OPERATION MANUAL

IMPORTANT

1. Read these instructions thoroughly prior to proceeding with installation.
2. Ensure that the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electric shock, or other occurrences, which may injure you or damage your property. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.
• Follow all safety codes.
• Wear safety glasses and work gloves.
• Be sure all power to equipment is shut off before performing maintenance or service. More than one disconnect may be present.
• Refer to appropriate dimension sheets for locations of electrical inlets, inlet and outlet piping connections, drain connections and required clearances before setting unit in place.

CONSTRUCTION

The OMNI 401 consists of a printed circuit board housed in a corrosion resistant enclosure, with attached preset and pre-wired Differential Pressure (Dp) Switch, LED indicator light, reset/manual rinse button and interconnecting wiring.
The OMNI 401 is a simple, but powerful controller, which allows the user flexibility in controlling up to 3 RAIN BIRD filters while maintaining reliability at low cost. The single filter version is normally supplied. The 2 or 3-filter versions are supplied when required by the application.

OPERATING FEATURES

Rinse Cycle Activation – Rinse cycles can be activated by any of the following methods:
• By differential pressure only
• By timer only (no DP switch attached)
• By timer with differential pressure override
• Manually by an operator

The OMNI 401 is capable of accepting input voltages of 110-120 or 220-240 VAC, 50-60 Hz single-phase. The unit is supplied with a factory installed and wired Differential Pressure Switch. The unit provides for up to three 24 Vac voltages for the operation of solenoid valves controlling the rinse cycle of 1, 2 or 3 filters. A LED is installed on the controller housing to indicate filter mode and assists in troubleshooting filter operation. See Figure 1 and Figure 2.

Adjustable parameters include:
- Duration of rinse cycle
- Timer interval to activate automatic rinse cycles

