-RB4-x and HC-PI/O boards.
3. Input circuit on the HC-PI/O board.</td></tr>
<tr><td>Bottom Floor Demand</td><td>SEC</td><td>BflrDem</td><td>BOTTOM FLOOR OR TOP FLOOR DEMAND</td><td></td></tr>
<tr><td colspan="5">This status is generated either when the established PI value corresponds to the top terminal landing, but the Up Slow Limit Switch is closed or when a valid PI value can not be found. A Bottom Floor Demand is generated to move the car away from the landing and establish a car position. Possible causes are:
• The COMPUTER RESET button was pressed.
• Initial Power-up.
• The state of the limit switch contacts do not correspond to the current PI value (example: the car is in door zone and the PI value corresponds to the bottom terminal landing, but the Down Slow Limit Switch is closed).
• The car was placed on Inspection (the computer does not attempt to maintain the PI value while the car is being moved in a “manual” fashion; Bottom Floor Demand is declared when the car is placed back into automatic operation).
Troubleshooting:
• If the floor encoding is invalid, the car should move to one of the terminal landings to establish car position.
• If the floor encoding is valid and the car is level at a landing, check the floor encoding magnets or vanes (perhaps a valid code cannot be read).
• If the floor encoding is invalid, check the terminal limit switches and associated wiring.
• Verify that the input circuits for USD and DSD are not failing by checking for defective:
1. 47Kohm resistors on top of the main relay board, HC-RB4-x.
2. C2 ribbon cable between HC-RB4-x and HC-PI/O boards.
3. HC-PI/O board.
4. Short circuit on HC-RB4-x board..</td></tr>
<tr><td>Bottom Landing Aux. Access Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">The inputs “Bottom Landing Access Bypass” (BAB) and “Redundant Bottom Landing Access Bypass” (RBAB) are compared. The car is shut down and this fault is generated if both inputs have the same status.</td></tr>
</table>

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Brake Failure	SEC	BF	**DRIVE FORCED MOTOR LIMIT TIMER**	YES

This fault indicates that after enabling the brake, the Drive process detected a Brake Current Feedback that was much lower than the desired Brake Current. This fault triggers a MLT - Drive Forced fault if encountered 4 times within 7 attempts to run.
• Verify that the brake coil resistance and brake input voltage on the Brake (Shift F3) screen match those of the brake.
• Re-calibrate the Brake by adjusting the CBV parameter on the Brake (Shift F3) screen.
• Verify the voltage between terminals AC1 and AC2 on the IMC-Sxx Unit
• Pick direction, then check for Brake Input Voltage at terminals BPO1 and BPO2 on the SCR-PRI board. If there is no voltage at BPO1 and BPO2 then verify that:
  • SAFB is not picked.
  • The direction relays, on the HC-RB4-x board, are not picked (contact failure).
• Verify that:
1. PT1, MX, and RE on the SCR-PRI are not picked.
2. FB1 or FB2 fuses have not cleared.
3. There is no trigger signal for brake voltage at test point BFT on the IMC-DIO board.
• Check for a defective:
1. Brake current sensor inside the IMC-Sxx Unit.
2. Bad diode bridge (DBB) inside the IMC-Sxx Unit.
3. IGBT Q5 inside the IMC-Sxx Unit.
4. Resistors RB1 and RB2.				

Brake IGBT Fault	SEC			
This MagneTek fault indicates that the brake transistor failed. This fault is not logged until the run command is removed. It is logged as an alarm until run command is removed. See the MagneTek manual for additional troubleshooting information.				
Brake Output Circuit Failure	SEC	BOF		NO
This fault indicates that the brake output circuit has failed. Check for a defective: • Brake IGBT. • Flywheel diode in the brake output circuit. • IMC-GPA board. • Resistors RB1 and RB2.				
Brake Pick Failure			**BRAKE PICK FAILURE**	
This fault indicates that the Brake Pick Sensor (BPS) input was high (indicating the brake was not fully picking) during three consecutive runs. The car is shut down. • Check the brake pick switch for proper operation (the contact should open when the brake is fully picked). • Check the status of the BPS input. It should be low when the brake is picked.				
Bridge Fault	SEC			
This MagneTek fault indicates a motor bridge failure. See the MagneTek manual for additional troubleshooting information.				
Car Call Bus Fuse Blown	SEC		**CAR CALL BUS IS DISCONNECTED**	
This fault indicates that there is no power to the car call circuits on the HC-CI/O board(s). A problem may exist with the Car Call Bus fuse (F2CC) or the car call common wiring (bus 2CC). • Check the Car Call Bus fuse (F4) in the controller. • Check the wires that go to the Car Call Power inputs (labeled PS1/PS2/PS3) on the HC-CI/O board(s) in the controller. • Check for the proper installation of the call board “jumper plug” on the HC-CI/O board(s). Look at the notch on the chip and match it up according to the notch orientation label on the HC-CI/O board.				
Car is Overloaded			**OVERLOAD CONDITION**	
This status indicates that the Overload input (OLW) is activated, or the perceived load in the car has exceeded the threshold value set for an overload condition. • For a discrete OLW input: check the status of the OLW input (wired to a load weigher contact), and determine if the status of the input is appropriate relative to the load in the car. • For an analog load weigher: check the perceived load percentage using the on-board diagnostic station. Determine if the value displayed (percentage) is appropriate relative to the load in the car.				
Car Not at Bottom Landing (Learn Mode Setup Error)			**CAR NOT AT BOTTOM LANDING (SETUP ERROR), LEARN MODE**	
This status indicates that the car is not positioned at the bottom landing, the Down Slow Limit switch is faulty, or Down Slowdown input (DSD) is faulty. • Position the car at the bottom landing. • Check the Down Slow Limit switch. The switch contacts should be open when the car is at the bottom landing. • Check the DSD input status. It should be low.				
Car Not Below Door Zone (Learn Mode Setup Error)			**CAR NOT BELOW DOOR ZONE (SETUP ERROR), LEARN MODE**	
This status indicates that the car is not positioned below the door zone, or the door zone sensor is faulty, or the Door Zone input (DZ) is faulty. • Position the car below the bottom of the landing door zone. • Check for a faulty door zone sensor. • Check the DZ input status. It should be low.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Car Not On Inspection (Learn Mode Setup Error)			**CAR NOT ON INSPECTION (SETUP ERROR), LEARN MODE**	
This status indicates that the car is not on Inspection operation, or the Inspection input (IN) is faulty. • Place the car on relay panel Inspection. • Check the IN input status. It should be low.				
Car Not On Level Up (Learn Mode Setup Error)			**CAR NOT ON LEVEL UP (SETUP ERROR), LEARN MODE**	
This status indicates that the car is not positioned below the bottom landing, or the Level Up sensor or input (LU) is faulty. • Position the car below the bottom landing. • Check for faulty level up sensor. • Check the LU input status. It should be high.				
Car Out of Service with Doors Locked	SEC			
This fault indicates that the car was shut down because it was delayed from leaving the landing for a predetermined time (default 5 minutes) after it timed out of service. The doors were locked when the timer elapsed. • Correct the problem that caused the car to time out of service. Refer to the Special Event Calendar for the event name, then troubleshoot that event.				
Car Out of Service without Doors Locked	SEC			
This fault indicates that the car was shut down because it was delayed from leaving the landing for a predetermined time (default 5 minutes) after it timed out of service. Doors were not locked when the timer elapsed. • Suspect an obstruction that has kept the doors from closing, thus preventing the car from leaving. • Verify that controller terminal #48, on the HC-RB4-x board, for zero voltage. • Correct the problem that caused the car to time out of service. Refer to the Special Event Calendar for the event name, then troubleshoot that event.				
Car Safety Device Open	SEC	SftyOpn	**CAR SAFETY DEVICE OPEN**	
This fault indicates that one or more of the car safety circuit devices is open (e.g., emergency exit contact, safety clamp switch, car-top emergency stop switch). This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened “upstream” of the SAFC input. • Check the applicable car safety devices. Refer to controller wiring prints for applicable devices.				
Car to Lobby			**CAR TO LOBBY OPERATION**	
This status indicates that the Car To Lobby input (CTL) has been activated. • Check the status of the CTL input. It should be high.				
Charge Fault	SEC			
This MagneTek fault indicates that the DC bus charging circuit failed to detect a stable DC bus charge above the fault level or the charge contactor appears to be open. See the MagneTek manual for additional troubleshooting information.				
Checksum Error - Brake		BRC		NO
This fault indicates that the Brake parameters saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re -save the parameters on the Brake (Shift F3) - Advanced View screen. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				
Checksum Error - Filter		FLC		
This fault indicates that the Filter parameters saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. This fault triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the Filter (Shift F4) screen. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Checksum Error - Floor Height		FHC		NO
This fault indicates that the Floor Height parameters saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the Floor Heights (Shift F8) screen. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				
Checksum Error - Identification		IDC		
This fault indicates that the Identification saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the Floor Heights (Shift F8) screen. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				
Checksum Error - Pattern		PPC		NO
This fault indicates that the Pattern parameters saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the Pattern (Shift F4) screen. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				
Checksum Error - Safety		SFC		
This fault indicates that the Safety parameters saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the Pattern (Shift F4) and Safety (Shift F6). • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).				
Checksum Error - Switch		SWC		NO
This fault indicates that the Normal Terminal Limit Switch data saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • Remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board.				
Checksum Error - System Configuration		SCC		
This fault indicates that the System Configuration data saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected. • Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location). • To clear this error, re-save the parameters on the General (Shift F1) screens. • If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket. • If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board.				

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Checksum Error - Test Point</td><td></td><td>TPC</td><td></td><td>YES</td></tr>
<tr><td colspan="5">This fault indicates that the Test Point data saved into memory on the EEPROM chip on the IMC-DDP-C(D) board is invalid. The pattern generator will not execute a normal profile run and RE will not be enabled if a checksum error is active. Triggers a Drive Fault 2, which clears automatically if the failure is corrected.
• Verify that the S2 Switch/Jumper, only available on IMC-DDP-D board, is in the 'A' position (see IMC-DDP Quick Reference Card for jumper location).
• To clear this error, re-save the parameters on the General (Shift F1) screen.
• If re-saving the parameters fails to correct the problem, remove and reinsert the EEPROM (U15) in its socket.
• If problem persists, replace the IMC-DDP-C(D) board. The problem lies in a defective EEPROM, or component on the IMC-DDP-C(D) board.</td></tr>
<tr><td>CMS Emergency Dial Out Unsuccessful</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the controller was unsuccessful in transmitting an emergency event to one of the CMS stations specified by the user. This fault only affects controllers that have the CMS option and are connected via a dial-up telephone modem.
• Verify that the telephone lines and modems on the controller and user ends are working.
• Check for noise on the phone lines. Correct and re-try.
• Check that the user phone number is unshared. CMS requires a dedicated line for emergency monitoring.</td></tr>
<tr><td>Co-processor Failure</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This Baldor fault indicates that the drive co-processor is defective. See the Baldor manual for additional troubleshooting information.</td></tr>
<tr><td>Communication Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the drive had detected a communication timeout or multiple, consecutive, invalid checksums. See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Communication Loss</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the car was previously communicating with the Group Supervisor but is now unable to communicate.
• Verify that the RS-422 communication cable is not removed from the Car’s MC-RS board.
• Verify the jumpers on all of the controllers’ MC-RS boards.
• Check for a defective MC-RS board on any of the controllers.</td></tr>
<tr><td>Communication Processor Identification Error</td><td></td><td>CPI</td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the IMC-DDP-C(D) board is receiving invalid car identification data from the MC-CGP-4 board. See Communication Processor Protocol Error for troubleshooting tips.</td></tr>
<tr><td>Communication Processor Looping Error</td><td></td><td>CPL</td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the pattern generator is not detecting a looping MC-CGP-4 processor.
• Check whether the power indicator is on solidly on the MC-CGP-4 board.
• Check for an incorrectly socketed EPROM on the MC-CGP-4 board.
• Check for a faulty connection between the IMC-DDP-C(D) and MC-CGP-4 board.
• Check for a faulty:
MC-CGP-4 board.
IMC-DDP-C(D) board.
MC-MP2 board. (See Appendix B for board replacement instructions).</td></tr>
<tr><td>Communication Processor Protocol Error</td><td></td><td>CPP</td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the IMC-DDP-C(D) board is receiving invalid data from the MC-CGP-4 board.
• Check for an incorrectly socketed EPROM on the MC-CGP-4 board.
• Check for a faulty connection between the IMC-DDP-C(D) and MC-CGP-4 board.
• Check for a faulty:
MC-CGP-4 board.
IMC-DDP-C(D) board. (See Appendix B for board replacement instructions).</td></tr>
<tr><td>Contactor Proofing Redundancy Failure</td><td>SEC</td><td></td><td>CONTACTOR PROOFING REDUNDANCY FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that one (or more) of the main power contactors has not dropped out properly after the car stopped moving. The computer generates this error when either the CNPB or CNPM input remains low after the car has stopped.
• This failure is only logged on the Group CRT and will occur in conjunction with one of the three local redundancy failures: PM Contactor Redundancy Failure, MX & PT1 Redundancy Failure, or PT2 & PT3 Redundancy Failure.
• Verify that the CNP input is high when the car is not in motion.
• Look for troubleshooting tips in the description of these specific redundancy failures.</td></tr>
</table>

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Contract Overspeed	SEC	COS		YES
This fault indicates that, during normal operation, the car speed was greater than 107% of contract speed. The car speed is monitored by the safety processor. • Verify, on inspection, that the car speed is relatively close to the Pattern velocity. Pattern velocity during inspection is determined by the VRL and VINH parameters on the Pattern (Shift F4) screen. • Then verify that the car is not overspeeding on a high speed normal run. • Verify that the PG parameter, Pattern Scaling on the Pattern (Shift F4) screen = 1.0. • Verify that GTC on the Pattern (Shift F4) screen is adjusted to display the correct car speed in the velocity block on the F3 screen as described in section 3.8 P. • If the car continues to overspeed, adjust the Baldor parameter P2003 or the MagneTek parameter P2-Contract Mtr Speed on the Drive (Shift F5) screen.				
Contract Velocity Error		VC		
This fault indicates that a normal run profile is invalid because contract velocity would be exceeded. • To clear the fault: increase J35L, increase J35H, decrease A6, decrease A2, increase J7. These parameters are given in order of decreasing affect.				
Co-processor Failure	SEC			
See the Baldor manual for additional troubleshooting information.				
Correction Run				
This status indicates that the car is on normal operation and running at correction speed to the nearest landing.				
CRC 16 Parameter Transfer Failure	SEC			
This fault indicates that while saving parameters the controller detected invalid information being sent from the MC-CGP-4 board to the IMC-DDP-C(D) board. • Verify that the MC-CGP-4 and IMC-DDP-C (D) boards are properly seated. Separate the boards, then reconnect them to be certain they are connected together properly. • Verify that the IMC-DDP-C (D) board is working properly. Replace with a known-good board to test.				
Cube Data Fault	SEC			
This MagneTek fault indicates that the cube data in flash is corrupted. See the MagneTek manual for additional troubleshooting information.				
Cube ID Fault	SEC			
This MagneTek fault indicates that the cube identification cannot be completed. See the MagneTek manual for additional troubleshooting information.				
Current Reg Fault	SEC			
This MagneTek fault indicates that the current regulator is unable to control current. See the MagneTek manual for additional troubleshooting information.				
Current Sensor Failure				
This Baldor fault indicates that a phase current sensor is defective or an open wire exists between the control board and the sensor. See the Baldor manual for additional troubleshooting information.				
DCU Checksum Fault	SEC			
This MagneTek fault indicates that the Drive Control Unit's data is corrupted. See the MagneTek manual for additional troubleshooting information.				
DC Bus High	SEC			
This Baldor fault indicates that a bus over voltage condition has occurred. This can be due to excessive regeneration current during deceleration, an improperly sized regen resistor or a problem with the regen circuit. See the Baldor manual for additional troubleshooting information.				
DC Bus Low	SEC			
This Baldor fault indicates that a bus under voltage condition has occurred. This can be due to low line voltage, soft line, or a problem with the soft start circuit. See the Baldor manual for additional troubleshooting information.				
Device Overtemp Fault	SEC			
This MagneTek fault indicates that the IGBT heatsink is above fault temperature. See the MagneTek manual for additional troubleshooting information.				
Direction Relay Redundancy Failure	SEC		**DIRECTION RELAY REDUNDANCY FAILURE**	
This fault indicates that one of the direction relays appears to have failed in the picked state. The computer has detected that the Direction Pilot input (UDF) is high without a direction output. Ensure that, when the car is not in motion, the UDF input is low.				

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Door Close Protection</td><td>SEC</td><td></td><td>DOOR CLOSE FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the doors were unable to close in typically 60 seconds.
• Check door lock contacts for proper closure and conductivity.
• Check individual doors and door tracks for physical obstructions.
• Verify that the Door Close Limit contact functions properly.
• Check for a faulty Door Lock Sensor input (DLS) or Door Close Limit input (DCL).</td></tr>
<tr><td>Door Lock Contact Failure</td><td>SEC</td><td></td><td>DOOR LOCK SWITCH FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that a door lock contact appears to have failed in the closed state. The computer compares the state of the landing Door Lock Sensor input (DLS or DLSR) with the state of the Door Close Limit input (DCL). If DLS or DLSR remains high after the doors have opened (DCL=1), this failure will be declared. (It appears that the door lock contact is shunted or has remained closed).
• Measure the voltage on the DLS or DLSR input, with doors open.
• If voltage exists on DLS or DLSR while the doors are open, trace the source of the voltage.
• If no voltage exists on the DLS or DLSR, suspect faulty DLS or DLSR input circuit. Check the HC-IOX and HC-I4O boards.</td></tr>
<tr><td>Door Lock Failure</td><td>SEC</td><td></td><td>DOOR LOCK FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the doors have closed, DCL = 0 (or DCLC = 1 if retiring cam), a demand exists for the car to move (DCP = 1), but the doors did not lock (DLK = 0) within 80 seconds with the door close power output (DCP) turned on.
• If no Retiring Cam is used, verify that the door lock contacts are closed to provide power to the door lock input (DLK = 1).
• If the Retiring Cam option is set:
1. Verify that the Retiring Cam relay is activated (DCP=1, DPM=1 or DCLC=1) and the doors are locked (DLK=1).
2. Momentarily place the car on Inspection to reset the Door Lock Failure.
3. Verify the proper operation of the Retiring Cam circuitry and mechanism.</td></tr>
<tr><td>Door Lock Relay Redundancy Failure</td><td>SEC</td><td></td><td>REDUNDANCY DOOR LOCK RELAY FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that one of the door lock relays has failed to drop out.
• Verify that, with the hoistway doors open, there is no power on the Door Lock Sensor Relay input (RDLS or RDLSR, if the car has rear doors).
• If the RDLS or RDLSR input is high and the doors are open, then a door lock relay has failed to drop.
• Verify that the door lock relay(s) operates properly.
• If no voltage appears on the RDLS (or RDLSR) input, suspect a faulty RDLS (or RDLSR) input circuit. Replace the HC-IOX and/or HC-I4O boards.</td></tr>
<tr><td>Door Open Limit Failure</td><td>SEC</td><td></td><td>DOOR OPEN LIMIT FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that a door open limit contact appears to have failed in the open state. This means that the Door Open Limit input (DOL or DOLR) is low--indicating an open door--while the Gate Switch (GS) or Door Lock Sensor (DLS) inputs are high--indicating a closed and locked door.
• Verify that, with the doors closed, there is power on the Door Open Limit input (DOL or DOLR). DOL or DOLR must be high when DLS and/or GS is high.
• Check the wire, in the controller, to terminal #36 on HC-RB4-x to verify DOL.
• If there is a rear door, check terminal #36 on the rear door board to verify DOL.</td></tr>
<tr><td>Door Open Protection</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the doors were unable to open in typically 12 seconds.
• Check door lock contacts for proper closure and conductivity.
• Check individual doors and door tracks for physical obstructions.
• Verify that the door Open Limit contact functions properly.</td></tr>
<tr><td>Doors Locked but not fully Closed - Front</td><td></td><td></td><td>FRONT DOOR IS LOCKED BUT NOT FULLY CLOSED</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Door Lock input (DLK) was high (doors locked) and the Door Closed Limit input (DCL) was high (doors not fully closed). DCL should be low when doors are locked.
• Determine the state of the doors.
• If the doors are closed, check the voltage on the DCL input terminal. If the voltage is high, adjust the Door Closed Limit switch so the switch opens prior to DLK.
• Check for a faulty door close limit contact or associated wiring.</td></tr>
<tr><td>Doors Locked but not fully Closed - Rear</td><td></td><td></td><td>REAR DOOR IS LOCKED BUT NOT FULLY CLOSED</td><td></td></tr>
<tr><td colspan="5">This fault indicates the Door Lock input (DLK) was high (doors locked) and Door Closed Limit Rear input (DCLR) was high (doors not fully closed). DCLR must be low when doors are locked.
• Determine the state of the doors.
• If the doors are closed, check the voltage on the DCLR input terminal. If the voltage is high, adjust Rear Door Closed Limit switch so the switch opens prior to DLK.
• Check for a faulty door close limit contact or associated wiring.</td></tr>
</table>

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Doors Open And Locked</td><td>SEC</td><td></td><td>DOL AND DLK BOTH ACTIVE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Door Open Limit input (DOL) was low while the Door Lock input (DLK) was high. The leveling inputs (LU and LD) must also be low to log this fault.
• Determine the state of the doors.
• If the doors are open, check the voltage on terminal #8 (DLK), on the HC-RB4-x board.
• If voltage exists, determine source of voltage (there should be no voltage on terminal 8 if doors are open and car is not leveling).
• If the doors are closed, check the voltage on terminal #36 (DOL), on the HC-RB4-x board. The voltage should be high.
• If voltage does not exist, check for faulty door open limit contact (contact should be closed if doors are not fully open) or associated wiring.
• If voltages are appropriate, suspect faulty input circuit (either DLK or DOL input circuit). Check the 47Kohm resistors on the HC-RB4-x and HC-PI/O boards.</td></tr>
<tr><td>Door Zone Sensor Failure (active state)</td><td></td><td></td><td>DOOR ZONE SENSOR FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Door Zone input (DZ) did not deactivate during the run. Probable causes are: shorted door zone sensor or associated circuitry (within the landing system assembly); faulty wiring from the landing system to the controller; or a faulty computer input circuit (main relay board or HC-PI/O board).
• Check the operation of the door zone sensors and associated wiring (place the car on inspection, move the car away from the floor, noting the transitions in the door zone signal(s) coming from the landing system).
• Verify that the computer diagnostic display of DZ (or DZ rear) matches the state of the sensor signals at the main relay board (or rear door relay board).</td></tr>
<tr><td>DPM Redundancy Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">A failure of a front door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPM (door position monitor) input.
• Valid when SAF=1. When DLK is ON (1) then input DPM must also be ON (1). When DOL=0, DPM=0. If this is not the case, then a DPM redundancy fault is recorded and the car is prevented from operating</td></tr>
<tr><td>DPMR Redundancy Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">A failure of a rear door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPMR (door position monitor rear) input.
• Valid when SAF=1. When DLK is ON (1), input DPMR must also be ON (1). When DOL=0, DPM=0. If not, a DPMR redundancy fault is recorded and the car is prevented from operating.</td></tr>
<tr><td>Drive Failed to Respond</td><td></td><td></td><td>DRIVE FAILED TO RESPOND</td><td></td></tr>
<tr><td colspan="5">Monitors the Drive On status of the drive. The DRON input must be ON when the elevator is stopped and OFF when the elevator is in motion. If this condition is not true, the Drive Failed To Respond fault will be logged. The elevator will attempt to recover from this fault up to four consecutive times after which this fault will latch and require a manual reset by toggling the inspection switch.
• Check the circuitry associated with the DRON input for proper operation.</td></tr>
<tr><td>Drive Not Ready</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Drive process on the IMC-DDP-C(D) board is not ready to move the car.
• This message is displayed to indicate a general problem with the IMC-DDP-C(D) board. See the Special Event Calendar or the F3 screen for specific information on the fault that has occurred.
• This fault may be cleared by pushing the RESET button on the IMC-DDP-C(D) board.</td></tr>
<tr><td>Drive Overload</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the Drive's current profile exceeds the Drive's limit.
See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Drive Temperature Sensor Fault</td><td></td><td></td><td>DRIVE TEMPERATURE SENSOR FAULT</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the Drive Temperature Sensor Input (DTS) is activated. This sensor monitors the temperature inside the IMC-SI2 drive unit.
• The ambient temperature has exceeded specifications.
• Verify that the fan on the side of the Drive unit operates correctly.
• Check for a faulty temperature sensor inside the Drive unit.</td></tr>
<tr><td>DZP Error</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the DZP (DZ / #27) input is not active while the elevator is stopped with RD active and LEV inactive.
• Verify that the status of these inputs are correct. When the elevator is stopped at a floor, DZP and RD should be active while LEV is inactive.</td></tr>
<tr><td>Earthquake</td><td>SEC</td><td>Eqactv</td><td>EARTHQUAKE OPERATION</td><td></td></tr>
<tr><td colspan="5">This fault indicates that one or both of the earthquake inputs (EQI, CWI) are high. The appropriate code-mandated earthquake operation is applied, for ANSI and California Earthquake Operation the car is brought to a floor and then shut down.
• The elevator may be returned to normal service by means of momentary reset button on the earthquake board (HC-EQ2). This should be done by authorized personnel, after it has been determined that it is safe to do so.
• Should the system remain in this mode of operation after the reset button has been pressed, check the status of the earthquake sensing devices (seismic switch or counterweight derailment device).</td></tr>
</table>

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Earthquake Normal Operation</td><td></td><td></td><td>EARTHQUAKE - REDUCED SPEED OPERATION</td><td></td></tr>
<tr><td colspan="5">This status allows the car to run after an Earthquake fault. To run at reduced speed on Earthquake Normal Operation the Earthquake fault timer must expire and the counterweight must not be derailed during the earthquake. (EQI is high, CWI is low; used for ANSI earthquake operation only.) Otherwise, the car remains shut down.
• The elevator may be returned to normal service by pressing the RESET button on the earthquake board (HC-EQ2). This should be done by authorized personnel, after it has been determined that it is safe to do so.
• Should the system remain in this mode of operation after the RESET button has been pressed, check the status of the EQI input.</td></tr>
<tr><td>Elevator Shutdown or Power Transfer</td><td></td><td></td><td>ELEVATOR SHUTDOWN SWITCH OR
POWER TRANSFER INPUT ACTIVE</td><td></td></tr>
<tr><td colspan="5">This status indicates that either the Elevator Shutdown input (ESS) has been activated or the Power Transfer input (PTI) has been activated. The car is stopped at the next available floor and then shut down.
• Verify that the status of the inputs (ESS) and (PTI) is appropriate relative to the status of the switch or contact that feeds the input.</td></tr>
<tr><td>Emergency Power</td><td>SEC</td><td>EmrgPwr</td><td>EMERGENCY POWER OPERATION</td><td></td></tr>
<tr><td colspan="5">This event indicates that the system is on Emergency Power operation. The Emergency Power input (EPI) is low, which indicates that the system is being powered by an emergency-power generator.
• If system is not running on an emergency-power generator, check the voltage on the EPI terminal (this terminal is generally found in the group supervisor controller in multi-group applications).
• If voltage does not exist on EPI, check contact and associated wires that feed the EPI input.
• If voltage does exist on the EPI terminal, suspect faulty EPI input circuitry (HC-IOX or HC-I4O board). [Note: In some applications, the EPI input resides in the individual elevator controller. Refer to specific job prints for details.]
• If this is a group system with emergency power, and the Group Supervisor has yet to be installed, place a jumper from the 2 bus to the EPI input on each local car's HC-IOX board. Remove the jumper when the Group Supervisor is installed.</td></tr>
<tr><td>Emergency Power Shutdown</td><td>SEC</td><td></td><td>EMERGENCY POWER SHUTDOWN</td><td></td></tr>
<tr><td colspan="5">This status indicates that the car is shutdown during Emergency Power Operation when the controller is unable to communicate with the Group Supervisor. When the Group Supervisor is unable to coordinate running the elevators on Emergency Power, this shutdown occurs in order to prevent the cars from running all at the same time and possibly overloading the generator.</td></tr>
<tr><td>Emergency Stop Input 1 Activated</td><td></td><td></td><td>EMERGENCY STOP INPUT 1 ACTIVATED</td><td></td></tr>
<tr><td colspan="5">This message is displayed when the Emergency Stop Input 1 (ESTP1) goes high.</td></tr>
<tr><td>Emergency Stop Input 2 Activated</td><td></td><td></td><td>EMERGENCY STOP INPUT 2 ACTIVATED</td><td></td></tr>
<tr><td colspan="5">This message is displayed when the Emergency Stop Input 2 (ESTP2) goes high.</td></tr>
<tr><td>Encoder Loss</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This Baldor fault indicates that the encoder has experienced a power loss, the coupling has slipped, there is excessive noise on the encoder line or the encoder is defective. See the Baldor manual for additional troubleshooting information.</td></tr>
<tr><td>Encoder Loss Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the encoder feedback was lost. See the MagneTek manual for troubleshooting information.</td></tr>
<tr><td>Excessive Heat in Baldor Drive</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates the drive heatsink temperature has exceeded safe levels. See the Baldor manual for troubleshooting information.</td></tr>
<tr><td>Excessive Position Error at OLM</td><td>SEC</td><td>OLD</td><td></td><td>YES</td></tr>
<tr><td colspan="5">This fault indicates that while the car was traveling past a floor, on normal operation, the IMC-DDP-C(D) computer detected a 30" (6" if destination landing) or more difference between the actual and learned distance to the floor. This condition is detected by the OLM sensor at 12" (305 mm) from the floor.
• Verify the on and off voltages of OLM signal 93, and 94 (off = 0VDC, on = 45-55VDC).
• Verify that 93 and 94 are not reversed.
• Check for Delta OLM at fault floor.
• Disconnect the OLM signal. See if elevator can make a normal run.
• If the car runs normally, the problem is with the external OLM signal. Trace the OLM signal through the following components.
Car Top selection.
SCR-RI board.
IMC-DIO board.
IMC-DDP-C(D) board (See Appendix B for board replacement instructions).
• If the car does not run normally, check the following on SCR-RI board terminals:
Verify the on and off voltages of the quadrature signal 95, 96 (off = 0VDC,on = 40-55VDC). (See Appendix C for further instructions).
Check for bad floor codes.
• Check the positioning of the floor magnets to the edge of the steel tape (on LS-QUAD-2R).
• The DP1 and DP2 quadrature signals must be routed through shielded cable from the car top to where the signal enters the SCR-RI board. To verify a noise free quadrature signal:
Connect an oscilloscope to 95 (CHA)and 96 (CHB) w.r.t. common or ground.
Run the car at high speed.
Watch for noise, irregularities or "drop out" of the signals.</td></tr>
<tr><td>External Trip</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that an external over temperature or open circuit on Baldor J1-16. See the Baldor manual for troubleshooting info.</td></tr>
</table>

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Fault Bypass		FLTB		
This status indicates that safety monitoring is bypassed inside the IMC-DDP-C(D) and IMC-DIO computers. With a highlighted FLTB, the car is only allowed to run for two hours in normal operation. NOTE: The safety functions which are not bypassed by the jumper between terminals FBP1 and FBP2 are any AC Drive faults, Drive ON fault (DRO), and brake output circuit failure (BOF). FLTB indicates the presence of a jumper on the SCR-RI board (FBP1 to FBP2).				
Fault Bypass Timeout		FBLT		NO
This event indicates that the Fault Bypass Jumper between FBP1 and FBP2 on the SCR-RI board has been in place for over two hours. During Inspection operation the timer is disabled so the car can be run on Inspection indefinitely. • To clear this fault, toggle the Inspection switch or remove the jumper.				
Fault Relay		FLT		
This status indicates that the fault relay has been dropped. • The clear this status check for and correct any of the following errors: MFF, BF, BOF, PIE, LOC, TE, TF, TS, UEF, DEF, DBF, IOC, PLL, CFF, PSF, and ACP. • If there are no errors and the FLT relay is not picked, check triac Q1 on the SCR-RI board. This relay must repick after 10-20 seconds if the fault does not persist.				
Fire Service Alternate	SEC	AltFir1	**FIRE SERVICE PHASE 1 - ALTERNATE**	
This event indicates that the system is on Fire Recall Operation (Fire Service Phase I), using the alternate fire recall floor. This recall is generally initiated by the activation of a smoke detector at the main fire recall floor. In some applications, an alternate fire recall switch may be specified (FRAON input). • Inspect the fire sensors (especially the main floor sensor) and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status, if activated by a smoke sensor. • If this is a group installation and the group has yet to be installed, make sure the 2-bus is jumpered to terminal #38 on the HC-RB4-x. Remove the jumper when Fire Service wiring is complete.				
Fire Service Main	SEC	MnFire1	**FIRE SERVICE PHASE 1 - MAIN**	
This event indicates that the system is on Fire Recall Operation (Fire Service Phase I), using the main fire recall floor. This recall is generally initiated by the activation of a smoke detector at a landing other than the main fire recall floor. Fire recall operation to the main floor can also be initiated by the activation of the fire recall switch (input FRON or FRON2). • Inspect the fire sensors and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status if activated by a smoke sensor. • If this is a group installation and the group has yet to be installed, make sure the 2-bus is jumpered to terminal #38 on the HC-RB4-x. • If this installation must comply with the requirements of the 1998 Addendum to the ASME A17.1-1996 or later code, and the machine room and hoistway sensors have not yet been installed, or if this is a group system and the Group Supervisor has yet to be installed, make sure the FRMR and FRHTW inputs on the HC-IOX boards in each simplex or local car controller are jumpered to the 2/2F bus, as applicable.				
Fire Service Phase 2	SEC	FirePh2	**FIRE SERVICE PHASE 2**	
This event indicates that the car is on In-car Fireman's Service (Fire Phase 2). The in-car fire service switch has been placed in the on (FCS) or hold (HLD) position. • Inspect the phase 2 switch and wiring. In most fire jurisdictions, the car must be returned to the fire floor at which Fire Phase 2 was activated, the doors must be fully open, and the phase 2 switch must be turned OFF to remove the elevator from Fire Phase 2 operation.				
Floor Height Learn Error		FHL		
This event indicates that the number of floors learned by the pattern generator is different from the NF (Number of Landings) parameter. • Verify that the NF value reflects the actual number of floors. Be sure to count "false" floors. • Verify that the Up Normal Limit switch is not below the top landing. • Verify that the USD and/or DSD switches operate correctly. • Verify that direction is not dropped before the entire building is learned. • Check for a faulty EEPROM on the IMC-DDP-C board.				
Floors Learned Error				
The fault indicates that the floor heights are invalid. • Remove and reinsert the EEPROM and/or the EPROM on the IMC-DDP-C(D) board. • If problem persists, check for a faulty EEPROM or IMC-DDP-C(D) board. (NOTE: record all parameters before replacing components)				
Following Error	SEC			
This Baldor fault indicates that there is an excessive following error detected between command and feedback signals. See the Baldor manual for additional troubleshooting information.				
FLT Relay Dropped			**FLT RELAY DROPPED**	
The FLT relay is dropped as a result of one or more of many possible fault conditions. • Check the Event Calendar to determine what has caused the FLT Relay Dropped message. Then look up that message or messages in this table to determine the appropriate troubleshooting and/or corrective action.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Fuse Fault	SEC			
This MagneTek fault indicates that the DC bus fuse is open. See the MagneTek manual for additional troubleshooting information.				
Gate Switch Failure	SEC			
This fault indicates that a car gate contact failed to open when the car doors opened. The computer checks the gate switch contact input (GS or GSR) against the door close limit input (DCL). If the gate switch contact remains closed (GS=1 or GSR=1) while the door is open (DCL=1) the fault is logged. Such a state would indicate that the gate switch contact has been shunted, or a contact or associated wiring is faulty. • Verify that, with the doors open, there is no power on the GS input (GS must be low when DCL is high). • If no voltage exists on the GS input, suspect a faulty GS input circuit (HC-IOX or HC-I4O board). • If there is a rear door perform the same tests for the GSR input.				
Gate Switch Relay Redundancy Failure	SEC			
This fault indicates that a car gate switch relay failed to release when the doors opened. • Verify that, with the car gate open, there is no power on the RGS input (or RGSR, if rear doors). • If the RGS input is high, suspect a stuck or welded gate switch relay. • Verify that the gate switch relay(s) operates properly. • If no voltage appears on the RGS (or RGSR) input, suspect a faulty RGS (or RGSR) input circuit.				
Governor Switch Open	SEC	SftyOpn	**GOVERNOR SWITCH OPEN**	
This fault indicates that the governor switch is open. This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened “upstream” of the GOV input. • Check the governor overspeed switch.				
Ground Fault (Baldor)	SEC			
This Baldor fault indicates that a low impedance path between a Baldor output phase and ground has been detected. See the Baldor manual for additional troubleshooting information.				
Ground Fault (MagneTek)	SEC			
This MagneTek fault indicates that the sum of all phase currents exceeds the fault level. See the MagneTek manual for additional troubleshooting information.				
Hall Call Bus Fuse Blown	SEC		**HALL CALL BUS IS DISCONNECTED**	
This fault indicates that there is no power to the hall call circuits on the HC-CI/O board(s). A problem may exist with the Hall Call Bus fuse or the hall call common wiring. • Check the Hall Call Bus fuse in the controller. • Check the wires that go to the Hall Call Power inputs on the HC-CI/O board(s) in the controller. • Check for proper installation of the call board “jumper plug” on the HC-CI/O board(s).				
Hall Call Bypass Operation		Byp-HLW		
This status indicates that the load weigher is detecting a significant load in the car so hall calls will be bypassed.				
Heavy Load			**HEAVY LOAD WEIGHER CONDITION**	
This status indicates that the Heavy Load (HLI) input has been high. • For a discrete HLI input (wired to a load weigher contact): Check the status of the HLI input, and determine if the status of the input is appropriate relative to the load in the car. • For an analog load weigher: Check the perceived load percentage using the on-board diagnostic station. Determine if the value displayed (percentage) is appropriate relative to the load in the car.				
Hoistway Safety Device Open	SEC	SftyOpn	**HOISTWAY SAFETY DEVICE OPEN**	
This fault indicates that one or more of the Hoistway Safety Circuit Devices is open (e.g., pit stop switch, car and cwt buffers switches, up/down final limit switches). This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened “upstream” of the SAFH input. • Check the applicable items (e.g., pit stop switch, car and cwt buffers switches, up/down final limit switches). Refer to the specific controller wiring prints for applicable devices.				
Hospital Service	SEC		**HOSPITAL PHASE 1 OPERATION**	
This status indicates that the car was placed on Hospital Service. • Hospital Service can be initiated by the registration of a hospital call, or by the activation of the in-car Hospital Service switch (HOSP input). • Verify that the status of the in-car hospital switch computer input (HOSP) is appropriate relative to the status of the key-switch.				
Hospital Service Phase 2	SEC		**HOSPITAL PHASE 2 OPERATION**	
This status indicates that the car has answered a hospital emergency call or the in car hospital emergency key switch has been activated (HOSP2 is high). • The car has been placed on in-car Hospital Emergency Service. The car will remain in this mode until the in-car Hospital Service key-switch is turned off. • Verify that the status of the in-car hospital switch computer input (HOSP2) is appropriate relative to the status of the key-switch.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Identification Mismatch		IDM		
This fault indicates a mismatch between the identification sent from the MC-CGP-4 board and the identification read from the DDP EEPROM. • This problem is caused when the hoistway has not been learned for the first time; the MC-MP2-2K, MC-CGP, or IMC-DDP-C boards have been exchanged; or the EEPROM on the IMC-DDP-C board has been exchanged. Relearn the hoistway to clear this fault.				
In-car Stop Switch	SEC	SftyOpn	**IN CAR STOP SWITCH ACTIVATED**	
This fault indicates that the in-car stop switch has opened the safety circuit. • Check the status of the in-car emergency stop switch and associated wiring.				
Inconspicuous Riser	SEC			
This event indicates that the System is on Swing operation or the Inconspicuous Riser is functional. • Check Swing Car Operation. • Inspect the SWG switch on the controller.				
Independent Service	SEC	IndSrv	**INDEPENDENT SERVICE OPERATION**	
This event indicates that the Independent Service switch has been turned on, or the TEST/NORMAL switch on the Relay board is in the TEST position. • Check the Independent Service switch. • Inspect the TEST/NORMAL switch on the Relay board on the controller. • Check the wiring to the relay board (HC-RB4-x) terminal #49.				
Inspection	SEC	InspAcc	**INSPECTION OPERATION**	
This event indicates that the hoistway access, car top inspection or relay panel inspection switch is on INSP or the hoistway and/or car-door bypass switch is on bypass. The Inspection input (IN) is low. • Check all of the inspection switches and associated wiring. • Check the wiring to the relay board (HC-RB4-x) terminal #59				
Inspection Run				
This status indicates that the car is on Inspection with direction activated.				
Inspection/ Leveling Overspeed	SEC	ILO	**INSPECTION/LEVELING OVERSPEED FAILURE**	
This fault indicates that the car has exceeded the inspection/leveling overspeed parameter (MILO) when the car is moving on inspection operation, or while in leveling. • Check for proper operation of the velocity transducer (tachometer or velocity encoder). • Check for proper adjustment of tachometer scaling (GTC) and pattern gain (PG). • Also check for a proper quadrature signal waveform (look for signal noise, or a fluctuating signal during steady state speed).				
Inspection Overspeed	SEC			YES
This fault indicates that, during an Inspection run, the car overspeeded while passing over the LU or LD vane of the destination floor. The overspeed value is determined by MILO, Inspection/Leveling Overspeed parameter on the Safety (Shift F6) screen. • If there is an intermittent IOS fault, there could be a loose E31/INS connection on the SCR-RI. • Verify, on inspection, that the car speed is relatively close to the Pattern velocity and less than the MILO parameter on Safety (Shift F6) screen. • If the car overspeeds, adjust GTC on the Drive (Shift F5) screen so that the car travels at the commanded speed (pattern velocity). • Verify that the PG=1.0, Pattern Scaling on the Pattern (Shift F4) screen.				
Invalid Base ID	SEC			
This Baldor fault indicates that drive does not recognize the power base ID. • Press RESET on the Baldor Drive keypad. • See the Baldor manual for additional troubleshooting information.				
Inverter Base ID	SEC			
This Baldor fault indicates that the control board was installed in the Baldor power base without current feedback. • See the Baldor manual for additional troubleshooting information.				
Landing System Redundancy Failure	SEC			
This fault indicates that one of the landing system sensors or associated relays has malfunctioned. A Landing System Redundancy Failure will be declared if the LSR input remains high throughout a run. • Verify proper operation of the Door Zone (DZ), Level Up (LU) and Level Down (LD) relays while the car is moving in the hoistway. • The LSR signal must go low at least once during a run.				
Learn Bypass Fault		IBJ		NO
This fault indicates that the INTB jumper on the SCR-RI board is in the LRN position. • Move the INTB jumper to the NORM position. • If the IBJ flag is highlighted on the F3 screen, there may be a problem with the input circuit. • Verify that when the car is on Inspection the INS flag on the F3 screen is highlighted and the IN input is low.				
Learn Run				
This status indicates that the car is on Inspection with the Swing Panel set for Hoistway Learn operation and direction is activated.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Level Down			**LEVELING DOWN**	
This status is normally on when the car is just above a floor. If the car is level with the floor and this message appears, it is usually the result of a switch or sensor problem. • Inspect the LD switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.				
Level Down ON (Learn Mode Setup Error)			**CAR NOT ON LEVEL DOWN (SETUP ERROR), LEARN MODE**	
This status indicates that the Level Down (LD) input is on during the learn process. • Verify that the INTB jumper on the SCR-RI board is in the LRN position. • Verify that the LD input (terminal #25 on the HC-RB4-x board) is disconnected.				
Level Up			**LEVELING UP**	
This status is normally on when the car is just below a floor. If the car is level with the floor and this message appears, it is usually the result of a switch or sensor problem. • Inspect the LU switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.				
Leveling Overspeed	SEC			YES
This fault indicates that the leveling speed has exceeded MILO, Inspection/Leveling Overspeed parameter on the Safety (Shift F6) screen, while the car was leveling into a destination floor. This fault is detected when the selector engaged the LU or LD vane. • Verify that the leveling relays (LU1, LU2, LD1 and LD2) are working correctly. • Loose connection of E14 (LEV on the SCR-RI board) can cause an intermittent LOS fault.				
Leveling Sensor Failure (Active State)			**LEVELING SENSOR FAILED - ON POSITION**	
This fault indicates that the MP detected a LU or LD input that is stuck in the active state. Computer input circuit (main relay board or HC-PI/O board). • Check operation of the leveling sensors and associated wiring. 1. Place car on inspection. 2. Put the INTB jumper on the SCR-RI board in the LRN position. 3. Move above and below a landing, noting the transitions in the leveling signal(s) coming from the landing system. • Verify that the computer diagnostic display (F3 screen or ADDR 29H, bits 3 and 7) of LU and LD matches the state of the sensor signals at the main relay board (terminals 25X and 26X). • Put the INTB jumper on the SCR-RI board back in the NORM position. • Check also the operation of any contacts that may be placed at the “low side” (the “1-bus” side) of the LU and LD relay coils (e.g., H, INT). Check that such contacts close properly when appropriate.				
Leveling Sensor Failure (Inactive State)			**LEVELING SENSOR FAILED - OFF POSITION**	
This fault indicates that the MP detected a LU or LD input that is stuck in the inactive state. Troubleshooting tips: • Check operation of the leveling sensors and associated wiring. 1. Place car on inspection. 2. Put the INTB jumper on the SCR-RI board in the LRN position. 3. Move above and below a landing, noting the transitions in the leveling signal(s) coming from the landing system. • Verify that the computer diagnostic display of LU and LD matches the state of the sensor signals at the main relay board. • Put the INTB jumper on the SCR-RI board back in the NORM position.				
Leveling Sensor Redundancy Failure	SEC		**LEVELING SENSOR FAILURE**	
This fault indicates that one of the LU or LD sensors appears to have failed. The MP computer has observed one of the following faults: • One of the leveling inputs was active continuously throughout a floor-to-floor run • The appropriate leveling input was not seen prior to the arrival of the car at a door zone Troubleshooting Tips: • Verify the proper operation of the leveling sensor signals when moving the car in the hoistway. • Check for a LU or LD input circuit failure by looking for defective: 1. 47kohm resistor on top of the main relay board, HC-RB4-x. 2. C2 ribbon cable. 3. HC-PI/O board input circuit. 4. Inputs at terminals 25 and 26 on the HC-RB4-x board.				
Light Load			**LIGHT LOAD WEIGHER CONDITION**	
This status indicates that the Light Load Weighing (LLI) input is activated. The Light Load error message is generated whenever the load inside the car is less than the threshold specified to activate Anti-Nuisance operation, and car calls are registered. • Response is only required if the anti-nuisance function (cancellation of car calls) appears to activate even when the car is loaded to a value above the threshold load value. • For a discrete (LLI) input (wired to a load weigher contact): check the status of the (LLI) input and determine if the status is appropriate relative to the load in the car. • For an Analog Load Weigher: check the perceived load percentage using the on-board diagnostic station. Determine if the percentage displayed is appropriate relative to the load in the car.				
Line Regeneration	SEC			
This Baldor fault only applies to Series 22H Line Regen controls. See the Baldor manual for additional troubleshooting information.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Logic Supply Failure	SEC			
This Baldor fault indicates that the logic power supply is not working properly. See the Baldor manual for additional troubleshooting information.				
Loss of Direction	SEC	LOD		NO
This fault indicates that the direction input (UP or DN) from the HC-RB4-SCRI, through the SCR-RI, to the IMC-DDP-C(D) computer has been lost prior to reaching the Dead Zone of the destination floor, during a normal run. • Look for a Drive Fault, in the Special Event Calendar, that dropped the fault relay. If one occurred at approximately the same time as the Loss of Direction fault then the LOD is most likely a side effect of the Drive Fault. • If the Door Lock signal is lost during a run, check for a clipped door lock. • If the Drive Enable LED is flickering and/or the H-speed relay is chattering on the HC-RB4-x board, check for a resistive door lock, which causes a sagging 2 bus. Either clean the door locks or add a RC network to burn off the residue. • Check for a defective: 1. Ribbon cable between the SCR-RI and IMC-MB boards. 2. SCR-RI board by verifying inputs 85 (UP) and 87(DN) on the IDC connectors (located on the right-hand side of the board). 3. IMC-DIO board 4. IMC-DDP-C(D) board (See Appendix B for board replacement instructions).				
Loss of IN During Learn (Learn Mode Setup Error)			**LOSS OF INSPECTION DURING LEARN MODE**	
This status indicates that the car was taken off of Inspection operation during the learn process. • Place the car on relay panel Inspection and perform the learn process again.				
Loss of Position Feedback	SEC	LOP	**DRIVE FAULT 2**	NO
The IMC-DDP-C(D) computer has lost signals DP1/DP2 from the car top landing system while the car was making a normal run. This fault triggers a Drive Fault 2, which must be manually reset. • Verify the on and off voltages of the quadrature signal 95, 96 (off = 0VDC, on = 40-55VDC). (See Appendix C for further instructions). • Check for dirty optical components if using a LS-QUAD-2R landing system. • Check all connections between terminals 95/DP1 and 96/DP2 on the landing system and panel mount terminals 95 and 96 on the controller (screw terminals, shielded cable, and optical sensors on LS-QUAD-2R). Check encoder connections for LS-QUIK-1R. Check for a defective: 1. SCR-RI board. 2. IMC-DIO board. 3. EEPROM on the IMC-DDP board. (See Appendix B for replacement instructions.) • Verify the value of MPER Position Encoder Resolution (see Table R.4)				
Lost Door Lock During Run	SEC			
This fault indicates that the Door Lock input was lost while the car was traveling through the hoistway. • Check door lock adjustment to prevent clipping of door lock mechanism when car passes a floor. • If logged with another fault, this event may be a side effect of the other fault.				
Lost User Data	SEC			
This Baldor fault indicates that the battery backed-up Baldor parameters have been lost or corrupted. • Cycle the power and reset the Drive parameters to the MCE settings. • See the Baldor manual for additional troubleshooting information.				
Low Initial Bus Voltage	SEC			
This Baldor fault indicates that the drive detected an insufficient DC bus voltage on power-up. • Check the AC line voltage. • See the Baldor manual for additional troubleshooting information.				
Memory Error	SEC			
This Baldor fault indicates that an EEPROM memory fault occurred. • Press RESET on the Baldor Drive to clear the fault. • If the fault clears, verify the drive parameters. • If the fault remains, contact Baldor.				
MG Shutdown Operation/ Shutdown Switch			**SHUTDOWN OPERATION**	
This status indicates that the car is on MG Shutdown Operation or that another Shutdown Switch is activated. If the MGS input is high see job prints to determine what switch is connected to the input. This shutdown will bring the car to the lobby first then shut down the car. • Check the status of the Motor Generator Shutdown Switch input. • Verify that the status of the computer input (MGS) is appropriate relative to the status of the switch or contact that feeds the input (see job prints).				
Microprocessor Reset	SEC			
This Baldor fault indicates that the input power was cycled before the DC bus voltage reached 0 VDC. • Press RESET on the Baldor Drive to clear the fault. • If the fault remains, contact Baldor.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
MLT - Drive Forced	SEC	MLT	**DRIVE FORCED MOTOR LIMIT TIMER**	
This fault indicates that a Motor Limit Timer fault was generated due to persistent system and drive faults. The system is shut down due to 4 drive related faults within 7 normal runs. • A special event calendar message which details the root cause of this fault should be logged in the event calendar. Refer to the event calendar and the specific troubleshooting suggestions that are associated with the event. • To clear the MLT fault, put the car on Inspection and press the “Drive Reset” button on the IMC-DAS (IMC-DCP) board.				
MLT - Drive Forced (ALT)	SEC	MLT	**DRIVE FORCED MOTOR LIMIT TIMER**	
See MLT - Drive Forced.				
MLT - Excessive PI Correction	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
This fault indicates that the logical PI value (obtained from the landing system) and the floor encoding are inconsistent. • Call MCE for troubleshooting. • To clear the condition, the car can be placed momentarily on Inspection.				
MLT - Excessive Releveling at Floor	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
This fault indicates that the car has releveled 25 times at the same floor. • Check the brake releveling motor adjustment. • If the job is using a sleeve bearing motor, turn the Idle option ON. (See Table 5.3, Timers and their Ranges, in the manual for details on the Idle option). • To clear the condition, the car can be placed momentarily on Inspection.				
MLT - Failed to Leave Floor	SEC	MLT	**FAILURE TO LEAVE THE FLOOR**	
This fault is generated when the controller has picked high speed a number of times but failed to leave the floor. The number of tries allowed is a field-programmable value, programmed through the MC-MP2 enhanced on-board diagnostics (“System Mode”). • The field adjustable option FTLF in the MP2's EOD may be used to turn the option OFF or to change the number of times H picks before shutdown. The factory default is FTLF = OFF. • Check for an intermittent Door Lock. • To clear the condition, the car can be placed momentarily on Inspection.				
MLT - Timer Expired	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
The motor limit timer has elapsed before the car has completed its movement. This condition can occur because the MC-MP computer receives a direction sensing (UPS or DNS) input for a sufficient amount of time to cause the MLT timer to elapse. This usually happens due to the system's failure to respond to a 120 VAC direction signal appearing on terminals 85(up) or 87 (down) on the HC-RB4-X Relay board. • Check Up and Down Sense inputs. • If the OLM, DZ, or LEV input signal is stuck on during a correction run, the car may not be able to reach the next landing before the Motor Limit Timer elapses. Check these input signals. • To clear the condition, the car can be placed momentarily on Inspection.				
Motor Data Fault	SEC			
This MagneTek fault indicates that the motor data is corrupted. See the MagneTek manual for additional troubleshooting information.				
Motor ID Fault	SEC			
This MagneTek fault indicates that the Motor ID is invalid. See the MagneTek manual for additional troubleshooting information.				
Motor Limit Timer	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
The motor limit timer has elapsed before the car completed its movement. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”. • To clear the condition, the car can be placed momentarily on Inspection. • Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.				
Motor Limit Timer (INT)	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
This fault indicates that the intermediate speed flag (INT) was active when the Motor Limit Timer elapsed. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”. • Verify that the INT relay is dropped(on the SCR-RI board) and the MP status flag for INT is low, once the car drops below the speed set by the MINT parameter, on the Pattern (Shift F4) page. • To clear the condition, the car can be placed momentarily on Inspection. • Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.				
Motor Limit Timer (LI)	SEC	MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
This fault indicates that the level inhibit flag (LI), controlled by the MLI parameter, was active when the Motor Limit Timer elapsed. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”. To clear the condition, the car can be placed momentarily on Inspection. • Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.				
Motor Limit Timer (LI & INT)		MLT	**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**	
This fault indicates that the level inhibit flag (LI) and the intermediate speed flag (INT) were active when the Motor Limit Timer elapsed. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”. • To clear the condition, the car can be placed momentarily on Inspection. • Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
MX and PT1 Redundancy Failure	SEC	CNPB	**CONTACTOR PROOFING REDUNDANCY FAILURE**	YES
This fault indicates that there is a failure in the contacts of PT1 and MX on the SCR-PRI board. • Verify the CNPB output on the SCR-PRI board. The output should be above 100VAC when the car is at a floor and 0VAC when the car is moving. Incorrect voltages normally indicate failed normally closed contacts. Replace the relays to correct the error. Do not attempt to “dress” the contacts. • Check for no brake input voltage at terminals BPI1 and BPI2 on the SCR-PRI board. • SAFB is not picked. • Verify that brake fuses FB1 and FB2 have not cleared. • Verify that PT1 and MX relay contacts dropped out after previous run.				
New Base ID	SEC			
This Baldor fault indicates that the control board has changed since the last operation. • Press RESET on the Baldor Drive keypad to clear the fault. • Then reset the drive parameters to the MCE/User settings. • See the Baldor manual for additional troubleshooting information.				
No Expansion Board	SEC			
This Baldor fault indicates that programmed operating mode needs an expansion board or that an incorrect operating mode was programmed. • Verify that parameters P1401 and P2701 are set to the default values listed on the Baldor AC Drive Parameter Table. • See the Baldor manual for additional troubleshooting information.				
No Response for Run Request	SEC	DRO		YES
This fault indicates that the AC Drive or System 12 SCR Drive has not activated the Drive ON (DRO) status within 200ms after receiving the three signals necessary to initiate a run (Direction, Run Enable (RE), M or PM contactors picked). This failure prevents a normal run. • For controllers with AC drives, refer to sections 3.7, 3.71 and 3.72 for detailed information.				
No Response from Pattern Generator (Learn Mode Setup Error)			**NO RESPONSE FROM PATTERN GENERATOR (SETUP ERROR), LEARN MODE**	
This status indicates faulty communication of status information between the MC-MP2 and the IMC-DDP-C(D) boards. • Verify that the boards in the Swing Panel are looping. • Reconnect the three boards in the Swing Panel (MC-MP2, MC-CGP-4, and IMC-DDP-C(D)). • Check for a defective board in the Swing Panel. (See Appendix B for board replacement instructions).				
Nudging		Nudging		
This status indicates that the door nudging operation has commenced. Doors will be closed with reduced speed and torque as required by code.				
One Floor Height Error		OFH		
This fault indicates that a normal run profile would be invalid for the shortest floor in the building. • To clear the fault decrease DSR, decrease VSR, decrease A2, and/or increase J1 on the Pattern (Shift F4) screen. Parameters listed are given in order of decreasing effect (that is, changing DSR would have the most effect and J1 the least effect).				
Open Motor Phase	SEC			
This MagneTek fault indicates that an open phase to the motor was detected. See the MagneTek manual for additional troubleshooting information.				
Outer Leveling Pattern Modified				
This fault indicates that the pattern profile was modified to accommodate the error seen at the OLM distance (12" [305 mm] from the floor). If the error is too great, the elevator will be allowed to pass the floor and stop at the next available landing. • Refer to Excessive Position Error at OLM for troubleshooting tips.				
Out of Service		OutServ		
This status indicates that the car is not available for normal passenger service.				
Overcurrent	SEC			
This Baldor fault indicates that an instantaneous overcurrent condition was detected. See the Baldor manual for additional troubleshooting information.				
Overcurrent Fault	SEC			
This MagneTek fault indicates that the motor current exceeded the current fault level. See the MagneTek manual for additional troubleshooting information.				
Overload 1 Minute	SEC			
This Baldor fault indicates that peak output current exceeded the 1 minute rating. See the Baldor manual for additional troubleshooting information.				
Overload 3 Seconds	SEC			
This Baldor fault indicates that peak output current exceeded the 3 second rating. See the Baldor manual for additional troubleshooting information.				

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Overspeed</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This Baldor fault indicates that the motor speed exceeded 110% of the Maximum Output RPM parameter value.
See the Baldor manual for additional troubleshooting information.</td></tr>
<tr><td>Overspeed Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the speed exceeded overspeed fault limit.
See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Overvoltage Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the DC bus voltage exceeded the overvoltage fault limit. See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Parameter Checksum Error</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the verification of the IMC-DDP-C(D) EEPROM checksum had failed. This check is performed after direction is picked.
• To troubleshoot this failure see the Special Event Calendar or the F3 screen flag for more specific checksum errors in the format Checksum Error - XXX then troubleshoot that error.</td></tr>
<tr><td>Parity Sensor Failure (Floor Code)</td><td>SEC</td><td>PRS</td><td></td><td>NO</td></tr>
<tr><td colspan="5">This fault indicates that the state of the PR signal is invalid in reference to the states of the R0, R1, R2, R3, R4, and R5 (refer to PR control status and Table 4.2, Absolute Floor Code Indicator Listing for more information). This fault triggers a Drive Fault 2, which clears automatically when the problem is corrected. If this fault occurs at a false floor, an entrapment may occur.
• RD and DZ signals should be active, LEV should be inactive, and the parity bit should only be active if an odd number of bits R0-R5 are on.
• Verify that the floor code is not greater than the floor number parameter, NF on the Pattern (Shift F4) page.
• Check for a defective:
SCR-RI board.
IMC-DIO board.
IMC-DDP-C(D) board (See Appendix B for board replacement instructions).</td></tr>
<tr><td>Passcode Requested</td><td>SEC</td><td></td><td>PASSCODE REQUEST</td><td></td></tr>
<tr><td colspan="5">This status indicates that the Passcode Requested option has been activated and that a passcode is required in order to run the car on any mode other than Inspection. Refer to the instructions titled Setting the Passcode in Section 5.</td></tr>
<tr><td>Pattern Detected Overspeed</td><td>SEC</td><td></td><td>DRIVE FORCED MOTOR LIMIT TIMER</td><td>NO</td></tr>
<tr><td colspan="5">This fault indicates that the synthesized velocity from position encoder (DP1 and DP2) exceeded 115% of contract speed or the error between the synthesized velocity and tachometer (velocity encoder) signal exceeded 50% of contract speed. This fault triggers a MLT - Drive Forced fault if encountered 4 times within 7 attempts to run.
• Check for a failing quadrature signal feedback coming from the encoder or LS-QUAD.
• Check for a defective Tach/Encoder.
• Check the integrity of the Motor armature, interpole (if any), and fields.
• To avoid this fault while performing an overspeed test, use OBT Buffer Test.</td></tr>
<tr><td>Pattern Generator Not Ready</td><td></td><td></td><td>PG NOT READY</td><td></td></tr>
<tr><td colspan="5">This fault indicates that PGU, DSR, EPR, and/or SPR status signals were not active and the IBJ fault flag was active.
• Check for active status signals on PGU, DSR, EPR and SPR.
• Check for the IBJ fault flag.</td></tr>
<tr><td>PCU Checksum Fault</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the Power Conversion Unit's data is corrupted.
See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>PG Error, Loss of UP Direction
(Learn Mode Setup Error)</td><td></td><td></td><td>PG ERROR, LOSS OF UP DIRECTION (SETUP ERROR) LEARN MODE</td><td></td></tr>
<tr><td colspan="5">This status indicates that the up direction was lost during the Learn Operation.
• Check for UP direction at terminal 10 on the HC-RB4-x Main Relay Board and at the computer input (UP).
• If the error occurs at the top, the UP Normal is too close to the top landing.
• If the UP direction input is correct but the computer input is not, the IMC-DAS board may be faulty. Verify the connections between the Swing Panel, SI2 drive and the SCR-RI board.</td></tr>
<tr><td>Photo-Eye Failure</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This fault indicates that the one of the photo-eye inputs has been active for a considerable amount of time.
• Check for abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHE or PHER) circuit.
• Ensure that the safety edge has power.</td></tr>
<tr><td>Photo-Eye Failure (Front)</td><td>SEC</td><td></td><td>PHOTO EYE FAILURE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the front-door, photo-eye input (PHE) was activated during a run.
• Check for abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHE) circuit.
• Ensure that the safety edge has power.</td></tr>
</table>

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Photo-Eye Failure (Rear)	SEC		**PHOTO EYE FAILURE**	
This fault indicates that the rear-door, photo-eye input (PHER) was activated during a run. • Check for abnormal blockage of the optical device. • Check for a failure of the device itself, or of the photo-eye input (PHER) circuit. • Ensure that the safety edge has power.				
PM Contactor Not Picking	SEC			
This fault indicates that during the redundancy check (initiated prior to motion), a DRO fault was generated by the drive. • After demand for car movement, verify that the PM1/PM2 Contactors picks and the ADO indicator on the F3 screen is illuminated.				
PM Contactor Redundancy Failure				YES
This fault indicates that, before enabling RE, the IMC-DDP-C(D) detected that the MR input voltage--on the SCR-RI board was less than 60VAC (normally 120 VAC) or after RE was enabled, the MR voltage was not zero (0VAC). Check the: • Normally closed auxiliary contacts of the PM1/PM2 contactors. • F2D fuse.				
Position Error at DETS	SEC		**DRIVE FAULT 2**	YES
This fault indicates that the DETS switch opened prematurely or did not open at the learned position. This fault triggers a Drive Fault 2, which automatically clears if the failure is corrected. • The learning process must be completed initially or any time modifications are made to the location of DETS (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • Physically check the integrity of the switch. • If there is a faulty input, check for a defective: SCR-RI board. IMC-DIO board.				
Position Error at DNTx	SEC	TPS	**DRIVE FAULT 2**	YES
This fault indicates that the DNTx switch opened prematurely or it did not open at the expected learned position. The car will run at correction speed in the down direction or at normal speed in the up direction. This fault triggers a Drive Fault 2, which automatically clears if the failure is corrected. • The learning process must be completed initially or any time modifications are made to the location of one of the DNTx switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • Physically check the integrity of the switch. • If this fault occurs while approaching a terminal landing, only on one floor runs, perform the Floor Height Learn procedure described in Section 4.1.2. • If there is a faulty input, check for a defective: SCR-RI board. IMC-DIO board.				
Position Error at OLM	SEC	OLP		YES
This fault indicates that while the car was traveling past a floor, on normal operation, the IMC-DDP-C(D) computer detected a 10" (2" if destination landing) or more difference between the actual and learned distance to the floor. This condition is detected by the OLM sensor at 12" (305 mm) from the floor. See Excessive Position Error at OLM for troubleshooting tips.				
Position Error at UETS	SEC		**DRIVE FAULT 2**	YES
This fault indicates that the UETS switch opened prematurely or it did not open at the learned position. This fault triggers a Drive Fault 2, which automatically clears if the failure is corrected. • The learning process must be completed initially or any time modifications are made to the location of UETS (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • Physically check the integrity of the switch. • If there is a faulty input, check for a defective: SCR-RI board. IMC-DIO board.				
Position Error at UNTx	SEC	TPS	**DRIVE FAULT 2**	YES
This fault indicates that the UNTx switch opened prematurely or it did not open at the expected learned position. The car will run at correction speed in up direction or at normal speed in the down direction. This fault triggers a Drive Fault 2, which clears automatically if the failure is corrected. • The learning process must be completed initially or any time modifications are made to the location of the one of the UNTx switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • Physically check the integrity of the switch. • If this fault occurs while approaching a terminal landing, only on one floor runs, perform the Floor Height Learn procedure described in Section 4.1.2. • If there is a faulty input, check for a defective: SCR-RI board. IMC-DIO board.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Position Feedback Reversed	SEC	QPR		NO
This fault indicates that the position quadrature signals 95/DP1 and 96/DP2 are reversed (while the elevator is traveling in the correct direction). The elevator will travel at correction speed until it reaches the next landing and then it will no longer run until the problem is fixed. This fault triggers a Drive Fault 2, which must be manually reset. • Swapping the wires at terminals 95 and 96 on the SCR-RI board will resolve this problem. • Check the ON and OFF voltages of the DP1/DP2 (OFF < 1VDC, ON = 46-55VDC).				
Power Base Fault	SEC			
This Baldor fault indicates that the power device has been de-saturated or the bus current threshold has been exceeded. See the Baldor manual for additional troubleshooting information.				
Power Down	SEC			
This event indicates that the entire controller lost power or was manually reset. This event is logged when the MC-CGP-4P board loses power or is reset while running.				
Power Supply Failure	SEC			
This Baldor fault indicates that the power supply has failed. • Press the RESET key on the Baldor Drive keypad to clear the fault. • If the fault remains, contact Baldor.				
Pre-test Mode			**PRE-TEST MODE**	
This status indicates that the car is bypassing hall calls and disabling the gongs. However, car calls may still be entered and will be answered. Once the last car call is answered, the car will park with doors closed. This function is normally used to capture a car.				
Priority/VIP Service Phase 1			**PRIORITY / VIP SERVICE - PHASE 1**	
This status indicates that a Priority/VIP Service momentary call switch was activated at any floor. • The car has been assigned a Priority/VIP Service call. The car can be removed from Priority/VIP Service by toggling (On-Off) the in-car Priority/VIP Service key-switch. The car should automatically return to normal service after a pre-determined period of time (typically 60 seconds) if the in-car switch is not activated.				
Priority/VIP Service Phase 2			**PRIORITY / VIP SERVICE - PHASE 2**	
This status indicates that the car has answered a Priority/VIP call or the in car Priority/VIP Service key switch has been activated (PRIS is high).				
PT2 & PT3 Redundancy Failure	SEC	CNPM	**CONTACTOR PROOFING REDUNDANCY FAILURE**	YES
This fault indicates that there is a failure in the contacts of PT2 and PT3 on the SCR-PRI board. • Verify the CNPM output on the SCR-PRI board. The output should be above 100VAC before the RE relay is picked and should drop to zero volts after RE picks. Incorrect voltages normally indicate failed normally closed contacts. Replace the relays to correct the error. Do not attempt to "dress" the contacts. • Check for no brake input voltage at terminals MI1 and MI2 on the SCR-PRI board. • SAFM is not picked • Verify that brake fuse FMC have not cleared • Verify that PT2 and PT3 relay contacts dropped out after previous run.				
Read Sensor Failure (Floor Code)	SEC	RDS	**DRIVE FAULT 2**	NO
This fault indicates that the elevator has stopped (LEV is inactive and DZ is active) and that the pattern generator is not receiving the RD signal (refer to the Status Flag Description Table (6.1) for more information).This fault triggers a Drive Fault 2, which clears automatically when the problem is corrected. If this fault occurs at a false floor, an entrapment may occur. • This event may be logged due to another drive fault. Check the Special Events Calendar for a drive fault that occurred at the same time as the Read Sensor Failure and troubleshoot that fault first. • This event could occur if LU or LD fails in the direction of travel and therefore the car stops short of the destination landing. • If there is no RD signal on the SCR-RI board, then verify that the RD signal is coming from the landing system (check the RD sensors). • If there is an RD signal on the SCR-RI board, then it may be a defective: Ribbon Cable connecting the SCR-RI board to the IMC-DIO board. Ribbon Cable connecting the IMC-MB board to the swing panel. SCR-RI board. IMC-DIO board.				
Regeneration Resistor Power	SEC			
This Baldor fault indicates that regeneration power has exceeded the dynamic brake resistor rating. See the Baldor manual for additional troubleshooting information.				
Releveling	SEC			
This event indicates that the car has traveled through the Dead Zone on an approach to the floor, and has had to relevel. • The drive must be properly adjusted to track the velocity profile from the IMC-DDP-C(D) computer using GP, GI, and GDEC parameters on the Drive (Shift F5) page. • Changing one or more of the following parameters can also help: decrease DS, increase the Final Leveling Distance (DFL), and/or decrease the Final Leveling Velocity (VFL) or Phase Seven Jerk (J7).				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Rollback Detected	SEC			NO
This event indicates that car rollback was detected. The car will continue to run under normal operation. • If a load weigher circuit is installed, check the load weigher circuit and adjustments. • Look for too much Speed Pick Delay (TSPD > 0.5). • Verify that the AC Drive gains are properly adjusted. (See section 4.4.2 for MagneTek and 4.4.3 for Baldor.)				
RS-422 Network Down	SEC			
This fault indicates that the Group Supervisor was previously communicating with one or more local cars but is now unable to communicate with any cars. • Verify that the RS-422 communication cable is not removed from the Group's MC-RS board. • Verify the jumpers on all of the controllers' MC-RS boards. • Check for a defective MC-RS board on any of the controllers by replacing it.				
RS-422 Network OK	SEC			
This event indicates that the Group Supervisor has recovered from an RS-422 Network Down event.				
Safety Overspeed at DETS	SEC			
This fault indicates that as the car approached a terminal landing the Safety processor detected a car speed greater than the learned velocity at the time the contact opened the DETS switch. See **Velocity Error at DETS** for troubleshooting tips.				
Safety Overspeed at DNTx	SEC			
This fault indicates that as the car approached a terminal landing the Safety processor detected a car speed greater than the learned velocity at the time the contact opened on one of the DNTx switches (DNTx or contacts on the TM switch). See **Velocity Error at DNTx** for troubleshooting tips				
Safety Overspeed at UETS	SEC			
This fault indicates that as the car approached a terminal landing the Safety processor detected a car speed greater than the learned velocity at the time the contact opened the UETS switches. See **Velocity Error at UETS** for troubleshooting tips.				
Safety Overspeed at UNTx	SEC			
This fault indicates that as the car approached a terminal landing the Safety processor detected a car speed greater than the learned velocity at the time the contact opened on one of the UNTx switches (UNTx or contacts on the TM switch). See **Velocity Error at UNTx** for troubleshooting tips.				
Safety Processor Communication Error		SPC		
This fault indicates that the IMC-DDP-C board is not receiving data from the IMC-DIO board. See **Safety Processor Protocol Error** for troubleshooting tips.				
Safety Processor Protocol Error		SPP		
This fault indicates that invalid data was passed between the IMC-DIO and IMC-DDP-C(D) boards. • Check for an: Incorrectly socketed EPROM on the IMC-DDP-C(D) board. Incorrectly socketed IMC-DIO processor board. A faulty IMC-DDP-C(D) board. (See Appendix B for board replacement instructions). A faulty IMC-DIO board.				
Safety Processor Tripped		SPT		
This fault indicates that a fault was detected by the safety processor on the IMC-DIO board. • Refer to Section 5.2 in this manual for troubleshooting information.				
Safety Relay Circuit Open	SEC	SftyOpn	**SAFETY CIRCUIT IS OPEN**	
This fault indicates that a contact in the safety relay circuit is open. This message is generated when the safety string input (SAFR1) is low and all safety devices through the in-car stop switch are closed (STOP=1). This indicates that a device “below” terminal #20 has opened. • Refer to the job prints to determine all components that make up the safety relay circuit (between terminal 20 and the CSAF output device). • Check each of these devices to determine the cause of the fault.				
Security	SEC		**ENTER SECURITY CODE**	
This event indicates that the secured car call button has been pressed, and the controller is awaiting proper security code to be entered through the car call buttons. A 10-second period of time is allowed to enter the correct code. • Enter floor pass code with car call buttons on COP. • See Section 5.3.2 or the appropriate security appendix for instructions on how to program or change security pass codes.				
Setup Fault 1	SEC			
This MagneTek fault indicates that the calculated rated slip is bad. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 2	SEC			
This MagneTek fault indicates that the pole pair to encoder pulses/revolution ratio is invalid. See the MagneTek manual for additional troubleshooting information.				

TABLE 6.11 Status and Error Messages

Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Setup Fault 3	SEC			
This MagneTek fault indicates that an odd number of poles have been entered. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 4	SEC			
This MagneTek fault indicates that the number of expected encoder pulses/sec is invalid. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 5	SEC			
This MagneTek fault indicates that the calculated base current is invalid. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 6	SEC			
This MagneTek fault indicates that the multi-step speed commands are out of acceptable range. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 7	SEC			
This MagneTek fault indicates that the Run Up, Run Down inputs are mixed with the Run, Up/Down inputs. See the MagneTek manual for additional troubleshooting information.				
Setup Fault 8	SEC			
This MagneTek fault indicates that the up/down confirm has been selected without also setting Speed Source = Analog and defining logic inputs for Run Up and Run Down. See the MagneTek manual for additional troubleshooting information.				
Short Velocity Error		VS		
This event indicates that a normal run profile is invalid because short velocity would be exceeded on a short floor. • To clear this fault: decrease A2, increase VSR, and/or increase J1. These parameters are given in order of decreasing affect.				
Step Signal Overlap Error		SSO		
This event indicates that the time between successive STP signals was shorter than the duration of the signal. • To clear the fault increase J1, decrease A2, increase J35H, increase J35L, and/or decrease A6 on the Pattern (Shift F4) screen.				
Sub-System Reset - DDP	SEC			
This event indicates that the DDP processor was reset.				
Sub-System Reset - Operation Processor	SEC			
This event indicates that the MP processor was reset.				
Sub-System(s) Reset	SEC			
This event indicates that the CGP did not see every processor in the system power up.				
Swing Car Operation		SwngOpr		
This status indicates that the car is operating as a swing car, independently from the Group Supervisor. This car should be servicing a riser of hall calls dedicated to that car.				
System Power Up/Reset	SEC			
This event indicates that the Communication processor detected that all the individual system processors successfully powered up. If one or more processors fail to successfully power up, then this event will be replaced by one or more Sub-System Reset events detailing which individual processors successfully powered up.				
Tach/Encoder Error	SEC	TE		YES
This fault indicates that the difference between the intended speed (pattern) and the speed feedback signal (tachometer/encoder) has exceeded the Maximum Speed Error allowed, STE on the Safety (Shift F6) screen. This fault may also be the result of a failure of the REI input to activate when there is intent to move the car. This fault triggers a MLT - Drive Forced fault if encountered four times within seven attempts to run. • Verify that the tachometer input is connected properly to the SCR-RI board (encoder - HC-EI board) . • Check for a faulty tachometer or encoder. • Check for disabled speed command (pattern) due to an unsafe operation. • Verify the armature voltage. • Verify the brake voltage. • Verify that the brake is lifting properly. • Verify that the REI input activates.				

