

Auto Tank Fill

Installation, Operation and Maintenance Instructions

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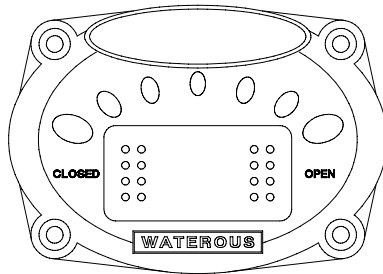
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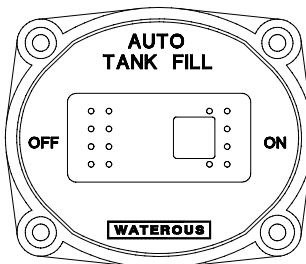
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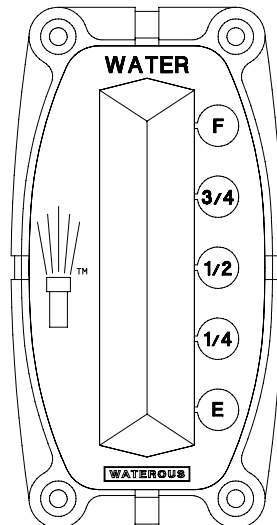
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Valve Position Control



Selector Switch



Tank Level Monitor

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Read through the instructions carefully before installing or operating your Auto Tank Fill System.

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Installation

CAUTION

Tank Overfill Damage.

The Auto Tank Fill valve is capable of providing a filling rate of greater than 1,000 gpm to the tank. Before installing this system, consult with the tank manufacturer to ensure the specified tank has sufficient venting and overflow capability for the maximum fill rate.

Overfilling the tank without sufficient relief capacity may result in equipment damage.

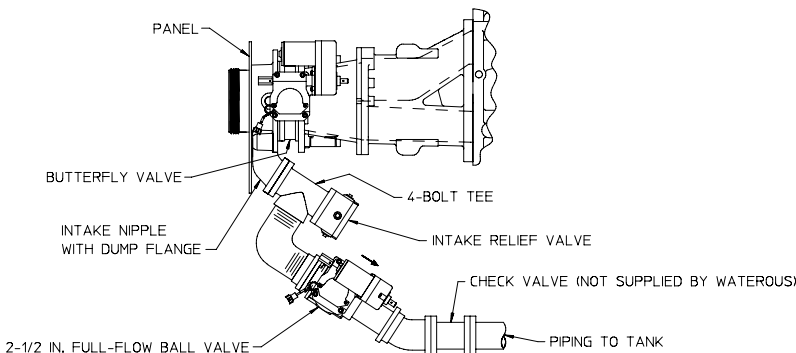
1. Note that the Auto Tank Fill System is designed to work with Waterous valves and will not work with other manufacturer's valves. Install a Waterous rotary electric 2-1/2" FF or 3-1/2" valve on the truck's external fill line.

It can be mounted in piping connected to the Intake Nipple Dump Valve Flange or plumbed into a separate external fill line. See example installations in Figure 1 below).

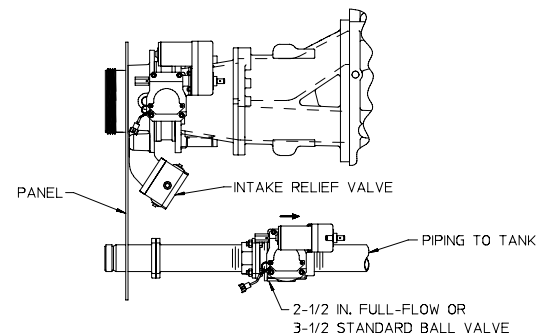
If the valve is mounted in piping connected to the Intake Nipple Dump Valve Flange, it is the OEM's responsibility to make provisions for connecting both the Intake Relief Valve and Auto Tank Fill Valve. Waterous offers a 2-1/2 in., 4-bolt tee or a 2-1/2 in. NPT tapped flange which may be ordered separately for this purpose.

2. When the Auto Tank Fill valve is connected to pump intake piping, the OEM should install a check valve (with flow direction toward tank) after the valve; this will help prevent loss of prime in the event the valve is accidentally opened while drafting.

Figure 1. Typical Ball Valve Installations



2-1/2 IN. FULL-FLOW BALL VALVE MOUNTED ON INTAKE NIPPLE DUMP FLANGE WITH INTAKE RELIEF VALVE



2-1/2 FULL-FLOW OR 3-1/2 STANDARD BALL VALVE MOUNTED IN A SEPARATE EXTERNAL FILL LINE

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3. All panel and cable components of the Auto Tank Fill system are packaged together. The Auto Tank Fill selector switch panel, valve position control panel and water tank level monitor panel must be

grouped together on the operator's panel. Recommended panel cut-outs are defined below.

