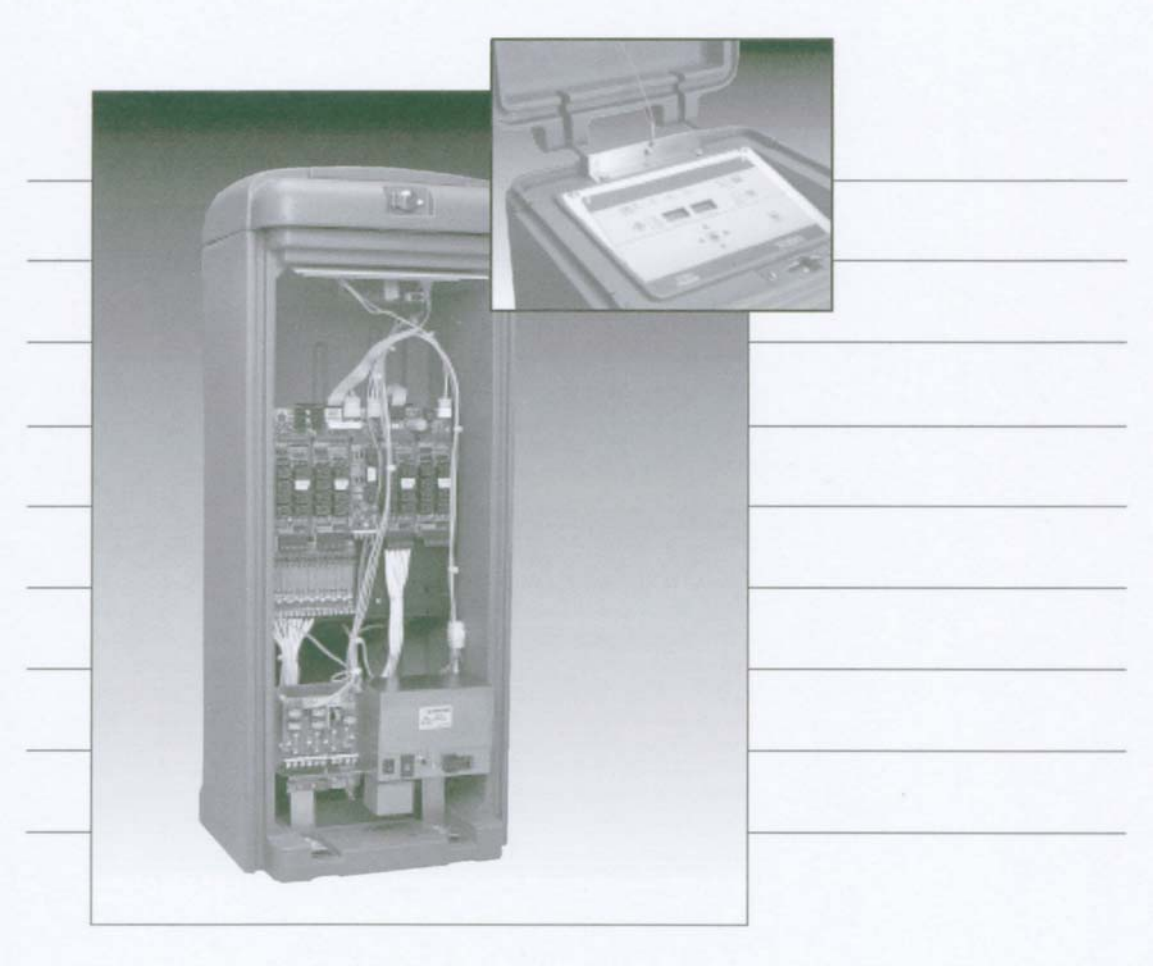
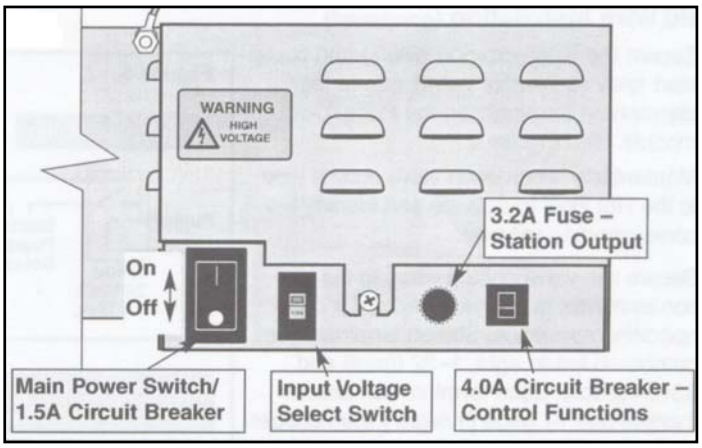
TORO Irrigation Business

