

## Installing TLS-C-12-G2 or TLS-C-16-G2 Limit Switches

This instruction is intended for use by elevator mechanics who are installing the TLS-C-12-G2 or TLS-C-16-G2 Magnetically Activated Limit Switch Systems. If you are replacing a TLS-C-xx with a TLS-C-xx-G2 or TLSC-4-SW-MOD with a TLSC-4-SW-MOD-G2, please refer to the additional instructions on page 6.

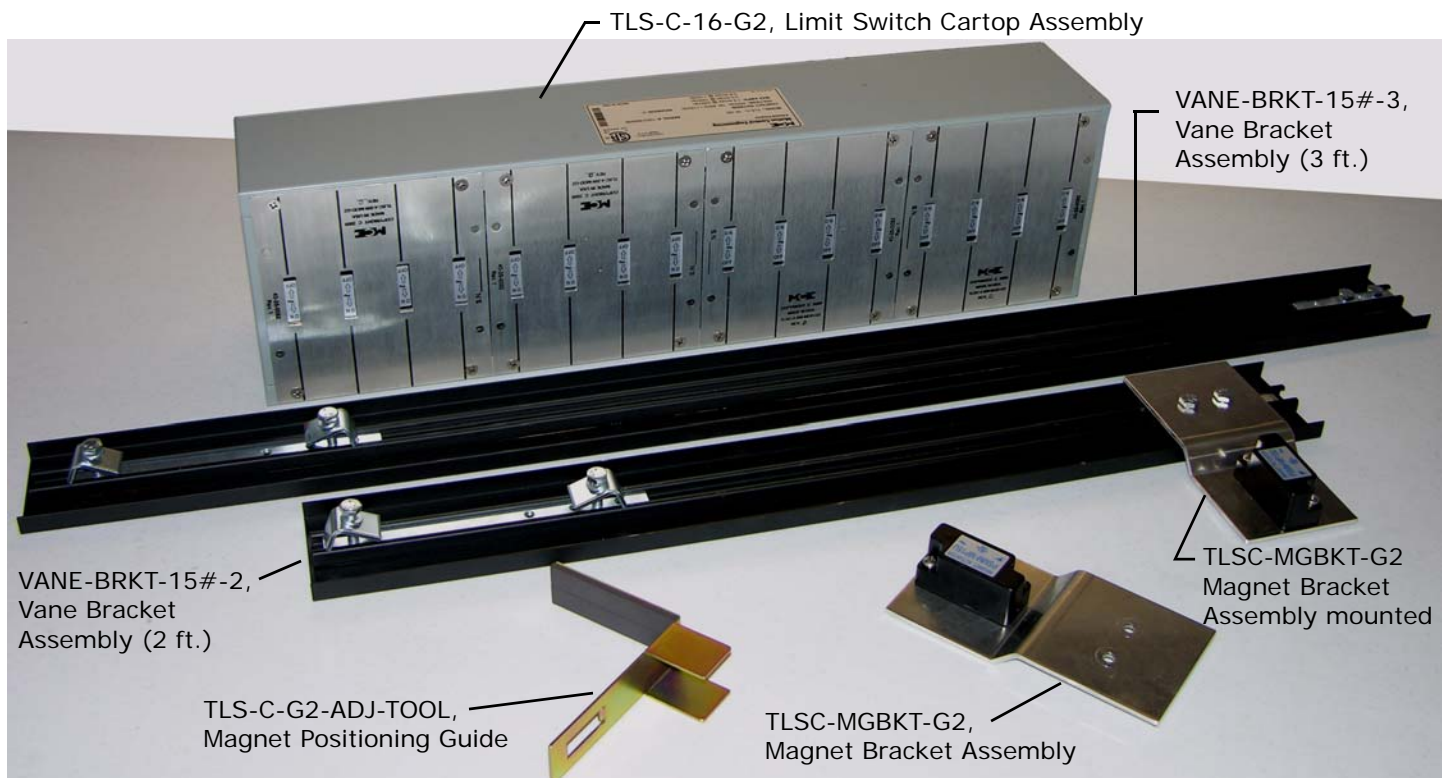
### Description

This product consists of an enclosure containing magnetically activated limit switches plus a number of vane and magnet bracket assemblies to be mounted on the rail. Each limit switch requires a corresponding actuating magnet. Vertical lines on the front of the enclosure show where the center of the actuating magnet must pass in order to actuate each limit switch. A Magnet Bracket Assembly is shown attached to a 2 foot Vane Bracket Assembly in Figure 1.