TABLE 6.11 Status and Error Messages

<table>
<tr><th>Special Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th><th>FBJ</th></tr>
<tr><td>Tach/Encoder Failure</td><td>SEC</td><td></td><td></td><td>YES</td></tr>
<tr><td colspan="5">This fault indicates that the difference between the synthetic tachometer signal (generated from the armature feedback voltage and current) and the external speed feedback signal (tachometer/encoder) has exceeded the tolerance value of 4 volts (40% of contract speed). The error between these two signals can be accessed through the software test points on the IMC-DAS board.
• Verify the armature voltage.
• Check for a grounded armature.
• Check for excessive armature voltage overshoot on the F3 screen. If so, decrease J35L(H) on the Pattern (Shift F4) screen.
• Check for incorrect adjustment of SVSC and SISC parameters on the Safety (Shift F6) screen.
• Ensure that the tachometer/encoder input is connected to the SCR-RI board (encoder - HC-EI board).
• Check for a faulty tachometer or encoder.
• Ensure that the 26 conductor cable between the IMC-MB and SCR-LG(A) boards is connected properly.</td></tr>
<tr><td>Tach Feedback Saturation</td><td>SEC</td><td>TS</td><td></td><td>NO</td></tr>
<tr><td colspan="5">This fault indicates that the voltage at test point TACH on the IMC-DAS board has exceeded the maximum voltage of ±10.0VDC (6.4VDC for Baldor drive).
• Adjust the TACH (R9) trimpot on the IMC-DAS board.
• Verify that the correct tachometer is being used .
• Verify that jumper TVR on the SCR-RI board is in the correct position.
• Adjust the TACH trimpot on the IMC-DAS. The resistance of this trimpot must be about 32Kohms for 60VDC/1000RPM tachometer.
• Verify that Pattern Scaling, PG=1.00 on the Pattern (Shift F4) screen.</td></tr>
<tr><td>Test Mode Operation</td><td></td><td></td><td>CAR IN TEST MODE</td><td></td></tr>
<tr><td colspan="5">This status indicates that the TEST/NORM switch on the HC-RB4-SCRI board is in the TEST position.
• Check the TEST/NORM switch on the HC-RB4-SCRI board.</td></tr>
<tr><td>Timed Out of Service</td><td>SEC</td><td>TOS</td><td>TIME OUT OF SERVICE</td><td></td></tr>
<tr><td colspan="5">This fault indicates that the car delayed reaching its destination (direction arrow established - SUA/SDA). In most cases, the car is delayed at a floor because the doors are prevented from closing. When the timed out of service (TOS) status is generated, the car is removed from hall call service until it is allowed to leave the landing.
• The timer is used to take the car out of service when the car is held excessively. Typically this occurs when the doors are held open by continuous activation of the photo-eye, a call button, or another reopening device. The TOS timer is a field-adjustable timer, which can be lengthened or shortened to suit the specific installation (via the MP diagnostics).</td></tr>
<tr><td>Timed Photo-Eye Failure</td><td>SEC</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">The photo-eye was on longer than the predetermined time (default 60 seconds).
• Check for an abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHE or PHER) circuit.</td></tr>
<tr><td>Top Floor Demand</td><td>SEC</td><td>TflrDem</td><td>BOTTOM FLOOR OR TOP FLOOR DEMAND</td><td></td></tr>
<tr><td colspan="5">This status is generated either when the established PI value corresponds to the bottom terminal landing, but the Down Slow Limit Switch is closed or when a valid PI value can not be found. A top-floor demand is generated to move the car away from the landing to establish car position. Possible causes are:
• The COMPUTER RESET button was pressed.
• Initial Power-up.
• The state of the limit switch contacts do not correspond to the current PI value (example: the car is in door zone and the PI value corresponds to the bottom terminal landing, but the Dn Slow Limit Switch is closed).
• The car was placed on Inspection (the computer does not attempt to maintain the PI value while the car is being moved in a “manual” fashion (Top Floor Demand is declared when the car is placed back into automatic operation).
Troubleshooting tips:
• If no floor encoding exists, car should move to one of the terminal landings to establish car position.
• If floor encoding system exists and car is level at a landing, check the floor encoding magnets or vanes (perhaps a valid code cannot be read).
• If floor encoding does not exist, check the terminal limit switches and associated wiring.
• Verify the input circuits for USD and DSD by looking at:
1. 47Kohm resistors on top of the HC-RB4-x.
2. C2 ribbon cable on top of the HC-RB4-x.
3. HC-PI/O board.
4. Short circuit on relay board.</td></tr>
<tr><td>Torque Limit Too High For Cube</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This MagneTek fault indicates that the torque limit setting is greater than the cube rating.
See the MagneTek manual for additional troubleshooting information.</td></tr>
<tr><td>Torque Prove Failure</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">This Baldor fault indicates that the torque proving test has failed to measure adequate current in all three motor windings.
• Check for any open or loose connections between the drive and motor.
• Check the motor windings.
• See the Baldor manual for additional troubleshooting information.</td></tr>
</table>

TABLE 6.11   Status and Error Messages

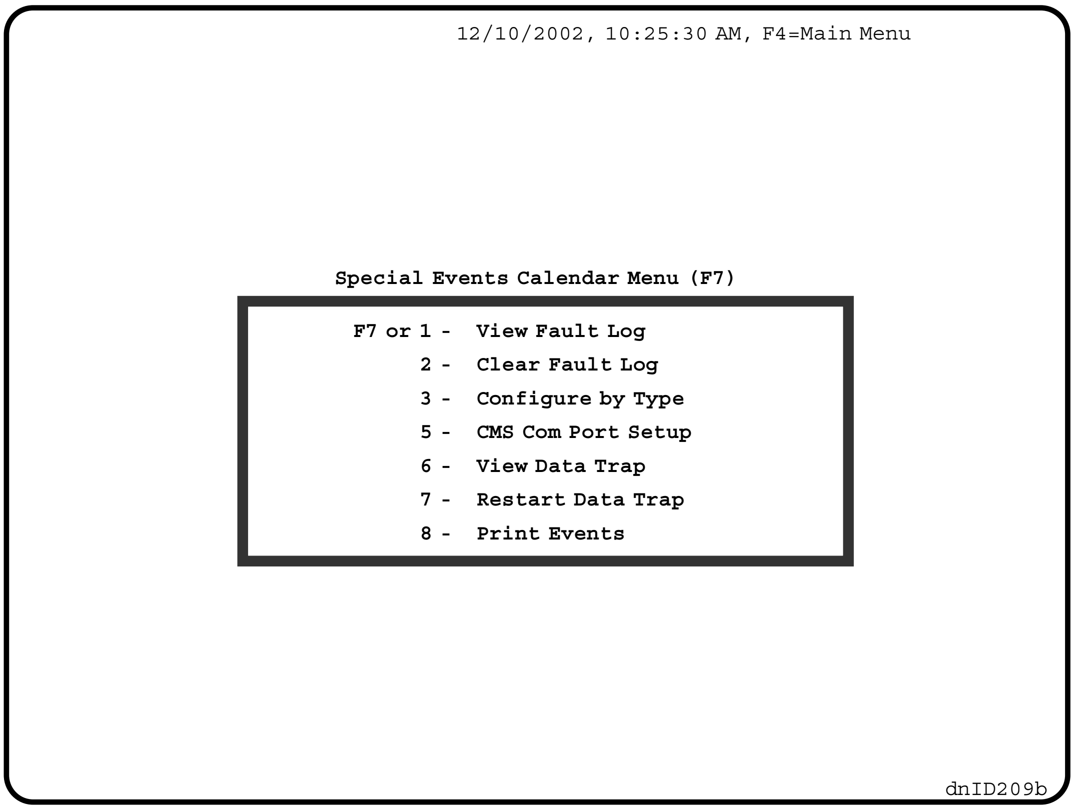
Special Event Message	SEC	F3 Flag	MP2 Scrolling Message	FBJ
Two Floor Height Error		TFH		
This fault indicates that a normal run profile would be invalid for the shortest two floor run in the building because the minimum profile distance would be greater. • To clear the fault: increase J35H, decrease A6, increase J7, increase J35L, decrease A2, increase VHL, increase VIL, increase VFL, decrease DFL, decrease DL, and/or increase J1 on the Pattern (Shift F4) screen. These parameters are given in order of decreasing affect.				
Undervoltage Fault				
This MagneTek fault indicates that the DC bus voltage is less than the undervoltage fault limit. See the MagneTek manual for additional troubleshooting information.				
User Fault				
This Baldor fault indicates that a custom software operating fault occurred. See the Baldor manual for additional troubleshooting information.				
Velocity Error at DETS	SEC	DEF		NO
This fault indicates that as the car approached a terminal landing, the Safety processor detected a higher than learned velocity when the contact opened on the DETS switch. The car will make a correction run in the opposite direction of the failed switch until it reaches a valid floor. If the valid floor is a false floor then the car will make a normal run to the next valid floor opposite the direction of the failed switch. • The learning process must be completed initially or any time modifications are made to the parameters on the Pattern (Shift F4) page or to the location of the DETS switch (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • If there are velocity fluctuations as the car approaches a terminal landing, the learn process should be repeated several times and the learned velocities recorded in each case. • If the velocity varies by more than 5%, limit switches and roller guides should be checked. • Verify the operation of the DETS switch. • Verify that the COMP2 LED on the IMC-DIO board is **not** blinking. • Verify that the learned values for the DETS switch on the Switches (Shift F5) screen are reasonable. • Verify that the DETS input on the SCR-RI board is connected.				
Velocity Error at DNTx	SEC			YES
This fault indicates that as the car approached a terminal landing the IMC-DDP-C(D) processor detected a car speed greater than the learned velocity at the time the contact opened on one of the DNTx switches (DNTx or contacts on the TM switch). • The learning process must be completed initially or any time modifications are made to the parameters on the Pattern (Shift F4) page or to the location of one of the DNTx switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • If there are velocity fluctuations as the car approaches a terminal landing, the learn process should be repeated several times and the learned velocities recorded in each case. • If the velocity varies more than 5%, limit switches and roller guides should be checked.				
Velocity Error at UETS	SEC	UEF		NO
This fault indicates that as the car approached a terminal landing, the Safety processor detected a higher than learned velocity at the time the contact opened on the UETS switch. The car will make a correction run in the opposite direction of the failed switch until it reaches a valid floor. If the valid floor is a false floor then the car will make a normal run to the next valid floor opposite the direction of the failed switch. • The learning process must be completed initially or any time modifications are made to the parameters on the Pattern (Shift F4) page or to the location of one of the UETS switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • If there are velocity fluctuations as the car approaches a terminal landing, the learn process should be repeated several times and the learned velocities recorded in each case. • If the velocity varies by more than 5%, limit switches and roller guides should be checked. • Verify the operation of the UETS switch. • Verify that the COMP2 LED on the IMC-DIO board is **not** blinking. • Verify that the learned values for the UETS switch on the Switches (Shift F5) screen are reasonable. • Verify that the UETS input on the SCR-RI board is connected. If not this error may be activated.				
Velocity Error at UNTx	SEC			YES
This fault indicates that as the car approached a terminal landing the IMC-DDP-C(D) processor detected a car speed greater than the learned velocity at the time the contact opened on one of the UNTx switches. • The learning process must be completed initially or any time modifications are made to the parameters on the Pattern (Shift F4) page or to the location of one of the UNTx switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches). • If there are velocity fluctuations as the car approaches a terminal landing, the learn process should be repeated several times and the learned velocities recorded in each case. • If the velocity varies by more than 5%, limit switches and roller guides should be checked.				

6.3 USING THE SPECIAL EVENTS CALENDAR

The Special Events Calendar can document the most recent 250 important fault conditions or events and display them in chronological order. The data displayed includes the type of event or fault, the date and time the fault/event occurred, the date and time the fault/event was corrected, as well as other information about the status of the elevator when the fault or event occurred.

The Special Events Calendar Fault Log is accessed from the Special Events Calendar Menu. Press the **F7** key while the Main Menu is displayed.

FIGURE 6.7 Special Events Calendar Menu (F7) screen



6.3.1 VIEW FAULT LOG

From the Special Events Calendar Menu (F7) screen press **1** or **F7** to display the events logged to the Special Events Calendar (Figure 6.8). This screen makes it possible to examine the documented faults and events. The latest 14 faults and events are displayed in the bottom half of the screen, including the date and time the event occurred.

FIGURE 6.8 Special Events Calendar (F7 - 1) screen

```
                                    9/26/2000, 10:25:30 AM,   F4=Main Menu

                        Special Events Calendar (F7, F7)
 STATUS                 SPEED (ft/Mmin)   VOLTAGE (volts)    CURRENT (amps)
 Direction   : N/A      Command  : N/A    Armature : N/A     Armature : N/A
 High Speed  : N/A      Tach/Enc : N/A    Motor Fld: N/A     Command  : N/A
 Start Floor : N/A      Terminal : N/A    Brake    : N/A
 Stop Floor  : N/A      Safety   : N/A
 Step Floor  : N/A      Pattern  : N/A    SENSOR (volts)     POSITION (ft)
 Switch      : N/A                        Motor Fld: N/A     Absolute : N/A
 PI          : 7                          Brake    : N/A
 Event Code  : 0x12 ( Operation, Communication )
 This event indicates that all the system processors were reset.

 DATE            TIME            DESCRIPTION
 2/14/2000       10:05:28 AM     Sub-System (s) Reset
 2/15/2000       10:07:37 AM     In Car Stop Switch
                 2:36:18 PM      Position Error at DNT1
 2/16/2000       2:36:20 PM      Brake Output Circuit Failure
                 4:26:44 AM      Lost Door Lock During Run

   ARROWS: Move Cursor, HOME: Oldest, END: Newest,  CTRL-T: Troubleshoot
                                                                 dnID208b
```

When this screen is first displayed, the most recent event is displayed at the bottom of the screen. Use the **Up / Down Arrow** keys to scroll one event at a time, the **Page Up / Page Down** keys to scroll a page at a time, or the ***Home / End*** key to scroll to event 1 or 250. As each event is selected (reverse video), the description of the event and any other logged data is displayed in the top half of the screen. Additional troubleshooting information for each event can be displayed by pressing **Crtl + T** (see Figure R.28). Tables 6.10 and 6.11list the faults or events which are recorded, including a description and recommended troubleshooting actions.

6.3.2 CLEAR FAULT LOG

While the Special Event Calendar Menu (F7) screen is displayed, if the **2** key is pressed, the message **`Delete All Events? (Y/N)`** is displayed. Press **Y** to clear the Special Events Calendar of all events.

6.3.3 SPECIAL EVENTS - CONFIGURE BY TYPE

In order to aid in troubleshooting, the list of events which are logged to the Special Events Calendar can be configured based on the event type.

While the Special Event Calendar Menu (F7) screen is displayed, press the **3** key to access the Special Events - Configure by Type (F7, 3) screen (see Figure 6.9). The ***Log*** column controls which events are logged to the Special Events Calendar Fault Log. Place an 'X' in this column if you want the event type listed in the selected row to be logged to the Special Events Calendar. When the Event Description is highlighted, a description of the event type is displayed above the column headings. Tables 6.10 and 6.11 provide a complete listing of events. The event messages that are logged to the Special Event Calendar are shown with SEC in the *Location* column.

FIGURE 6.9 Special Events - Configure by Type (F7, 3) Screen

```
                                    9/27/2000, 10:25:30, F4= Main Menu


                  Special Events - Configure by Type (F7, 3)
  The Log column controls which events are logged to the Special Events
  Calendar. Place an X in the Log column to have events of the type specified by
  this row to be logged to the Special Events Calendar. Events with a "." in the
  Log column will not be logged.


   Log  CMS       Process         Event Description                1 of 154

   X     .        DDP             +15V Power Supply Failure
   X     .        DDP             AC Drive Hardware Fault
   X     .        DDP             AC Drive Not Ready
   X     .        Operation       Alarm - No Car Movement
   X     .        Operation       Alarm - No Door Zone
   X     .        DDP             At Speed Fault
   X     .        Operation       Both USD and DSD Are Open
   X     .        Operation       Bottom Floor Demand
   X     .        DDP             Brake Failure
   X     .        DDP             Brake Output Circuit Failure
   X     .        Operation       Car Call Bus Fuse Blown
   X     .        Operation       Car Out of Service with Doors Locked
   X     .        Operation       Car Out of Service without Doors Locked
   X     .        Operation       Car Safefy Device Open
   X     .        Communication   CMS Emergency Dial Out Unsuccessful
   X     X        Baldor Drive    Co-processor Failure
   X     X        Operation       Contactor Proofing Redundancy Failure
   X     X        Safety          Contract Overspeed
   X     X        DDP             CRC 16 Parameter Transfer Failure
   X     .        Baldor Drive    Current Sensor Failure


                  ARROWS: Select,   ENTER KEY: Edit,   S: Saves

                                                                    dnID239c
```

6.3.4 REPORTING SPECIAL EVENTS TO A CENTRAL MONITORING SYSTEM (CMS)

IMC-SCR controllers can be programmed to call a computer at a remote location when specific events, logged to the Special Events Calendar, occur. The specific events which will cause the controller to report the event are programmed from the Configure by Type (F7,3) screen (see Figure 6.9).

If the controller is equipped with CMS, place an 'X' in the ***CMS*** column if you want the controller to call a remote PC running CMS, Central Monitoring System for Windows software to report this type of event. In order to place an 'X' in the CMS column, there must also be an 'X' in the Log column for that type of event. A complete listing of the events that can be logged can be found in Tables 6.10 and 6.11 (SEC in *Location* column).

CMS COM PORT SETUP

The CMS Com Port Setup (F7, 5) screen is used to set the com ports to be used to transmit emergency information to a remote PC running CMS. From the Special Events Calendar Menu (F7) screen press **5** to display the CMS Com Port Setup screen (see Figure 6.10).

FIGURE 6.10 CMS Com Port Setup (F7, 5) Screen

```
                         12/28/1999, 10:25:30, F4= Main Menu


                 CMS Com Port Setup (F7, 5)

Emergency Transmission Switch: YES

Maximum Number of Attempts:  4

Com  Device  Media  Transimit Emergencies on This Port?
---  ------  -----  --------------------------------
1    CRTxK   SCBL   ---
2    CRTxK   MODM   ---
3    CMS     SCBL   YES
4    CMS     MODM   YES


Phone  Dial  Number
-----  ----  --------------------------
1      YES   555-5555
2      NO    666-6666
3      NO
4      NO



         ARROWS: Select,   ENTER KEY: Edit,   S: Saves

                                                      dnID237
```

Emergency Transmission Switch - Set to ON to transmit emergency messages to a remote PC running CMS software.

Maximum Number of Attempts - Set to the number of times the system should attempt to send each emergency message via modem to a remote PC running CMS software. If all attempts fail, the system will stop sending after this number of tries until a new CMS connection is established or another Emergency Event occurs.

Com, Device, Media - These are the current communication port settings. These settings are programmed using the Computer Swing Panel as described in Section 5.4.1, *Programming the Communication Ports*. The *Device* must be set to *CMS* for transmitting emergency messages to a PC running CMS software.

> **NOTE:** If *Media* = MODM (or MODM1 / MODM2), additional setup may be required using the Modem Setup (F1, 9) screen. The default settings will work for most standard modems.

Transmit Emergencies on this Port? - Set to YES to transmit emergency messages on this port.

Phone, Dial, Number - Set *Dial* to YES and enter the phone number(s) to be dialed to send emergency messages via a modem. The phone number(s) will only be dialed if at least one com port is programmed for *Device* = CMS and *Media* = MODM (or MODM1 / MODM2) and *Transmit Emergencies on This Port* = YES.

6.3.5 PRINTING THE EVENTS LOG

Special Events Calendar entries can be printed using the Event Calendar Print Setup (F7, 8) screen.

FIGURE 6.11 Event Calendar Print Setup (F7, 8) Screen

You can print all of the available events or chose a range of dates using the Start Date and End Date entry fields.

6.4 USING THE DIAGNOSTICS SCREENS

System diagnostics are accessed via the Diagnostics Menu (F11) screen (Figure 6.12)

Network Status - The status of communication between the car controller and the Group Supervisor can be verified using the Network Status (F11, 1) screen. A Success Rate of less than 100% indicates possible improper termination of the High-Speed Serial Communication Link. Proper termination is achieved by installing or removing shunts on jumpers JP1 and JP2 on the MC-RS Communication Interface boards at the ends of the communication chain while observing the Success Rate percentage for each local Car. The goal is to achieve 100% Success Rate for each car, or the highest percentage possible. This diagnostic screen is also available on the M3 Group Supervisor (see Section 3.9.2 *Using the Network Status Diagnostics Screen* in the M3 Group Supervisor manual, part #42-02-G004)

Memory Dump - (screen not shown) This diagnostic screen shows the status of memory locations within the controller's computers. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

FIGURE 6.12 Diagnostics Menu (F11) screen

```
9/18/2002, 10:25:30 AM, F4=Main Menu

Diagnostics Menu (F11)

1 - Network Status
3 - Memory Dump
4 - Task Info for CGP
5 - Resource Usage
7 - MP Input/Output
8 - Car Performance

dnID227c
```

FIGURE 6.13 Network Status (F11, 1) screen

```
12/6/2000, 10:25:30, F4= Main Menu

Network Status (F11, 1)

Controller        Online      Success Rate
Car A             YES         100%

dnID233a
```

Task Info for CGP - (screen not shown) This diagnostic screen shows the status of various tasks performed by the MC-CGP-4(8) Communication Processor Board. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

Resource Usage - (screen not shown) This diagnostic screen shows resource usage in the MC-CGP-4(8) Communication Processor Board. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

MP Input / Output - (see Figure 6.16) This diagnostic screen shows the status of many of the MP Input and Output flags.

Car Performance - The Car Performance Graph (F11, 8) screen and the Car Performance Report (F11, 8, H) screen provide car performance data including:

- Door Close Time (DCT)
- Door Close & Car Start Time (DT)
- Run Time (RT)
- Door Open Time (DOT)
- Performance Time (PT)
- Cycle Time (CT)
- Average Short Door Dwell Time (SDT)
- Average Car Call Dwell Time (CCT)
- Average Hall Call Dwell Time (HCT)

FIGURE 6.14 Car Performance Graph (F11, 8) screen

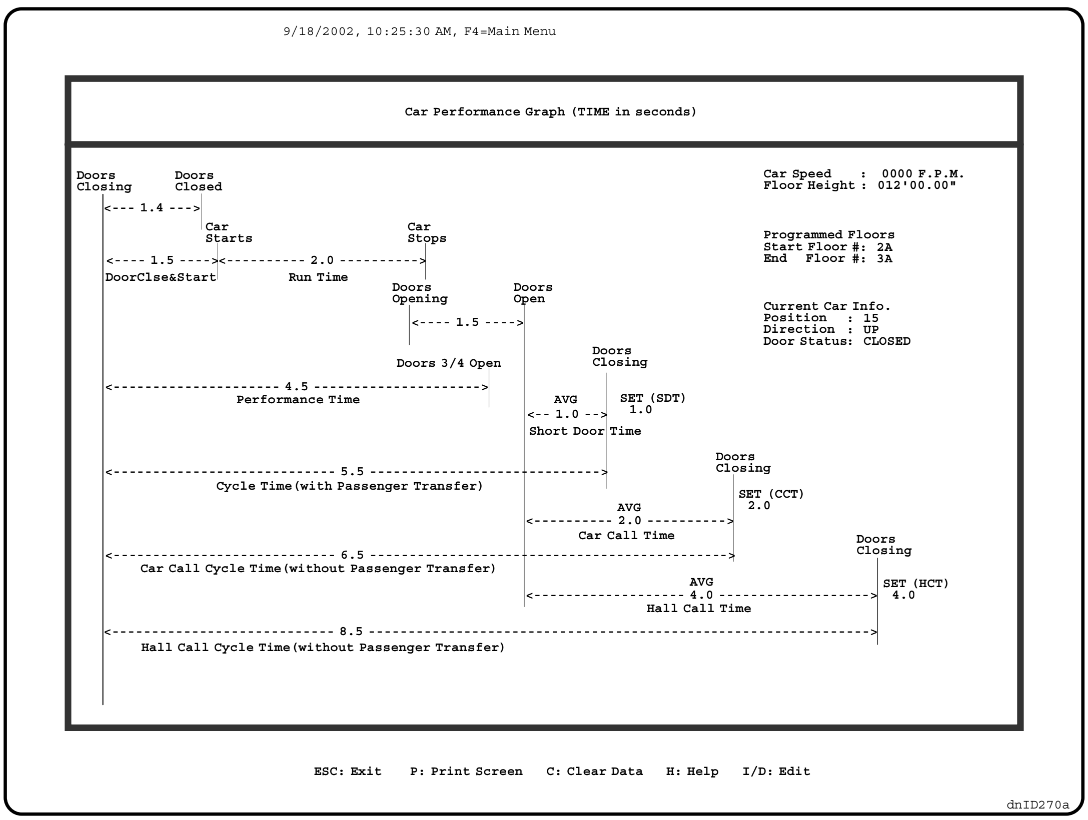


FIGURE 6.15   Car Performance Report (F11, 8, H) screen

```
                                  9/18/2000, 10:25:30 AM, REC, F4=Main Menu

                         Car Performance Report (F11, 8)

     Start Floor #: 2A                        Car Speed    :  0000 F.P.M.
     End   Floor #: 3A                        Floor Height :  012'00.00"

  Door Close Time (DCT):                                  1.4  Car @ Flr:  12
  Doors Start Closing - TO-  Doors Closed                      Car Dir.:  UP
                                                               Dar Door:  OPEN
  Door Close & Car Start Time (DT):                       1.5
  Doors start Closing -TO- Car Stops

  Run Time (RT):                                          2.0
  Car Starts -TO-Doors Open

  Door Open Time (DOT):                                   1.5
  Doors Start Opening -TO- Doors Open

  Performance Time (PT):                                  4.5
  DT + RT + (1/2 * DOT)

  Cycle Time (CT):                                        5.0
  Doors Start Closing -TO- Doors Open

  Average Short Door Dwell Time (SDT):    1          1    5.5
  Cycle Time (with Passenger Transfer):
  CT + SDT

  Average Car Call Dwell Time (CCT):      2          2    6.5
  Car Call Cycle Time (wighout Passenger Transfer):
  CT + CCT

  Average Hall Call Dwell Time (HCT):     4          4    8.5
  Hall Call Cycle Time (without Passenger Transfer):
  CT + HCT

   Up/DN Arrow: Select  +/-: Change Value  C KEY: Clear  PKEY: Print Screen
                                                                  dnID271a
```

6.5 TROUBLESHOOTING CAR OPERATION CONTROL (COC)

Usually, a malfunction is due to a faulty input or output signal. Inputs are signals generated outside the controller cabinet that connect to terminals inside the cabinet, and are subsequently read by the computer during its input scan. Outputs are signals generated by the computer that energize relays or turn on indicators during the computer's normal output scan. Since an incorrect input or output can cause a system malfunction, tracing these signals to find the source of the problem is essential. Read the example problem on the next page to become familiar with signals generated in the system.

6.5.1 DOOR LOGIC

As complex as it is, the door logic basically answers one simple question; should the doors be open? The computer looks at certain inputs and then calls upon specific logic to answer this question. All of the inputs and flags generated by the specific logic are available for viewing through the EOD. When troubleshooting a door problem, inspecting the action and sequence of these flags and inputs is important. The status of these logic flags will generally point toward the root of the problem. Once the computer has determined the answer to the door status question, the appropriate outputs are turned ON or OFF, so the doors are in the desired state. Refer to Figure 6.17 Door Sequence of Operation.

The computer looks at the following inputs:

- DBC - Door Close Button input
- DCLC - Door Closed Contacts input (Retiring Cam only)
- DLK - Door Locks input
- SE - Safety Edge input
- DOL - Door Open Limit input
- DZ - Door Zone input
- PHE - Photo Eye input

The computer generates the following outputs:

- DCF - Door Close Function output
- DCP - Door Close Power output
- DOF - Door Open Function output
- NUDG - Nudging output

TRACING SIGNALS IN THE CONTROLLER

The following example shows how an input signal can be traced from its source (field wire) to its destination inside the computer (EOD). Monitor the Door Zone (DZ) flag. The door flags can be viewed on the MP Input/Output (F11, 7) screen (see Figure 6.16). The DZ flag can also be monitored using the Computer Swing Panel Diagnostic Indicators as described in Section 5.4.1, *Viewing the MC-MP Computer Variable Flags.* Moving the car in the hoistway should cause this flag to turn ON and OFF whenever the car goes through a floor. If the flag (LED) does not turn ON and OFF, the following could be causing the problem.

1. Defective Door Zone sensor.
2. Incorrect hoistway wiring.
3. Faulty termination of hoistway wiring to the (DZ) terminal inside the controller.
4. Defect on the HC-RB4-SCRI or HC-PI/O board.

NOTE: If this installation has rear doors and at least one floor where both openings exist, look up the rear door zone flag (DZR). To do so, the Diagnostic On/Norm switch and the A5 switch must be up. All other switches are down. Diagnostic Indicator 6 shows the status of the DZR flag.

First, determine whether the problem is inside or outside the controller. With a voltmeter, probe the Door Zone terminal (27). This terminal is in Area 3 of the job prints. Moving the car in the hoistway should cause the voltmeter to read 120VAC when the car is in the door zone. If when the car passes through the door zone the voltmeter does not read 120VAC the problem is external to the controller (see items 1, 2, and 3 above). If the voltmeter does read 120VAC when the car passes through the door zone the problem is internal to the controller (see item 4 above). The job prints show the DZ signal goes to the right hand side of the DZ relay to a 47K 1W resistor, to pin 8 of connector C2 on the HC-RB4-SCRI Relay board, and then to pin 8 of connector C2 on the HC-PI/O board.

Figures 6.18 and 6.19 show the HC-PI/O and HC-RB4-SCRI boards and the location of the DZ signal in the controller. Notice that if terminal 27 is powered, approximately 120VAC will be present at the bottom of the 47K 1W resistor corresponding to DZ. The top of the same resistor should read about 5VAC with respect to COM.

FIGURE 6.16   MP Input/Output (F11, 7) Screen

7/19/2000, 10:25:30 AM, F4=Main Menu

MP Diagnostic Input/Output Flags

20	DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
21		DC	UC	CC			DHO	DOI
22	DCF	DCP	DOF	LOT		HTC	CCT	SDT
23			HSEL	CSB	DCC	NUDG		DSHT
24	INT	FRA	FCS	FRS	DNS	UPS	STD	STU
25			HLW	HLI			**FWI**	
26	LFP	UFP						
27			EQI	IND	IN		DEL	YSIM
28	LLW	DLK		DZORDZ			PK	LLI
29	DNDO	LD		DDP	UPDO	LU		UDP
2A	DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B	TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
2C		STC	SAF	**HCR**	**HCDX**	**CCD**	ISV	ISRT
2D					**FRM**			FRC
2E	SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F	HLD		EQA	ATSF		ECRN	CD	EPR

dnID265

The HC-RB4-SCRI board has test pads on the front of the board which surround every relay and connector. Relays IN2 and SAF each have a legend that indicates which pad corresponds to which contact or its coil on this board. To be sure that the input from terminal 27 is making its way to the relay coil, probe the test pad on the lower right hand side of the DZ relay.

It is not necessary to remove the relay or get to the back of the HC-RB4-SCRI board to trace signals on the board. Signals can be traced on the HC-PI/O board. If the signal gets to the HC-PI/O board but does not get to the computer, it is safe to assume that the problem is on the HC-PI/O board.

Important computer-generated logic flags:

- CCT - Car Call Time flag
- DOI - Door Open Intent flag
- DSH - Door Shortening (Intermediate) flag
- DSHT - Door Shortening (Final) flag
- HCT - Hall Call Time flag
- LOT - Lobby Time flag
- SDT - Short Door Time flag

Using the logic flags listed above, the computer makes a decision regarding the doors. The Door Open Intent flag's (DOI) status reflects the computer's decision. If the computer recognizes the necessity of either opening the doors or keeping the doors open, this flag will come ON. This flag can be found using the EOD. When viewing this flag, the corresponding Diagnostic Indicator will turn ON when the computer decides that the doors should be open.

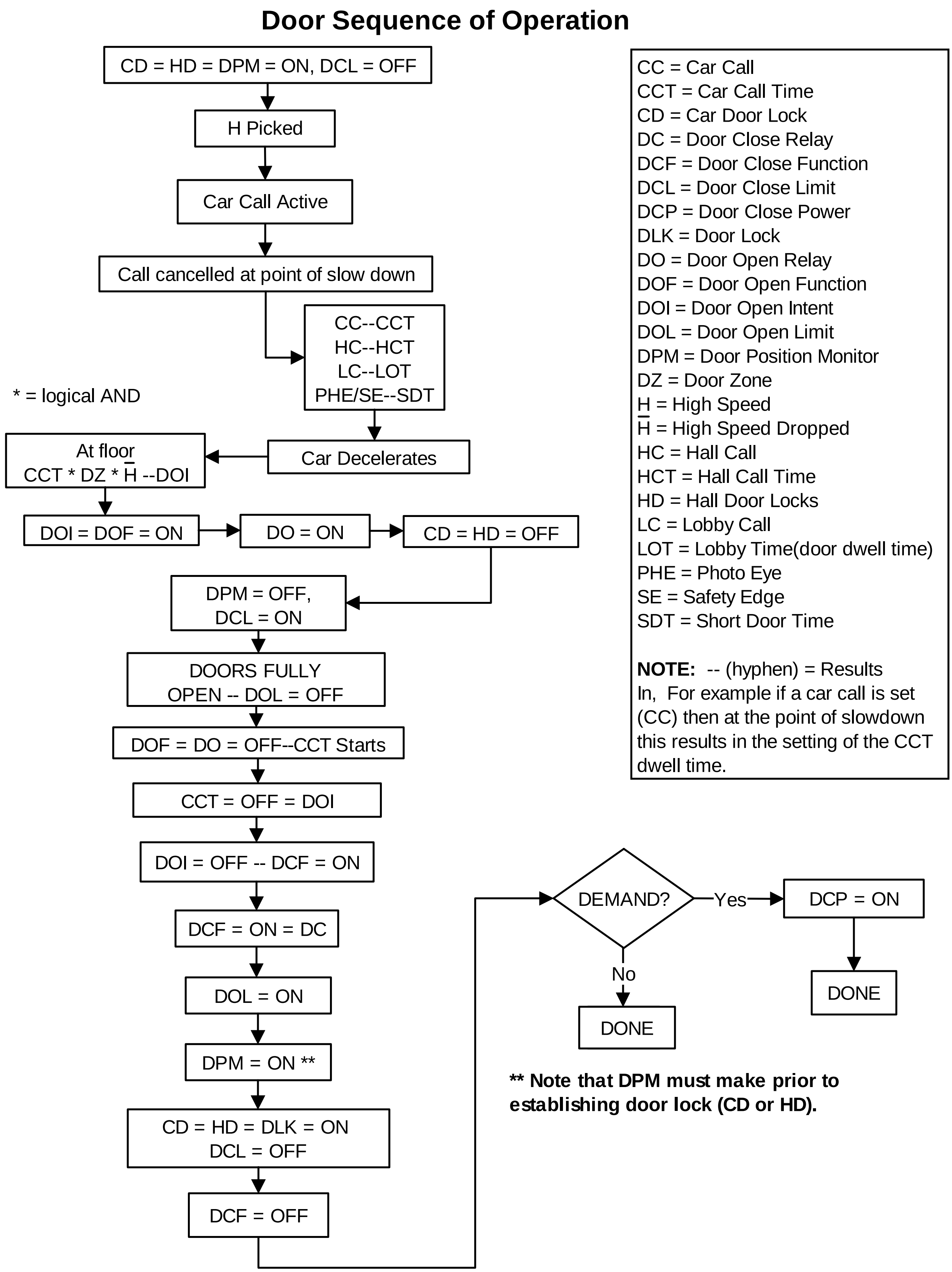
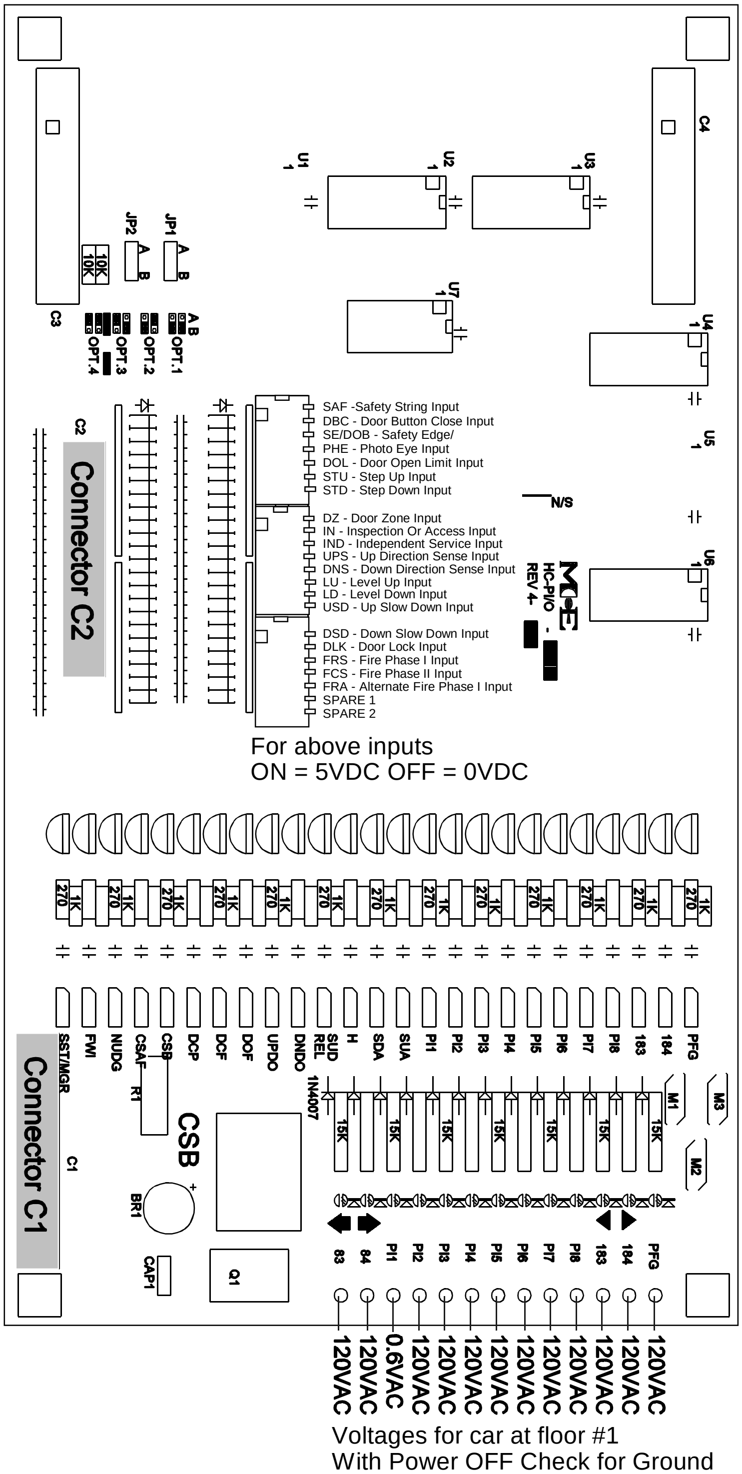

Door Sequence of Operation
CD = HD = DPM = ON, DCL = OFF
H Picked
Car Call Active
Call cancelled at point of slow down
CC--CCT
HC--HCT
LC--LOT
PHE/SE--SDT
* = logical AND
At floor
CCT * DZ * $\overline{H}$ --DOI
Car Decelerates
DOI = DOF = ON
DO = ON
CD = HD = OFF
DPM = OFF,
DCL = ON
DOORS FULLY
OPEN -- DOL = OFF
DOF = DO = OFF--CCT Starts
CCT = OFF = DOI
DOI = OFF -- DCF = ON
DCF = ON = DC
DOL = ON
DPM = ON **
CD = HD = DLK = ON
DCL = OFF
DCF = OFF
DEMAND?
Yes
No
DCP = ON
DONE
DONE
CC = Car Call
CCT = Car Call Time
CD = Car Door Lock
DC = Door Close Relay
DCF = Door Close Function
DCL = Door Close Limit
DCP = Door Close Power
DLK = Door Lock
DO = Door Open Relay
DOF = Door Open Function
DOI = Door Open Intent
DOL = Door Open Limit
DPM = Door Position Monitor
DZ = Door Zone
H = High Speed
$\overline{H}$ = High Speed Dropped
HC = Hall Call
HCT = Hall Call Time
HD = Hall Door Locks
LC = Lobby Call
LOT = Lobby Time(door dwell time)
PHE = Photo Eye
SE = Safety Edge
SDT = Short Door Time
NOTE: -- (hyphen) = Results
In, For example if a car call is set (CC) then at the point of slowdown this results in the setting of the CCT dwell time.
** Note that DPM must make prior to establishing door lock (CD or HD).

FIGURE 6.18 HC-PI/O Power Input/Output Board Quick Reference

42-QR-HC-PCI/O Rev. 1

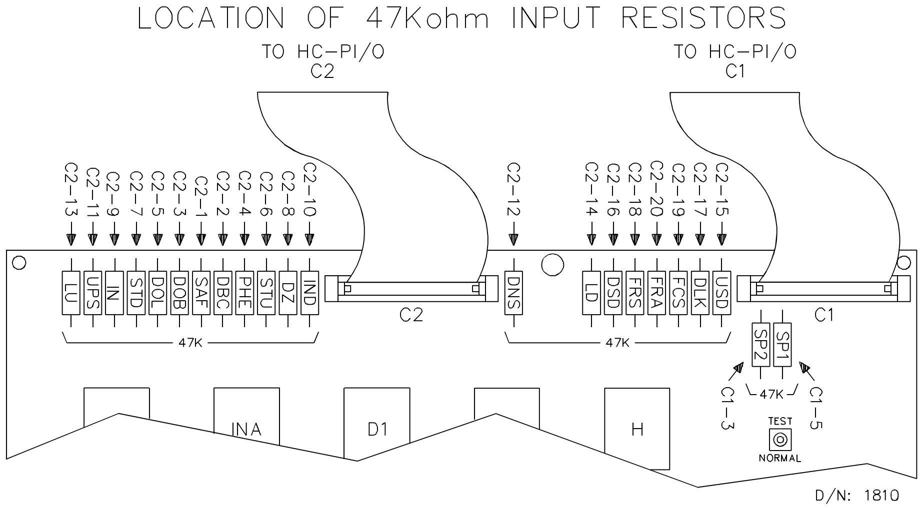
HC-PI/O QUICK REFERENCE CARD (Board 3)



Connector C2	
INPUT	**PIN**
SAF	1
DBC	2
SE/DOB	3
PHE	4
DOL	5
STU	6
STD	7
DZ	8
IN	9
IND	10
UPS	11
DNS	12
LU	13
LD	14
USD	15
DSD	16
DLK	17
FRS	18
FCS	19
FRA	20
SPARE 1	21
SPARE 2	22

Connector C1	
OUTPUT	**PIN**
SST/MGR	1
FWI	2,4
SPARE 2 input	3
SPARE 1 input	5
NUDG	6
Lamp Common	7
CSAF	8
SUB/REL	9,11
DCP	10
DCF	12
Stop SW Out	13,15
DOF	14
UPDO	16
DNDO	18
Stop SW Source	17,19
H	20

FIGURE 6.19 HC-RB4-SCRI Relay Board Details



The DOI flag is a useful flag to inspect when troubleshooting door problems. Remember if DOI is ON, it will turn the DOF output ON which should pick the DO relay. The door should stay open until the DOL (Door Open Limit) turns OFF. The absence of DOL will turn the DOF output OFF. DOI will remain ON for the door dwell time (CCT, HCT, etc.). When DOI turns OFF, the DCF output turns ON and the DC relay will close the car doors. The signal that turns the DCF output OFF is DLK (Doors Locked) or possibly DCLC if the car has a retiring cam. After the doors are locked there is approximately a two-second delay before the DCF output turns OFF. If there is a demand for the car (as is evidenced by the DMU or DMD flags being on) and if the DOI flag is *not* ON, then the DCP (Door Close Power) output will be turned ON regardless of the position of the door. The DCP output is used to provide door closing power while the car runs through the hoistway for those door operators requiring it, such as those made by the G.A.L. corporation.

The door logic provides protection timers for the door equipment for both open and closed functions. If the doors get stuck because the door interlock keeper failed to lift high enough to clear the door interlock during the opening cycle, then the doors cannot complete opening, which could damage the door motor. The Door Open Protection Timer will eventually stop trying to open the doors and the car will then go on to the next call. Similarly, if the doors do not close all the way, the computer recycles the doors at a programmed interval in an attempt to clear the problem.

The computer basically looks for a reason to open the doors. If a valid reason to open the doors is *not* found, or if conditions are detected that prohibit the opening of the doors, the logic will close the doors (reset, or turn DOI OFF). To open the doors, the car must be in a door zone and not running at high or intermediate speed. Once the car has settled into a proper position to open the doors, a condition must exist that indicates that the doors should be open. Some of these conditions are listed below:

- Call demand at the current landing (or a call has just been canceled)
- Safety Edge/Door Open Button (DOB) input
- Emergency/Independent Service conditions
- Photo Eye input

When a call is canceled, one of the following door time flags should be turned ON: CCT, HCT, or LOT. When one of the reopening devices (SE or DOB) is active, the SDT flag is turned ON.

When an Emergency or Independent Service condition exists, the presence of the particular condition will cause the DOI flag to be set. Some of these conditions include: Fire Service, Emergency Power operation, Independent Service, Attendant Service, etc.

Once the state of the computer flags has been determined, inspect the high voltage hardware to see if the appropriate functions are being carried out. For example, if the doors are closed and the DOI flag is set, the doors should be opening (the DO relay picked). If the doors are open and the DOI flag is cleared (turned OFF), the doors should be closing (the DC relay picked).

It is vital to determine whether or not *the control system* is doing what *its* logic determines it should be doing. If the control system is doing what the logic intended it to do, then it is important to determine how the logic came to its conclusions. If the control system is *not* doing what the logic intended it to do, then it is important to determine what is preventing the desired function from being carried out. The diagnostics on the Computer Swing Panel and/or the CRT can help determine which situation is present. The output flags will show which outputs the computer is attempting to turn ON/OFF. Compare the flags with what is actually happening in the high voltage hardware.

6.5.2 CALL LOGIC - NORMAL OPERATION

NOTE: If the controller is equipt with the SmartLink for Car Operating Panel option, see Appendix L, *Option* SmartLink for Car Operating Panel, for troubleshooting information.

Calls are input to the system by grounding the appropriate call input, as labeled on the Call Input/Output board (Figure 6.20, HC-CI/O Call Input/Output Board Quick Reference). The act of physically grounding the call input terminal turns on the corresponding LED on the Call board. Recognition and acceptance of the call by the computer will cause the indicator to remain lit on the board. Cancellation of the call turns the indicator off. The single input/output terminal on the Call board accepts call inputs from the call fixture push-buttons, and also serves as the output terminal illuminating the call fixtures to indicate registration of a call. This means that the field wiring is identical to that used for a standard relay controller.

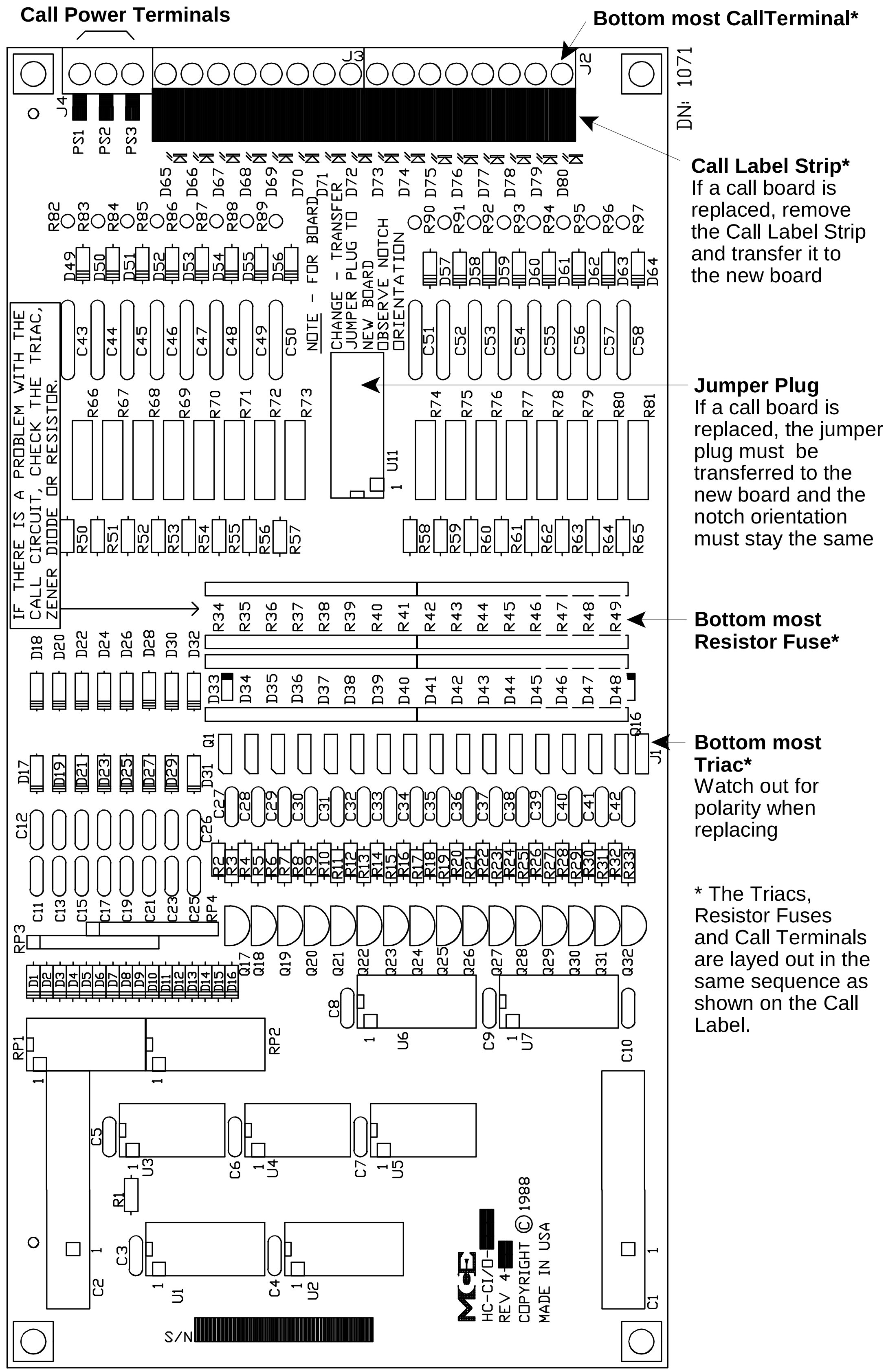
The computer may intentionally block call registration. When the computer prevents car call registration, it turns ON the Car Call Disconnect flag (CCD) for that car. Inspection of this flag in the diagnostics (ADDR 2C, Diagnostic Indicator #3) will tell if the computer is preventing the acceptance of calls. If the CCD flag is ON, the reason for this condition must be discovered. CCD condition is caused by: Fire Service, motor limit timer elapsed, bottom or top floor demand, etc.

A corresponding flag exists for hall call registration prevention. The computer may detect conditions that prevent hall calls from registering, and set the Hall Call Disconnect Flag (HCDX). This is a system flag (as opposed to a per car flag) but is available for viewing in the diagnostic display along with each car's operating flags. There are many reasons for the computer to reject hall call registration: Fire service, a hall call bus problem, no available cars in service to respond to hall calls, etc.

If a call circuit becomes damaged or simply stuck on as the result of a stuck push-button, the elevator will release itself from the stuck call automatically. If the push-button remains stuck, the car will stop at the floor each time it passes. Again, the computer will release itself automatically, thereby allowing continued service in the building.

FIGURE 6.20 HC-CI/O Call Input/Output Board Quick Reference

42-QR-HC-CI/O Rev. 2 **HC-CI/O QUICK REFERENCE CARD** **BOARD 2**



6.5.3 TROUBLESHOOTING THE CALL CIRCUITS

If there is a problem with a call, first disconnect the field wire or wires from that call terminal to determine if the problem is on the board or in the hoistway wiring or fixtures. Disconnect the calls by unplugging the terminals, or removing individual wires. If the individual field wire is disconnected, lightly tighten the screw terminal since it may not make contact if an attempt is made to ground the terminal using a jumper when the screw on the terminal is loose.

NOTE: Call terminal voltage must be $\geq$ 85% of call supply voltage.
Example: If supply is 100VAC, terminal voltage may be 85VAC to 100VAC. 80VAC is insufficient.

TABLE 6.11 Call Board Troubleshooting

Problem	**Recommended steps to resolve the problem**
Call Terminal Voltage is insufficient	1. Turn OFF the power and remove the resistor fuse associated with that terminal. 2. Turn ON the power and check terminal voltage again. 3. If no voltage is present on the terminal: a. Check the jumper plug (header) on the HC-CI/O Call board. The jumper plug socket is located on the right hand side near the call indicators. If a Call board is replaced, this jumper plug must be transferred to the new board and stay in the same board position (more than one Call board on the controller). b. Verify that the correct incoming power is on terminals marked PS1, PS2 and PS3. NOTE: Power will exist on *at least one* and possibly more of these terminals.
Call LED is ON even though the field wire is removed	1. Reset the computer (Computer Reset pushbutton on Swing Panel). 2. Run the car to the nearest landing to reset PI. 3. It may be necessary to reset the computer in the Group Supervisor in order to reset a latched hall call. 4. If the call does not cancel under these conditions--replace the call board
Cannot register a hall call at the call board	To discover whether the problem is with the call board or the field wiring: 1. First remove the resistor fuse and disconnect the field wire(s). 2. Verify that the HCDD, Hall Call Disconnect Computer Variable Flag is OFF (Address 2C, LED 6). 3. Verify that there is proper voltage on the call terminal. 4. Register a call by shorting the call terminal to terminal 1 or GND and verify with EOD as described in Section 5.4.3, *Viewing and Entering Calls* (the call registered light on the call board may not work correctly). 5. If the call does not register under these conditions--replace the call board. 6. If the call circuit works with field wires removed, before connecting wires, jumper the wire(s) to ground or terminal 1 and press the call pushbutton. If a fuse blows, there is a field wiring problem. If connecting the call wires causes a problem, the call board may be damaged.
Call remains latched even though the car arrives at that landing	Remove the associated resistor fuse. If call cancels, replace the bad resistor fuse.

6.5.4 TROUBLESHOOTING THE CALL INDICATORS

When working correctly, a call indicator glows brightly when a call is registered and glows dimly or not at all when a call is not registered.

NOTE: Before troubleshooting the call indicators, ensure that the call circuit is working correctly, the field wires are connected and the resistor fuses are plugged in. If the board is arranged for neon (or LED) indicators (HC-CI/O -N board), the board indicators are not affected by the fixture bulbs.

TABLE 6.12 Call Indicator Troubleshooting

Problem	Recommended steps to resolve the problem
With a call registered, the Call Indicator is dimly lit (Call Board is HC-CI/O)	Incandescent bulb in the fixture for the call is burned out or missing. Replace the bulb.
Indicator glows bright whether or not there is a call registered	Bad triac or triac driver transistor. Check triac with power OFF and field wire removed. Failed triac usually measures a short circuit from the metal back (collector) to terminal 1. If board is not in system, measure short between metal back and pad area around mounting hole. Be careful, the metal back of the triac is connected to AC when power is ON. NOTE: bottom triac corresponds to bottom terminal.

6.6 PC BOARD QUICK REFERENCES

This section contains a quick reference for the PC boards found in the typical IMC Performa controller. They are as follows:

- Standard Board Layout . . . . Figure 6.21
- MC-MP-1ES Main Processor Board Quick Reference . . . . Figure 6.22
- MC-MP2 Main Processor Board Quick Reference . . . . Figure 6.23
- HC-PI/O Power Input/Output Board Quick Reference . Figure 6.18 in Section 6.4.1
- HC-CI/O Call Input/Output Board Quick Reference . . . Figure 6.20 in Section 6.4.2
- MC-CGP-x Communication Processor Board Quick Reference . . . . Figure 6.24
- MC-RS Communication Interface Board Quick Reference . . . . Figure 6.25
- IMC-DDP-x Digital Drive Processor Board Quick Reference . . . . Figure 6.26
- SCR-RI Relay Interface Board Quick Reference . . . . Figure 6.27
- IMC-DAS Data Acquisition System Board Quick Reference . . . . Figure 6.28
- IMC-DIO Digital Input/Output Board Quick Reference . . . . Figure 6.29
- SCR-PRI SCR Power Interface Board Quick Reference . . . . Figure 6.30
- IMC-GPA General Power Adapter Board Quick Reference . . . . Figure 6.31
- IMC-ACIM AC Drive Interface Board Quick Reference (MagneTek) . . . Figure 6.32
- IMC-ACIB AC Drive Interface Board Quick Reference (Baldor) . . . . Figure 6.33
- IMC-ACIK AC Drive Interface Board Quick Reference (TORQMAX) . . . Figure 6.34

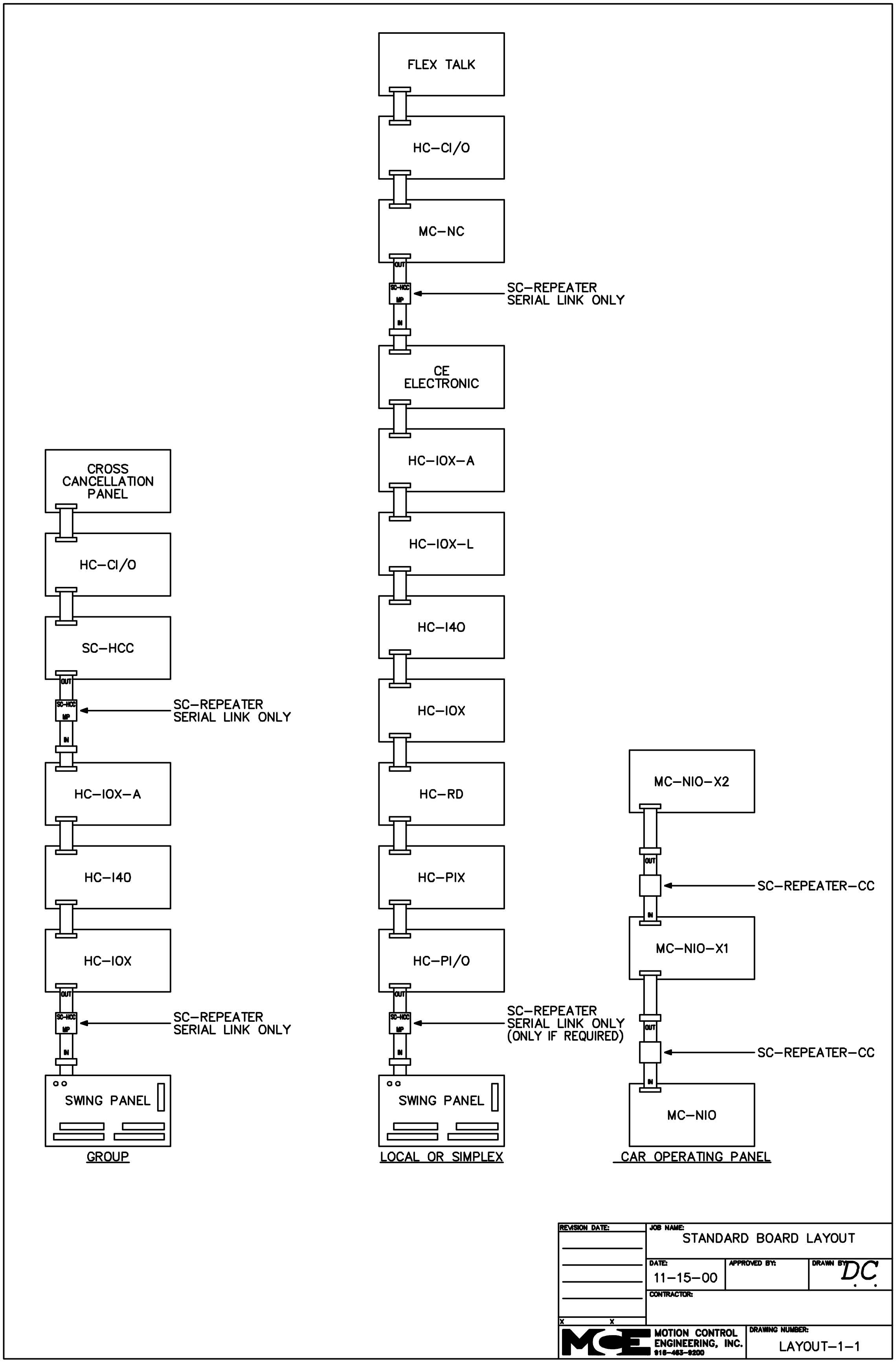
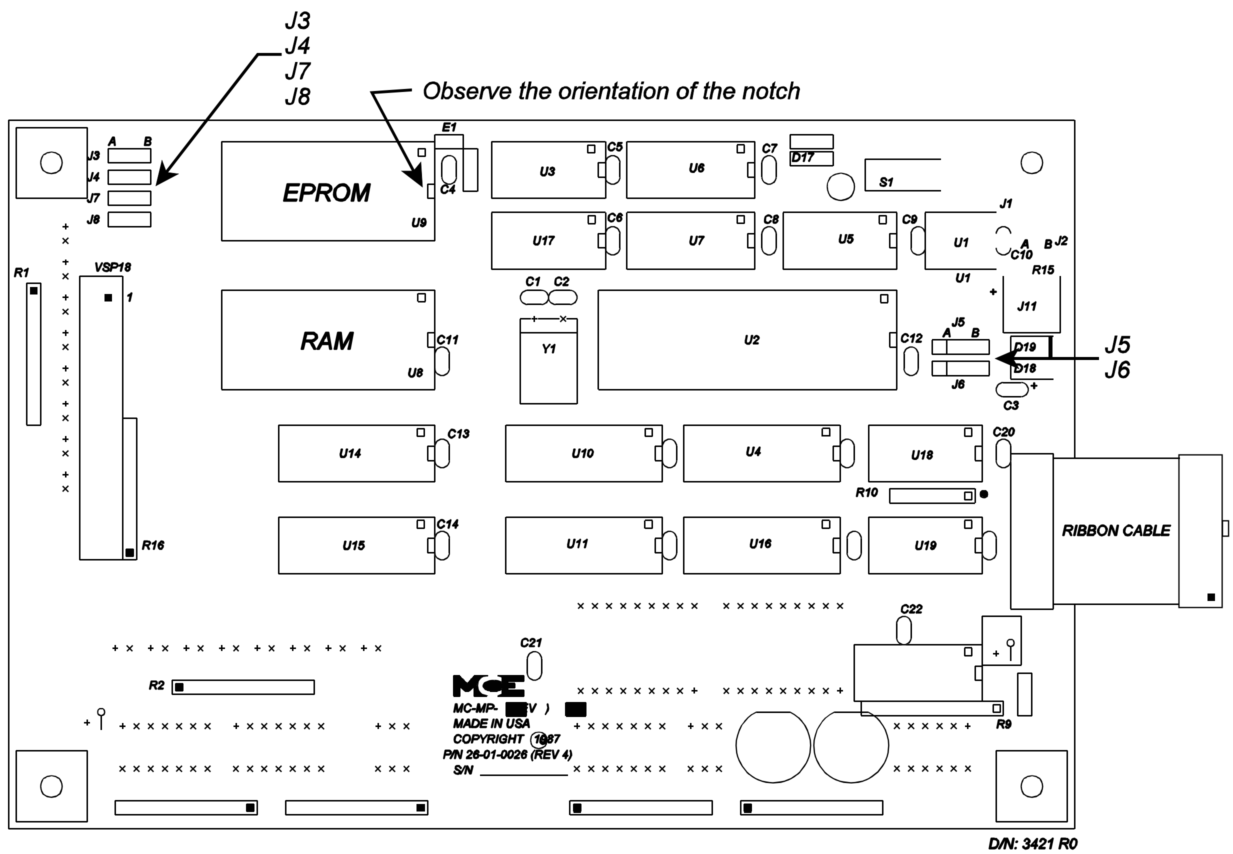

FLEX TALK
HC–CI/O
MC–NC
SC–REPEATER
SERIAL LINK ONLY
CE
ELECTRONIC
HC–IOX–A
HC–IOX–L
HC–I4O
HC–IOX
HC–RD
HC–PIX
HC–PI/O
SC–REPEATER
SERIAL LINK ONLY
(ONLY IF REQUIRED)
SWING PANEL
LOCAL OR SIMPLEX
CROSS
CANCELLATION
PANEL
HC–CI/O
SC–HCC
SC–REPEATER
SERIAL LINK ONLY
HC–IOX–A
HC–I4O
HC–IOX
SC–REPEATER
SERIAL LINK ONLY
SWING PANEL
GROUP
MC–NIO–X2
SC–REPEATER–CC
MC–NIO–X1
SC–REPEATER–CC
MC–NIO
CAR OPERATING PANEL
REVISION DATE:
JOB NAME:
STANDARD BOARD LAYOUT
DATE:
11–15–00
APPROVED BY:
DRAWN BY:
DC
CONTRACTOR:
MOTION CONTROL
ENGINEERING, INC.
DRAWING NUMBER:
LAYOUT–1–1

FIGURE 6.22 MC-MP-1ES Main Processor Board Quick Reference

42-QR-MC-MP-IES Rev. 1

MC-MP-1ES QUICK REFERENCE

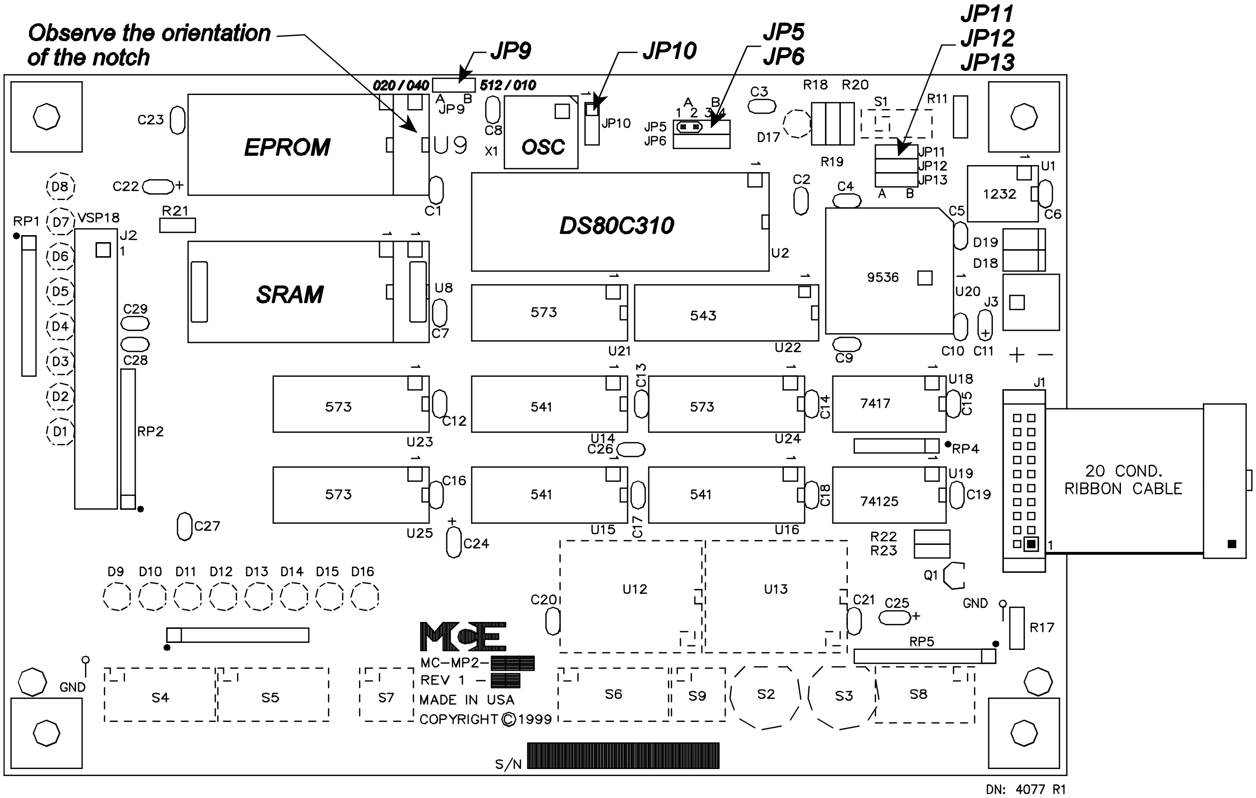


JUMPER	TYPICAL SETTING	DESCRIPTION
J3	A	A = 27C512 or 27C256 EPROM B = 27C128 EPROM
J4	A	A = 27C512 EPROM B = 27C256 or 27C128 EPROM
J5	see Description	N/C = Car Controller ON = M3 Group Supervisor
J6	N/C	Jumper not loaded
J7	A	A = 32K X 8 RAM, M5M525610-LP or HY62256ALP-10 B = 8K X 8 RAM, TC5564 or AM99C88
J8	A	A = 32K X 8 RAM, M5M525610-LP or HY62256ALP-10 B = 8K X 8 RAM, TC5564 or AM99C88

FIGURE 6.23 MC-MP2 Main Processor Board Quick Reference

42-02-MC-MP2 Rev. 1

MC-MP2 QUICK REFERENCE

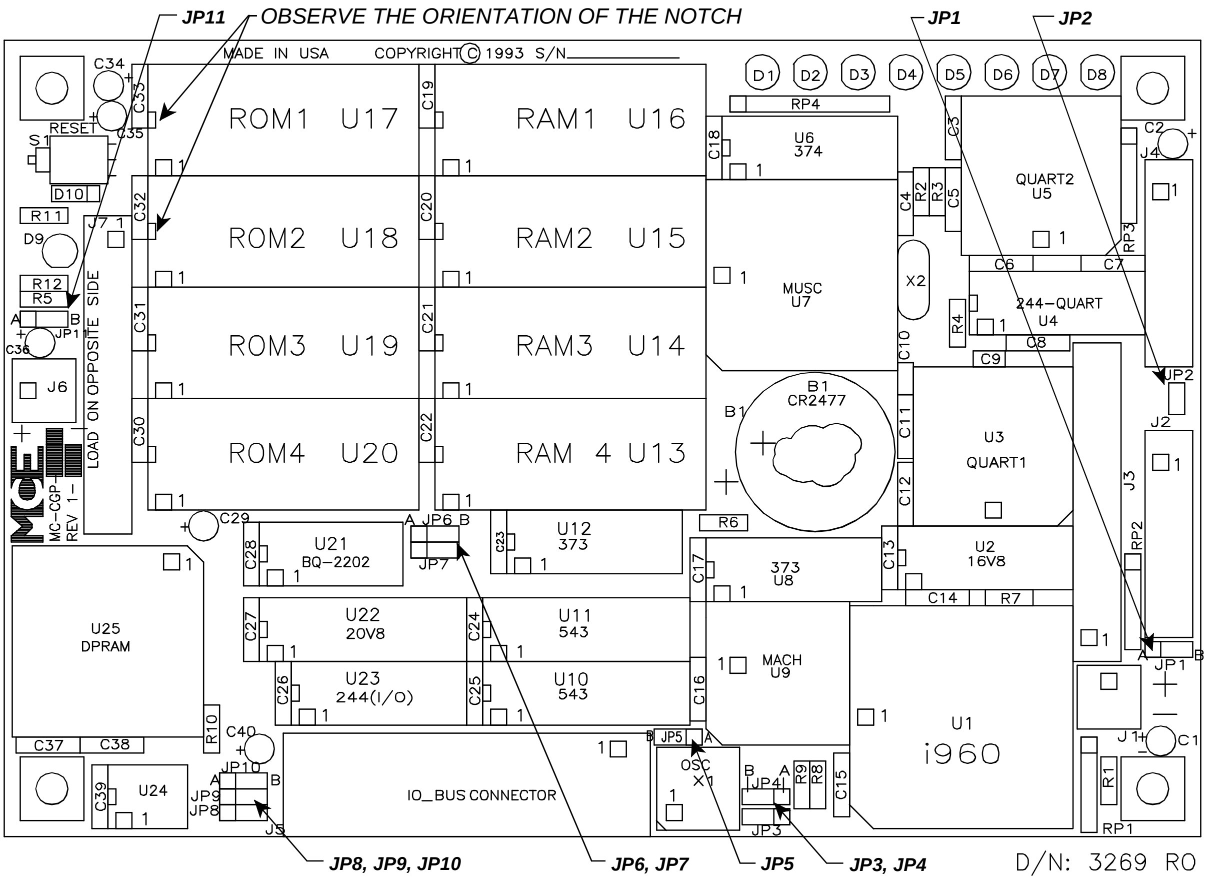


JUMPER	TYPICAL SETTING	DESCRIPTION
JP5	see Description	N/C = Car Controller A pins 1 & 2 = M3 Group Supervisor
JP6	N/C	Jumper not loaded
JP9	A	A = 27C020 or MC27C2001 EPROM B = 27C512, 27C010 or MC27C1001EPROM
JP10	N/C	Jumper not loaded
JP11	A	A = SRAM A16 Bank select enabled, B = Bank select disabled
JP12	A	A = ROM A17 Bank select enabled, B = Bank select disabled
JP13	A	A = ROM A16 Bank select enabled, B = Bank select disabled

FIGURE 6.24   MC-CGP-x Communication Processor Board Quick Reference

42-QR-MC-CGP Rev 3

MC-CGP-x QUICK REFERENCE CARD



JUMPER TABLE

JUMPER	CGP	CGP-4 CGP-8	DESCRIPTION
JP1	A	A	Communication Clock Rate: set to A if JP4 = B, set to B if JP3 = A or B or if JP4 = A.
JP2	ON	ON	Master Clock Rate: ON = Enabled, N/C = Disabled. Set to ON if JP4 = B. Set to N/C if JP3 = A or B or if JP4 = A.
JP3	N/C	N/C	Communication Clock: A = 16 Mhz, B = 4 Mhz (if JP3 = A or B, JP4 must = N/C).
JP4	B	B	Communication Clock: A = 8 Mhz, B = 2 Mhz (if JP4 = A or B, JP3 must = N/C).
JP5	B	B	This jumper relates to the I/O Bus Connector (J5), which is currently not used. I/O Connector J5 Pin 38 function: A = i960 Interrupt INT3# input, B = IO_CS1# output.
JP6	B	B	EPROM Size (27Cxxx): set to A for xxx = 512, set to B for xxx = 010, 020, 040 or 080.
JP7	A	A	Off Board Reset Signal: A = Enabled, B = Disabled.
JP8	A or hard wired	A or hard wired	EPROM Size (27Cxxx): set to A for xxx = 010, 020, 040 or 080, set to B for xxx = 512.
JP9	B	B	EPROM or Flash Memory: A = Flash, B = EPROM.
JP10	B	B	EPROM or Flash Memory: A = Flash, B = EPROM.
JP11	B or hard wired	B or hard wired	SRAM Size (68xxx): set to A for 1Mb SRAM, set to B for 4Mb SRAM.