Network LTC *Plus*

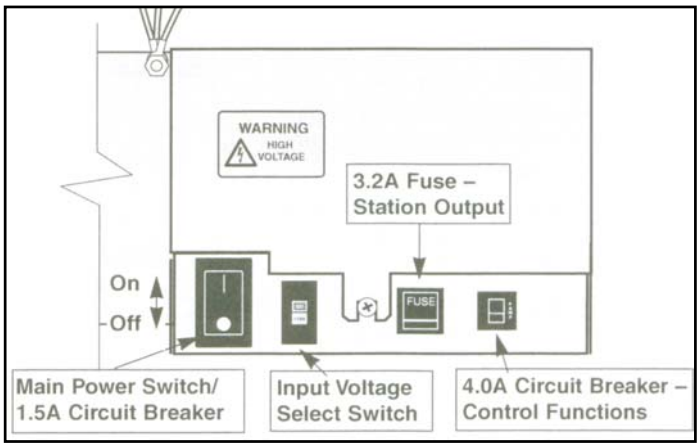
Satellite Troubleshooting Guide



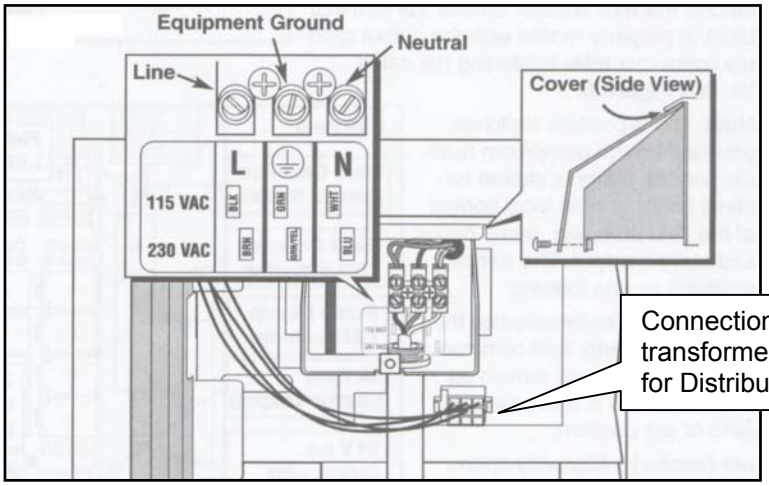
TORO University



New Style
Power Supply



Old Style
Power Supply



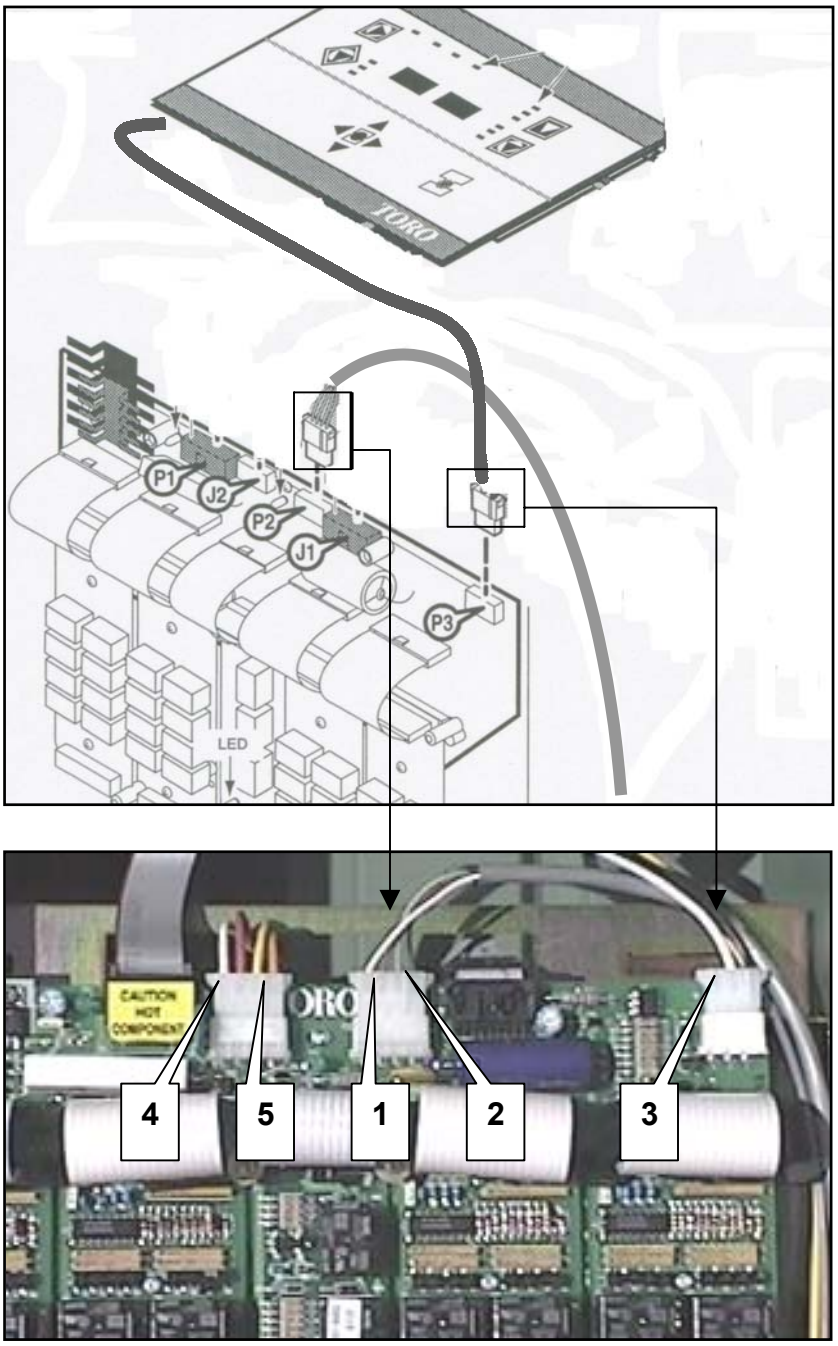
Connection from
transformer to power cable
for Distribution Board

Electrical Protection:

1.5A Circuit Breaker: Protects the controller from a short circuit on the incoming power wire.

4.0A Circuit Breaker: Protects the controller from a short circuit on boards dealing with controller logic such as the TM or Distribution Board.

3.2A Slow Blow Fuse: Protects the controller from a short circuit on the 24 Vac field wiring, a shorted solenoid or too many stations running at one time.