The TLS switches open or close when they pass an actuating magnet. Once a switch has passed a magnet, it remains in the same state, open or closed, until it passes the same magnet in the opposite direction. The magnets are placed near the terminals. The TLS switches must open as the car passes the magnets while moving towards a terminal. All of the magnets and switches are the same. However, the up switches are rotated 180 degrees with respect to the down switches so that the ON arrow on the face of the switch points towards the respective terminal.

The TLS unit should be mounted so that the side with the mounting holes is facing down. In this orientation, when looking at the faceplate, the down switches are on the left and the up switches are on the right. The switches can be seen through the holes in the faceplate. The ON arrow points towards the terminal (see “TLSC-4-SW-MOD-G2S Switch Module (front and rear)” on page 4).

Figure 1. TLS-C-12 (16) Limit Switch Components (typical)



## Mounting the Limit Switch Cartop Assembly

Remove the rear cover of the TLS Limit Switch Cartop enclosure (the screws for the rear cover do not have to be fully removed in order to remove the rear cover). The limit switch assembly should be mounted using the pre-drilled holes on the bottom of the enclosure.

- Use a 3 foot vane bracket, with a magnet bracket attached, to help position the enclosure. The magnet must be able to reach the switch that is furthest away from the crosshead. The vertical lines on the front of the enclosure show the location of the switches where the center of the magnet should be aligned.
- Note: The ideal running clearance between the magnet and the enclosure is 1/4 to 1/2 inch. The Magnet Positioning Guide will be used to correctly position the actuating magnets (see Figure 2).
- The wires may be brought in through any of the pre-punched knockout holes on the bottom or sides of the enclosure. Use a knockout punch, if necessary, to obtain the required hole size for the conduit.

## Installing the Vane and Magnet Bracket Assemblies

The vane brackets are mounted to the rail using the rail clips supplied with the assembly (see Figure 2). The rail size must be provided to MCE to ensure that the right size hardware is supplied. The rail size is given either in pounds or by measuring of the width of the back of the rail. **Note:** For best results, prior to installing and adjusting the Vane and Magnet Bracket assemblies, verify that all of the roller guides are running with adequate tension to prevent undue car movement due to an off center load in the car. Also, if you adjust the tension on the roller guides, be sure to verify that the clearance between the safety jaws and the rails is still within the tolerance specified in Requirement 2.17.10 of ASME A17.1 - 2007.

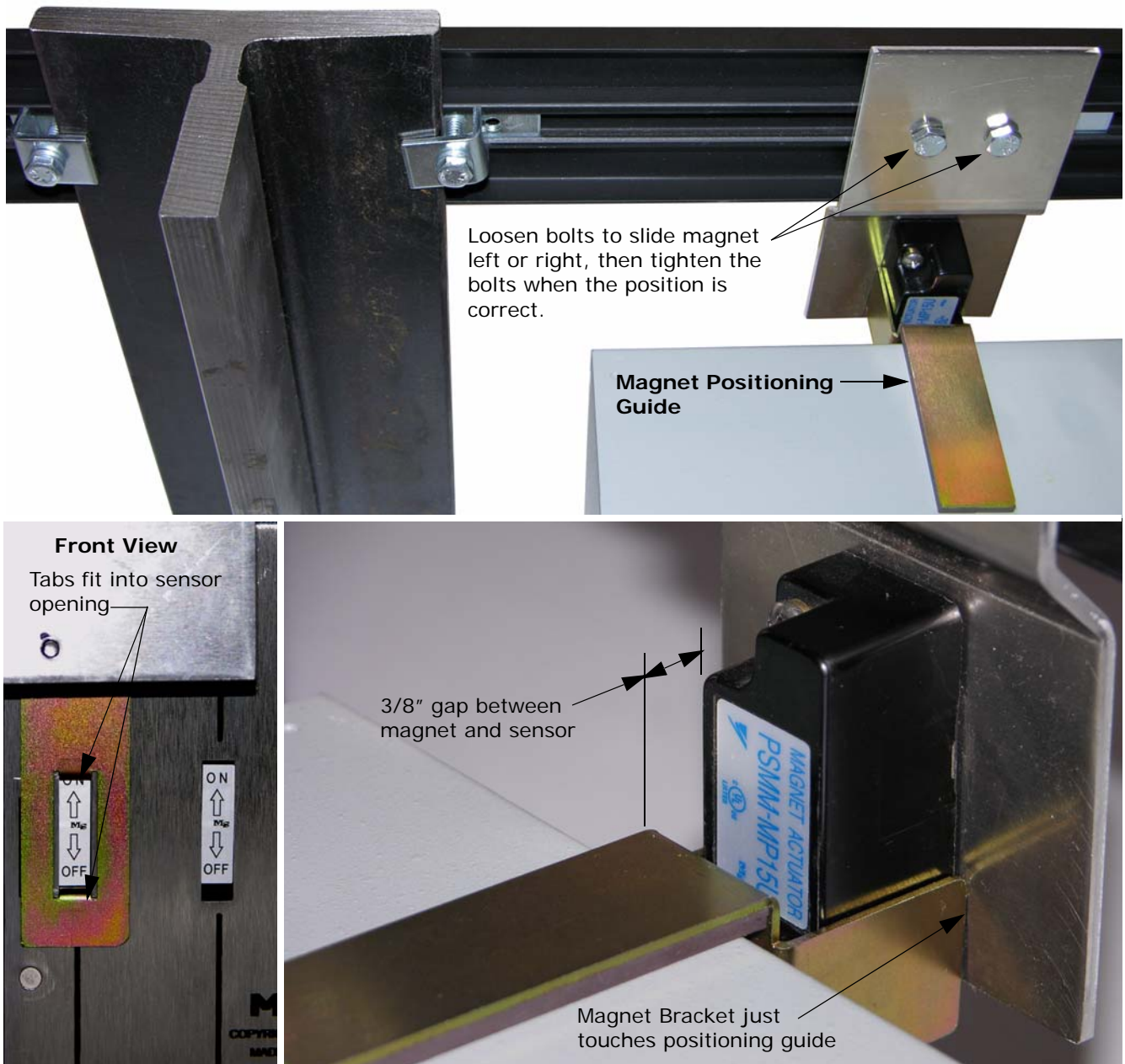
### Vane and Magnet Bracket Installation Instructions

