

# **IMPORTANT**

## **Engineering Bulletin #110 M00352 Limit Board Installation & Adjustment on Series 90 Controllers**

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## **O. Thompson M00352 Limit Board**

The O. Thompson M00352 Limit board is designed to comply with the latest version of ANSI and Canadian elevator codes. It performs the NTS (Normal Terminal Stopping, ANSI Rule 209.2) function by clamping the speed reference signal from the MPU or the speed board to the drive or regulator. It performs the ETS (Emergency Terminal Stopping, ANSI Rule 209.4b) function by opening a series of contacts in the elevator's safety circuit.

The M00352 Limit board uses a processor to monitor car speed and the status of the hoistway limit switches. If the car speed exceeds that which is safe for an approach to the top or bottom terminal floor, the Limit board will open the safety circuit, removing power from the brake and hoist motor. This will stop the car close to the terminal floor, allowing the passengers (if any) to get off the car.

### **Limit Board Mounting**

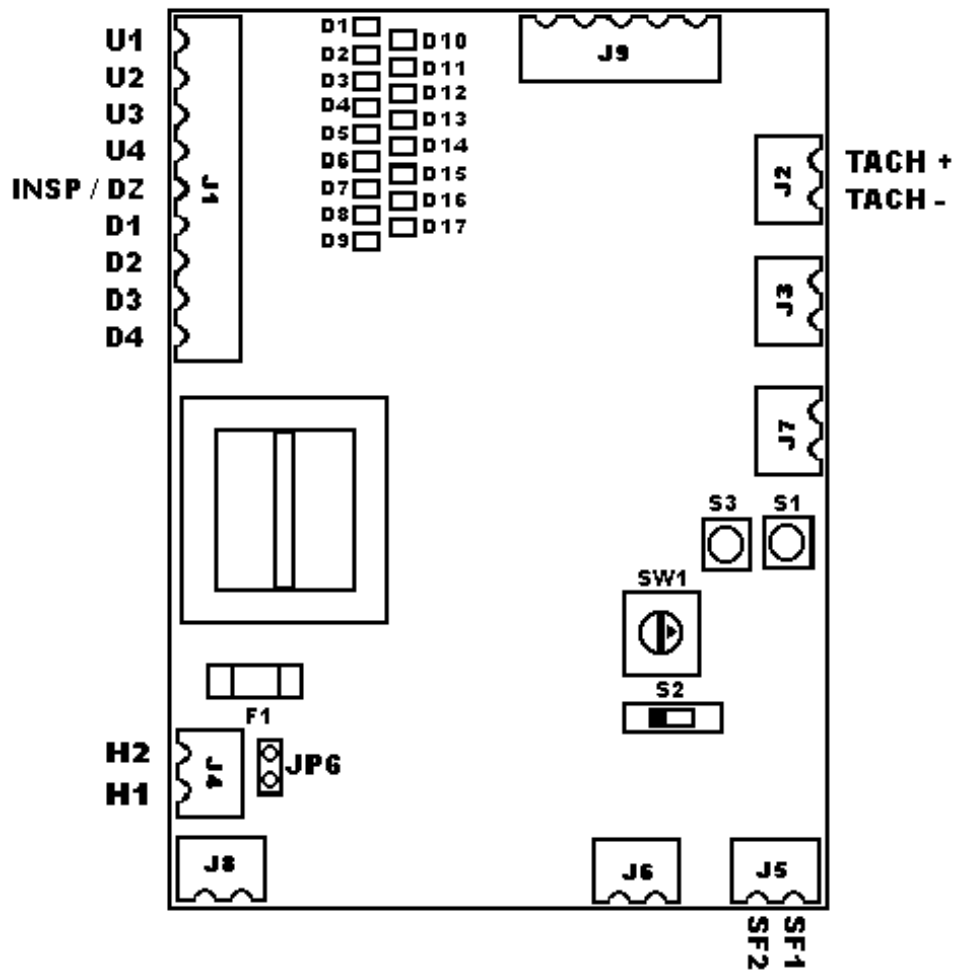
The mounting holes on the new board are positioned such that the new board will use the existing mounting holes on most controllers.

Position the Limit board so that it is aligned with the existing mounting holes on the right side. Install the mounting screws and stand-offs, securing the new board to the controller.

Before the Limit board can be adjusted, it must be wired correctly. The board was designed so that the wiring from the existing board will connect to the new board. You may, however, have to re-route or lengthen the wires that connect to some of the terminals. Due to the smaller size of the new board, some of the terminals have been relocated about 5 inches away. Refer to Figure 1 on the following page for the correct terminals.

**Please Note:** Not all limit switch input terminals are used on Series 90 applications. There should be no wires on the existing board on terminals U1, U2, D1, or D2. U3 and D3 may or may not be connected, depending on car speed.