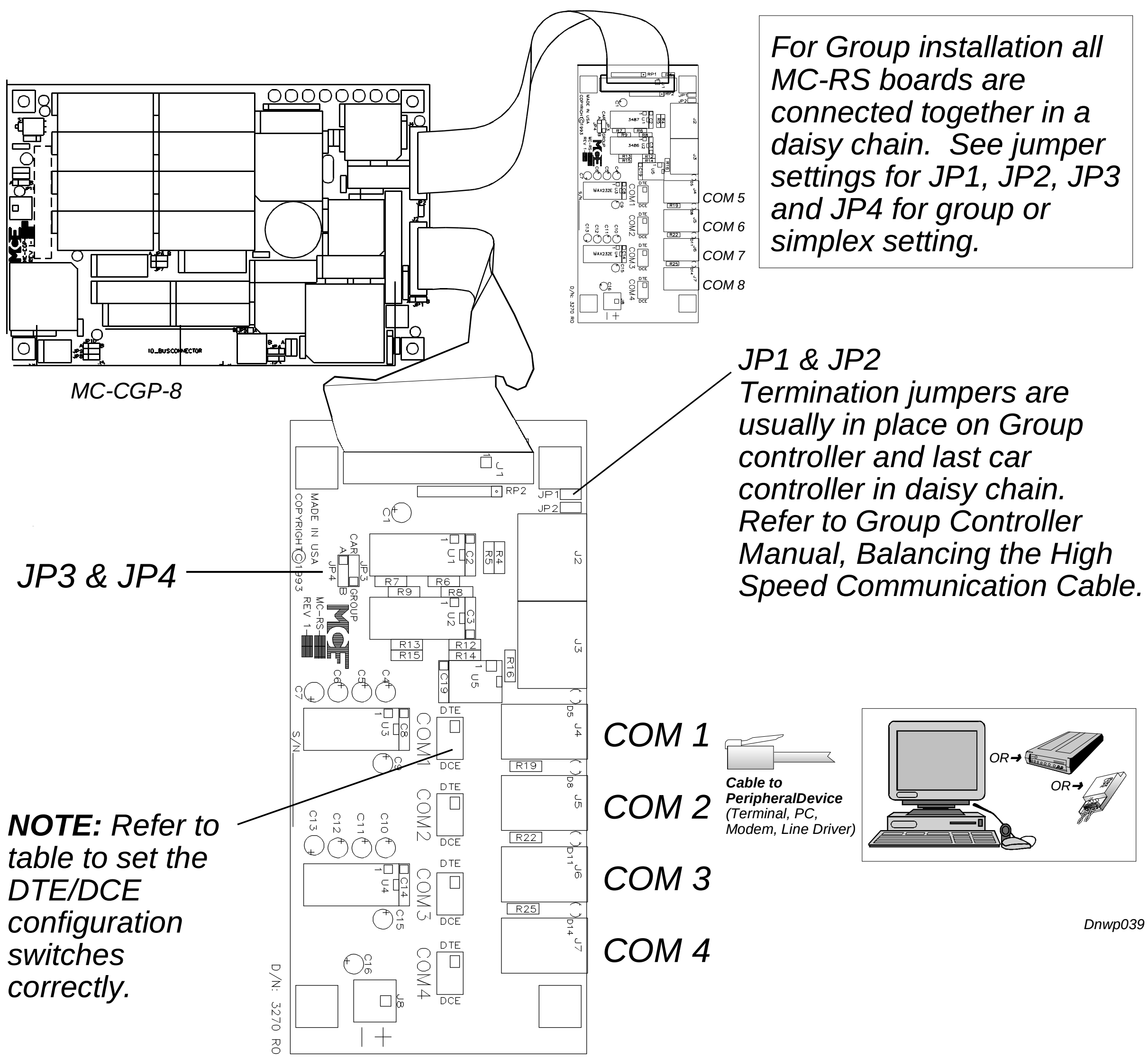
FIGURE 6.25 MC-RS Communication Interface Board Quick Reference

42-QR-MC-RS Rev.2

MC-RS QUICK REFERENCE CARD

MC-RS COM Port Toggle Switches

Port Switch Setting	Cable Connects to
DCE	CRT Terminal or PC
DTE	Line Driver or Modem



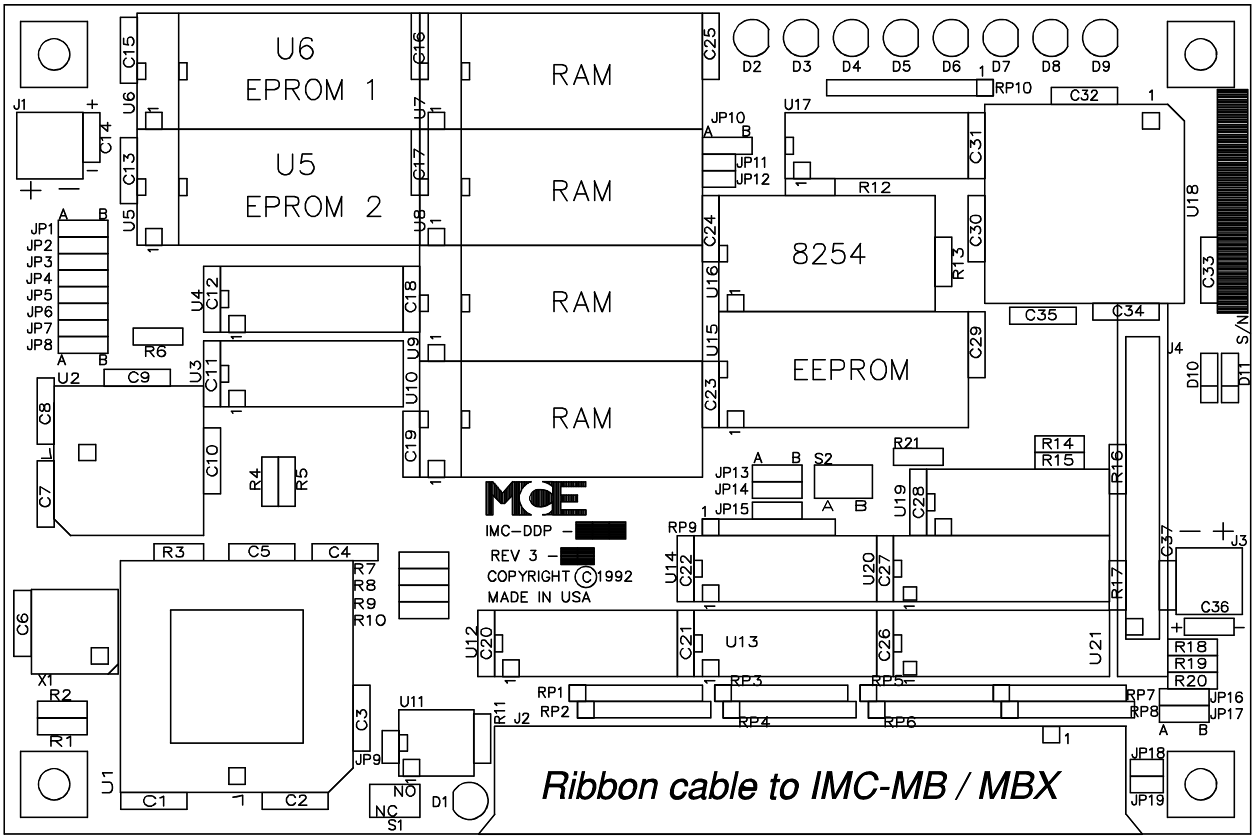
Jumper	Setting	Description
JP3	Car	Setting for car controllers (Simplex or Local).
	Group	Setting for Group controller. **Only the Group MC-RS board should be set to Group.**
JP4	B	Set to B on all controllers including the Group.

FIGURE 6.26 IMC-DDP-x Digital Drive Processor Board Quick Reference

42-QR-IMC-DDP Rev. 3

IMC-DDP QUICK REFERENCE

page 1 of 2



D/N: 1279 R2

IMC-SCR DDP Status / Error Messages ❍ = LED off ● = LED blinking

HEX	DDP Diagnostic Indicators*	MODE	MEANING
	Single LED scanning	*Normal*	*Normal Operation, no errors or status messages*
01	❍ ❍ ❍ ❍ ❍ ❍ ❍ ●	Normal	Loss of Position
03	❍ ❍ ❍ ❍ ❍ ❍ ● ●	Normal	Terminal Position Switch
07	❍ ❍ ❍ ❍ ❍ ● ● ●	Normal	CP not responding
1F	❍ ❍ ❍ ● ● ● ● ●	Normal	Learn Run
24	❍ ❍ ● ❍ ❍ ● ❍ ❍	Learn	Drive not ready
3F	❍ ❍ ● ● ● ● ● ●	Normal	Inspection Run
42	❍ ● ❍ ❍ ❍ ❍ ● ❍	Inspection	PG not ready
7E	❍ ● ● ● ● ● ● ❍	Normal	Identification mismatch
80	● ❍ ❍ ❍ ❍ ❍ ❍ ❍	Normal	Read sensor error from the landing system
81	● ❍ ❍ ❍ ❍ ❍ ❍ ●	Normal	Parity sensor error from the landing system
99	● ❍ ❍ ● ● ❍ ❍ ●	Normal	Fault Relay
C0	● ● ❍ ❍ ❍ ❍ ❍ ❍	Normal	Invalid Pattern/Profile parameters
C2	● ● ❍ ❍ ❍ ❍ ● ❍	Normal	Safety not ready
EF	● ● ● ❍ ● ● ● ●	Normal	Correction Run
F0	● ● ● ● ❍ ❍ ❍ ❍	Normal	Parameter checksum error
F8	● ● ● ● ● ❍ ❍ ❍	Normal	Floor Height checksum error
F9	● ● ● ● ● ❍ ❍ ●	Normal	Floors learned error

*** DDP Diagnostic Indicators on top of the Computer Swing Panel**

FIGURE 6.26 IMC-DDP-x Digital Drive Processor Board Quick Reference

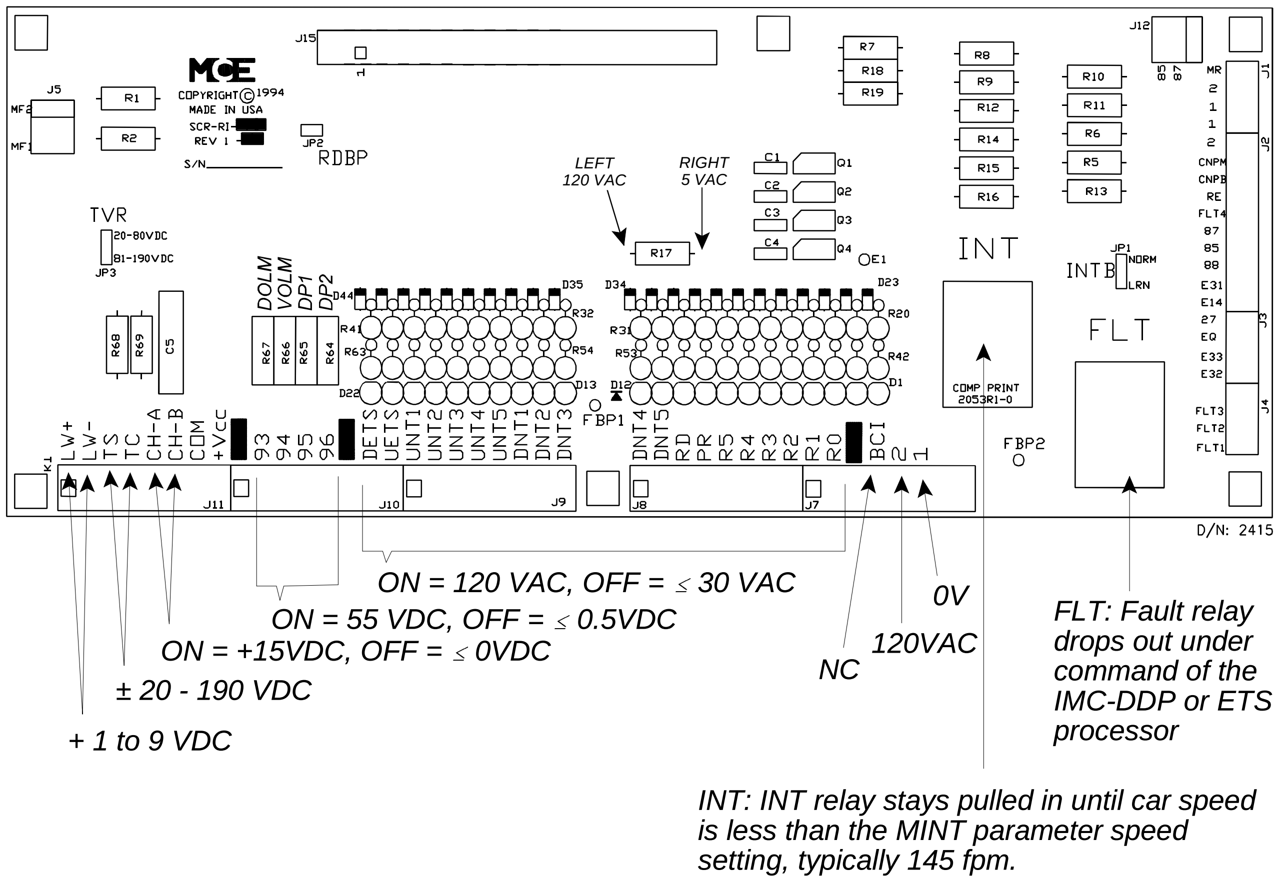
JUMPERS NOTE: NC = No Pins Connected, ON = Pins Connected, N/A = not applicable				
JUMPER	**IMC-DDP**	**IMC-DDP-B IMC-DDP-C**	**IMC-DDP-D**	**REASON**
JP1	NC	NC	NC	Future use - Flash EPROM
JP2	A	NC	NC	EPROM: U5 & U6 27C512 (64K) = A 27C010 (128K) = NC 27C020 (256K) or 27C040 (512) = B
JP3	A	A	A	RAM: U7 - U10 less than 2 Megabit = A 2 Megabit of larger = B
JP4	NC	NC	NC	Future use - Large EPROMS
JP5	B	B	B	RAM: U7 - U10 28 PINS= A 32 PINS= B
JP6	B	B	B	EPROM: U5 & U6 27C256 (32K) = A 27C512 (64K) or larger = B
JP7	NC	NC	NC	Future use - Flash EPROM
JP8	B	B	B	Timer/External Clock freq: 4MHz = B 8MHz = A
JP9	NC	NC	NC	RAM: U7 - U10 less than 4 Megabit = NC 4 Megabit or larger = YES
JP10	A	A	A	External Clock source: From Timer=B From OSC = A
JP11	ON	ON	ON	INT2 Interrupt from timer: Enable = ON Disable = NC
JP12	ON	ON	ON	INT1 Interrupt from timer: Enable = ON Disable = NC
JP13	B	B	B	EEPROM: U15 X28C256 (32K) or larger = A X28C64 (8K) or smaller = B
JP14	A	A	B	EEPROM: U15 X28C16 (2K) or smaller (24 pin) = A X28C64 (8K) or larger (28 pin) = B
JP15	A	A	A	EXTERNAL BUS: Yes = A No = B
JP16	A	A	A	RESET: From CPA board = A On board only = B
JP17	NC	NC	NC	External BUS signal: INT3 input = B IO_CS1 output = A
JP18	NC	NC	NC	DDP RESET Output to CPA board: Enable = YES Disable = NC
JP19	NC	NC	NC	INT3: Enable from CPA board = YES Disable from CPA board = NC
S2	N/A	N/A	A	EEPROM write protect: Write Enable = A Write Disable = B

FIGURE 6.27 SCR-RI Relay Interface Board Quick Reference

42-QR-SCR-RI Rev. 1

SCR-RI QUICK REFERENCE

BOARD 41



JUMPER	NAME	UP	DOWN
JP1	INTB	NORMAL	LEARN
JP2	RDBP	NOT USED	
JP3	TVR	20 - 80 VDC	81 - 190 VDC

TRIACS	
Q1	Fault Relay (FLT)
Q2	Intermediate Speed (INT)
Q3	Run Enable (RE)
Q4	Spare

FAULT BYPASS	
FBP1 & FBP2	Fault Bypass is activated by clipping a jumper wire between pin jacks FBP1 and FBP2.

Measured Voltage on Input Dropping Resistors for "ON" State

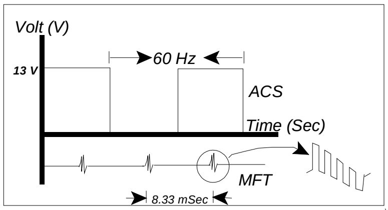
Resistor	Input	VAC (Left)	VAC	Resistor	Input	VAC (Left)	VAC
R5	RDBP	5	120	R14	LEV (E14)	5	120
R6	INTB	5	120	R15	DZ (27)	5	120
R7	MR	5	120	R16	EQ	5	120
R8	DN (87)	5	120	R17	FBP1	120	5
R9	UP (85)	5	120	R18	CNPM	5	120
R12	H (88)	5	120	R19	CNPB	5	120
R13	INS (E31)	5	120	( ) = INPUT DESIGNATION ON BOARD			

FIGURE 6.28 IMC-DAS Data Acquisition System Board Quick Reference

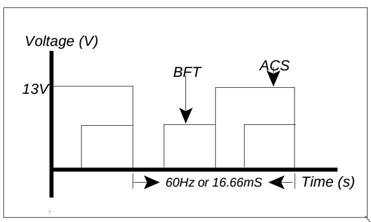
42-QR-IMC-DAS Rev. 3

IMC-DAS QUICK REFERENCE

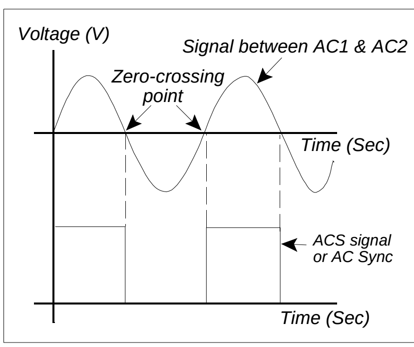
BOARD 36



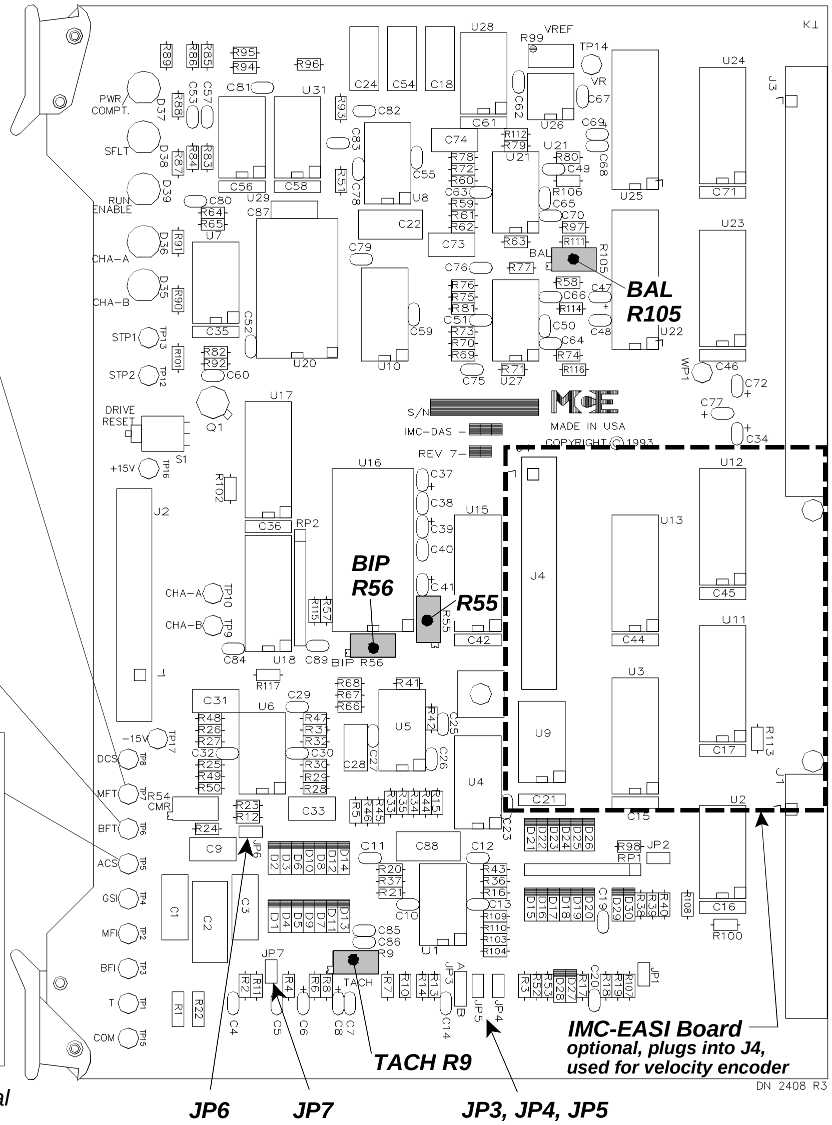
Test Point MFT (Motor Field Trigger) Signal with respect to ACS Signal (not applicable to IMC-AC controllers)



Test Point BFT (Brake Field Trigger) signal with respect to ACS signal



Test Point ACS - AC zero-crossing signal



JUMPER SCHEDULE FOR IMC-DAS BOARD (N/C = No Connection)

MG SYSTEM JUMPERS	JP1 Not Used	JP2 Not Used	JP3 B position	JP4 ON	JP5 ON	JP6 N/C	JP7 N/C
SCR & AC SYSTEM JUMPERS	JP1 Not Used	JP2 Not Used	JP3 A position	JP4 N/C	JP5 N/C	JP6 ON	JP7 ON

Indicators

PWR/COMPT ON = DDP is looping, OFF = no 5V power supply, blinking = DDP is not looping.

SFLT Illumination indicates that the Digital Drive's safety monitoring functions have detected one or more safety failures in the Drive Unit and tripped the FLT relay.

RUN ENABLE Illumination indicates that the Digital Drive is initiating motion.

CHA-A Illumination reflects the transition of the channel A quadrature signal from the hoist motor encoder. The input is used only if an encoder is used instead of a tachometer. (not applicable to IMC-AC controllers)

CHA-B Illumination reflects the transition of the channel B quadrature signal. See CHA-A. (not applicable to IMC-AC controllers)

FIGURE 6.28 IMC-DAS Data Acquisition System Board Quick Reference

Test Points	
COM	This is the reference test point against which all other test points are measured. The oscilloscope or voltmeter common lead wire connects here.
T	Tachometer test point. Maximum is +8VDC (if over 9.9VDC change jumper TVR on SCR-RI board). Use trimpot R9 to set to exactly +8VDC at contract speed. (not applicable to IMC-AC)
BFI	Brake Field Current: Maximum is +6VDC. Change JP1 on IMC-GPA board if over +6VDC.
MFI	Motor Field Current: Maximum is +8VDC. Change JP2 on IMC-GPA board if over +8VDC. (not applicable to IMC-AC controllers)
GSI	Generator Shunt Field Current:: 0.9VDC is equal to 1 Amp of Generator Shunt Field Current. (not applicable to IMC-AC controllers)
DCS	Current Command Signal: 3.0VDC = 100% of SCR Drive rated current. Maximum +/- 5VDC. (±10VDC on IMC-AC controllers)
CHA-A **CHA-B**	Channel A and B quadrature signals from the hoistmotor encoder can be verified at these test points.

SIGNAL PROCESSED BY THE IMC-DAS BOARD	
Digital Inputs	**Digital Outputs**
CHAN-A: Velocity encoder Signal CHAN-B: Velocity encoder Signal GSF SAT: Generator Shunt Field Voltage HIT: High Temperature in SCR Drive DRO: Drive On PLL: Phase Lock Loop Fault IOC: Instantaneous Over Current CFF: Contactor or Fuse Failure HV: Generator Voltage High	FLT: Fault Relay MFF: Motor Field Failure DRE: Drive Enable
Analog Inputs	**Analog Outputs**
Tach: Tach Feedback Loop Voltage (Armature) Loop Current (Armature) Brake Current MF Current: Motor Field Current MF Voltage: Motor Field Voltage GSF Current: Generator Shunt Field Voltage LW: Load Weigher	DCS: Current Command Pre Torque STP1 Software Test Point 1 STP2 Software Test Point 1 Pattern Feed forward (to SCR Drive) Current Feed forward (to SCR Drive)

FIGURE 6.29 IMC-DIO Digital Input/Output Board Quick Reference

42-QR-IMC-DIO Rev. 1

IMC-DIO QUICK REFERENCE

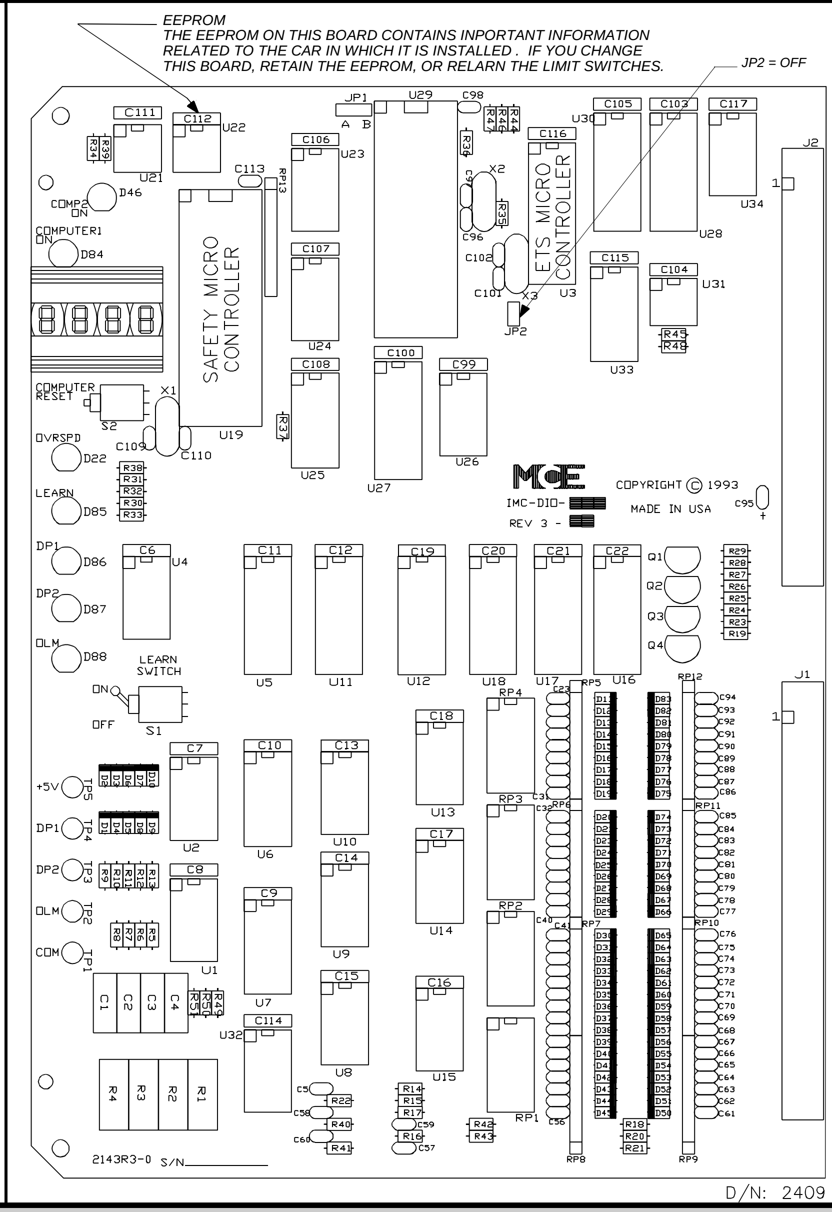
Board 35

Signals Processes by the IMC-DIO board

RD	Read Input
RE	Trigger for RE Triac
PR	Parity Input
R0	Floor Code Input 0
R1	Floor Code Input 1
R2	Floor Code Input 2
R3	Floor Code Input 3
R4	Floor Code Input 4
R5	Floor Code Input 5
UNT	Up Normal Terminal Switches
DNT	Down Normal Terminal Switches
UETS	Up Emergency Terminal Switch
DETS	Down Emergency Terminal Switch
UOLM	Up Outer Leveling Marker
DOLM	Down Outer Leveling Marker
DP1	Digital Pulse 1
DP2	Digital Pulse 2
UP	Up Direction
DN	Down Direction
H	High Speed
INS	Inspection Operation
LEV	Leveling
FLR	Car is at the floor
EQ	Earthquake
INTB	Intermediate Bypass
FLTB	Fault Bypass
CNPB	Contactor Proof Brake
CNPG	Contactor Proof Generator
CNPM	Contactor Proof M Contactor
BCI	Brake Not Lifted
DEL/MR	Delta/M Contactor Redundancy

<u>SCR Drive Status</u>

PSF	Power Supply Failure
ACP	AC Phase Failure
RDY	Ready
LVN	Loop Voltage not zero
DBF	Dynamic Brake Failure



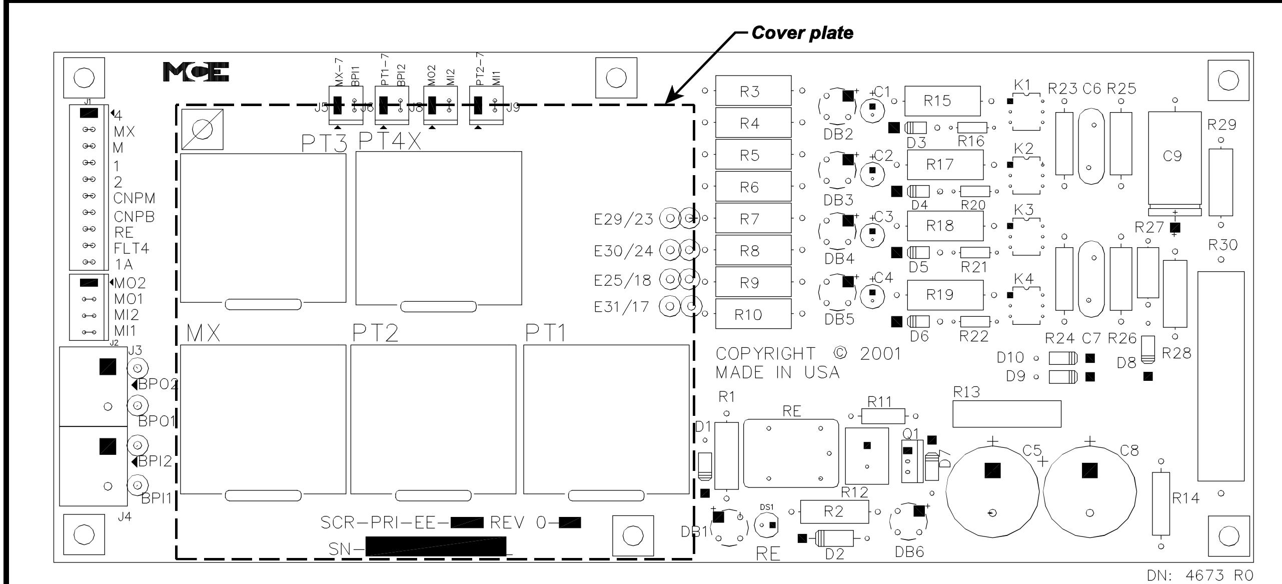
Test Points	
+ 5V	Digital Supply Voltage
DP1	+5V = ON 0V = OFF
DP2	+5V = ON 0V = OFF
OLM	+5V = ON 0V = OFF
COM	0V = GROUND

Indicators and Switches

COMPUTER 1 ON	When illuminated, indicates that the safety processor is looping.
COMP 2 ON	When illuminated, indicates that the ETS processor is looping.
COMPUTER RESET	When pressed, this button resets the safety processor.
OVRSPD	When illuminated, indicates that the safety processor has detected an overspeed condition. This condition can arise from the following: velocity greater than ILO velocity when on Inspection of Leveling, or velocity greater than contract speed (VH).
LEARN	When illuminated, indicates that the safety processor is on Learn operation.
DP1	Illumination reflects the transition of the channel A quadrature signal from the car top landing system.
DP2	Illumination reflects the transition of the channel B quadrature signal from the car top landing system.
OLM	When illuminated, indicates the transition through the Outer Leveling Marker. Signal occurs 1 ft. (305 mm) before a floor.
LEARN SWITCH	Switch used to place the safety processor on Learn operation.

FIGURE 6.30 SCR-PRI SCR Power Relay Interface Board Quick Reference

42-QR-SCR-PRI-EE Rev. 0 **SCR-PRI-EE QUICK REFERENCE** Board 42



IDC TERMINAL	DESCRIPTION
4	4 bus 120VAC
MX	Routed to terminal MX on System 12 drive via N.O. M aux contacts
M	M and MX are connected via N.O. M aux contacts. When made up, the MX relay picks.
1	1 bus, ground connection for relays MX, PT1, PT2 and PT3.
2	2 bus, 120VAC power for relay RE.
CNPM	Power supplied by relay PT2 and PT3 N.O. contacts, and then routed to the SCR-RI / SCR-RIX board for read by the IMC-DDP-x computer.
CNPB	Power supplied by relay PT1 and MX N.O. contacts, and then routed to the SCR-RI / SCR-RIX board for read by the IMC-DDP-x computer
RE	Routed to RE IDC connector on SCR-RI / SCR-RIX. The SCR-RI / SCR-RIX board provides ground to the RE relay subject to FLT N.O. contacts.
FLT4	This connection provides power to relays PT1, PT2, and PT3 subject to an active direction output from the MP and the FLT relay must be energized.
1A	1A bus, ground connection for relays MX, PT1, PT2 and PT3, for Australian AS 1735 code.
MO1	Output AC voltage to M contactor coils.
MO2	Output AC voltage to M contactor coils.
MI1	Input AC voltage for the M contactor coils.
MI2	Input AC voltage for the M contactor coils.
PHOENIX TERM	**DESCRIPTION**
BPO1	Output AC voltage to brake circuit on SI2 / S25 / SMB3(5) unit.
BPO2	Output AC voltage to brake circuit on SI2 / S25 / SMB3(5) unit.
BPI1	Input AC voltage for the brake circuit.
BPI2	Input AC voltage for the brake circuit.

JUMPERS		Test terminals for compliance with CAN/CSA-B44-94 Sections 3.12.9c & d, item 181.1 on Supplement A. See Compliance Report.
J5	MX-7 / BPI1	Terminals across contact #1 (N.O.) of relay MX.
J6	PT1-7 / BPI2	Terminals across contact #1 (N.O.) of relay PT1.
J8	MO2 / MI2	Terminals across contact #1 (N.O.) of relay PT3.
J9	PT2 / MI1	Terminals across contact #1 (N.O.) of relay PT2.

LEDs	
RE	Indicates that the RE relay is energized.

FIGURE 6.31 IMC-GPA General Power Adapter Board Quick Reference

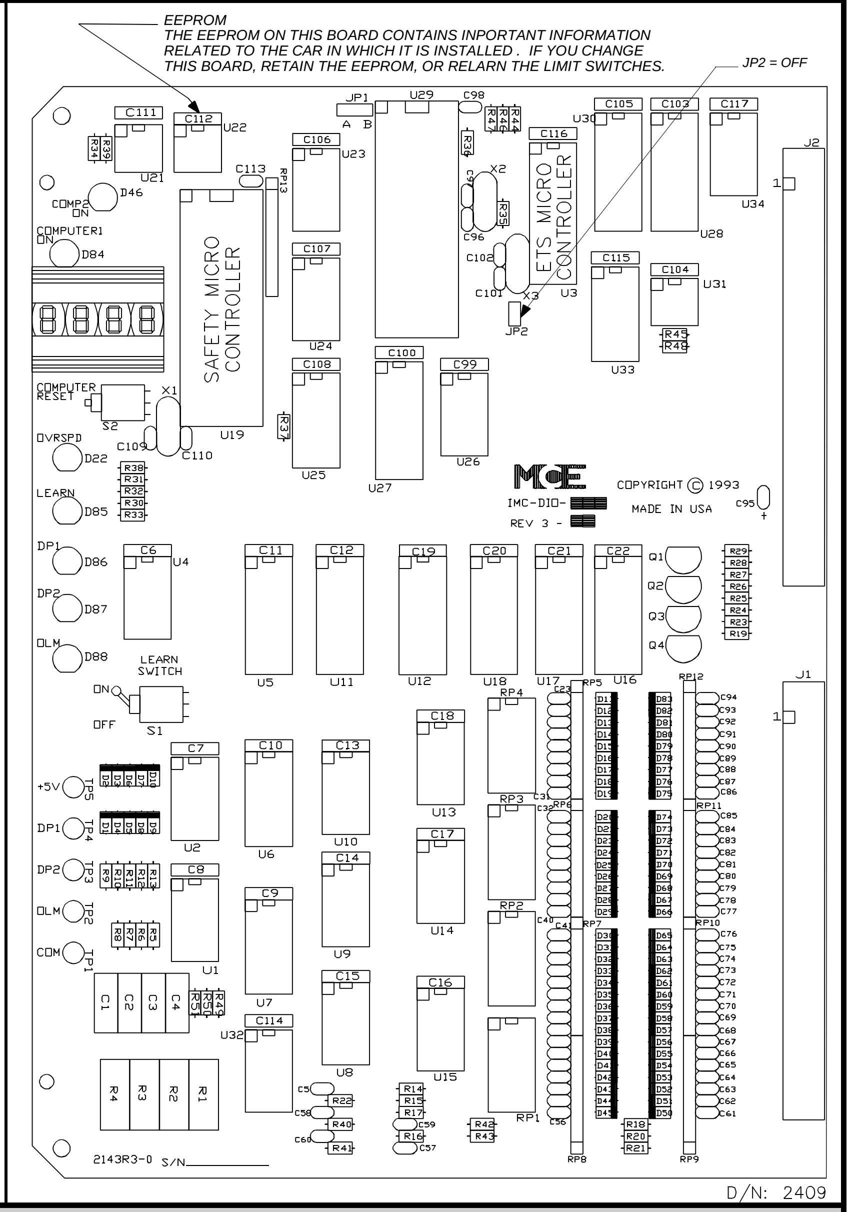
42-QR-IMC-DIO Rev. 1

IMC-DIO QUICK REFERENCE

(BOARD 35)

Signals Processes by the IMC-DIO board

RD	Read Input
PR	Parity Input
R0	Floor Code Input 0
R1	Floor Code Input 1
R2	Floor Code Input 2
R3	Floor Code Input 3
R4	Floor Code Input 4
R5	Floor Code Input 5
UNT	Up Normal Terminal Switches
DNT	Down Normal Terminal Switches
UETS	Up Emergency Terminal Switch
DETS	Down Emergency Terminal Switch
UOLM	Up Outer Leveling Marker
DOLM	Down Outer Leveling Marker
DP1	Digital Pulse 1
DP2	Digital Pulse 2
UP	Up Direction
DN	Down Direction
H	High Speed
INS	Inspection Operation
LEV	Leveling
FLR	Car is at the floor
EQ	Earthquake
INTB	Intermediate Bypass
FLTB	Fault Bypass
CNPB	Contactor Proof Brake
CNPG	Contactor Proof Generator
CNPM	Contactor Proof M Contactor
BCI	Brake Not Lifted
DEL/MR	Delta/M Contactor Redundancy
RE	Trigger for RE Triac



Test Points	
+ 5V	Digital Supply Voltage
DP1	+5V = ON 0V = OFF
DP2	+5V = ON 0V = OFF
OLM	+5V = ON 0V = OFF
COM	0V = GROUND

Indicators and Switches

COMPUTER 1 ON	When illuminated, indicates that the safety processor is looping.
COMP 2 ON	When illuminated, indicates that the ETS processor is looping.
COMPUTER RESET	When pressed, this button resets the safety processor.
OVRSPD	When illuminated, indicates that the safety processor has detected an overspeed condition. This condition can arise from the following: velocity greater than ILO velocity when on Inspection of Leveling, or velocity greater than contract speed (VH).
LEARN	When illuminated, indicates that the safety processor is on Learn operation.
DP1	Illumination reflects the transition of the channel A quadrature signal from the car top landing system.
DP2	Illumination reflects the transition of the channel B quadrature signal from the car top landing system.
OLM	When illuminated, indicates the transition through the Outer Leveling Marker Signal occurs 1 ft. (305 mm) before a floor.
LEARN SWITCH	Switch used to place the safety processor on Learn operation.

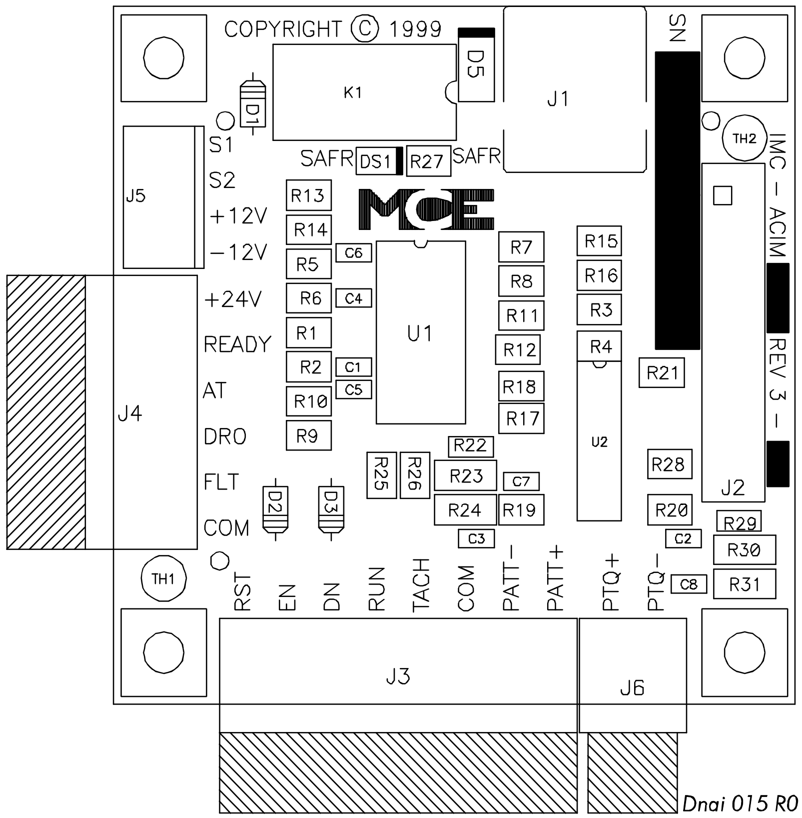
Note: The Learn procedure must be performed whenever the IMC-DIO board is replaced or when Pattern or Profile parameters are modified (see Section 4.10 Learning the Normal (NTS) and Emergency (ETS) Limit Switches in the Controller Installation Manual).

FIGURE 6.32 IMC-ACIM Quick Reference (MagneTek Drive)

42-QR-IMC-ACIM Rev 2

IMC-ACIM QUICK REFERENCE

Board 58



J3		J4	
RST	Reset input to the AC drive (0 VDC = reset, 24 VDC = no reset)	+24 V	24 VDC from the AC drive power supply
EN	Enable input command to the AC drive (0 VDC = ON, 24 VDC = OFF)	RDY	Drive Ready output (0 VDC = Drive ON, 18 VDC = Drive OFF)
DN	Down input command to the AC drive (0 VDC = ON, 24 VDC = OFF)	AT	At Speed output from the AC drive (0 VDC = Normal, 18 VDC = At Speed Fault)
RUN	Run input commands the drive to run (0 VDC = ON, 24 VDC = OFF)	DRO	Drive ON output (0 VDC = Drive ON, 18 VDC = Drive OFF)
TACH	Speed output from the AC drive (± 10 VDC between TACH and COM)	FLT	Fault output from the AC drive (0 VDC = fault, 18 VDC = no fault)
COM	Common to all inputs and outputs	COM	Common to all inputs and outputs
PATT- PATT+	Speed command (Pattern to the AC drive (± 10 VDC between PATT+ and PATT-)		

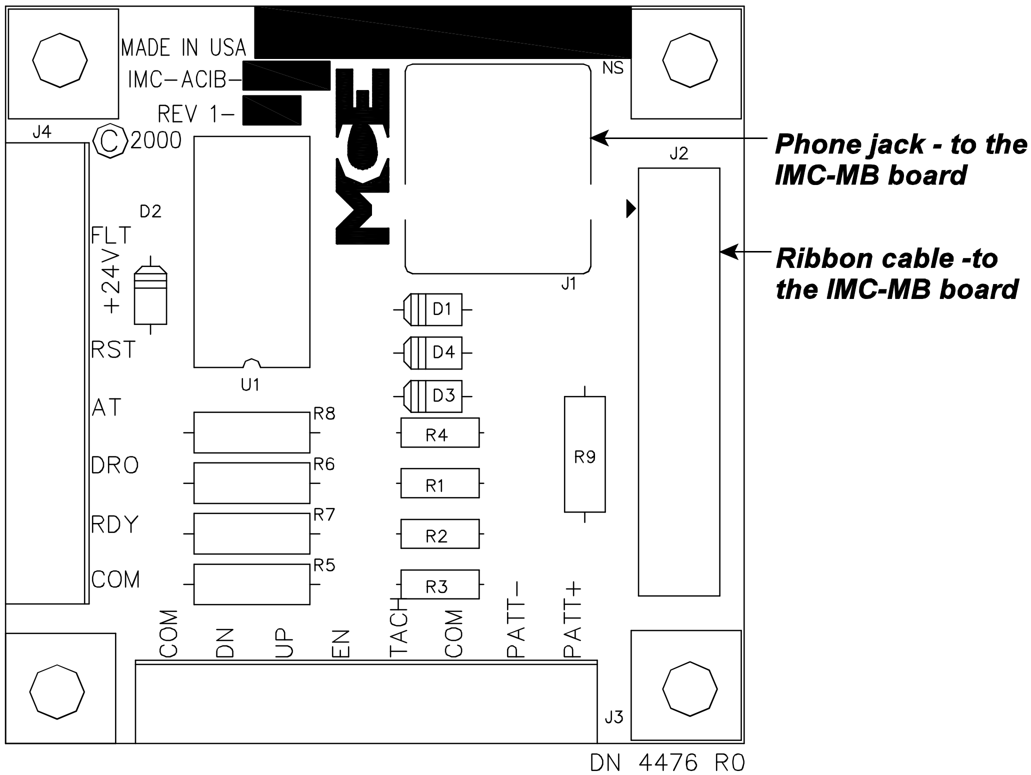
J5		J6	
S1	0 VDC = SAFR ON, 12 VDC = SAFR OFF	PTQ+	Pre-Torque signal to the AC Drive
S2	0 VDC	PTQ-	(± 10VDC between PTQ+ and PTQ-)
+12 V	+12 volts from the power supply		
-12 V	-12 volts from the power supply		

FIGURE 6.33 IMC-ACIB Quick Reference (Baldor Drive)

42-QR-IMC-ACIB Rev 1

IMC-ACIB QUICK REFERENCE

Board 49



J3	
COM	Common to all inputs and outputs
DN	Down input command to the AC drive (0 VDC = ON, 20 VDC = OFF)
UP	Up input command to the AC drive (0 VDC = ON, 20 VDC = OFF)
EN	Enable input command to the AC drive (0 VDC = ON, 20 VDC = OFF)
TACH	Speed output from the AC drive (0 - 5 VDC)
COM	Common to all inputs and outputs
PATT+ PATT-	Speed command (Pattern) to the AC drive (± 10 VDC between PATT+ and PATT-)

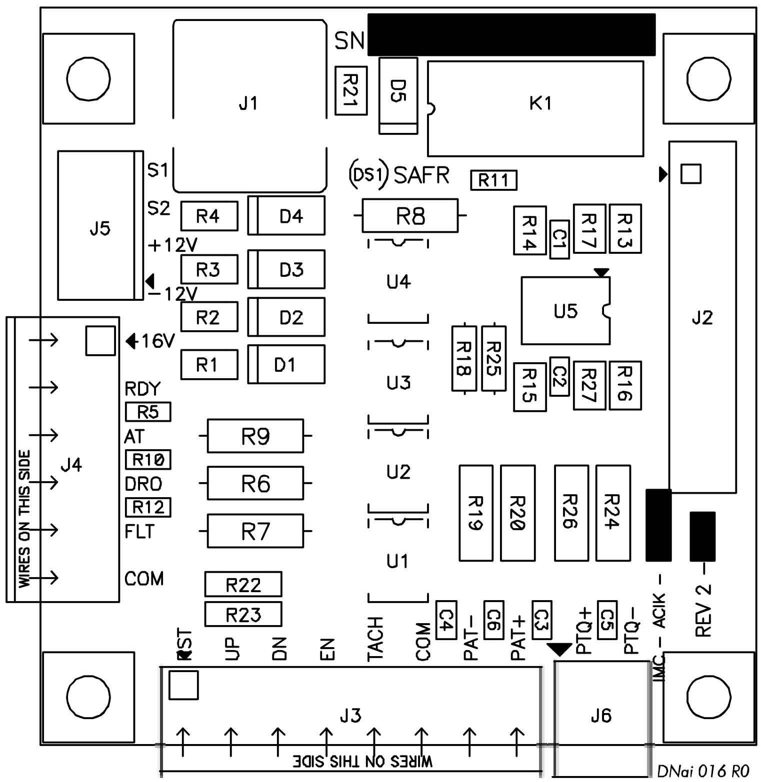
J4	
FLT	Fault output from the AC drive (0 VDC = no fault, 20 VDC = fault)
24 V	20 - 24 VDC from the AC drive power supply
RST	Reset input to the AC drive (0 VDC = reset, 20 VDC = no reset)
AT	At Speed output from the AC drive (20 VDC = Normal, 0 VDC = At Speed Fault)
DRO	Drive ON Output (0 VDC = Drive OFF, 20 VDC = Drive ON)
RDY	Drive Ready Output (0 VDC = Not Ready, 20 VDC = Ready)
COM	Common to all inputs and outputs

FIGURE 6.34 IMC-ACIK Quick Reference (TORQMAX)

42-QR-IMC-ACIK Rev. 1

IMC-ACIK QUICK REFERENCE

Board ??



J3	
RST	Reset input to the AC drive (0 VDC = no reset, 18 VDC = reset)
EN	Enable input command to the AC drive (0 VDC = OFF, 18 VDC = ON)
UP	Up input command to the AC drive (0 VDC = OFF, 18 VDC = ON)
DN	Down input command to the AC drive (0 VDC = OFF, 18 VDC = ON)
TACH	Speed output from the AC drive (± 10 VDC between TACH and COM)
COM	Common to all inputs and outputs
PATT- PATT+	Speed command (Pattern to the AC drive (± 10 VDC between PATT+ and PATT-)

J4	
+24 V	18 - 24 VDC from the AC drive power supply
RDY	Drive Ready output (0 VDC = Drive OFF, 18 VDC = Drive ON)
AT	At Speed output from the AC drive (0 VDC = At Speed Fault, 18 VDC = Normal)
DRO	Drive ON output (0 VDC = Drive OFF, 18 VDC = Drive ON)
FLT	Fault output from the AC drive (0 VDC = fault, 18 VDC = no fault)
COM	Common to all inputs and outputs

J5	
S1	0 VDC = SAFR ON, 12 VDC = SAFR OFF
S2	0 VDC
+12 V	+12 volts from the power supply
-12 V	-12 volts from the power supply

J6	
PTQ+	Pre-Torque signal to the AC Drive
PTQ-	(± 10VDC between PTQ+ and PTQ-)

6.7 TROUBLESHOOTING THE TORQMAX DRIVE

The drive's digital operator display should have the normal display. If there is any drive fault displayed, refer to the following troubleshooting suggestions and/or the fault section in the TORQMAX Drive Technical Manual.

6.7.1 CAR OVERSHOOTS OR THE DRIVE TRIPS on 'E. OL' or 'E. OP' ON ACCELERATION

If, during acceleration, the car OVERSHOOTS or trips on OVER VOLTAGE, then check the following:

NOTE: It is mandatory to have 40% counterweight.

1. Decrease A2 - Phase Two Acceleration on the Pattern (Shift F4) screen.
2. Increase the drive gains by increase parameters LF. 31 and LF.32.
3. Turn OFF the power and wait for 5 minutes so the DC bus voltage is not present in the dynamic braking circuit. Using a voltmeter, verify that no voltage is present. Then verify the value of the dynamic braking resistor with the job prints and check for any loose connection.

6.7.2 DRIVE TRIPS 'E.OP' OR THE CAR OVERSHOOTS ON DECELERATION

If the drive trips on 'E.OP' during deceleration or overshoots the floors, then check the following:

1. Verify that all the items described in Section 6.7.3 and the counter weight are set properly.
2. Increase A6 - Phase Six Deceleration on the Pattern (Shift F4) screen and verify that the VHL, VIL, and VFL speeds are adjusted to provide a smooth transition from high speed to leveling speed.
3. If all the items above are set properly and the car still overshoots, consult the Drive manual. If the problem still exists then increase the slow down distance on a couple of floors so that you can run the car between these floors at high speed and stop the car properly.

6.7.3 OSCILLATIONS IN THE CAR AT CONTRACT SPEED

The HPV 900 series drive is used for Flux Vector applications. If there are OSCILLATIONS in the car at contract speed, then verify the following:

1. Are the gain parameters are set two high (LF.31 and LF.32).
2. Are the Motor parameters set correctly?
3. Is the encoder properly mounted? If it is properly mounted it should not oscillate.

6.7.4 DRIVE TRIPS “OVER VOLTAGE” BY CLIPPING THE DOOR LOCKS

If the drive trips on over voltage by clipping the door locks, check the dynamic braking circuit.

6.7.5 ALARMS AND FAULTS

The following are some of the TORQMAX drive error messages. Refer to the TORQMAX drive manual for troubleshooting suggestions.

TABLE 6.13 TORQMAX Drive Error Messages

Display	Description
bbi	Base Block Time - message precedes most faults (F5)
E.br	Error Current Check (F5) - verifies each phase of the motor for connection and magnetization.
E.buS	Error, bus, failure in serial communication
E.dOH	Motor over temperature - the external motor temperature sensor tripped
E.dSP	Error, digital signal processor, error in signal processor
E.EnC	Encoder Failure, error in the encoder signal - bad connection (reset only possible with Power-On-Reset)
E.EnC1	Encoder Signal Loss or signal not correct (F5)
E.EnCC	Encoder Communication Error (F5) - problem with communication between drive and encoder or the value of data being transferred (see US.26).
E.hSd	Occurs when there is a difference between the commanded speed and the actual motor speed for a certain period of time. Verify parameter LF.58 and LF.59. Lower Speed Prop (LF.31) and Integral Gain (LF.32) parameters. Verify LF.17 (Encoder pulse count). Verify LF.11 (Motor speed/RPM). Reaching Tork limit - caused by higher acceleration. Load is too high - lower the value of LF.36. (F4)
E.hyb	Encoder Card Invalid - feedback card has an invalid identification code.
E.hybC	Encoder Card Change (F5) - indicates that the feedback card was changed.
E.LC	No current flowing to the motor, check the wiring between motor and inverter (F4)
E.LSF	DC Bus Charging Error - error occurs for a short time during power up, but will clear automatically if everything is OK.
E.nOH	Over Temperature Cooled Down, overheating no longer present, error can be reset (valid for malfunction E. OH or E.OH2
E.nOL	Cool down phase completed, no overload, error can be reset
E. OC	Over current - specified peak output current exceeded or short-circuit or ground fault
E. OH	Inverter Overheat - heat sink temperature rises above permissible limit.
E.OH2	Electronic Motor Overload - electronic motor overload protection was activated.
E. OL	Overload - time dependent overload (can not be reset until display shows E.nOL).
E.OL2	Low speed overload - time dependent overload at low speed (can not be reset until display shows E.nOL).
E. OP	Over voltage - DC bus voltage rises above the permissible value either during motor regenerative operation or as a result of line side voltage spikes.
E. OS	Over Speed, (can only be reset with Power-On-Reset)
E.PrF	Prohibited rotation forward, error in the software limit switch (when the set direction of rotation is forward, the software limit switch for forward is inactive) (F4)
E.Prr	Prohibited rotation reverse, error in the software limit switch (when the set direction of rotation is reverse, the software limit switch for reverse is inactive) (F4)
E.PuC1	Power Unit Code - invalid power circuit recognition
E.PuCH	Power Unit Code Changed (F5) - typically experienced when exchanging control cards.
E.SEt	Error, set, set selection error, check LF.02
E. UP	Under voltage - DC bus voltage below permissible value, input single phasing or phase imbalance

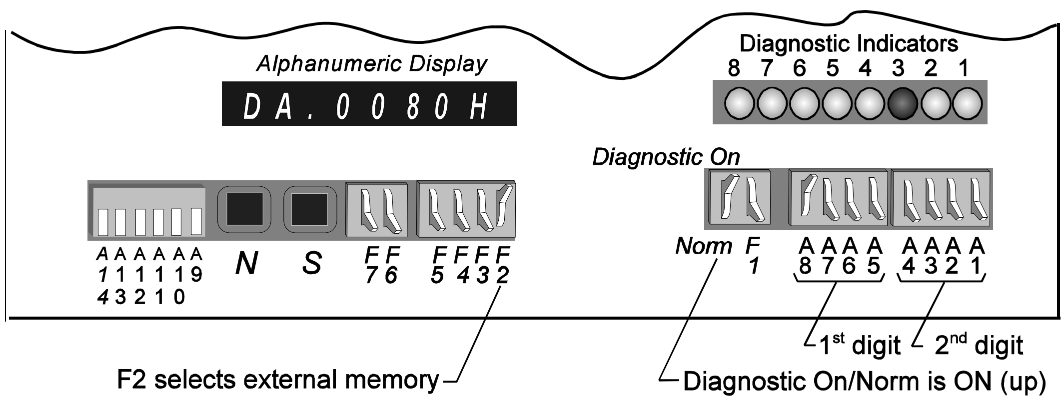
6.8 TROUBLESHOOTING USING THE MLT DATA TRAP

The MLT "data trap" records many of the controller's operation “flags” at the moment the MLT occurs. This allows you to see what flags led up to the fault. Note: Direction must be on (inputs UPS or DNS) for two minutes before MLT will occur.

Once an MLT shuts down the car, use these steps to look at the stored flags.

1. Do not reset the computer, as this will clear the data trap on controllers with older software versions.* To return the car to service and not harm the data, simply toggle the relay panel inspection switch from OFF to ON and back to OFF.

2. On the Computer Swing Panel, place the Diagnostic On/Norm switch and the F2 switch up (ON) as shown.

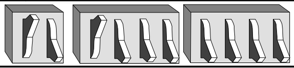
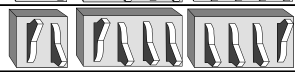
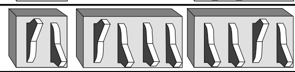
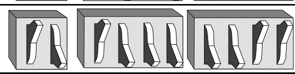
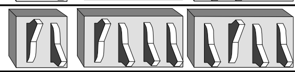
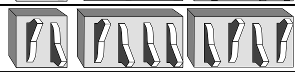
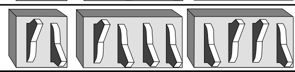
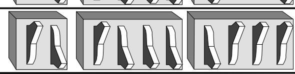
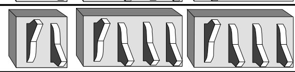
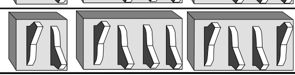
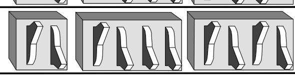
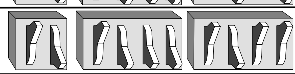
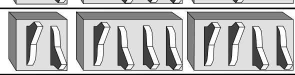
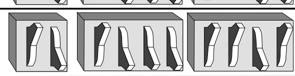
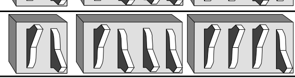
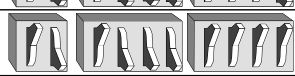
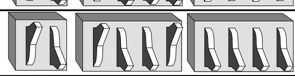
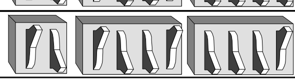
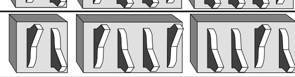
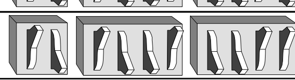
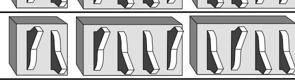
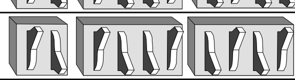
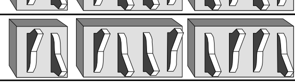
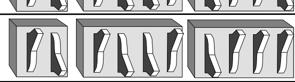


3. Use the DATA TRAP MEMORY CHART to look at the saved MLT data. Set the address switches A1 thru A8 as shown in the Data Trap Memory Chart which is appropriate for your controller type (Local, Simplex Car A or Simplex Car B). Switches A5 thru A8 select the first digit and switches A1 thru A4 select the second digit of the Hex address. The picture above shows the switches set for the first address in the local controller chart.

4. Record the data displayed on the Diagnostic Indicators for all rows (addresses) shown on the chart. It helps if you have a few photocopies of the chart. Simply mark the positions in the chart for the Diagnostic Indicators that are ON. The first 20 addresses contain car status flags. The last four addresses contain the car's position indicator value at the instant the MLT condition occurred, MLT counter, PG flags and MLT Code number. Only the labeled positions are important to mark.

5. Use the recorded values to help determine the root of the problem. Call MCE for assistance if any is needed.

   * Note: If the data trap has been cleared and/or no MLT has occurred, all of the flags in the data trap memory addresses will be set (LEDs will be ON). Each time a new MLT occurs, the new data overwrites the old data.

TRACTION (LOCAL) MLT DATA TRAP MEMORY CHART									
Computer Memory Address (Hex)	**Toggle Switches** Diagnostic On F1 A8.......A5 A4.......A1	**Diagnostic Indicators** LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
80		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
81			DC	UC	CC			DHO	DOI
82		DCF	DCP	DOF	LOT		HCT	CCT	SDT
83				HSEL	CSB	DCC	NUDG		DSHT
84		INT/DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
85				HLW	HLI			FWI	
86		LFP	UFP						
87				EQI	IND	IN		DELSIM	YSIM
88		LLW	DLK		DZORDZ			PK	LLI
89		DNDO	LD		DDP	UPDO	LU		UDP
8A		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
8B		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
8C			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
8D						FRM			FRC
8E		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
8F		HLD	EPI	EPR	SLV	ISR	YRQ	PTR	PTS
90								HML	ALT
91		ATSF	NSI	DNI	UPI	ATS	CTLF	CTL	PFG
92		CAC	CAB	CWI	EQA	EDS	ESTE	EQN	PUSD
93			CWIL						
94		PI	PI	PI	PI	PI	PI	PI	PI
95		Counter	Counter	Counter	Counter	Counter	Counter	Counter	Counter
96		LRARN	IN	CORR	SHRTRUN	DANGER	PH2	PH1	PHS0
97		CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #

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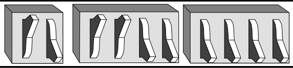
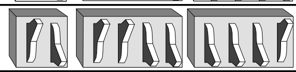
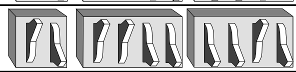
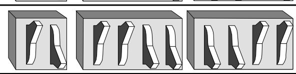
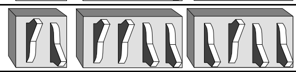
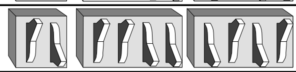
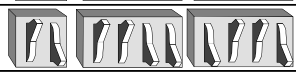
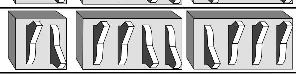
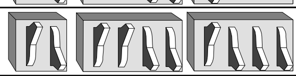
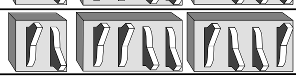
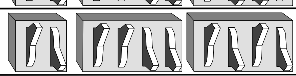
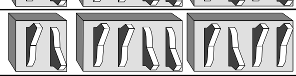
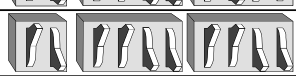
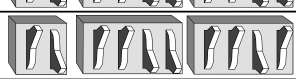
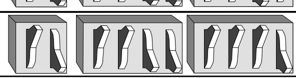
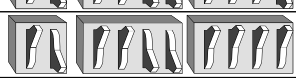
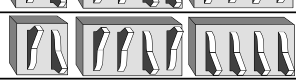
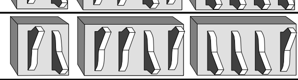
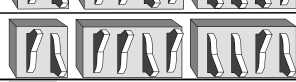
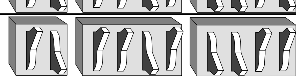
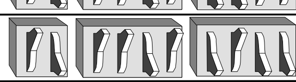
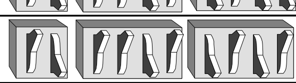
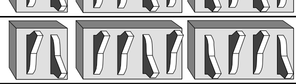
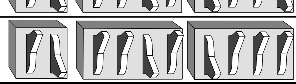
TRACTION (SIMPLEX CAR A) MLT DATA TRAP MEMORY CHART

Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active							
		8	7	6	5	4	3	2	1
C0		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
C1			DC	UC	CC			DHO	DOI
C2		DCF	DCP	DOF	LOT		HCT	CCT	SDT
C3				HSEL	CSB	DCC	NUDG		DSHT
C4		INT/DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
C5				HLW	HLI			FWI	
C6		LFP	UFP						
C7				EQI	IND	IN		DELSIM	YSIM
C8		LLW	DLK		DZORDZ			PK	LLI
C9		DNDO	LD		DDP	UPDO	LU		UDP
CA		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
CB		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
CC			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
CD						FRM			FRC
CE		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
CF		HLD		EQA	ATSF		ECRN	CD	EPR
D0					ESP2	EPS1	EPI	HML	ALT
D1		SDAM	CTLM	SUAM	DOLL	RDEMD	CTLF	CTL	PFG
D2		CAC	CBC	CWI	EQA	EDS	ESTE	EQN	PUSD
D3			CWIL						
D4		PI	PI	PI	PI	PI	PI	PI	PI
D5		Counter	Counter	Counter	Counter	Counter	Counter	Counter	Counter
D6		LEARN	IN	CORR	SHRTRUN	DANGER	PH2	PH1	PHS0
D7		CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #

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TRACTION (SIMPLEX CAR B) MLT DATA TRAP MEMORY CHART									
Computer Memory Address (Hex)	**Toggle Switches** Diagnostic On F1 A8.......A5 A4.......A1	**Diagnostic Indicators** LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
E0		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
E1			DC	UC	CC			DHO	DOI
E2		DCF	DCP	DOF	LOT		HCT	CCT	SDT
E3				HSEL	CSB	DCC	NUDG		DSHT
E4		INT/DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
E5				HLW	HLI			FWI	
E6		LFP	UFP						
E7				EQI	IND	IN		DELSIM	YSIM
E8		LLW	DLK		DZORDZ			PK	LLI
E9		DNDO	LD		DDP	UPDO	LU		UDP
EA		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
EB		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
EC			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
ED						FRM			FRC
EE		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
EF		HLD		EQA	ATSF		ECRN	CD	EPR
F0					ESP2	EPS1	EPI	HML	ALT
F1		SDAM	CTLM	SUAM	DOLL	RDEMD	CTLF	CTL	PFG
F2		CAC	CBC	CWI	EQA	EDS	ESTE	EQN	PUSD
F3			CWIL						
F4		PI	PI	PI	PI	PI	PI	PI	PI
F5		Counter	Counter	Counter	Counter	Counter	Counter	Counter	Counter
F6		LEARN	IN	CORR	SHRTRUN	DANGER	PH2	PH1	PHS0
F7		CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #

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APPENDIX

APPENDIX A
DISASSEMBLING THE COMPUTER SWING PANEL

FIGURE A.1 Computer Swing Panel With Boards (Top View)

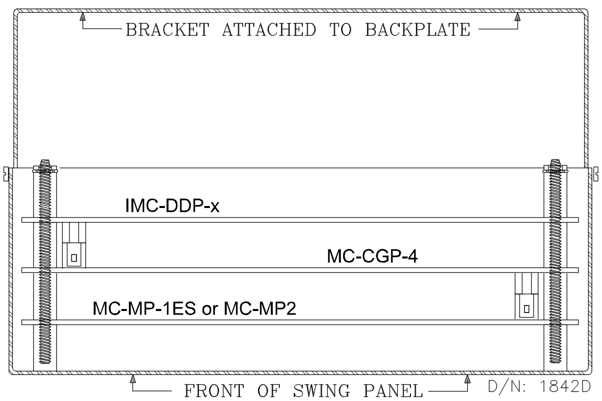


FIGURE A.2 Computer Swing Panel Without Boards (Top View)

FIGURE A.3 Computer Swing Panel Boards Boards(Snapped Together)

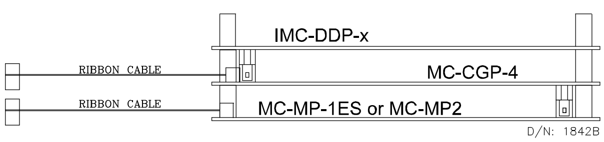
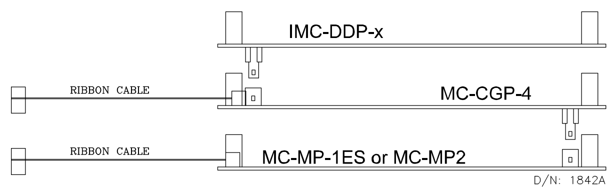


FIGURE A.4 Computer Swing Panel (Unsnapped)



MCE Technical Support may advise an installer to remove a circuit board for troubleshooting reasons. If so, remove the thumbscrew holding the Swing Panel to the bracket on the back plate. Lower the Swing Panel so that it faces down.

With the back of the Swing Panel facing up, loosen and remove the four nuts securing the back cover plate. This may require the use of a 11/32 nut driver.

CAUTION: Components on the PC boards can be damaged by ESD. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

Disconnect the 60 pin ribbon cable from the connector on the IMC-MB board in the IMC-Sxx drive. Disconnect the 20 pin ribbon cables from the HC-PIO and MC-RS boards.

Remove the circuit boards from the Swing Panel. Put the nuts back on the bolts for safekeeping.

Unsnap the boards from each other and replace/repair the boards as necessary.

APPENDIX B
CHANGING PC BOARDS, EPROMS OR MICROCONTROLLERS

With directions from MCE Technical Support, a PC board, EPROMs or Microcontroller may need to be reinstalled in the field. Great care should be taken when changing any of these items. The EPROM stores the computer program, the microcontroller both stores and executes the program and all three are subject to damage by ESD (see CAUTION). These instructions should be followed step-by-step.

CAUTION: Components on the PC boards can be damaged by ESD. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

B.1 REPLACING THE MAIN PROCESSOR BOARD OR EPROM

Normally the microprocessor on the Main Processor board (MC-MP-1ES or MC-MP2) is not replaced in the field. Sometimes the EPROM is replaced to upgrade the program and occasionally the complete board must be replaced due to a component failure.

Replacing the EPROM - The EPROM for the MC-MP-1ES board is labeled S-MP-xx-1. The EPROM for the MC-MP2 board is labeled S-MP2-xx-1. The “xx” represents the controller type. If the new EPROM has the same job number as the old EPROM, the user settings for timers and adjustable control variables, etc., are retained. Any new timers or variables added to the new EPROM will be set to their default values.

If the job number on the new EPROM is different from the job number on the old EPROM, all of the timers and variables will be set to their default values. The user settings should be documented before the old EPROM is removed so that they can be re-entered when the new EPROM is installed.

Replacing the Main Processor board - The user settings for timer and adjustable control variables are stored in battery backed RAM on the Main Processor board. If the new board was previously installed in another car controller, the user settings from that car will be retained. If the new board is a replacement from MCE, all of the user programmable values will be set to their default values. Therefore, the current user settings should be documented before the old board is removed so that they can be re-entered when the new board is installed. The following is a list of the user settings:

- Elevator Timers (see Section 5.2.4)
- Processor Clock Flags (see Section 5.2.5)
- Communications Port Settings (see Section 5.3.1)
- Security Codes (see Section 5.3.2)
- Master Software Key (MSK) (see Section 5.3.4)
- Software Options - Adjustable Control Variables (see Section 5.3.5)
- Learned values for the Load Weigher - if a load weigher is used for dispatching, the Load Weigher Learn Operation must be performed (see Section 5.3.6)

Replacement Procedure

1. Document the current settings for the items listed above.

2. Turn power OFF at the main disconnect and verify that no lights are operating on the microprocessor panel. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

3. Remove the Main Processor board (MC-MP-1ES or MC-MP2) from the Swing Panel. Refer to Appendix A for instructions on unloading the boards from the Swing Panel. If you are replacing the PC board, proceed to step 6 below (refer to MC-MP-1ES or MC-MP2 Quick Reference in Section 6 for proper jumper settings).

4. Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket, *not* between the socket and the board (see MC-MP-1ES or MC-MP2 Quick Reference in Section 6). Gently pry the existing EPROM out from the socket. Do this very slowly, taking care not to bend the leads. If they become bent, straighten them carefully with needlenose pliers.

5. Place the new EPROM lightly (do not plug it in yet) into the socket and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the orientation of the notch should also correspond to the notches on all of the other chips on the board). Now push the EPROM firmly into the socket and make sure that *none* of the pins are bent during the insertion. Inspect the EPROM to make sure that no pins are bent outward or under the EPROM.

6. Reassemble the Swing Panel assembly and close the Swing Panel. Refer to the instructions in Appendix A.

7. Turn power ON at the main disconnect. Verify the proper operation of all boards by inspecting the diagnostic indicators and Computer ON LEDs on the individual processor boards.

   - If the Computer ON LEDs are not illuminated on all three boards, the EPROMs may not have been installed properly. Repeat the above steps 2 through 7.

8. Re-enter the user settings documented in step 1 above.

B.2 REPLACING THE MC-CGP-4 BOARD OR EPROMS

Sometimes the EPROMs are replaced to upgrade the program to a new software version and occasionally the complete board must be replaced for a software upgrade or a component failure.

Replacing the EPROMs - The EPROMs for the MC-CGP-4 board are labeled S-CGP-CC-1 and S-CGP-CC-2.

i) EPROMs with the same software version number will not cause the loss of user data. Follow steps **2 thru 7** in the Replacement Procedure below.

ii) EPROMs with a new software version number will result in loss of user data. Follow the **entire** Replacement Procedure below.

Replacing the MC-CGP-4 board - The user settings for the items listed below are stored in battery backed RAM on the MC-CGP-4 board. If the new board was previously installed in another car controller, the user settings from that car will be retained. Follow the **entire**

Replacement Procedure below when using a board from another car controller which has different settings from those of the car being replaced or when installing a board from MCE.

NOTE: The Fault Log and Performance Reports will all be lost and can not be recovered.

Replacement Procedure

1. Document the current settings for the items listed below.

   - M3 Group Parameters or Car ID parameter CNID on F1 -1 screen for local cars only
   - Security - timer tables, security configurations, passenger names and access codes (simplex car and group only)
   - Special Events Calendar Menu options Configure by Type, Configure by Controller, and CMS Com Port Setup (if available)
   - Job Configuration data used for display - job name, car label and landing labels

2. Turn power OFF at the main disconnect and verify that no lights are operating on the microprocessor panel. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

3. Remove the MC-CGP-4 board from the Swing Panel. Refer to Appendix A for instructions on unloading the boards from the Swing Panel. If you are replacing the PC board, proceed to step 6 below (refer to MC-CGP-x Quick Reference in Section 6 for proper jumper settings).

4. The two EPROMs on the MC-CGP-4 board are labeled ROM1-U17 and ROM2-U18 (see MC-CGP-x Quick Reference in Section 6) Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket, *not* between the socket and the board. Gently pry the existing EPROMs out from the socket. Do this very slowly, taking care not to bend the leads. If they become bent, straighten them carefully with a needlenose pliers.

5. Place the new EPROMs lightly (do not plug it in yet) into the sockets and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the orientation of the notch should also correspond to the notches on all of the other chips on the board). Now push the EPROMs firmly into the socket and make sure that *none* of the pins are bent during the insertion. Inspect the EPROMs to make sure that no pins are bent outward or under the EPROM.

6. Reassemble the Swing Panel assembly and close the Swing Panel. Refer to the instructions in Appendix A.

7. Turn power ON at the main disconnect. Verify the proper operation of all boards by inspecting the diagnostic indicators and Computer ON LEDs on the individual processor boards.

   - If the Computer ON LEDs are not illuminated on all three boards, the EPROMs may not have been installed properly. Repeat the above steps 2 through 7.
   - Verify that the group controller is communicating with the cars by looking at the LEDs in the front of the group swing panel.

8. Set ODPC=ON, on the General F1-1 screen, and save the parameter.

9. Re-enter the user settings documented in step 1 above.

B.3 REPLACING THE IMC-DDP-x BOARD OR EPROMS

Sometimes the EPROMs are replaced to upgrade the program to a new software version and occasionally the complete board must be replaced for a software upgrade or a component failure.

Replacing the EPROMs - The EPROMs for the IMC-DDP-x board are labeled S-DDP-PSD-1 and S-DDP-PSD-2. Replacing EPROMs will not cause the loss of user data. The user data is located on the EEPROM, U15. Follow steps **2 thru 7** in the Replacement Procedure below, omitting the noted instructions regarding the EEPROM.

Replacing the IMC-DDP-x board - The user settings for the parameters are stored in EEPROM on the IMC-DDP-x board. If the new board was previously installed in another car controller, the user settings from that car will be retained. Follow the **entire** Replacement Procedure below when using a board from another car controller which has different settings from those of the car being replaced or when installing a board from MCE.

Replacement Procedure

1. Use the tables in the Reference section to document the current settings for the parameters on the following screens.

   - General (Shift F1) screen
   - Brake Standard view (Shift F3) screen
   - Pattern (Shift F4) screen
   - Safety (Shift F6) screen
   - Limit Switches (Shift F7) screen, values of position margins only.
   - Floor Heights (Shift F8) screen

2. Turn power OFF at the main disconnect and verify that no lights are operating on the microprocessor panel. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

3. Remove the IMC-DDP-x board from the Swing Panel. Refer to Appendix A for instructions on unloading the boards from the Swing Panel. If you are replacing the PC board, proceed to step 6 below (refer to IMC-DDP-x Digital Drive Processor Board Quick Reference in Section 6, for proper jumper settings).