1. The vane brackets are supplied in two lengths. The longer brackets (3 foot) are used for the switches farthest from the rail. The shorter brackets (2 foot) are used for the switches closest to the rail (see [“Limit Switch Layout Planning Table”](#) on page 7).
2. The cartop wiring print shows the distance from the terminal landings to where the limit switches must open. Install the vane brackets on the rail at the correct vertical location in the hoistway. Allow for an offset of 2” from the bottom of the vane bracket to the center of the magnet (magnet bracket mounted so that the magnet is below the bracket). **Note:** If a fish plate and/or a rail bracket interferes with the placement of a vane bracket, be aware that the magnet bracket assembly can be rotated 180 degrees thereby moving the vane bracket mounting point by up to 7 inches. If this does not solve the problem, in most cases it is OK to move the bracket mounting point several inches to avoid the obstruction. This is because the switch locations are “learned”. There are two possible exceptions to this:
  - where these switches are used as direction limits.
  - where you have a very short floor at the terminal landing and if moving the Up Slow Limit X switch or the Down Slow Limit X switch causes either switch to fail to open at the terminal landing or if it causes either of them to open inside of a door zone.
3. Adjust the position of the Limit Switch Cartop Assembly, relative to the magnets, so that the running clearance between any magnet and the enclosure is as close to 3/8 inch as possible. Use the Magnet Positioning Guide as a gauge (refer to Figure 2, Using the Magnet Positioning Guide).

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4. Position the car so that a magnet extends about 1 1/4" above the top of the Limit Switch Cartop Assembly. Use the Magnet Positioning Guide to align the center of the actuating magnets with the switches as shown in Figure 2.
  - To move the magnets left or right, loosen the two bolts holding the magnet bracket on the vane bracket, move the magnet bracket until the tabs on the Magnet Positioning Guide fit into the opening for the appropriate switch, then re-tighten the bolts.
  - The Magnet Bracket should just touch the Magnet Positioning Guide. The actuating magnet should not pass closer than 1/4 inch or more than 1/2 inch from the face of the cartop enclosure. It may be necessary to shim or bend the vane bracket to comply with this tolerance.