Figure 2. Selector Switch Panel

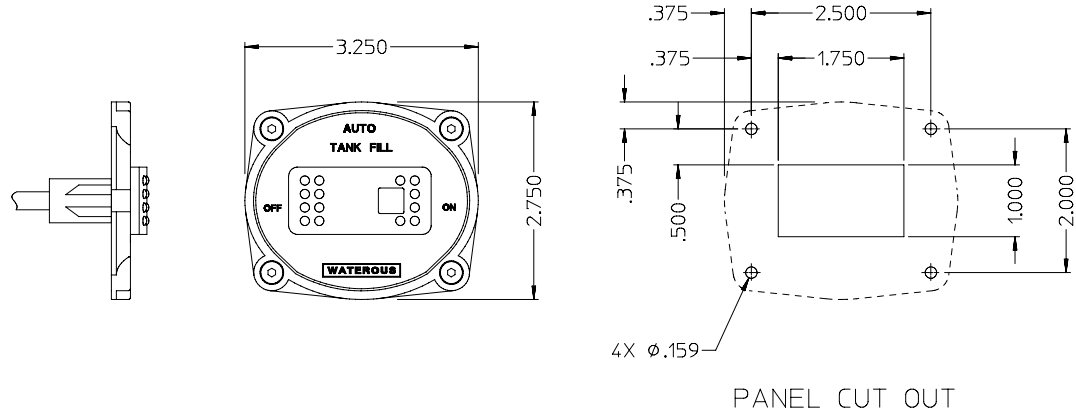


Figure 3. Tank Level Monitor Panel

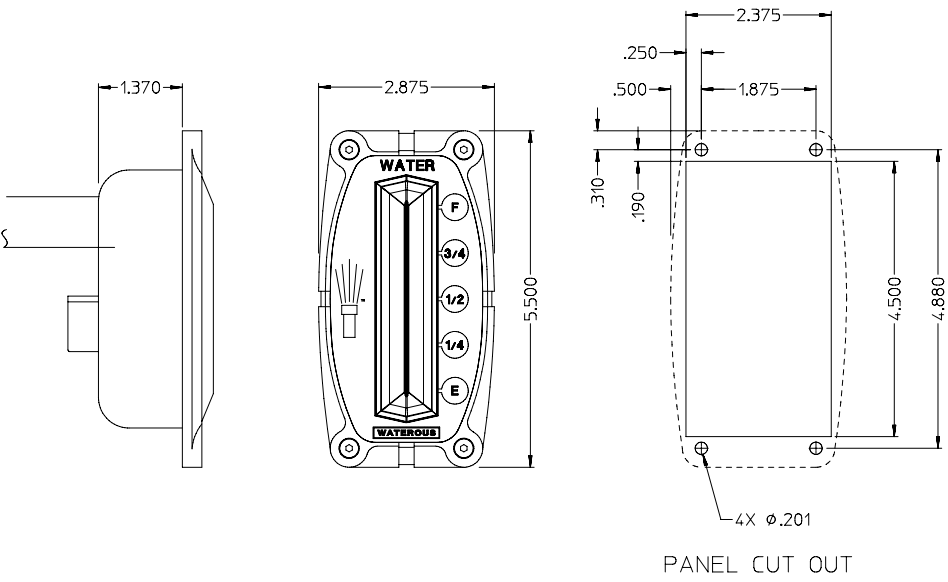
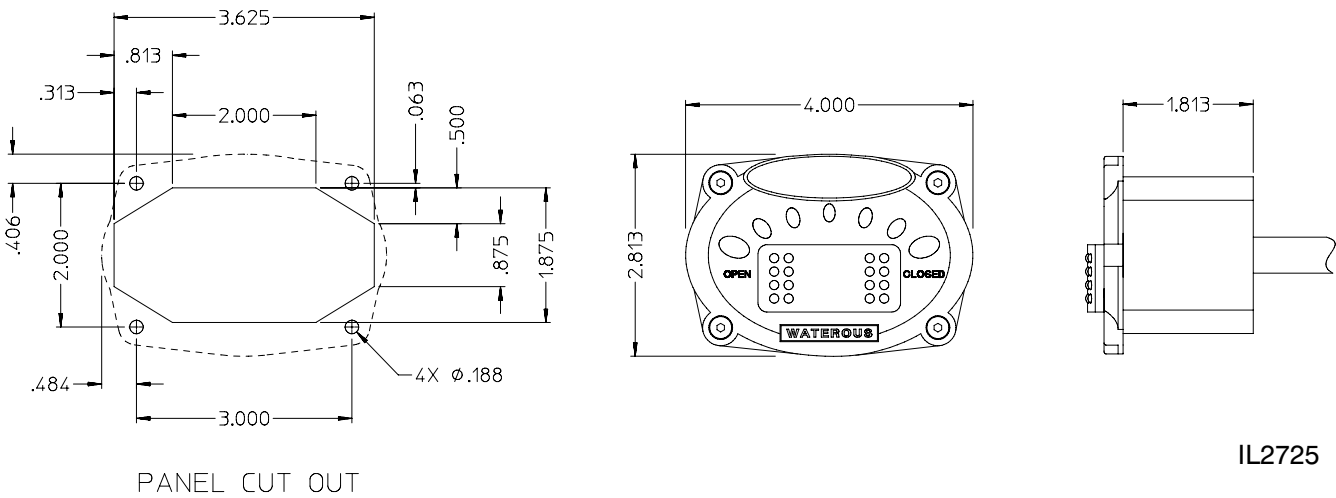


