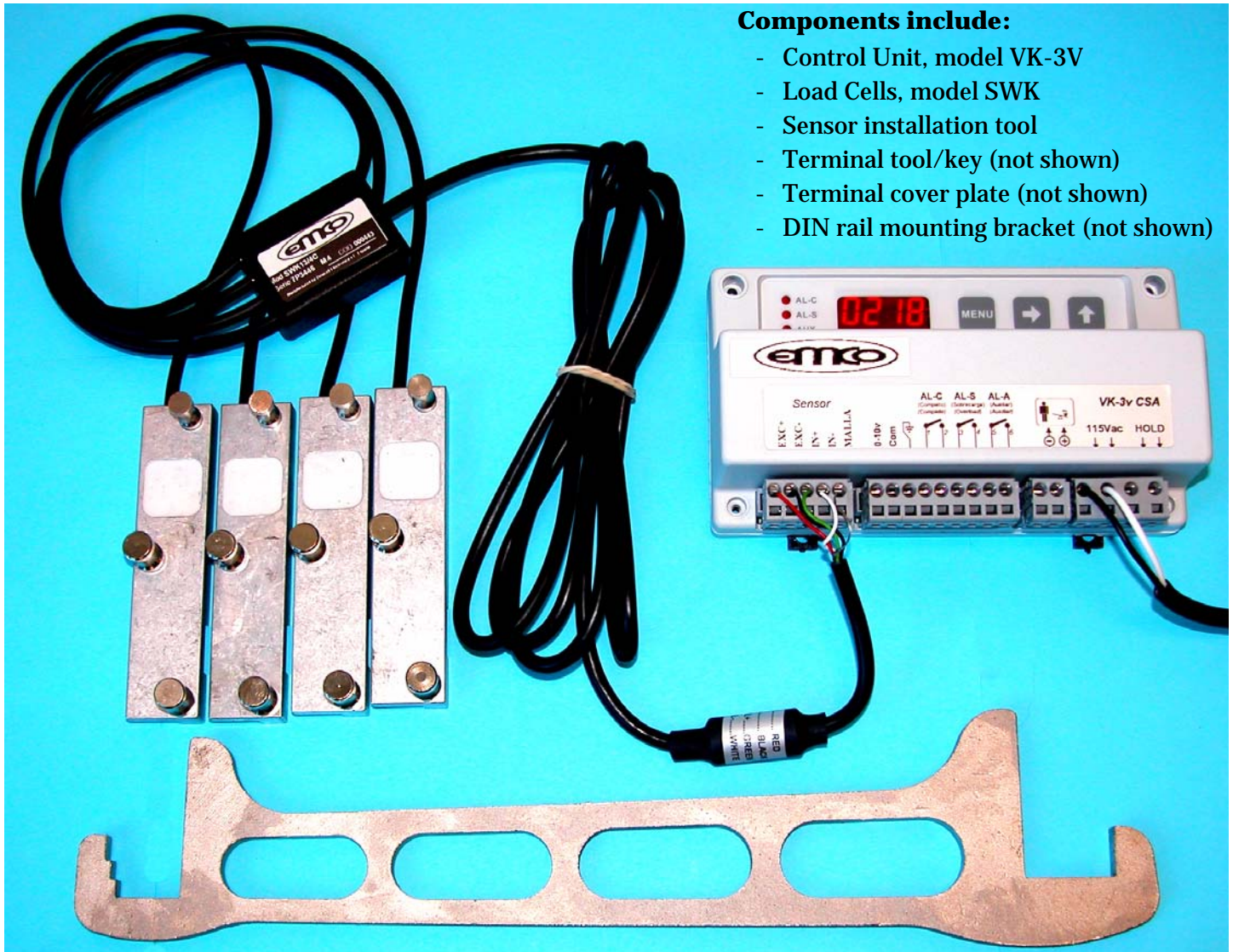


EMCO Load Weigher Installation and Calibration

This instruction pertains to the installation and calibration of the Elevator Motors Corporation, EMCO, Load Weigher. The following topics are covered:

- Installing the EMCO Load Cells (Sensors) (see [page 2](#))
- Installing the EMCO Control Unit and connecting the wires (see [page 3](#))
- Control Unit description of operation (see [page 4](#))
- Load Weigher calibration procedure ([page 5](#))
- Final calibration with iControl (see [page 8](#))
- Final calibration with IMC controller (see [page 9](#))
- Installation with 2 to 1 roping (see [page 10](#))
- Verifying the zero calibration (empty car weight) (see [page 11](#))
- Troubleshooting (see [page 11](#))

EMCO Load Weigher



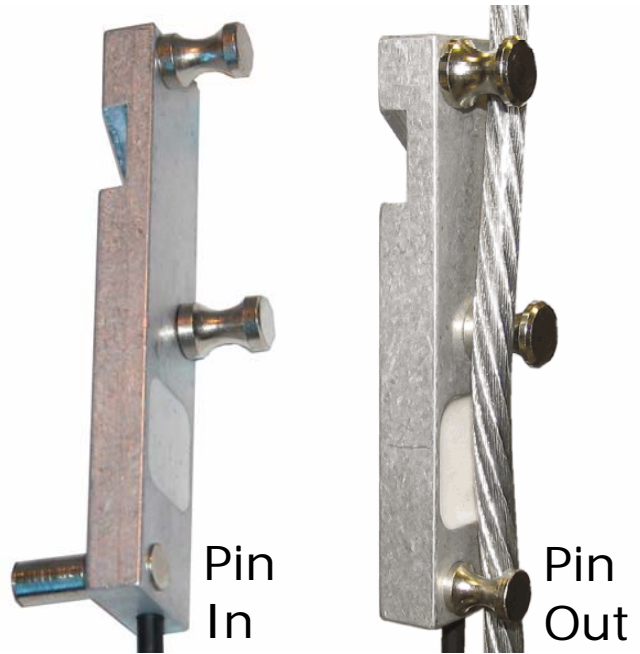
Components include:

- Control Unit, model VK-3V
- Load Cells, model SWK
- Sensor installation tool
- Terminal tool/key (not shown)
- Terminal cover plate (not shown)
- DIN rail mounting bracket (not shown)

Installing the Sensors

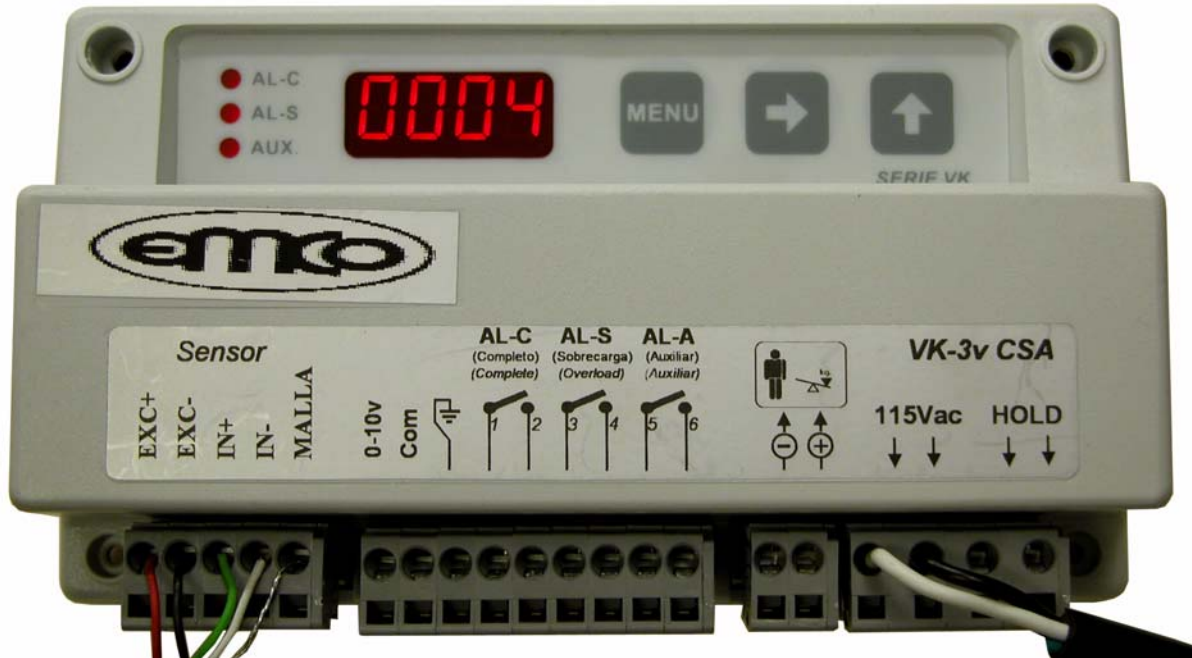
The model SWK sensors are installed using the tool supplied. In some instances it may be necessary to extend the length of the handle to gain more leverage.