Figure 2. Using the Magnet Positioning Guide



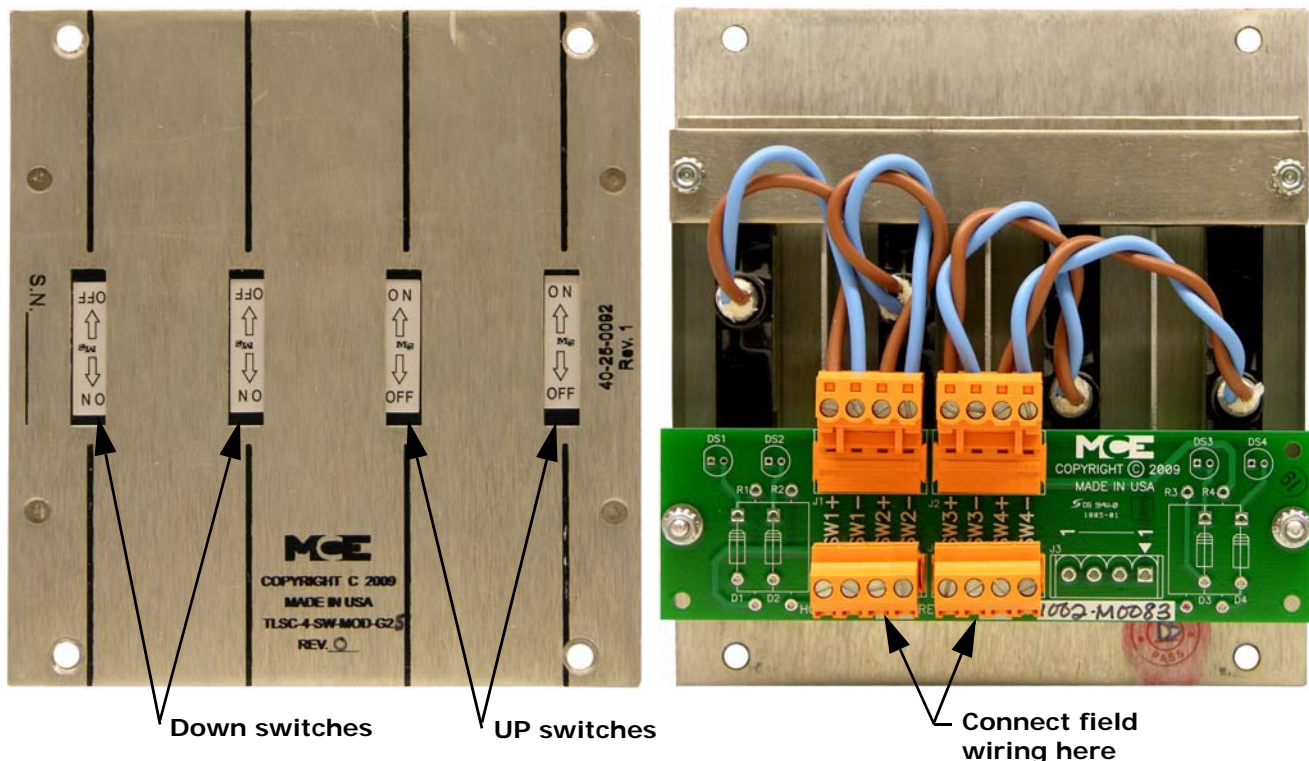
## Wiring

The wiring must comply with local code requirements, especially with regard to conduit size.

- Since the decision as to which side of the crosshead the enclosure will be mounted is usually made in the field, the terminals in the unit are not pre-labeled. They must be labeled by the installer. The labeling can be done on the “plug-in” terminals with an indelible marker.
- The terminals are the “plug-in” type, which makes it easy to attach the wires and then reconnect the terminal plug to the limit switch PC board.
- Note that there are two independent terminals for each switch. This is to allow maximum flexibility. Since many switches have the same common terminal for power supply, you may “daisy chain” these terminals as necessary.
- Be sure to ground the enclosure according to local electrical code. Use the grounding lug located inside the enclosure. Use #14 AWG wire as a minimum.

Figure 3 shows the front and rear views of a four switch module (TLSC-4-SW-MOD-G2S). This is the center module used in the TLS-C-12-G2 Limit Switch Cartop Assembly. Notice that it has two down switches (ON arrow points down) and two up switches (ON arrow points up). The switch modules can be easily rotated 180 degrees by removing the four mounting screws on the face plate.

Figure 3. TLSC-4-SW-MOD-G2S Switch Module (front and rear)



### Additional Application Information

The contacts on the TLS-C-12-G2 and TLS-C-16-G2 Limit Switch can be used for functions other than slowdown switches. The following are some examples:

**Note:** Ensure that the contact ratings as stated on the silver label are not exceeded.

#### Hoistway Access Limit Switches

You can use the contacts for Access Limit switches, to limit the movement of the car while on Access operation. This may make sense when you have contacts to spare in your enclosure, however, you may also want to consider using MCE's model TLS-1 magnetically activated limit switch as a hoistway-mounted access limit switch because it keeps the wiring strictly local to the access switch itself.

#### Direction or Normal Limit Switches

Except for jurisdictions prohibiting this function, you are permitted (in A.S.M.E. A17.1) to use the contacts on the TLS-C limit switch system for the “directional” or “normal” limit switches located just beyond the terminal landings.

#### Earthquake “Car Above/Below Counterweight” Switch

Consult your job engineer for this option.