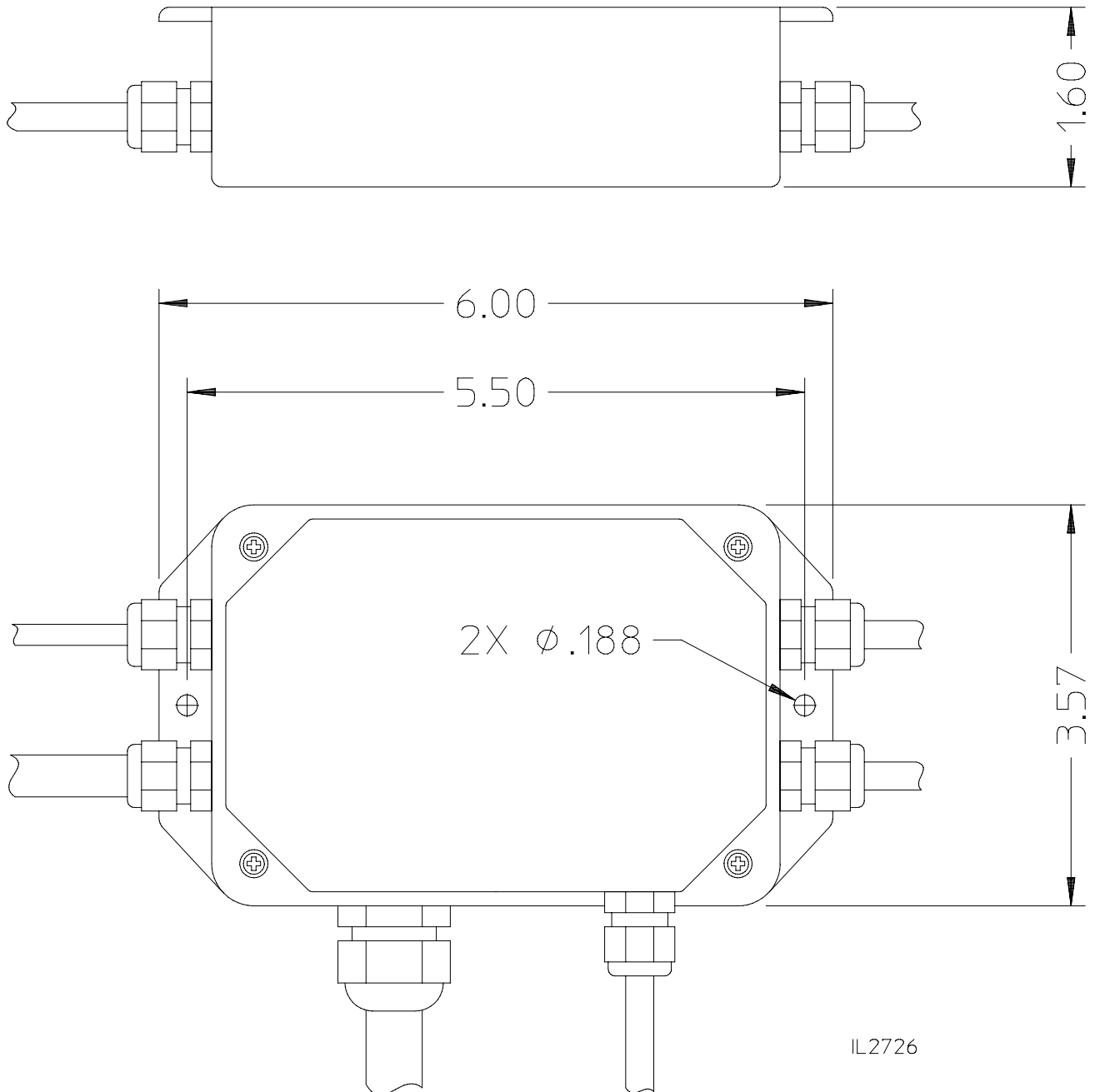
Figure 4. Valve Position Control Panel



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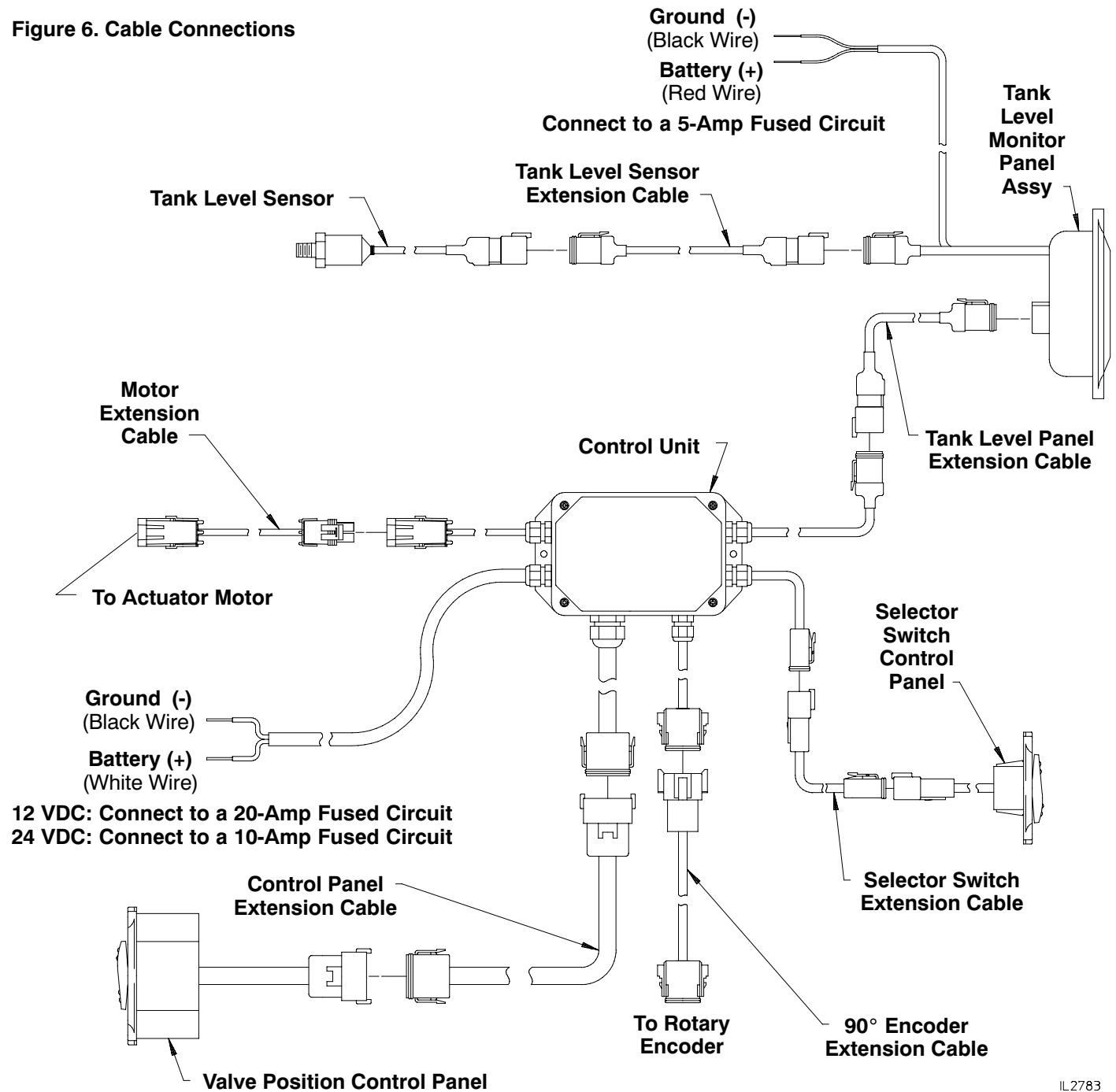
4. Cable lengths from panel-mounted displays (tank level monitor, valve position control and selector switch) to the control unit are 5 feet in length. Choose a mounting location for the control unit accordingly.

Figure 5. Control Unit Mounting



5. Connect cables and components to control unit as shown in Figure 6.

Figure 6. Cable Connections

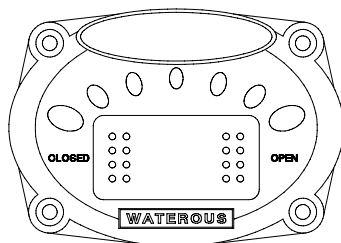


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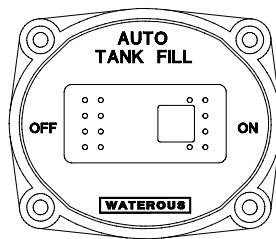
6. See separate Tank Level Monitor instructions for recommended mounting of the tank level sensor.
 7. Connect the battery "+" wire of both the control unit and tank level monitor to a switched power supply (switch OFF), with external circuit protection defined in Figure 6. Be sure the identification tag on the power wires of the control unit states the correct voltage (12 VDC or 24 VDC) for the intended application.
 8. Connect the battery "-" wire of both the control unit and tank level monitor to chassis ground.
- Note:** Before applying power to the tank level monitor for the first time, read the **Level Monitor Calibration Installation Instructions** to be familiar with the procedure before actually performing the calibration.
9. Calibrate the tank level monitor according to separate Level Monitor Calibration Instructions.