4. The two EPROMs on the IMC-DDP-x board are labeled EPROM 1 - U6 and EPROM 2 - U5 (see IMC-DDP-x Board Quick Reference in Section 6) Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket, *not* between the socket and the board. Gently pry the existing EPROMs out from the socket. Do this very slowly, taking care not to bend the leads. If they become bent, straighten them carefully with needlenose pliers. **Note:** If you are replacing the board, also remove the EEPROM - U15 so that the user parameters will be transferred to the new board.

5. Place the new EPROMs / EEPROM lightly (do not plug in) into the sockets and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM / EEPROM is correctly aligned with the notch on the socket (the orientation of the notch should also correspond to the notches on all of the other chips on the board). Now push the EPROMs / EEPROM firmly into the socket and make sure that *none* of the pins are bent.

6. Reassemble the Swing Panel assembly and close the Swing Panel. Refer to the instructions in Appendix A.

7. Turn power ON at the main disconnect. Verify the proper operation of all boards by inspecting the diagnostic indicators and Computer ON LEDs on the individual processor boards.

   - If the DDP reset LED is blinking, the EPROMs / EEPROM may not have been installed properly. Repeat the above steps 2 through 7.

8. Verify the user settings documented in step 1 above. Go screen by screen. Re-enter parameters if required, then save each screen before moving on to the next one. NOTE: If CGP software has also been replaced some screens may be removed or changed and some parameters may be moved but all parameter names will remain the same.

9. The NTS and ETS Limit Switch values must be re-learned as described in Section 4.10.

B.4 REPLACING THE IMC-DIO BOARD OR MICROCONTROLLERS

The program instructions for the IMC-DIO board are stored on the microcontrollers. Sometimes the microcontrollers are replaced to upgrade the program and occasionally the complete board must be replaced due to a component failure.

Replacing the Safety and/or ETS microcontroller - The learned data for the Normal Terminal Limit Switches (NTS) and Emergency Terminal Limit Switches (ETS) will be retained when the Safety and/or ETS microcontrollers are changed.

Replacing the IMC-DIO board -The NTS and ETS Limit Switch values must be re-learned as described in Section 4.10.

Replacement Procedure

1. Turn the power OFF at the main disconnect and verify that no lights or LEDs are operating on the board. Install a grounding strap on your wrist and connect it to ground before handling the PC board.

2. Remove the IMC-DIO board from the Digital Drive enclosure by releasing the extraction handles and pulling forward. If you are replacing the PC board, proceed to step 5 below.

3. Refer to the IMC-DIO Board Quick Reference in Section 6 for the location of the microcontrollers, safety processor (U19) and ETS processor (U3). Using a small, thin-bladed screwdriver, place the tip of the screwdriver between the microcontroller chip and its socket, *NOT* between the socket and the board. Gently pry the microcontroller chip from its socket. Do this slowly, taking care not to bend the last pins as they come out of the socket.

3. Place the new microcontroller lightly (do not plug it in yet) into the socket and check that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the microcontroller is correctly aligned with the notch on the socket. The orientation of the notch should correspond with the notches on all the other chips on the board. Now push the microcontroller firmly into the socket and make sure that none of the pins are bent outward or under the microcontroller.

4. Insert the board firmly into the Digital Drive enclosure and engage the extraction handles.

5. Reapply power to the system. Verify the proper operation of the IMC-DIO board by observing the TEST and PASS messages on the four character alphanumeric display and the COMPUTER 1 ON and COMP 2 ON LEDs.

   - If the TEST and PASS messages do not appear, the microcontroller may not have been installed properly. Repeat steps one through four.

   - The COMPUTER 1 ON and COMP 2 ON LEDs should not be blinking. If either one or both LEDs are blinking, repeat steps one to four.

6. Perform the NTS and ETS Limit Switch learn procedure as described in Section 4.10.

B.5 REPLACING THE IMC-DAS BOARD

1. Turn the main power OFF and remove the IMC-DAS board from the IMC-SI2 drive unit.

2. Perform the following:

   - Locate the R9 trimpot at the bottom of the old board (see IMC-DAS Board Quick Reference in Section 6 for location). Measure the resistance between the outer pins of this trimpot.

   - Adjust the R9 trimpot on the replacement board to get the same resistance reading (as close as possible).

3. Install the replacement board in the IMC-SI2 drive unit. Turn the main power ON.

4. Perform the procedure described in Section 3.7.4 for the adjustment of the BIP and BAL trimpots.

B.6 REPLACING THE EPROM ON THE SMARTLINK MC-NC / MC-NIO BOARD

With directions from MCE Technical Support, an EPROM may need to be reinstalled in the field. Great care should be taken as printed circuit (PC) boards and integrated circuits (ICs), such as an EPROM, are subject to damage by ESD (see CAUTION). These instructions should be followed step-by-step.

CAUTION:	Components on the PC boards can be damaged by ESD. Wear an ESD grounding strap on your wrist and connect it to ground before handling the PC boards.

Identification of the EPROMs - The EPROM for the MC-NC board is labeled S-NC-C (see Figure L.9, MC-NC Board Quick Reference). The EPROM for the MC-NIO board is labeled S-NIO-C (see Figure L.10, MC-NIO Board Quick Reference).

Replacement Procedure

1. Turn controller power OFF and verify that no lights are operating on the processor boards. Wear an ESD grounding strap on your wrist and connect it to ground before handling the PC boards.

2. Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket (***not*** between the socket and the board). Gently pry the existing EPROM out from the socket. Do this very slowly, taking care not to bend the leads.

3. Position the new EPROM into the socket (do not plug it in yet) and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the notch orientation of all the ICs on the board are the same). Once these checks have been made, push the EPROM slowly, evenly and firmly into the socket and make sure that the pins are not bent during the insertion. Inspect the EPROM for pins bent outward or under the EPROM and correct any bent pins found.

4. Disconnect Network cable NETA and NETB. Turn power ON. Verify the proper operation of the board by inspecting the diagnostic indicators (COMPUTER ON and SERVICE LEDs) on the respective processor boards:

   MC-NC Board - If installed properly, the COMPUTER ON LED will be ON continuously and the SERVICE LED will be OFF, plus both will blink together approximately once every 10 seconds. This pattern repeats continuously. If the EPROM has been installed incorrectly, both the Computer ON and the SERVICE LEDs will blink simultaneously once per second. A similar pattern is observed if no EPROM is installed. Repeat the above steps 1 through 3. Check for notch orientation and look for bent pins.

   MC-NIO Board - If properly installed, the SERVICE LED should not illuminate and the COMPUTER ON LED should stay ON continuously. If the SERVICE LED stays illuminated, the EPROM may not be installed properly. Repeat the above steps 1 through 3. Check for notch orientation and look for bent pins.

APPENDIX C
INSPECTING THE LS-QUAD-2 POSITION PULSES

If the Outer Leveling Distance Error (OLD) or quad pulser relation (QPR) flag are highlighted on the F3 screen, follow the steps below.

1. Using a multi-meter, measure the voltage with reference to the 1 Bus on terminals 95 and 96 on the SCR-RI board.

   On Voltage: 52 ± 5VDC
   Off Voltage: 0 to 1VDC (preferably 0.5V or less)

2. If any of these voltages are out of the above range, find the error by performing the same voltage measurement inside the LS-QUAD-2 box. Terminals 95 and 96 are located on HC-DFLS board.

3. Check tape guide assembly distances against the drawing in Figure C.1. Make sure that all distances are within the ranges given in the drawing. If the sensors are too close to the running surface of the tape, add a washer between the subplate and the brass spacers for the HC-SB1 assembly. See Figure C.2. If all the dimensions are correct and the proper voltage cannot be achieved, contact the factory.

4. Using an oscilloscope, connect the probes from channels 1 and 2 to test points DP1 and DP2 with reference to test point COM on the IMC-DIO board. Observe the pulses while running the car in either direction at a constant speed of about 50 fpm (.25 m/s). The signals should have approximately a 50% duty cycle and should be 90 degrees out-of-phase as shown in Figure C.3.

FIGURE C.1 ***LS-QUAD-2 Enclosure (Top View)***

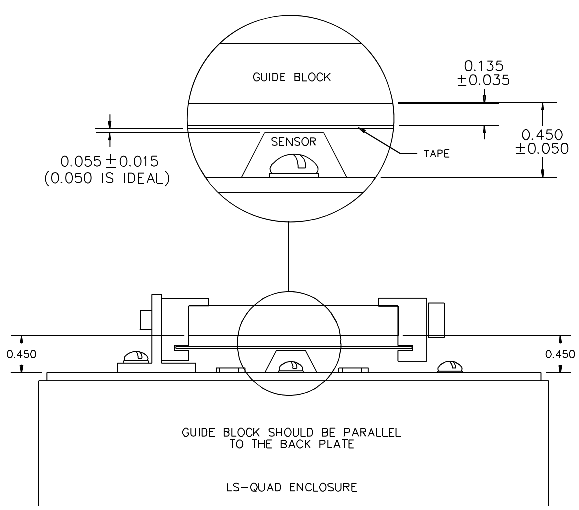
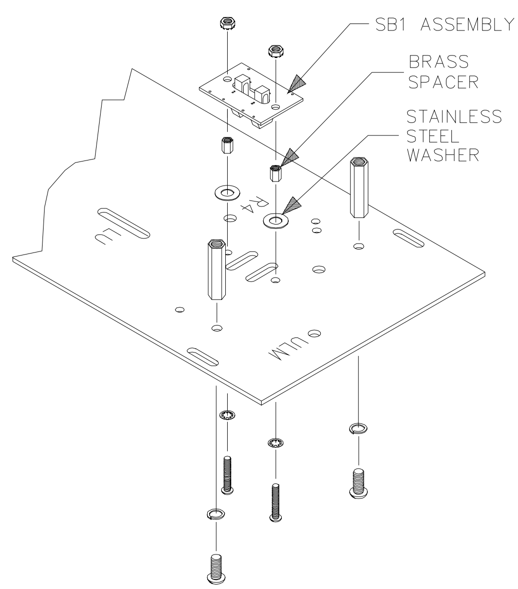


FIGURE C.2 ***Attaching SB1 to LS-QUAD-2 Backplate***

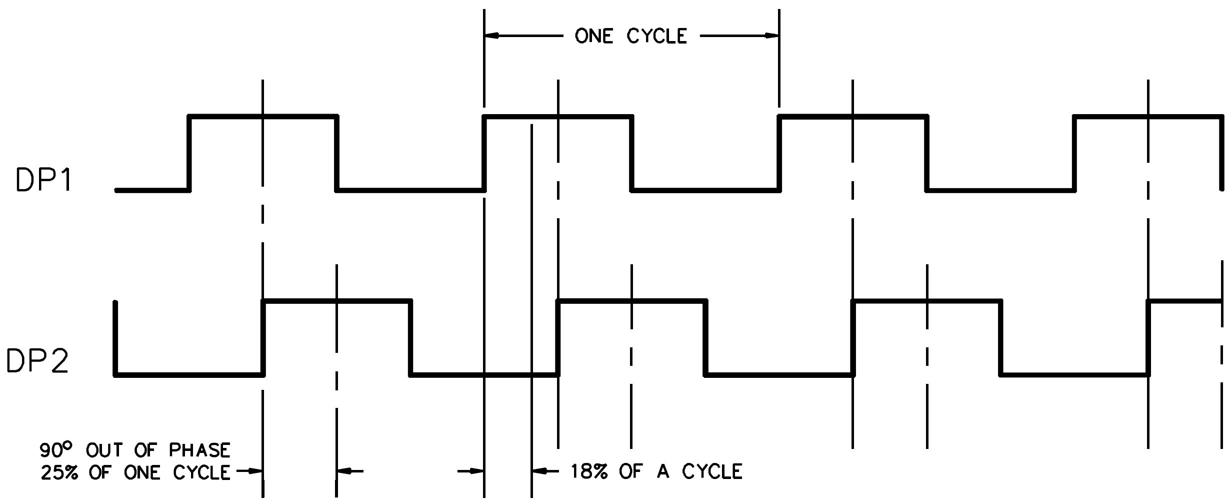


The **MINIMUM** time between any two adjacent transitions of DP1 and DP2 must be at least 18% of one cycle.

NOTE:	90 degrees is equal to 25% of one cycle.

If the OLD flag is still highlighted on the F3 screen and steps 1-4 have been followed, contact MCE Technical Support.

FIGURE C.3 Signal Comparison of DP1 and DP2



APPENDIX D
INSPECTING THE LS-QUIK-1 POSITION PULSES

STEP 1: QUADRATURE VOLTAGE MEASUREMENT

A. Using a multi-meter, make the following measurements:

DP1 & DP2 (terminals 95 & 96 respectively, inside the controller).

ON VOLTAGE:	52 ±5VDC with respect to ground (1 bus)
OFF VOLTAGE:	0 to 1VDC (preferably 0.5V or less) with respect to ground (1 bus)

If any of these voltages are out of tolerance:

1. Perform the same voltage measurement inside the LS-QUIK-1 box. Terminals 95 & 96 are located on HC-DFLS board.

STEP 2: QUADRATURE SIGNAL COMPARISON

A. If an oscilloscope is available, connect channel 1 and 2 to the DP1 and DP2 test points on the IMC-DIO board. Observe the pulses while running the car in either direction at a constant speed of about 50 fpm (.25 m/s). The signals should have approximately a 50% duty cycle and should be 90 degrees out-of-phase (see Figure C.3).

The **MINIMUM** time between any two adjacent transitions of DP1 & DP2 must be 18% of one cycle.

> **NOTE:** 90 degrees is equal to 25% of one cycle.

APPENDIX E NOMENCLATURE

Motion Control Engineering, Inc.	NOMENCLATURE		
F:\DOCS\Nmcltr1Shipping.frm	Effective Date: 11/27/00	Approved By: Engineering Manager	Page 1 of 2

#	PC BOARD	DESCRIPTION
1	HC-RB4	Traction Controller Main Relay Board
1	HC-RBH	Hydraulic Controller Main Relay Board
2	HC-CI/O	Non Programmable Controller Call I/O Board
2	HC-CI/O-E	Programmable Controller Call I/O Expander Board
3	HC-PI/O	Non Programmable Controller Power I/O Board (Car A) ①
3	HC-PCI/O	Programmable Controller Power And Call I/O Board
4	HC-PI/O	Non Programmable Controller Power I/O Board (Car B) ①
6	HC-TAB	Traction Adapter Board
7	HC-RDRB	Rear Door Relay Board
8	HC-RD	Rear Door Logic Board (Car A) ①
9	HC-RD	Rear Door Logic Board (Car B)
10	HC-DB-MOD	Front G.A.L. MOD Door Interface Board
11	HC-DB-MOD-R	Rear G.A.L. MOD Door Interface Board
12	HC-DPS	Door Power Supply Board
13	HC-PIX	Position Indicator Expander Board (Car A) ①
14	HC-PIX	Position Indicator Expander Board (Car B)
15	HC-SRT	Suicide Relay Timing Board
16	HC-SCR	SCR Interface Board
17	HC-EQ	Earthquake Board
18	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car A) ①
19	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car B)
20	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car A) ①
21	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car B)
26	HC-DYNA	Dynalift Interface Board
27	MC-ACFR	AC Feedback Relay Board
28	IMC-GIO	General Turbo DF I/O Board
29	IMC-RB	Turbo DF Relay Board
30	HC-DB-MOM/H	Front G.A.L. MOM/MOH Door Interface Board
31	HC-DB-MOM/H-R	Rear G.A.L. MOM/MOH Door Interface Board
32	HC-OA	Output Adapter Board
33	IMC-RI	M/G Relay Interface Board
34	IMC-PRI	M/G Power Relay Interface Board
35	IMC-DIO	Digital I/O Board
36	IMC-DAS	Data Acquisition Board
37	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car A) ①
38	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car B)
39	HC-I4O	Additional I/O(16 Input / 4 Output) Expander Board (Car A) ①
40	HC-I4O	Additional I/O(16 Input /4 Output) Expander Board (Car B)
41	SCR-RI	SCR/AC Relay Interface Board
42	SCR-PRI	SCR/AC Power Relay Interface Board
43	HC-LB	Lock Bypass Board
44	HC-GB	Gong Board
45	HC-GB	Additional Gong Board
46	HC-SIB	Selectable Input Buffer Board (Car A) ①
47	HC-SIB	Selectable Input Buffer Board (Car B)
48	HC-RT	Relay Tester Board
49	IMC-ACIB	AC Baldor Interface Board
50	HC-DPS-MOM/H	Front G.A.L. MOM/MOH Door Interface and Power Supply Board
51	HC-ACI	AC Drive Interface Board
52	HC-ACIF	AC Flux Vector Interface Board
53	HC-DPS-MOM/H-R	Rear G.A.L. MOM/MOH Interface and Power Supply Board

#	PC BOARD	DESCRIPTION
54	IMC-MBX	IMC Enhanced Motherboard
55	SCR-RIX	SCR Relay Interface Extension Board
56	HC-HBF	A.S.M.E. Front Door Lock Bypass Board
57	HC-HBFR	A.S.M.E Front and Rear Door Lock Bypass Board
58	IMC-ACIM	AC MagneTek Interface Board
59	HC-TACH-MG	Tach Adjust Board for VVMC-MG Controller
60	HC-TACH-SCR	Tach Adjust Board for VVMC-SCR Controller

① Individual group cars use board numbers for car A only

SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
X / X	BUS LOCATED ON PC BOARD
X / X	BUS LOCATED OFF PC BOARD
	MICROCOMPUTER OUTPUT OR CALL CIRCUIT
	MICROCOMPUTER INPUT
MP	MICROCOMPUTER OUTPUT OR CALL CIRCUIT FOR ASME 17.1–2000 SERIES CONTROLLER
MP	MICROCOMPUTER INPUT FOR ASME 17.1–2000 SERIES CONTROLLER
P	PATTERN GENERATOR OUTPUT
P	PATTERN GENERATOR INPUT
S	PATTERN GENERATOR SAFETY INPUT
	POWER TERMINAL
	PANEL MOUNT TERMINAL
X	EYELET ON PC BOARD
X	SCREW TERMINAL ON PC BOARD
X	IDC CONNECTOR ON PC BOARD
CX–X X CX–X X	RIBBON CABLE CONNECTOR
TPX	TEST POINT

SYMBOL	DESCRIPTION
OFF BOARD SIDE X BOARD NUMBER	BOARD DESIGNATOR
	SOLDER CONNECTION ON REAR OF PC BOARD
	WIRING INSIDE CONTROL CABINET
	TRACE ON PC BOARD
	CUSTOMER WIRING INTO CONTROL CABINET
	ALL UNMARKED DIODES ARE 2.5 AMP 1000 VOLT
	VOLTAGE SPIKE SUPPRESSOR
	DOT BY RESISTOR INDICATES TOP OR LEFT SIDE AS MOUNTED
	BOX INDICATES UNUSED ITEM
	RELAY COIL
	FORCE GUIDED RELAY COIL
POLE NUMBER X SWING SIDE	NORMALLY OPEN (N.O.) RELAY CONTACT
POLE NUMBER X SWING SIDE	NORMALLY CLOSED (N.C.) RELAY CONTACT
N/C	NO CONNECTION

WIRE SYMBOLS

SYMBOL	DESCRIPTION
X	#X AWG THHN WIRE 90° C
X	#X AWG PVC WIRE 105° C
X	#X AWG PTL WIRE 125° C
X	#X AWG TEFLON WIRE 200° C

UNLESS NOTED, ALL WIRES ARE #18 AWG PVC, WITH EXCEPTION TO THE PC BOARD WIRING, WHICH IS DETERMINED BY ENGINEERING.

WIRE GAUGES

SYMBOL	SIZE
03	3/0 AWG
02	2/0 AWG
0	0 AWG
1	1 AWG
2	2 AWG
4	4 AWG
6	6 AWG
8	8 AWG
10	10 AWG
12	12 AWG
14	14 AWG
16	16 AWG
18	18 AWG

Motion Control Engineering, Inc.	NOMENCLATURE
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APPENDIX G
REPLACING IMC-SI2 DRIVE COMPONENTS

CAUTION:	Components on the PC boards can be damaged by ESD. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

a. IMC-GPA-SI REMOVAL

1. Remove the cover from the IMC-SI2.

2. Disconnect the ribbon cable from the IMC-DAS board.

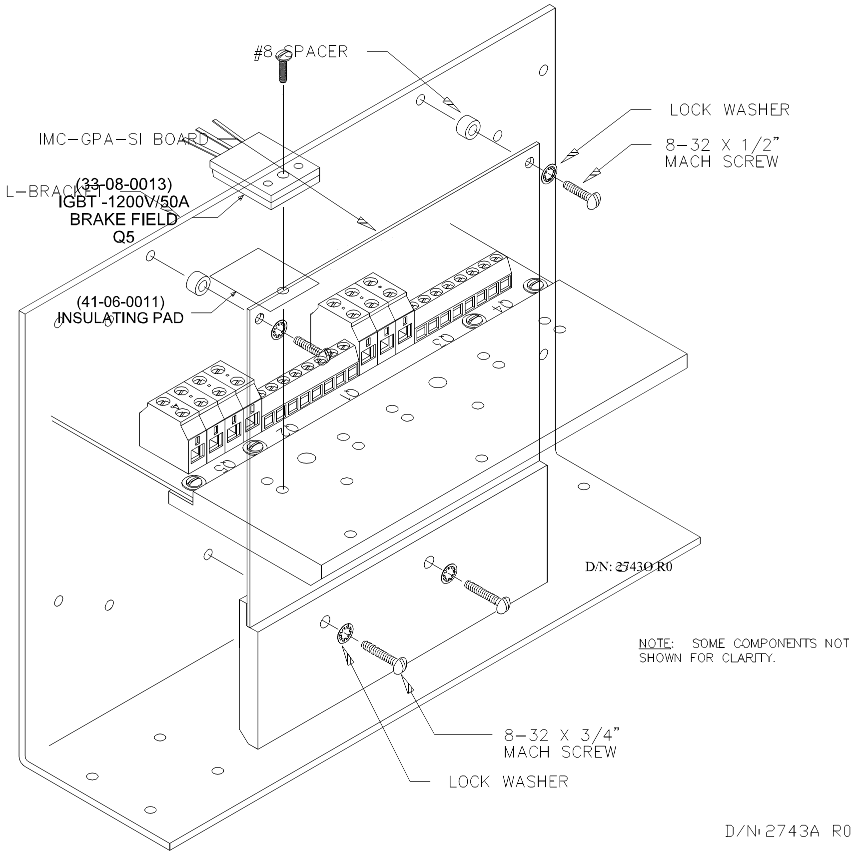
3. Remove the red wires labeled BR1 and +DC from their IMC-GPA board terminals.

4. Remove the connectors from J2 and J3 of the IMC-GPA board.

5. Remove the four screws which hold the IMC-GPA-SI in place (Figure G.1).

6. Remove the IMC-GPA-SI.

FIGURE G.1 IMC-GPA-SI Removal



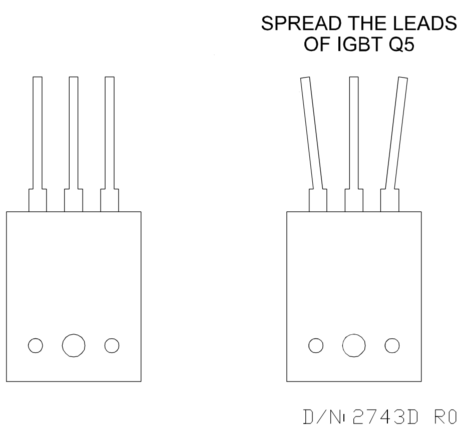


FIGURE G.2 IGBT Removal

b. BRAKE IGBT REMOVAL

1. With the IMC-GPA-SI removed, loosen the terminals of the IGBT.

2. Remove the screw which secures the IGBT followed by the IGBT itself. See Figure G.2.

FIGURE G.3 Spreading Leads of IGBT

FIGURE G.4 Inserting IGBT Into Screw Terminal

c. BRAKE IGBT INSTALLATION

1. Prepare the new IGBT as shown in Figures G.3 and G.4.

2. .Inspect the insulating pad and replace if necessary.

3. Place the insulating pad in position so that the hole lines up with the hole furthest from the screw terminal.

4. Insert the leads of the new IGBT into the appropriate screw terminals but do not tighten.
5. Install and tighten the screw that holds the IGBT in place.

6. Tighten the three screw terminals.

d. IMC-GPA-SI INSTALLATION

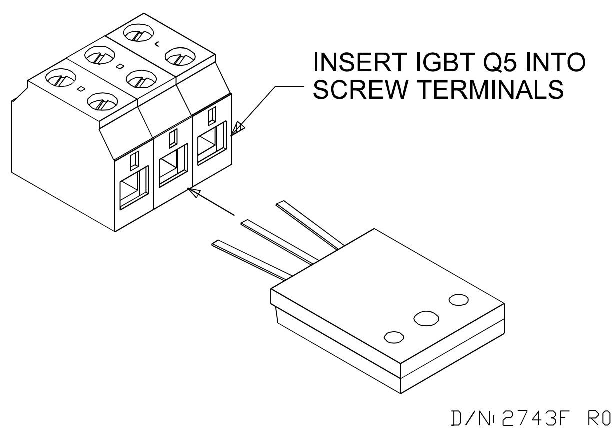
1. Place the IMC-GPA-SI in its original position within the Drive enclosure as shown in Figure G.1.

2. With a starter screwdriver, install the two lower screws through the heat sink but do not tighten.

3. Install the spacers and screws into the upper holes and tighten.

4. Tighten the two lower screws.

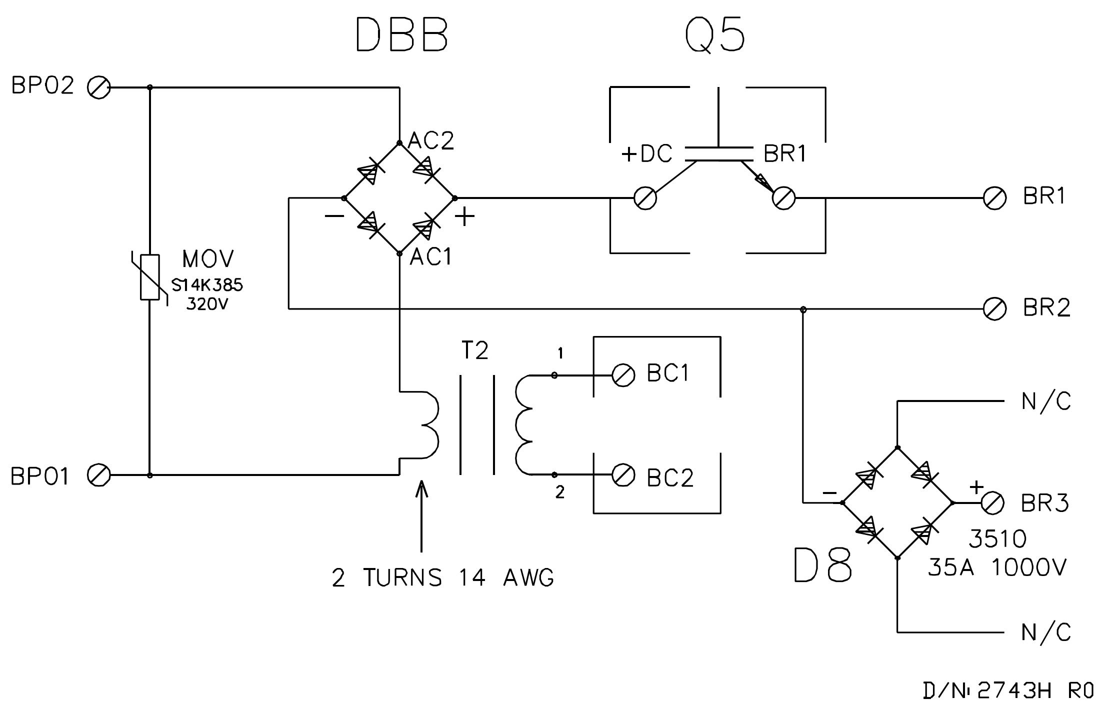
5. Reconnect J2 and J3.



6. Carefully insert each of the red wires into their proper screw terminals and tighten.

7. Reconnect the ribbon cable to the IMC-DAS board.

FIGURE G.5 Brake Circuit


DBB
Q5
BP02
AC2
+DC
BR1
BR1
AC1
MOV
S14K385
320V
BR2
T2
1
BC1
N/C
BP01
BC2
2
BR3
3510
35A 1000V
D8
2 TURNS 14 AWG
N/C
D/N:2743H R0

APPENDIX K
FLEX-TALK OPTION

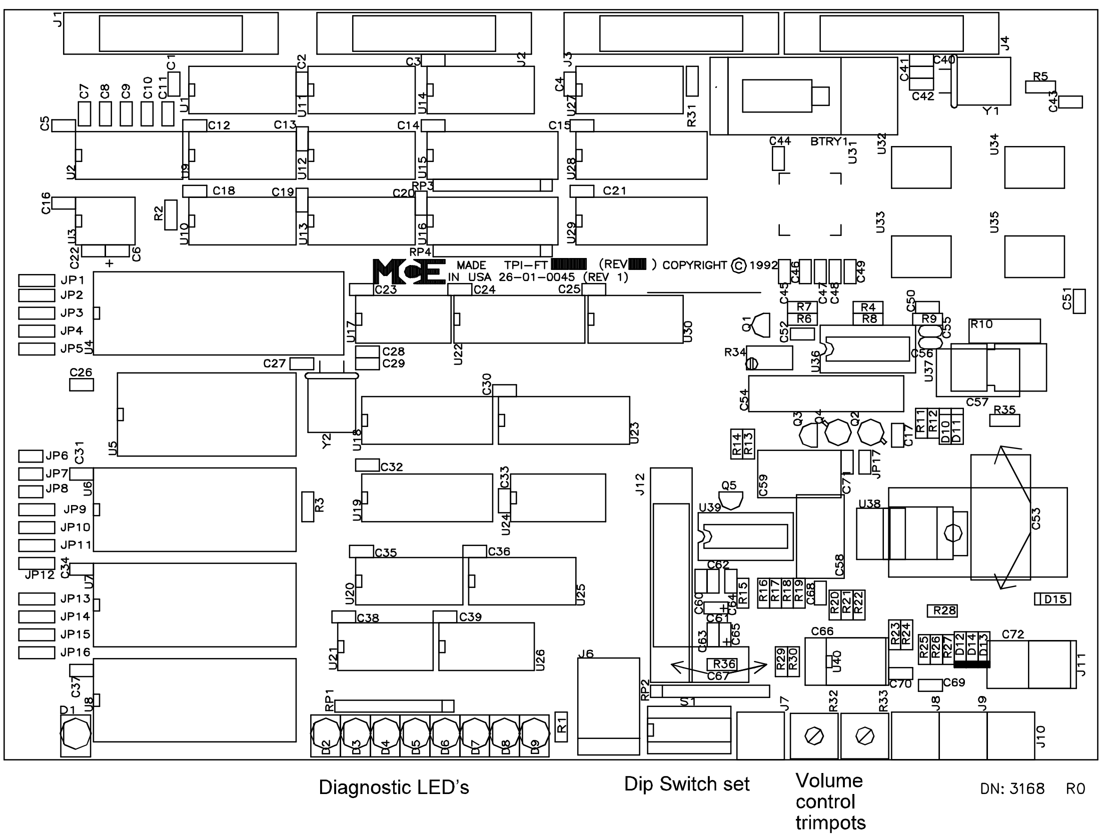
> **NOTE:** The following is a listing of diagnostic tools available on a controller if the Flex-Talk option is provided.

Use this appendix in conjunction with the manual. The appendix provides information regarding the diagnostics and volume adjustments for the TPI-FT option on the Flex-Talk unit.

K.1 INTRODUCTION AND THEORY OF OPERATION

The Flex-Talk board is designed for use on any MCE controller to provide flexibility in audio announcement. The TPI-FT board is installed inside the controller and hooked up to the last board of the daisy chain. The TPI-FT receives such needed information as door status, nudging, PI, etc. from the MCE bus. A +5V power supply runs the digital circuitry, and a -/+15V supply operates the analog circuitry of the speaker. There are eight LED's used for diagnostic purposes in conjunction with the dip switches. The input and output connectors (J1 and J2) are used for the MCE bus; however, it is unlikely that the output will be used, as the Flex-Talk board is typically the last in the daisy chain, the exception being a duplex where there are two Flex-Talk boards.

FIGURE K.1 TPI-FT Flex-Talk Board



K.2 DIAGNOSTICS

The six switches on the dip switch package are used for diagnostics purposes. There are eight LED's (D2 through D9) also, for displaying diagnostics information. These LED's are used in conjunction with the dip switch package (see below). For self-test, turn on switch S2 of the dip switch set. The unit will announce each of the floor messages, the direction, nudging, and the fire service messages (the special messages are not included in the self test). This test does not require the connection of the MCE bus.

FIGURE K.2 Diagnostic Table

DIP SWITCHES					DIAGNOSTIC LEDS								MNEM.
S2	S3	S4	S5	S6	D2	D3	D4	D5	D6	D7	D8	D9	
1	0	0	0	0	SELF TEST								
0	0	0	0	0	UP	DOWN	NUDG	DOOR	MAIN FIRE	SAF	ALT FIRE	HOSP	MODSW
0	1	0	0	0	PIs DISPLAYED IN BINARY (00 = BOTTOM)								PIN
0	0	1	0	0	X	EM3A	EM2A	EM1A	DORA	GDA	GUA	PIA	MAW
0	1	1	0	0	PIs DISPLAYED IN BINARY (00 = BOTTOM)								IPR_3
0	0	0	1	0	SEC. FLR	HLW	EMP	X	X	X	X	X	SMAW1
0	1	0	1	0	STOP SW	OVS	LOBM	X	X	X	X	X	SMAW2
0	0	1	1	0	X	X	EMP	X	X	X	X	X	EMPWI N
0	1	1	1	0	UP	DOWN	NUDG	DLK	FRS	SAF	FRA	HOSP	ITR-1
0	0	0	0	1	PI0	PI1	PI2	PI3	PI4	CSE	HLW	EPR	ITR-2
0	1	0	0	1	PI5	X	DOPLFR	X	X	H OR (NOT) STC	ATALT	ATMN	ITR-3

Dip switches:
- switches S2, S3, S4, S5, and S6 are used to select which flags on the TPI are to be displayed.
- switch S2 is used for the self test.
- switch S1 is current not used.
- 0 = switch is "Off", 1 = switch is "On"

D2 thru D9: diagnostic LEDs located on the processor board. Lit LEDs indicate that one of the flags listed below D2 thru D9 on the above chart are read as active.

Example: if all switches are off, D4 & D6 are turned on, then nudging and main fire service flags are on.

K.3 VOLUME CONTROL

The trimpots R32 and R33 adjust the main and alternate volume. The main volume adjustment (R32) controls the floor announcements (such as “First Floor”). The alternate volume (R33) controls all other announcements (such as “going up”). Turning either trimpot fully counterclockwise gives maximum volume. The adjustments are easily made with diagnostics switch S2-ON. This will activate the messages and allow the time necessary to adjust volume. These two trimpots do not affect any music volume that may be connected on J8. Music volume is set external of this unit.

K.4 TROUBLESHOOTING

If there are no audio messages, then:

- The speaker may not be connected on J9.
- The +/-15V supply on connector J7 may not be present.
- Relay U39 may be defective.
- U38 (audio power op-amp) may be defective.
- U5 (program EPROM), U7 or U8 (digitized voice EPROM) may be defective.
- A volume control trimpot may be defective or turned fully clockwise.

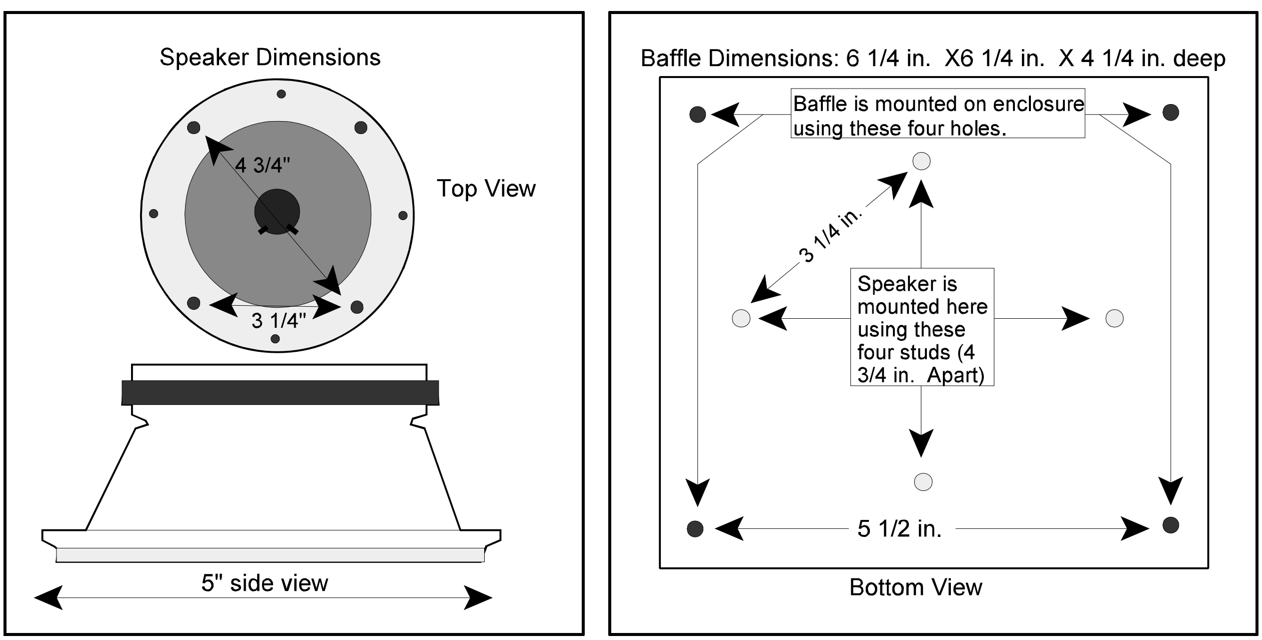
If the message, “Please allow the doors to close” is heard when nudging:

- The photo eye used to detect objects in the door path may be blocked.
- The photo eye may be dirty, or defective.

K.5 PERIPHERAL EQUIPMENT

Square recessed mount 6 1/4" by 6 1/4" by 4 1/4" deep (manufacturer Model # 198-4).
Square surface mount 7" by 7" by 4 1/4" deep (manufacturer Model # SE 198-4).
Circular recessed mount 6 1/8" by 4 1/4" deep without lip (manufacturer Model # 94-4).
7" round by 4 1/4" deep (including lip).
7 3/8" in diameter with circular grill.

FIGURE K.3 Speaker Dimensions



APPENDIX L
OPTION SMARTLINK FOR CAR OPERATING PANEL

L.0 GENERAL INFORMATION

This Appendix applies to MCE Controllers with the following boards and software versions: MC-NC Software Version 2.00, and MC-NIO Software Version 2.00. SmartLink Serial Communication for Car Call Signals **is an option** for MCE controllers. It links the Car Operating Panel (COP) signals to the car controller in the machine room using serial communication techniques. This option reduces the wiring from the COP to the car controller; thus, reducing the installation time and labor cost. The serial link is based on state-of-the-art LonWorks® networking technology. A four-wire link carries the signals and power from the COP to the car controller. If the SmartLink for COP option is on this controller, reference this Appendix Figure L.1 for controller and board layout. Otherwise, use the controller manual information only.

TABLE L.1 SmartLink for Car Operating Panel - Principal Characteristics

PRINCIPAL CHARACTERISTICS	
Number of Wires	4 (2 for data and 2 for power)
Power on serial link	24 VDC
Number of I/Os on one COP board	24 inputs, 24 outputs
Communication protocol	LonTalk® (based on OSI 7-layer networking protocol)
Controller characteristics	Available for M3 Group System car controllers

L.1 PRODUCT DESCRIPTION

SmartLink Serial Communication for Car Call Signals provides a serial communication link between the car controller and the Car Operating Panel (COP). Other than the input/output interface between the controller and the COP, there are no changes to the existing controller. The functionality of the controller is not affected.

L.1.1 CAR CONTROLLER NODE

The car controller node (MC-NC board) is the main node of the network. It provides the input/output interface between the car controller computer (MC-MP or MC-MP2 board) and the COP. It contains the Neuron® processor which implements the seven layers of the LonTalk® communication protocol for receiving and sending signals, as network data packets, to and from the COP. It also implements the application level routines to serially transfer these signal values to the car controller computer.

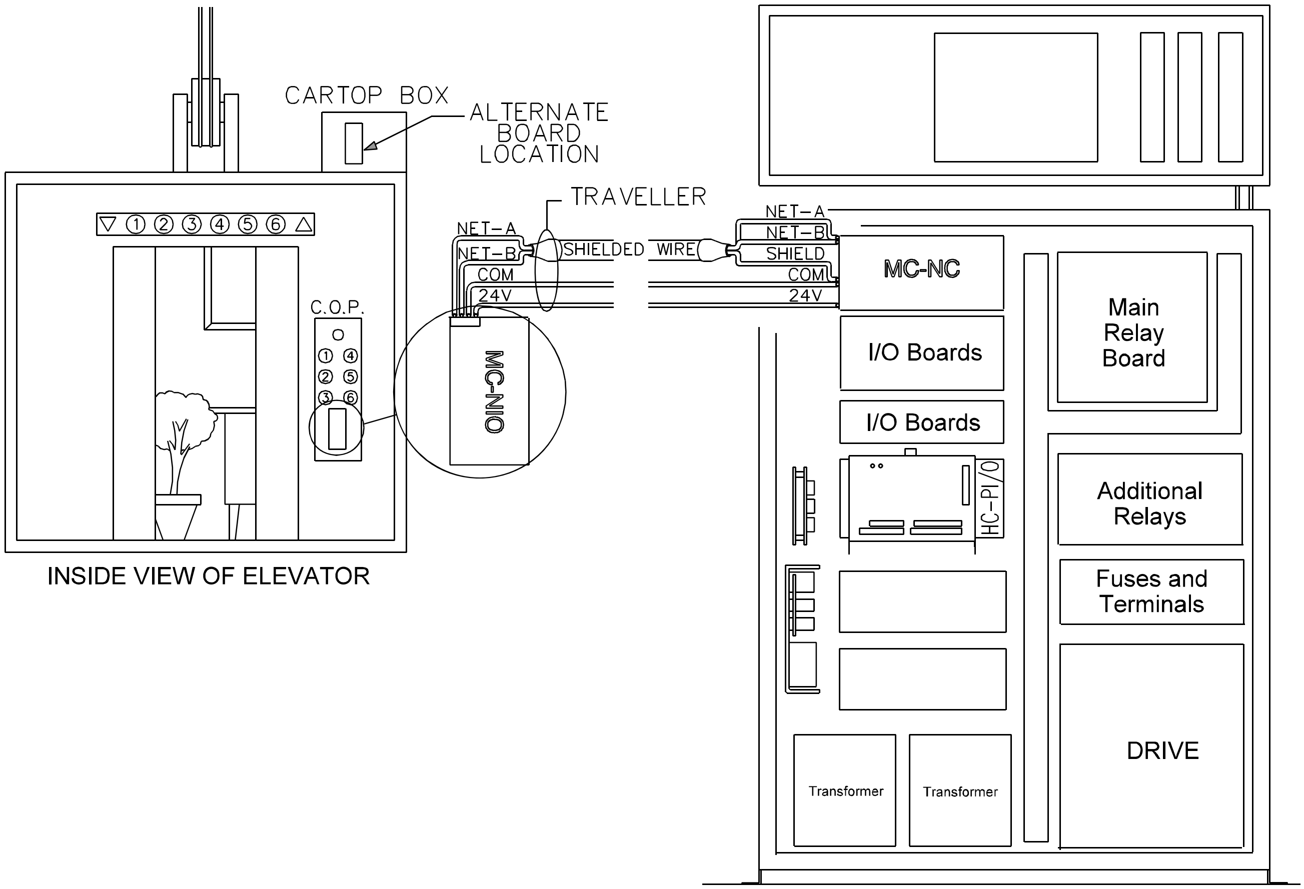
L.1.2 CAR OPERATING PANEL (COP) NODE

The function of the COP node (MC-NIO board) is to transfer COP signal values to and from the car controller node as network packets. The COP signals, such as call buttons, door close button, call lockouts, etc., are sent serially to the car controller node via the LonWorks® network. Similarly, signals such as call button lights, indicators, etc., are received from the car controller node.

L.2 PHYSICAL LAYOUT AND FUNCTIONAL DESCRIPTION

Figure L.1 shows the typical connection between the controller node and the COP node. The physical layout and hardware are described below.

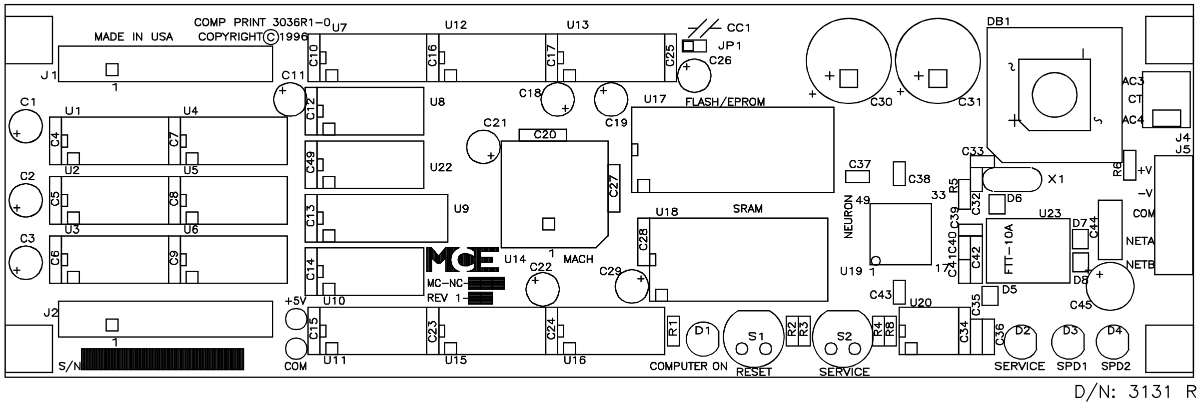
FIGURE L.1 SmartLink for Car Operating Panel - Typical System



L.2.1 CAR CONTROLLER NODE

The car controller node consists of the MC-NC Neuron Controller board (see Figure L.2) which, for most controllers, replaces the HC-CI/O Call Input/Output board and is physically located where the HC-CI/O board would otherwise be. The MC-NC board provides the interface between the car controller's Main Processor (MC-MP or MC-MP2 board) and the MC-NIO board in the COP. The car call push-button inputs and other input signals from the COP are received serially via the LonWorks® network and are processed by the MC-NC board and then sent serially to the car controller's Main Processor board via a 20-conductor ribbon cable. Information from the car controller's Main Processor board is received serially by the MC-NC board, formatted into data packets, and sent to the COP via the LonWorks® network.

FIGURE L.2 MC-NC Neuron Controller Board



L.2.2 CAR OPERATING PANEL (COP) NODE

The COP node consists of the MC-NIO Neuron Input/Output board (see Figure L.3) and, if required, one or more MC-NIO-X Neuron Input/Output Extender board(s) (see Figure L.4). The COP board(s) are physically located either in the COP itself or on the car top. The MC-NIO board has two major functional blocks, the input/output interface and the LonWorks® network interface.

The MC-NIO board monitors the state of the car call push-buttons (ON/OFF) and activates call acknowledgment outputs. It also acquires other inputs from the COP switches and buttons and activates other COP outputs. The MC-NIO board can handle 24 inputs and 24 outputs. The MC-NIO-X board is used for additional inputs and outputs and is responsible for the input/output interface only. It does not contain the network interface electronics.

FIGURE L.3 MC-NIO Neuron Input/Output Board

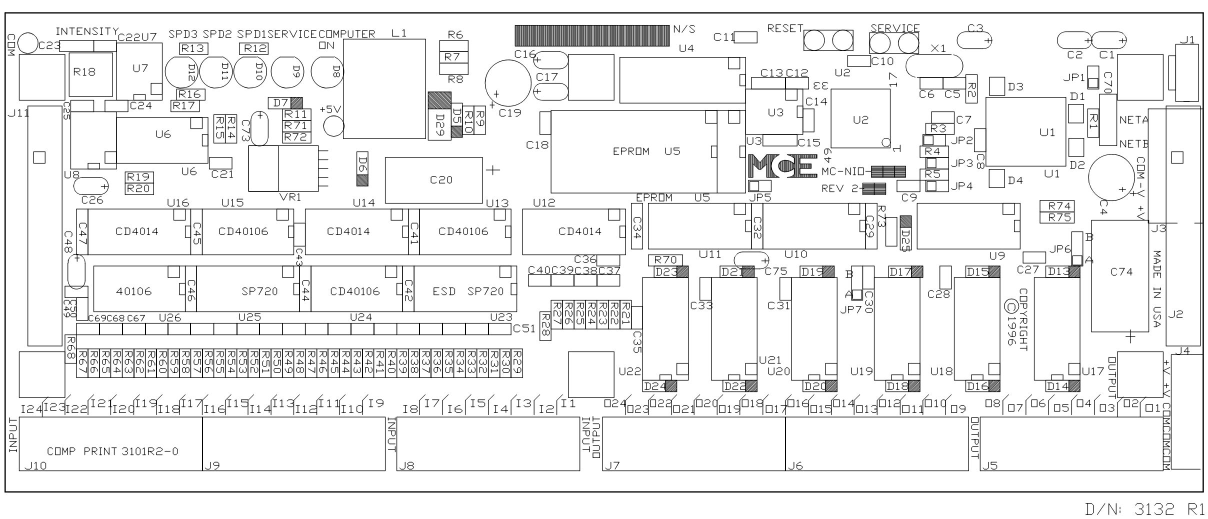
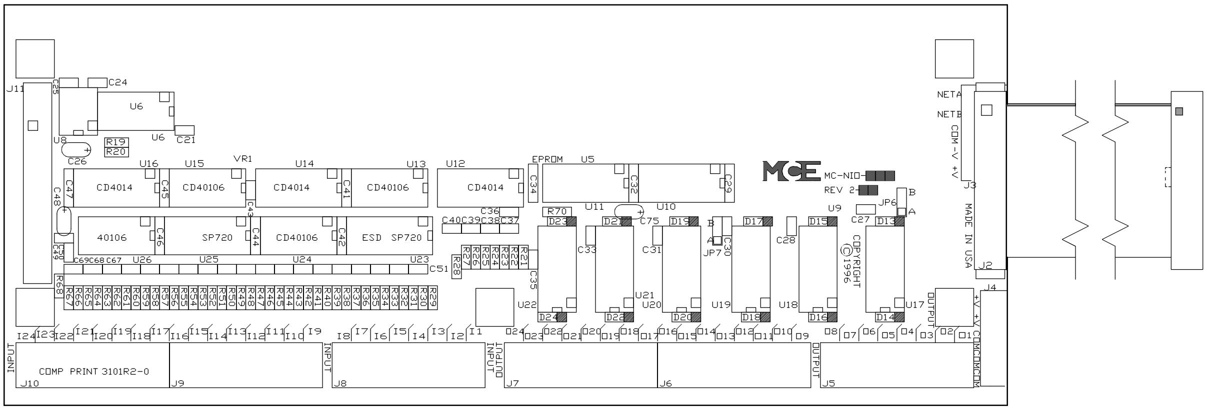


FIGURE L.4   MC-NIO-X Neuron Input/Output Extender Board



L.3 INSTALLING THE MC-NIO & MC-NIO-X BOARDS

MCE’s SmartLink Serial Communication for Car Call Signals option is simple and easy to install. A communication cable is required to connect the MC-NC board (located in the elevator controller) to the MC-NIO board, mounted in the Elevator’s Car Operating Panel (COP). As an alternative, the COP board(s) may be located in a metal box on the car top and wired to the COP.

The **MC-NIO** board is the ‘NEURON INPUT/OUTPUT’ board. All car call buttons as well as all car call acknowledge lights are connected to this board. The **MC-NIO-X** board is the ‘NEURON INPUT/OUTPUT EXPANDER’ board. It is also located in the COP and used in conjunction with the MC-NIO board for providing additional I/O. The MC-NIO-X board is used when more inputs or outputs are required than the MC-NIO board can provide. The MC-NIO-X board is the same as the MC-NIO board except that fewer components are loaded. The MC-NIO-X board is connected to the MC-NIO board through a 26-conductor ribbon cable. The MC-NIO board connector J11 connects to the MC-NIO-X board at connector J2. Additional MC-NIO-X boards, if needed, can be connected in a cascade fashion to connector J11 of the MC-NIO-X board.

L.3.1 MOUNTING THE BOARDS IN THE COP

MOUNTING ONE BOARD - If the job requires only one board, the MC-NIO can be mounted anywhere in the COP such that the connectors are easily accessible and the board does not obstruct any fixture in the COP. The MC-NIO board is supplied with a mounting plate. The dimensions are shown in Figure L.5.

MOUNTING MORE THAN ONE BOARD - If the job requires the expander MC-NIO-X board(s), they can be mounted in the following three ways. The MC-NIO-X board is also supplied with a mounting plate.

Option 1 - The boards can be stacked one on top of another (see Figure L.6). Make sure that the total height of the boards stacked together does not exceed the available height for mounting the boards in the COP.

Option 2 - The boards can be placed end to end with connector J11 of one board facing connector J2 of the other board (see Figure L.7). In this case, the height requirement will be that of a single board and the I/O connectors on all the boards will be on the same side. Since the boards are mounted lengthwise in this option, make sure that the COP has enough free space lengthwise.

Option 3 - The boards can be placed side by side, with the I/O connectors facing the opposite sides and the non-I/O connector side of the two boards facing each other (see Figure L.8). This option can be used if the COP is wide enough to place two boards side by side.

Any combination of the above three options can be used to best suit the COP length, width, height and the wiring requirements.

NOTE:	The MCE part number for the Mounting Plate is **40-02-0074**

FIGURE L.5 Mounting Plate Dimensions for Mounting the MC-NIO and MC-NIO-X boards

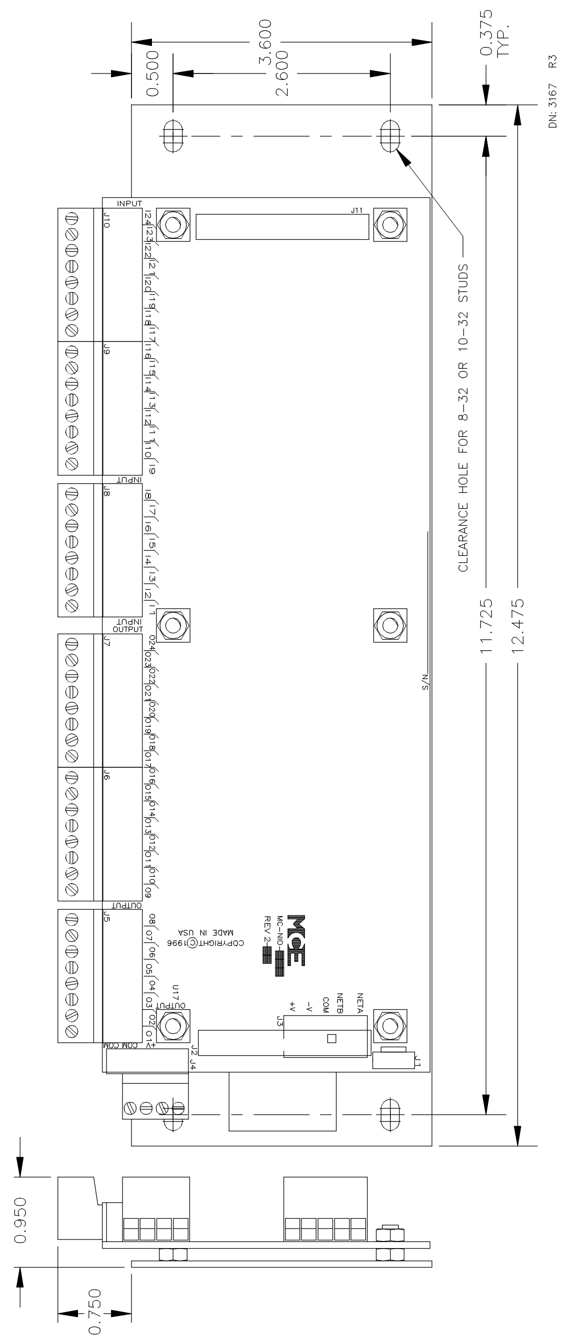


FIGURE L.6 Mounting Option 1: Boards Stacked

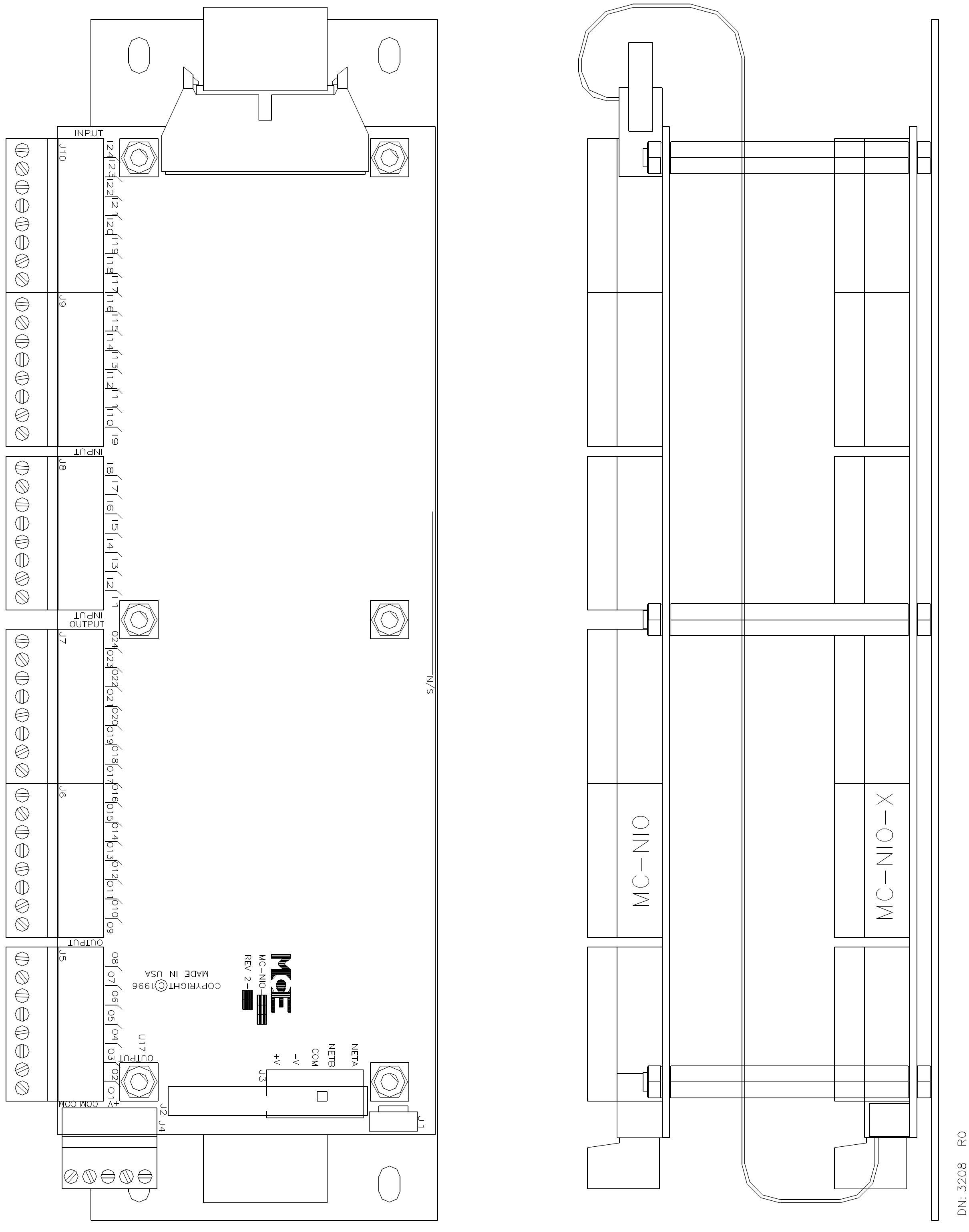


FIGURE L.7 Mounting Option 2: Boards Placed End to End

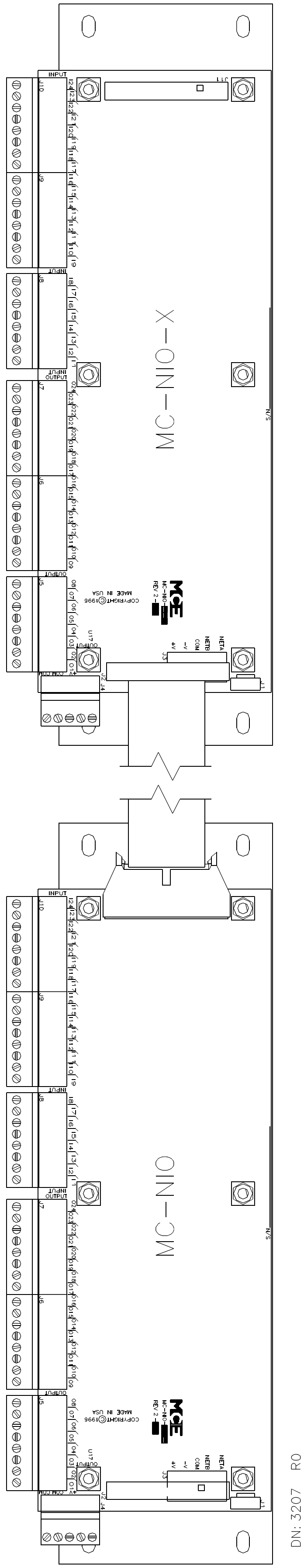
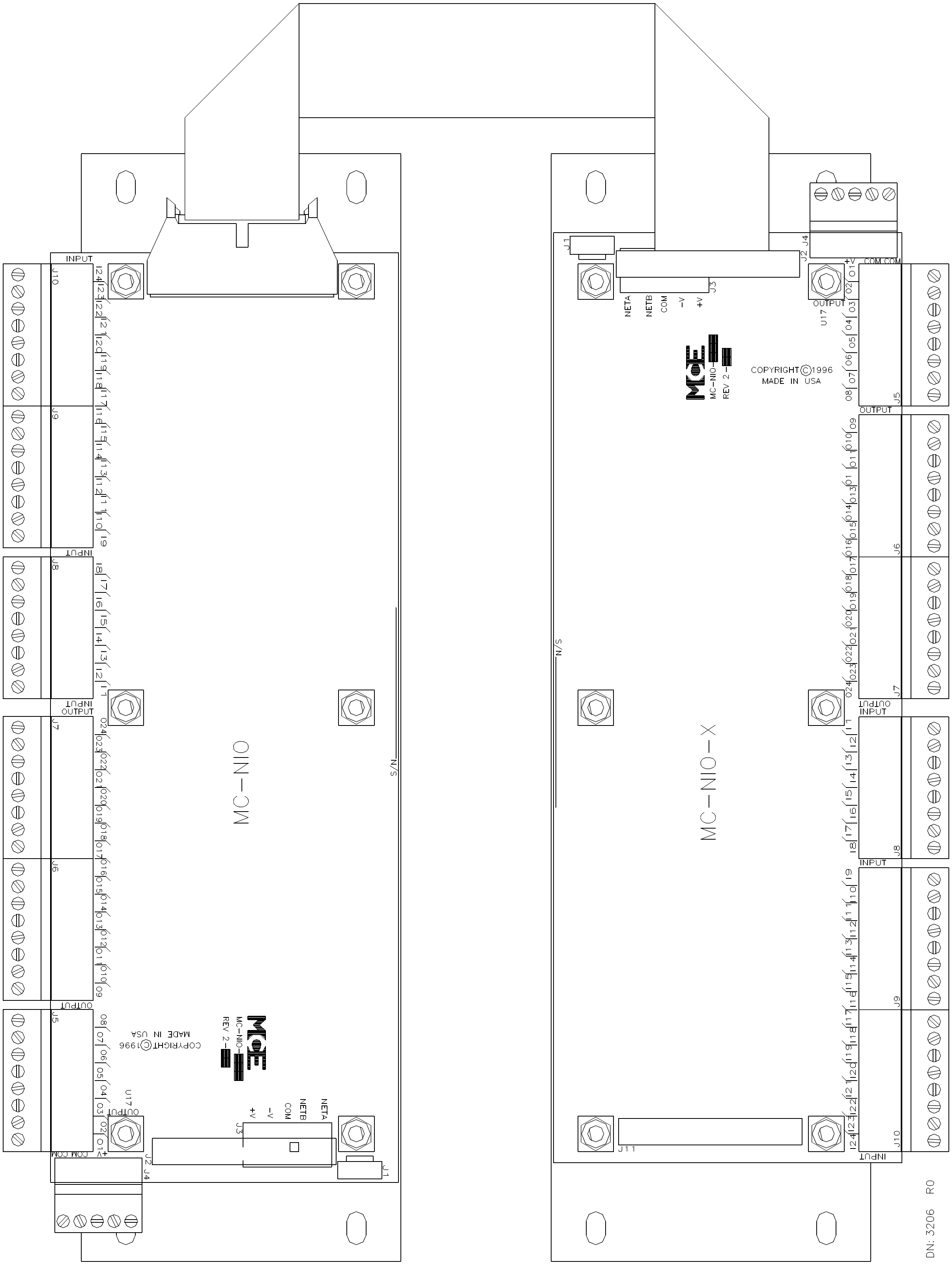


FIGURE L.8 Mounting Option 3: Boards Placed Side By Side



L.3.2 COP INPUT/OUTPUT WIRING

The outputs of the MC-NIO, MC-NIO-X boards are of the "open-collector" type. The bulbs are turned ON when the output terminal is grounded, therefore, the common side of bulbs is connected to the +V terminal (J4) on the MC-NIO and MC-NIO-X boards.

The inputs are internally pulled up to the +V voltage and become activated when grounded, therefore, the common of all the switches is connected to the COM terminal (J4) on the MC-NIO and MC-NIO-X board.

The MC-NIO board is provided with an additional 'COM' terminal (J4) which is to be connected to the car or cartop. This will provide a common to the Car. Refer to the job prints for details of the connections.

L.3.2.1 TESTING THE CONNECTIONS

To locally test the connections to the buttons and indicators, power must be supplied with the Network disconnected. To test inputs and outputs after the connections are made, put the MC-NIO board into test mode. To do this, disconnect NETA or NETB and then momentarily short the reset pins. This will cause the inputs of the MC-NIO and MC-NIO-X (if available) boards to turn on its corresponding outputs (i.e., I1 turns on O1 ..... I24 turns on O24). Inputs are activated by grounding them. Test all the outputs by grounding the corresponding inputs. Confirm the wire connections with this test.

L.3.2.2 ACCEPTABLE BULBS FOR USE WITH MC-NIO AND MC-NIO-X BOARDS

In the following tables, the shaded row indicates the preferred lamp for this application.

TABLE L.2 Indicator Specification

INDICATOR SPECIFICATION			
INDICATOR TYPE	**VOLTAGE**	**MAXIMUM CURRENT EACH OUTPUT**	**WATTAGE EACH OUTPUT**
Incandescent Lamp	28V	0.3 Amps	6 Watts
Solid State LED	28V (lamp must have built-in resistor)	0.3 Amps	6 Watts
Neon Lamp	Not applicable		
Electronic Buzzer/Chime	28V	0.3 Amps	6 Watts
Mechanical Buzzer/Chime	Not Applicable		

TABLE L.3 Miniature Bayonet Bulbs

MINIATURE BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
1495	28V	0.30A (MORE BRIGHT)
1873	28V	0.20A
1864, 313, 456, 356	28V	0.17A
1820	28V	0.10A
757, 265	28V	0.08A
1829	28V	0.07A
1819, 28MB	28V	0.04A
1843	28V	0.022A (LESS BRIGHT)

TABLE L.4 Single Contact Bayonet Bulbs

SINGLE CONTACT BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
303	28V	0.30A (MORE BRIGHT)
1251	28V	0.23A
456	28V	0.17A
757	28V	0.08A (LESS BRIGHT)

TABLE L.5 Double Contact Bayonet Bulbs

DOUBLE CONTACT BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
304	28V	0.3A (MORE BRIGHT)
6S6DC/30V	30V	0.23A
1252	28V	0.23A (LESS BRIGHT)

TABLE L.6 Screw Base Bulbs

CANDELABRA, SCREW BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
6S6/30V	30V	6 WATTS (MORE BRIGHT)
28RC	28V	1.1 WATTS (LESS BRIGHT)

TABLE L.7 PSB5 Bulbs

SLIDE BASE - TYPE 5 (PSB5)		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
28PSB	28V	0.04A

*** Note:** Bulb shapes vary within a given base style and some may not fit within your fixture.

L.3.3 TRAVELER CABLE

For proper operation the specification of this cable must be, at a minimum, the following:

TABLE L.8 Existing Traveler-Communication Cable Specification

EXISTING TRAVELER-COMMUNICATION CABLE SPECIFICATION	
For NETA and NETB connections	**For +V and Com**
Shielded Twisted Pair (16-22 AWG) (Shield grounded in controller)	See Job Prints - page 1

When the opportunity exists for a new traveler cable, the following specifications are recommended.

TABLE L.9 New Traveler-Communication Cable Specification

NEW TRAVELER-COMMUNICATION CABLE SPECIFICATION	
For NETA and NETB connections	**For +V and Com**
Single twisted pair (one of the following) Belden # 85102 (or equivalent) Belden # 8471 (or equivalent) Belden # 9841 (or equivalent)	See Job Prints - page 1

L.3.3 NODE IDENTIFICATION JUMPERS

A future option will allow multiple MC-NIO boards to be connected to the LonWorks® network where multiple COPs exist. Each MC-NIO board has several jumpers located on it. Three of the jumpers are for identifying the board when more than one is used. These identifying jumper positions are listed in Figure L.10 MC-NIO Board Quick Reference.

L.3.4 BULB INTENSITY

The COP node (MC-NIO board) has an intensity control for incandescent bulbs and solid state LEDs. The intensity adjustment trimpot is located at the edge of the board near the 26-pin ribbon cable connector. It is a single turn trimpot which, when turned fully counterclockwise, reduces the intensity by approximately 50%. When turned fully clockwise the intensity is 100% (full voltage applied at output terminals). In addition, two jumpers control which lamps are affected by the intensity trimpot. Jumper position and affected outputs are listed in Figure L.10 MC-NIO Board Quick Reference. Acceptable bulb types are listed in Tables 0.2 thru 0.7. If two COPs are connected in parallel, bulbs cannot exceed three watts each.

L.3.5 PERIPHERAL DEVICES

Output devices connected to the MC-NIO board must be “Positive Common Bus” type devices. The voltage rating must be 24VDC. Devices can include digital PI’s, electronic arrival chimes, lanterns, and electronic buzzers.

L.3.6 COMMUNICATION TERMINATION

The shield of the twisted pair SmartLink communication cable must be connected to the “COM” terminal (J5) only on the MC-NC board in the car controller (located in the machine room). Do NOT connect the shield on the MC-NIO board.

The serial link is a 78 Kbit per second data link which should be terminated at both ends of the communication cable, both in the machine room and in the COP or car top box. Termination at the car controller end, on the MC-NC board, is integrated into the design. Termination at the COP end, on the MC-NIO board, is accomplished by placing a shunt on jumper JP1 (factory installed).

L.4 NETWORK SELF-INSTALLATION AND CONFIGURATION

NOTE: Previous software versions required that the installer perform a “network installation process” before the serial communication link would function. MC-NC software version 2.00 includes an enhancement which eliminates the need for such a process.

After all electrical connections have been made, network communication should be established approximately 10 seconds after system power-up.

L.4.1 NETWORK COMMUNICATION

The diagnostic LED SPD2 on the MC-NC board indicates network activity/status.

If the SPD2 LED on the MC-NC board blinks at an approximate rate of twice per second, network communication has been established.

If the LED is solidly ON or OFF, the network communication is not established. Check the network wire connections to NETA and NETB.

Diagnostic address 3017H contains a communication error counter(see Section L.5.4). Normally all diagnostic LEDs displayed at this address should be OFF on the computer swing panel. If the counters are increasing rapidly (once every 10 seconds), the communication is not stable, check for proper wiring and shielding.

L.5 TROUBLESHOOTING SMARTLINK FOR COP

The Diagnostic Indicators on the MC-NC and MC-NIO boards and on the Computer Swing Panel assist in troubleshooting the SmartLink Serial Communication for Car Call Signals. The SmartLink for Car Calls option requires two additional boards, the MC-NC Neuron Controller board (in the car controller) and MC-NIO, Neuron Input/Output board (in the COP or on top of the car). Both of these boards have a processor on them and run independent software programs.

L.5.1 TROUBLESHOOTING THE MC-NC BOARD

Begin by examining the indicators and jumpers on the MC-NC board (see Figure L.9, MC-NC Quick Reference).

L.5.1.1 COMPUTER ON LED

Upon power-up the “Computer On” LED on the MC-NC board should be solidly ON. If this LED is OFF or blinking, verify that the EPROM is installed properly and that all the ribbon cable connections are secure. Verify that the voltage at the +5V test point (located near ribbon cable connector J2) is between 4.75V and 5.1V.

L.5.1.2 COMMUNICATION WITH THE MAIN COMPUTER

The diagnostic LED SPD1 on the MC-NC board indicates communication activity with the Main computer (MC-MP/MC-MP2). If this LED is solidly ON, it means that the MC-NC and the Main Computer are not communicating. Verify that the ribbon cable is connected properly to J2. Proper communication is indicated by the SPD1 LED blinking at a rate of approximately 20 times/second.

L.5.1.3 NETWORK COMMUNICATION

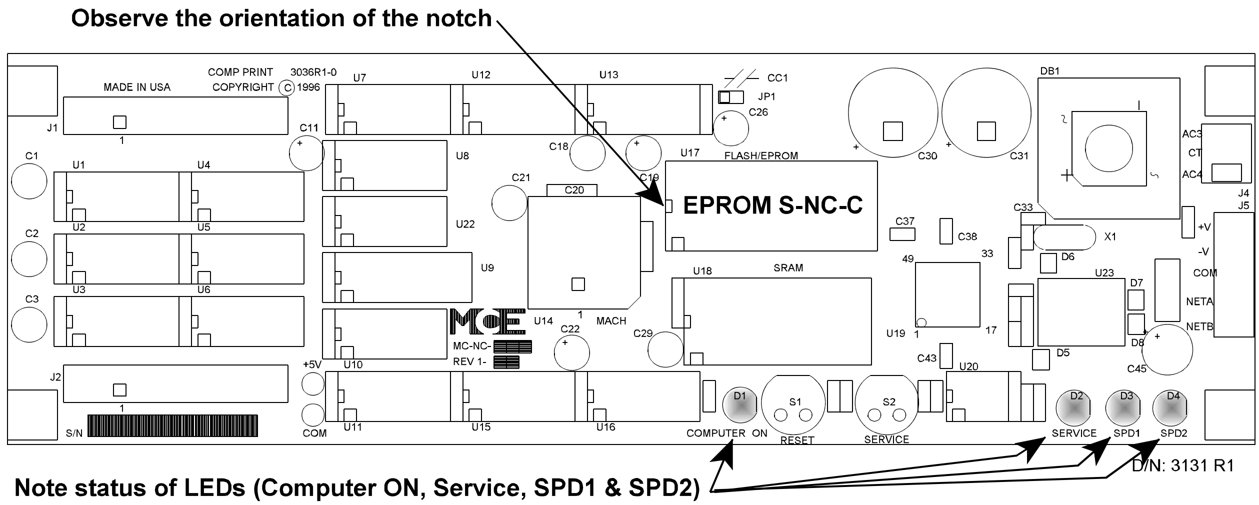
The network communication status is indicated by diagnostic LED SPD2 on the MC-NC board. If this LED is solidly ON, it means that the network communication is not established. Verify that the network wires are connected properly to NETA and NETB on the connector.

To confirm that the network communication is established properly, check the SPD2 LED on the MC-NC board. It should be blinking at a rate of twice a second. If the SPD2 LED on the

MC-NC board is either ON or OFF, network communication is not established. Check the network communication counters in the diagnostic buffer address 3017H (see Section L.5.4). If these counters are increasing rapidly (once every 10 seconds), the communication is not stable. Verify proper wiring and shielding of the network cable as shown in the Job prints.

FIGURE L.9 MC-NC Board Quick Reference

MC-NC QUICK REFERENCE Software Ver. 2.00 or higher



RESET AND SERVICE TEST PINS
"Reset" test pins reset the board and the board program when shorted together. "Service" test pins send the node information on the network when shorted together.