1. Typically the sensors are mounted on the wire ropes directly above the cartop hitch. However, with 2 to 1 roping the sensors must be mounted below the dead-end hitch beneath the overhead. [Please refer to "Installation with 2 to 1 Roping" on page 10.](#)
2. Notice that one of the sensor's pins moves in and out. Move the pin to the in position as shown.
3. Place the sensor on the wire rope and using the installation tool, apply leverage to rotate the sensor until the pin can be moved to the out position as shown.



Installing the Control Unit and Connecting the Wires

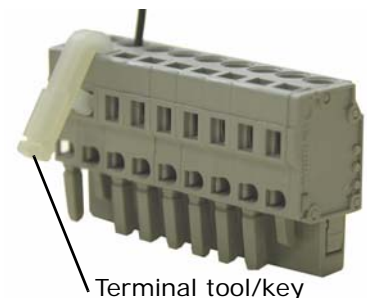
The control unit may be mounted using the DIN mounting bracket supplied or using the holes in the sensor itself. Choose a convenient location on the cartop. (For iControl, if there is space, the control unit could be mounted inside the iLink enclosure.)



Three sets of wires must be connected to the EMCO VK-3v control unit:

1. a. For iControl, EMCO control unit output to ICE-CTP board in the iLink Cartop box:
 - connect CTP board terminal LW- to EMCO control terminal Com.
 - connect CTP board terminal LW+ to EMCO control terminal 0-10v.
 - connect CTP board terminal SHLD to the cable shield (do not connect the shield to the EMCO control unit).
1. b. For IMC or Performa, EMCO control unit output, through the traveler, to controller.
 - connect SCR-RI (or SCR-RIX) board terminal LW- to EMCO control terminal Com.
 - connect SCR-RI (or SCR-RIX) board terminal LW+ to EMCO control terminal 0-10v.
1. c. If discrete inputs are used, connect the controller inputs to the EMCO control unit relays per the job prints.
2. 115Vac power, connected to the terminals labeled 115Vac.
3. Sensor wires, connect the control unit as indicated on the sensor wire:
 - red wire to terminal EXC+
 - black wire to terminal EXC-
 - green wire to terminal IN+
 - white wire to terminal IN-
 - shield wire to terminal MALLA

Use the Terminal tool/key (wire insertion tool), or a narrow flat blade screwdriver to open the detent in the terminal connector to allow insertion of the tinned wires.








PROGRAMMING the EMCO VK-3v Control Unit

Description of Operation

The purpose of the EMCO Load Weigher system is to measure the load in the elevator and provide usable information about the load to the elevator controller. This information is used for pre-torquing and for dispatching decisions, e.g. light load anti-nuisance, heavy load and overload.