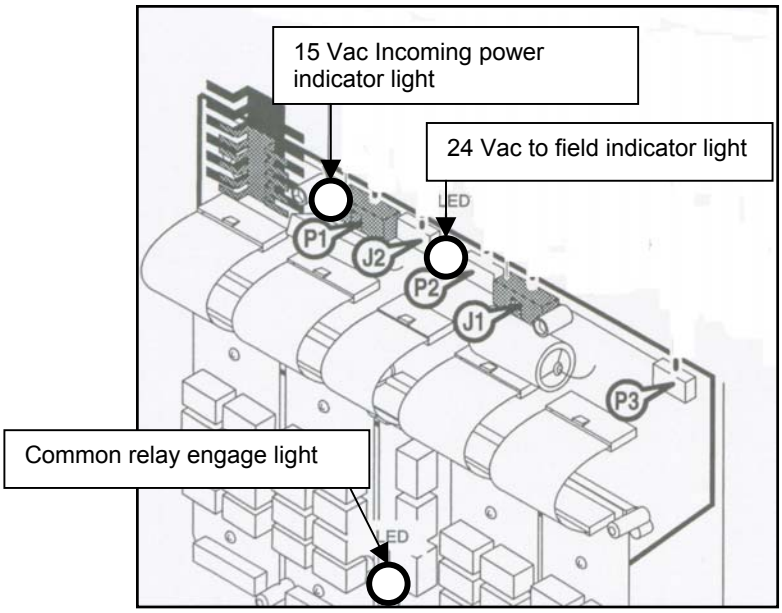


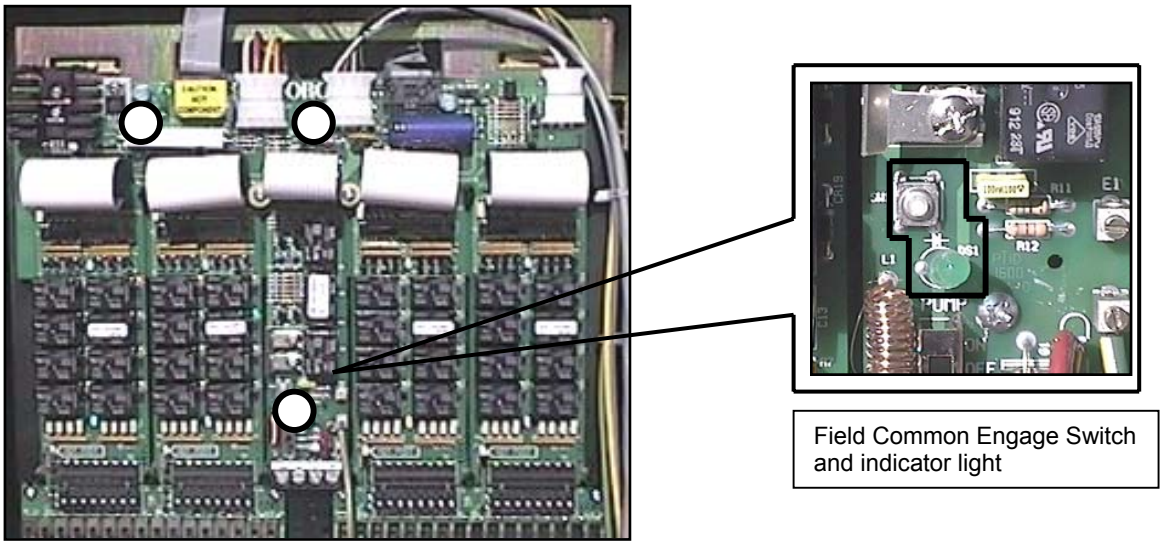
Voltage Checks:

1	White and Red from Power Supply:	14 – 16 Vac	protected by the 4.0A breaker.
2	Green and Black from Power Supply:	24 – 26 Vac	protected by the 3.2A fuse.
3	White and Black from Distribution Board to TM:	16 – 19 Vdc	protected by the 4.0A breaker.

If back Distribution Board exists the jumper cable will read as follows:

4	White and Red:	14 – 16 Vac	protected by the 4.0A breaker
5	Yellow and Orange:	24 – 26 Vac	protected by the 3.2A fuse



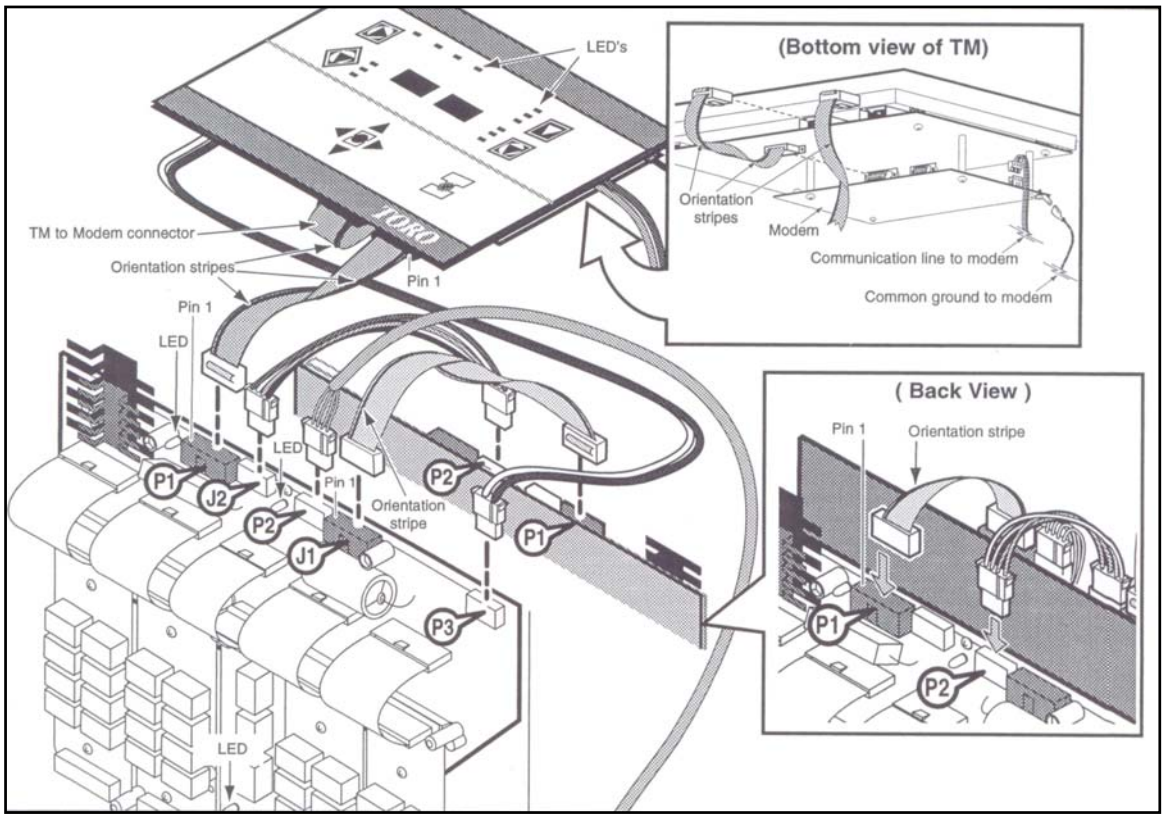


Lights:

The Green light located on the left of the Distribution Board when illuminated indicates the presence of 14-16 Vac on the White and Red wires coming from the Power Supply. If it is not illuminated check for (1) a tripped 4.0A breaker (2) loss of 115 Vac power (3) a bad transformer. If the breaker is tripped the Distribution Board or TM likely contains a short circuit. Replace as needed.

The Green center light on the Distribution Board when illuminated indicates the presence of 24–26 Vac on the Green and Black wires coming from the Power Supply. If it is not illuminated check for (1) a blown 3.2A fuse (2) loss of 115 Vac power (3) a bad transformer. If the fuse is blown check for a short on a 24 Vac field wire, a shorted solenoid or too many stations running at one time.

The Green light on the Pump/Common Board when illuminated indicates the common relay has been energized and is in the closed position. The light illuminates when either an automatic or manual function is started from the TM. It will also illuminate when the Field Common Engage Switch is pressed to allow manual operation through the station switches. It will only turn off when either an automatic or manual function initiated from the TM ends. It will not turn off by simply moving a manual switch to the off position.



AC/DC Power Cable Connections

P2 Incoming AC power from Power Supply. Connector cannot be plugged in wrong.