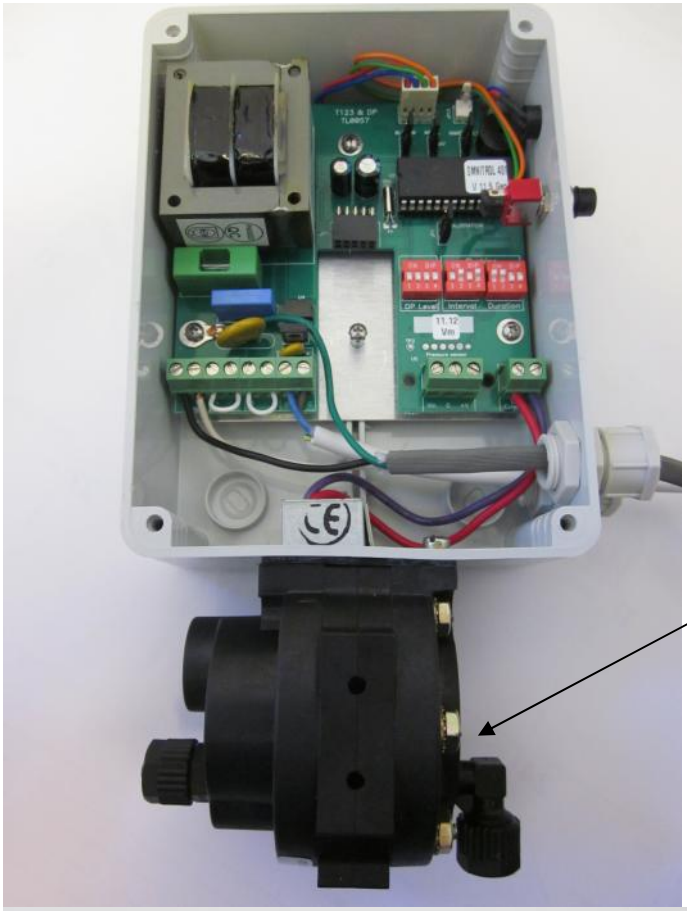


FIGURE 1

OMNI 401 with cover removed

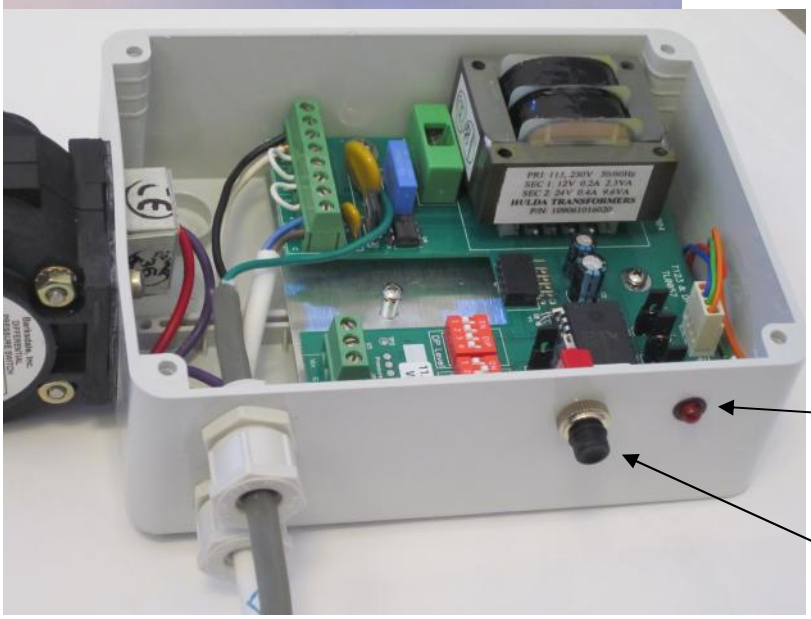


FIGURE 2

OMNI 401 Side View

Mounting - The controller should be mounted in an upright vertical position, allowing access for service and troubleshooting. The **RESET / MANUAL** button and **LED** indicator should be visible and accessible. For best results, install the controller as near as possible to the filter(s) it is to control, to minimize tubing runs to the Differential Pressure Switch.

Power Source Connections – The system operates on either 110-120 Vac, single phase, 60 Hz or 220-240 Vac, single phase, 50/60 Hz power. Wire to the **Power L & N** terminals and a grounding screw. Jumper terminals (labeled **1**, **2**, **3** & **4**) on the printed circuit board are used to configure the board for the proper supply voltage. See Figure 3 and Figure 4 for correct wiring.