The system usually consists of a sensor or group of sensors mounted on the elevator's wire ropes and a control unit. The sensor(s) provide a signal to the control unit directly related to the amount of load in the cab. The load weigher control accepts this signal and provides usable data to the elevator controller in the form of an analog signal and discrete relay contacts.










How to Program the EMCO Load Weigher Control Unit

- Press the  menu button until the display shows the desired parameter to be changed.
- Press the  button to select the digit to be modified (digit blinks when selected).
- Press the  button to change the digit.
- Press the  menu button twice to save the new value. Once a value is saved the control will display the next parameter.
- If you do not press the  menu button twice the changes will not be stored and the control display will continue to show the parameter you were modifying.

Menu/Programming Order

Installation Menu

Pressing the  menu button will scroll through the Installation Menu in the following order:

	- Measured weight in car (value displayed varies with load in car)
	- Relay C set point (also sets the analog output 10Vdc reference value)
	- Relay S set point
	- Relay A set point
	- Learn empty car weight (zero weight)
	- Learn a known weight (calibrate with weights)
	- Calibrate without weights (not used)
	- Auto-zero calibration (used as required)
	- (not used)











Calibration









Manual Calibration with Weights

The Calibration with Weights procedure is the most accurate and recommended method of calibrating the EMCO Load Weigher. This procedure allows the EMCO control unit to do the following:

- Learn the empty weight of the car and set this weight as the zero reference (the analog voltage output from the control unit will be about zero volts at this weight).
- Learn a known weight. You place a known weight in the car and enter the value of the weight into the control unit. The load weigher will then learn this weight
- If you are using the EMCO load weigher's analog output, you will enter the value of the car's overload weight into the control unit. The control unit will use this information to scale the analog output so that when the sensors detect the overload weight, the output voltage is about 10 volts. The analog output for the weights between empty car weight and overload weight will then be linear from about 0.0 volts to 10 volts.
- If you are using the relays, you will enter the set points for each relay.







Calibration procedure:
















1. Before programming or calibrating the sensors and control unit:
 - Bring car to the lowest floor of its total travel.
 - Bounce in car to verify that it is free on guide rails.
2. Verify that the sensors are properly connected to the control unit.
3. Power up the control unit and verify that the input voltage is within the voltage range of the control unit.
4. Verify that the sensors are installed on the wire ropes per the previous instructions.
5. **Learn the empty car weight (Zero the control unit):**
 - Press the  menu button until  is displayed.
 - Press the  button once. The display will flash.
 - While the display is flashing, press the  menu button once. If the display stops flashing before you press the menu button, you must start over.
 - The control unit's display begins to count down. Exit the cartop before the countdown finishes.
 - When the zero calibration is complete,  will be displayed. If  is not shown, the value has not been saved and this step must be repeated.
6. **Learn a known weight (full load weight recommended):**
 - Press the  menu button until  is displayed, if it is not shown already.
 - Place a known weight to the car (full load weight recommended).
 - Enter the value of the known weight. Press the  button to select a digit (blinks when selected) and press the  button to set the value. **Note:** If the overload weight (125% of full load weight) exceeds 9999 lbs, enter a percentage of the full load weight. For example, if the full load weight is 12,000 lbs, you could scale it to 75% by entering 9000 (12,000 x .75) or to 50% by entering 6,000 (12,000 x .5).