MC-NC Diagnostic Indicators

LED	Computer On	Service	SPD1	SPD2
OFF	Board not functioning. Check +5V. If no +5V, check ribbon cable connection at J2.	**Normal.** The normal state of this LED is OFF.	Possible faulty ribbon cable at J2, connector J2, or MC-NC board.	If normal blinking does not occur (as described below), check NETA and NETB connections.
ON	**Normal.** Computer functioning properly.	Verify proper installation of EPROM. If installed properly, replace board.	MC-NC unsuccessful in communicating with MC-MP. Possible software configuration error (MP).	MC-NC unsuccessful in communicating with MC-NIO. Check NETA and NETB connections.
Blinking	If Computer On LED blinks continuously (approx. once per second), verify proper installation of EPROM.	Verify EPROM version. If V2.00 or higher, replace board.	**Normal.** When accompanied by SPD2 blinking, there is communication. SPD1 blinks very rapidly under normal conditions.	**Normal.** Indicates communication between the MC-NC and the MC-NIO (blinks approx. twice per second).

L.5.2 TROUBLESHOOTING THE MC-NIO BOARD

Begin by examining the indicators and jumpers on the MC-NIO board (see Figure L.10, MC-NIO Quick Reference).

L.5.2.1 COMPUTER ON LED

Upon power-up the “Computer ON” LED on the MC-NIO board should be solidly ON. If the LED is OFF or is flashing, verify that the EPROM is installed properly and the voltage on the +V pin of connector J3 is between 12V and 28V and that the voltage at the +5V test point is between 4.75 and 5.15V.

L.5.2.2 NETWORK COMMUNICATION

The network communication status is indicated by diagnostic LED SPD2 on both the MC-NC and the MC-NIO boards. If this LED is solidly ON, it means that the network communication is not established (see the diagnostic indicator table on the MC-NIO QR card).

L.5.2.3 BULB INTENSITY CONTROL

If the bulbs do not come on or if varying the intensity trimpot has no effect on the bulb intensity check jumpers JP6 and JP7 (see Figure L.10, MC-NIO Quick Reference). If the jumpers are installed correctly and the bulb intensity still does not work, replace the MC-NIO board.

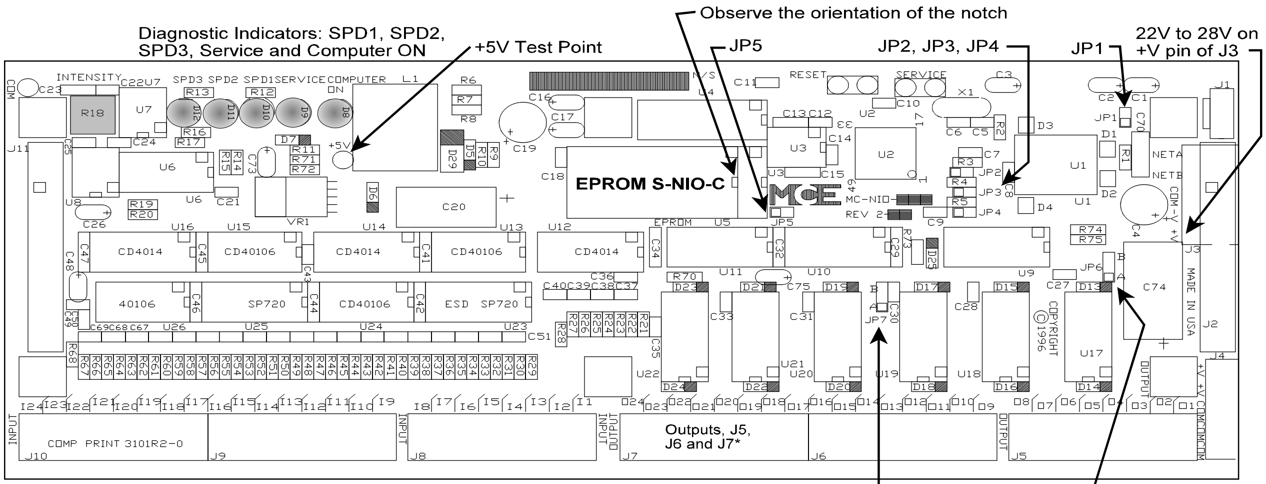
L.5.2.4 MC-NIO & MC-NIO-X OUTPUTS

Testing During Installation - To test inputs and outputs during installation, put the MC-NIO board into test mode. To do this, ensure that the board has power at the +V to COM terminals at connector J3, then disconnect the NETA wire and momentarily short the reset pins. This will cause the inputs of the MC-NIO and MC-NIO-X (if available) boards to turn ON its corresponding outputs (i.e., I1 turns on O1 ..... I24 turns on O24). Inputs are activated by grounding them. Test all the outputs.

Output Fails During Operation - If a previously working output fails, check the output device and wiring. If the device is functional, and the wiring correct, swap the corresponding driver chip with another driver chip (U17 to U22) to check for a failed driver. If problem remains, replace the board.

FIGURE L.10 MC-NIO Board Quick Reference

MC-NIO QUICK REFERENCE
Software Ver. 2.00 or higher



* Outputs are open collector type, i.e. bulbs are turned ON when the output terminal is grounded.

Jumper Settings (* Denotes factory setting)

NODE IDENTIFICATION JUMPERS

	JP2	JP3	JP4
1st Board*	ON	ON	ON
2nd Board	OFF	ON	ON
3rd Board	ON	OFF	ON
4th Board	OFF	OFF	ON
5th Board	ON	ON	OFF
7th Board	OFF	ON	OFF
6th Board	ON	OFF	OFF
8th Board	OFF	OFF	OFF

OUTPUT INTENSITY CONTROL JUMPERS
R18 adjusts intensity when Enabled

JUMPER	POSITION	DESCRIPTION
JP6	A	Intensity Enabled Outputs 01 to 08
	B*	Intensity Disabled Outputs 01 to 08
JP7	A*	Intensity Enabled Outputs 09 to 024
	B	Intensity Disabled Outputs 09 to 024

TERMINATION JUMPER

JP1	ON*	ON = terminated, OFF = not terminated

EPROM SIZE JUMPER

JP5	ON*	ON = 27C256, 27C512, 27C010. OFF = 27C020

MC-NIO Diagnostic Indicators

LED	Computer On	Service	SPD1	SPD2	SPD3
OFF	Board not functioning. Check +5V and +24V	**Normal.** The normal state of this LED is OFF.	SPD1 lights whenever any input is activated. If SPD1 does not light when a button is pushed, check the button/switch "common."	This LED should flash whenever a button/switch is activated or deactivated.	SPD3 lights whenever the input/output circuits are being read/written. This LED should blink very quickly (this is the normal state of SPD3). Check EPROM and +5V if SPD3 is off continuously.
ON	**Normal.** Computer functioning properly.	Verify proper installation of EPROM. If installed properly, replace board.			
Blinking	Computer not functioning. Verify proper installation of EPROM.	Verify EPROM version. If V2.00 or higher, replace board.			

L.5.3 SYSTEM TROUBLESHOOTING

GENERAL The serial link is a method of transferring input status (buttons and switches) and output status (indicators) between the car operating panel and the elevator controller. A non-operational serial link would generally result in the complete failure in the transfer of this information. When troubleshooting a problem that you believe might be attributed to a failure of the serial link, bear in mind that the serial link is simply an I/O system. For example, the inability to register a car call from the car operating panel may be due to reasons other than the serial link. Whenever possible, separate the issues (divide and conquer) through creative means (e.g., try to register car calls via the group or local CRT to determine if car calls can be registered at all).

A few examples are given below, with commentaries that serve to illustrate the concepts discussed above.

Problem: Car call buttons do not illuminate when pressed, and the calls do not latch.

Pushing a car call button should always result in the illumination of the indicator for that button. If the car call indicators do not light when the respective buttons are pushed, a failure of the serial link should be investigated. Special attention should be paid to the serial bus wiring (the wires that make up the serial link), especially when this behavior applies to all of the car call buttons (not just a select few). Follow the instructions in the “General Troubleshooting Steps” section below.

Problem: Car calls do latch, and a number of car calls can be registered, but after awhile all the calls cancel simultaneously. The car stops at the next landing and does not open its doors.

Because the car calls can, in fact, be registered through the car operating panel, and because the car call indicators do function properly, the problem described may not be related to the serial link. Cancellation of the car calls may be a result of something unrelated to the serial link (e.g., anti-nuisance logic), so it is important to keep an open mind (don’t assume that the serial link is the cause for canceling the car calls). Check the job prints for inputs that are being transferred through the serial link. There may be an input transferred through the serial link that may cause car cancellation should an intermittent problem with the input signal exist. For example, “flickering” of the independent service input will generally result in car call cancellation (it is typical to initially cancel all car calls whenever an off-to-on transition of independent service is detected).

Problem: When pressed, the call buttons illuminate, but then extinguish. The call does not latch.

Discussion: This may or may not be a problem with the serial link. During conditions in which car calls are not allowed to latch by the controller main processor, this behavior is expected. Follow the “General Troubleshooting Steps” outlined below.

GENERAL TROUBLESHOOTING STEPS

Step 1 Determine if car calls can, in fact, be registered. On many products this can be accomplished via a system CRT Terminal (connected to either the elevator controller or a Group Supervisor). If a CRT is not available, car calls can be latched via the elevator controller’s swing panel. Section 5 of the controller’s installation manual provides details regarding this process. If car calls cannot be registered, the problem may not be with the serial link at all.

Step 2 Determine if the serial link is communicating reliably. This is done by activating the independent service switch in the COP (if one exists; if one does not exist, go to Step 2A). Make sure that the independent service status is not being established through any other means (i.e., the Test switch, or some other independent service switch not wired through the serial link). Verify the car is on independent service. If a helper is available (with communications) verify that the independent service indicator on the swing panel's vertical LEDs toggles on and off corresponding to the activation and deactivation of the switch in the COP. Check to see that the indicator does not "flicker" when the independent service switch is left in the ON position.

Step 2A If an independent service switch does not exist in the COP, activate the door close button. If the doors appear to respond to this button, it is very likely that the serial link is performing properly. It may be worthwhile to verify that the communication link is solid by referencing the swing panel diagnostics (address 20H). As an example, an assistant can observe the DBC flag in the diagnostics while the door close button is being pressed continuously in the COP. The DBC flag should illuminate solidly while constant pressure is placed on the door close button. Refer to the Controller Manual for additional swing panel diagnostic information.

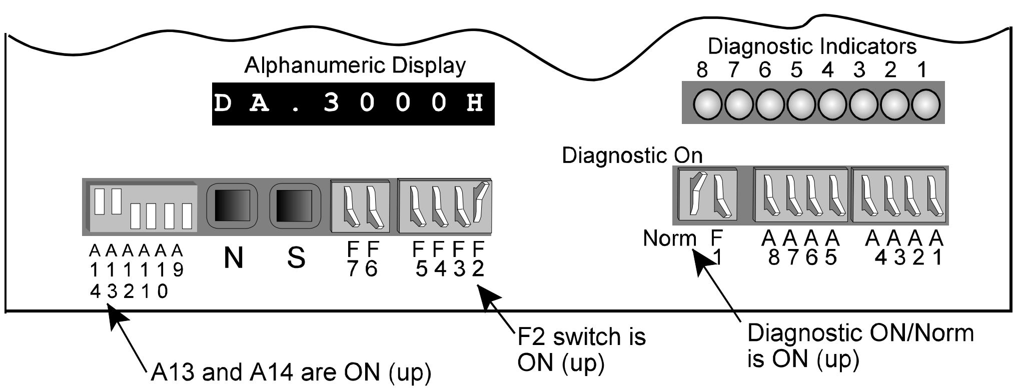
Step 3 If Step 2 indicates that the serial communication is not established, all network wiring should be double-checked. "Network wiring" refers to the wires that connect the MC-NC board (in the controller) to the MC-NIO board (in the COP). These wires should be checked for continuity and for connection to the proper respective terminals on each board. [Note: A subsequent step in the troubleshooting process will call for the inspection of diagnostic indicators on the MC-NIO board. Accordingly, it is suggested that access to the MC-NIO board be maintained at this time.]

Step 4 Once all wiring has been verified (both in the controller and in the COP) observe the diagnostic LEDs on both the MC-NC board and the MC-NIO board. Figures .9 "MC-NC Quick Reference" and L.10 "MC-NIO Quick Reference" provide information regarding the interpretation of these LEDs.

L.5.4 COMPUTER SWING PANEL DIAGNOSTICS

The contents of serial link related computer memory flags can be viewed on the Computer Swing Panel's Diagnostic Indicators. MCE Technical Support personnel may request that you access this information while troubleshooting. The memory flags for serial link data begin at address 3000 hex. Set the switches as shown in Figure L.11 to access address 3000 hex.

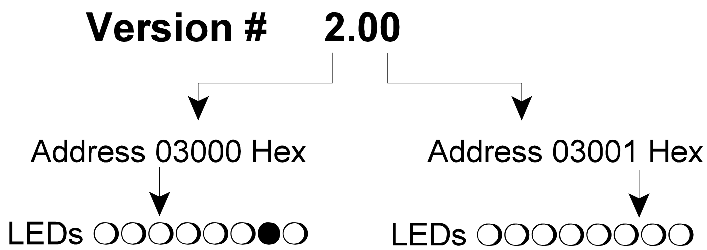
FIGURE L.11 Diagnostic Switch Settings for Address 3000 HEX



Switches A13 and A14 select the first two digits of the address (30) with A9 thru A12 OFF (down) and A13 and A14 ON (up). Switches A1 thru A8 select the last two digits of the address (00) with A1 thru A8 OFF (down). The Alphanumeric Display indicates that address 3000 hex is selected (DA.3000H). The Diagnostic Indicators show the status of the computer memory flags at this location (LED ON = 1, LED OFF = 0).

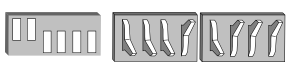
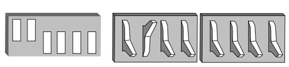
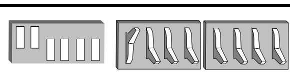
Software Version Verification for the MC-NC: Address 03000H displays the major version number on the diagnostic indicators. Address 03001H displays the minor version number. See example below.

Example:



Car call inputs from the MC-NC board to the MC-MP board, and car call latched outputs from the MC-MP board may be viewed in the following addresses and are useful troubleshooting tools.

TABLE L.10 Key Diagnostic Memory Addresses

Alpha-numeric Display	Switch Setting A14 - A9 A8 - A1	Diagnostic Indicators	LED Designation
3017H		Displays the count of failed attempts for MC-NC communication.	LEDs should be *OFF*.
3040H		Displays the car call inputs from the MC-NIO board.	LEDs correspond to the first eight floors. Subsequent floor calls are viewed at address 3041, 3042 etc.
3080H		Displays the car call registration outputs from the Main controller.	LEDs correspond to the first eight floors. Subsequent floor calls are viewed at address 3081, 3082 etc.

APPENDIX M
K-TECH LW-KK2 LOAD WEIGHER CALIBRATION

The load weighing system, part # LW-KK2 as manufactured for MCE by K-Tech, consists of a load sensor(s) and control box (most systems use two sensors). The sensor(s) are mounted to the crosshead and measure deflection as the elevator is loaded. The control box contains a power supply, amplifier modules, and an interface or buffer board for processing the load weigher signal to be sent to the elevator controller.

NOTE: The K-Tech Load Weighing system should be installed according to the installation instructions provided with the Load Weigher. Improper installation is the most frequent cause of poor performance.

M.1 CALIBRATING THE K-TECH LW-KK2 LOAD WEIGHER

The K-Tech LW-KK2 assembly is shown open in Figure M.1, with the two amplifiers and buffer board identified. Signals from the two amplifier boards are averaged at the buffer board (see Figure M.2). If you have a single sensor system, amplifier 2 is not included.

FIGURE M.1 Nyload (Blue) Control Box: LW3200-MC2

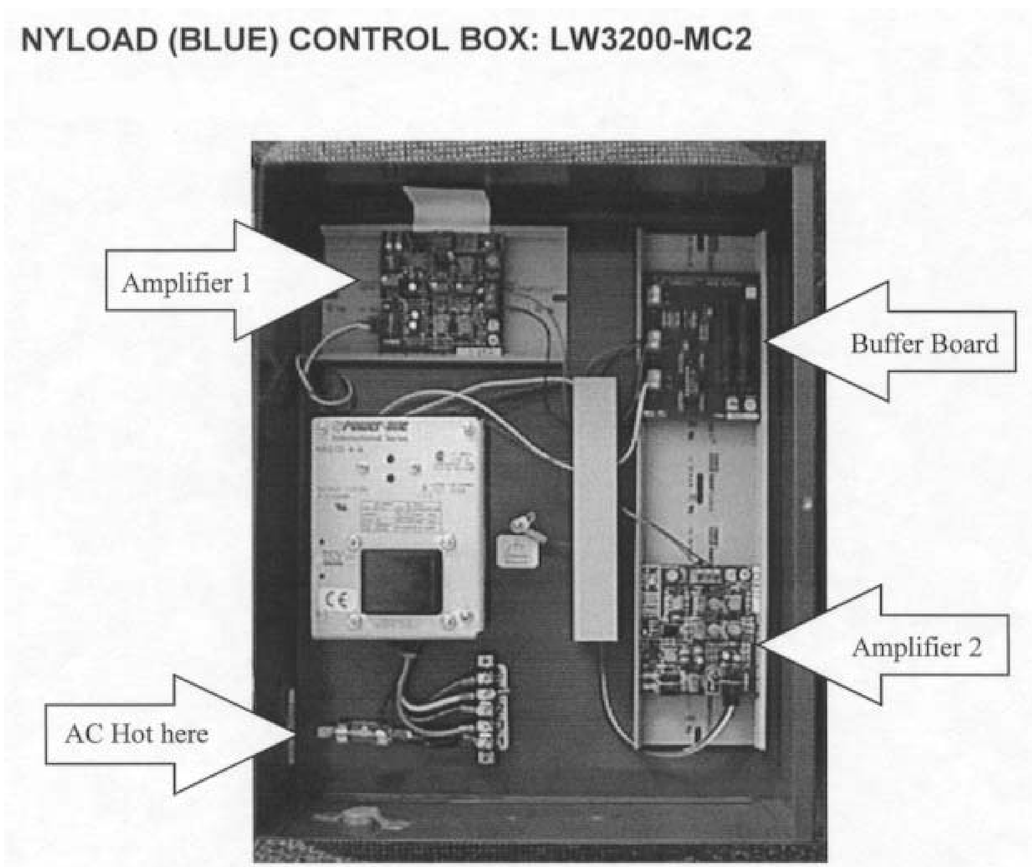
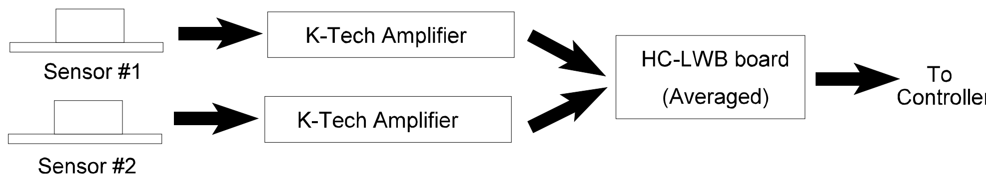


FIGURE M.2 Dual Sensor Single Averaged Analog Output



The HC-LWB board is designed by MCE to buffer the load weigher signals by generating a differential output that can be sent to terminals LW+ and LW- on the SCR-RIX board through the traveler cable. These two wires do *not* have to be shielded.

NOTE: Before performing the sensor calibration and load compensation adjustments, all drive parameters (with the exception of safety calibration) must be adjusted so that reasonably satisfactory operation has been achieved.

The following adjustments refer to the Amplifier board(s), Part #PCBELA-04 Rev E (see Figure M.3). The DVM (digital voltmeter) used in this section should be able to read down to +/-1 millivolt, or better, +/-0.5 millivolt. The calibration procedure involves first setting the output voltage to 0 to 8 volts and then later offsetting this to 1 to 9 volts to match the controller's required input. The **green and yellow LEDs are not used in this setup**.

Note that each step must performed for both amplifier boards in a two-sensor setup. To avoid interaction between the two amplifier boards, the test leads must be connected to the isolation resistor as shown in Figure M.3, or the amplifier boards must be disconnected from the buffer board.

M.1.1 CALIBRATING THE SENSOR ADJUST TRIMPOT

a. Bring the *empty* elevator car to the lowest floor in the hoistway, usually the lobby, and position the car so that the car top can be accessed from the floor above. If the floor above is a blind zone, the Alternate Methods must be used.

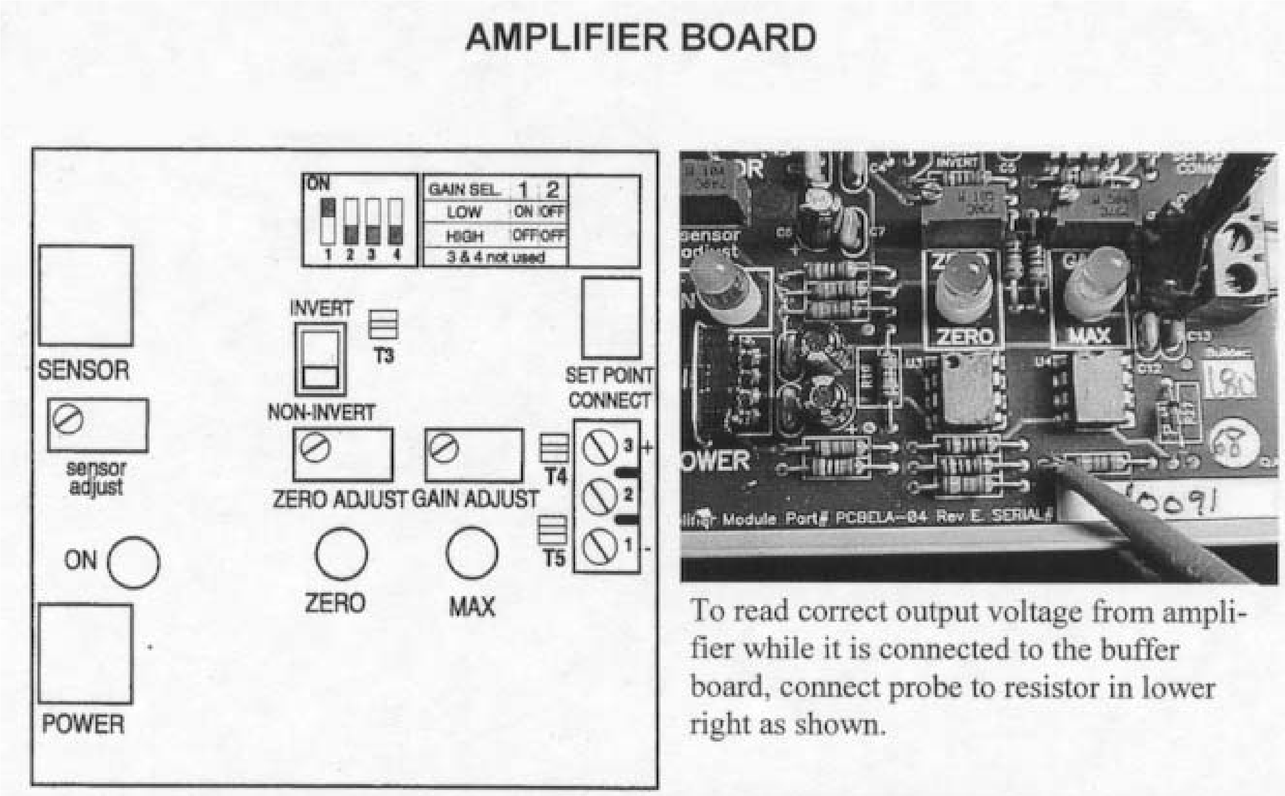
b. Apply power to the K-Tech unit. The **RED** LED should turn ON. Give the system 5 to 10 minutes warm up and stabilize before adjustment.

c. Connect (clip) the **RED** or positive meter lead to test point **T3** (signal) and the **BLACK** meter lead to test point **T5** (ground), see Figure M.3. Set the meter to the millivolt (mV) range. If you can make the adjustment while *standing off of the car top*, proceed to step 'd', otherwise go to SENSOR ADJUST (Alternate Method).

d. Adjust the SENSOR ADJUST pot until the meter reads **0 ± 1mV,** otherwise go to the alternate procedure. If you cannot adjust the amplifier to 0 ± 1mV, see Section M.2, Troubleshooting the K-Tech Load Weigher, Check Point #1.

e. Observe the meter reading at T3. Put some weight (200 lbs.) in the car, or step onto the car top. If the meter reading goes **negative**, verify/set the INVERT/NON-INVERT switch to the **NON-INVERT** position. If the meter reading goes **positive**, verify/set the INVERT/NON-INVERT switch to the **INVERT** position. This switch will **NOT** change the meter reading at T3, but will invert the output at test point T4. Test point T4 must go positive with added weight.

FIGURE M.3 K-Tech Amplifier Board Test and Adjustment Points



To read correct output voltage from amplifier while it is connected to the buffer board, connect probe to resistor in lower right as shown.

f. Repeat steps 'c' and 'd' for amplifier 2. Note that it is possible that one amplifier could be set to INVERT and the other to NON-INVERT. You may then proceed to Section M.1.2, *Calibration of the Zero Adjust Trimpot (Empty Car)*.

SENSOR ADJUST (Alternate Method) - This procedure is used if it is not possible to make the adjustment while standing off of the car top.

a. Connect (clip) the **RED** or positive meter lead to test point **T3** (signal) and the **BLACK** meter lead to test point **T5** (ground), see Figure M.3. Set the meter to the millivolt (mV) range. Adjust the SENSOR ADJUST pot until the meter reads **0 ± 1mV** while standing on the car. We will compensate for your weight in the next step.

b. Step off of the car. The meter reading should go in the **positive direction*** between 5 and 20 mV (typical) depending on the gain setting and crosshead sensitivity to weight changes. Lets assume that the meter reading changed to **+7mV**. Step back onto the car in the same location and orientation as before and adjust the SENSOR ADJUST pot until the meter reads **-7mV ± 1mV**.

***** If the meter reading goes in the negative direction when you step off of the car, perform the sensor calibration as above but with opposite polarities. Lets assume that the meter reading changed to **-7mV**. Step back onto the car in the same location and orientation as before and adjust the SENSOR ADJUST pot until the meter reads **+7mV ± 1mV**.

c. Step off of the car again and observe the meter reading. It should now be within **0 ± 1mV**. If you cannot adjust the sensor to within **0 ± 1mV** consult Section M.2, Troubleshooting, Check Point 1.

d. Observe the meter reading at T3. Put some weight (200 lbs.) in the car, or step on the car. If the meter reading goes **negative**, verify/set the INVERT/NON-INVERT switch to the **NON-INVERT** position. If the meter reading goes **positive**, verify/set the INVERT/NON-INVERT switch to the **INVERT** position. This switch will **NOT** change the meter reading at T3, but will invert the output at test point T4. Test point T4 must go positive with added weight.

M.1.2 CALIBRATING THE ZERO ADJUST TRIMPOT (EMPTY CAR)

a. The EMPTY car should still be at or near the bottom landing. Connect (clip) the **RED** meter lead to the resistor on amplifier 1 as shown in Figure M.3. and the **BLACK** meter lead to test point **T5** (ground) on the K-Tech amplifier board. Ensure that the GAIN SELECT switches are set to the lowest setting. Set the meter to read **10-20V** at full scale. If you can make the adjustment while *standing off of the car top*, proceed to step 'b', otherwise go to the Alternate Method.

b. Adjust the ZERO ADJUST pot until the meter reads **0 ±0.025** volts. You may then proceed to Section M.1.3, *Calibration of The Gain Adjust Trimpot (Full Load*). If you cannot obtain this reading consult Section M.2, Troubleshooting the K-Tech Load Weigher, Check Points 2, 3 and 4.

ZERO ADJUST (Alternate Method) - This procedure is used if it is not possible to make the adjustment while standing off of the car top.

a. Adjust the ZERO ADJUST pot until the meter reads **1.0 ±0.05V** while standing on the car. We will compensate for your weight in the next step. Ignore the green LED next to the trimpot.

b. Step off of the car. The meter reading should go down. Observe the **change in voltage**. Lets say that the reading goes down to **0.25V**. Calculate the amount of change, **1.0 - 0.25 = .75V**.

c. Step back on the car and adjust the ZERO ADJUST pot until the meter reading is equal to the amount of change, **0.75V**.

f. Step off of the car again and observe the meter. It should now read **0 ±0.025** volts. If you cannot obtain this reading consult Section M.2, Troubleshooting the K-Tech Load weigher, Check Points 2,3, and 4.

M.1.3 CALIBRATION OF THE GAIN ADJUST TRIMPOT (FULL LOAD)

a. Place a FULL load in the *center* of the car, or equally distributed in the car and run the car to the top landing. Connect (clip) the **RED** meter lead to the resistor as shown in Figure M.3 and the **BLACK** meter lead to test point **T5** (ground) on the K-Tech amplifier board. Set the meter to read **10-20V** at full scale.

b. Adjust the GAIN ADJUST trimpot on the amplifier board until the meter reading is **8.0 ±0.025** volts, or the maximum output achievable. The MCE controller can work with as little as 5.0 VDC. If you cannot make this adjustment while standing off of the car top, compensate for your weight as in Sections M.1.1 and M.1.2.

c. Next, go back and adjust the ZERO ADJUST pot until the meter reading is **9.0 ±0.1** volts. If you cannot make this adjustment while standing off of the car as in Sections

M.1.1 and M.1.2. The meter reading should now be a maximum voltage of **9.0 ±0.1 VDC** with full weight in the car at the top landing and **1.0 ±0.1 VDC** with no weight in the car at the bottom level (which will be verified in step 'e'). If the maximum output in step 'b' was less than 8.0 VDC, adjust the ZERO ADJUST pot up 1.0 V from the maximum reading achieved. If the output does not reach at least 5.0 volts, consult Section M.2, Troubleshooting the K-Tech Load weigher, Check Point 5.

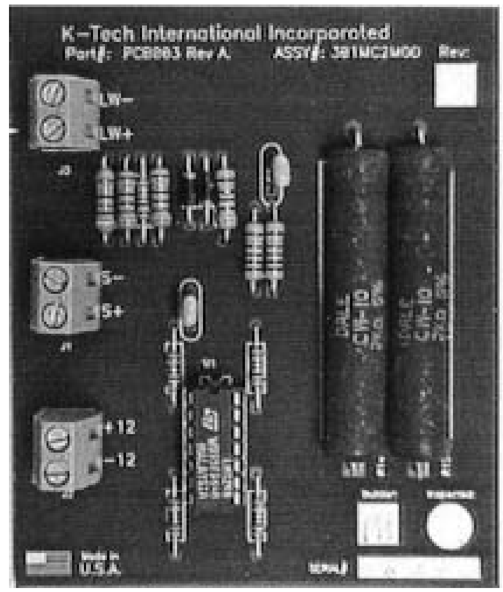
d. Repeat steps 'b' and 'c' for amplifier 2.

e. With the full load at the top of the hoistway and with no one on the car top, verify that the output of the HC-LWB board (terminals **LW+** and **LW-**) inside the K-Tech control box is **9.0 ±0.2** volts. Also check the wiring from the load weigher to the controller by verifying that the input to the SCR-RIX board (terminals LW+ and LW-) is the same as the output of the HC-LWB board.

f. Check the installation and calibration settings by verifying that the voltage on the amplifier board resistors is **1.0 ±0.1 VDC** with the car empty at the bottom floor. If the reading is not **1.0 ±0.1 VDC** with the car empty at the bottom floor, see Section M.2, Troubleshooting the K-Tech Load Weigher, Check Points 6 and 7.

This completes the calibration of the K-Tech Load Weigher.

FIGURE M.4 HC-LWB Buffer Board



If at any point, you have questions, call K-Tech's Technical Support at:

860-489-9399 or 800-993-9399

NOTE:	A properly installed Nyload system is reliable and repeatable over time. However, due to mechanical settling and/or elevator frame variations, periodic re-zeroing of the system may be necessary. It is recommended that the system zero be checked and reset **once/month** to **once/quarter** to maintain original settings. This readjustment **should not require weights** when performed and can be done manually by adjusting the ZERO ADJUST control at the bottom floor with no weight in the car as described in Section M.1.

M.2 TROUBLESHOOTING THE K-TECH LOAD WEIGHER

SENSOR ADJUSTMENT TROUBLESHOOTING		
CHECK POINT	**POSSIBLE CAUSE**	**SOLUTION**
1. *Sensor Zero* at T3 does not adjust to 0V +/-1.0mv	Elevator car is not at the lowest level	Send car to lowest level
	Crosshead surface may not be flat	If the sensor is unbolted and then can be zeroed, resurface (grind smooth) the crosshead, de-bur the holes and re-bolt the sensor.
2. *Empty Load Zero* at output isolation resistor does not adjust to 0+/-0.05V	*Sensor Zero* (T3) is out of adjustment	Readjust *Sensor Zero* (T3)
	Gain Adjust is set too high	**NOTE:** Gain Adjust pot on Amplifier bd. is factory set at approximately 2/3 of maximum, or 16 turns CW. Turn Gain pot 1 to 2 turns CCW.
	Gain Select dip switches are improperly set	Make sure that the GAIN select DIP switches are set to the lowest gain (see to Figure M.3).
3. *Empty Load Zero* at output isolation resistor Zero Adjust pot has no affect on output (output stuck at 0.00)	*Sensor Zero* (T3) is out of adjustment	Readjust *Sensor Zero* (T3)
	Gain adjust is set too low	Turn Gain adjust pot CW 2 to 4 turns, then try Zero pot again. Repeat one more time if necessary.
4. Output voltage at the output isolation resistor does not respond to any adjustment	Sensor connector is loose	Verify that the sensor connector is fastened securely into the sensor connector housing on the amplifier board(s).
	Power connector is loose	Verify that the power connector is fastened securely into the power connector housing on the amplifier board(s)
5. *Full Load Adjustment* at output isolation resistor does not adjust to full scale (9.0 VDC) for max weight	Stiff crosshead	The MCE controller can work with as little as 5VDC for full load. If the maximum output achievable at the lowest GAIN switch settings is less than 5VDC, try changing the sensor location or moving it to the other C channel.
6. *Buffer Board Output Check* at T4 output is drifting **NOTE:** drifting can occur when rails are flexed by adjacent elevators traveling by (in proximity to) the setup elevator. Also the reading “up” will tend to be lower than the “down” reading at a floor due to friction	Sensor may be bowed or not mounted at the lowest level	Remount the sensor (at the lowest level). NOTE: allow unit to settle for “mechanical creep” one to two hours before completing the adjustments.
		Change sensor location on the crosshead or switch to the other crosshead for more linear reaction with respect to weight inside the car.

SENSOR ADJUSTMENT TROUBLESHOOTING		
CHECK POINT	**POSSIBLE CAUSE**	**SOLUTION**
7. *Buffer Board Output Check* unexpected reading at Lobby or is not repeatable at specific locations in the hatchway under the same conditions	Varying mechanical (bending and twisting) forces as the car moves	**NOTE:** the following are dependent on the elevator and should only be attempted only after all other remedies. 1) Check rails for alignment. Poorly aligned rails can cause the car to drag resulting in pull on the cables and erratic/non-repeatable deflection of the crosshead. 2) Tighten all car frame nuts and bolts. An elevator car that is not plumb can cause errors due to deflection. 3) If the output offset has suddenly changed, the sensor may have been disturbed by changes in the crosshead (not related to weight). See Maintenance Note in the Pre-Installation Checklist for periodic re-zeroing.

APPENDIX N
MCE LOAD WEIGHER INSTALLATION AND ADJUSTMENT

N.0 GENERAL INFORMATION

The MCE Load Weigher is designed for use with isolated platform elevator cars. The accuracy of the load weigher is dependent on the condition of the rubber isolation pads. If they are old, cracked or hard, the performance of the load weigher can be very poor. Similarly, if the wrong pad material is used, the deflection (with load) can be excessive or insufficient. Be sure to verify the performance of the pads with the test in Section N.1.2 step 8.

N.1 SENSOR INSTALLATION METHODS

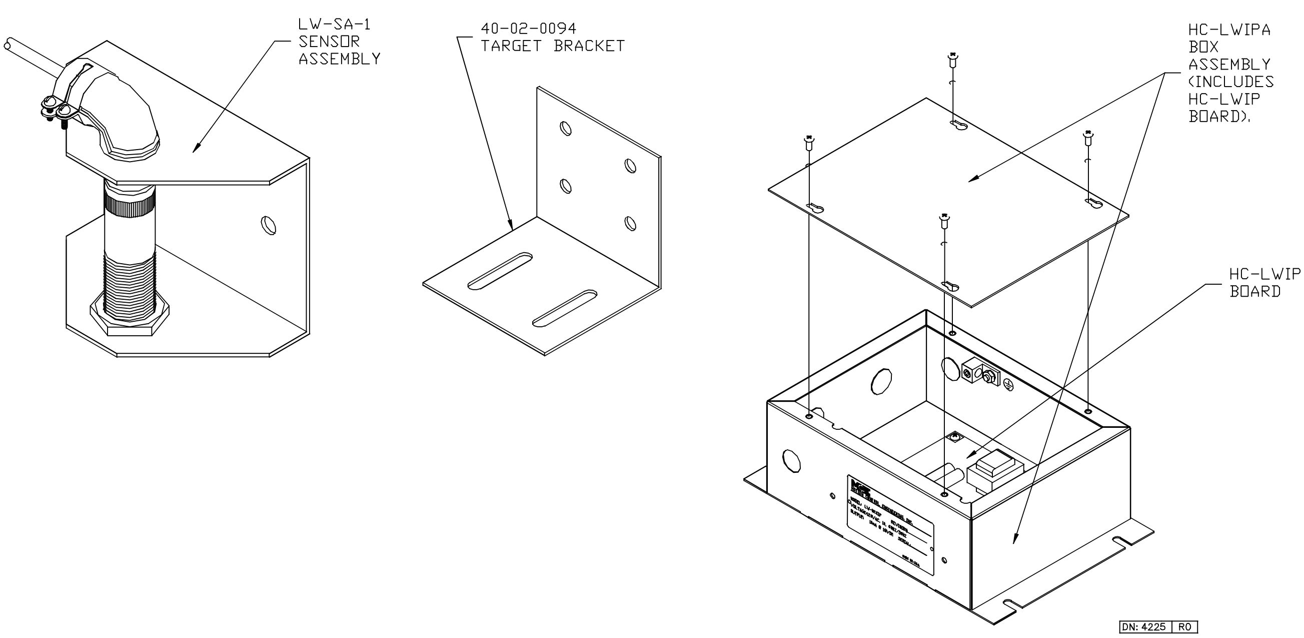
Method #1 New or replacement installation with target bracket near the middle bottom of the floor, as in Figure N.3 (preferred method).

Method #2 Replacement installations re-using the original load weigher location for target bracket near the center of top of cab or under the floor (see Section N.1.3).

Method #3 Sensor and amplifier on the top of the car (predisposes sensor and amplifier to damage and adjustment problems – see limitations in Section N.1.4).

CAUTION: Increasing the weight in the car must always increase clearance between the proximity sensor and the target for proper operation.

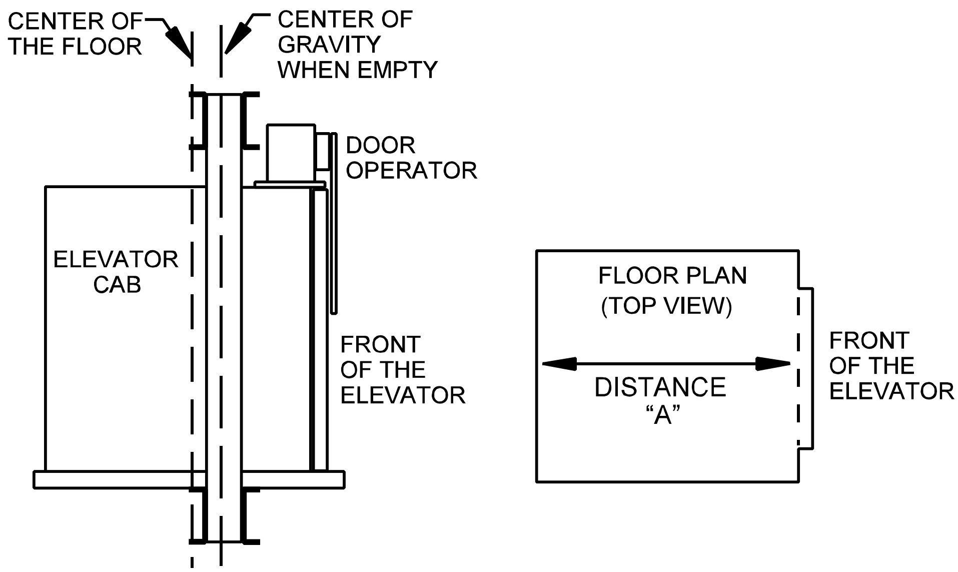
FIGURE N.1 MCE Load Weigher



N.1.1 INSTALLATION METHOD #1 OVERVIEW (PREFERRED METHOD)

When installing – remember that the car is supported near the center of gravity. The center of gravity may be offset towards the front of the car to compensate for the door operator weight, unless the car has *both* front and *rear* doors (see Figure N.2). Install the target bracket as close to the center of the floor as possible.

FIGURE N.2 Center of Gravity vs Center of Floor



To measure the compression of the rubber pads and not the sagging of the floor – attach a structural piece such as a 1 ½ " by 1 ½" angle to the outside edges of the floor (see Figure N.3).

FIGURE N.3 Sensing the Edges of the Floor (compensation for floor sag)

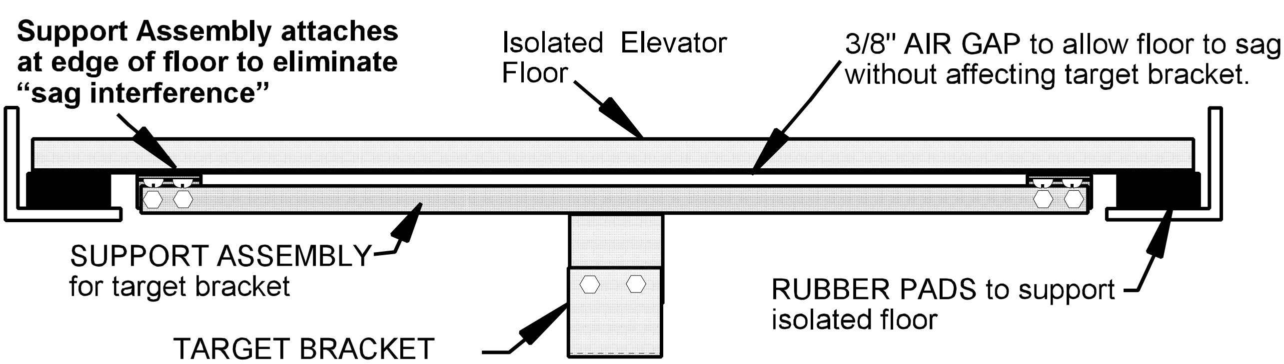
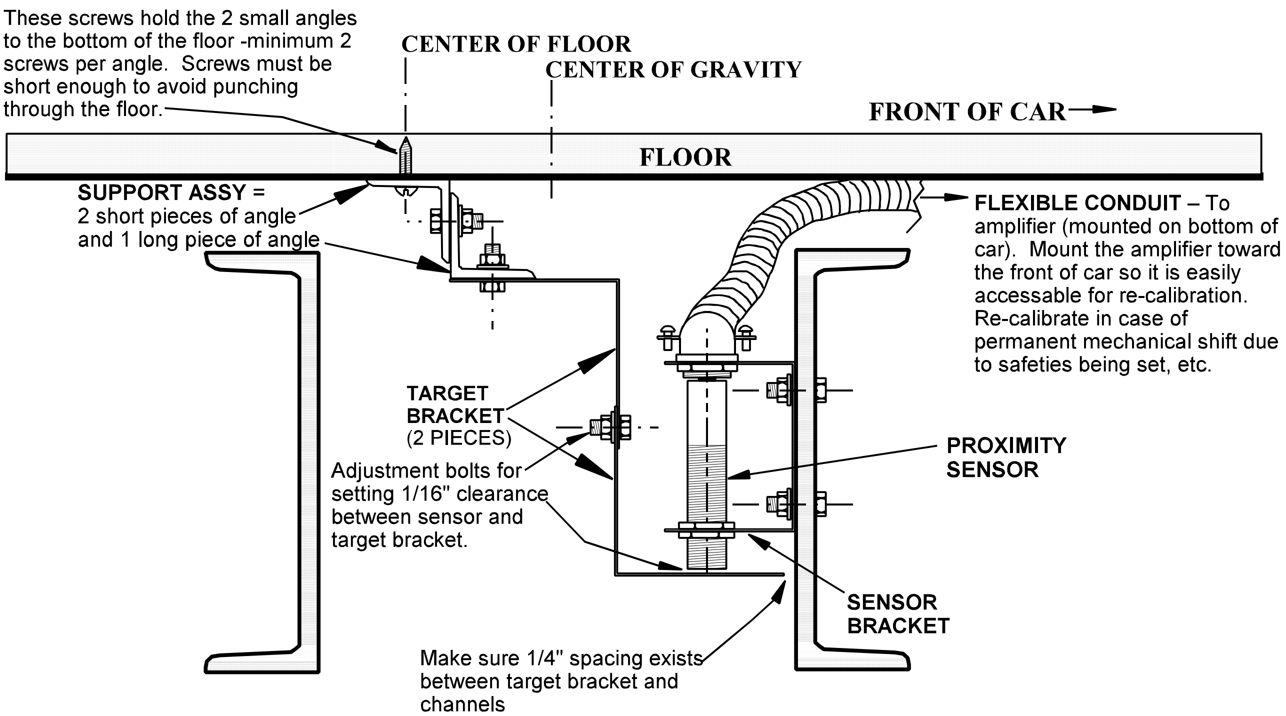


FIGURE N.4 Target Bracket and Sensor mounted on Support Assembly and Car frame



NOTE: The position sensed is where the support assembly for the target bracket is attached to the floor, NOT where the sensor is located. In Figure N.4 the attachment point for the target bracket support assembly is toward the rear of the car, therefore the sense position is toward the rear of the car.

If the distance between where the target bracket attaches to the floor and the center of the floor is greater than 20% of distance “A” (see Figure N.2), an alternate mounting method may produce better results.

Example: If distance “A” is 10'
Then 20% of 10' is 2'
Therefore, if the target bracket attaches to floor more than 2' from the center of the channel, an alternate method of mounting is suggested (see Figure N.5).

FIGURE N.5 Alternate Mounting Location for Sensor and Target

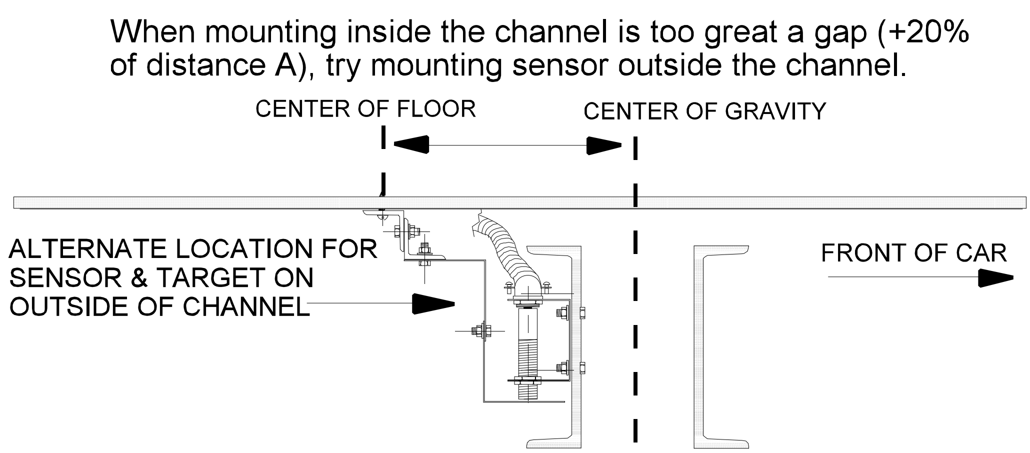
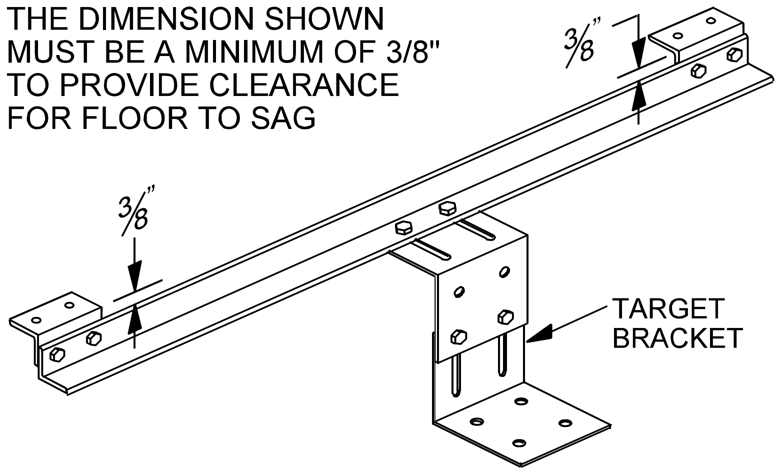


FIGURE N.6 Typical Support Assembly for Target Bracket



N.1.2 METHOD #1 INSTALLATION INSTRUCTIONS

1. MAKE THE SUPPORT ASSEMBLY

a. Cut a piece of 1 ¼" x 1 ¼" or 1 ½" x 1 ½" steel angle to span the width of the floor as shown in Figure N.3 and Figure N.6.

b. Cut 2 more short 2" lengths of angle to attach the long piece as close as possible to the outer edge of the floor. When attaching the angles together, provide a 3/8" clearance to allow for floor sagging (see Figure N.6).

2. MOUNT THE TARGET BRACKET ON THE SUPPORT ASSEMBLY

a. Bolt the two-piece target bracket in the middle of the support assembly so that the slots allow movement of the target for alignment (see Figure N.6).

3. MOUNT THE SUPPORT ASSEMBLY

a. The support assembly attaches to the bottom of the floor of the isolated platform as close to the outside edge as possible, preferably attaching between the two channels comprising part of the safety plank (see Figure N.4). Hold the support assembly for the proper 1/4" spacing between the target bracket and the channel shown in Figure N.4 where the sensor will be mounted and mark the holes to drill for the support assembly to attach to the floor. Be sure to leave room for the sensor and mounting bracket.

b. Drill the holes and mount the support assembly.

c. Verify the 1/4" space set in step 3a is still 1/4" or within 1/8" to 3/4" after mounting.

4. MOUNT THE PROXIMITY SENSOR

a. Mount the proximity sensor and bracket on the channel closest to the front of the car. Center the sensor over the target with about 1/16" (or less) space between the target and sensor (see Figure N.4).

5. MOUNT THE AMPLIFIER BOX

a. Mount the amplifier box under the car so that the 6 foot sensor cable can wire directly to the HC-LWIP board inside the amplifier box (preferably no splicing). Try to mount the box so it is accessible from the front of the car, thus eliminating the need to go into the pit to gain access. The box may be mounted upside down or on its side so long as the test points are accessible.

b. Install ½" flexible conduit from the sensor to the amplifier box (use the knockouts on the box for conduit connection.

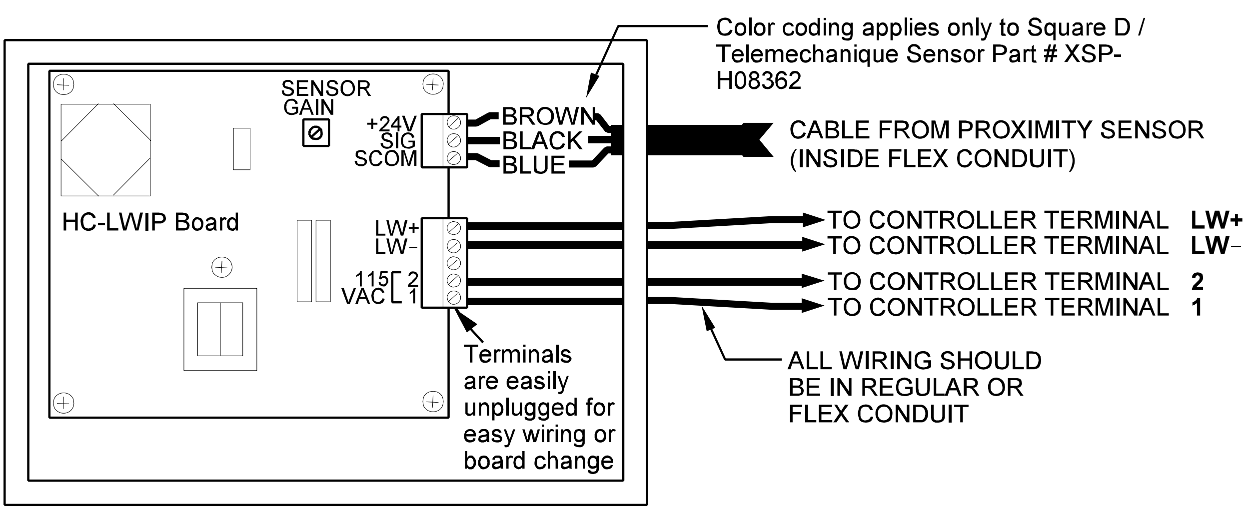
c. Install another flexible conduit from the amplifier box to a junction where Controller terminals 1 and 2 (120VAC), as well as LW+, LW- sensor wires feed through the traveler cable to the machine room. Grounding the amplifier box is recommended, ground according to local electrical codes.

6. CONNECT THE WIRING

a. Connect proximity sensor wires to HC-LWIP board terminals (see Figure N.7).
For Square D/Telemechanique Sensor Part # XSP-H08362 the color coding is as follows:
  Brown sensor wire to +24V terminal
  Black sensor wire to SIG terminal
  Blue sensor wire to SCOM terminal

b. Connect terminals 1, 2, LW+ and LW- from the controller to the terminals of the same name on the HC-LWIP board. NOTE: A #18 wire pair is sufficient for LW+ and LW- (shielding is recommended).

FIGURE N.7 Wiring the HC-LWIP board



7. ADJUST THE AMPLIFIER

a. For adjusting the sensor amplifier the following conditions must first be met:
- Power to the controller
- The car is on Inspection operation
- The brake is already adjusted to hold 125% of full load
- The elevator is positioned level with the floor and with doors open so test weights may be added and removed.

b. With car empty, adjust the clearance between sensor and target so that 0.3VDC to 1VDC is on test points SIG to SCOM. This is a sensitive apparatus, so hold the target while loosening the adjustment bolts of the target, make the adjustment, and tighten the bolts.

c. Remove all personnel from the pit (in case the car moves when fully loaded) and put 100% of load in the car.

d. Adjust the sensor Gain trimpot on the amplifier board fully clockwise (re-entering the pit if necessary) and check that LESS THAN 14VDC is on test points LW+ and LW-. Then adjust the Gain trimpot for no more than 8VDC on LW+ and LW- and no less than 4VDC (8VDC recommended).

8. VERIFY THE PERFORMANCE

a. Check the voltages measured from SIG to SCOM with the following loads. This information is used to verify the rubber pad compression for the isolation platform. Document the data below.

	Load in pounds	Volts across SIG to SCOM	Voltage increase
No load		(1)	
1/4 of full load		(2)	(2)-(1)
½ of full load		(3)	(3)-(2)
3/4 of full load		(4)	(4)-(3)
Full load		(5)	(5)-(4)

The variation between voltage increase entries should be linear. If voltage increase is more than 25% different from the entry just above it, check the following:

- Condition of rubber pad
- Voltage variance when weight is in center of car vs on edge of car (sagging problem)

b. For future maintenance, measure the voltage between Controller terminals LW+ and LW- with the car empty. Then compute the following:

$$\frac{\text{Empty car voltage between SIG and SCOM on the amplifier board}}{\text{Empty car voltage between terminals LW+ and LW- on controller}} = \mathbf{K}$$

For future maintenance, record the K value here **K =** _______.

9. ADJUST THE CONTROLLER PARAMETERS

The loadweigher is now installed and properly adjusted; however, the parameter adjustments for the load weigher must be completed (see Section 4.7.1, *Setting the Pre-Torque Parameters* and Section 4.8, *Load Weigher Adjustment for Dispatching*).

10. RECOMMEND MAINTENANCE

Once a month check the voltage set in step 7b. It should be within .3V and 1.0VDC when the car is empty. This voltage may be checked in the machine room at the controller terminals LW+ and LW-; however, the voltage reading at LW+ and LW- must be multiplied by **K** above. If the measured voltage times K is between 0.3 and 1.0VDC no adjustment is necessary. If the voltage is outside the 0.3 to 1.0VDC range – adjust the target bracket as explained in 7b.

Periodic checks of the voltage increase (table 8a) will help diagnose when rubber pads are losing compression consistency.

N.1.3 INSTALLATION METHOD # 2

Re-using pre-existing holes or brackets to mount sensor and target.

When using supports created for other load weighers, be sure to arrange sensor and target so that increasing the weight in the car increases the clearance between the proximity sensor and the target.

Always use the target bracket for the target as it will flex slightly and not damage the sensor during any rebound while doing a buffer test, etc.

If the voltage between SIG and SCOM varies depending on where the weight is in the car – use the preferred method.

N.1.4 INSTALLATION METHOD # 3

A very simple approach. Mount the sensor and amplifier on the top of the car. This has the advantage of being the most convenient location, both for installation and for any later adjustment. Unfortunately, there are several disadvantages to this approach.

The first disadvantage is that the sensor and target bracket are usually more exposed to accidental physical damage, which is critical, since the system depends on precise clearances between the sensor and target.

Second, since the inclination of most installers would be to mount the target directly to the top of the cab, the extra weight of an elevator adjuster on the cartop often creates problems during adjustment or if they happen to be riding there temporarily during normal operation, especially since the top of the cab is not as structurally rigid as the floor.

NOTE: If locating the load weigher on the cartop is necessary, a better result can be obtained by making up a target bracket assembly similar to Figure N.6 and attaching it to the edges of the elevator cab, which will make it not sensitive to the bending of the top of the elevator cab. Then mount the sensor so it is supported by the crosshead. This can give a very good result, but requires real mechanical expertise on the part of the installer.

CAUTION: In any case of mounting the sensor and amplifier on top of the car, be sure to arrange the sensor and target bracket so that <u>increasing the weight in the car increases the clearance between the proximity sensor and the target.</u>

APPENDIX O
POWERBACK R4 REGENERATIVE DRIVE

O.1 GENERAL

The following information pertains to the POWERBACK R4 Regenerative Drive used with IMC-AC-R and VFMC Series M controllers.

O.2 REGENERATIVE DRIVE INTERFACE

The following is an explanation of the POWERBACK R4 Regenerative Drive interface.

O.2.1 DRIVE INPUTS

- Drive Enable (Terminal 8): This input enables the R4 drive and puts the drive in standby mode. Drive parameter **ru. 0** reads **stby** during motoring condition and **Active** during deceleration/overhauling conditions. A voltage between drive terminals 7 & 8 of 18 VDC = ON, 0 VDC = OFF.

- Drive Reset (Terminal 11): This input resets an R4 drive fault. Pressing the Drive Reset button on the IMC-SI2 unit activates the reset input and clears regenerative drive faults. A voltage between drive terminal 11 & 7 of 18 VDC = ON, 0 VDC = OFF.

O.2.2 DRIVE OUTPUT

- Drive ready contact: The contacts between terminals 1 and 3 on the R4 drive remain closed under normal condition and open during a fault, which turns OFF the RDY input on the IMC-ACIK board. Pressing the Drive Reset button on the IMC-SI2 unit should clear the R4 drive fault and should turn ON the RDY input.

O.2.3 POWER CONNECTIONS

a. It is recommended that the L1, L2, L3 connections on the Inverter and the R4 drive be in phase.

b. The input power connections (L1-2, L2-2, L3-2) and the phase monitoring connections (L1, L2, L3) on the R4 drive must be in phase. If these connections are not in phase the R4 drive will trip fault **E.Syn** and turn OFF the RDY input on the IMC-ACIK board. If the R4 drive trips on **E.nEt** at power up or trips the over voltage **E.oP** fault at the end of a run, one of the phase monitoring fuses may be open or there may be a loose connection on the phase monitor inputs.

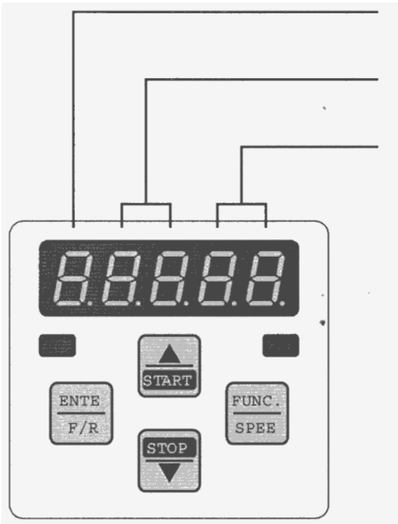
c. The DC bus connections must be correct and according to the drawings. ***It is critical that DC bus connections be correct. Incorrect connections will damage the drive units.***

d. The line inductor ground connection to the R4 Drive and F4 Drive must be completed according to the drawings.

O.2.4 HOW TO USE THE DRIVE KEYPAD

The R4 drive is delivered from the factory in the *Application* mode, which allows access to all parameters and functions available on the unit.

The display shows three types of information which define the parameter:



Parameter set

Parameter group

Parameter number

By pressing the FUNC button you can change between the displayed parameter and its value.

To select a different parameter use the ENTER button to toggle the flashing point to the right of the field to be changed. Then use the UP and DOWN buttons to scroll the desired value. Once the correct parameter information is displayed, the FUNC button can be pressed at any time to see the value of the parameter.

When displaying a parameter value, the value of the parameter can be changed by pressing the UP/DOWN buttons. Generally, these changes are immediately effective and permanently stored, meaning they remain stored after the unit is switched off. Confirming the input with ENTER is not necessary, with the exception of the parameters known as *Enter Parameters*.

Enter Parameter: For some parameters the value adjusted by UP/DOWN does not automatically become valid. These parameters are called Enter Parameters since they must be confirmed by ENTER. When pressing UP/DOWN only the display is changed but not the value stored in the R4. When the display value is different from the stored value in the R4, it is marked by a point in the display. By pressing ENTER the display value is stored in theR4 and the point is deleted. The displayed value of an Enter parameter always starts with the stored value.

O.2.5 ERROR MESSAGES

If a drive fault occurs during operation, the display is overwritten with an error message. Press ENTER to clear the error message.

> **NOTE:** Pressing ENTER resets only the error message in the display. To reset the actual error and return the unit to normal operation, the cause of the error must be removed and a reset done on terminal 11, or power off reset.

Refer to the R4 drive manual for a listing of error messages.

O.2.6 PARAMETER SETTING / ADJUSTMENT

The R4 drive parameters listed below are set at MCE and no field adjustments are necessary. The parameter explanation is only for reference.

QUICK REFERENCE FOR POWERBACK R4 REGENERATIVE AC DRIVE PARAMETERS

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

Digital Operator Display	Parameter Description	Unit	Setting Range	MCE Drive Defaults	Field/MCE Set
	Cp - Parameters				
Cp. 0	Password (100 = read only, 200 = customer mode, 440 = application password)		0 - 9999	440	440
	Pn - Parameters				
Pn. 0	Auto reset E.UP	-	0 - 1	1	1
Pn. 1	Auto reset E.OP	-	0 - 1	1	0
Pn.16	Delay time E.dOH	sec	0 - 120	60	60
Pn.59	Delay time E.nEt	sec	0 - 10	0	0
	Ud - Parameters				
ud. 0	Key Board Pass	-	0 - 9999	APPL	APPL
ud. 1	Buss Password	-	0 - 9999	N/A	N/A
ud. 2	Start parameter group	-	ru - table	ru	ru
ud. 3	Start parameter number	-	0 - 99	0	0
ud. 4	Save Changes	-	0 = Off 1= on	0	1
ud. 6	Inverter Address	-	0 - 239	1	1
ud. 7	Baud rate	-	1200 - 19200	9600	19200
	Fr - Parameters				
Fr. 0	Copy parameter set	-	-2 : init	-2	init
Fr. 1	Copy Bus parameter	-	-2	N/A	N/A
	An - Parameters	-			
An.14	Analog output function	-	0 - 2	0	0
An.15	Analog output gain	-	-20 to 20	1.0	1
An.16	Analog output offset X	%	-100 to 100	0.0	0.0
An.17	Analog output offset Y	%	-100 to 100	0	0
	di - Parameters				
di. 0	Noise Filter Digital	-	0 - 31	0	0
di. 1	NPN / PNP Selection	-	0 = PNP 1 = NPN	0	0
di. 2	Input logic	-	0 - 7	0	0
di. 3	Input function I1	-	0 - 1	0	0
di.14					0
di.15	Select Signal Source	-	0 - 7	0	0
di.16	Digital input setting	-	0 - 7	0	0

Digital Operator Display	Parameter Description	Unit	Setting Range	MCE Drive Defaults	Field/MCE Set
	do - Parameters				
do. 0	Output Logic	-	0 - 3	0	0
do. 1	Output Condition 1	-	0 - 10	2	2
do. 2	Output Condition 2	-	0 - 10	4	5
do. 3	Output Condition 3	-	0 - 10	3	3
do. 9	Select Out 1 Condition	-	0 - 7	1	1
do.10	Select Out 2 Condition	-	0 - 7	2	2
do.11	Select Out 3 Condition	-	0 - 10	4	4
do.17	Out 1 Condition Logic	-	0 - 7	0	0
do.18	Out 2 Condition Logic	-	0 - 7	0	0
do.19	Out 3 Condition Logic	-	0 - 7	0	0
do.25	Out Condition Logic	-	0 - 7	0	0
	Le - Parameters				
Le. 8	Load Level 1	%	0 - 200	50	50
Le. 9	Load Level 2	%	0 - 200	100	100
Le.10	Load Level 3	%	100 - 200	100	160
Le.12	Phase Current Level 1	A	0 - 370	370	0
Le.13	Phase Current Level 2	A	0 - 370	370	0
Le.14	Phase Current Level 3	A	0 - 370	370	0
Le.24	DC Voltage Level 1	V	0 - 1000	650	0
Le.25	DC Voltage 2evel 2	V	0 - 1000	650	✳________
✳Set to 250 for 230V AC Drives. Set to 500 for 480V AC Drives.					
Le.26	DC Voltage Level 3	V	0 - 1000	650	0
Le.32	OL-Warning Level	%	0 - 100	80	80
Le.38	Current Hysteresis	A	0 - 370	370	0.0
	CS - Parameters				
CS.27	Regen voltage Level	%	100 - 200	110	106
CS.35	Line frequency window	%	2 - 30	10	5

Job #:
Drive Model #:
Drive Manufacturer:
Drive Software (In. 4):
Line #:
Tested By:
Approved:

APPENDIX P
CRT TERMINAL AND TERMINAL EMULATOR SETUP

P.1 GENERAL

This appendix contains setup information for the controller COM ports and for the following terminals and terminal emulators:

P.1.1 CONTROLLER COM PORT SETTINGS

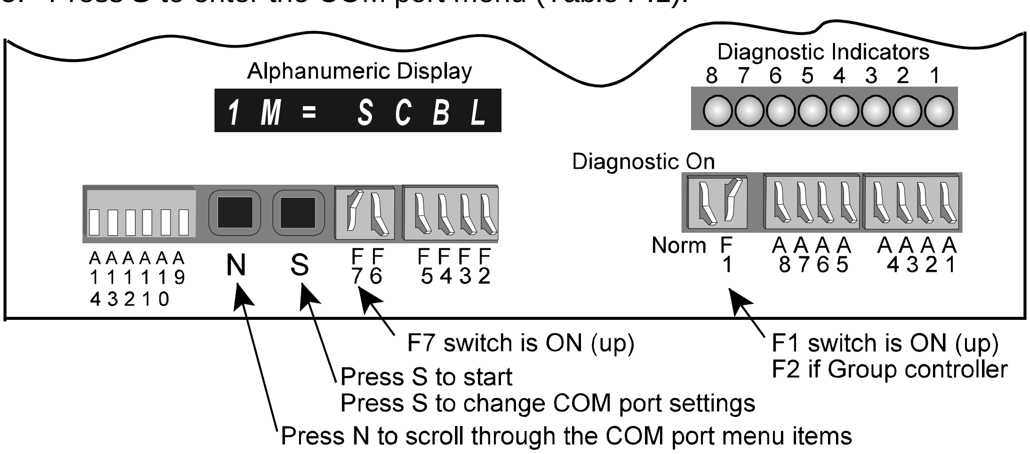
The communication ports were programmed at the factory for the original hardware, based on customer-provided information. Changing a communication port setting may be necessary if you are:

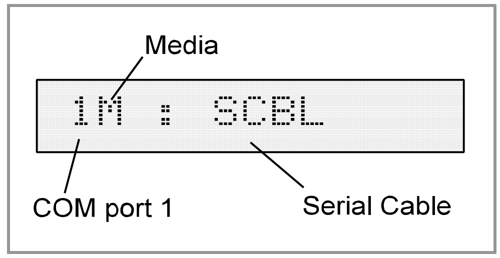
- Changing from a monochrome to a color CRT terminal or terminal emulator
- Adding a lobby CRT or CRT with keyboard
- Adding a modem, line driver, or serial cable
- Adding a PC (for CMS or MSD software or graphic display)

Refer to Tables P.2 and P.3 to determine the correct Media and Device setting for the communication port being used.

To program a communication port:

1. Set all Swing Panel switches to the down (off) position.
2. Raise the F7 switch on the Swing Panel. “PASSWORD” is displayed.
3. Press and hold ***S*** until “SYSTEM” is displayed.
4. Raise the F1 switch (F2 if Group controller).
5. Press ***S*** to enter the COM port menu (Table P.1).





6. Press **N** to scroll and select the desired COM port (1 to 4) and media (M) or device (D).
7. Press ***S*** to change the media (Table P.2) or device (Table P.3) setting

   or

   press ***N*** to view the next COM port.
8. When “SAVE” is displayed:

   Press ***S*** to Save the COM port parameters.

   Press ***N*** to loop back to COM port 1.
9. To exit, place the Swing Panel switches in the down (off) position.

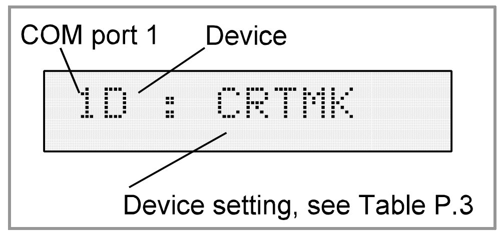


TABLE P.1 *Communication Port Menu*

EOD Display	Description
NO COM	No COM port option has been enabled
1M	COM Port 1 Media
1D	COM Port 1 Device
2M	COM Port 2 Media
2D	COM Port 2 Device
3M	COM Port 3 Media
3D	COM Port 3 Device
4M	COM Port 4 Media
4D	COM Port 4 Device
SAVE?N/S	Save the changes? N for no or continue, S for save

TABLE P.2 COM Port Media Selections

EOD DISPLAY	DESCRIPTION
NONE	No Media - the port is not being used
SCBL	Serial Cable - direct connection to a CRT terminal or terminal emulator
LDRV	Line Driver - connection to a CRT terminal or terminal emulator at a distance of over 40 feet using a line driver
MODM	Modem - phone line connection to a Personal Computer using modems

TABLE P.3 COM Port Device Selections

EOD DISPLAY	DESCRIPTION
NONE	No Device - the port is not being used

CRTMK	Use for these terminals or emulators with keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
CRTM	Use for these terminals or emulators without keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
PC	Use for Personal Computer with CMS / MSD
PCGD	Personal Computer Graphic Display (no longer used)
CRTCK	Use for these terminals with keyboard (Link MC-70, Wyse WY-370)
CRTC	Use for these terminals without keyboard (Link MC-70, Wyse WY-370)

P.2 ESPRIT 250C TERMINAL EMULATOR SETUP

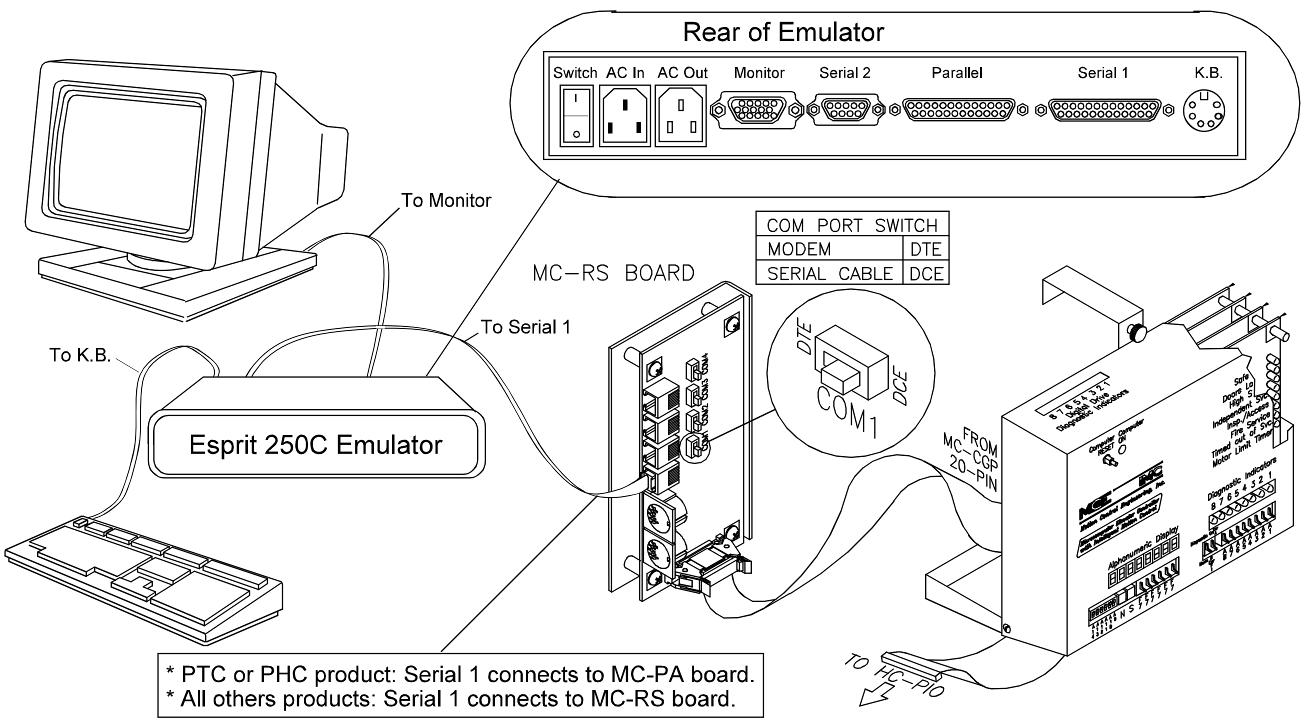
The ESPRIT 250C terminal emulator, along with a standard monitor and keyboard, is used in place of a traditional terminal.

P.2.1 CONTROLLER COM PORT SETTING (ESPRIT 250C)

Swing Panel Controller - Refer to Section P.1.1 *Controller COM Port* Settings, or to *Programming the Communication Ports* in Section 5 of the Car Controller manual (Section 4 of the Group Supervisor manual) for instructions on viewing and changing the controller Communication Port settings. For the ESPRIT 250C Emulator the COM port ***Device*** option must be set to ***CRTMK***.

PTC / PHC Controller - Refer to ***Peripheral Device*** in Section 5.4.9 Extra Features Menu Options for instructions on changing the controller Communication Port settings. For the ESPRIT 250C Emulator the ***COLOR CRT*** option must be set to ***NO***.

P.2.2 ESPRIT 250C TERMINAL EMULATOR CONNECTIONS



- Connect the monitor’s signal cable to the Monitor jack (DB-15) on the rear of the emulator.
- Connect the keyboard cable to the K.B. jack (Din) on the rear of the emulator.

- Connect the controller's communication interface board (MC-RS or MC-PA) to the Serial 1 jack (DB-25) on the rear of the emulator using a C-CRT/MD/PA-x cable (x = length in feet).
- Connect the printer, if applicable, to the Parallel jack (DB-25) on the rear of the emulator.
- Connect AC In jack on the rear of the emulator to the Group controller's AC outlet using the cord supplied with the emulator.

P.2.3 ESPRIT 250C TERMINAL EMULATOR SETUP

The Esprit 250C Emulator has certain parameters which must be configured properly in order to function with MCE controllers. Disconnect the emulator from the controller while setting these parameters. In order to examine and/or modify these parameters, enter the Emulator setup mode. Press and hold the ***Alt*** key while pressing the ***Esc*** key.