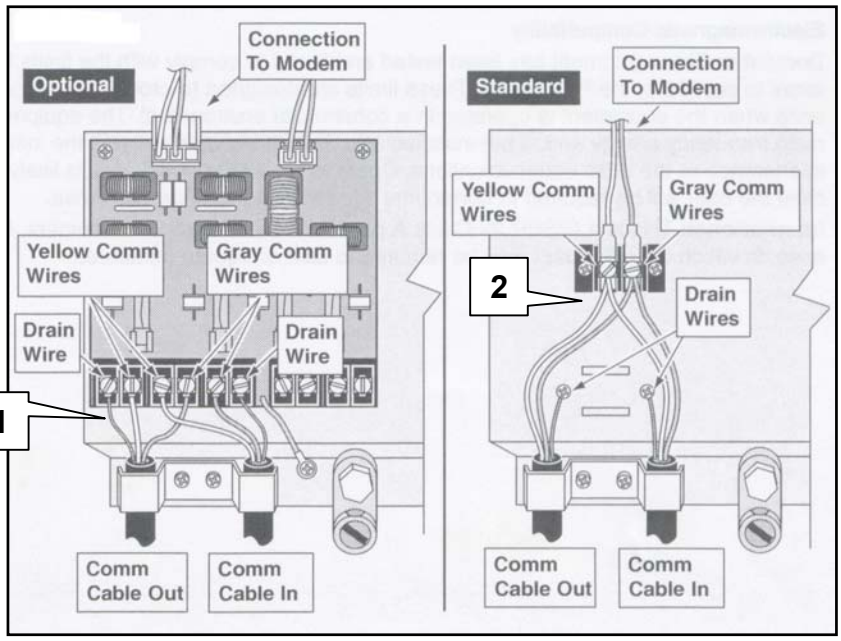
J2 AC power jumper cable to back Distribution Board. Connectors are keyed and cannot be plugged in wrong. Cable rotates as it crosses over to the back.

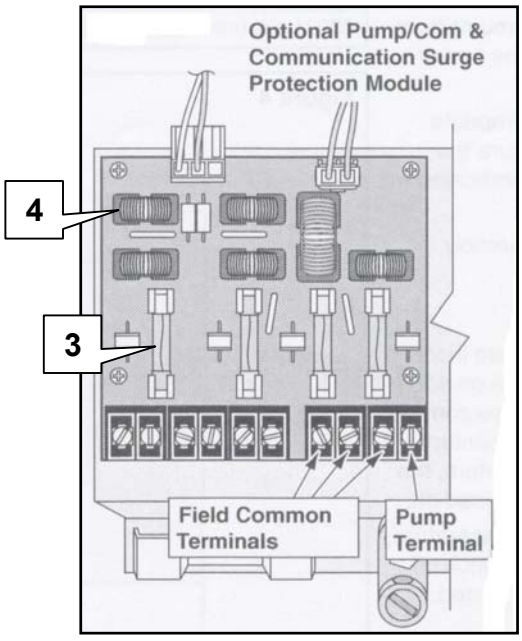
P3 DC power from Distribution Board to TM. Cable cannot be plugged in wrong. Ends are different sizes and keyed.

Controller Logic Cable Connections

P1 Logic cable from Distribution Board to TM. The connectors can be forced in backwards, but not likely. Pay close attention to the blue or red orientation stripe on the cable. It will rotate from the Distribution Board to the TM. The most common mistake occurs when the controller is 32 stations or less, which means there is not a jumper logic cable installed in J1. If inadvertently the logic cable from the Distribution Board to the TM is installed in J1 instead of P1 the Time and Date will register on the TM, but no other functions or lights will register.

J1 Logic jumper cable from front Distribution Board to rear Distribution Board. The connectors can be forced in backwards and does occur often. Closely follow the orientation stripe, because it rotates as it crosses over from front to rear. If it is not installed correctly the TM will not acknowledge any stations on the back panel.