- Press the  menu button twice. The control unit's display begins to count down. Exit the cartop before the countdown finishes. When the known weight has been learned,  will be displayed. You can press the  menu button until the weight is shown on control unit display. The weight displayed should be the value of the weights in the car, or the scaled value.
7. **Enter the overload weight:** Perform steps 7, 8 and 9 only if the load weigher's analog output will be used (references the analog output to 10Vdc at this weight):
 - Press the  menu button until  is displayed.
 - Enter the value of the overload weight (or the value of the overload weight scaled by the same percentage used in step 6). Press the  button to select a digit (blinks when selected) and press the  button to set the value.
 - Press the  menu button three times. (Note that when the menu button is pressed once, it displays "On" to allow you to set the AL C relay to normally open or normally closed. If only the analog output is being used, continue pressing the menu button two more times to save the value).
 8. With the full load of weights in the car, using a digital multimeter, measure the voltage at terminals **0-10v** and **Com** on the control unit. It should be approximately 8 volts. Note the exact value.
 9. Proceed to one of the following sections depending on the controller type:
 - **iControl** - *Final Calibration with iControl* on [page 8](#) and *Additional iControl Settings and Procedures* on [page 9](#).
 - **IMC or Performa** - *Final Calibration with IMC or Performa Controllers* on [page 9](#) and *Additional IMC or Performa Settings and Procedures* on [page 9](#).

Using the Discrete (Relay) Outputs

Each controller is engineered for a specific job. The set points for the relays, AL C, AL S, and AL A must be programmed according to the job prints (typical uses and settings indicated):

- Light Load - 25% or less of full load, relay set to ON, normally closed.
 - Dispatch Load - 60% of full load, relay set to OFF, normally open.
 - Heavy Load - 80% of full load, relay set to OFF, normally open.
 - Overload - 100% of full load, relay set to OFF, normally open.
 - Overload 2 - 125% of full load, relay set to OFF, normally open.
1. Enter the trip point for relay AL C - (EMCO terminal #2 on the job prints).
 - Press the  menu button until  is displayed.
 - Enter the value of the desired trip point weight (or the value of the weight scaled by the same percentage used in step 6). Press the  button to select a digit (blinks when selected) and press the  button to set the value.
 - Press the  menu button once. The display indicates "On" which equals normally closed. Press the  button if you want to change it to "Off", normally open. Normally open/Off causes weight greater than the set point weight to activate the input using this relay. Normally closed/On causes weight less than the set point weight to activate the input using this relay.

- Press the  menu button twice to save the settings.
2. Enter the trip point for relay AL S - EMCO terminal #4 on the job prints).
 - Press the  menu button until  is displayed.
 - Enter the value of the desired trip point weight (or the value of the weight scaled by the same percentage used in step 6). Press the  button to select a digit (blinks when selected) and press the  button to set the value.
 - Press the  menu button once. The display indicates “On” which equals normally closed. Press the  button if you want to change it to “Off”, normally open. Press the  menu button twice to save the settings.
 3. Enter the trip point for relay AL A - EMCO terminal #6 on the job prints).
 - Press the  menu button until  is displayed.
 - Enter the value of the desired trip point weight (or the value of the weight scaled by the same percentage used in step 6). Press the  button to select a digit (blinks when selected) and press the  button to set the value.
 - Press the  menu button once. The display indicates “On” which equals normally closed. Press the  button if you want to change it to “Off”, normally open. Press the  menu button twice to save the settings.






Auto-zero Calibration

The EMCO load weigher has an auto-zero calibration option which can be used if needed. Typically this option is recommended for 2 to 1 roping or where guide shoes, rather than guide rollers, are used.

How auto-zero calibration works:

- The control unit must see no power on the Hold terminals. Some installations use these terminals to indicate when the doors are closed, but with MCE controllers these terminals are not used.
- The CAde parameter must be set to 50.
- When the control unit senses no change in weight for two minutes, it automatically performs the CEro zero load calibration (learns the empty car weight).