TABLE 1 Setup Mode Keyboard Commands

KEY	COMMAND FUNCTION
Arrow Keys	Used to select an item on the menu.
Space Bar	Press the space bar to change the setting

Step 1 With the emulator disconnected from the controller, hold down ***Alt*** and press ***Esc*** to put the terminal into Setup mode. The Esc key is in the upper left corner of the keyboard.

Step 2 From the Setup menu press ***Shift+Esc*** to default all parameters.

ESPRIT 250C Setup: Setup Menu

Setup Save?
(F1-F11 selects menu; Shift+ESC sets defaults) (SPACE toggles)

No

F1	F2	F3	F4	F5	F6	F7	F8		F10	F11	F12
Disp	Genrl	Keybd	Comm	Misc	Tabs	Fkeys	Ansbk		Colr1	Colr2	Exit

Step 3 From the Setup menu press **F2** to enter the General Menu. Use the **Arrow keys** to highlight **Enhance** and press the ***Spacebar*** to change the option to **Off**. Use the **Arrow keys** to highlight **Autoscrl** and press the ***Spacebar*** to change the option to **Off** .

Step 4 Use the **Arrow keys** to highlight **End of Line Wrap** and press the ***Spacebar*** to change the option to **On**.

ESPRIT 250C Setup: F2 General Menu

Change: Use ARROWS and SPACE

Personality = WY 120/WY 60	Enhance = Off	Status Line = Standard
Scrl = Jump	Autoscrl = Off	End of Line Wrap = On
Rcv CR = CR	Monitor = Off	Attribute = Char

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 5 Press **F1** to enter the Display Menu. Use the **Arrow keys** to highlight **Lines** and press the ***Spacebar*** to change the option to **42**. Use the **Arrow keys** and **Spacebar** to set **Cursor = Blink**, **Scrn Saver = Off** and **Width Change Clear = On**.

ESPRIT 250C Setup: F1 Display Menu

Change: Use ARROWS and SPACE

Columns = 80	Cursor = Blink Line	Scrn Saver = Off
Lines = 42	Display = Dark	Page Length = 1 * Lines
Auto Page = Off	Width Change Clear = On	ANSI Reverse = Off
Display = CRT		

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 6 Press **F3** to enter the Keybd Menu. Use the **Arrow keys** and ***Spacebar*** to set **Margin Bell = Off** and **Bell Volume = 1**.

ESPRIT 250C Setup: F3 Keybd Menu

Change: Use ARROWS and SPACE

Keyclick = On	Key Repeate = 5	Xmt Limit = None
Margin Bell = Off	Language = US	Keycode = ASCII
NRC = Off	Bell Volume = 1	NUM Start = Off
DEL Keypad = Dot/Del	Keyboard Installed = EPC	

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 7 Press **F4** to enter the COMM Menu. Use the **Arrow keys** and ***Spacebar*** to set **Baud Rate = 19200** and **Printer = Off**.

ESPRIT 250C Setup: F4 COMM Menu

Change: Use ARROWS and SPACE

Baud Rate = 19200	Data/Stop Bits = 8/1	Parity = None
Rcv Hndshk = Xon/Xoff	Xmt Hndshake = Xon/Xoff	Comm Mode = FDX
XPC Hndshake = Off	Printer = Off	

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

NOTE: If a line driver is used between the controller and the terminal emulator, set **Baud Rate = 9600**.

Step 8 Press **F10** to enter the Colr1 Menu. Use the **Arrow keys** and ***Spacebar*** to change colors for best viewing. The recommended colors are:

Normal = Light Blue Blink = Light Green Rev. = Yellow Dim = White

ESPRIT 250C Setup: F10 Colr1 Menu

Change: Use Arrows, Space for Forground, Shift+Space for Background colors

Normal		Dim	
Normal =	Light Blue	Dim =	White
Blank =	White	Blank =	White
Blink =	Light Green	Blink =	White
Blink Blank =	White	Blink Blank =	White
Rev. =	Yellow	Rev. =	White
Rev. Blank =	White	Rev. Blank =	White
Rev. Blink =	White	Rev. Blink =	White
Rev. Blink Blank =	White	Rev. Blink Blank =	White
Undl. =	White	Undl. =	White
Undl. Blank =	White	Undl. Blank =	White
Undl. Blink =	White	Undl. Blink =	White
Undl. Blink Blank =	White	Undl. Blink Blank =	White
Undl. Rev. =	White	Undl. Rev. =	White
Undl. Rev. Blank =	White	Undl. Rev. Blank =	White
Undl. Rev. Blink =	White	Undl. Rev. Blink =	White
Undl. Rev. Blink Blank =	White	Undl. Rev. Blink Blank =	White

F1	F2	F3	F4	F5	F6	F7	F8	F10	F11	F12
Disp	Genrl	Keybd	Comm	Misc	Tabs	Fkeys	Ansbk	Colr1	Colr2	Exit

Step 9 Press **F11** to enter the Colr2 Menu. Use the **Arrow keys** and ***Spacebar*** to set **Cursor = BLACK** and **Color Association = On**.

ESPRIT 250C Setup: F11 Colr2 Menu

Change: Use ARROWS and SPACE

Sample

Background = BLACK	Cursor = BLACK	Color Mode = Normal
Normal F.G. = GREEN	Intensity F.G. = GRAY	Color Map = Reverse
Normal B.G. = BLACK	Intensity B.G. = BLACK	Color Association = On
Border Color = BLACK	Attribute = Bold	

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 10 Press **F12** to return to the Setup menu and press the ***Spacebar*** to change **Save** to **Yes**. Press **F12** to save the parameters and exit the Setup Menu.

P.2.4 PARALLEL PRINTER SETUP (ESPRIT 250C)

Printers are typically used to create a hard copy of system parameters, controller screens, or simple reports. MCE currently supports two Epson dot-matrix printers (Epson FX 85 and Epson LQ 570) and their equivalents. For nicer looking reports with the printer of your choice, MCE recommends using a PC connected to the controller. Central Monitoring System software or WYSE emulation software may be used to print screens from the PC. Contact the sales department at Motion Control Engineering for further information.

NOTE: The ESPRIT 250C emulator is set up by default with the printer option turned off. A serial interface card on the printer is not required with this emulator. Display screens wider than 80 columns will not be formatted properly. This model of emulator supports any IBM PC compatible printer.

Step 1 Press **F4** to enter the COMM Menu. Use the **Arrow keys** and ***Spacebar*** to set **Printer = Parallel**.

ESPRIT 250C Setup: F4 COMM Menu

Change: Use ARROWS and SPACE

Baud Rate = 19200	Data/Stop Bits = 8/1	Parity = None
Rcv Hndshk = Xon/Xoff	Xmt Hndshake = Xon/Xoff	Comm Mode = FDX
XPC Hndshake = Off	Printer = Parallel	

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 2 Press **F7** to enter the Fkeys Menu (Figure 9). Press **Ctrl** + **Print Scrn** (press and hold the Ctrl key, then press the Print Scrn key). To edit **Print =**, press the keys shown in **bold** in the following order:

Ctrl + **[** then **Shift** + **P** then **Ctrl** + **M** then **Ctrl** + **J**

The text should look as shown next to **Print =** in Figure 9. Press the **Enter** key on the ***numeric*** keypad to set **Unshifted Direction = Local**.

Step 3 Press the **down Arrow** key and repeat Step 2 to set **sPrint =** and **Shifted Direction = Local**.

Press **F12** to return to the Setup menu and press the ***Spacebar*** to change **Save** to **Yes**. Press **F12** to save the parameters and exit the Setup Menu.

ESPRIT 250C Setup: F7 Fkeys Menu

Change: Use ARROWS and SPACE

Unshifted Direction = Local	Shifted Direction = Local
Print =	░P␍␊
sPrint =	░P␍␊

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Misc	F6 Tabs	F7 Fkeys	F8 Ansbk	F10 Colr1	F11 Colr2	F12 Exit

Step 4 Verify that the emulator is connected to the MCE controller through the rear port labeled SERIAL 1.

Step 5 Verify that the printer's DIP switches are set correctly (refer to Table below).

Parallel Printer DIP Switch Settings

PRINTER	EPSON FX 85		EPSON LQ 570	
SETTING	**ON**	**OFF**	**ON**	**OFF**
DIP SW1	6, 7, 8	1, 2, 3, 4, 5	1, 2, 3, 4	5, 6, 7, 8
DIP SW2	1	2, 3, 4		1, 2, 3, 4

Step 6 Connect the 25-pin male DB connector end of the parallel printer cable into the PARALLEL port located in the rear of the emulator. Connect other end of the parallel printer cable into the Centronics connector in the rear of the printer. Use the clips on the connector to secure the cable.

Step 7 Feed the paper through the paper guide and line up the perforation with the top of the print head. Refer to the printer manual for operation and proper care of the printer.

Step 8 Plug the printer into a 120VAC outlet and turn on power to both the emulator and printer.

P.2.5 PRINTING SCREENS WITH THE ESPRIT 250C TERMINAL

To print the screen being viewed follow the steps below.

Step 1 Verify printer is connected to the CRT.

Step 2 Turn on the power to the printer and load it with paper.

Step 3 Press the Print Screen key on the keyboard.

P.3 ADDS 260LF TERMINAL EMULATOR SETUP

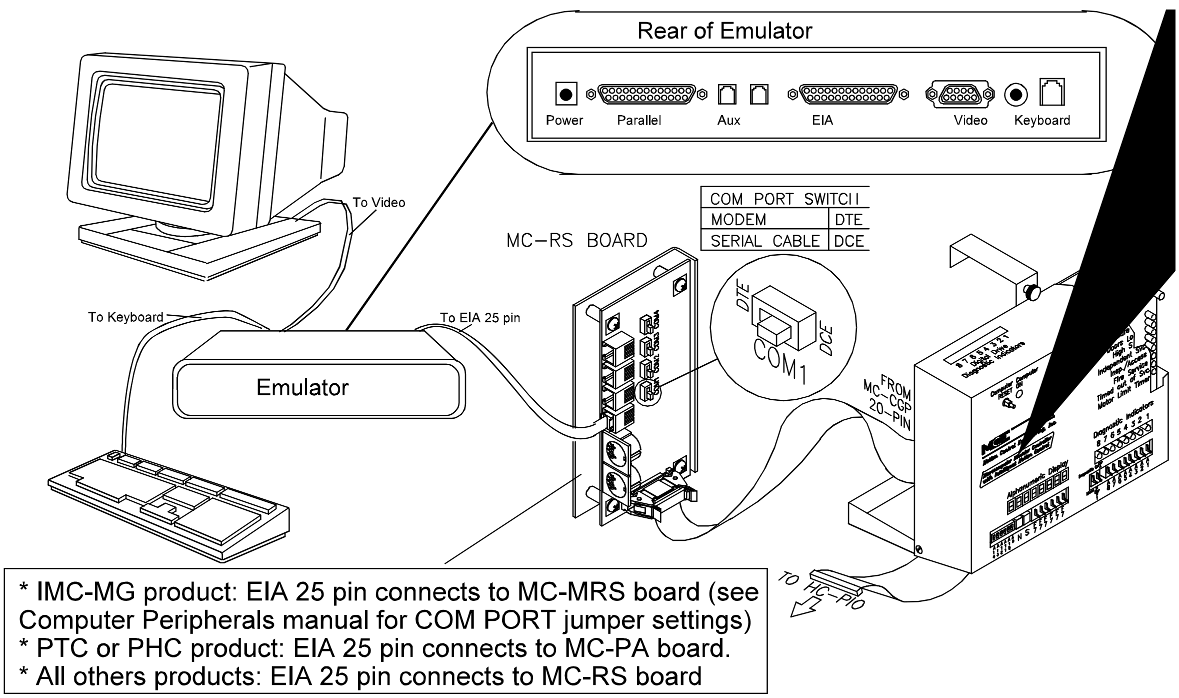
The ADDS 260LF terminal emulator, along with a standard monitor and keyboard, is used in place of a traditional terminal.

P.3.1 CONTROLLER COM PORT SETTINGS (ADDS 260LF)

Swing Panel Controller - Refer to Section P.1.1 *Controller COM Port Settings*, or to *Programming the Communication Ports* in Section 5 of the Car Controller manual (Section 4 of the Group Supervisor manual) for instructions on viewing and changing the controller Communication Port settings. For the ADDS 260LF Emulator, the COM port ***Device*** option must be set to ***CRTMK***.

PTC / PHC Controller - Refer to ***Peripheral Device*** in Section 5.4.9 Extra Features Menu Options for instructions on changing the controller Communication Port settings. For the ADDS 260LF Emulator, the ***COLOR CRT*** option must be set to ***NO***.

P.3.2 ADDS 260LF TERMINAL EMULATOR CONNECTIONS



- Connect the monitor's signal cable to the Video jack (DB-15) on the rear of the emulator.
- Connect the keyboard cable to the Keyboard jack on the rear of the emulator.
- Connect the controller's communication interface board (MC-RS or MC-PA) to the EIA jack (DB-25) on the rear of the emulator using a C-CRT/MD/PA-x cable (x = length in feet).
- Connect the printer, if applicable, to the Parallel jack (DB-25) on the rear of the emulator.
- Connect Power jack on the rear of the emulator to the Group controller's AC outlet using the cord supplied with the emulator.

P.3.3 ADDS 260LF TERMINAL EMULATOR SETUP

Step 1 Disconnect the cable connecting the emulator to the elevator communication board.

Step 2 Hold down the ***Ctrl key*** and press ***Scroll Lock*** to enter the setup mode. The F1 Screen comes up automatically.

Step 3 Press the ***Print Screen*** key to access the Print Exec Screen.

Step 4 Using the right arrow key, move the cursor right to highlight Default Terminal. Press ***Enter***.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	**Print Exec**

Parameters

Save Terminal	Recall Terminal	Default Terminal
Save Session	Recall Session	Default Session
Reset Terminal	Rest Session	Reset Ports
Clear Screen	Default Session UDKs	

Choices

Use Enter Key To Execute Action

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

The terminal will default with all required settings for a serial connection to MCE controllers. After the unit has been defaulted, cursor position is highlighted, default choices are in bold. Verify the following parameters, press the ***Pause/Break*** key to save the settings.

Step 5 Press the ***F1 key***. On the **F1 Quick** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Emulation = Wyse-60	EIA Baud Rate = 19200	EIA Data Format = 8/1/N
Enhanced = Off	Aux Baud Rate = 9600	Aux Data Format = 8/1/N
Comm Mode = Full Duplex	Language = U.S.	Sessions = One
Host/Printer = EIA/None(SEE NOTE)		

Choices

ADDS-VP	**Wyse-60**	Wyse-325	Wyse-50+	Wyse-350	PC-Term	TVI-925
VT-300-7	VT-300-8	Intecolor	VT-200-7	VT-200-8	VT-100	SCO Console
AT386						

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

NOTE: Set Host/Printer to EIA/Para only if you are connecting a parallel printer. If not, set Host Printer to EIA/None. With no printer connected, the EIA/Para setting may cause your emulator to generate an error (TRANSMIT CONDITION PARALLEL PRINTER NO PRINTER) and be unable to communicate with the Controller.

NOTE: If a line driver is used between the controller and the terminal emulator, set the baud rate to 9600.

Step 6 On the **F2 Genrl** Menu verify the following Parameters.

F1 Quick	**F2 Genrl**	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Emulation = Wyse-60	Enhanced = Off	Auto Wrap = On
Auto Font Load = On	Auto Page = Off	Curs Dir = Left to Right
Auto Scroll = On	Monitor Mode = Off	Screen Saver = Off
Bell Volume = 03	Warning Bell = On	Bell Length = 140 ms
Sessions = One		

Choices

ADDS-VP	**Wyse-60**	Wyse-325	Wyse-50+	Wyse-350	PC-Term	TVI-925
VT-300-7	VT-300-8	Intecolor	VT-200-7	VT-200-8	VT-100	SCO Console
AT386						

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

NOTE: The Screen Saver function will only blank the screen after the specified time set if the emulator loses communication with the controller. Therefore, turn off the VGA monitor (and only the VGA monitor) when not in use. Screen Saver settings are Off, 2, 5,15 and 30 min.

Step 7 On the **F3 Displ** Menu verify the following Parameters.

F1 Quick	F2 Genrl	**F3 Displ**	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Display Cursor = Off	Cursor = Blink Block	Auto Adjust Cursor = Off
Page Length = 42	Screen Length = 44 Lines	Screen Video = Normal
Columns = 80	Scroll = Jump	Width Change Clear = On
Speed = Fast	**Palette Number = Soft 1**	

Choices

Off ON

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 8 On the **F4 Kybd** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Language = U.S.	Char Set = Multinational	Code Page = CP 437
Key Mode = ASCII	Keyclick = On	Key Repeat = On
Key Rate = 20 cps	Margin Bell = Off	Key Lock = Caps
Caps Lock = Toggle	Num Lock = Toggle	

Choices

U.S.	U.K.	Danish	Finnish	French	German	Norwegian
Portuguese	Spanish	Swedish	Dutch	Belgian-Flemsh	Fr-Canadian	Italian
Latin-American	Swiss-German	Swiss-French				

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 9 On the **F5 Keys** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	**F5 Keys**	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameter

Enter Key = < CR >	Return Key = < CR >	Backspace = < BS > / < DEL >
Alt Key = Funct	Disconnect = Pause	Desk Acc = Ctrl←
Pound Key = U.S.	Return Key Repeat = Off	UDKs = User Dependent

Choices

< CR > < CR >< LF > < TAB >

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 10 On the **F6 Ports** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	**F6 Ports**	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

EIA Baud Rate = 19200	EIA Data Format = 8/1/N	EIA Parity Check = Off
Aux Baud Rate = 9600	Aux Data Format = 8/1/N	Aux Parity Check = Off
EIA Xmt = No Protocol	EIA Recv = Xany - Xoff (XPC)	EIA Xmt Pace = Baud
Aux Xmt = Xon - Xoff	Aux Recv = No Protocol	Aux Xmt Pace = Baud

Choices

110	150	300	600	1200	1800	2000	2400	4800	9600
19200	38400	57600	76800	115200					

Select

← ↑ → ↓ : Parameter   Enter/S-Enter : Next/Prev Choice   Exit : Esc Key

Step 11 On the **F7 Host** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	**F7 Host**	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Comm Mode = Full Duplex	Local = Off	Null Suppress = On
Break = 250 ms	Modem Control = Off	Disconnect = 2 sec
Recv < CR > = < CR >	Recv < DEL > = Ignore	Send ACK = On
Alt Input Data = Off	Send Line Term = < US >	Send Block Term = < CR >

Choices

Full Duplex   Half Duplex   Full Block   Half Block

Select

← ↑ → ↓ : Parameter   Enter/S-Enter : Next/Prev Choice   Exit : Esc Key

Step 12 On the **F8 Print** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	**F8 Print**	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Prnt Line Term = < CR > < LF >	Prnt Block Term = < CR >	Secondary Recv = Off

Choices

< US >   **< CR > < LF >**

Select

← ↑ → ↓ : Parameter   Enter/S-Enter : Next/Prev Choice   Exit : Esc Key

Step 13 On the **F9 Emul** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	**F9 Emul**	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

Attribute = Character	Page Edit = Off	WPRT Intensity = Normal
WPRT Reverse = Off	WPRT Underline = Off	WPRT Blink = Off
Display NV Labels = Off	Save Labels = On	Char Set = Multinational
Status Lines = Extended	Fkey Speed = Normal	WP-Graphics = On

Choices

Character Line Page

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 14 On the **F10 Tabs** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	**F10 Tabs**	F11 AnsBk	F12 Prog	Print Exec

Parameters

Auto Init Tabs = Off	Default Tabs	

10 ▼ 20 ▼ 30 ▼ 40 ▼ 50 ▼ 60 ▼

. . . .

. . . .

▲ 70 ▲ 80 ▲ 90 ▲ 100 ▲ 110 ▲ 120 ▲ 130

Choices

Off On

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 15 On the **F11 AnsBk** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	**F11 AnsBk**	F12 Prog	Print Exec

Parameters

Answerback Mode = Off	Answerback Conceal	

Answerback Message:

Bytes Remaining : 0542

Choices

Off On

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 16 On the **F12 Prog** Menu verify the following Parameters.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	**F12 Prog**	Print Exec

Parameters

Key = F1	Program = F Key	Key Dir = Host

Text:

Label: **Bytes Remaining : 0542**

Choices

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14 F15 F16

Select

← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

Step 17 If you are not setting up a modem, but are setting up a parallel printer, go to step 21. If you are setting up a modem, continue to step 18. Otherwise, press ***Esc*** then ***Y*** to save.

Step 18 If you are setting up a modem, change the following highlighted settings when connecting with a modem.

F6 Ports *EIA Xmt = Xon - Xoff*
EIA Recv = No Protocol

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	**F6 Ports**	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

EIA Baud Rate = 19200	EIA Data Format = 8/1/N	EIA Parity Check = Off
Aux Baud Rate = 9600	Aux Data Format = 8/1/N	Aux Parity Check = Off
EIA Xmt = Xon - Xoff	**EIA Recv = No Protocol**	EIA Xmt Pace = Baud
Aux Xmt = Xon - Xoff	Aux Recv = No Protocol	Aux Xmt Pace = Baud

Step 19 Change the following parameters when using line drivers, set EIA Baud Rate to 9600.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	**F6 Ports**	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	F12 Prog	Print Exec

Parameters

EIA Baud Rate = 9600	EIA Data Format = 8/1/N	EIA Parity Check = Off
Aux Baud Rate = 9600	Aux Data Format = 8/1/N	Aux Parity Check = Off
EIA Xmt = No Protocol	EIA Recv = Xon - Xoff (XPC)	EIA Xmt Pace = Baud
Aux Xmt = Xon - Xoff	Aux Recv = No Protocol	Aux Xmt Pace = Baud

Step 20 If you are connecting a parallel printer go to Step 21. If you are not connecting a parallel printer, press the ***Esc*** Key, then press ***Y*** to save.

Step 21 Follow these instructions to connect a parallel printer. Go to the **F12 Prog** screen.

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 AnsBk	**F12 Prog**	Print Exec

Parameters		
Key = F1	Program = F Key	Key Dir = Host

Text:

Label: Bytes Remaining : 0542

Choices											
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12

Select		
← ↑ → ↓ : Parameter	Enter/S-Enter : Next/Prev Choice	Exit : Esc Key

On the ***F12 Prog*** screen, you can assign special programming to different keys. All data that is sent to the printer with a Print Screen function will format in a basic 80-column mode. Print screen features will not print screens wider than 80 columns without offsetting the format, making the page difficult to read. Basic formatting also does not print the last 3 to 4 lines of information that is on the screen. To improve the print function the following steps can be taken.

Step 1 Cursor right one position until the ***Program = F Key*** is highlighted.

Step 2 Press the ***Spacebar*** four times to change to ***=Edit Key***.

Step 3 Cursor ***Left*** one position until ***Key = TAB*** is highlighted.

Step 4 Hold down the ***Shift*** key and press the ***Spacebar*** twice change to ***=Print***.

Step 5 Cursor down one time to the ***Text*** edit area. Press the ***Shift +Backspace*** key to delete any text or characters before entering the following.

Step 6 Type the following keys in the exact order as shown. Keys indicated with a "+" require holding the first key listed and pressing the second one.

Ctrl+[Shift+P Ctrl+M Ctrl+J

the text entered will look similar to this: **█P ␍ ␊**

Step 7 Cursor up once. Cursor Right twice to highlight ***Key Dir***, if not set to ***=All***, hold down the ***Shift*** key and press the ***Spacebar*** to change to ***=All***.

Step 8 Change the Host/Printer option on the F1 screen to EIA/Para.

Step 9 Press the ***Esc*** key and then the letter ***Y*** to save your changes.

Step 10 Make sure that your F1 screen Host/Printer setting is EIA/Para.

When you are finished configuring your emulator, reconnect the cable between the emulator and the elevator controller.

P.3.4 ADJUSTING PALETTE COLORS

It is a good idea to adjust the colors used by the emulator to display MCE screens on the monitor so that it is easier to see if a flag is ON or OFF when viewing diagnostics.

Step 1 While viewing any of the MCE screens, press and hold the ***Ctrl*** key and then press the ***left arrow***. This brings up a menu for the desktop accessaries.

Step 2 Press ***F6*** to change the palette colors. Use the ***right*** and ***left arrow*** keys to adjust the foreground and background colors. Use the ***up*** and ***down arrow*** keys to select the option you want to change colors on.

The color table chart below shows the default colors and the colors MCE recommends for easy viewing. The highlighted MCE Recommended settings are different from the default settings.

Step 3 When finished, press ***Esc*** to exit the desk accessories.

Changes to these colors must be saved or they will be lost when the unit is powered off. To save your color settings:

Step 4 Disconnect the cable between the emulator and the elevator controller.

Step 5 Press ***Ctrl*** and ***Scroll Lock*** to enter setup mode.

Step 6 Press the ***Pause/Break*** key to save the settings.

Step 7 Reconnect the cable between the emulator and the elevator controller.

Color Table

Attributes	Default Setting Fore/Back	MCE Recommended Fore/Back
Normal	Green / Black	Light Gray / Black
Rev	Black / Green	Light Green **/** Blue
Int	Yellow / Black	Green / Black
Rev, Int	Black / Yellow	Black / Yellow
Und	Light Red / Black	Light Red / Black
Und, Rev	Black / Light Red	Black / Light Red
Und, Int	Light Blue / Black	Light Blue / Black
Und, Rev, Int	Black / Light Blue	Black / Light Blue

P.3.5 TROUBLESHOOTING

If you experience problems using your terminal emulator, please refer to the following table.

Symptom	Cause	Solution
Keyboard not responding to keys pressed.	Possible locked keyboard	If the upper left corner of the display screen shows the word LOCK use the following keystrokes to unlock the keyboard: Shift+Scroll Lock
Screen displays message: “Transmit condition EIA port XOFF To cancel type (Shift + CTRL + Tab)”	Emulator is connected to controller when attempting to save changes to the setup.	Turn off the emulator and wait 5 seconds. Do not attempt to make changes in the emulator setup while the emulator is connected to the controller. Turn the emulator back on.
Screen displays message “Transmit Condition Parallel Port No Printer.”	Printing was attempted with no active printer connected to the emulator.	Enter setup and change the F1 screen, Host/Printer setting to EIA/None if a printer is not being used.

P.4 LINK MC5 MONOCHROME TERMINAL SETUP

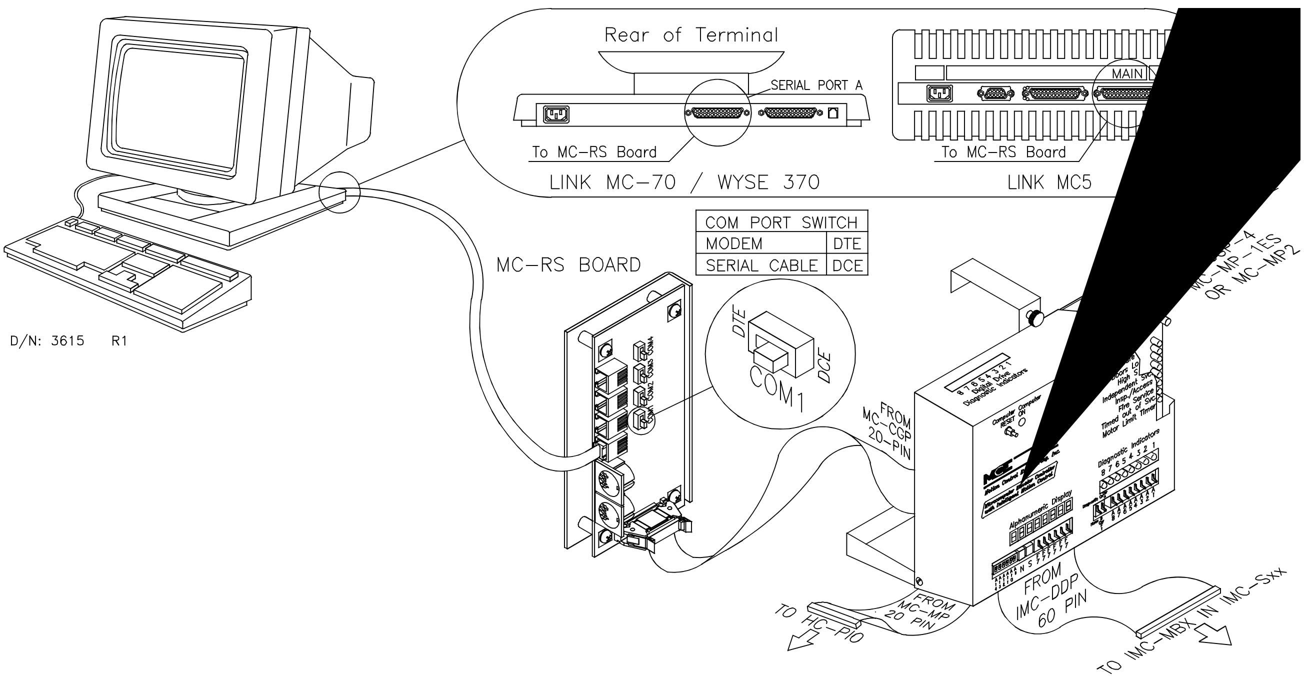
If you are using a Link MC5 monochrome terminal to configure the elevator controller, set the terminal up as described in this section.

P.4.1 CONTROLLER COM PORT SETTING (LINK MC5)

Swing Panel Controller - Refer to Section P.1.1 *Controller COM Port* Settings, or to *Programming the Communication Ports* in Section 5 of the Car Controller manual (Section 4 of the Group Supervisor manual) for instructions on viewing and changing the controller Communication Port settings. For the LINK MC5 terminal the COM port ***Device*** option must be set to ***CRTMK*** (with keyboard) or ***CRTM*** (without keyboard).

PTC / PHC Controller - Refer to ***Peripheral Device*** in Section 5.4.9 Extra Features Menu Options for instructions on changing the controller Communication Port settings. For the LINK MC5 terminal the ***COLOR CRT*** option must be set to ***NO***.

P.4.2 LINK MC5 MONOCHROME TERMINAL CONNECTIONS



- Connect the DB-25 (25-pin plug) of the signal cable, C-CRT/MD/PA-x (x = length in feet) into the MAIN jack on the rear of the terminal. Use the screws on the cable hood to secure the cable to the terminal.
- Plug the RJ-11 plug of the signal cable into a COM port jack (usually COM 1) on the controller's communication interface board (MC-RS or MC-PA).
- If the terminal is connected directly to the communication interface board, set the COM port switch to DCE. If the terminal is connected to the communication interface board through a modem or line driver, set the COM port switch to DTE.
- Connect the printer, if applicable, to the Parallel jack (DB-25) on the rear of the terminal.
- Connect the AC jack on the rear of the terminal to the controller's AC outlet using the cord supplied with the terminal.

P.4.3 LINK MC5 TERMINAL SETUP

Setup Mode Keyboard Commands

KEY	COMMAND FUNCTION
↑ or ↓	Used to select the operating parameter to be set
← or →	Used to change the active setting for the selected operating parameter.
TAB	Moves the highlight cursor to the opposite parameter column.
P	Toggles the communication port between Main and Auxiliary.
D	Restores the default settings.
S	Saves current settings in nonvolatile memory. The settings stored in nonvolatile memory are used at power-up.
R	Restores the most recently saved settings.
E	Exits setup mode.

Step 1 Disconnect the cable connecting the terminal to the elevator controller.

Step 2 Press and hold the ***Shift*** key while pressing the ***Select*** key to enter setup mode.

Step 3 With the CRT disconnected from the Controller, press ***D*** to default the CRT terminal parameters. (You should see the message “Setup Defaulted”).

Step 4 Use the *arrow keys* to set the following **highlighted** General Setup parameters:

General Setup Screen

Link MC5		General Setup	Ver. X.XX
Emulation	**Wyse 60**	Auto Page	Off
Enhancements	Off	Warning Bell	Off
Virtual Terminal	Off	Margin Bell	Off
Scroll Style	Jump	Bell Sound	1
Auto Scroll	On	Block Terminator	US/CR
Auto Wrap	On	**Send ACK**	**On**
Received CR	CR	Monitor Mode	Off
	Setup Defaulted		

Step 5 Press the ***F2*** key to go to the Communications Setup screen.

Step 6 Use the *arrow keys* to set the following **highlighted** Communications Setup parameters. NOTE: Set Main baud rate to 19200 for everything *except Line Drivers*. For Line Drivers the baud rate should be set to *9600*. If a printer is to be used, set the lighter **highlighted** parameters.

Communications Setup Screen

Link MC5	Communications Setup		Ver. X.XX
Main Baud	**19200**	**Aux Baud**	**9600**
Main Data/Parity	8/None	Aux Data/Parity	8/None
Main Stop bits	1	Aux Stop Bits	Off
Main Rcv Hndsk	XON/XOFF	**Aux Rcv Hndsk**	**None**
Main Xmt Hndsk	None	**Aux Xmt Hndsk**	**XON/XOFF**
Main Rcv Level	50%	Aux Rcv Level	50%
Ignore 8th bit	Off	Aux Port	RS232
Comm Mode	Full Duplex	Aux Interface	RS232
Disconnect	2 Sec	**Printer**	**Parallel**

Step 7 Press the ***F3*** key to go to the Display Setup screen.

Step 8 Use the *arrow keys* to set the following **highlighted** Display Setup parameters:

Display Setup Screen

Link MC5	Display Setup		Ver. X.XX
Columns	80	Background	Dark
80/132 Clear	On	Attributes	Char
Lines	**42**	**Wprt Intensity**	**Normal**
Pages	1xLines	Wprt Reverse	Off
Status Line	Ext	Wprt Underline	Off
Cursor Style	**Blink Line**	Refresh Rate	60Hz
Cursor	**Off**	Pound Char	US
Screen Saver	15 Min	Auto Font Load	On

Step 9 Press the ***S*** key to save the changes.

Step 10 If you are installing a printer. Press ***F6*** to go to the Function Keys Setup screen to make the print screen key operational.

10a Press both the ***Ctrl*** and ***Print screen*** keys simultaneously to change "sF1=" and "F1=", to "sPRINT=" and "PRINT=."

10b Use the *numeric keypad* ***Enter*** key to toggle "Remote" to "Local."

Function Key Setup Screen

Link MC5	Function Keys Setup		Ver. X.XX
		Direction:	Remote
sF1 =			
F1 =			
Host is on Main	Port	F1 Gen F2 Comm F3 Disp F4 Kbd F5 ANSI	F6 Fkeys F7 Tabs F8 Ansbk F9 Exit
CTRL+Key . . Select Key arrow keys . . Select Field END/F13 . . . Default Keys	← . . . . .Erase Char HOME/F14 . Erase Field ENTER . . . . .Change Dir		

Step 11 Press ***F9*** to exit the setup mode.

When you are finished configuring your terminal, reconnect the cable between the terminal and the elevator controller.

P.5 WYSE WY-325ES COLOR TERMINAL SETUP

If you are using a Wyse WY-325S color terminal to configure your elevator controller, follow the instructions in this section.

P.5.1 CONTROLLER COM PORT SETTING (WYSE WY-325ES)

Swing Panel Controller - Refer to Section P.1.1 *Controller COM Port* Settings, or to *Programming the Communication Ports* in Section 5 of the Car Controller manual (Section 4 of the Group Supervisor manual) for instructions on viewing and changing the controller Communication Port settings. For the Wyse WY-325ES color terminal the COM port ***Device*** option must be set to ***CRTMK*** (with keyboard) or ***CRTM*** (without keyboard).

PTC / PHC Controller - Refer to ***Peripheral Device*** in Section 5.4.9 Extra Features Menu Options for instructions on changing the controller Communication Port settings. For the Wyse WY-325ES color terminal the ***COLOR CRT*** option must be set to ***NO***.

P.5.2 WYSE WY-325ES COLOR TERMINAL CONNECTIONS

- Connect the DB-25 (25-pin plug) of the signal cable, C-CRT/MD/PA-x (x = length in feet) into the SERIAL 1 jack on the rear of the terminal. Use the screws on the cable hood to secure the cable to the terminal.
- Plug the RJ-11 plug of the signal cable into a COM port jack (usually COM 1) on the controller's communication interface board (MC-RS or MC-PA).
- If the terminal is connected directly to the communication interface board, set the COM port switch to DCE. If the terminal is connected to the communication interface board through a modem or line driver, set the COM port switch to DTE.
- Connect the printer, if applicable, to the Parallel jack on the rear of the terminal.
- Connect the AC jack on the rear of the terminal to the controller's AC outlet using the cord supplied with the terminal.

P.5.3 WYSE WY-325ES COLOR TERMINAL SETUP

Step 1 Disconnect the cable between the terminal and the elevator controller before proceeding with setting up the terminal.

Step 2 Press and hold the ***Shift*** key while pressing the ***Select*** key to enter setup mode.

> **NOTE:** If the CRT terminal will not enter Setup mode, try powering the terminal ON while holding down the ***Select*** key until the screen is displayed (about 5 seconds).

Setup Mode Keyboard Commands

KEY	COMMAND FUNCTION
↑ or ↓	Used to select an item on the menu.
← or →	Used to select items on the Menu Bar (top line).
SPACE BAR	Press the space bar to change the setting.

Step 3 With the CRT disconnected from the Controller, press the ***Enter*** key to Default all parameters.

Setup Parameters for Wyse WY-325ES CRT Terminal and Printer

Set the following parameters every time.

Setup	Save?
(F1-F11 selects menu; ENTER sets defaults)	(SPACE toggles)
	No

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Disp	Genrl	Keybd	Comm	Attr	Misc	ANSI1	ANSI2	Tabs	Ansbk	Fkeys	Exit

Step 4 Press ***F2*** to enter the General Menu. Use the ***arrow keys*** to highlight Personality and press the ***Spacebar*** to change the option to **"Wyse 60."**

Wyse WY-325ES Setup: F2 General Menu

Change: Use ARROWS and SPACE

Personality = Wyse 60	Enhance = On	Status Line = On
Scrl = Jump	Autoscrl = Off	Wrap EOL = On
Rcv CR = CR	Monitor = Off	Recognize DEL = Off

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Disp	Genrl	Keybd	Comm	Attr	Misc	ANSI1	ANSI2	Tabs	Ansbk	Fkeys	Exit

Step 5 Use the ***arrow keys*** to highlight Autoscrl and press the ***Spacebar*** to change the option to "Off."

Step 6 Press ***F1*** to enter the Display Menu. Use the ***arrow keys*** to highlight Lines and press the ***Spacebar*** to change the option to "42." Use the ***arrow keys*** and the ***Spacebar*** to change Scrn Saver to "Off" and 80/132 Clr to "On."

Wyse WY-325ES Setup: F1 Display Menu

Change: Use ARROWS and SPACE

Columns = 80	Cursor = Blink Line	Scrn Saver = Off
Lines = 42	Display = Dark	Char Cell = 10 x 16
Page = 1 x Lines	Autopage = Off	80/132 Clr = On

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 7 Press ***F4*** to enter the COMM Menu. Use the ***arrow keys*** and ***Spacebar*** to change Baud Rate to "19200" and Rcv Hndshk to "XON-XOFF/XPC."

Wyse WY-325ES Setup: F4 COMM Menu

Change: Use ARROWS and SPACE

Baud Rate = 19200	Data/Parity = 8/None	Stop Bits = 1
Rcv Hndshk = XON-XOFF/XPC	Rcv Hndshk Level = 192	Xmt Hndshk = None
Comm = FDX	Xmt Lim = None	Host Port = Serial 1

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 8 Press ***F5*** to enter the Attribute Menu. Use the ***arrow keys*** and ***Spacebar*** to change WPRT Intensity to "Normal" and Intensity Attribute to "Off."

Wyse WY-325ES Setup: F5 Attribute Menu

Change: Use ARROWS and SPACE

Color Map = Reverse	Intensity Attribute = Off	Attribute = Char
WPRT Intensity = Normal	WPRT Rev = Off	WPRT Undrln = Off

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 9 Press ***F6*** to enter the Miscellaneous Menu. Use the ***arrow keys*** and ***Spacebar*** to change Multiple Page to "Off."

Wyse WY-325ES Setup: F6 Miscellaneous Menu

Change: Use ARROWS and SPACE

Ptr Baud Rate = 9600	Ptr Data/Parity = 8/None	Ptr Stop Bits = 1
Printer = Parallel	Nulls Suppress = On	Blk End = US/CR
Border Color = *{BLACK}*	Color Mode = Palette	Multiple Page = Off

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 10 Press ***F7*** to enter the ANSI 1 Menu. Use the ***arrow keys*** and ***Spacebar*** to change DEL to "BS/DEL."

Wyse WY-325ES Setup: F7 ANSI 1 Menu

Change: Use ARROWS and SPACE

Char Set = Multinational	Char Mode = Multinational	ANSI ID = VT 100
Cursor Keys = Normal	Keypad = Numeric	DEL = BS/DEL
Feature Lock = Off	Fkey Lock = Off	Newline = Off

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 11 Press ***F8*** to enter the ANSI 2 Menu. Use the ***arrow keys*** and ***Spacebar*** to change Print to "ALL."

Wyse WY-325ES Setup: F8 ANSI 2 Menu

Change: Use ARROWS and SPACE

Print = All	Print Area = Screen	Print Term = None
Send = All	Send Area = Screen	Send Term = None
Xfer Term = EOS	Auto Answerback = Off	Keys = Typewriter

F1 Disp	F2 Genrl	F3 Keybd	F4 Comm	F5 Attr	F6 Misc	F7 ANSI1	F8 ANSI2	F9 Tabs	F10 Ansbk	F11 Fkeys	F12 Exit

Step 12 Press ***F12*** to return to the Setup menu and press the ***Spacebar*** to change the save option to "Yes." Press ***F12*** to save the parameters and exit the Setup Menu.

The Wyse WY-325ES CRT has 10 color palettes numbered 0 to 9. To change the screen colors, hold down the ***CTRL*** key and press ***(a number)*** on the numeric keypad. The recommended color palette is *9*. Other palettes that work well are 1, 2, 3 and 8.

When you are finished configuring your terminal, reconnect the cable between the terminal and the elevator controller.

P.5.4 PRINTER SETUP

Printers are typically used to print a hard copy of system parameters, controller screens, or reports. MCE currently supports two Epson dot-matrix printers (Epson FX 85 and Epson LQ 570) and their equivalents. For nicer looking reports with the printer of your choice, MCE recommends using a PC connected to the controller. Central Monitoring System software or WYSE emulation software may be used to print screens from the PC. Contact the sales department at Motion Control Engineering for further information.

Step 1 Verify that the CRT terminal is connected to the MCE controller through the rear port labeled MAIN.

Step 2 Set the printer DIP switches as shown:

Parallel Printer DIP Switch Settings

PRINTER	EPSON FX 85		EPSON LQ 570	
SETTING	**ON**	**OFF**	**ON**	**OFF**
DIP SW1	6, 7, 8	1, 2, 3, 4, 5	1, 2, 3, 4	5, 6, 7, 8
DIP SW2	1	2, 3, 4		1, 2, 3, 4

Step 3 Connect the 25-pin male DB connector end of the parallel printer cable to the PARALLEL port on the back of the CRT terminal. Connect the other end of the parallel printer cable to the printer. Lock the clips on the connectors to secure the cable.

- Feed the paper through the paper guide and line up the perforation with the top of the print head. Refer to the printer manual for operation and proper care of the printer.
- Plug the printer into a 120VAC outlet and turn on power to both the CRT terminal and printer.

P.5.5 PRINTING SCREENS

After the printer is connected to the CRT, powered ON, and paper has been loaded, screen data may be printed:

Mono CRT Set the Function Keys as described in Section P.3 Step 9. To print, press the ***Print Screen Key***.

Color CRT If the Num Lock light is *ON* (upper right area of the keyboard) press the *Num Lock key* once, to turn it off. To print, hold down the ***SHIFT*** and ***CTRL*** keys at the same time and momentarily press "**.**" *(Period key)* on the numeric keypad.

P.6 WYSE WY-370 COLOR TERMINAL SETUP

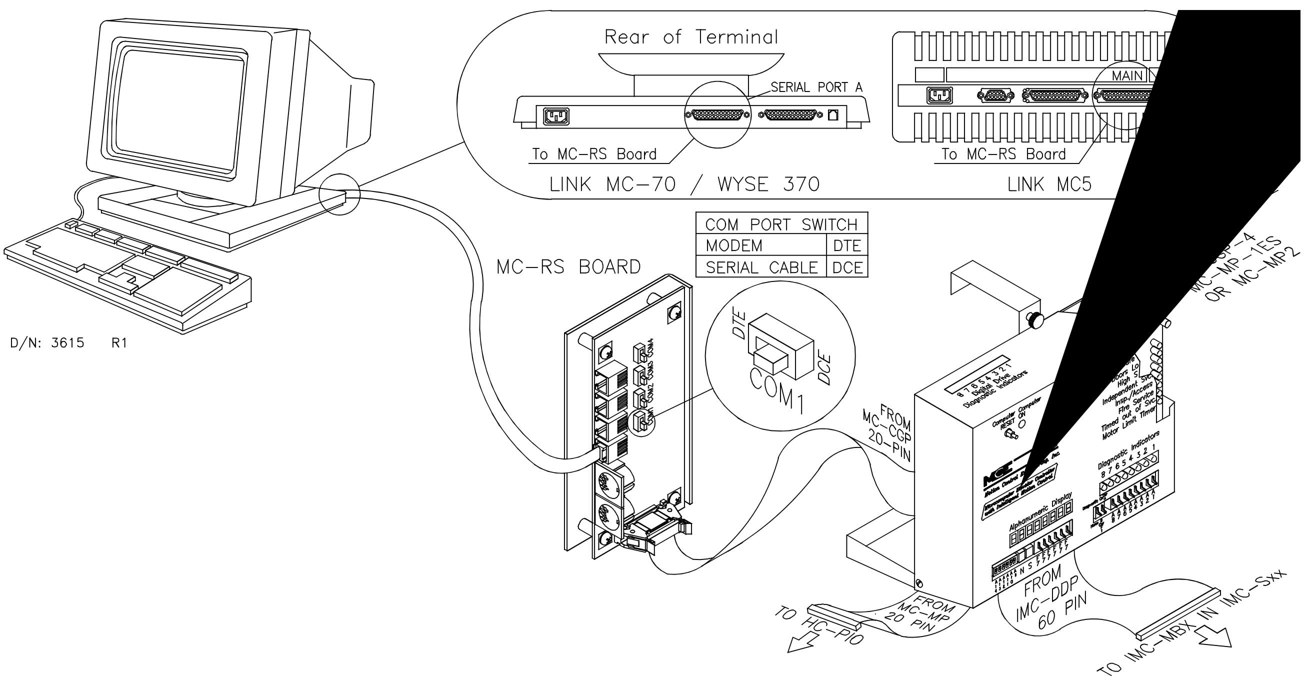
If you are using a Wyse WY-370 color terminal to configure the elevator controller, set the terminal up as described in this section.

P.6.1 CONTROLLER COM PORT SETTING (WYSE WY-370)

Swing Panel Controller - Refer to Section P.1.1 *Controller COM Port* Settings, or to *Programming the Communication Ports* in Section 5 of the Car Controller manual (Section 4 of the Group Supervisor manual) for instructions on viewing and changing the controller Communication Port settings. For the Wyse WY-370 color terminal the COM port ***Device*** option must be set to ***CRTCK*** (with keyboard) or ***CRTC*** (without keyboard).

PTC / PHC Controller - Refer to ***Peripheral Device*** in Section 5.4.9 Extra Features Menu Options for instructions on changing the controller Communication Port settings. For the Wyse WY-370 color terminal the ***COLOR CRT*** option must be set to ***YES***.

P.6.2 WYSE WY-370 COLOR TERMINAL CONNECTIONS



- Connect the DB-25 (25-pin plug) of the signal cable, C-CRT/MD/PA-x (x = length in feet) into the SERIAL PORT A jack on the rear of the terminal. Use the screws on the cable hood to secure the cable to the terminal.
- Plug the RJ-11 plug of the signal cable into a COM port jack (usually COM 1) on the controller's communication interface board (MC-RS or MC-PA).
- If the terminal is connected directly to the communication interface board, set the COM port switch to DCE. If the terminal is connected to the communication interface board through a modem or line driver, set the COM port switch to DTE.
- Connect the printer, if applicable, to the Serial Port B jack on the rear of the terminal.
- Connect the AC jack on the rear of the terminal to the controller's AC outlet using the cord supplied with the terminal.

P.6.3 WYSE WY-370 COLOR TERMINAL SETUP

Step 1 Press ***Select*** to put the terminal into Setup mode. The Select key is in the upper right corner of the keyboard. If you can't get the terminal into Setup mode, try powering the terminal ON with the "Select" key held down until the screen comes up (about 5 seconds).

- Press the left and right arrow keys to select items on the Menu Bar (top line).
- Press the up and down arrow keys to select an item on a menu.
- Press the space bar to change the setting

Step 2 From the Exit menu select "Default all" and press the ***Enter*** key. Press ***Y*** to confirm this action.

Set these quick-set parameters every time.

Set these if a Printer is attached.

Exit Screen Modes Display Attribute Port Keyboard

Exit setup
Exit setup and cancel
Exit setup and save
Restore last saved
Default all
Default user defined keys

Step 3 From the Screens menu, set the highlighted parameters as shown.

Exit Screens Modes Display Attribute Port Keyboard

Width change clear	On
Screen Columns	80
Screen data lines	50
page columns	132
Page lines	50/51
Page line multiplier	1
Number of pages	1
Number of sessions	1
Session display, split	1,Full
Power-on tab stops	Off
Tab stops	

Step 4 From the Modes menu select "Personality". From the Personality sub-menu select "Wyse 350."

Modes Display Attribute Port Keyboard

Feature lock	Off
Controls mode	Interprt
Received CR	CR
Received LF	LF
Block end	US/CR
Terminal mode	8 bit
Enhance	On
Null OK	Off
Del OK	Off
Send ACK	On
Bell settings	
Personality	

Personality
Wyse 370
VT320/VT220
VT100
VT52
Intecolor 220
Wyse 350
TVI 950
Esprit III
ADDS A2
TEK 4010/4014

Step 5 If you plan to use a printer, set "Enhance" and "Terminal mode" to the values shown (use the space bar to toggle).

Modes Display Attribute Port Keyboard

Feature lock	Off
Controls mode	Interprt
Received CR	CR
Received LF	LF
Block end	US/CR
Terminal mode	8 bit
Enhance	On
Null OK	Off
Del OK	Off
Send ACK	On
Bell settings	
Personality	

Step 6 From the “Port” menu, select “Port A settings” and press Enter. Set the Transmit baud rate as follows:

* IMC Car controller with MC-CGP board = 19,200
* Group or Car controller with MC-CPA board = 19,200
* Group controller with MC–CGP board = 19,200
* Line Driver = 9600
* Modem = 19,200

Press ***Shift-Up arrow*** when done.

Modes Display Attribute Port Keyboard

Port B Settings	
Baud Rate	9600**
Data/stop/parity bits	8/1 None
Receive handshake	Xon/Xoff
Transmit handshake	Xon/Xoff
Transmit limit	None
Break	250ms
Modem control	ASCII
Disconnect delay	Off

Communications mode	Full DPX
Online/local	Online
Trace	Both
Port A settings	
Port B settings	
Communication cartridge session resources	

Port A Settings	
Transmit baud rate	19,200*
Receive baud rate	Rcv=Xmit
Data/stop/parity bit	8/1None
Receive Handshake	Xon/Xoff
Transmit handshake	None
Transmit limit	None
Break	250 ms
Interface	RS-232C
Modem control	ASCII
Disconnect Delay	2 sec

Step 7 Do the following only **if you plan to attach a printer** to the terminal. From the “Port” menu select “Port B settings” and press Enter. Set the highlighted Port B Settings as shown. Press Shift-Up arrow when done.
** Printer port (Port B) : baud rate should always be 9600. Note: This port must be connected to a ***serial port*** on the printer.

Step 8 Return to the Exit menu. Select “Exit setup and save”. Press ***Enter*** and then ***Y*** for yes.

APPENDIX Q
POWERBACK R6 REGENERATIVE DRIVE

Q.1 GENERAL

The following information pertains to the POWERBACK R6 Regenerative Drive used with IMC-AC-R controllers.

Q.2 REGENERATIVE DRIVE INTERFACE

The following is an explanation of the POWERBACK R6 Regenerative Drive interface.

DRIVE INPUTS

- Drive Enable (Terminal 12): This input enables the R6 drive and puts the drive in standby mode. Drive parameter **ru. 0** reads **stby** during motoring condition and **Active** during deceleration/overhauling conditions. A voltage between drive terminals 12 & 17 of 18 VDC = ON, 0 V = OFF.

- Drive Reset (Terminal 13): This input resets an R6 drive fault. Pressing the Drive Reset button on the IMC-SI2 unit activates the reset input and clears regenerative drive faults. A voltage between drive terminal 13 & 17 of 18 VDC = ON, 0 V = OFF.

DRIVE OUTPUT

- Drive ready contact: The contacts between terminals 24 and 26 on the R6 drive remain closed under normal condition and open during a fault, which drops the RDY relay on the HC-ACI board. Pressing the Drive Reset button on the IMC-SI2 unit should clear the R6 drive fault and should turn ON the RDY relay.

POWER CONNECTIONS

- Make sure synchronization cable is connected between the commutation choke and the R6 drive.

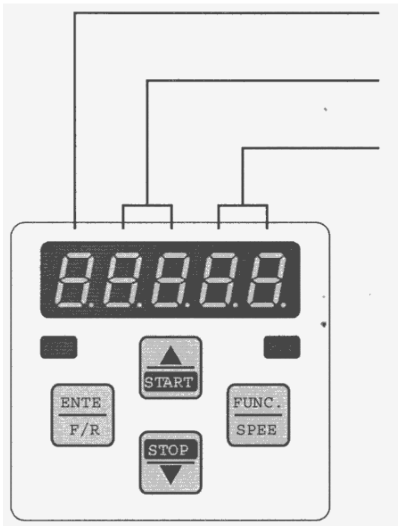
- The DC bus connections must be correct and according to the drawings. ***It is critical that DC bus connections be correct. Incorrect connections will damage the drive units.***

- The line inductor ground connection to the R6 Drive and F5 Drive must be completed according to the drawings.

HOW TO USE THE DRIVE KEYPAD

The R6 drive is delivered from the factory in the *Application* mode, which allows access to all parameters and functions available on the unit.

The display shows three types of information which define the parameter:



Parameter set

Parameter group

Parameter number

By pressing the FUNC button you can change between the displayed parameter and its value.

To select a different parameter use the ENTER button to toggle the flashing point to the right of the field to be changed. Then use the UP and DOWN buttons to scroll the desired value. Once the correct parameter information is displayed, the FUNC button can be pressed at any time to see the value of the parameter.

When displaying a parameter value, the value of the parameter can be changed by pressing the UP/DOWN buttons. Generally, these changes are immediately effective and permanently stored, meaning they remain stored after the unit is switched off. Confirming the input with ENTER is not necessary, with the exception of the parameters known as *Enter Parameters*.

Enter Parameter: For some parameters the value adjusted by UP/DOWN does not automatically become valid. These parameters are called Enter Parameters since they must be confirmed by ENTER. When pressing UP/DOWN only the display is changed but not the value stored in the R6. When the display value is different from the stored value in the R6, it is marked by a point in the display. By pressing ENTER the display value is stored in theR6 and the point is deleted. The displayed value of an Enter parameter always starts with the stored value.

ERROR MESSAGES

If a drive fault occurs during operation, the display is overwritten with an error message. Press ENTER to clear the error message.

NOTE: Pressing ENTER resets only the error message in the display. To reset the actual error and return the unit to normal operation, the cause of the error must be removed and a reset done on terminal 13, or power off reset.

Refer to the R6 drive manual for a listing of error messages.

TURN ON PROCEDURE

The Powerback R6 is initialized after connection of the main line supply. The power circuit identification is checked first. If an invalid power circuit is recognized, error E.PuCi (power unit check) is triggered and displayed in the operator. This error cannot be reset, the power circuit must be checked.

If a valid power circuit is recognized, the Powerback R6 changes into status "Syn". The following procedures take place one after another during this synchronisation phase:

- Verification of correct synchronisation to the line, (error E.nEt is triggered if the synchronization signals are missing)
- Verification of the phasing of the synchronization signals to the main line phases. Error E.Syn is triggered if a phase signal is missing or in case the phasing is not correct.
- The actual line frequency is determined. If the frequency is outside the set window the unit will trigger an E.FnEt fault.
- The unit is now ready for operation. If the enable (terminal I1) is activated, the Powerback R6 is put into operation. Depending on the actual value of the DC bus voltage, the Powerback R6 is in status rEgEn or Stdby.

Status Stdby - Powerback R6 detects the idle voltage level in the DC bus circuit of the connected frequency inverter (motor operation) and keeps the modulation signals of the regen unit deactivated.

Status rEgEn - If the DC bus voltage rises above 103% of the idle voltage (CP.9), the modulation signals are activated and the unit changes into regen operation. Alternately, if another R6 unit connected in parallel switches into rEgEn mode, the slave unit will immediately switch into regen mode simultaneously.

CP.34 Control Angle Parameter

This parameter adjusts the conduction angle during regen mode. The default value is 30.0 degrees. By lowering this value, the audible sound from the commutation choke can be reduced. The typical adjustment range is 25.0 to 30.0 degrees. Values higher than 36 can result in random E.OC errors. Values lower than 25 can limit the available regen power.

Troubleshooting		
Problem	**Cause**	**Solution**
During parallel operation, load sharing between units is not equal.	Can be caused by tolerances between the voltage circuit in the choke, the choke itself and the voltage sensing circuit in the R6 unit. As a result more current flows through that unit.	If the unit has version 1.3 software, lower the value of CP.34, on the unit with the highest load, in steps of 1.0, until the load between the two balances out.
Audible noise from the choke is too loud.	The default adjustment of the R6 unit allows for fast response and high peak capacity. This can lead to more audible noise from the choke. By reducing the commutation angle, it is possible to lower this sound.	If the unit has version 1.3 software, lower the value of parameter CP.34 from 30.0 to 26.0. Run the car at full load to make sure there are no issues running full load down.

PARAMETER SETTING / ADJUSTMENT

The R6 drive parameters listed in the Parameters Quick Reference are set at MCE and should not require field adjustments.

QUICK REFERENCE FOR POWERBACK R6 REGENERATIVE AC DRIVE PARAMETERS

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

All parameters should be set to the values shown below in the "Field/MCE Set" column.

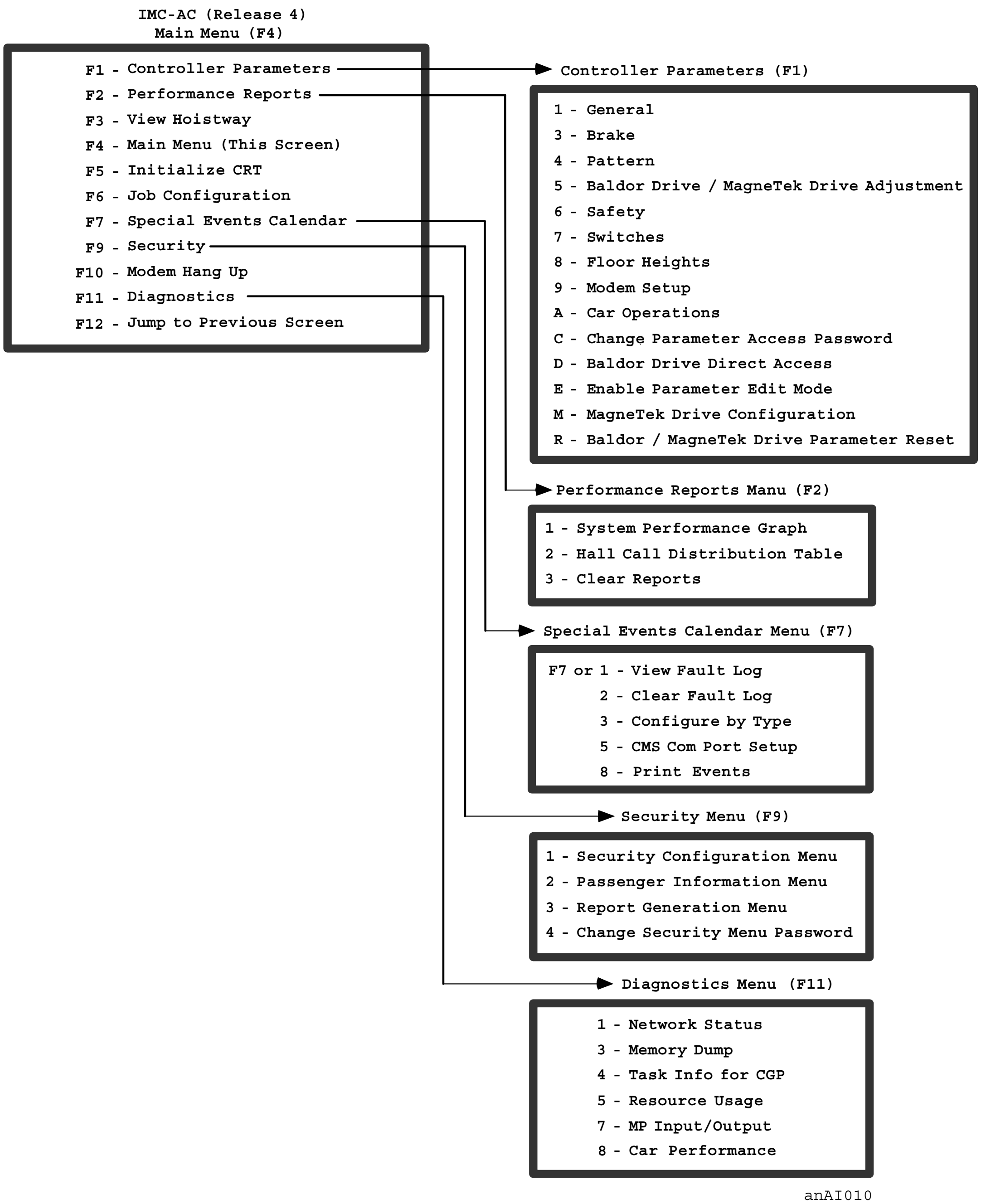
Operator Display	Parameter Description	Setting Range	Resolution	Field/MCE Set
CP. 0	Password	0 - 9999	1	---
CP. 1	Status display	---	---	---
CP. 2	Main Line Frequency	---	0.1 Hz	---
CP. 3	AC-Phase current L1	---	0.1 A	---
CP. 4	AC-Phase current L2	---	0.1 A	---
CP. 5	AC-Phase current L3	---	0.1 A	---
CP. 6	Actual Load	---	1%	---
CP. 7	Actual Load / peak value	---	1%	---
CP. 8	DC output current	---	0.1 A	---
CP. 9	Actual DC voltage	---	1 V	---
CP.10	DC voltage / peak value	---	1 V	---
CP.11	Heat sink temperature	---	1^{0}C	---
CP.12	Over load counter	---	1%	---
CP.13	Active power	---	0.1kW	---
CP.14	Total regen kWh counter	---	0.1kWh	---
CP.15	Total motor kWh counter	---	0.1kWh	---
CP.16	Total net kWh counter	---	0.1kWh	---
CP.17	Apparent power / Line input	---	0.1kVA	---
CP.18	Analog output 1/ amplification factor	-20.00...20.00	0.01	---
CP.19	DC bus switching level	+/- 30000.00	0.01	Set to 260 for 208 - 240Vac Set to 600 for 460 - 480Vac
CP.20	Auto error reset counter	0...10	1	3
CP.21	Last Error	---		---
CP.22	Last Error 1	---		---
CP.23	Last Error 2	---		---
CP.24	Last Error 3	---		---
CP.25	Last Error 4	---		---
CP.26	Last Error 5	---		---
CP.27	Last Error 6	---		---
CP.28	Last Error 7	---		---
CP.29	Software version	---		1.3
CP.30	Software date code	DDMM.Y		
CP.31	Power part ID code	---		250 for 208-240Vac 253 for 460-480Vac
CP.32*	Pulse off Level	-100kW...0.0kW	0.1kW	-0.8kW
CP.33*	Operating Mode 0: Master with Commutation Choke 2: Slave with Commutation Choke	0...3	1	Set to 0 for Main Regen Drive Set to 2 for Second Drive
CP.34*	Control Angle	0.0...60.0	0.1	29

* NEW PARAMETERS in software version 1.3

Job #:	
Prod. Order #:	
Drive Model #:	
Drive Serial #:	
Test Technician:	
Date:	

REFERENCE SECTION

FIGURE R.1 CRT Screen Menus Flowchart



NOTE: Generally the CRT screens shown in this section are the *Advanced View* screens. Press **Ctrl** + **V** to toggle between the Standard View and Advanced View screens. The Advanced parameters are displayed only on the Advanced View screens and are preceded by an asterisk (*).

NOTE: The following pages contain drawings of the IMC-AC CRT screens. The values shown are for reference only and ***should not be used for programming***.

FIGURE R.2 Main Menu screen

```
9/6/2000, 10:25:30 AM

Job #00-10000    EASTMAN KIDAK - BUILDING 820 - CAR 73    Simplex Car -A-

IMC-AC (Baldor) Car Controller (Release 4)

Main Menu (F4)

  F1 - Controller Parameters
  F2 - Performance Reports
  F3 - View Hoistway
  F4 - Main Menu (This Screen)
  F5 - Initialize CRT
  F6 - Job Configuration
  F7 - Special Events Calendar
  F9 - Security
 F10 - Modem Hang Up
 F11 - Diagnostics
 F12 - Jump to Previous Screen

MP v03.55    CGP-C v08.10    DDP v02.14
```

dnID250a

FIGURE R.3 Controller Parameters Menu (F1) screen

```
12/22/2000, 10:25:30 AM, F4=Main Menu

Controller Parameters (F1)

1 - General
3 - Brake
4 - Pattern
5 - Baldor Drive / MagneTek Drive Adjustment
6 - Safety
7 - Switches
8 - Floor Heights
9 - Modem Setup
A - Car Operations
C - Change Parameter Access Password
D - Baldor Drive Direct Access
E - Enable Parameter Edit Mode
M - MagneTek Drive Configuration
R - Baldor / MagneTek Drive Parameter Reset
```

dnID189a

FIGURE R.4 General Parameters (Shift F1) screen

```
                         7/14/2000, 10:25:30 AM, F4=Main Menu

                General (Shift F1) - Standard View (U.S.)

CNID   Car Network ID                                   Car-A
The Car Network ID identifies this controller to the Group Supervisor.

CNID  CAR-A          PRNT  None
                     
OPU   U.S.           DCOM  Com4
ODAP  OFF            ICOM  None
ODPC  OFF

TFMT  12 HOUR
TIME  10:25:30 A

DFMT  M/d/yyyy
DATE  7/14/2000

TP1   4
TP1S  00.00
TP2   6
TP2S  00.00

   ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View
                                                          dnID251c
```

TABLE R.1 General Parameters Defined

Controller Parameters

General (F1 - 1) or (Shift F1) Screen

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
CNID - Car Network ID	CAR -H	CAR-A	CAR-L			The Car Network ID identifies this controller to the Group Supervisor.
OPU - Parameter Units (U.S. / METRIC)	U.S.	U.S.	METRIC			OPU selects parameter units for the user interface. Example: to read speed in fpm, select OPU=U.S., and to read speed in m/s set OPU=METRIC.
ODAP - Default Advanced Parameters (ON/OFF)	OFF	ON	OFF			**CAUTION ! Setting ODAP to ON and saving will set the Advanced Parameters to their default values.** After saving is complete, ODAP will reset itself to the OFF position. NOTE: Advanced Parameters are preceded by an asterisk (*) and displayed only in the Advanced View. Press CTRL-V to toggle between Standard and Advanced view at any time.
ODPC - Reset CGP Parameters (ON/OFF)	OFF	ON	OFF			ODPC resets non-drive parameters to their default values. Depending on the type of controller, this may include: car labels, PI labels, COM port/modem settings, passenger security info, passwords, dispatcher settings, special event logs, and performance data. It does NOT affect drive settings. After saving is complete, ODPC will reset itself to the OFF position.

TABLE R.1 General Parameters Defined

Controller Parameters						
General (F1 - 1) or (Shift F1) Screen						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
TFMT - Time Display Format	24 Hour	12 Hour	24 Hour			Choose the Time Format you wish the CRT to display at the top of the screen. Options are 12 or 24 hour displays.
TIME - Current Time						Enter the current time in the format hh:mm:ss. You may specify AM or PM by typing an 'A' or 'P' after the time. If no 'A' or 'P' is typed then the time is assumed to be in 24 hour format. **NOTE: For multi-car groups, the current time must be entered on the Group Supervisor.**
DFMT - Date Display Format	M/d/yyyy	✳✳	✳✳			Choose the Date Format you wish the CRT to display at the top of the screen and on any generated reports. ✳✳(M/d/yyyy, M/d/yy, MM/dd/yy, MM/dd/yyyy, yy/MM/dd, dd-MMM-yy)
DATE - Today's Date						Enter the current month, date and year in the format MM/DD/YYYY. Even if the parameter DFMT specifies a different display format for date values (e.g. dd-MMM-yy), you must always use the format MM/DD/YYYY when entering dates from the keyboard. **NOTE: For multi-car groups, the date must be entered at the Group Supervisor.**
TP1 - Test Point 1	4	1	99			TP1 allows monitoring of a selected data signal, internal to the computer, at test point STP1 on the IMC-DAS board. See Table R.2, in the manual, for a list of possible assignments to these test points.
TP1S - Test Point 1 Scale						Not available on this software.
TP2 - Test Point 2	6	1	99			TP2 allows monitoring of a selected data signal, internal to the computer, at test point STP2 on the IMC-DAS board. See Table R.2, in the manual, for a list of possible assignments to these test points.
TP2S - Test Point 2 Scale						Not available on this software.
PRNT - Printer Attached to CRT	NONE	✪	✪			Specify the type of printer that is connected to the CRT and to be used for printing reports and screen captures. If no printer is attached, select NONE. If the printer you're using does not appear on the list of supported printers then chose Generic. ✪ NONE / GENERIC / DESKJET
DCOM - Drive Comport	NONE	✪✪	✪✪			Used on car controllers with Baldor, MagneTek, or other non-MCE drive units connected via one of the MC-RS board COM ports. DCOM specifies the comport to which the drive is connected. Set to NONE for an MCE System 12 drive. When a DCOM port is specified, any previous settings for that comport are ignored. ✪✪ COM1 - COM4 / NONE.
ICOM - IDS Comport	NONE	✪✪	✪✪			Normally this should be set to NONE. It is used only for systems which are to be monitored via the non-MCE “Lift-Net” software from Integrated Display Systems(IDS). Note: Set comport “switch” to DCE for IDS. ✪✪ COM1 - COM4 / NONE

TABLE R.2 *Software Test Point Assignment Table (see TP1/TP2 in Table R.1)*

TP1 / TP2	DESCRIPTION (signal at STP1/STP2 on the IMC-DAS board)
1	Raw pattern from pattern generator
2	Raw drive pattern
3	Pattern with gain (Pattern)
4	Pattern after acceleration/deceleration limiter (Processed pattern)
5	Speed feedback with gain (Raw speed feedback)
6	Speed feedback after filtering (Processed speed)
7	Speed with direction (Directionalized speed)
8	Error between pattern and speed feedback
9	Brake feedback current (Brake current)
10	Load Weigher after balance (LW - GBAL)
11	Pre-Torque

FIGURE R.5 *Brake (Shift F3) screen*

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                         7/13/2000,  10:25:30 AM, F4=Main Menu

                  Brake (Shift F3) - Advanced View (U.S.)

 OACF   AC Line Frequency (50/60)                       60 Hz

 OACF reflects the frequency of the power for the controller.  For example,
 Europe uses 50Hz while the United States uses 60Hz.  If this parameter is
 incorrect, the motor and brake output voltages will also be incorrect.

  OACF  60 Hz

  DBV   208
  DBR   015.00
  CBV   01.00
  BPV   125
  BHV   085
  BRV   100
 *BWV   250
  BRLD  0.01

  TBPD  0.00
  TBDD  0.00
  TBWD  0.00
  TBRD  1.00
  TSPD  0.00
  TRED  1.10

  TP1   4
  TP2   6

        ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View

                                                                 dnID253
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TABLE R.3 Brake Parameters Defined

Controller Parameters						
Brake (F1 - 3) or (Shift F3) Screen						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
OACF - AC Line Frequency (50/60)	60	50	60		Hz	OACF reflects the frequency of the power for the controller. For example, Europe uses 50Hz while the United States uses 60Hz. If this parameter is incorrect, the motor and brake output voltages will also be incorrect.
DBV - AC Voltage Reference	XX	25	500		Volts	Enter the brake AC Voltage Reference provided on the -D page of the job prints. Verify this voltage by measuring VAC between the tops of FB1 and FB2 fuses (or BPI1 and BPI2 if there is a transformer). An incorrect value for this parameter results in an incorrect brake output voltage.
DBR - Resistance	XX	1.00	999		Ohms	Enter the resistance of the brake. This value and the brake feedback current are used by the computer to calculate the brake voltage.
CBV - Calibration Factor	1.00	0.10	50.00			CBV calibrates the brake voltage displayed on the F3 screen. Enter the correct values for DBV and DBR before adjusting this parameter. Then adjust CBV until the Brake Voltage, on the F3 screen, is as close as possible to the voltage measured across B1 and B2 when direction is picked.
BPV - Pick Voltage	XX	005	500		volts	Enter the desired Brake Pick Voltage from the job print or the Brake used on this job.
BHV - Hold Voltage	XX	005	500		volts	After the Brake picks, the Brake Voltage will change from BPV to BHV. Set BHV = BPV, if not used. This is the brake “cooling” voltage.
BRV - Relevel Voltage	XX	005	500		volts	BRV is the desired releveling Brake Voltage. This voltage must be sufficient to reduce Brake pressure so the car can relevel under the brake. On gearless machines, it is important to partially reduce Brake pressure. Hence, BRV should be less than BPV, usually about 50%.
*BWV - Weakening Voltage	025	005	500		volts	BWV is used to smoothly pick the Brake when there is rollback. Set BWV = BPV, if not used.
BRLD - Voltage Decay Time	0.01	0.01	1.00		sec	A larger Voltage Decay Time will lead to a more gradual brake drop. **WARNING! Possibility of losing control of the car at the end of the run if TBDD and BRLD exceed TRED!**
TBPD - Pick Delay	0.40	0.00	2.00		sec	TBPD is the delay between when the Drive is enabled for a run and when the Brake Voltage is set to BPV.
TBDD - Drop Delay	0.00	0.00	1.00		sec	The Brake is not dropped for a short period of time, after a run is completed in order to allow the system to stop completely. **WARNING! Possibility of losing control of the car at the end of the run if TBDD and BRLD exceed TRED!**
TBWD - Weakening Delay	0.00	0.00	2.00		sec	TBWD determines how long Brake Voltage remains at BPV, Pick Voltage, before BWV, Weakening Voltage, is applied. This timer starts after pick delay (TBPD) expires. If there is no rollback, set TBWD = 0.00.
TBRD - Repick Delay	0.00	0.00	2.00		sec	TBRD determines how long Brake Voltage remains at BWV, Weakening Voltage, before BPV is reapplied. This timer starts after weakening delay (TBWD) expires. If there is no rollback, set TBRD = 0.00.
TSPD - Speed Pick Delay	0.60	0.00	1.20		sec	TSPD determines the time between when the brake voltage is applied and the pattern is applied to the system. This delay allows coordination of acceleration with the picking of brake. Adjust this parameter for minimum rollback without accelerating through the brake.
TRED - Run Enable	1.10	0.00	2.00		sec	TRED determines at what time the Run Enable relay is dropped after direction is removed. **WARNING! Possibility of losing control of the car at the end of the run if TBDD and BRLD exceed TRED!**
TP1 - Test Point 1	4	1	28			See Tables R.1 and R.2.
TP2 - Test Point 2	6	1	28			See Tables R.1 and R.2.

FIGURE R.6 Pattern (Shift F4) screen

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                        6/4/2003,  10:25:30 AM, F4=Main Menu

              Pattern (Shift F4) - Advanced View (U.S.)

 J1   Phase 1 Jerk                                   06.00      ft/s^3

 J1 determines how quickly the profile transitions from starting (A0) to
 maximum acceleration (A2). As J1 increases the sensation of movement during
 this phase is greater.