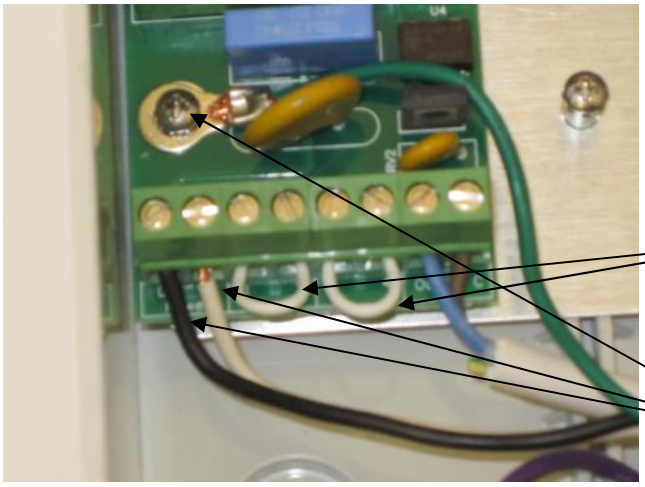


FIGURE 3

Power Connection & Jumpers
For 110-120 Vac 60 Hz Operation

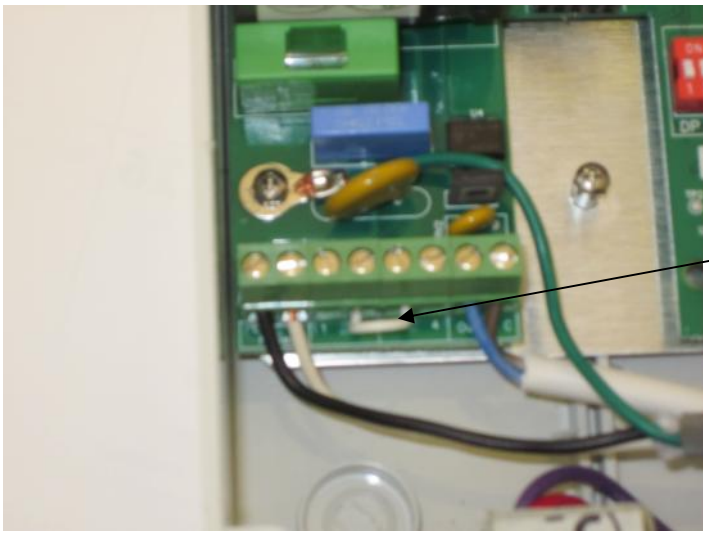


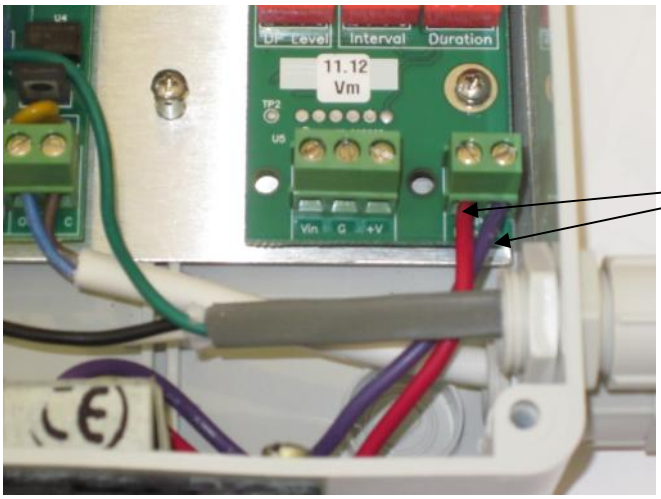
FIGURE 4

Power Connection & Jumpers
For 220-240 Vac 50 Hz Operation

NOTE: The controller is shipped prepared for the end user's voltage at the factory. Verify the correct jumper configuration for your installation's voltage. Failure to follow this check may result in system overload and may damage the controller.

Input Connections – The OMNI 401 has a single input, which is normally used for connection of a Differential Pressure Switch. In most cases, this Dp Switch is factory mounted and wired, and is factory preset to 7 psi increasing. **DO NOT ADJUST!** The switch is connected across terminals labeled **DP External.** See Figure 5**.**

FIGURE 5



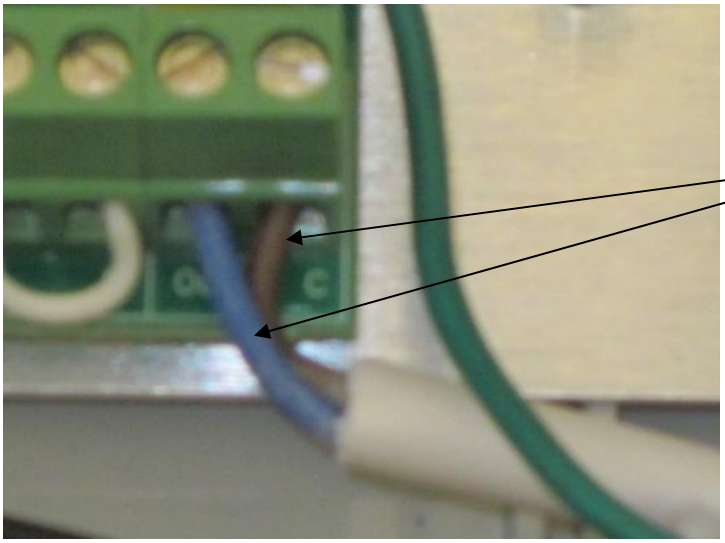
Red & Violet Differential Pressure Switch connections – not polarity sensitive

If the system is to be rinsed based on timer only (no differential pressure switch attached), then these terminals can be used for activation of rinse cycles by an external dry contact closure. Note that these are not dry contacts – power is present in these terminals.

Output Connections – The OMNI 401 provides for connections of up to three outputs, normally used for a solenoid valve for rinse cycle activation and a Controlled Outlet Valve (COV) closure.

When the Controller is supplied for single filter use, a plug-in module is not supplied. In this configuration the Controller can activate just one solenoid coil. The terminals are labeled **Out.1** & **C**. See Figure 6.

FIGURE 6



Wires to 24 Vac Solenoid Coil Connection – not polarity sensitive

When the Controller is supplied for use in controlling more than one filter, a plug-in module is also supplied. The terminals for this module are labeled. **Out. 2** & **C** and **Out.3** & **C**. See Figure 7.