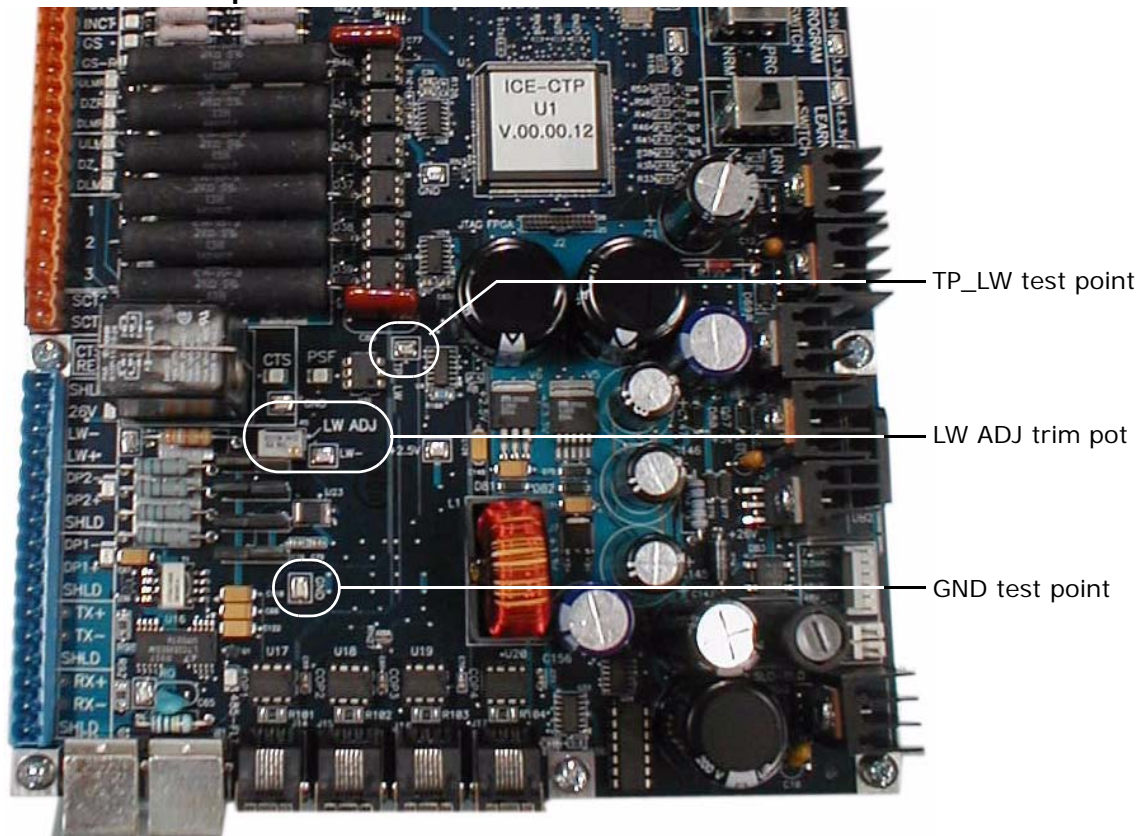
To enable auto-zero calibration:

1. Press the  menu button until  is displayed.
2. Enter the value 50. Press the  button to select a digit (blinks when selected) and press the  button to set the value.
3. Press the  menu button twice to save the value.

Final Calibration with iControl

1. Connect the multimeter to test points **TP_LW** and **GND** on the ICE-CTP board inside the iLink Cartop Box. Adjust trimpot **LW ADJ** until the multimeter reads the same as the value noted in step 8 of the Manual Calibration with Weights procedure.

Figure 1. ICE-CTP Cartop Processor Board



2. To view the voltage values from the load weigher using the iView Virtual Oscilloscope:
 - Using iView, connect to the controller
 - Display the Virtual Oscilloscope (View > Virtual Oscilloscope)
 - Select Load Weigher (Raw) for Test point 1
 - Observe the Load Weigher voltage values on the digital display.
3. To verify the linearity of the load weigher, place weights in the car that represent the following and observe the voltage values:
 - Empty car - about 0.0 volts
 - 25% of overload weight - about 2.5 volts
 - 50% of overload weight - about 5.0 volts
 - 75% of overload - about 7.5 volts
 - Full load weight - about 8 volts
 - Overload weight - about 10 volts

Additional iControl Settings and Procedures

Verify the following iControl settings and procedures:

1. On the iView Controller > Configuration > Load Weigher tab:
 - Set *Load weighing device type* to *Analog signal*.
 - Set *Sensing type* to *Cross head deflection or rope tension sensing*.
2. If the load weigher will be used to implement dispatching options, the parameters associated with these options must be set (see *Load Weigher Adjustment for Dispatching* in Section 4 of the iControl User Guide).
3. iControl needs to learn the empty and full load weights at every landing available to this car. This is a semi-automated process (see *Learning Load Values* in Section 4 of the iControl User Guide).