  J1    06.00     *VSR   075       VINH  050       *FRP   002.50
  J35L  04.00     *ASR   02.00     AIN   02.00     *FPP   002.50
  J35H  06.00     *DSR   03.00                     *FET   02.00
  J7    02.00                      VLR   035       *OET   OFF
 *A0    00.10      VRL   006       ALR   02.00     *GT    001.00
  A2    04.00      VCR   050                       *GTPC  000.00
  A6    03.75      ACR   02.00     PG    1.00      *GBAL  004.00
  VH    0500                       PZA   00.00
  VHL   024        VEQ   150      *PADL  07.00
  VIL   012        AEQ   02.00     GTC   1.00       TP1   06
  VFL   005        DEQ   03.00     GRS   01.00      TP2   04
  DL    03.00                     *GES   00.00
  DFL   00.36                     *MPI   100
                                  *MLI   06.00
                                  *MINT  100
                                  *MRSR  00.60
                                   MDTC  00.00
                                  *MPER  000
                                   NF    9

     ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View

                                                                dnID254b
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TABLE R.4 Pattern Parameters Defined

Controller Parameters						
Pattern (FI - 4) or (Shift F4) Screen						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
J1 - Phase One Jerk	06.00	01.00	15.00		ft/s³	J1 determines how quickly the profile transitions from starting (A0) to maximum acceleration (A2). As J1 increases the sensation of movement during this phase is greater.
J35L - Phase Three/ Five Jerk - High Speed	03.00	01.00	15.00		ft/s³	J3L determines how quickly the profile transitions from maximum (A2) to zero acceleration and from zero to maximum deceleration (A6). These transitions occur in phase 3 and 5 of the velocity profile.
J35H - Phase Three/ Five Jerk - One Floor Run	06.00	01.00	15.00		ft/s³	J35H determines how quickly the profile transitions from maximum (A2) to zero acceleration (peak velocity) and from zero to maximum deceleration (A6). These transitions occur in phases 3 and 5 of the velocity profile.
J7 - Phase Seven Jerk	02.00	01.00	15.00		ft/s³	J7 determines how quickly the profile transitions from maximum deceleration (A6) to the deceleration formed by the parameters VHL, VIL, and DL. As J7 increases, the profile transitions quicker between these two deceleration points and the sensation of movement is greater.
*A0 - Phase Zero Acceleration	00.10	00.01	01.00		ft/s³	A0 determines the starting acceleration for Phase One. Increasing A0 allows the elevator to leave a floor more quickly while maintaining the same J1 value. This compensates for sluggish rotating equipment.
A2 - Phase Two Acceleration	04.00	01.00	10.00		ft/s³	A2 determines the maximum acceleration the system will attain.

TABLE R.4 Pattern Parameters Defined

Controller Parameters

Pattern (F1 - 4) or (Shift F4) Screen

PARAMETERS		DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
A6	- Phase Six Deceleration	03.50	01.00	10.00		ft/s³	A6 determines the maximum deceleration that the system will attain.
VH	- Contract Velocity	500	50	2500		fpm	VH determines the maximum velocity that the elevator can attain when the hoist motor is rotating at rated rpm.
VHL	- High Leveling Velocity	024	001	050		fpm	VHL determines the velocity at which the elevator will begin a leveling approach to the destination floor.
VIL	- Intermediate Leveling Velocity	010	001	025		fpm	VIL determines the leveling approach pattern to a destination floor. Set VIL between VHL and VFL.
VFL	- Final Leveling Velocity	004	001	015		fpm	VFL determines the velocity at which the elevator will level into a floor.
DL	- Leveling Distance	03.00	00.12	06.00		inches	DL determines the leveling distance the elevator travels when transitioning from VHL, through VIL, to VFL velocity.
DFL	- Final Leveling Distance	00.36	00.12	06.00		inches	DFL determines how much stabilized leveling distance the elevator will travel before arriving at the destination floor.
*VSR	- Short Run Velocity	075	025	150		FPM	VSR determines the maximum velocity for a Short Profile. This profile is generated when a Normal Profile cannot accommodate a one-floor run.
*ASR	- Short Run Acceleration/ Deceleration	02.00	01.00	10.00		ft/s²	ASR determines the acceleration/deceleration and smoothing of the Short Run Profile. The value of this parameter determines how gently the pattern transitions between short to leveling velocity.
*DSR	- Short Run Leveling Distance	03.00	00.12	12.00		inches	DSR determines the distance at which the pattern begins to transition from short run velocity to leveling velocity.
VRL	- Releveling Velocity	006	001	015		fpm	VRL determines the velocity at which the elevator will relevel into the floor. Releveling occurs when direction is enabled with a leveling input active (LD or LU).
VCR	- Correction Velocity	050	005	150		FPM	VCR determines the maximum velocity for the Correction Profile. This profile brings the elevator to the next valid floor from a starting position between floors.
ACR	- Correction Acceleration/ Deceleration	02.00	01.00	10.00		ft/s²	ACR determines the acceleration/deceleration rate of the Correction profile filter. ACR determines how gently the pattern transitions between the correction and leveling velocity.
VEQ	- Earthquake Velocity	150	050	150		fpm	VEQ determines the maximum velocity for the Earthquake Profile generated when the earthquake input (EQI) is activated. The value of MINT must be at least 5 fpm less than the value of VEQ, i.e. if VEQ = 100, MINT = 95 or less.
AEQ	- Earthquake Acceleration/ Deceleration	02.00	01.00	10.00		ft/s²	AEQ determines the acceleration/deceleration rate and smoothing of the Earthquake Profile. If EQI is activated during a Normal run AEQ determines how gently the pattern will transition from current to Earthquake velocity. Otherwise, it determines how gently the pattern transitions from earthquake to leveling velocity.
DEQ	- Earthquake Leveling Distance	03.00	00.12	12.00		inches	DEQ determines the distance at which the pattern begins to transition from Earthquake Velocity to Leveling Velocity.
VINH	- Inspection Velocity - High	050	001	150		fpm	VINH determines the maximum velocity for the Inspection profile. The Inspection profile is generated when the car in on inspection and direction is picked.
AIN	- Inspection Acceleration	02.00	01.00	10.00		ft/s²	AIN determines the acceleration rate for the Inspection profile. AIN determines how gently the pattern transitions between zero speed and VINx.
VLR	- Learn Velocity	035	015	150		fpm	VLR determines the velocity used when the hoistway is learned. NOTE: During the learning process, the car slows down to leveling velocity when traveling across leveling targets.

TABLE R.4 Pattern Parameters Defined

Controller Parameters						
Pattern (F1 - 4) or (Shift F4) Screen						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
ALR - Learn Acceleration/ Deceleration	02.00	01.00	10.00		ft/s²	ALR determines the acceleration/deceleration rate of the Learn profile. ALR determines how gently the pattern transitions between leveling and learn velocity.
PG - Pattern Scaling	1.000	0.000	1.500			PG is used to scale the velocity profile. If PG = 0.000, the car will not move and zero pattern command is output. If PG = 1.000, the drive will follow the idealized velocity profile. **WARNING ! This gain must be set to 1.0 after all adjustments are completed.**
*PZA - Zero Pattern Adjust	00.00	-05.00	05.00			PZA is used to eliminate any speed offsets in SCR Controllers. PZA is not applicable to AC controllers.
PADL - Pattern Acceleration/ Deceleration Rate Limiter	07.00	01.00	15.00		ft/s²	PADL determines maximum rate of change in the pattern signal. This value establishes the emergency deceleration rate. A higher value will slow the car down faster in an emergency situation. PADL > STDR > A2 and A6.
GTC - Tach/Velocity Encoder Scaling	1.000	0.100	10.00			Adjust GTC to calibrate the Tach/Encoder velocity. GTC does not affect car speed. Set PG = 1.000 when calibrating this value.
*GRS - Rate Limited Stop	50.00 15.24	00.10 *0.030*	50.00 15.24		ft/sec^2 *m/s^2*	GRS determines the deceleration from leveling/releveling to zero speed when the elevator stops normally at a floor.
*GES - Electric Stop	00.00	00.00	50.00			GES determines the amount of reverse pulse applied to the current command to end a run, which enables an Electric Stop. If GES = 0.00, then there is no affect on the current command. **CAUTION ! If GRS is less than 5 ft/s^2, then this parameter may not be effective.** [NOTE: 1.0 ft/s^2 = 0.305 m/s^2]
*MPI - Pattern Interpolation	100	001	125			Normally MPI = 100. MPI determines the amount of smoothing applied to the pattern during slowdown. To observe the affect of MPI set STP1 = 1 (unprocessed pattern) and STP2 = 4 (processed pattern).
*MLI - Leveling Inhibit Distance	06.0	01.00	12.00		inches	When the distance to the destination floor is less than MLI and the INT relay is dropped, the MP will begin evaluating H, LD, LU, and DZ signals to determine when the car should physically stop.
*MINT -Leveling Inhibit Speed	100	025	250		fpm	When the car speed drops below MINT, the INT relay is dropped. This speed and MLI are used by the MP to verify that the car is not over-speeding when it approaches a destination floor. If the car is over-speeding, then the car is allowed to pass the destination floor and stop at the next available floor. MINT <= [VEQ - (5 fpm)]. NOTE: 5 fpm = 0.0254 m/s
MRSR - Rope Stretch Relevel Distance	00.60	00.00	03.00		inches	When the car is a distance greater than MRSR away from the door zone, the car will relevel into the floor.
*MDTC - Tracking Compensation Distance	00.00	-12.00	12.00		inches	MDTC is the maximum compensation distance used for a one-floor run to ensure that the leveling distance is equivalent to that of a multi-floor run that reaches contract speed, VH. If MDTC is positive, the leveling distance for a one-floor run is increased. If MDTC is negative, the leveling distance for a one-floor run is decreased.
MPER - Position Encoder Resolution	000	000	256		ppr	MPER indicates number of pulses per revolution (ppr) that the landing system position encoder generates. For LS-QUAD landing systems, set MPER=000.0 ppr; and for LS-QUIK, enter the ppr of the encoder (normally 25).
NF - Number of Floors	XX	2	63			Enter the number of valid landings. Include false floors as valid landings.
*FRP - Raw Pattern	002.50	01.00	99.00		Hz	FRP determines the raw pattern (desired speed) smoothing.
*FPP - Processed Pattern	005.00	01.00	99.00		Hz	FPP determines the processed pattern signal smoothing.
*FET - Tach/Velocity Encoder	002.00	01.00	99.00		Hz	FET determines the TACH/ENC signal smoothing. The recommended range for this parameter is 50 to 75 Hz.

TABLE R.4 Pattern Parameters Defined

Controller Parameters						
Pattern (F1 - 4) or (Shift F4) Screen						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
OTE - Pre-Torque Enable	OFF	OFF	ON			Set OTE = ON to activate FT, GTPC and GBAL. These parameters are used to adjust the pre-torque output.
*GT - Pre-Torque Gain	000.00	00.00	050.00			GT is only effective if OTE = ON. GT controls the amount of output voltage from the pre-torque function. Increasing this gain applies more voltage at takeoff and compensates for any rollback at the start of a run (only if a load weigher is installed).
*GTPC - Pre-Torque Position Compensation	000.00	00.00	50.00			GTPC is only effective if OTE = ON. GTPC controls the pre-torque output voltage based on car position.
*GBAL - Pre-Torque Balance	004.00	00.00	010.00			GBAL is only effective if OTE = ON. GBAL is adjusted to ensure no rollback of a balanced car at the top of the hoistway.
TP1 - Test Point 1	4	1	28			See Tables R.1 and R.2.
TP2 - Test Point 2	6	1	28			See Tables R.1 and R.2.

FIGURE R.7 Baldor Drive (Shift F5) screen

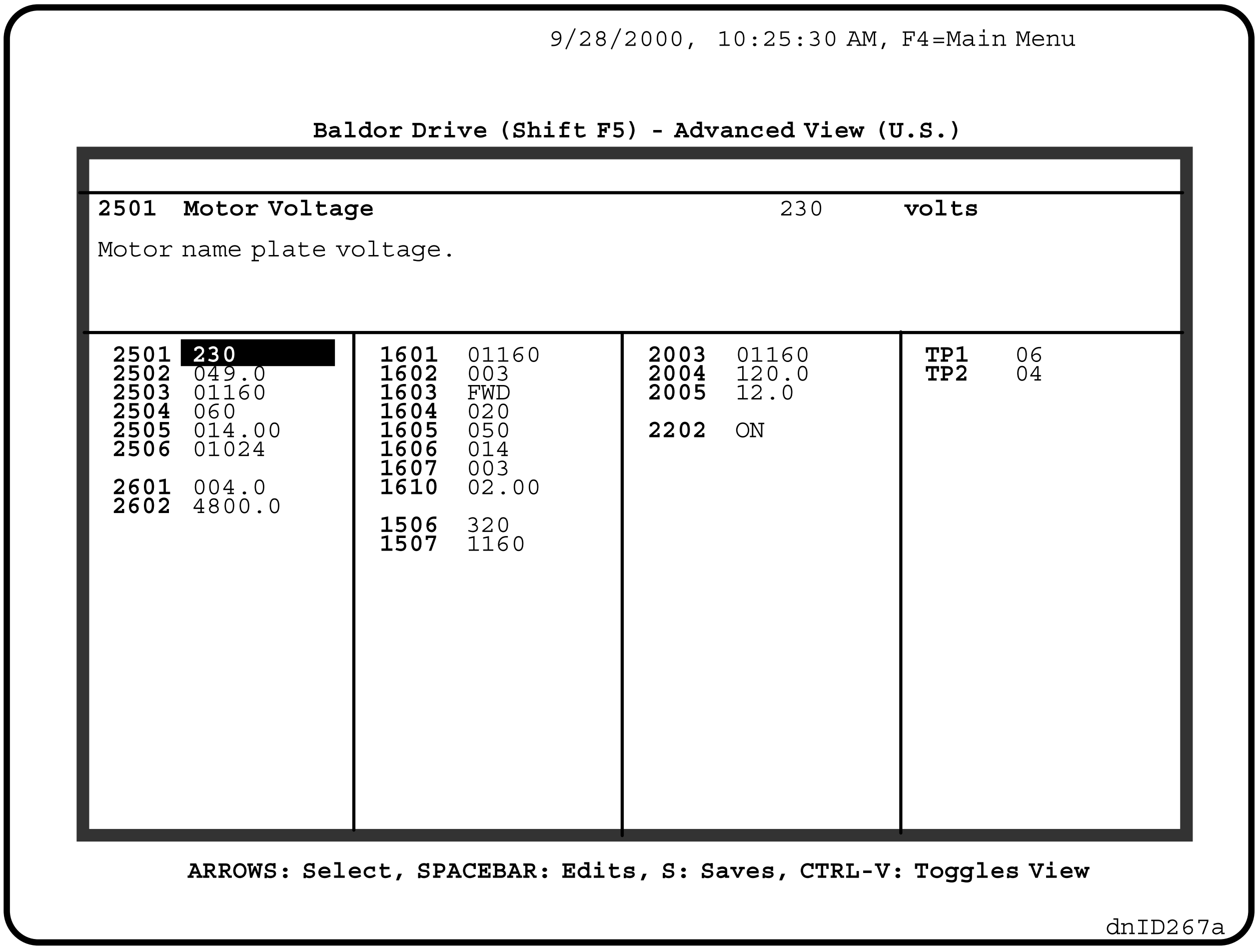

TABLE R.6 Baldor Drive Parameters Defined

Controller Parameters

Baldor Drive (F1 - 5) or (Shift F5) Screen

✳ Note: These values are job specific and must be verified according to the parameter sheet shipped with the controller.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
P2501 - Motor Voltage	✳ 000	0	999		volts	Set P2501 to the motor name plate voltage.
P2502 - Motor rated Amps	✳ 000.0	0	999.9		amps	Set P2502 to the motor name plate full-load current.
P2503 - Motor rated SPD	✳ 00000	0	Motor full load RPM		RPM	Set P2503 to the motor name plate full-load rpm. Do not change this parameter to achieve contract speed.
P2504 - Motor rated FREQ	✳ 000	0	500		Hz	Set P2504 to the motor name plate frequency.
P2505 - Motor Mag Amps	✳ 000.00	0	85% of Motor FLS		amps	Set P2505 to the motor name-plate no-load current or 30%-50% of motor full-load current (higher values help prevent rollback, but may cause jerky starts and stops.) P2505 also sets the motor voltage at contract speed provided that P1610 is correctly set. If the motor voltage is not within 5% of the motor name-plate voltage, decrease P1610 by 0.10 until it is.

TABLE R.6 Baldor Drive Parameters Defined

Controller Parameters

Baldor Drive (F1 - 5) or (Shift F5) Screen

✳ Note: These values are job specific and must be verified according to the parameter sheet shipped with the controller.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
P2506 - Encoder Counts	✳ 01024	0	65535		counts	Set P2506 to the encoder name plate pulses per revolution. MCE uses 1024 ppr encoders.
P2601 - Resistor Ohms	✳ 000	0	255		ohms	Set P2601 to the dynamic braking resistor value (in ohms) that is listed in the MCE parameter sheet shipped with the controller. If P2601 is set to an incorrect value the drive may be damaged.
P2602 - Resistor KW / watts	✳ 00000	0	360/ 32767		KW/ watts	P2602 is the wattage value of the dynamic braking resistor that is listed in the MCE parameter sheet shipped with the controller (KW for model ZD18HXXXLDEX/ watts for model ZD18HXXXL-EX.)
P1601 - Ctrl base speed	✳ 00000	0	Motor F.L. RPM		RPM	P1601 is the speed (in RPM) at which the drive output saturation voltage is reached. This value is automatically set by the drive unit based upon the motor information programmed into the control & the preset calculations are performed by the drive.
P1602 - Encoder filter	✳ 3	0	7			P1602 is the number of control microprocessor scans used to filter the encoder signal input to the control. This value is automatically calculated by the drive. Lower numbers will give smoother operation at lower speeds. Higher values may cause oscillation.
P1603 - Encoder align	Forward	For-ward	Reverse			P1603 sets the encoder's electrical direction of rotation to match the motor rotation.
P1604 - Current Prop gain	20		256			P1604 sets the current loop proportional gain. Do not change this value.
P1605 - Current Int gain	50		100			P1605 sets the current integral gain. Do not change this value.
P1606 - Speed prop gain	10	0	256			P1606 regulates how closely the car tracks the commanded pattern. Excessive proportional gain may cause overshoot and oscillation. The preferred setting is between 10 and 60 for model ZD18HXXXL-DEX and 10 and 40 for model ZD18HXXXL-EX.
P1607 - Speed Int gain	1	0	9.99			P1607 increases the low frequency gain and stiffness of the controller. Excessive integral gain may cause oscillation. This parameter helps hold a full-load car at zero speed after the brake is picked. The preferred setting is between 1.00 and 4.00.
P1610 - Slip Frequency	✳ 01.00	0	20			Verify P1610 in the field. The value entered for P1610 is based on the motor name-plate information given to MCE. (Refer to Table R.11, Baldor AC Drive Parameters for further details). F slip = Rated Freq - (Rated F.L. RPM x Number of Poles / 120)
P1506 - At speed band	✳ 100	0	1000		RPM	Set P1506 to 30% of the motor name-plate full-load rpm (FL rpm x 0.3). P1506 sets the speed tolerance of the set speed at which the At Speed output will turn OFF. Under normal conditions this output is always ON and it turns OFF if there is a following error fault in the drive.
P1507 - Set speed	✳ 00000	0	Motor full load RPM		RPM	P1507 sets the speed at which the At Speed output turns ON.

TABLE R.6 Baldor Drive Parameters Defined

Controller Parameters						
Baldor Drive (F1 - 5) or (Shift F5) Screen						
✳ **Note: These values are job specific and must be verified according to the parameter sheet shipped with the controller.**						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
P2003 - Max output speed	✳ 00000	0	Motor full load RPM		RPM	P2003 sets the maximum motor RPM to achieve contract speed when there is +/- 10 VDC pattern applied to the drive unit at high speed. P2003 should not exceed 105% of the motor full load RPM to achieve contract speed. The car will not run if P2003 is set to zero.
P2004 - PK current limit	✳ 000.00	0	PK drive rated AMPS		amps	Set P2004 to the maximum drive output current (in AMPS) that can be provided to the motor. The preferred setting is 260% - 300% of the motor full-load current.
P2005 - PWM frequency	12.5	1.0	16			P2005 sets the switching rate of the output power IGBTs. The preferred setting is 12.5 kHz. Values less than 8.0 KHZ might cause audible noise in the motor.
P2202 - External trip	ON	OFF	ON			If P2202= ON, the controller will shut down if the circuit tied to the External input (Drive terminal 16) opens.
TP1 - Test Point 1	4	1	28			See Tables R.1 and R.2.
TP2 - Test Point 2	6	1	28			See Tables R.1 and R.2.

FIGURE R.8 MagneTek Drive Adjustment (Shift F5) screen

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                         9/25/2000, 10:25:30 AM, F4=Main Menu

           MagneTek Adjustment (Shift F5) - Advanced View (U.S.)

P1  Contract Car Spd                          0000.0      ft/min
This parameter ses the elevator contract speed.

  P1   0000.1   *P26  0.10    *P63  3.00     *P95   80
  P2   1130.0   *P27  1.00    *P64  08.0     *P96   80
  P3   10.0      P28  250.0   *P65  08.0     *P97   00.0
  P4   02.00    *P29  250.0                   P98   230
  P5   02.0     *230  075     *P70  0000.0
  P6   100      *P31  00.0    *P71  0000.0    P110  MCE TEST
  P7   100.0    *P32  00.0    *P72  0000.0    P111  005.0
 *P8   00.0     *P33  01.0    *P73  0000.0    P112  460.0
 *P9   80       *P34  01.0    *P74  0000.0    P113  060.0
 *P10  0.20     *P35  005     *P75  0000.0    P114  006.80
 *P11  0.50     *P36  03      *P76  0000.0    P115  6
 *P12  0.00                   *P77  0000.0    P116  1130.0
 *P13  0.00     *P50  7.99    *P78  0000.0    P117  35.0
 *P14  125.0    *P51  7.99    *P79  0000.0   *P118  09.0
 *P15  1.00     *P52  00.0    *P80  0000.0   *P119  09.0
  P16  100.0    *P53  00.0    *P81  0000.0   *P120  01.5
  P17  01024    *P54  03.00   *P82  0000.0   *P121  00.5
  P18  10.0     *P55  03.00   *P83  0000.0   *P122  01.0
 *P19  1.00     *P56  00.0    *P84  0000.0   *P123  110
 *P2P  20.0     *P57  08.0                   *P124  060.0
 *P21  0.00     *P58  3.00    *P90  1.00     *P125  075
 *P22  1.00     *P59  3.00    *P91  0.30     *P126  000
 *P23  0.00     *P60  08.0    *P92  1.00      P127  050
 *P24  01.00    *P61  08.0    *P93  0.30
 *P25  0.00     *P62  3.00     P94  10.0

   ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View

                                                              dnID267
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TABLE R.7 MagneTek Drive Adjustment Parameters Defined

Controller Parameters

MagneTek Adjustment (F1 - 5) or (Shift F5) Screen

✳ Note: Parameters marked with an asterisk (✳) are job specific and must be verified according to the parameter sheet shipped with the controller.

CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
P1 - Contract Car Spd	✳ 0.1	0	3000		fpm	This parameter sets the elevator contract speed.
P2 - Contract Mtr Spd	✳ 1130	50	3000		rpm	This parameter sets the motor speed at elevator contract speed.
P3 - Response	✳ 10	1.0	20.0		rad/sec	This parameter sets the sensitivity of the speed regulator.
P4 - Inertia	✳ 2.0	0.25	50.00		sec	This parameter sets the system inertia.
P5 - Inner Loop Xover	✳ 2.0	0.1	20.0		Rad/sec	This parameter sets the inner speed loop crossover frequency. This is only used with the Ereg speed regulator.
P6 - Gain Reduce Mult	✳ 100	10	100		%	This parameter sets the percent of response of the speed regulator used when in the low gain mode.

TABLE R.7 MagneTek Drive Adjustment Parameters Defined

Controller Parameters

MagneTek Adjustment (F1 - 5) or (Shift F5) Screen

✳ Note: Parameters marked with an asterisk (✳) are job specific and must be verified according to the parameter sheet shipped with the controller.

CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
P7 - Gain Chng Level	✳ 100	0	100.0		%	This parameter sets the speed level at which the system changes to low gain mode. This is only enabled if the internal gain switch is enabled
P8 - Tach Rate Gain	0	0	30.0			This gain helps with the effects of rope resonance.
*P9 - Spd Phase Margin	80	45	90			This parameter sets the phase margin of the speed regulator (only with a PI speed regulator).
*P10 - Ramped Stop Time	0.20	0	2.50		sec	This parameter sets the time it takes to ramp torque from rated torque to zero. This time is only applied with the torque ramp down stop function.
*P11 - Contact Flt Time	0.50	0.10	5.00		sec	This parameter sets the amount of time the system waits before a contactor fault is logged.
*P12 - Brake Pick Time	0.00	0	5.00		sec	This parameter sets the amount of time the system waits before a brake pick fault is logged.
*P13 - Brake Hold Time	0.00		5.00		sec	This parameter sets the amount of time the system waits before a brake hold fault is logged.
*P14 - Overspeed Level	125.0	100.0	150.0		%	This parameter sets the percentage of Contract Car Speed at which and overspeed condition is detected.
*P15 - Overspeed Time	1.00	0	9.99		sec	This parameter sets the amount of time the system waits before an overspeed fault is logged.
P16 - Overspeed Mult	✳ 100	100	150		%	This parameter sets the percentage above Contract Car Speed at which the car should be run when performing an overspeed test.
P17 - Encoder Pulses	✳ 1024	600	10000		ppr	This parameter sets the number of encoder counts per revolution.
P18 - Spd Dev Lo Level	✳ 10	00.1	10.0		%	This parameter sets the range around the speed reference for speed deviation low logic output.
*P19 - Spd Dev Time	1.00	0	9.99		sec	This parameter sets the time delay before the speed deviation low logic output is true.
*P20 - Spd Dev Hi Level	20.0	0	99.9		%	This parameter sets the level at which the speed deviation alarm should be activated.
*P21 - Spd Command Bias	0.00	0	6.00		volts	This parameter sets the amount by which the actual speed command voltage is reduced to remove any offset in the signal.
*P22 - Spd CommandMult	1.00	0.90	3.00			This parameter sets the amount by which the analog speed command is scaled.
*P23 - Pre Torque Bias	0.00	0	6.00		volts	This parameter sets the amount by which the pre-torque command voltage is reduced to remove any offset in the signal.
*P24 - Pre Torque Mult	1.00	-10.00	10.00			This parameter sets the amount by which the analog speed command is scaled.
*P25 - Zero Speed Level	0.00	0	9.99		%	This parameter sets the threshold for zero speed logic output.
*P26 - Zero Speed Time	0.10	0	9.99		sec	This parameter sets the delay time before zero speed logic output is set to true.
*P27 - Up/Dwn Threshold	1.00	0	9.99		%	This parameter sets the threshold for detection of up or down direction.
P28 - Mtr Torque Limit	✳ 250.0	0	250.0		%	This parameter sets the motoring torque limit.
*P29 - Regen Torq Limit	250.0	0	250.0		%	This parameter sets the regenerating torque limit.
*P30 - Flux Wkn Factor	75	60	100		%	This parameter defines the torque limit at higher speeds.
*P31 - ANA 1 Out Offset	0.00	-99.9	99.9		%	This parameter sets the amount by which the analog output 1 voltage is reduced to remove any offset in the signal.

TABLE R.7 MagneTek Drive Adjustment Parameters Defined

Controller Parameters

MagneTek Adjustment (F1 - 5) or (Shift F5) Screen

✳ Note: Parameters marked with an asterisk (✳) are job specific and must be verified according to the parameter sheet shipped with the controller.

CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
*P32 - Ana 2 Out Offset	0.00	-99.9	99.9		%	This parameter sets the amount by which the analog output 2 voltage is reduced to remove any offset in the signal.
*P33 - Ana 1 Out Gain	1.0	0	10.0			This parameter sets the amount by which the analog output 1 is scaled.
*P34 - Ana 2 Out Gain	1.0	0	10.0			This parameter sets the amount by which the analog output 2 is scaled.
*P35 - Flt Reset Delay	5	0	120		sec	This parameter sets the time before a fault is automatically reset.
*P36 - Flt Resets/Hour	3	0	10		faults	This parameter sets the number of faults that are allowed to be automatically "reset in an hour.
*P50 - Accel Rate 0	7.99	0	7.99		f/s^2	This parameter sets acceleration rate #0.
*P51 - Decel Rate 0	7.99	0	7.99		f/s^2	This parameter sets deceleration rate #0.
*P52 - Jerk Rate 0	0.0	0	29.9		f/s^3	This parameter sets acceleration jerk rate in, acceleration jerk rate out, and deceleration jerk rate in #0.
*P53 - Lev Jerk Rate 0	0.0	0	29.9		f/s^3	This parameter sets leveling jerk rate (deceleration jerk rate out) #0.
*P54 - Accel Rate 1	3.00	0	7.99		f/s^2	This parameter sets acceleration rate #1.
*P55 - Decel Rate 1	3.0	0	7.99		f/s^2	This parameter sets deceleration rate #1.
*P56 - Jerk Rate 1	0.0	0	29.9		f/s^3	This parameter sets acceleration jerk rate in, acceleration jerk rate out, and deceleration jerk rate in #1.
*P57 - Lev Jerk Rate 1	8.0	0	29.9		f/s^3	This parameter sets leveling jerk rate (deceleration jerk rate out) #1.
*P58 - Accel Rate 2	3.00	0	7.99		f/s^2	This parameter sets acceleration rate #2.
*P59 - Decel Rate 2	3.00	0	7.99		f/s^2	This parameter sets deceleration rate #2.
*P60 - Jerk Rate 2	8.0	0	29.9		f/s^3	This parameter sets acceleration jerk rate in, acceleration jerk rate out, and deceleration jerk rate in #2.
*P61 - Lev Jerk Rate 2	8.0	0	29.9		f/s^3	This parameter sets leveling jerk rate (deceleration jerk rate out) #2.
*P62 - Accel Rate 3	3.00	0	7.99		f/s^2	This parameter sets acceleration rate #2.
*P63 - Decel Rate 3	3.0	0	7.99		f/s^2	This parameter sets deceleration rate #2.
*P64 - Jerk Rate 3	8.0	0	29.9		f/s^3	This parameter sets acceleration jerk rate in, acceleration jerk rate out, and deceleration jerk rate in #2.
*P65 - Lev Jerk Rate 3	8.0	0	29.9		f/s^3	This parameter sets leveling jerk rate (deceleration jerk rate out) #2.
*P70 - Speed Command 1	0	0	66%**		ft/m	This parameter sets multi-step command speed #1.
*P71 - Speed Command 2	0	0	16%**		ft/m	This parameter sets multi-step command speed #2.
*P72 - Speed Command 3	0	0	0		ft/m	This parameter sets multi-step command speed #3.
*P73 - Speed Command 4	0	0	25%**		ft/m	This parameter sets multi-step command speed #4.
*P74 - Speed Command 5	0	0	0		ft/m	This parameter sets multi-step command speed #5.
*P75 - Speed Command 6	0	0	91%**		ft/m	This parameter sets multi-step command speed #6.
*P76 - Speed Command 7	0	0	0		ft/m	This parameter sets multi-step command speed #7.
*P77 - Speed Command 8	0	0	100%**		ft/m	This parameter sets multi-step command speed #8.
*P78 - Speed Command 9	0	0	0		ft/m	This parameter sets multi-step command speed #9.
*P79 - Speed Command 10	0	0	0		ft/m	This parameter sets multi-step command speed #10.
*P80 - Speed Command 11	0	0	0		ft/m	This parameter sets multi-step command speed #11.

TABLE R.7 MagneTek Drive Adjustment Parameters Defined

Controller Parameters						
MagneTek Adjustment (F1 - 5) or (Shift F5) Screen						
✳ **Note: Parameters marked with an asterisk (✳) are job specific and must be verified according to the parameter sheet shipped with the controller.**						
CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.						
PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
*P81 - Speed Command 12	0	0	0		ft/m	This parameter sets multi-step command speed #12.
*P82 - Speed Command 13	0	0	0		ft/m	This parameter sets multi-step command speed #13.
*P83 - Speed Command 14	0	0	0		ft/m	This parameter sets multi-step command speed #14.
*P84 - Speed Command 15	0	0	0		ft/m	This parameter sets multi-step command speed #15.
*** The speed range is shown as a percentage of contract speed, but the values entered are in FPM. Any speed other then the defined values will trip the drive SET UP FAULT 6. To clear the fault, enter the correct parameter value and then reset the drive by pressing the reset button on the Computer Swing Panel. These parameters are not used on IMC-AC controllers.*						
*P90 - Id Reg Diff Gain	1.00	0.80	1.20			This parameter sets flux current regulator differential gain.
*P91 - Id Reg Prop Gain	0.30	0.20	0.40			This parameter sets flux current regulator proportional gain.
*P92 - Iq Reg Diff Gain	1.00	0.80	1.20			This parameter sets torque current regulator differential gain.
*P93 - Iq Reg Prop Gain	0.30	0.20	0.40			This parameter sets torque current regulator proportional gain.
*P94 - PWM Frequency	✳ 10.0	2.5	16.0		KHz	This parameter sets the carrier frequency.
*P95 - UV Alarm Level	80	80	99		%	This parameter sets the voltage level at which the undervoltage alarm should be triggered.
*P96 - UV Fault Level	80	50	88		%	This parameter sets the voltage level at which the undervoltage fault should be triggered.
*P97 - Extern Reactance	0	0	10		%	This parameter sets the external choke reactance.
P98 - Input L-L volts	✳	110	480		volts	This parameter sets the nominal line-line AC input voltage (RMS).
P110 - Motor ID	✳ MCE Test	✪	✪			This parameter sets the motor identification. ✪ 4 Pole DFLT, 6 Pole DFLT, MCE Test
P111- Rated Mtr Power	✳ 5.0	1.0	500		HP	This parameter sets the rated motor output power.
P112 - Rated Motor Volts	✳ 460	190	575		volts	This parameter sets the rated motor terminal RMS voltage.
P113 - Rated Excit Freq	✳ 60	5.0	400.0		Hz	This parameter sets the rated excitation frequency.
P114 - Rated Motor Curr	✳ 6.8	1.00	800.00		amps	This parameter sets the rated motor current.
P115 - Motor Poles	✳ 6	2	32			This parameter sets the motor poles.
P116 - Rated Mtr Speed	✳ 1130	50.0	3000.0		rpm	This parameter sets the rated motor speed at full load.
P117 - % No Load Curr	✳ 35.0	10.0	60.0		%	This parameter sets the percent no load current.
*P118 - Stator Leakage X	9.0	0	20.0		%	This parameter sets the stator leakage reactance.
*P119 - Rotor Leakage X	9.0	0	20.0		%	This parameter sets the rotor leakage reactance.
*P120 - Stator Resist	1.5	0	20.0		%	This parameter sets the stator resistance.
*P121 - Motor Iron Loss	0.5	0	15.0		%	This parameter sets the iron loss at rated frequency.
*P122 - Motor Mech Loss	1.0	0	15.0		%	This parameter sets the mechanical loss at rated frequency.
*P123 - Ovld Start Level	110	100	150		%	This parameter sets the maximum continuous motor current.
*P124 - Ovld Time Out	60	5	120		sec	This parameter sets the time that defines the motor overload curve.
*P125 - Flux Sat Break	75	0	100		%	This parameter sets the flux saturation curve slope transition point.
*P126 - Flux Sat Slope 1	0	0	200.0		PU slope	This parameter sets the flux saturation curve slope for low fluxes.
P127 - Flux Sat Slope 2	✳ 50	0	200.0		PU slope	This parameter sets the flux saturation curve slope for high fluxes.

FIGURE R.9 MagneTek Drive Configuration (F1, M) screen

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                                  12/22/2000, 10:25:30 AM, F4=Main Menu

               MagneTek Configuration (F1, M) - Advanced View (U.S.)

P140  Speed Command Src                              MULTI-STEP
This parameter ses the speed command source.

*P140  MULTI-STEP    *P159  NONE          *P190  SPD CMMAND
*P141  EXTERN TBL                         *P191  FDBACKRR
*P142  INTERNAL      *P170  DRIVE ENBL
*P143  ELEV SPD RR   *P171  RUN           *P204  U.S.
 P144  FWD           *P172  UP/DWN
*P145  RG RELEASE    *2173  FLT RESET
*P146  NONE          *P174  STP RF B0
*P147  NONE          *P175  STP RF B1
*P148  NOT LTCHED    *P176  STP RF B2
*P149  EXTERN TB1    *P177  STP RF B3
*P150  EXTERN TB1    *P178  S-CURVE S0
*P151  EXTERN TB1
*P152  INTERNAL      *P180  SPD DEV LW
*P153  NONE          *P181  SPD DEV LW
*P154  INTERNAL      *P182  SPD RG RLS
*P155  NONE          *P183  FAULT
*P156  EXTERN TB1    *P184  FAULT
*P157  DISABLE       *P185  SPD RG RLS
*P158  DISABLE

   ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View
                                                              dnID268
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TABLE R.8 MagneTek Drive Configuration Parameters Defined

Controller Parameters

MagneTek Configuration (F1 - M) Screen

CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.

PARAMETERS	DEFAULT VALUE	VALUE RANGE	USER ADJ.	UNIT	DESCRIPTION
*P140 - Spd Command Src	Analog Input	Analog, Serial, Multi-Step			This parameter sets the speed command source.
*P141 - Run Command Src	External TB1	External TB1, Serial			This parameter sets the run command source.
*P142 - Hi/lo Gain Src	Internal	External TB1, Serial, Internal			This parameter sets the source of the high/low gain transition switch.
*P143 - Speed Reg Type	Elev Spd Reg	Elev spd reg, PI speed reg External reg			This parameter chooses the type of speed regulator.
*P144 - Motor Rotation	✳ Forward	Forward, Reverse			This parameter allows the user to reverse the direction of motor rotation.
*P145 - Spd Ref Release	Reg release	Reg release, Brake Picked			This parameter determines when the speed reference release is asserted.
*P146 - Cont Confirm Src	None	None, External TB1			This parameter determines if an external logic input is used for contactor confirm.
*P147 - PreTorque Source	None	None, Serial, Analog input			This parameter determines if a pre-torque command is used. If a pre-torque command is used then it determines the source of the pre-torque command.
*P148 - PreTorque Latch	Not Latched	Latched, Not latched			This parameter determines if analog pre-torque is latched.

TABLE R.8 MagneTek Drive Configuration Parameters Defined

Controller Parameters

MagneTek Configuration (FI - M) Screen

CAUTION! Use Standard View for AC drive adjustments. If saving Advanced View parameters is required, place the car on Inspection as it may take 1 minute.

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
*P149 - PTtorq Latch Clck	External TB1	Serial, External TB1				This parameter determines the source of pre-torque latch control (if used).
*P150 - Fault Reset Src	External TB1	Serial, Automatic, External TB1				This parameter determines the fault reset source.
*P151 - Overspd Test Src	External TB1	Serial, External TB1				This parameter determines the external logic source used to trigger an overspeed test.
*P152 - Brake Pick Src	Internal	Serial, Internal				This parameter determines the source of the brake pick command, if the drive controls the mechanical brake.
*P153 - Brake Pick Cnfm	None	None, External TB1				This parameter determines whether or not a logic input is used for brake pick confirm.
*P154 -Brake Hold Src	Internal	Serial, Internal				This parameter determines the source of the brake hold command, if the drive controls the mechanical brake.
*P155 - Ramped Stop Sel	None	None, Ramp on stop				This parameter chooses between using a normal stop and a torque ramp down stop.
*P156 - Ramp Down En Src	External TB1	Serial, Run logic, External TB1				This parameter determines the source that triggers a torque ramp down stop (if used).
*P157 - Brake Pick Flt Ena	Disable	Enable	Disable			This parameter enables or disables the brake pick fault.
*P158 - Brake Hold Flt Ena	Disable	Enable	Disable			This parameter enables or disables the brake hold fault.
*P159 - Ext Torq Cmd Src	None	None	Serial			When parameter P143 is set to EXTERNAL REG, this parameter sets the source of the torque command. This determines where the output of the external speed regulator (a torque command) should be connected into the HPV.
*P160 - Dir Confirm Ena	Disable	Enable	Disable			This parameter confirms proper analog signal polarity when it is set to Enable and a logic input is programmed to Run UP or Run Down.
*P170 - Log In 1 TB1-1	Drive Enable					This parameter sets Terminal 1 to a function.
*P171 - Log In 2 TB1-2	Run					This parameter sets Terminal 2 to a function.
*P172 - Log In 3 TB1-3	Up/Dwn					This parameter sets Terminal 3 to a function.
*P173 - Log In 4 TB1-4	Fault Reset					This parameter sets Terminal 4 to a function.
*P174 - Log In 5 TB1-5	No Func					This parameter sets Terminal 5 to a function.
*P175 - Log In 6 TB1-6	No Func					This parameter sets Terminal 6 to a function.
*P176 - Log In 7 TB1-7	No Func					This parameter sets Terminal 7 to a function.
*P177 - Log In 8 TB1-8	No Func					This parameter sets Terminal 8 to a function.
*P178 - Log In 9 TB1-9	No Func					This parameter sets Terminal 9 to a function.
*P180 - Log Out 1 TB1-14	Ready to Run					This parameter sets Terminal 14 to a function.
*P181 - Log Out 2 TB1-15	Speed Dev Low					This parameter sets Terminal 15 to a function.
*P182 - Log Out 3 TB1-16	Speed Reg Rls					This parameter sets Terminal 16 to a function.
*P183 - Log Out 4 TB1-17	Fault					This parameter sets Terminal 17 to a function.
*P184 - Relay Coil 1	Fault					This parameter sets Relay 1 to a function.
*P185 - Relay Coil 2	Speed Reg Rls					This parameter sets Relay 2 to a function.
*P190 - Ana Out 1 TB1-33	Speed Cmd					This parameter sets Terminal 33 to a function.
*P191 - Ana Out 2 TB1-35	Speed Feedbk					This parameter sets Terminal 35 to a function.
*P204 - Units Selection	English	English, Metric				This parameter sets the units for parameters.

FIGURE R.10 Safety (Shift F6) screen

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                                9/28/2000, 10:25:30 AM, F4=Main Menu

                    Safety (Shift F6) - Advanced View (U.S.)

OBT   Buffer Test (ON/OFF)                                 OFF
When OBT = ON, it automatically turns OFF after one run is completed. OBT
allows a Contract Speed Buffer Test to be performed with most of the safety
circuit bypassed. The car operates at contract speed on Inspection
operation.

 OBT   OFF

 STE   050
*MILO  150

*SETM  010
 STDR  07.00
 STSS  01.00

 TP1   6
 TP2   4

        ARROWS: Select, SPACEBAR: Edits, S: Saves, CTRL-V: Toggles View

                                                                 dnID256a
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TABLE R.9 Safety Parameters Defined

Controller Parameters

Safety (FI - 6) or (Shift F6) Screen

PARAMETERS	DEFAULT VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
OBT - Buffer Test	OFF	ON	OFF			When OBT = ON, it automatically turns OFF after one run is completed. OBT allows a Contract Speed Buffer Test to be performed with most of the safety circuit bypassed. The car operates at contract speed on Inspection operation.
STE - Maximum Speed Error	025	001	100		%	STE adjusts amount of error permitted between voltage from TACH/ ENC and pattern voltage. When STE=100%, a 10VDC error is allowed between the TACH/ENC and pattern voltages. If excessive error is detected, TE flag will be highlighted on the F3 screen, and the FLT relay is dropped if the fault bypass jumper is not connected.
*MILO - Inspection/ Leveling Trip Speed	140	050	150		fpm	MILO determines the speed that will cause the elevator to shut down in the event of an overspeed condition during Inspection or Leveling operation.
*SETM - ETS Safety Margin	10	0	100		%	After learning the car speed at UETS and DETS this percentage will be added to the learned value to avoid nuisance tripping at the switches. The recommended range for this parameter is 5 - 10%.
STDR - Terminal/Danger Slowdown Rate	07.00	01.00	25.00		ft/s^2	STDR determines the deceleration rate for a Terminal/Danger profile.
STSS - Terminal Slowdown Smoothing	01.00	00.10	05.00		hz	STSS limits the jerk rate allowed during a transition to/from the deceleration rate--as specified by STDR.

FIGURE R.11 Switches (Shift F7) screen

7/13/2000, 10:25:30 AM, REC, F4=Main Menu

Switches (Shift F7) - Advanced View (U.S.)

Switch	**Description**	**Learned Velocity SAF**	**Learned Velocity DDP**	**Learned Position DDP**
UNT1	Up Normal Slowdown 1........	0483 fpm	0483 fpm	363'50.16"
UNT2	Up Normal Slowdown 2........	0475 fpm	0475 fpm	366'05.97"
UNT3	Up Normal Slowdown 3........	0380 fpm	0380 fpm	369'00.00"
UNT4	Up Normal Slowdown 4........	0290 fpm	0290 fpm	372'00.00"
UNT5	Up Normal Slowdown 5........	0200 fpm	0200 fpm	375'01.25"
DNT1	Down Normal Slowdown 1......	0485 fpm	0485 fpm	015'11.27"
DNT2	Down Normal Slowdown 2......	0475 fpm	0475 fpm	013'00.26"
DNT3	Down Normal Slowdown 3......	0380 fpm	0380 fpm	009'07.35"
DNT4	Down Normal Slowdown 4......	0290 fpm	0290 fpm	006'01.95"
DNT5	Down Normal Slowdown 5......	0200 fpm	0200 fpm	003'06.26"
UETS	Up Emergency Slowdown	0475 fpm	0475 fpm	370'02.52"
DETS	Down Emergency Slowdown	0475 fpm	0475 fpm	005'01.77"

***** VIEW ONLY MODE ***   ARROWS: Select, CTRL-V: Toggles View**

dnID257

TABLE R.10 Switch Parameters Defined

Controller Parameters						
Switches (FI - 7) or (Shift F7) **Screen**						
PARAMETERS	PRESET VALUE	VALUE RANGE		USER ADJ.	UNIT	DESCRIPTION
Switch UNTx - Learned Velocity UETS - Learned Velocity DNTx - Learned Velocity DETS - Learned Velocity					ft/min	The Learned Velocity is the car's velocity at the time each Normal Terminal and Emergency Terminal switch was activated during the learn procedure described in Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches.
Switch UNTx - Learned Position UETS - Learned Position DNTx - Learned Position DETS - Learned Position					ft, in	The Learned Position is the car's position at the time each Normal Terminal and Emergency Terminal switch was activated during the learn procedure described in Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches.

FIGURE R.12 Floor Heights (Shift F8) screen

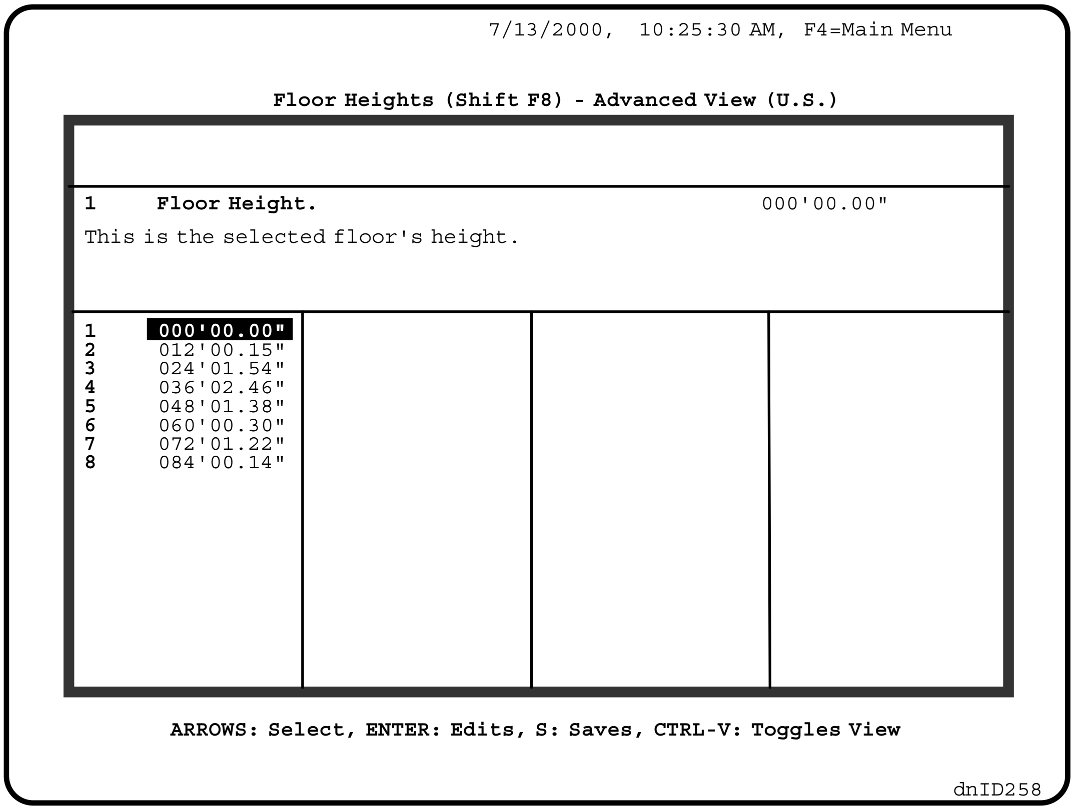


FIGURE R.13 Modem Setup (F1, 9) screen

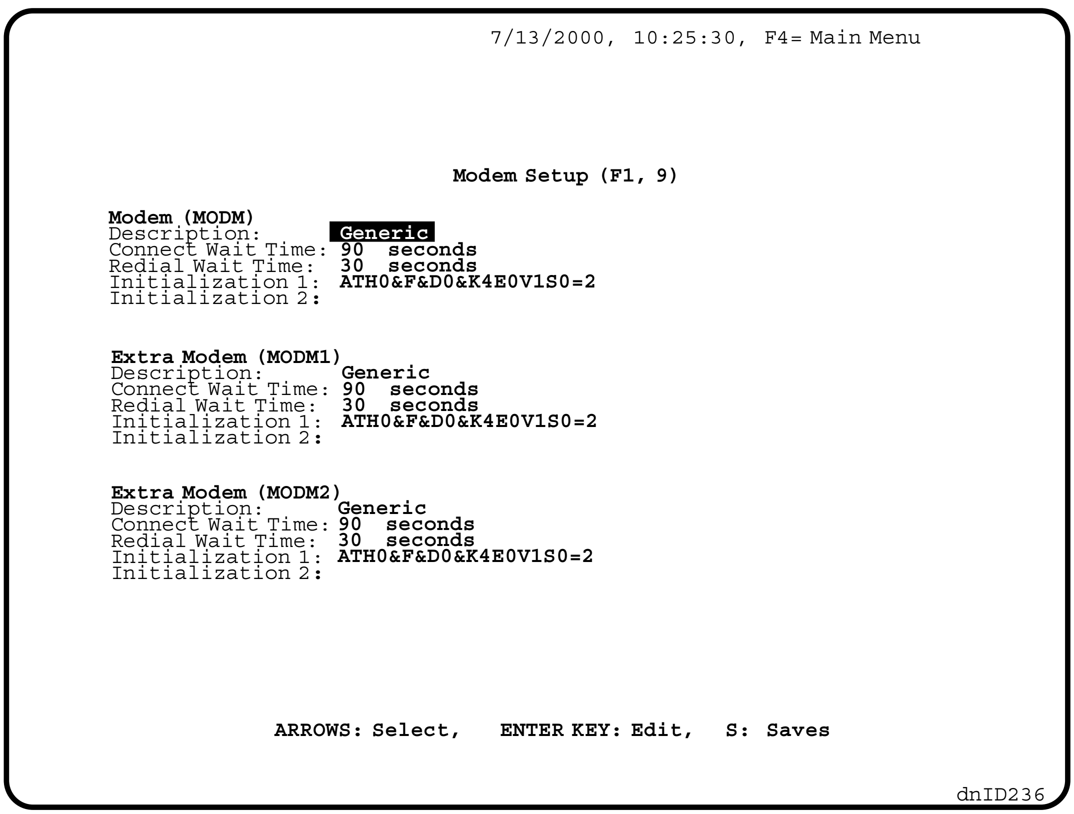


FIGURE R.14 Car Operations (F1, A) screen

12/20/2000, 10:25:30 AM, F4= Main Menu

Car Operations (F1, A)

Adjustable Car Timers

CAR # ------------->	A	
Short Door Time......	**1**	Sec
Car Call Time........	**2**	Sec
Hall Call Time......	**4**	Sec
Lobby Open Time......	**6**	Sec
MG Shutdown Time. . .	**OFF**	Min
Timed Out of Service.	**40**	Sec

Calculated Car Times

CAR # ------------->	A	
Door Open Time......	**1.4**	Sec
Door Close Time......	**2.1**	Sec
Deceleration Time...	**4.0**	Sec
Through Time........	**1.7**	Sec

ARROWS: Select, +,-: Edits, S: Saves

dnID241

FIGURE R.15 Change Parameter Access Password (F1, C) screen

7/13/2000, 10:25:30, F4= Main Menu

Change Parameter Access Password (F1, C)

Enter Current Password: **(none)**
Enter New Password:
Confirm New Password:

dnID262

FIGURE R.16 Performance Reports Menu (F2) screen

4/7/1999, 10:25:30 AM, F4=Main Menu

Performance Reports Menu (F2)

1 - System Performance Graph
2 - Hall Call Distribution Table
3 - Clear Reports

dnID224

FIGURE R.17 Performance Reports (F2, 1) - System Performance Graph screen

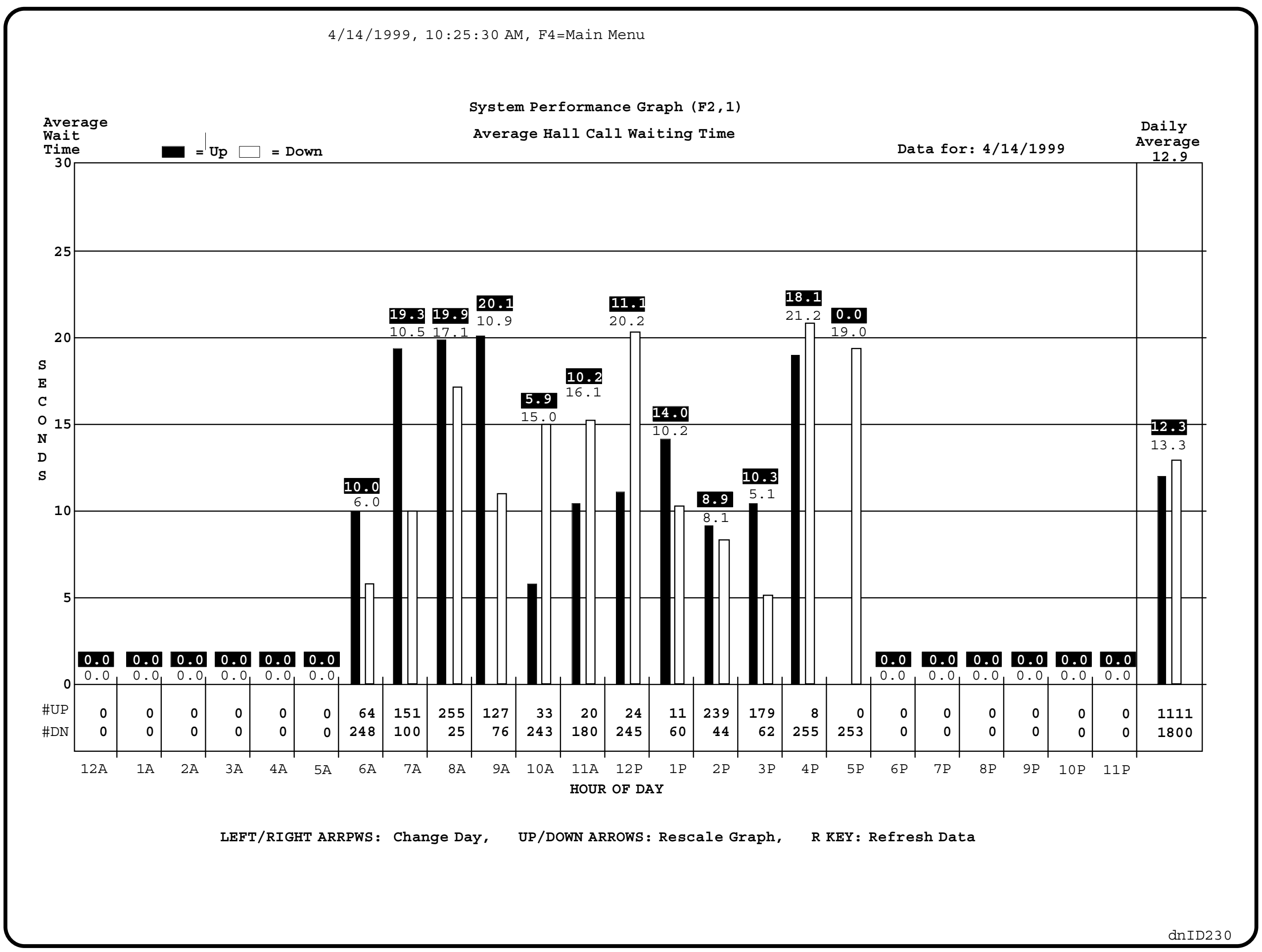


FIGURE R.18 Hall Call Distribution Table (F2, 2) screen

4/14/1999, 10:25:30 AM,F4=Main Menu

Hall Call Distribution Table (F2,2)

Flr	Up Call Wait Time 0-15	16-30	31-45	46-60	61-75	76-90	91+ Sec	Total Up	Down Call Wait Time 0-15	16-30	31-45	46-60	61-75	76-90	91+ SEC	Total Down	Total Up+Dn
6	5	...	...	...	...	...	...	5	7	...	...	...	...	...	...	5	12
5	7	...	...	...	...	...	...	7	9	...	...	...	...	...	...	7	16
4	12	2	1	...	...	...	...	15	18	3	2	...	...	...	...	12	33
3	9	...	...	...	...	...	...	9	9	...	...	...	...	...	...	9	18
2	3	...	...	...	...	...	...	3	11	...	...	...	...	...	...	3	14
1	8	...	...	...	...	...	...	8	6	...	...	...	...	...	...	8	14
B	2	...	...	...	...	...	...	2	4	...	...	...	...	...	...	2	6
Tot	46	2	1	...	...	...	...	49	64	3	2	...	...	...	...	69	118
%	94	4	2	...	...	...	...	100	93	5	2	...	...	...	...	100	100

Car:	A	B	C	D	E	F	G	H	Average
% Time In Group:	100	100	100	100	100	100	100	25	95%

Selected Hour: 11AM

+/-: Change Hour, UP/DOWN ARROWS: View Additional Floors

dnID231

FIGURE R.19 View Hoistway (F3) screen

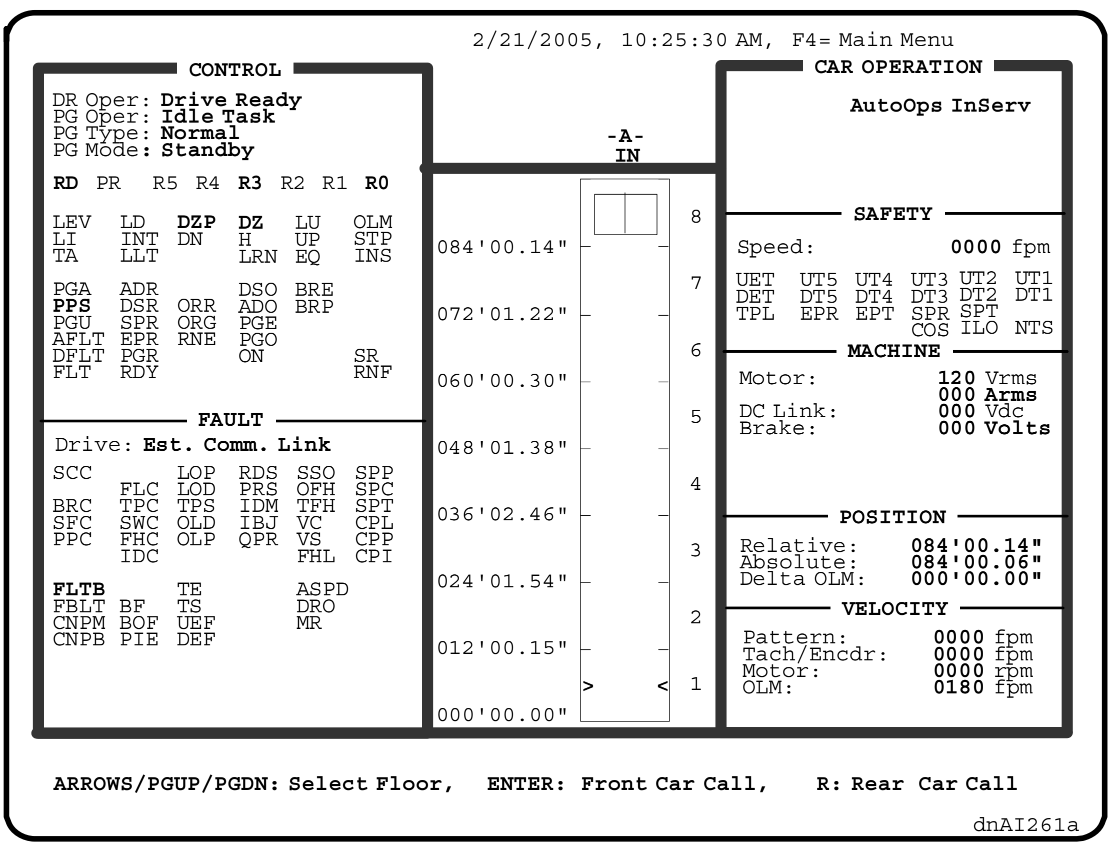


FIGURE R.20 Job Configuration (F6) screen

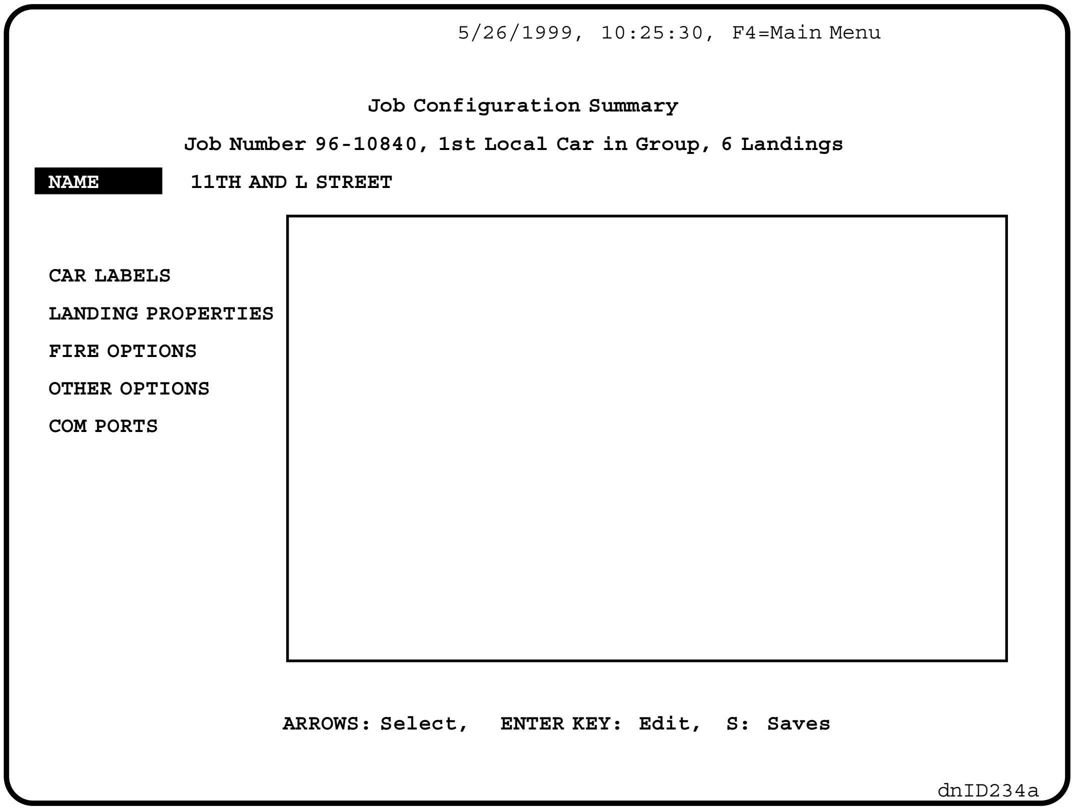


FIGURE R.21 Job Configuration (F6) - Car Labels screen

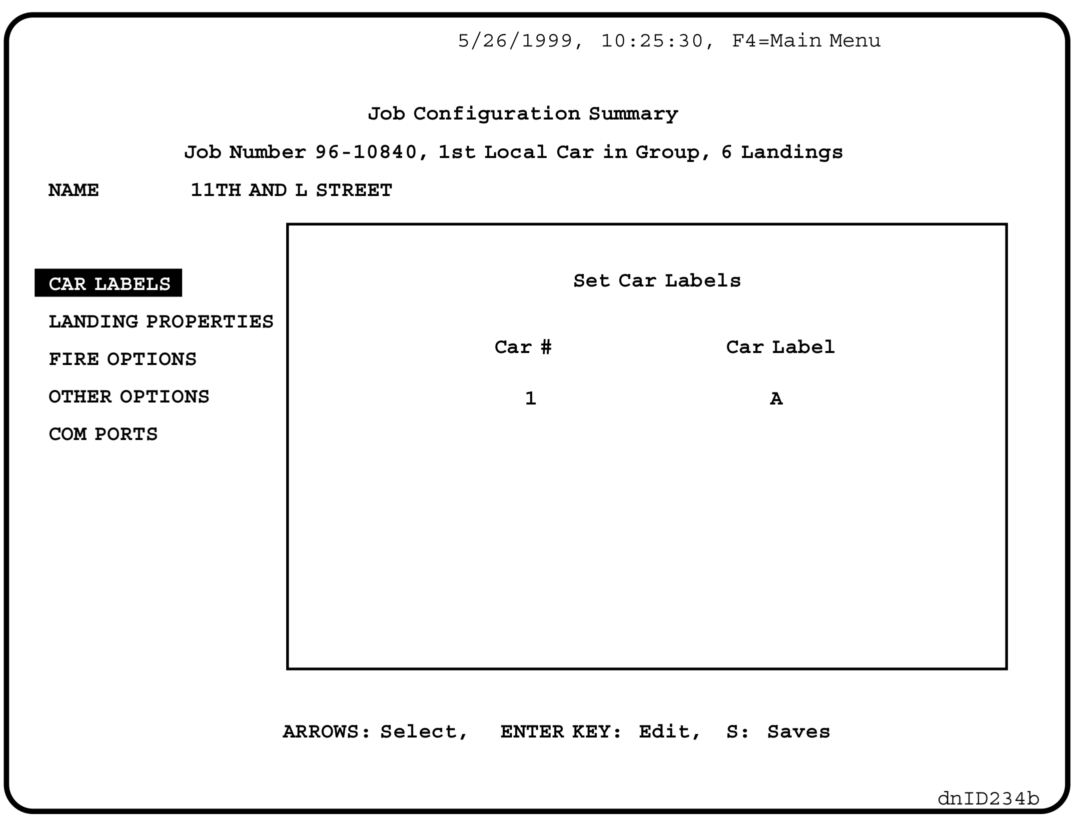


FIGURE R.22 Job Configuration (F6) - Landing Properties screen

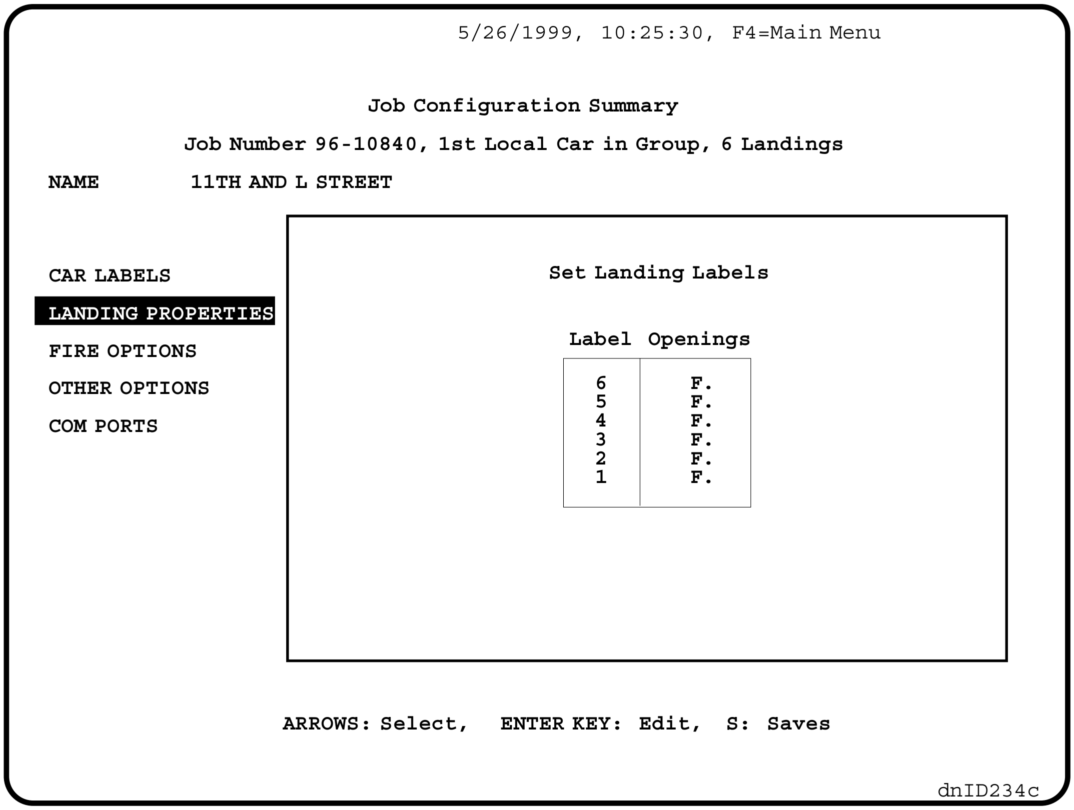


FIGURE R.23 Job Configuration (F6) - Fire Options screen

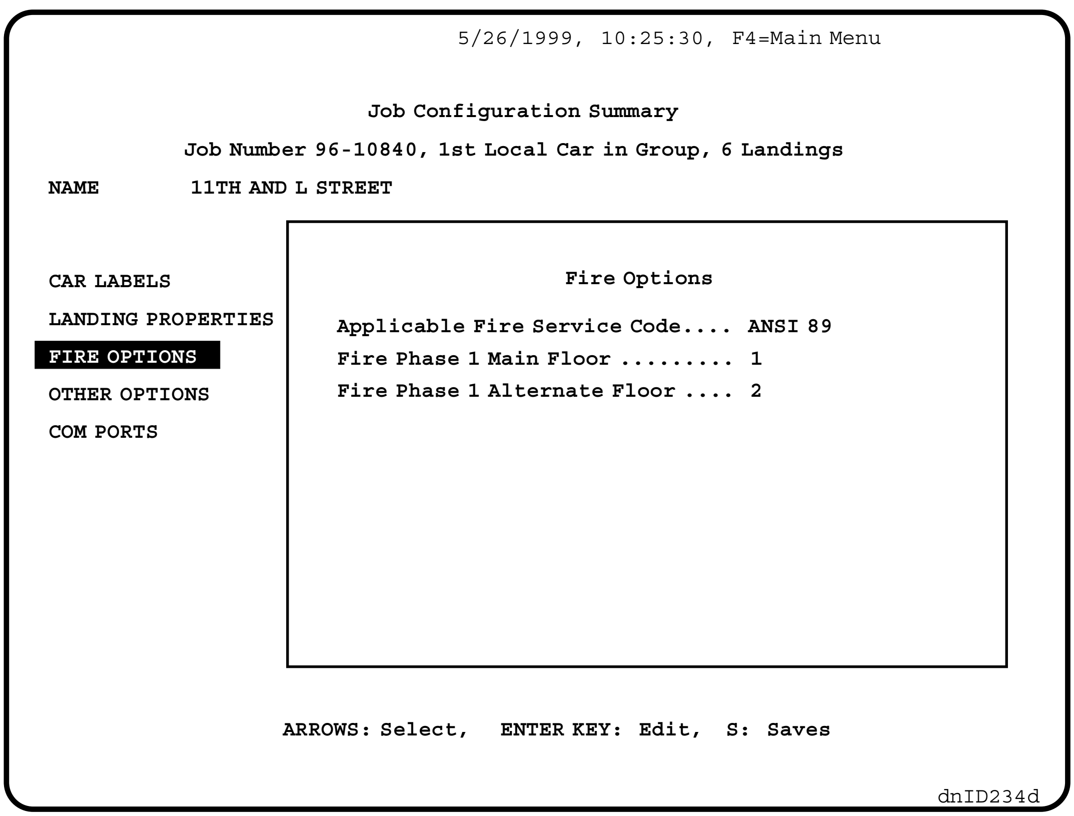


FIGURE R.24 Job Configuration (F6) - Other Options screen

5/26/1999, 10:25:30, F4=Main Menu

Job Configuration Summary

Job Number 96-10840, 1st Local Car in Group, 6 Landings

NAME 11TH AND L STREET

CAR LABELS
LANDING PROPERTIES
FIRE OPTIONS
OTHER OPTIONS
COM PORTS

Other Options

Hospital
Nudging
Earthquake
Heavy Load Weigher
Light Load Weigher
Hall Gongs
Hall Lanterns
Car Lantern

ARROWS: Select, ENTER KEY: Edit, S: Saves

dnID234e

FIGURE R.25 Job Configuration (F6) - Com Ports screen

5/26/1999, 10:25:30, F4=Main Menu

Job Configuration Summary

Job Number 96-10840, 1st Local Car in Group, 6 Landings

NAME 11TH AND L STREET

CAR LABELS
LANDING PROPERTIES
FIRE OPTIONS
OTHER OPTIONS
COM PORTS

Com Port Settings

Com	Device	Media	Baud
1	**Standard CRT (CRTxK)**	**Serial Cable (SCBL)**	19200
2	---	---	---
3	---	---	---
4	---	---	---

ARROWS: Select, ENTER KEY: Edit, S: Saves

dnID234f

FIGURE R.26 Special Events Calendar Menu (F7) screen

```
12/10/2002, 10:25:30 AM, F4=Main Menu

Special Events Calendar Menu (F7)

F7 or 1 -  View Fault Log
      2 -  Clear Fault Log
      3 -  Configure by Type
      5 -  CMS Com Port Setup
      8 -  Print Events

dnID209
```

FIGURE R.27 Special Events Calendar (F7, 1) or (F7, F7) screen

```
9/26/2000, 10:25:30 AM,   F4=Main Menu

Special Events Calendar (F7, F7)

STATUS                   SPEED (ft/Mmin)    VOLTAGE (volts)    CURRENT (amps)
Direction   : N/A        Command  : N/A     Armature : N/A     Armature : N/A
High Speed  : N/A        Tach/Enc : N/A     Motor Fld: N/A     Command  : N/A
Start Floor: N/A         Terminal : N/A     Brake    : N/A
Stop Floor  : N/A        Safety   : N/A
Step Floor  : N/A        Pattern  : N/A     SENSOR (volts)     POSITION (ft)
Switch      : N/A                           Motor Fld: N/A     Absolute : N/A
PI          : 7                             Brake    : N/A
Event Code  : 0x12 ( Operation, Communication )

This event indicates that the DNTx switch opened prematurely or it did not open
at the expected learned position. The car will run at correction speed in the
down direction or at normal speed in the up direction. This fault triggers a
Drive Fault 2, which automatically clears if the failure is corrected.

DATE          TIME           DESCRIPTION

2/14/2000     10:05:28 AM    Sub-System (s)Reset
2/15/2000     10:07:37 AM    In Car Stop Switch
               2:36:18 PM    Position Error at DNT1
2/16/2000      2:36:20 PM    Brake Output Circuit Failure
               4:26:44 AM    Lost Door Lock During Run

ARROWS: Move Cursor, HOME: Oldest, END: Newest,  CTRL-T: Troubleshoot
dnID208d
```

FIGURE R.28 Special Events Calendar - Troubleshooting (F7, 1, Ctrl + T) screen

2/16/2000, 10:25:30 AM, F4= Main Menu

Special Events Calendar Troubleshooting Tips

2/15/2000, 2:36:18 PM, **Position Error at DNT1**

--The learning process must be completed initially or any time modifications are made to the location of one of the DNTx switches (see Section 4.10, Learning the Normal (NTS) and Emergency (ETS) Limit Switches).
--Physicaly check the integrity of the switch.
--If there is a faulty input, check for a defective:
1. SCR RI board.
2. IMC-DIO board.

ESC or CTRL-T: Special Events Calendar

dnID248c

FIGURE R.29 Special Events Calendar - Configure by Type (F7, 3) screen (CMS)

9/27/2000, 10:25:30, F4= Main Menu

Special Events - Configure by Type (F7, 3)

The Log checkbox controls which events are logged to the Special Events Calendar. CHECK this box if you want to enable the event type specified by this row to be logged to the Special Events Calendar. If the log checkbox is UNCHECKED then events of this type will never be logged. Unchecking this box will automatically disable the CMS and DT (if present) checkboxes.