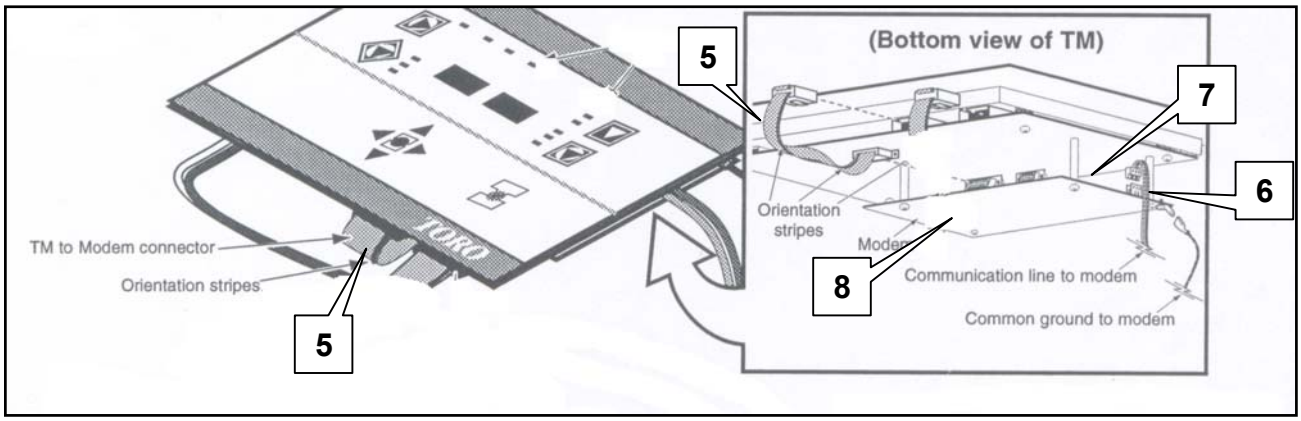
Communication Issues at Connection Points:

1 Check installation of communication wires for proper location and tight connections.

2 Make sure no loose strands from one wire are touching other wires.

3 Make sure fuses are good. The Pump/Com & Communication Surge board has Two ¾ amp fuses that protect the communication wire.

4 If the optional surge board is installed make sure the chokes have not come loose.



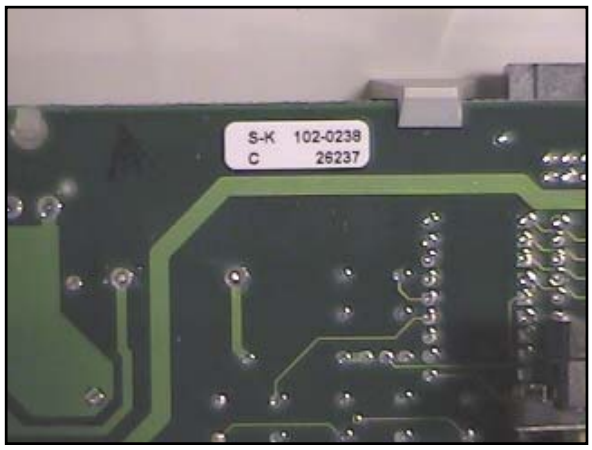
Communication Issues at the Modem:

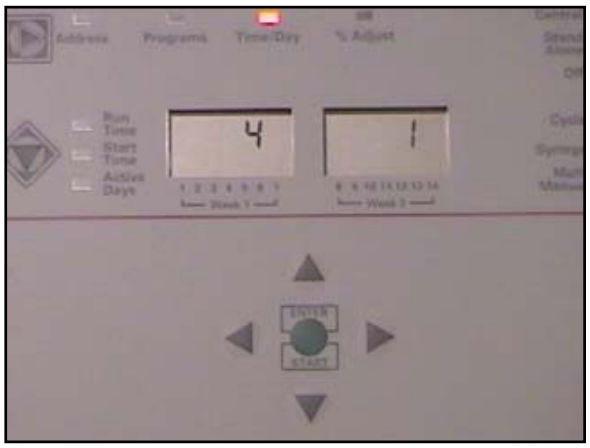
5 Make sure TM to Modem cable is tight and installed correctly.

6 Make sure communication cable is installed tight and correctly.

7 Check to see if either of the ¾ amp fuses on the modem are blown.

8 Replace modem if necessary. It's advised to try a modem that is working in another controller and not one lying on the customer shelf.