Final Calibration with IMC or Performa Controllers

1. Connect the multimeter to terminals LW+ and LW- on the SCR-RI (or SCR-RIX) board inside the IMC controller. Verify that the reading is the same as the measurement at terminals 0-10v and Com on the EMCO control unit.
2. To verify the linearity of the load weigher, place weights in the car that represent the following and observe the voltage values:
 - Empty car - about 0.0 volts
 - 25% of overload weight - about 2.5 volts
 - 50% of overload weight - about 5.0 volts
 - 75% of overload - about 7.5 volts
 - Full load weight - about 8 volts
 - Overload weight - about 10 volts

Additional IMC or Performa Settings and Procedures

1. If the load weigher will be used for pre-torque, refer to the instructions in the *Adjusting the Pre-Torque on Gearless Applications* section of the controller installation manual.
2. If the load weigher will be used for dispatching options, e.g., light load anti-nuisance, dispatch load (lobby door dwell cancel), heavy load (hall call bypass) or overload options, the controller needs to learn the empty and full load weights at every landing available to this car. Please refer to the *Load Weigher Adjustment for Dispatching* section of the controller installation manual.
3. If the load weigher will be used to implement dispatching options, the parameters associated with these options must be set. Please refer to the *Adjusting the Load Thresholds* section of the controller installation manual.

Installation with 2 to 1 Roping

When the EMCO load weigher is used with 2 to 1 roping, the components must be installed in locations that are different from a 1 to 1 roping application.

The load cells (sensors) must be installed just below the dead-end hitch, as shown.

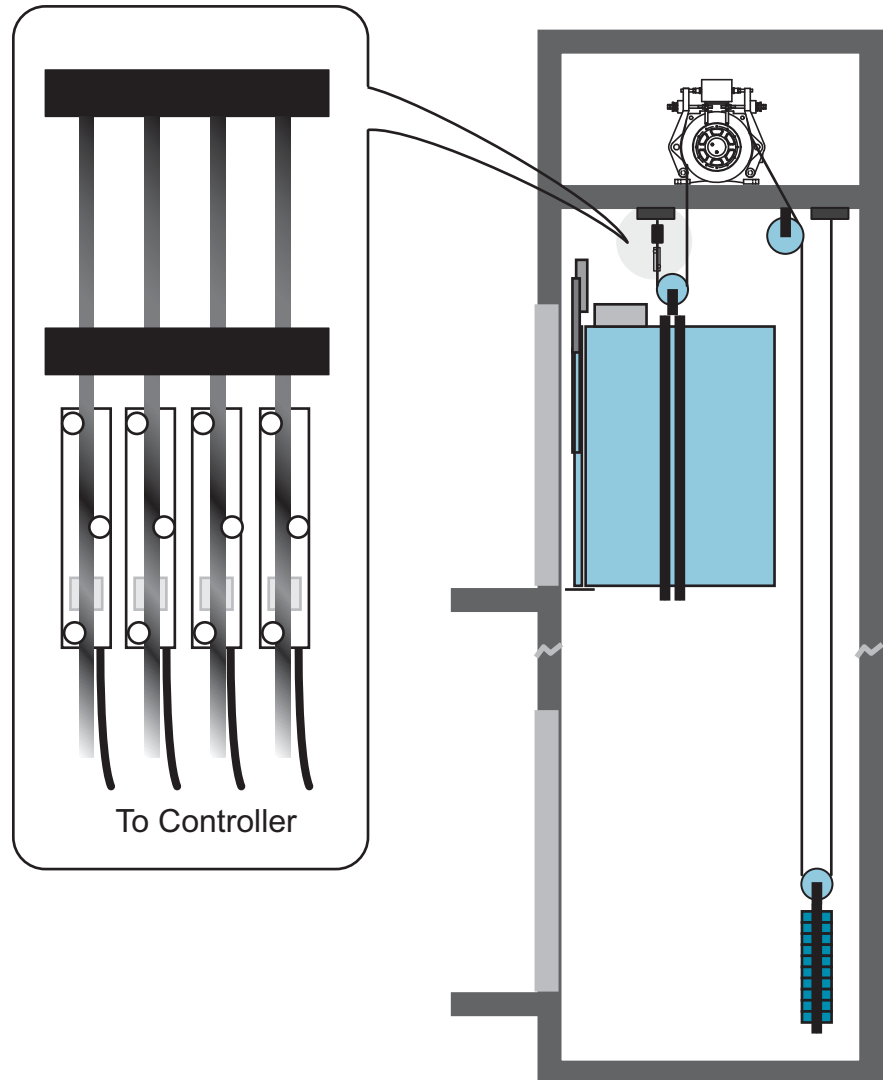
It is recommended that the EMCO control unit be mounted in the controller cabinet.