Log	CMS	Process	Event Description	1 of 171
X	.	DDP	+15V Power Supply Failure	
X	.	DDP	AC Drive Hardware Fault	
X	.	DDP	AC Drive Not Ready	
X	.	DDP	AC Drive Software Fault	
X	.	DDP	AC Phase Failure	
X	.	Operation	Alarm - No Car Movement	
X	.	Operation	Alarm - No Door Zone	
X	.	DDP	At Speed Fault	
X	.	Operation	Both USD and DSD Are Open	
X	.	Operation	Bottom Floor Demand	
X	.	DDP	Brake Failure	
X	.	DDP	Brake Output Circuit Failure	
X	.	Operation	Car Call Bus Fuse Blown	
X	.	Operation	Car Out of Service with Doors Locked	
X	.	Operation	Car Out of Service without Doors Locked	
X	X	Operation	Car Safefy Device Open	
X	X	Communication	CMS Emergency Dial Out Unsuccessful	
X	X	Communication	CMS Emergency Transmission Unsuccessful	
X	X	Baldor Drive	Co-processor Failure - Baldor Drive	
X	.	Operation	Contactor Proofing Redundancy Failure	

ARROWS: Select, ENTER KEY: Edit, S: Saves

dnID239c

FIGURE R.30 CMS Com Port Setup (F7, 5) screen

```
                              12/28/1999, 10:25:30, F4= Main Menu



                          CMS Com Port Setup (F7, 5)

     Emergency Transmission Switch: YES

     Maximum Number of Attempts: 4

     Com  Device  Media  Transimit Emergencies on This Port?
     ---  ------  -----  --------------------------------
     1    CRTxK   SCBL   ---
     2    CRTxK   MODM   ---
     3    CMS     SCBL   YES
     4    CMS     MODM   YES


     Phone  Dial  Number
     -----  ----  --------------------------
     1      YES   555-5555
     2      NO    666-6666
     3      NO
     4      NO



          ARROWS: Select,   ENTER KEY: Edit,   S: Saves

                                                              dnID237
```

FIGURE R.31 Event Calendar Print Setup (F7, 8) Screen

```
                              12/19/2002, 10:25:30, F4= Main Menu




                    Event Calendar Print Setup (F7, 8)

                       Print Range: ALL EVENTS

                       Start Date:  -- N/A --
                         End Date:  -- N/A --

                       Events Per Page:  8




      ARROWS: Select Item,   +/- KEYS: Change Value,   P: Print

                                                              dnID272
```

FIGURE R.32 Security Menu (F9) screen

```
2/17/1999, 10:25:30 AM, REC, F4=Main Menu

Security Menu (F9)

1 - Security Configuration Menu
2 - Passenger Information Menu
3 - Report Generation menu
4 - Change Security Menu Password

dnID211
```

FIGURE R.33 Diagnostics Menu (F11) screen

```
9/18/2002, 10:25:30 AM, F4=Main Menu

Diagnostics Menu (F11)

1 - Network Status
3 - Memory Dump
4 - Task Info for CGP
5 - Resource Usage
7 - MP Input/Output
8 - Car Performance

dnID227c
```

FIGURE R.34 Diagnostics - Network Status (F11, 1) screen

5/27/1999, 10:25:30, F4= Main Menu

Network Status (F11, 1)

Controller	**Online**	**Success Rate**
Car A	**YES**	**100%**

dnID233a

FIGURE R.35 MP Input/Output (F11, 7) screen

7/19/2000, 10:25:30 AM, F4=Main Menu

MP Diagnostic Input/Output Flags

20	DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
21		DC	UC	CC			DHO	DOI
22	DCF	DCP	DOF	LOT		HTC	CCT	SDT
23			HSEL	CSB	DCC	NUDG		DSHT
24	INT	FRA	FCS	FRS	DNS	UPS	STD	STU
25			HLW	HLI			**FWI**	
26	LFP	UFP						
27			EQI	IND	IN		DEL	YSIM
28	LLW	DLK		DZORDZ			PK	LLI
29	DNDO	LD		DDP	UPDO	LU		UDP
2A	DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B	TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
2C		STC	SAF	**HCR**	**HCDX**	**CCD**	ISV	ISRT
2D					**FRM**			FRC
2E	SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F	HLD		EQA	ATSF		ECRN	CD	EPR

dnID265

FIGURE R.36 Controller Memory Diagnostic Display (Shift F11 or F11, 3) screen (BIP Calibration)

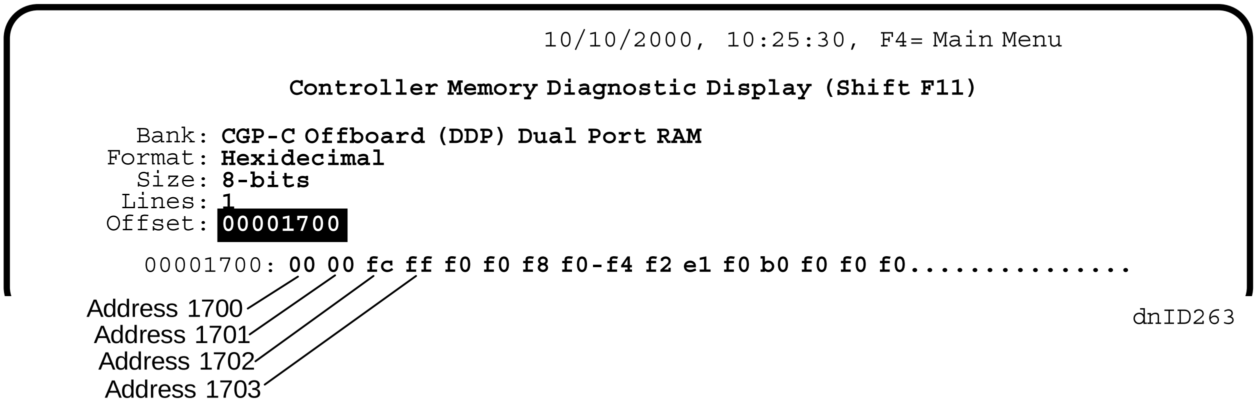


FIGURE R.37 Car Performance Graph (F11, 8) Screen

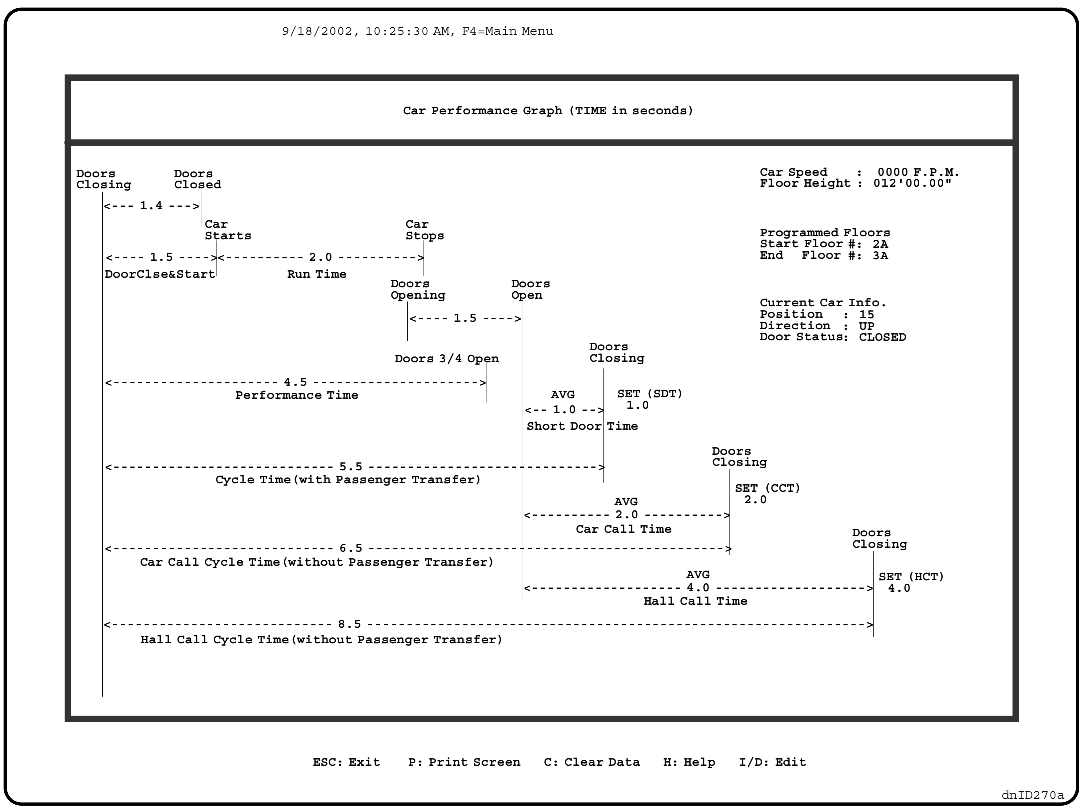


FIGURE R.38 Car Performance Report (F11, 8) Screen

```
                              9/18/2000, 10:25:30 AM, REC, F4=Main Menu

                     Car Performance Report (F11, 8)

     Start Floor #: 2A                    Car Speed    :  0000 F.P.M.
     End   Floor #: 3A                    Floor Height :  012'00.00"

  Door Close Time (DCT):                              1.4  Car @ Flr:  12
  Doors Start Closing - TO-  Doors Closed                  Car Dir.:   UP
                                                           Dar Door:   OPEN
  Door Close & Car Start Time (DT):                   1.5
  Doors start Closing -TO- Car Stops

  Run Time (RT):                                      2.0
  Car Starts -TO-Doors Open

  Door Open Time (DOT):                               1.5
  Doors Start Opening -TO- Doors Open

  Performance Time (PT):                              4.5
  DT + RT + (1/2 * DOT)

  Cycle Time (CT):                                    5.0
  Doors Start Closing -TO- Doors Open

  Average Short Door Dwell Time (SDT):   1            1    5.5
  Cycle Time (with Passenger Transfer):
  CT + SDT

  Average Car Call Dwell Time (CCT):     2            2    6.5
  Car Call Cycle Time (wighout Passenger Transfer):
  CT + CCT

  Average Hall Call Dwell Time (HCT):    4            4    8.5
  Hall Call Cycle Time (without Passenger Transfer):
  CT + HCT

  Up/DN Arrow: Select  +/-: Change Value  C KEY: Clear  PKEY: Print Screen
                                                                  dnID271a
```

Car Performance - The Car Performance Graph (F11, 8) and Car Performance Report (F11, 8, H) screens on the preceding page provide car performance data including:

- Door Close Time (DCT)
- Door Close & Car Start Time (DT)
- Run Time (RT)
- Door Open Time (DOT)
- Performance Time (PT)
- Cycle Time (CT)
- Average Short Door Dwell Time (SDT)
- Average Car Call Dwell Time (CCT)
- Average Hall Call Swell Time (HCT)

NOTE: The AC Drive Parameters described on the Baldor Drive (Shift F5) screen can be verified from the following 18H Vector Drive Parameter list.

TABLE R.11 AC Drive Parameters Table (for Baldor Drive model # ZD18HXXXL-DEX)

BALDOR AC DRIVE PARAMETERS

Model # ZD18HXXXL-DEX (with DSP Control Board)

LEVEL 1 PROGRAMMING BLOCKS

Note: The numbers in parenthesis, i.e. (1) are displayed on the Baldor Drive Direct Access (F2 - 7) screen.

Block Title	Description and Serial Mode Parameter Number		Range	Drive Defaults	MCE/User Settings
PRESET SPEEDS	PRESET SPEED #1-15	P1001-P1015	0 - MAX SPEED (RPM)	0	0
PRESS ENTER FOR MENU EXIT					
ACCEL/ DECEL RATE	ACCEL #1	P1101	0 - 3600 SECONDS	3.0	0.1
	DECEL #1	P1102	0 - 3600 SECONDS	3 .0	0.1
	S CURVE #1	P1103	0 - 100%	0	1
	ACCEL #2	P1104	0 - 3600 SECONDS	3.0	3.0
	DECEL #2	P1105	0 - 3600 SECONDS	3.0	3.0
	S CURVE #2	P1106	0 - 100%	0	0
PRESS ENTER FOR MENU EXIT					
JOG SETTINGS	JOG SPEED	P1201	0 - MAX SPEED IN RPM	200	10
	JOG ACCEL TIME	P1202	0 - 3600 SECONDS	3.0	1.0
	JOG DECEL TIME	P1203	0 - 3600 SECONDS	3.0	1.0
	JOG S CURVE TIME	P1204	0 - 100%	0	6
PRESS ENTER FOR MENU EXIT					
KEYPAD SETUP	KEYPAD STOP KEY	P1301	REMOTE OFF (0), REMOTE ON (1)	REMOTE ON (1)	REMOTE ON (1)
	KEYPAD STOP MODE	P1302	COAST (0), REGEN (1)	REGEN (1)	REGEN (1)
	KEYPAD RUN FWD	P1303	OFF (0), ON (1)	ON (1)	OFF (0)
	KEYPAD RUN REV	P1304	OFF (0), ON (1)	ON (1)	OFF (0)
	KEYPAD JOG FWD	P1305	OFF (0), ON (1)	ON (1)	OFF (0)
	KEYPAD JOG REV	P1306	OFF (0), ON (1)	ON (1)	OFF (0)
	LOC. HOT START	P1307	OFF (0), ON (1)	OFF (0)	OFF (0)
PRESS ENTER FOR MENU EXIT					
INPUT	OPERATING MODE	P1401	(1 - 10) KEYPAD (1), BIPOLAR (7)	KEYPAD (1)	BIPOLAR (7)
	COMMAND SELECT	P1402	(1 - 12) ±10 VOLTS (1)	±10 VOLTS (1)	±10 VOLTS (1)
	ANA CMD INVERSE	P1403	OFF (0), ON (1)	OFF (0)	OFF (0)
	ANA CMD OFFSET	P1404	-20.0% to +20.0%	0.0	0.0
	ANA 2 DEADBAND	P1405	0-10.00 VOLTS	0.00	0.00
	ANA 1 CUR LIMIT	P1406	OFF (0), ON (1)	OFF (0)	OFF (0)
PRESS ENTER FOR MENU EXIT					

Block Title	Description and Serial Mode Parameter Number		Range	Drive Defaults	MCE/User Settings
OUTPUT	OPTO OUTPUT #1	P1501	(0 - 15) READY (0) ZERO SPEED (1) AT SPEED (2) FAULT (6) DRIVE ON (9)	READY (0)	READY (0)
	OPTO OUTPUT #2	P1502		ZERO SPEED (1)	AT SPEED (2)
	OPTO OUTPUT #3	P1503		AT SPEED (2)	DRIVE ON (9)
	OPTO OUTPUT #4	P1504		FAULT (6)	FAULT (6)
	ZERO SPD SET PT	P1505	1 - MAX RPM	200	10
	AT SPEED BAND	P1506	1 -1000 RPM	100	✳
	SET SPEED	P1507	0 - MAX RPM	RATED MOTOR SPEED	✳
	ANALOG OUT #1	P1508	(0 - 23) ABS SPEED (0) VELOCITY (16) MOTOR CURRENT (18)	ABS SPEED (0)	ABS SPEED (0)
	ANALOG OUT #2	P1509		MOTOR CURRENT (18)	VELOCITY (16)
	ANALOG #1 SCALE	P1510	10 - 100%	100	100
	ANALOG #2 SCALE	P1511	10 - 100%	100	100
	POSITION BAND	P1512	1 - 32767 CNTS	6	CALC
PRESS ENTER FOR MENU EXIT					
VECTOR CONTROL	CTRL BASE SPEED	P1601	0 - MAX RPM	CALC	✳
	FEEDBACK FILTER	P1602	0 - 7	CALC	3
	FEEDBACK ALIGN	P1603	REVERSE (0), FORWARD (1)	FORWARD (1)	✳
	CURRENT PROP GAIN	P1604	0 - 1000	CALC	✳✳ 20
	CURRENT INT GAIN	P1605	0 - 400 Hz	150	50
	SPEED PROP GAIN	P1606	0 - 1000	10	✳✳ 10
	SPEED INT GAIN	P1607	0 - 9.99 Hz	1.00 Hz	✳✳ 1.00
	SPEED DIFF GAIN	P1608	0 - 100	0	✳✳ 0
	POSITION GAIN	P1609	0 - 9999	CALC	✳
	SLIP FREQUENCY	P1610	0 - 20.00 Hz	CALC	✳
	STATOR R1	P1611	0 - 65.535 OHM	CALC	CALC
	STATOR X1	P1612	0 - 65.535 OHM	CALC	CALC
PRESS ENTER FOR MENU EXIT					

LEVEL 2 PROGRAMMING BLOCKS

Note: The numbers in parenthesis, i.e. (1) are displayed on the Baldor Drive Direct Access (F2 - 7) screen.

Block Title	Description and Serial Mode Parameter Number		Range	Drive Defaults	MCE/User Settings
OUTPUT LIMITS	OPERATING ZONE	P2001	(1 - 4) STD CONST. TQ. (1) QUIET CONST.TQ. (3)	STD CONST. TQ. (1)	QUIET CONST.TQ. (3)
	MIN OUTPUT SPEED	P2002	0 - MAX SPEED RPM	0	0
	MAX OUTPUT SPEED	P2003	0 - MAX SPEED	RATED MOTOR SPEED	✳
	PK CURRENT LIMIT	P2004	0 - PEAK RATED CURRENT	PK CONTROL RATING	✳
	PWM FREQUENCY	P2005	1.0 - 5 KHz (STANDARD) STD = 2.5 KHz 1.0 -16KHz (QUIET) QUIET = 8.0 KHz	2.5	12.0
	CURRENT RATE LIMIT	P2006	0 - 10.00 SECONDS	0.004	0.000
PRESS ENTER FOR MENU EXIT					

Block Title	Description and Serial Mode Parameter Number		Range	Drive Defaults	MCE/User Settings
CUSTOM UNITS	DECIMAL PLACES	P2101	0 - 5	5	5
	VALUE AT SPEED	P2102	0 - 65535	0	0
	UNITS OF MEASURE	P2105		DRIVE DEFAULT	DRIVE DEFAULT
PRESS ENTER FOR MENU EXIT					
PROTECTION	OVERLOAD	P2201	FOLDBACK (0), FAULT (1)	FOLDBACK (0)	FOLDBACK (0)
	EXTERNAL TRIP	P2202	OFF (0), ON (1)	OFF (0)	ON (1)
	LOCAL ENABLE INP	P2203	OFF (0), ON (1)	OFF (0)	OFF (0)
	FOLLOWING ERROR	P2204	OFF (0), ON (1)	OFF (0)	ON (1)
	TORQUE PROVING	P2205	OFF (0), ON (1)	OFF (0)	ON (1)
PRESS ENTER FOR MENU EXIT					
MISC	RESTART AUTO/MAN	P2301	MANUAL (0), AUTOMATIC (1)	MANUAL (0)	AUTOMATIC (1)
	RESTART FAULT/HR	P2302	0 - 10	0	1
	RESTART DELAY	P2303	0 - 120 SECONDS	0	2
	FACTORY SETTINGS	P2304	NO (0), YES (1)	NO (0)	NO (0)
	HOMING SPEED	P2305	0 - MAX SPEED RPM	100	0
	HOMING OFFSET	P2306	0 - 65535 COUNTS	ENC COUNTS	1024
PRESS ENTER FOR MENU EXIT					
SECURITY CONTROL	SECURITY STATE	P2401	OFF (0), LOCAL (1), SERIAL (2), TOTAL (3)	OFF (0)	OFF (0)
	ACCESS TIMEOUT	P2402	0 - 600 SEC	0	0
	ACCESS CODE	P2403	0 - 99999	9999	9999
PRESS ENTER FOR MENU EXIT					
MOTOR DATA	MOTOR VOLTAGE	P2501	150 - 999	FACTORY SET	✳
	MOTOR RATED AMPS	P2502	0 - 999.9	FACTORY SET	✳
	MOTOR RATED SPD	P2503	0 - 32767 RPM	FACTORY SET	✳
	MOTOR RATED FREQ	P2504	0 - 500.0 Hz	FACTORY SET	✳
	MOTOR MAG AMPS	P2505	30-40% RATED CUR.	CALC	✳
	ENCODER COUNTS	P2506	50 - 65535 PPR	1024	1024
	RESOLVER SPEED	P2507	0 - 10 SPEED	0	0
	CALC PRESET	P2508	NO (0), YES (1)	NO (0)	NO (0)
PRESS ENTER FOR MENU EXIT					
BRAKE ADJUST	RESISTOR OHMS	P2601	0 - 255 OHMS	FACTORY SET	✳
	RESISTOR WATTS	P2602	0 - 360.00 KW	FACTORY SET	✳
	DC BRAKE CURRENT	P2603	0 - 100%	0	0
PRESS ENTER FOR MENU EXIT					
PROCESS CONTROL	PROCESS FEEDBACK	P2701	(0 - 9) NONE (9)	NONE (9)	NONE (9)
	PROCESS INVERSE	P2702	OFF (0), ON (1)	OFF (0)	OFF (0)
	SETPOINT SOURCE	P2703	(0 - 10) NONE (9)	SETPOINT CMD	NONE (9)
	SETPOINT COMMAND	P2704	0 - ±100%	0.0	0.0
	SET PT ADJ LIMIT	P2705	0 - 100%	10.0	0.0
	PROCESS ERR TOL	P2706	0 - 100%	10	1
	PROCESS PROP GAIN	P2707	0 - 200	0	0
	PROCESS INT GAIN	P2708	0 - 9.99 Hz	0.00	0.00
	PROCESS DIFF GAIN	P2709	0 - 100	0	0
	FOLLOW I: O RATIO	P2710	1 - 65535	1:1	1:1
	MASTER ENCODER	P2712	50 - 65535 PPR	1024	1024
COMMUNI-CATIONS	PROTOCOL	P2801	(0 - 4) RS232 ASCII (0)	RS232 ASCII (0)	RS232 ASCII (0)
	BAUD RATE	P2802	(0 - 7) 9600 (0), 19.2K (1), 38.4K (2)	9600 (0)	9600 (0)
	DRIVE ADDRESS	P2803	0 - 31	0	0
PRESS ENTER FOR MENU EXIT					

Block Title	Description and Serial Mode Parameter Number	Range	Drive Defaults	MCE/User Settings
AUTO TUNING	**CALC PRESET**	CALC	YES, NO	NO
	CMD OFFSET TRIM Trims out any voltage offsets on the differential command input (J1-4 & J1-5). Press the Enter key to run auto-tuning test.	AU1		NO
	CUR LOOP COMP This procedure measures current response to commanded pulses of ½ rated motor current.	AU2		NO
	STATOR R1 Measures stator resistance	AU3		NO
	FLUX CUR SETTING This procedure runs the motor near rated speed for up to several minutes and set the motor magnetizing current based on line voltage and motor nameplate data.	AU4		NO
	FEEDBACK TESTS Checks the Master Encoder and Feedback Align values.	AU5		NO
	SLIP FREQ TEST This procedure repeatedly accelerates the motor to test Slip Frequency and will yield errant results if there are significant windage or friction loads on the motor.	AU5		NO
	SPD CNTRLR CALC This procedure accelerates the motor to measure the current to acceleration ratio. It also adjusts Speed Control Integral Gain and Speed Controller Differential Gain. Because the auto-tune is usually done at no load, it will generally set the Speed Controller Integral Gain too high for high inertial motors and loads if the Current Limit is set too low. If the control is too responsive when the Drive is loaded, set the current limit to the proper value and rerun this procedure.	AU6		NO
PRESS ENTER FOR MENU EXIT				

✳ PARAMETERS MUST BE ENTERED PER CONTROLLER

✳✳ FIELD ADJUSTABLE GAIN PARAMETERS

Slip Frequency = P1610

P1610 = f_s = f − (N x P/120)
where...
f_s: slip frequency (Hz)
f: motor rated frequency (Hz)
N: motor rated speed (F.L - rpm)
P: number of motor poles

P	Synchronous RPM	
	60Hz Motor	**50Hz Motor**
8	900	750
6	1200	1000
4	1800	1500

Job #
Drive Model #
Drive Serial #
Software Ver. #
Line #
Tested by
Approved

TABLE R.12 Quick Reference for MagneTek HPV 900 Drive Parameters (IMC-AC)

QUICK REFERENCE FOR HPV 900 DRIVE PARAMETERS (IMC-AC PRODUCT ONLY)

The parameter *numbers (P1 thru P240)* appear *only* on the CRT screen. The parameter *names* appear on the drive's Digital Operator display. Field Adjustable Parameters are shown in shaded rows. All other parameters should be set to the values shown below in the “Field/MCE Set” column.

WARNING: Parameters with an asterisk (✳) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
	Adjust A0					
	A1 Drive					
P1	Contract Car Spd	Elevator Contract Speed	fpm	0 - 3000.0	0.1	✳
P2	Contract Mtr Spd	Motor Speed at elevator contract speed	rpm	50.0 - 3000.0	1130.0	✳
P3	Response	Sensitivity of the speed regulator	rad/sec	1.0 - 20.0	10.0	20.0
P4	Inertia	System inertia	sec	0.25 - 50.00	2.00	✳
P5	Inner Loop Xover	Inner speed loop crossover frequency (only with Ereg speed regulator)	rad/sec	0.1 - 20.0	2.0	2.0
P6	Gain Reduce Mult	Percent of response of the speed regulator using when in the low gain Mode	%	10 - 100	100	80
P7	Gain Chng Level	Speed level to change to low gain mode (only with internal gain switch)	%	0 - 100.0	100.0	10.0
P8	Tach Rate Gain	Helps with the effects of rope resonance	-	0 - 30.0	0.0	0.0
P9	Spd Phase Margin	Sets phase margin of speed regulator (only with PI speed regulator)	°	45 - 90	80	80
P10	Ramped Stop Time	Time to ramp torque from rated torque to zero (only with torque ramp down stop function)	sec	0 - 2.50	0.20	0.20
P11	Contact Flt Time	Time before a contactor fault is declared	sec	0.10 - 5.00	0.50	0.50
P12	Brake Pick Time	Time before a brake pick fault is declared	sec	0 - 5.00	0.00	0.00
P13	Brake Hold Time	Time before a brake hold fault is declared	sec	0 - 5.00	0.00	0.00
P14	Overspeed Level	Threshold for detection of overspeed fault	%	100.0 - 150.0	125.0	125.0
P15	Overspeed Time	Time before an overspeed fault is declared	sec	0 - 9.99	1.00	1.00
P16	Overspeed Mult	Multiplier for overspeed test	%	100.0 - 150.0	125.0	100.0
P17	Encoder Pulses	Encoder counts per revolution	ppr	600 - 10000	1024	1024
P18	Spd Dev Lo Level	Range around the speed reference for speed deviation low logic output	%	00.1 - 10.0	10.0	10.0
P19	Spd Dev Time	Time before speed deviation low logic output is true	sec	0 - 9.99	1.00	1.00
P20	Spd Dev Hi Level	Level for declaring speed deviation alarm	%	0 - 99.9	20.0	20.0
P21	Spd Command Bias	Subtracts an effective voltage to actual speed command voltage	volts	0 - 6.00	0.00	0.00
P22	Spd Command Mult	Scales analog speed command	-	0.90 - 3.00	1.00	1.00
P23	Pre Torque Bias	Subtracts an effective voltage to actual pre-torque command voltage	volts	0 - 6.00	0.00	0.00
P24	Pre Torque Mult	Scales pre-torque command	-	-10.00 - 10.00	1.00	1.00
P25	Zero Speed Level	Threshold for zero speed logic output	%	0 - 99.99	0.00	0.00
P26	Zero Speed Time	Time before zero speed logic output is declared true	sec	0 - 9.99	0.10	0.10
P27	Up/Dwn Threshold	Threshold for detection of up or down direction	%	0 - 9.99	1.00	1.00
P28	Mtr Torque Limit	Motoring torque limit	%	0 - 250.0	250.0	250.0
P29	Regen Torq Limit	Regenerating torque limit	%	0 - 250.0	250.0	250.0
P30	Flux Wkn Factor	Defines the torque limit at higher speeds	%	60 - 100	75	75
P31	Ana 1 Out Offset	Subtracts an effective voltage to actual analog output 1	%	-99.9 - 99.9	0.0	0.0

No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
P32	Ana 2 Out Offset	Subtracts an effective voltage to actual analog output 2	%	-99.9 - 99.9	0.0	0.0
P33	Ana 1 Out Gain	Scaling factor for analog output 1	-	0 - 10.0	1.0	1.0
P34	Ana 2 Out Gain	Scaling factor for analog output 2	-	0 - 10.0	1.0	1.0
P35	Flt Reset Delay	Time Before a fault is automatically reset	sec	0 - 120	5	5
P36	Flt Reset / Hour	Number of faults that is allowed to be automatically reset per hour	faults	0 - 10	3	3
P37	Up to Spd. Level	The logic output function is true when the motor speed is above the user specified speed defined by this parameter.	%	0 - 110.00	080.00	080.00
P38	Mains DIP Speed	When enabled by the Main DIP Speed (A1) parameter, speed is reduced by this percent when a UV alarm (low voltage) is declared	%	5 - 99.9	25.00	25.00
P39	Run Delay Timer	Delays the Drive's recognition of the RUN signal.	sec	0.00 - 0.99	0.00	0.10
P40	AB Zero Spd Lev	Auto Brake Function - N/A to MCE products	%	0.00 - 2.00	0.00	0.00
P41	AB Off Delay	N/A to MCE products	sec	0.00 - 9.99	0.00	0.00
P42	Contactor DO Delay	N/A to MCE products	sec	0.00 - 5.00	0.00	0.00
P43	TRQ Lim Msg Dly	Determines the amount of time the drive is in torque limit before the Hit Torque Limit message is displayed.	sec	0.50 - 10.00	0.50	2.00
	SER2 Insp Spd	Defines the serial mode 2 inspection (only serial mode 2)	ft/min	0 - 100	000.0	000.0
	SER2 RS Crp Spd	Defines the creep speed that will be used in the "rescue mode."	ft/min	0 - 100	000.0	000.0
	SER2 RS Cpr Time	Defines the maximum time the drive will continue to run at rescue creep speed (only serial mode 2)	ft/min	0 - 100	180	180
	SER2 FLT Tol	Defines the maximum time that may elapse between valid run time messages before a serial fault is declared (only serial mode 2)	sec	0.0 - 2.0	0.04	0.4
	Rollback Gain	Anti-rollback gain	-	1 - 99	1	1
	Notch Filter Frq	Notch filter center frequency	Hz	5 - 60	20	20
	Notch Filt Depth	Notch filter maximum attenuation	%	0 - 100	0	0
	MSPD Delay 1 - 4	Determines the recognition time delay for a defined multistep speed command	sec	0.00 - 10.0	0.00	0.00
	A2 S-Curves					
	Accel Rate 0	Acceleration rate limit #0	ft/s^2	0 - 7.99	3.00	7.99
	Decel Rate 0	Deceleration rate limit #0	ft/s^2	0 - 7.99	2.60	7.99
	Accel Jerk In 0	Rate of increase of acceleration, up to Accel Rate, when increasing elevator speed	ft/s^3	0 - 29.9	8.0	29.9
	Accel Jerk Out 0	Rate of decrease of acceleration to zero when approaching elevator contract speed	ft/s^3	0 - 29.9	8.0	29.9
	Decel Jerk In 0	Rate of increase of deceleration, to Decel Rate, when decreasing elevator speed	ft/s^3	0 - 29.9	8.0	29.9
	Decel Jerk Out 0	Rate of decrease of deceleration to zero when slowing the elevator to leveling speed	ft/s^3	0 - 29.9	8.0	29.9
	Accel Rate 1	Acceleration rate limit #1	ft/s^2	0 - 7.99	3.00	3.00
	Decel Rate 1	Deceleration rate limit #1	ft/s^2	0 - 7.99	2.60	2.60
	Accel Jerk In 1	(see Accel Jerk In 0)	ft/s^3	0 - 29.9	00.0	00.0
	Accel Jerk Out 1	(see Accel Jerk Out 0)	ft/s^3	0 - 29.9	00.0	00.0
	Decel Jerk In 1	(see Decel Jerk In 0)	ft/s^3	0 - 29.9	00.0	00.0
	Decel Jerk Out 1	(see Decel Jerk Out 0)	ft/s^3	0 - 29.9	8.0	8.0
	Accel Rate 2	Acceleration rate limit #2	ft/s^2	0 - 7.99	3.00	3.00
	Decel Rate 2	Deceleration rate limit #2	ft/s^2	0 - 7.99	2.60	2.60
	Accel Jerk In 2	(see Accel Jerk In 0)	ft/s^3	0 - 29.9	8.0	8.0
	Accel Jerk Out 2	(see Accel Jerk Out 0)	ft/s^3	0 - 29.9	8.0	8.0
	Decel Jerk In 2	(see Decel Jerk In 0)	ft/s^3	0 - 29.9	8.0	8.0
	Decel Jerk Out 2	(see Decel Jerk Out 0)	ft/s^3	0 - 29.9	8.0	8.0

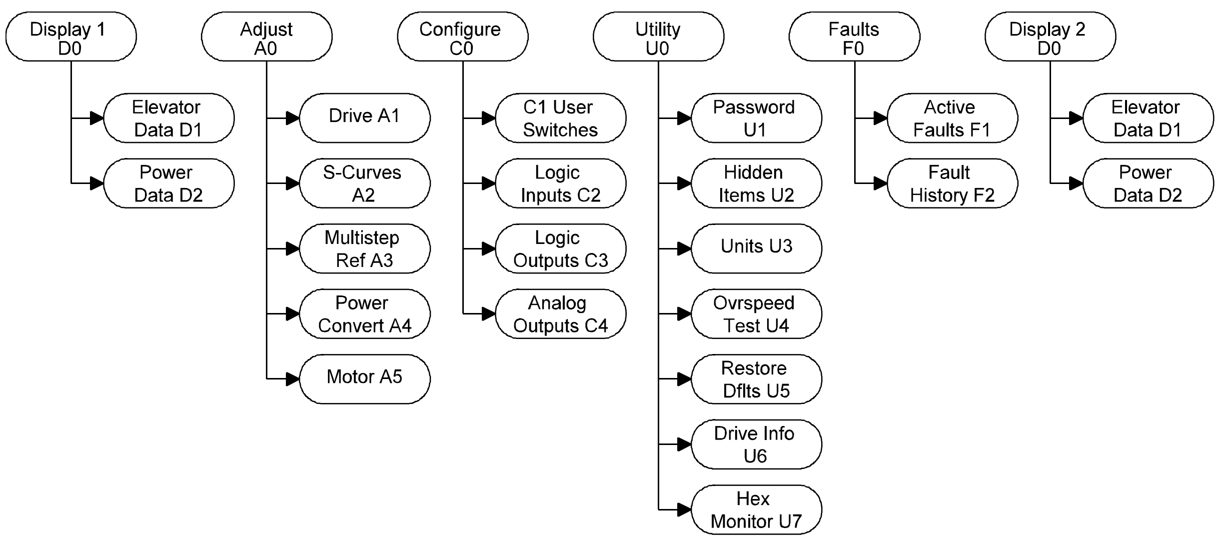
No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
	Accel Rate 3	Acceleration rate limit #3	ft/s^2	0 - 7.99	3.00	3.00
	Decel Rate 3	Deceleration rate limit #3	ft/s^2	0 - 7.99	2.60	2.60
	Accel Jerk In 3	(see Accel Jerk In 0)	ft/s^3	0 - 29.9	8.0	8.0
	Accel Jerk Out 3	(see Accel Jerk Out 0)	ft/s^3	0 - 29.9	8.0	8.0
	Decel Jerk In 3	(see Decel Jerk In 0)	ft/s^3	0 - 29.9	8.0	8.0
	Decel Jerk Out 3	(see Decel Jerk Out 0)	ft/s^3	0 - 29.9	8.0	8.0
	A3 Multistep Ref					
P70	Inspection	Multi-step speed command #1	ft/m	0 - 66%	0.0	0.0 **
P71	Level	Multi-step speed command #2	ft/m	0 - 16%	0.0	0.0 **
P72	Speed Command 3	Multi-step speed command #3	ft/m	0 %	0.0	0.0 **
P73	High Level	Multi-step speed command #4	ft/m	0 - 25%	0.0	0.0 **
P74	Speed Command 5	Multi-step speed command #5	ft/m	0 %	0.0	0.0 **
P75	Intermediate	Multi-step speed command #6	ft/m	0 -91%	0.0	0.0 **
P76	Speed Command 7	Multi-step speed command #7	ft/m	0 %	0.0	0.0 **
P77	High Speed	Multi-step speed command #8	ft/m	0-100%	0.0	0.0 **
P78	Speed Command 9	Multi-step speed command #9	ft/m	0 %	0.0	0.0 **
P79	Speed Command 10	Multi-step speed command #10	ft/m	0 %	0.0	0.0 **
P80	Speed Command 11	Multi-step speed command #11	ft/m	0 %	0.0	0.0 **
P81	Speed Command 12	Multi-step speed command #12	ft/m	0 %	0.0	0.0 **
P82	Speed Command 13	Multi-step speed command #13	ft/m	0 %	0.0	0.0 **
P83	Speed Command 14	Multi-step speed command #14	ft/m	0 %	0.0	0.0 **
P84	Speed Command 15	Multi-step speed command #15	ft/m	0 %	0.0	0.0 **
	***** Note: Parameters P70 thru P84 are not used for IMC-AC Controllers and must be set to zero.***					
	A4 Power Convert					
P90	Id Reg Diff gain	Flux Current regulator differential gain	-	0.80 - 1.20	1.00	1.00
P91	Id Reg Prop Gain	Flux current regulator proportional gain	-	0.20 - 0.40	0.30	0.30
P92	Iq Reg Diff Gain	Torque current regulator differential gain	-	0.80 - 1.20	1.00	1.00
P93	Iq Reg Prop Gain	Torque current regulator proportional gain	-	0.20 - 0.40	0.30	0.30
P94	PWM Frequency	Carrier frequency	kHz	2.5 - 16.0	10.0	10.0
P95	UV Alarm Level	Voltage level for under voltage alarm	%	80 - 99	80	80
P96	UV Fault Level	Voltage level for under voltage fault	%	50 - 88	80	80
P97	Extern Reactance	External choke reactance	%	0.0 - 10.0	0.0	0.0
P98	Input L-L Volts	Nominal line-line AC input Voltage, RMS	volts	110 - 480	Drive dep.	✳
	A5 Motor					
P110	Motor ID	Motor Identification	-	4 Pole DFLT, 6 Pole DFLT, MCE Test	MCE Test	✳
P111	Rated Mtr Power	Rated motor output power	HP	1.0 - 500.0	5.0	✳
P112	Rated Mtr Volts	Rated motor terminal RMS voltage	volts	190.0 - 575.0	460.0	✳
P113	Rated Excit Freq	Rated excitation frequency	Hz	5.0 - 400.0	60.0	✳
P114	Rated Motor Curr	Rated motor current	amps	1.00 - 800.00	6.80	✳
P115	Motor Poles	Motor poles	-	2 - 32	6	✳
P116	Rated Mtr Speed	Rated motor speed at full load	RPM	50.0 - 3000.0	1130.0	✳
P117	% No Load Curr	Percent no load current	%	10.0 - 60.0	35.0	✳
P118	Stator Leakage X	Stator leakage reactance	%	0 - 20.0	9.0	9.0
P119	Rotor Leakage X	Rotor leakage reactance	%	0 - 20.0	9.0	9.0
P120	Stator Resist	Stator resistance	%	0 - 20.0	1.5	1.5
P121	Motor Iron Loss	Iron loss at rated frequency	%	0 - 15.0	0.5	0.5
P122	Motor Mech Loss	Mechanical loss at rated frequency	%	0 - 15.0	1.0	1.0
P123	Ovld Start Level	Maximum continuous motor current	%	100 - 150	110	110
P124	Ovld Time Out	Time that defines motor overload curve	sec	5.0 - 120.0	60.0	60.0
P125	Flux Sat Break	Flux saturation curve slope change point	%	0 - 100	75	75
P126	Flux Sat Slope 1	Flux saturation curve slope for low fluxes	%	0 - 200	0	0
P127	Flux Sat Slope 2	Flux saturation curve slope for high fluxes	%	0 - 200	50	50

No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
	Configure C0					
	C1 User Switches					
P140	Spd Command Src	Speed Command Source	-	Analog input Serial Multi-step	Multi-step	Analog Input
P141	Run Command Src	Run Command Source	-	External TB Serial Serial+extern	External TB	External TB
P142	Hi/Lo Gain Src	High / low gain change switch source	-	Internal External TB Serial	Internal	Internal
P143	Speed Reg Type	Chooses speed regulator	-	Elev spd reg PI speed reg External reg	Elev spd reg	Elev spd reg
P144	Motor Rotation	Allows user to reverse direction of motor rotation	-	Forward Reverse	Forward	Forward
P145	Spd Ref Release	Determines when speed reference release is asserted	-	Reg release Brake picked	Reg release	Reg release
P146	Cont Confirm Src	Determines if an external logic input is used for contactor confirm	-	None External TB	None	None
P147	Pre Torque Source	Determines if a pre torque command is used and if used, it determines the source of the pre torque command	-	None Analog input Serial	None	None (Note 1)
P148	Pre Torque Latch	Chooses if analog pre-torque command is latched	-	Latched Not latched	Not latched	Not latched
P149	PTtorq Latch Clck	Determines source of pre torque latch control (if used)	-	External TB Serial	External TB	External TB
P150	Fault Reset Src	Fault reset source	-	External TB Serial Automatic	External TB	Automatic
P151	Overspd Test Src	Determines external logic source to trigger overspeed test	-	External TB Serial	External TB	External TB
P152	Brake Pick Src	If drive controls the mechanical brake, this determines the source of the brake pick command	-	Internal Serial	Internal	Internal
P153	Brake Pick Cnfm	Determines if a logic input is used for brake pick confirm	-	None External TB	None	None
P154	Brake Hold Src	If drive controls the mechanical brake, this determines the source of the brake hold command	-	Internal Serial	Internal	Internal
P155	Ramped Stop Sel	Chooses between normal stop and torque ramp down stop	-	None Ramp on stop	None	None
P156	Ramp Down En Src	Determines the source that signals the torque ramp down stop (if used)	-	External TB Run logic Serial	External TB	External TB
P157	Brk Pick Flt Ena	Brake pick fault enable	-	Enable Disable	Disable	Disable
P158	Brk Hold Flt Ena	Brake hold fault enable	-	Enable Disable	Disable	Disable
P159	Ext Torq Cmd Src	When P143 = External Reg, this sets the source of the torque command	-	None Serial Analog Input	None	None
P160	Dir Confirm	Confirms proper analog signal polarity when set to Enable and a logic input is programmed to Run Up and Run Down	-	Enabled Disabled	Disabled	Disabled
P161	S-Curve Abort	Addresses how the S-Curve Speed Reference Generator handles a *reduction* in the speed command before the S-Curve Generator has reached its target speed.		Enabled Disabled	Disabled	Disabled
P162	Fast Flux	Reduces starting takeoff time by reducing motor fluxing time	-	Enabled Disabled	Disabled	Enabled
P163	Main DIP Ena	Enables the Mains DIP Speed (A1) parameter which reduces speed when a UV alarm (low voltage) is declared	-	Enable Disable	Disable	Disable

No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
	DB Protection	Dynamic braking protection fault or alarm selection	-	Fault Alarm	Fault	Fault
P164	Encoder Fault	Temporarily disables the Encoder Fault	-	Enable Disable	Enable	Enable
P165	Stopping Mode	Determines the stopping mode when Spd Command Src = multi-step	-	Immediate Ramp to stop	Immediate	Immediate
	Motor Ovrld Sel	Motor overload selection	-	Alarm Flt Immediate Fault at stop	Alarm	Flt Immediate
	Auto Stop	Auto stop function enable	-	Disable Enable	Disable	Disable
	Serial Mode	Serial protocol selection	-	None, Mode1 Mode 2 Mode 2 test	Mode 1	None
	Ser2 Flt Mode	Defines the reaction to a serial communication fault while in Serial Mode 2 (only serial mode 2)	-	Immediate Run remove Rescue	Immediate	Immediate
	DRV Fast Disable	Addresses how fast the drive responds to removal of drive enable logic input	-	Disable Enable	Disable	Disable
	MLT-Spd to DLY 1	Assigns multi-step speed command to recognition delay timer 1	-	None mspd1- mspd15	None	None
	MLT-Spd to DLY 2	Assigns multi-step speed command to recognition delay timer 2	-	None mspd1- mspd15	None	None
	MLT-Spd to DLY 3	Assigns multi-step speed command to recognition delay timer 3	-	None mspd1- mspd15	None	None
	MLT-Spd to DLY 4	Assigns multi-step speed command to recognition delay timer 4	-	None mspd1- mspd15	None	None
	C2 Logic Inputs					
P170	Log In 1 TB1-1	Terminal 1 Selection	-	-	DRIVE ENABLE	DRIVE ENABLE
P171	Log In 2 TB1-2	Terminal 2 Selection	-	-	RUN	RUN
P172	Log In 3 TB1-3	Terminal 3 Selection	-	-	UP /DWN	NO FUNC
P173	Log In 4 TB1-4	Terminal 4 Selection	-	-	FAULT RESET	FAULT RESET
P174	Log In 5 TB1-5	Terminal 5 Selection	-	-	STEP REF B0	NO FUNC
P175	Log In 6 TB1-6	Terminal 6 Selection	-	-	STEP REF B1	NO FUNC
P176	Log In 7 TB1-7	Terminal 7 Selection	-	-	STEP REF B2	NO FUNC
P177	Log In 8 TB1-8	Terminal 8 Selection	-	-	STEP REF B3	NO FUNC
P178	Log In 9 TB1-9	Terminal 9 Selection	-	-	S-CURVE SEL 0	NO FUNC
	C3 Logic Outputs					
P180	Log Out 1 TB1-14	Terminal 14 Selection	-	-	SPEED DEV LOW	READY TO RUN
P181	Log Out 2 TB1-15	Terminal 15 Selection	-	-	RUN COMMANDED	SPD DEV LOW
P182	Log Out 3 TB1-16	Terminal 16 Selection	-	-	MTR OVERLOAD	SPEED REG RLS
P183	Log Out 4 TB1-17	Terminal 17 Selection	-	-	ENCODER FAULT	FAULT
P184	Relay Coil 1	Relay 1 Function Selection	-	-	FAULT	FAULT
P185	Relay Coil 2	Relay 2 Function Selection	-	-	SPEED REG RLS	SPEED REG RLS

No.	Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	MCE/User Settings
	C4 Analog Outputs					
P190	Ana Out 1 TB1-33	Terminal 33 Selection	-	-	SPEED CMD	SPEED CMD
P191	Ana Out 2 TB1-35	Terminal 35 Selection	-	-	SPEED FEEDBK	SPEED FEEDBK
	Utility U0					
	U1 Password	Password	-	-	000000	000000
	U2 Hidden Items	Enable or disable hidden parameters	-	Enabled, Disabled	ENABLED	ENABLED
P204	***U3 Unit***	Unit for parameters	-	English, Metric	ENGLISH	ENGLISH
	U4 Overspeed Test	Allows overspeed test during inspection	-	Yes, No	No	No
	U5 Restore Dflts					
	Restore Motor Defaults?	Reset all parameters to default values except parameters in MOTOR A5				
	Restore Device Defaults?	Resets the parameters in MOTOR A5 to the defaults defined by the MOTOR ID				
	U6 Drive Info	Drive information (Drive Version, Boot Version, Cube ID, Drive Type)				
	U7 HEX Monitor	Hex Monitor				
	U8 Language Sel	Selects the language for display				
Drive Software Version A2950-C10304						

FIGURE R.36 HPV 900 Parameter Menu Trees



Note 1: For gearless AC applications, set Pre-Torque Source = analog input.
For more information refer to Section 3, *Parameter Adjustments* in the MagneTek HPV 900 AC Vector Elevator Drive Technical Manual.

P *	Motor Synchronous RPM	
	60Hz Motor	50Hz Motor
8	900	750
6	1200	1000
4	1800	1500

* P = number of motor poles

Job #
Prod. Order #
Drive Model #
Drive Serial #
Boot Version (U6)
Drive Version (U6)
Cube ID
Tested by
Approved

TABLE R.13 Quick Reference for TORQMAX F4 Drive Parameters

QUICK REFERENCE FOR TORQMAX F4 DRIVE PARAMETERS (IMC-AC / IMC-AC-R PRODUCT ONLY)

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

WARNING: Parameters with an asterisk (✳) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

Digital Operator Display	Parameter Description	Unit	Setting Range	MCE Drive Defaults	Field/MCE Set
LF.00	Password; (-5 = read & write, -4 = read only)	-	0 - 9999	-5	-5
LF.01	User defined Password	-	0 - 9999	440	440
LF.02	Operating Mode: 4 = +/- 10 VDC	-	1 - 4	4	4
LF.03	Incremental Encoder output (Not used)	-	1-128	1	1
LF.04	Motor selection: 1=Synchronous, 0= Induction	-	0 - 1	0	0
LF.05	Drive Fault Auto Reset	-	0 - 10	3	10
LF.07	Unit system	-	SI, US	US	US
LF.08	Electronic Motor Protection	-	off, 1 - 4	off	3
LF.09	Electronic Motor Protection Current	A	1.0 - 110%Rtd	8.0	✳
LF.10	IM- Rated Motor Power	HP	0.00 - 100.00	5.00	✳
LF.11	IM-Rated Motor speed	rpm	75-6000	1165	✳
LF.12	IM- Rated Motor current	A	1.0 - 110% Drive rated	8	✳
LF.13	IM-Rated Motor Frequency	Hz	5 - 100	60	✳
LF.14	IM-Rated Motor voltage	V	1 - 650	230/460	✳
LF.15	IM-Rated power factor	-	0.01 - 1.00	0.83	0.83 - 0.90
LF.16	IM Field Weakening Speed	rpm	0.0 - 6000.0	set @ 80% of LF.11	✳
LF.17	Encoder Pulse Number	ppr	256 - 10000	1024	1024
LF.18	Swap Encoder channel:	-	on - off	off	off
LF.19	DC voltage compensation (Not used for IMC)	V	150 - 500	230/460	250/500
LF.20	Contract Speed	fpm	0.0 - 2000.0	0	✳
LF.21	Traction Sheave Diameter	inch	7.00 - 80.00	24.00	✳
LF.22	Gear Reduction Ratio	-	1.00 - 99.99	30.00	✳
LF.23	Roping ratio	-	1 - 8	1	✳
LF.24	Load	lbs	0 - 30000	0	✳
LF.25	Estimated Gear Reduction	-	-	-	-
LF.30	Control method: 2 = closed loop	-	0 - 3	0	2
LF.31	IM-KP Speed (proportional gain)	-	1 - 65535	3000	✳✳ 3000
LF.32	IM-KI Speed (integral gain)	-	1 - 65535	1000	✳✳ 1000
LF.33	IM-KI Speed offset	-	0 - 65535	1000	✳✳ 4000
LF.34	IM-KP Current (proportional gain)	-	1 - 65535	1500	1500
LF.35	IM-KI Current (integral gain)	-	1 - 65535	500	500

Digital Operator Display	Parameter Description	Unit	Setting Range	MCE Drive Defaults	Field/MCE Set
LF.36	Maximum torque **(Automatically calculated by the drive). This value should be 3 times LF.91.**	lbft	0 - 500%Trtd	300%Trtd	300% of LF.91 ✳________
LF.37	Low speed torque boost	%	0 - 25.5	10.0	10.0
LF.38	Switching frequency; 0= 8 KHz , 1= 16KHz (**Note: set LF.38 = 0 if E.OL2 error on drive**)	-	0, 1	1	1
LF.40	Re-leveling Speed (Not used, must be set to 0)	fpm	0.0 - 16% of LF.20	0.0	0.0
LF.41	Leveling Speed (Not used, must be set to 0)	fpm	0.0 - 16% of LF.20	0.0	0.0
LF.42	High Speed	fpm	0.0 - LF.20	0.0	✳ ________
LF.43	Inspection Speed (Not used, must be set to 0)	fpm	0.0 - 66% of LF.20	0.0	0.0
LF.44	High Leveling Speed (Not used, set to 0)	fpm	0.0 - 25% of LF.20	0.0	0.0
LF.45	Intermediate Speed (Not used, must be set to 0)	fpm	0.0 - 91% of LF.20	0.0	0.0
LF.50	Start Jerk (Not used, set to 32.00)	ft/s^3	0.31 - 32.00	2.00	32.00
LF.51	Acceleration Rate (Not used, set to 8.00)	ft/s^2	0.30 - 8.00	3.00	8.00
LF.52	Flare Jerk (Not used, set to 32.00)	ft/s^3	0.31 - 32.00	3.28	32.00
LF.53	Deceleration Rate (Not used, set to 8.00)	ft/s^2	0.30 - 8.00	3.00	8.00
LF.54	Stop Jerk (Not used, set to 32.00)	ft/s^3	off, 0.02 - 32.00	off	32.00
LF.55	Acceleration Jerk (Not used, set to 32.00)	ft/s^3	0.30 - 32.00	3.28	32.00
LF.56	Deceleration Jerk (Not used, set to 32.00)	ft/s^2	0.30 - 32.00	3.00	32.00
LF.57	Speed following error (0=off, 1 = on, 2=alarm)	-	0 - 2	1	1
LF.58	Speed Difference	%	0 - 30	10	10
LF.59	Following error timer	sec	0.000-10.000	3.000	3.000
LF-60 to LF-63	NOT USED BY MCE, Must be left at factory defaults.	-	-	-	-
LF.64	DC Bus Warning Level (X3.22 - DC Bus Over-voltage Fault output) *** Set to 400 for 230V, 800 for 460V application.	V	0 - 800	***	✳ ________
LF-65 to LF-66	NOT USED BY MCE, Must be left at factory defaults.	-	-	-	-
LF.67	Pretorque Gain	-	0.50 - 1.50	1.00	1.00
LF.68	Pretorque Offset	%	-25.0 - 25.0	0	0
LF.69	Pretorque Direction (0 = off, 1 = on)	-	0, 1	0 (off)	0 (off)
LF-70	Brake Release Time (Delay to turn on DRO).	sec	.001 - 3.0	0.200	0.300
LF.71 to LF-78	NOT USED BY MCE, Must be left at factory defaults.	-	-	-	-
LF-79	Delay in turning off the drive (Delay to turn OFF the motor current after the direction is dropped)	sec	0.300 - 3.000	0.200	0.300 - 0.800
LF.A0 to LF.C5	NOT USED BY MCE, Must be left at factory defaults.	-	-	-	-

Digital Operator Display	Parameter Description	Unit	Setting Range	MCE Drive Defaults	Field/MCE Set
Monitor Parameters (Read only parameters)					
LF.25	Estimated gear ratio				
LF.80	Software version				
LF.81	Software date				
LF.82	Terminal X2 - Input states (refer to table x.x)				
LF.83	Terminal X2- output states (refer to table x.x)				
LF.84	Terminal X3 - input states (refer to table x.x)				
LF.85	Terminal X2- output states (refer to table x.x)				
LF.86	Selected speed				
LF.87	Actual inverter load	%			
LF.88	Actual set speed (commanded motor RPM)	rpm			
LF.89	Actual speed (actual motor RPM)	rpm			
LF.90	Elevator speed **(Note: Verify the car speed with hand held tachometer. LF.90 may not be exactly accurate but it may give a close value)**	fpm			
LF.91	Rated motor torque	lbft			
LF.92	Positioning drive	inch			
LF.98	Starting sequence state				
LF.99	Inverter state				
ru.09	Phase Current (actual motor current)	A			
ru.11	Actual DC Voltage (DC bus voltage)	V			
ru.12	Peak DC Voltage (max. DC bus voltage measured)	V			
The speed setting range is described in percentage of the contract speed, but the actual entered value of the speed is in FPM. The drive will not accept any speed, higher than the defined values. ✳ Parameters are motor / machine / job dependent. ✳✳ Recommended but field adjustable.					
Parameters for Drive Software Version C31A (LF.81 date code = 0209.4)					

Job #:
Drive Manufacturer:
Drive Model #:
Drive Serial #:
Drive Software (LF.80):
Line #:
Tested By:
Approved:

TABLE R.14 Quick Reference for TORQMAX F5 Drive Parameters (for Drive software ≤ V1.4)

QUICK REFERENCE FOR TORQMAX F5 DRIVE PARAMETERS
(IMC-AC / IMC-AC-R PRODUCT ONLY) (For Drive software ≤ V1.4)

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

WARNING: Parameters with an asterisk (✳) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	Factory Setting
LF. 2	Signal Operating Mode: d SPd - Digital Speed Selection A tor - Analog Torque Control A Spd - Analog Speed Control SerSP - Serial Com. Speed Control	-	d Spd A tor A Spd SErSP	d SPd	A Spd
LF. 3	Drive Configuration: run - run mode conF - Configuration (5 minute time limit) EconF - Expired Configuration	-	run conF EconF	run	run
LF. 4	Motor-Selection: Displays mode selected using US. 4 and US.10	-	see US.10	-	✳✳✳
LF. 5	Drive Fault Auto Reset	1	0 - 10	3	3
LF. 8	Electronic Motor Overload Protection	-	on, off	off	on
LF. 9	Electronic Overload Current PM - not visible, auto set same as LF.12	A	1.0 - 110% Drive rated	8.0	✳
LF.10	Rated Motor Power, PM - read only, auto calc.	HP	0.00 - 100.00	5.00	✳
LF.11	Rated Motor Speed	rpm	10.0 - 6000.0	1165	✳
LF.12	Rated Motor Current	A	1.0 - 110% Drive rated	8.0	✳
LF.13	Rated Motor Frequency	Hz	4.0 - 100.0	60.0	✳
LF.14	Rated Motor Voltage IM - Name plate rated voltage PM - No-load, phase-to-phase back EMF rms voltage at 1000rpm	V	IM: 120 - 500V PM: 1 - 32000V/krpm	230/460	✳
LF.15	Power factor, PM - not applicable	1	0.50 - 1.00	0.83	0.92
LF.16	Field Weakening Speed, PM - not applicable	rpm	0.0 - 6000.0	set @ 80% of LF.11	✳
LF.17	Rated Motor Torque, IM - read only, auto calc. PM - enter motor name plate torque	lb ft	1 - 10000	IM - calc. PM - 18	IM - ✳✳✳ PM ✳____
LF.18	Motor Stator Resistance: PM only - Motor resistance value	ohm	0.0 - 49.999	49.999	
LF.19	Motor Leakage Inductance: PM only - motor winding leakage inductance, data sheet	mH	0.01 - 500.00	1.00	1.00
LF.20	Contract Speed	fpm	0 - 1600	0	✳
LF.21	Traction Sheave Diameter (measured value)	inch	7.00 - 80.00	24.00	✳
LF.22	Gear Reduction Ratio	1	1.00 - 99.99	30.00	✳
LF.23	Roping Ratio	1	1 - 8	1	✳
LF.24	Load Weight	lbs	0 - 30000	0	✳
LF.25	Estimated Gear Ratio: Read only, auto calc.	.01	1.00 - 99.99	-	✳✳✳
LF.26	Encoder Feedback: displays feedback type	-	-	-	✳✳✳

Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	Factory Setting
LF.27	Encoder Pulse Number	ppr	256 - 16384	1024	
LF.28	Reverse Encoder: 0 nothing reversed 1 encoder A<–>B swapped 2 motor rotation reversed 3 motor rotation reversed and A<–>B swapped	1	0 - 3	0	✳
LF.29	Encoder Sample Time	mSec	0.5 - 32	4	8
LF.30	Control Method 0, 1 Open loop induction motor operation 2 - Closed loop speed control (LF.2 = A Spd) 3 - Closed loop speed control with pre-torque 4 - Closed loop torque control.	1	0 - 4	0	✳
LF.31	Kp Speed: Proportional gain	1	1 - 32767	3000	✳✳ 2500
LF.32	Ki Speed: Integral gain	1	1 - 32767	500	✳✳ 200
LF.33	Ki Speed offset: Gain effective at low speeds	1	0 - 8000	2000	✳✳ 4000
LF.34	Kp Current: Proportional gain (calculated, don't change)	1	1 - 32767	Calculated	✳✳✳
LF.35	Ki Current: Integral gain (calculated, don't change)	1	1 - 65535	Calculated	✳✳✳
LF.36	Maximum Torque **(Automatically calculated by the drive). This value should be 3 times LF.91.**	lb ft	0 - 500%Trtd	Calculated	✳✳✳
LF.37	Open Loop Torque Boost: Open loop op. only	%	0 - 25.5	10.0	10.0
LF.38	Carrier frequency; 0 = 8 KHz , 1 = 16KHz (**Note: set LF.38 = 0 if E.OL2 error on drive)**	1	0, 1	0	✳
LF.41	Leveling Speed (Not used, must set to 0)	fpm	-	0.0	0.0
LF.42	High Speed	fpm	0.0 - LF.20	0.0	✳
LF.43	Inspection Speed (Not used, must set to 0)	fpm	-	0.0	0.0
LF.44	High Leveling Speed (Not used, must set to 0)	fpm	-	0.0	0.0
LF.45	Intermediate Speed (Not used, must set to 0)	fpm	-	0.0	0.0
LF.50	Starting Jerk (Not used, must set to 32.00)	ft/s^3	0.31 - 32.00	2.00	32.00
LF.51	Acceleration (Not used, must set to 12.00)	ft/s^2	0.30 - 12.00	3.00	12.00
LF.52	Flare Jerk (Not used, must set to 32.00)	ft/s^3	0.31 - 32.00	3.28	32.00
LF.53	Deceleration Rate (Not used, must set to 12.00)	ft/s^2	0.30 - 8.00	3.00	12.00
LF.57	Speed Following Error (0 = off, 1 = on,)	1	0 - 1	1	ON
LF.58	Speed Difference	%	0 - 30	10	10
LF.59	Trigger Time Speed Difference: Following error timer	sec	0.0 -1.0	1.0	1.0
LF.67	Pre-torque Gain	-	0.25 - 2.00	1.00	1.00
LF.68	Pre-torque Offset	%	-100.0 - 100.0	0	0
LF.69	Pre-torque Direction (0 = +V, 1 = -V)	1	0, 1	0	0
LF.70	Speed Pick Delay (Delay to turn on DRO)	sec	0.0 - 3.0	0.3	0.3
LF.76	Encoder Resolution Multiplier	1	0 - 13	2	2
LF.77	Absolute Encoder Position	1	0 - 65535h	0	0
LF.78	Brake Drop Delay. Time motor will hold full current and control after direction inputs drop.	sec	0.00 - 3.00	0.50	0.50

Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	Factory Setting
LF.79	Current Hold Time. Delay in turning off the drive (Delay to turn OFF the motor current after the direction is dropped and LF.78 has expired)	sec	0.00 - 3.00	0.30	0.30 - 0.80
Diagnostic Parameters (Read only)					
LF.25	Estimated gear ratio	1			
LF.80	Software version	-			
LF.81	Software date	-			
LF.82	X2-Input State	-	see tables in F5 Drive Manual		
LF.83	X2-Output State	-			
LF.86	Operation Mode	-			
LF.87	Actual Inverter Load (100% = rated load)	%			
LF.88	Motor Set Speed	rpm			
LF.89	Actual Motor Speed	rpm			
LF.90	Actual Elevator Speed	ft/m			
LF.93	Phase Current	A			
LF.94	Peak Phase Current	A			
LF.95	DC Bus Voltage	V			
LF.96	Peak DC Bus Voltage	V			
LF.97	Actual output frequency	Hz			
O.LF.98	Last Fault	-			
US Parameters					
US. 1	Password: With different passwords different parameter groups can be accessed for advanced programming.	-	-	-	-
US. 3	LF Parameter Reset: Entering a 1 causes all LF parameters to be reset to factory default values.	1	0 - 1	0	
US. 4	Load Configuration: Entering a 1 causes the configuration selected in US.10 to be loaded.	1	0 - 1	0	
US.10	Select Configuration: Selects the drive mode. IOPEn = Open loop induction ICLSd = Closed loop induction I9LSS = Closed loop induction gearless PCLSd = Closed loop permanent magnet (PM) P9LSS = Closed loop PM gearless	-	IOPEn ICLSd I9LSS PCLSd P9LSS	-	✳ ________
✳ Parameters are motor / machine / job dependent. ✳✳ Recommended but field adjustable. ✳✳✳ The value is automatically calculated from the motor data or other parameter values.					
Parameters for Drive Software Version (LF.80 Drive Software = 1.40) (LF.81 date code = 901.7)					

TABLE R.15 Quick Reference for TORQMAX F5 Drive Parameters (for F5 Drive Software ≥ V1.61)

QUICK REFERENCE FOR TORQMAX F5 DRIVE PARAMETERS
(IMC-AC / IMC-AC-R PRODUCT ONLY) (For Drive software ≥ V1.61)

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

WARNING: Parameters with an asterisk (✳) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

CAUTION: For permanent magnet (PM Synchronous) motors, consult the following sections of the TORQMAX F5 Drive manual before roping the machine,
5.5 *PM Synchronous Motors*, 5.8 *Encoder Feedback* and 5.11 *Running the Motor.*

Digital Operator Display	Parameter Description	Unit	Setting Range	Default Setting	Factory Setting
LF. 2	Signal operating mode: AbSPd - Absolute Analog Speed d SPd - Digital Speed Selection A tor - Analog Torque Control A Spd - Analog Speed Control SerSP - Serial Com. Speed Control bnSPd - Binary Speed Selection S POS - Serial Position feedback	-	AbSPd d Spd A tor A Spd SerSP bnSPd S POS	bnSPd	A Spd
LF. 3	Drive configuration: run - run mode conF - Configuration (5 minute time limit) EconF - Expired Configuration Stop - Drive stopped, motor can not run. Allows parameter changes when using serial communication. S Lrn - activate auto tune I Lrn - Inertia Learn. Learns the system inertia and activates the FFTC. P Lrn - Pole Learn. Learn the pole positions of PM Motor.	-	run conF EconF Stop S Lrn I Lrn P Lrn	conF	run
LF. 4	Motor-selection: Displays mode selected using US. 4 and US.10	-	see US.10	-	✳✳✳
LF. 5	Drive fault auto reset	1	0 - 10	5	5
LF. 8	Electronic motor overload protection	-	on, off	off	on
LF. 9	IM - Electronic overload current PM - not visible, auto set same as LF.12	A	1.0 - 110% Drive rated	8.0	✳
LF.10	IM - Rated motor power PM - read only, auto calc.	HP	0.00 - 125.00	5.00	✳
LF.11	Rated motor speed	rpm	10.0 - 6000.0	1165 or 150	✳
LF.12	Rated motor current	A	1.0 - 110% Drive rated	8.0	✳
LF.13	Rated motor frequency	Hz	4.0 - 100.0	60.0	✳
LF.14	Rated motor voltage IM - Name plate rated voltage PM - No-load, phase-to-phase back EMF rms voltage at LF.11	V	IM: 120 - 500V PM: 1 - 32000V/krpm	230/460	✳

Digital Operator Display	Parameter Description	Unit	Setting Range	Default Setting	Factory Setting
LF.15	IM: Power factor, PM: not visible	1	0.50 - 1.00	0.90	0.90
LF.16	IM: Field weakening speed, PM: not visible	rpm	0.0 - 6000.0	set @ 80% of LF.11	✳
LF.17	Rated motor torque, IM - read only, auto calc. PM - enter motor name plate torque	lb ft	1 - 10000	IM - calc. PM - 18	IM - ✳✳✳ PM ✳____
LF.18	PM: Motor stator resistance - from data sheet or learn procedure (see F5 Drive manual) IM : not visible	ohm	0.0 - 49.999	49.999	PM ✳_____
LF.19	Motor leakage inductance - from data sheet or learn procedure (see F5 Drive manual) IM : not visible	mH	0.01 - 500.00	1.00	PM ✳_____
LF.20	Contract speed	fpm	0 - 1600	0	✳
LF.21	Traction sheave diameter (measured value)	inch	7.00 - 80.00	24.00	✳
LF.22	Gear reduction ratio	1	1.00 - 99.99	30.00	✳
LF.23	Roping ratio	1	1 - 8	1	✳
LF.24	Load weight	lbs	0 - 30000	0	✳
LF.25	Estimated gear ratio: Read only, auto calc.	.01	1.00 - 99.99	-	✳✳✳
0.LF.26	Encoder Interface: displays feedback type	-	-	-	✳✳✳
LF.27	Encoder pulse number For IncIE and SinCo reference customer data For HIPEr set to 1024 For EndAt set to 2048	ppr	256 - 16384	1024	✳
LF.28	Encoder channel swap / direction 0 nothing reversed 1 encoder A<–>B swapped 2 motor rotation reversed 3 motor rotation reversed and A<–>B swapped	1	0 - 3	0	✳
LF.29	Encoder sample time (recommend gearless = 4, geared = 8)	mSec	0.5 - 32	4	✳ 4 or 8 ________
LF.30	Control mode 0, 1 Open loop induction motor operation 2 - Closed loop speed control (LF. 2 = A Spd) 3 - Closed loop speed control with pre-torque 4 - Closed loop torque control (LF. 2 = A tor) 5 - Close loop speed control with synthesized pre-torque	1	0 - 5	0	✳
A.LF.31	Kp speed accel: Proportional gain, accel & run	1	1 - 50369	3000	✳✳ 3000
d.LF.31	Kp speed decel: Proportional gain, decel	1	1 - 50369	3000	✳✳ 3000
P.LF.31	Kp speed torque (Synth. Pretorque)	1	1 - 50369	2000	2000
A.LF.32	Ki speed accel: Integral gain, accel & run	1	1 - 26214	350	✳✳ 350
d.LF.32	Ki speed decel: Integral gain, decel	1	1 - 26214	250	✳✳ 250
P.LF.32	Ki speed torque (Synth. Pretorque)	1	1 - 26214	10000	10000
A.LF.33	Ki speed offset accel: Gain at low speed, accel	1	0 - 8000	3000	✳✳ 3000
d.LF.33	Ki speed offset decel: Gain at low speed, decel	1	0 - 8000	1000	✳✳ 1000
0.LF.36	Maximum torque **(Auto calc by the drive)**.	lb ft	0 - 500%Trtd	Calculated	✳✳✳
1.LF.36	Maximum torque emergency operation (= LF.17)	lb ft	0 - 500%Trtd	Calculated	✳✳✳
LF.37	Open loop torque boost: Open loop op. only	%	0 - 25.5	5.0	5.0
LF.38	Carrier frequency; 0 = 8 KHz , 1 = 16KHz (**Note: set LF.38 = 0 if E.OL2 error on drive)**	1	0, 1	0	✳
LF.41	Leveling speed (Not used, must set to 0)	fpm	0 - 25	0.0	0.0

Digital Operator Display	Parameter Description	Unit	Setting Range	Default Setting	Factory Setting
LF.42	High speed	fpm	0.0 - LF.20	0.0	✳
LF.43	Inspection speed (Not used, must set to 0)	fpm	0.0 - 150.00	0.0	0.0
LF.44	High leveling speed (Not used, must set to 0)	fpm	0.0 - LF.20	0.0	0.0
LF.45	Earthquake speed 1 (Not used, must set to 0)	fpm	0.0 - LF.20	0.0	0.0
LF.46	Emergency Power speed 2 (Must be set to 0)	fpm	0.0 - LF.20	0.0	0.0
LF.47	Intermediate speed (Not used, must set to 0)	fpm	0.0 - LF.20	0.0	0.0
Note: Parameters LF.50 through LF.56 default to oFF when LF.2 is set to AbSPd, A Spd or A Tor.					
0.LF.50	Profile 1 - Starting jerk (not used)	ft/s^3	see note	see note	oFF
0.LF.51	Profile 1 - Acceleration (not used)	ft/s^2	see note	see note	oFF
0.LF.52	Profile 1 - Acceleration jerk (not used)	ft/s^3	see note	see note	oFF
0.LF.53	Profile 1 - Deceleration jerk (not used)	ft/s^3	see note	see note	oFF
0.LF.54	Profile 1 - Deceleration (not used)	ft/s^2	see note	see note	oFF
0.LF.55	Profile 1 - Approach jerk (not used)	ft/s^3	see note	see note	oFF
1.LF.50	Profile 2 - Starting Jerk (not used)	ft/s^3	see note	see note	oFF
1.LF.51	Profile 2 - Acceleration (not used)	ft/s^2	see note	see note	oFF
1.LF.52	Profile 2 - Acceleration jerk (not used)	ft/s^3	see note	see note	oFF
1.LF.53	Profile 2 - Deceleration jerk (not used)	ft/s^3	see note	see note	oFF
1.LF.54	Profile 2 - Deceleration (not used)	ft/s^2	see note	see note	oFF
1.LF.55	Profile 2 - Approach jerk (not used)	ft/s^3	see note	see note	oFF
2.LF.50	Profile 3 - Starting jerk (not used)	ft/s^3	see note	see note	oFF
2.LF.51	Profile 3 - Acceleration (not used)	ft/s^2	see note	see note	oFF
2.LF.52	Profile 3 - Acceleration jerk (not used)	ft/s^3	see note	see note	oFF
2.LF.53	Profile 3 - Deceleration jerk (not used)	ft/s^3	see note	see note	oFF
2.LF.54	Profile 3 - Deceleration (not used)	ft/s^2	see note	see note	oFF
2.LF.55	Profile 3 - Approach jerk (not used)	ft/s^3	see note	see note	oFF
LF.56	Stop jerk (not used)	ft/s^3	see note	see note	oFF
Note: Parameters LF.50 through LF.56 default to oFF when LF.2 is set to AbSPd, A Spd or A Tor.					
LF.57	Speed following error (0 = off, 1 = on,)	1	off, on	on	on
LF.58	Speed difference	%	0 - 30	10	10
LF.59	Trigger time speed difference: Following error timer	sec	0.0 -1.0	1.0	1.0
LF.61	Emergency operation mode		Off, SPd1, SPd2, SPd3, di 1	off	off
LF.67	Pre-torque gain	-	0.25 - 2.00	1.00	1.00
LF.68	Pre-torque offset	%	-100.0 - 100.0	0.00	0.00
LF.69	Pre-torque direction (-1 = -V, 1 = +V,)	1	-1, 1	1	1
LF.70	Speed pick delay (Delay to turn on DRO)	sec	0.0 - 3.0	0.30	0.30
LF.71	Brake pick delay	sec	0.0 - 3.0	0.05	0.05
LF.76	Encoder resolution multiplier 2 for incremental encoder 8 for Sin/Cos, EnDat or Hiperface endoder	1	0 - 13	2	
LF.77	Absolute encoder position (measured)	1	0 - 65535h	0	✳
LF.78	Brake drop delay. Time motor will hold full current and control after direction inputs drop.	sec	0.00 - 3.00	0.50	0.50
LF.79	Current hold time. Delay in turning off the drive (Delay to turn OFF the motor current after the direction is dropped and LF.78 has expired)	sec	0.00 - 3.00	0.30	0.30

Digital Operator Display	Parameter Description	Unit	Setting Range	Default Setting	Factory Setting
Diagnostic Parameters (Read only)					
LF.25	Estimated gear ratio	1			
LF.80	Software version	-			
LF.81	Software date	-			
LF.82	X2A input state	-	see tables in F5 Drive Manual		
LF.83	X2A output state	-			
LF.86	Operation mode	-			
LF.87	Actual inverter load (100% = rated load)	%			
LF.88	Motor command speed	rpm			
LF.89	Actual motor speed	rpm			
LF.90	Actual elevator speed	ft/m			
LF.93	Phase current	A			
LF.94	Peak phase current	A			
LF.95	Actual DC voltage	V			
LF.96	Peak DC voltage	V			
LF.97	Actual output frequency	Hz			
O.LF.98	Last error	-			
US Parameters					
US. 1	Password: With different passwords different parameter groups can be accessed for advanced programming.	-	-	-	-
US. 3	Load defaults: Select LoAd and press ENTER to cause all LF parameters to be reset to drive default values.	-	LoAd	-	
US. 4	Load configuration: Select LoAd and press ENTER to load the configuration selected in US.10.	-	LoAd	-	
US.10	Select configuration: Selects the drive mode. ICLSd - Close loop induction I9LSS = Closed loop induction gearless PCLSd = Closed loop permanent magnet (PM) P9LSS = Closed loop PM gearless	-	ICLSd I9LSS PCLSd P9LSS	-	✳ ________

✳ Parameters are motor / machine / job dependent.
✳✳ Recommended but field adjustable.
✳✳✳ The value is automatically calculated from the motor data or other parameter values.

Parameters for Drive Software Version (LF 80 Drive Software = 1.61 or greater) (LF.81 date code = 2801.9 or greater)

Job #:
Production Order #:
Drive Model #:
Drive Serial #:
Test technician:
Date:

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