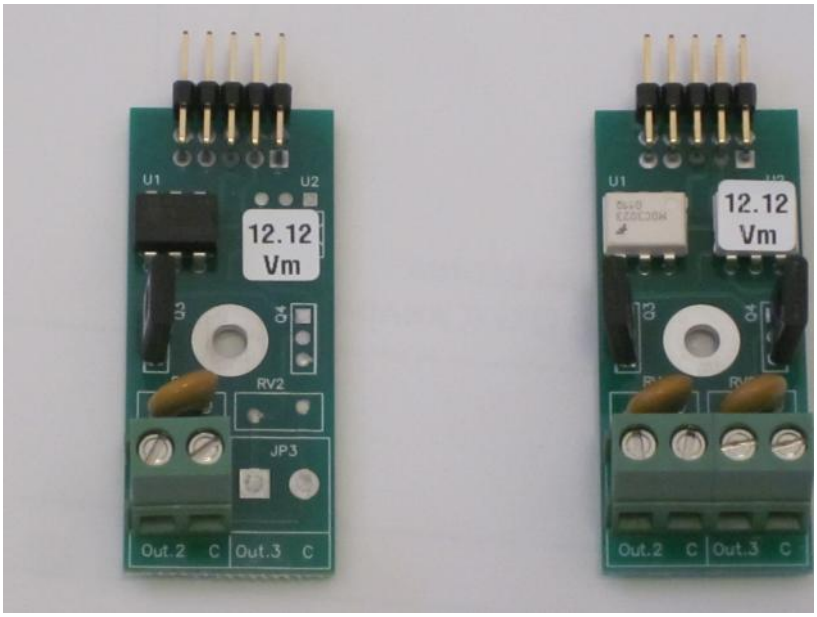


FIGURE 7 Plug- In Modules

On the left is a single output module for a second filter or a single filter with COV.

On the right is a dual output module for up to 3 filters or 2 filters plus a COV.

The three outputs are typically wired to the coil of a solenoid valve that opens a rinse valve or closes a COV. Typical coil connections for solenoids that are factory supplied are shown in Figure 8.

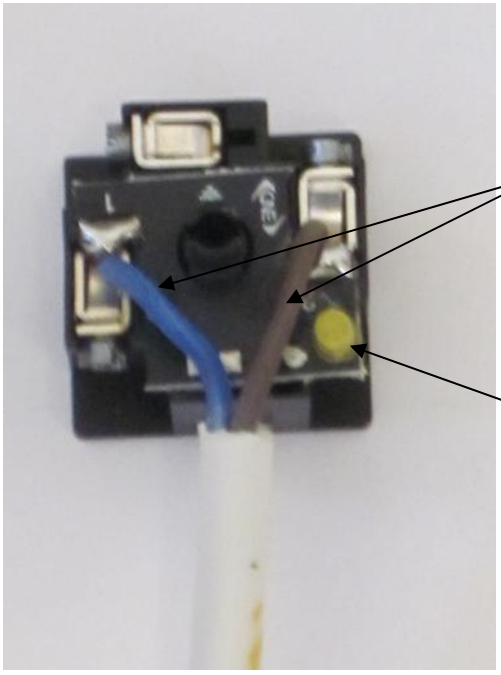


FIGURE 8 Solenoid Wiring

Typical Solenoid Coil Connections (opposite each other) Third terminal is not to be used.

Solenoid LED

ADJUSTING PARAMETERS

NOTE: The Dp Switch has been preset for 7 psi increasing. **Do not adjust prior to start-up.**

NOTE: The **S3** dip switch is not used and it should be set for **0 0 0 0.** See Figure 9 for **S1, S2** & **S3** locations.

Rinse Cycle Duration – The rinse cycle duration is controlled by the set of dip switches labeled **S2**. To set the rinse cycle time, set the dip switch for **S2** according to **Table 2**. Note that the ON position is the up position on the dip switch. Refer to the Operation and Maintenance Manual supplied with your filter to determine the proper timer setting.

Timed Interval Between Rinse Cycles – The time interval between rinse cycles is controlled by the set of dip switches labeled **S1**. The setting for the switch is given in **Table 1**. For initial operation, it is recommended to set **S1** for Dp only until sufficient experience has been gained in operation of the filter.

Table 1 – Dip Switch S1 Setting
Timer Interval Between Rinses

Switch Setting 1 2 3 4	Timer Setting
0 0 0 0	DP only
1 0 0 0	5 minutes
0 1 0 0	10 minutes
1 1 0 0	15 minutes
0 0 1 0	20 minutes
1 0 1 0	30 minutes
0 1 1 0	45 minutes
1 1 1 0	1 hour
0 0 0 1	2 hours
1 0 0 1	4 hours
0 1 0 1	8 hours
1 1 0 1	12 hours
0 0 1 1	18 hours
1 0 1 1	24 hours
0 1 1 1	72 hours
1 1 1 1	120 hours

Table 2 – Dip Switch S2 Setting
Rinse Cycle Duration

Switch Setting 1 2 3 4	Timer Setting
0 0 0 0	5 seconds
1 0 0 0	8 seconds
0 1 0 0	10 seconds
1 1 0 0	12 seconds
0 0 1 0	16 seconds
1 0 1 0	20 seconds
0 1 1 0	25 seconds
1 1 1 0	30 seconds
0 0 0 1	45 seconds
1 0 0 1	1 minute
0 1 0 1	1-1/2 minutes
1 1 0 1	2 minutes
0 0 1 1	3 minutes
1 0 1 1	4 minutes
0 1 1 1	5 minutes
1 1 1 1	6 minutes