The signal wires from the load cells must be routed through the overhead to the machine room. The sensor wires, which are only 6 feet in length, must be extended. It is recommended to use a terminal block to join the wires and to route the extended wires through a flexible or rigid conduit.

For an IMC or Performa installation, the output from the EMCO control unit can be connected directly the LW+ and LW- terminals on the SCR-RI (or SCR-RIX) board inside the controller cabinet.

For an iControl installation, the output signal from the EMCO control unit must be routed through the traveler to the LW+, LW- and SHLD terminals on the ICE-CTP board located inside the iLink Cartop box.

It is recommended to enable the Auto-zero Calibration option for a 2 to 1 roping installation. [Please refer to “Auto-zero Calibration” on page 7.](#)



Verifying the zero calibration (empty car weight)

It is recommended to verify the zero calibration if:

1. When working with new ropes, the calibration may change slightly as the ropes settle. After the first 30 days of operation it is recommended to check the empty car weight, with the car in the middle of the hoistway, using the display on the EMCO Load Weigher. If the empty car weight has changed (no longer zero), at a minimum the empty car weight should be re-learned (steps 1 through 5 of the calibration procedure).
2. If the car experiences violent motion, e.g. emergency stop or car / counterweight contacts the buffers, it is recommended to check the empty car weight, with the car in the middle of the hoistway, using the display on the EMCO Load Weigher. If the empty car weight has changed (no longer zero), at a minimum the empty car weight should be re-learned (steps 1 through 5 of the calibration procedure).

Troubleshooting

1. Check for Err codes on the display.

Err1 = Bad load cell connection or damaged load cell. Verify that the load cells are connected to the control unit per the wiring diagram. Inspect the cables for cuts or broken wires.

Err2 = Negative load cell flow. Verify that the load cell connections to the control unit are per the wiring diagram.

Err3 = Positive load cell flow. Load cells are too small for the application and must be replaced with proper units.

Err4 = Polarity error. Verify that the load cell connections to the control unit are per the wiring diagram. Reprogram the control.

Err5 = MB-D display short. Locate the short. Disconnect MB-D display, turn off the control and reconnect the MB-D display.

Err6 = Loss of data in memory. Reprogram the control.

2. Verify that proper voltage is being supplied to the control unit.
3. Check all of the connections to the control unit.
4. Check the fuse. To check fuse: Disconnect power to the control unit. Open the control unit by removing the five (5) screws that hold the cover. Remove fuse from vertical free mounting (black) fuse holder next to controller transformer and replace with new fuse if necessary.

**FOR FURTHER ASSISTANCE CONTACT:
MCE Technical Support**