Operation

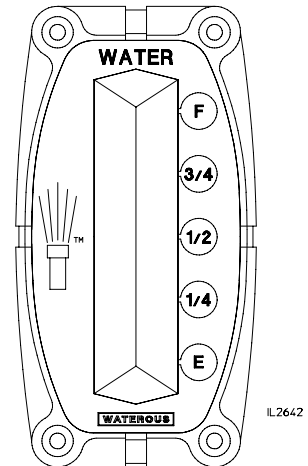
Figure 7. Auto Tank Fill Control Panel, Switch and Display



Valve Position
Control



Selector Switch



Tank Level
Monitor

WARNING

Insufficient Inlet Water Supply. May result in pump cavitation and loss of discharge pressure causing equipment damage and possible personal injury.

The Auto Tank Fill system is intended to maintain the on-board tank's water level. This system can do so only if there is a sufficient water supply feeding the water tank. If the pump is operated at a capacity exceeding the inlet water supply to the water tank, it is the responsibility of the pump operator to make the needed adjustments so the correct water supply of the pump is maintained. Failure to do so can cause pump cavitation and loss of discharge pressure, which could result in equipment damage or personal injury.

WARNING

Loss of pump prime. May result in pump cavitation and loss of discharge pressure, causing possible equipment damage and personal injury.

DO NOT open the Auto Tank Fill valve during drafting situations when plumbed into the pump intake piping. An open valve on the external fill line can allow air into the inlet piping, which may result in loss of prime.

With a **possitive pressure** water supply connected to appropriate external fill line and switched power ON to both Auto Tank Fill control unit and Tank Level Monitor:

Auto Tank Fill Mode

1. Place the selector switch in the ON position. The green LED on the switch will illuminate.
2. The external fill valve will now automatically open/-close to maintain tank water level between 50% and 80% capacity.
Note: It is normal for the valve to produce a ratcheting sound upon reaching the fully open or fully closed position.
3. To override the Auto Tank Fill when the selector switch is ON, simply push the rocker switch on the valve position control panel in the direction you wish to move the valve. The green LED on the selector switch will turn off, indicating that the system is no longer in Auto Fill mode. After 3 seconds of non-interaction from the pump operator, the system will return to the Auto Fill mode and the green LED will again illuminate.

Manual Tank Fill Mode

1. Place the selector switch in the OFF position.
2. The external fill valve is now controlled manually by using the valve position control panel, so it is the pump operator's responsibility to watch the tank water level on the tank level monitor and maintain as desired.
Note: It is normal for the valve to produce a ratcheting sound upon reaching the fully open or fully closed position.

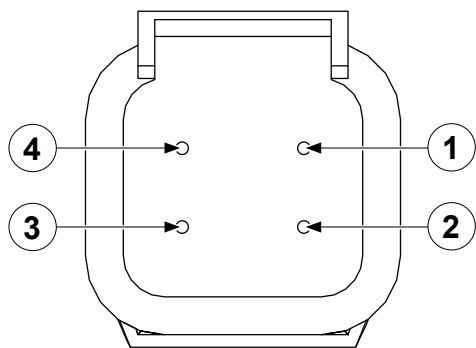
Maintenance

No scheduled maintenance is required.

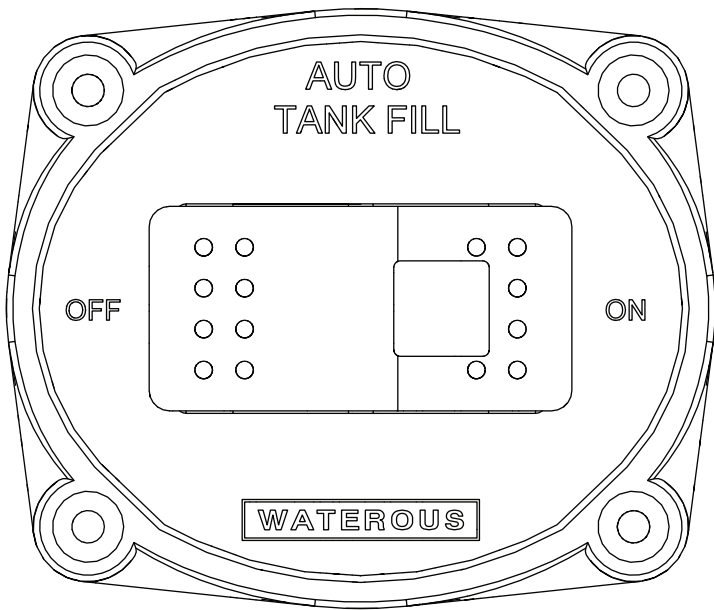
Troubleshooting Guide

Note: Before troubleshooting, make sure that the control unit is properly grounded and receiving 12V of power.