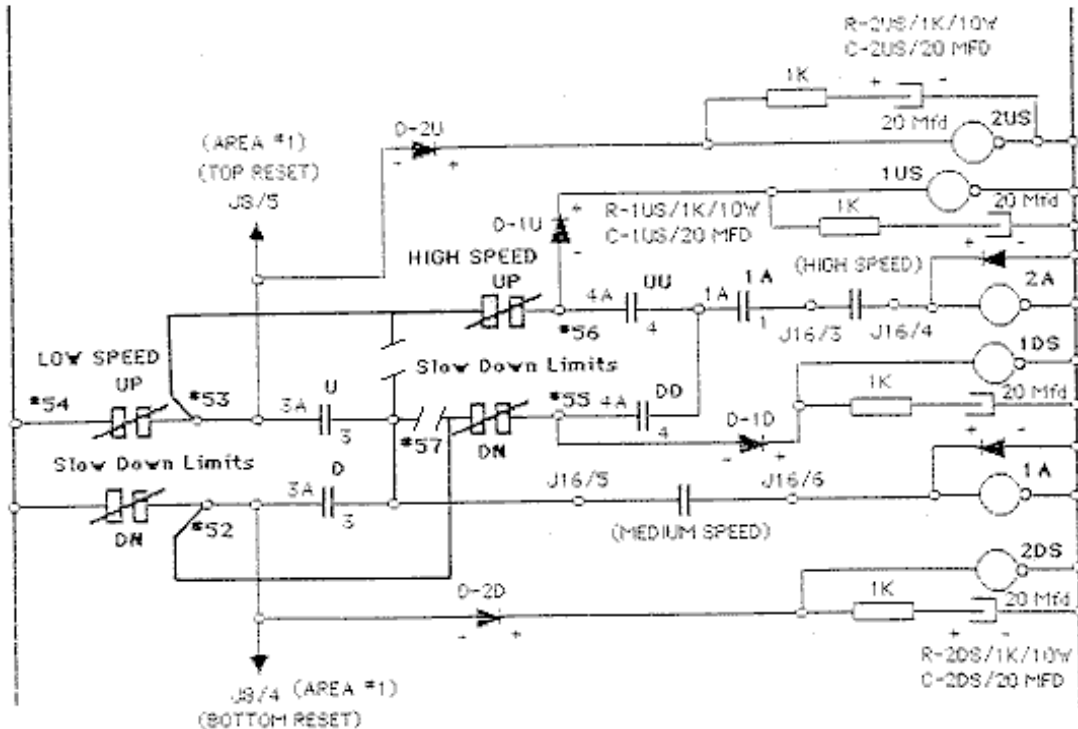
Power to the board is derived from 110 VAC to the J4 connector. Generally, the existing power is from terminals H1 and H2. If this is also the power for the limit switches, then jumper JP6 must be in place. If not, terminals J8-1 and J8-2 must be wired to the low side of the line supplying the inputs to the board.



**Figure 1**

On cars over 200 FPM, locate the page of the print showing the limit switches. If there is a U or D contact between the high speed and low speed limit switches, a simple wiring change must be made. The high speed limits must be wired to the output of the low speed limit switches.

If this is not done the Limit board will not function properly, and will trip when the car comes to a stop. Refer to the drawing in Figure 2 on the following page for how the switches should be wired.



**Figure 2**

To perform the wiring change, locate the field wires on controller terminal 57. These wires must be removed from terminal 57. The wire going to the high speed up limit must be installed on terminal 53. The wire going to the high speed down limit must be installed on terminal 52.

**Limit Board Set Up**

Before the Limit board is adjusted, it is necessary to program the car speed. Locate the rotary switch "SW1" on the board. Using the chart on the following page, locate the contract speed of the car. SW1 will be set based on the car speed. If the contract speed of the car is not divisible by 100 (for example, 350 FPM), S2 will be used to add 50 FPM to the programmed car speed.

<u>Car Speed</u>	<u>SW1</u>	<u>Car Speed</u>	<u>SW1</u>
100	1	300	3
200	2	400	4

Set SW1 to the value specified above. If 50 FPM needs to be added, place S2 in the right most position. If not, S2 must remain in the left most position.

### **Limit Board Learn Procedure**

The Limit board requires a learn procedure for calibration. There are two types of learn operations. First, the board must be set up for Inspection speed operation. This will prevent the car from moving at excessive speed while on inspection.

With the car on inspection, place it somewhere near the center of the hoistway, away from all terminal floor slowdown switches. Confirm that all of the switches are turned on by checking the LED on the board. Use the chart below to determine which LED corresponds to which limit.

<b><u>Limit</u></b>	<b><u>LED</u></b>	<b><u>Limit</u></b>	<b><u>LED</u></b>
U3	D3	D3	D7
U4	D4	D4	D8

LED D9 should be turned off. It will turn on when the car is on Automatic operation with the doors closed.

To place the board in the learn mode, press S3 and then press and release S1. Release S3. LED D25 will be blinking rapidly (on 1/8 second, off 1/8 second). Also, the D10, D11, and D17 LED's will be lit.

Run the car up and down on inspection. Confirm that the car speed does not exceed 100 FPM.

Run the car up on inspection about 5 feet. With the car running, press and release S3. D10 will turn off.

Run the car down on inspection about 5 feet. With the car running, press and release S3. D11 will turn off. D25 will now be on continuously, indicating that the inspection learn procedure was done correctly, and the board is in normal operation.

Next, the Limit board must be set up for high-speed operation. Bring the car to the lowest landing door zone on inspection operation. Disable the doors, and place the car on Automatic operation. Press and hold S3. Press and release S1. Release S3. D25 will begin blinking rapidly, and D10 and D11 will be illuminated.

Do a high-speed run to the top floor. When the car goes into slowdown, D14 **MUST** illuminate. If it does not, the Limit board has detected that the car went into slow down significantly before the limit switches opened. The limit switches need to open just as the tape reader comes off the slowdown magnet. **The Limit board will not function properly until the limit switches are moved to the proper position.**

After the car stops, D10 will turn off.

Do a high-speed run to the bottom floor. After the car stops, D11 will turn off, and D25 will be on continuously, indicating that the high speed learn procedure was completed successfully, and the Limit board is in normal operation.

The Limit board set up is now complete.

### **Limit Board Testing**

To confirm that the board will function correctly, remove the J1 connector. Run the car in the up direction on automatic. As soon as the car speed reaches about 100 - 150 FPM, the Limit board will trip, stopping the car. Re-connect the J1 connector, cycle power to the controller and the car can be returned to service.