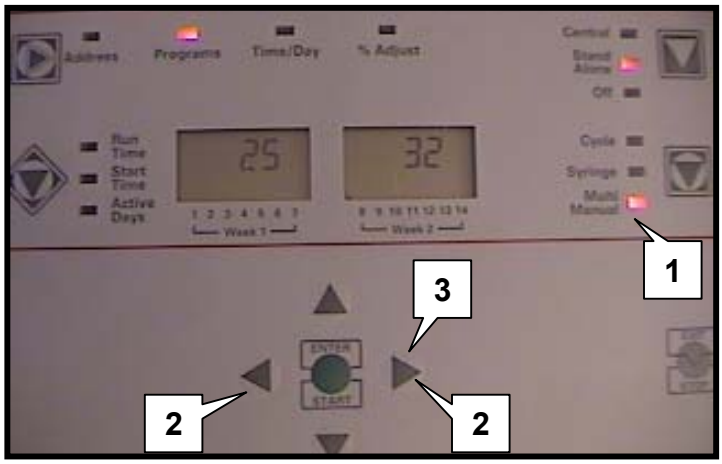


Current Revision Code

The current version of the LTC+ timing mechanism is Rev C and will be identified on the back of the TM with a white sticker. The version will also be identified in the display window during the “self test” or “initialization” procedures.

There have been three versions of LTC+ 4.0 timing mechanisms. They are Rev A, Rev B and Rev C. Rev A used a Motorola microprocessor and was used up to the middle of April 2000. The use of a new Dallas chip was implemented at that point, which added two new features (1) retention of time and date for up to 10 years and (2) output card diagnostics. TM’s using the initial release of the Dallas chip would revert to “stand alone” mode and sometimes change back to Sunday after a power outage. The chip was reprogrammed late in 2000 and has operated correctly since. Below is a history of those versions.

Rev A	Motorola microprocessor	used up to mid April 2000	no issues
Rev B	Dallas microprocessor	initial production release	power outage issues
Rev C	Dallas microprocessor	current production	no issues



Output Card Diagnostics

The new output card diagnostics feature allows you to confirm the electrical signal to each 8-output card.

1 Select the multi-manual feature on the TM.

2 Simultaneously press the left and right arrow keys and then release them. If all 64 stations were installed “00” would be displayed. In the above case the first set of stations that were not found are 25-32 indicating the fourth card on the front could not be found.

3 To check for more press the right arrow key.

Special Functions

Note: Station/pump outputs will be momentarily cycled on and off several times during the self test and Initialization procedures. To prevent possible operation of irrigation valves and pump relay, remove the 3.2A fuse or disconnect the field common wire(s) until the test is completed.

■ Self Test

The Self Test enables the LTC satellite to automatically perform a diagnostic check of all functions, LED indicators, LCD elements, internal circuits and station/pump outputs.

To perform the self test:

1. Turn off power supply switch.
2. Press and hold ▲ key down while switching power on. Continue holding key down for 5 seconds, then release.

During the first portion of the test, the displays will momentarily show the following information:

- Software version installed (i.e., version 1.0 = **1 0**)
- Number of stations installed (i.e., 16 stations = **16 STA**)
- Diagnostic code (i.e., **00 000**)
- Memory chip number (i.e., **EE1**)

Note: If the memory chip or timer chip is not functioning properly, **EE1 Err or CLK Err** will be displayed.

The next portion of the test cycles all LED indicators and LCD elements and turns the station/pump outputs on and off.

3. To end self test, press ▲ and ▼ keys simultaneously. Current time will be displayed (flashing). Press the EXIT/STOP key to stabilize display.

■ Initialization

Note: Performing an initialization permanently erases all user defined program information from the satellite memory (except current time and day).

To perform an initialization:

1. Turn off power supply switch.
2. Press and hold ▼ key down while switching power on. Continue holding key down for 5 seconds, then release.

Note: The satellite will perform the same operation as the Self Test (as detailed above), however during the process all user defined information stored in the memory will be erased.

3. To end initialization process, press ▲ and ▼ keys simultaneously. Current time will be displayed (flashing). Press the EXIT/STOP key to stabilize display.