Problem	Possible Cause	Solution
The selector switch panel is unresponsive.	The selector switch is damaged.	See page 7 to perform a continuity test.
	The selector switch LED is damaged.	See page 7 to perform an LED test.
The valve position control panel is unresponsive.	The control panel is damaged.	See page 8 to perform a continuity test.
	The control panel LEDs are damaged.	See page 8 to perform an LED test.
The valve position indicator LEDs work when the valve is open, but not closed.	The encoder is not grounded.	Make sure that the encoder is properly grounded.
Only one valve position indicator LED is responsive.	The encoder is damaged.	See page 11 to test the encoder.
The valve position indicator LEDs are unresponsive.		
The tank level monitor is not indicating the correct water level.	The tank level monitor is not calibrated.	Follow the instructions provided by the OEM to calibrate the tank level monitor.
When the tank is empty, the tank level monitor immediately reads full (F).	The sensor cable is disconnected or damaged.	Connect or replace the sensor cable.
When the tank is empty, the tank level monitor slowly climbs to full (F) over 30–60 seconds.	The sensor or gauge is damaged.	See page 9 to test the sensor and gauge.
When Auto Mode is enabled, the system does not respond to the water level indicated by the tank level monitor.	The tank level monitor or control unit is damaged.	See page 10 to test the power at the tank level monitor.
The valve is unresponsive.	The valve has no power.	While manually activated, check for 12V at the valve.
The valve is stuck in the open or closed position and is not released when 13 ft-lb (18 N·m) is applied to the manual override coupler.	Debris is blocking the valve.	Clean the valve.
	The bushings are corroded.	Replace the bushings.
The valve is stuck in the open or closed position and there is no audible “clicking” coming from the ball detent.	The voltage drop in the wiring exceeds acceptable levels.	Increase the size of the power and ground wires.



Pin	Description
Pin 1	Power
Pin 2	Signal
Pin 3	
Pin 4	LED ground



Testing the Selector Switch Continuity

Use the illustrations and instructions to test the selector switch with a multimeter.

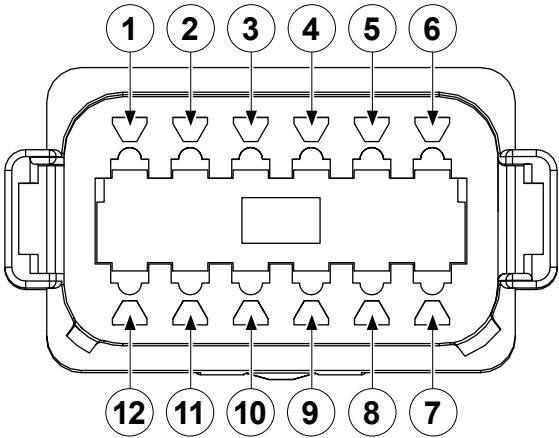
Note: All connectors are shown from the pin side.

- 1 Touch the probes to pins 2 and 4.
The multimeter should emit a sound when the switch is in the *ON* and *OFF* positions.
- 2 Touch the probes to pins 1 and 2.
The multimeter should emit a sound when the switch is in the *ON* position.
- 3 Touch the probes to pins 1 and 4.
The multimeter should emit a sound when the switch is in the *ON* position.
- 4 If any tests fail, replace the selector switch panel.
- 5 If all tests pass, replace the control unit.

Testing the Selector Switch LED

Use the illustrations and instructions to test the selector switch LEDs.

- 1 Connect the ground wire to pin 4.
- 2 Supply 12V to pin 1. The LED should emit light when the switch is in the *ON* position.
- 3 If the test fails, replace the selector switch.
- 4 If the test passes, replace the control unit.



Pin	Description
Pin 1	Signal to close valve
Pin 2	“Open” indicator
Pin 3	80% indicator
Pin 4	100% indicator
Pin 5	60% indicator
Pin 6	Signal supply (open/close)
Pin 7	“Closed” indicator
Pin 8	40% indicator
Pin 9	20% indicator
Pin 10	Ground
Pin 11	Signal to open valve
Pin 12	Power

Testing the Control Panel Continuity

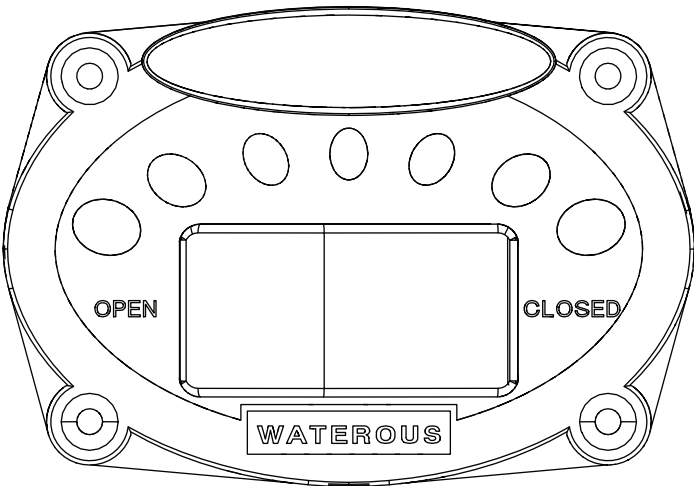
Use the illustrations and instructions to test the valve position control panel with a multimeter.