### Prohibitions on Using TLS-C-12 (16) -G2 Limit Switches

Note that there can be certain prohibitions against using the TLS-C family of limit switches, and if they exist, these can be found in whatever applicable elevator code is used in your area. Some of the more common ones are outlined below, and apply as of May, 1999.

#### IN THE U.S.A.

- DO NOT USE for the “Emergency Terminal Speed Limiting Device” (which is required when you have a REDUCED STROKE BUFFER) if your Elevator Code is prior to A.S.M.E. A17.1-1996. Do NOT confuse this with “Emergency Terminal Stopping Devices” (which we sometimes refer to as ETS) in which case it is always permitted to use magnetically actuated limit switches such as the TLS-C-12-G2 or the TLS-C-16-G2.
- DO NOT USE for the “Final Terminal Stopping Device”, sometimes referred to as Final limit switches or Overtravel limit switches.
- DO NOT USE for any other application where the elevator code prohibits the use of magnetically actuated limit switches.

#### IN CANADA

- DO NOT USE for the “Final Terminal Stopping Device”, sometimes referred to as Final limit switches or Overtravel limit switches.
- DO NOT USE for any other application where the elevator code prohibits the use of magnetically actuated limit switches.

## Field Replacement using TLS-C-xx-G2 or TLSC-4-SW-MOD-G2

These instructions provide additional information that will be helpful if you are replacing a TLS-C-XX with a TLS-C-XX-G2 or if you are replacing an TLSC-4-SW-MOD four switch module with a TLSC-4-SW-MOD-G2.

The TLS-C-12-G2 and TLS-C-16-G2 Limit Switch Cartop Assemblies are physically the same as the TLS-C-12 and TLS-C-16 respectively and are similar in operation. The primary difference is as follows:

- With the TLS-C-XX, the orientation (polarity) of the magnet determines whether the switch opens or closes as it passes the magnet going in the up or down direction.
- With the TLS-C-XX-G2, the orientation of the switch itself determines whether the switch opens or closes as it passes the magnet in the up or down direction. The orientation of the magnet has no effect. [Please refer to “Description” on page 1.](#)
- The vane brackets are the same, but the magnet bracket assemblies are different and must be changed. In addition, the vertical location of the vane bracket must be adjusted.

Similarly, the four switch module (TLSC-4-SW-MOD-G2) is physically the same size as the TLSC-4-SW-MOD and can be used as a replacement. However, proper orientation must be observed, e.g., if a switch is being used as a down limit switch, the ON arrow on the switch must point towards the bottom terminal. This causes the switch to open as it passes the magnet in the down direction. Conversely, if a switch is being used as an up limit switch, the ON arrow on the switch must point towards the top terminal.

### Field Replacement Procedure

1. Become familiar with the usage of each switch in the current unit ([see “Limit Switch Layout Planning Table” on page 7](#)). Determine if the lane assignments used for the current unit are compatible with the orientation of the switch modules on the replacement unit. Determine if it will be necessary to either rotate some of the switch modules or change some of the lane assignments in order to accommodate the requirement that the ON arrow of each switch must point towards the terminal for which it is being used. Make modifications to the replacement unit as required.
2. Create a wiring diagram and label the terminals in the replacement unit to reflect any changes in lane assignments required.
3. Mount the replacement unit. [Please refer to “Mounting the Limit Switch Cartop Assembly” on page 2.](#)
4. Connect the wires based on the decisions made in steps one and two. [Please refer to “Wiring” on page 4.](#)
5. Travel through the hoistway, and perform the following, ([see “Installing the Vane and Magnet Bracket Assemblies” on page 2](#)):
  - Remove the old magnet brackets.
  - Install the new magnet bracket assemblies.
  - Adjust the height of the vane brackets.
  - Position the magnet bracket using the magnet positioning guide and tighten the bolts.

## Limit Switch Layout Planning

Use this form for planning the layout of your new installation or field replacement. Fill in the form as follows:

- **Use:** e.g., Up Limit #1. For a replacement, show the current use of the switch in this lane.
- **+ Wire:** color or number of wire (to be) connected to the plus terminal of this switch.
- **- Wire:** color or number of wire (to be) connected, to the minus terminal of this switch.
- **New Switch:** the proposed switch/lane on the replacement unit to be used for this use.
- **Vane Brkt:** the length of the vane bracket required, two or three feet.
- **Distance:** the distance from the terminal landing for this switch (reference MCE Job Engineering Print for specific placement/distance details).

**Table 1. Limit Switch Layout Planning Table**

Switch /Lane	Use	+ Wire	- Wire	New Switch	Vane Brkt	Distance
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						