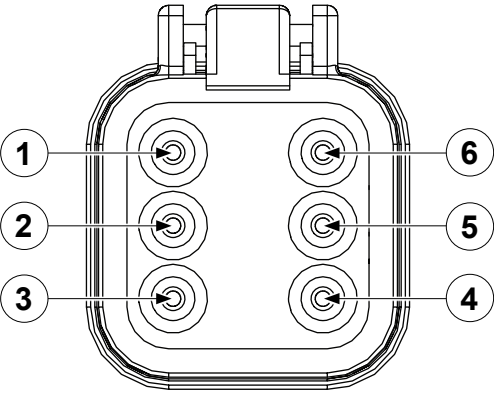
- 1 Touch the probes to pins 6 and 11, then press the *OPEN* button.
The multimeter should emit a sound when the button is pressed.
- 2 Touch the probes to pins 6 and 1, then press the *CLOSED* button.
The multimeter should emit a sound when the button is pressed.
- 3 If any tests fail, replace the control panel.
- 4 If all tests pass, replace the control unit.

Testing the Control Panel LEDs

Use the illustrations and instructions to test the control panel LEDs.

- 1 Connect the ground wire to pin 10, then supply 12V to the following pins: 7, 9, 8, 5, 3, 4, 2.
The LEDs should emit light in order from *CLOSED* to *OPEN* on the panel.
- 2 If any tests fail, replace the control panel.
- 3 If all tests pass, replace the control unit.





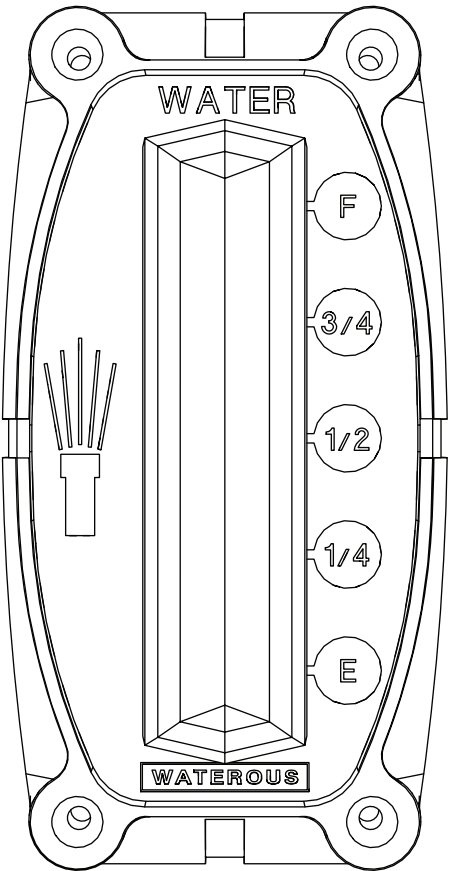
Pin	Description
Pin 1	Signal
Pin 2	
Pin 3	
Pin 4	
Pin 5	5V supply
Pin 6	Ground

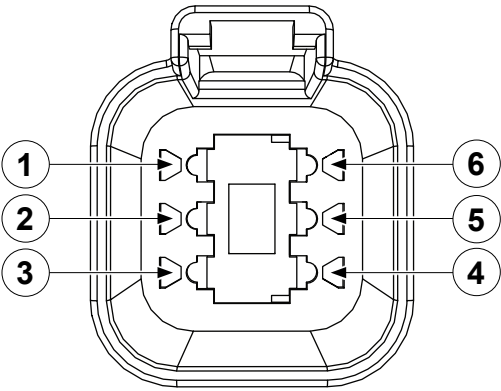
Testing the Tank Level Monitor and Sensor

Use the illustrations and instructions to test the monitor and sensor with a multimeter.

Note: Make sure that the tank is 1/2 full or lower before performing the test.

- 1 Turn the Auto Tank Fill off, wait 30 seconds, then turn it on again to verify that the tank level monitor is still slowly climbing to full (F).
- 2 Touch the probe to pin 5 on the tank level monitor panel.
- 3 If the multimeter reads approximately 5V, replace the sensor.
- 4 If there is no voltage, replace the monitor.



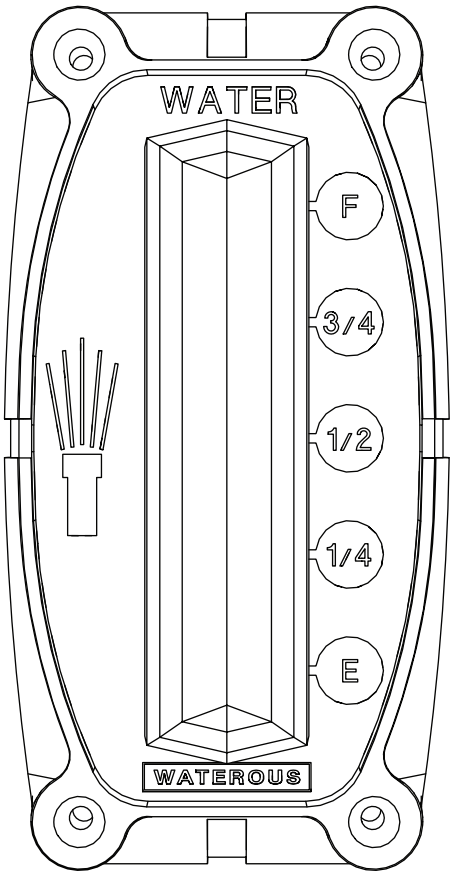


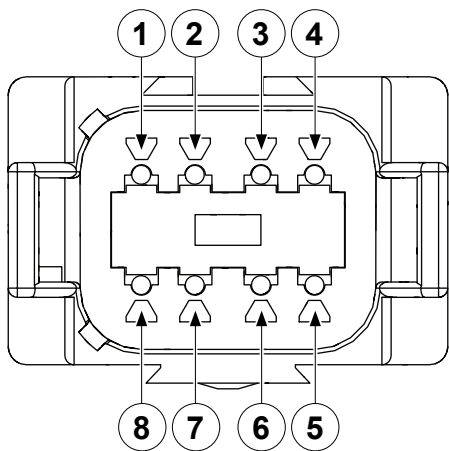
Pin	Description
Pin 1	12V
Pin 2	
Pin 3	
Pin 4	
Pin 5	
Pin 6	0.07–1.3V

Testing the Tank Level Monitor Power

Use the illustrations and instructions to test the tank level monitor’s power with a multimeter.

- 1 Disconnect the tank level monitor from the control unit.
- 2 Touch the probe to pin 6 on the tank level monitor connector.
When the monitor indicates an empty tank (E), the multimeter should read 0.07V. When the monitor indicates a full tank (F), it should read 1.3V.
- 4 If either test fails, replace the monitor.
- 5 If both tests pass, replace the control unit.



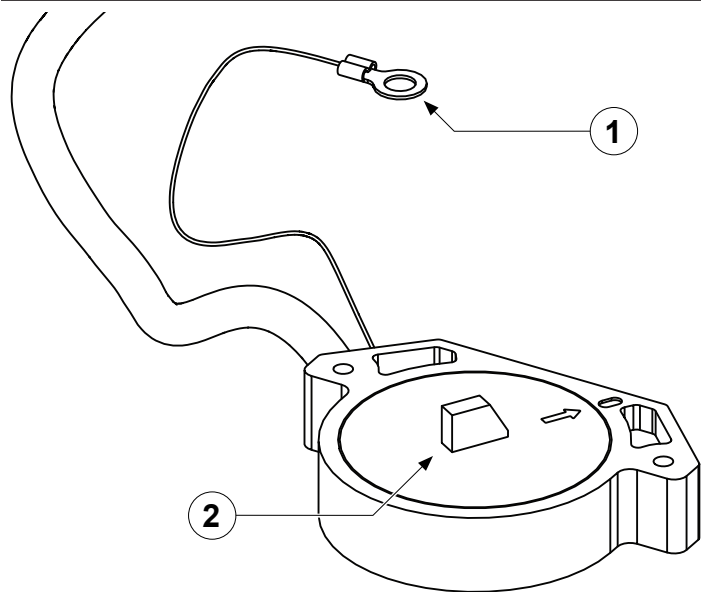


Pin	Description
Pin 1	Ground
Pin 2	Closed
Pin 3	20%
Pin 4	40%
Pin 5	60%
Pin 6	80%
Pin 7	100% open
Pin 8	Power

Testing the Encoder

Use the illustrations and instructions to test the encoder.

- 1 Connect the ground wire to pin 1 and the ring terminal, then supply 12V to pin 8.
- 2 Align the arrow on the dial with the position indicator on the side of the case.
Note: Make sure that the magnets inside the encoder pot stay in position. If the dial is removed, the magnets may lose their orientation.
- 3 Touch the probe to pin 2 while turning the dial counter-clockwise.
The multimeter should read 8–9V, and the remaining pins should have no signal.
- 4 Touch the probe to pin 3 while continuing to turn the dial counter-clockwise.
The lower-numbered pins (except for pin 1) should now have a signal.
- 5 Repeat the previous step for the following pins: 4, 5, 6, 7.
- 6 If any tests fail, replace the encoder.
- 7 If all tests pass, replace the control unit.



Feature
1 Ground (ring terminal)
2 Encoder pot