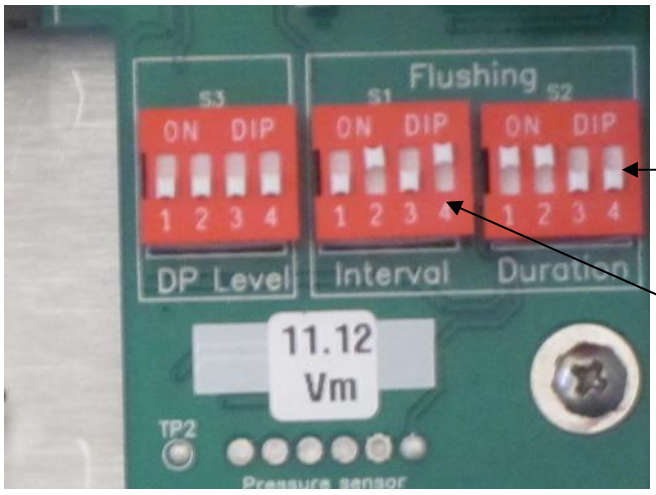


FIGURE 9 DIP Switches

S2 Rinse Duration

S1 Timer Interval

PRINTED CIRCUIT BOARD JUMPERS

The printed circuit board (PCB) has 4 jumper locations with shorting bars in place. See Figure 10. They are: **JP1, JP8, JP9** & **JP11**.

The JP1, JP8 & JP9 jumpers always must have their upper pin exposed. Do not change.

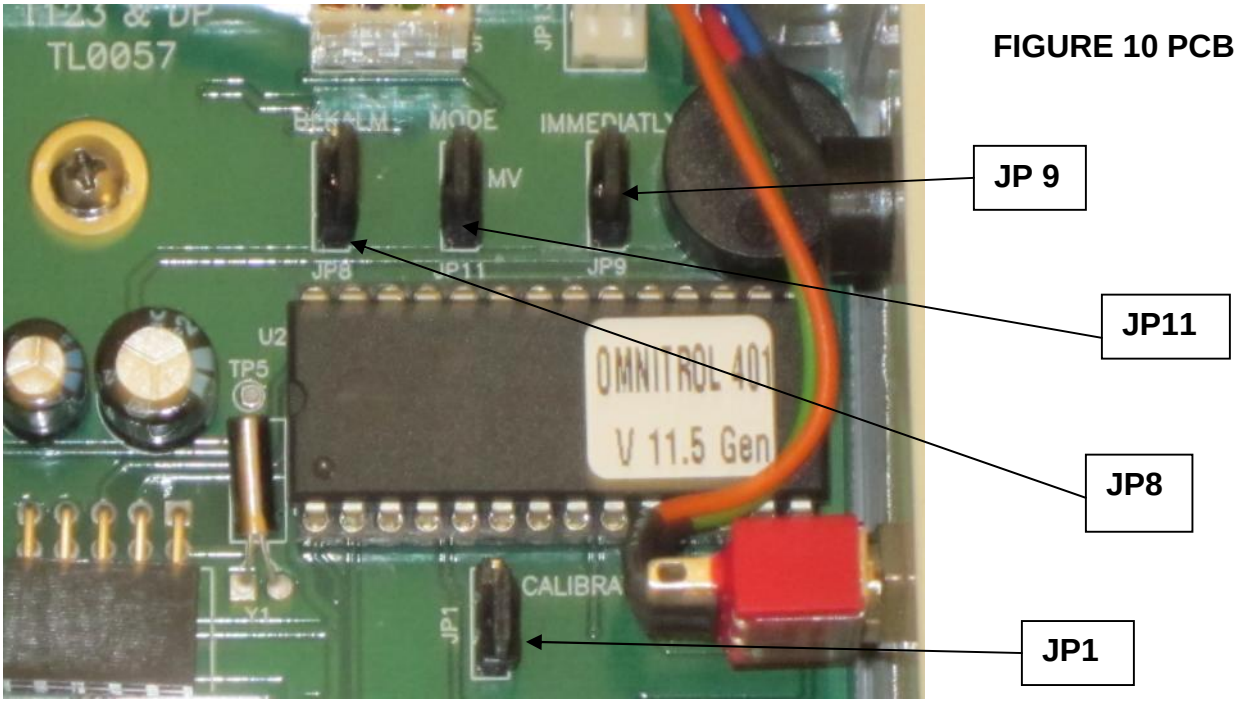


FIGURE 10 PCB Jumpers

SYSTEM OPERATION

The Printed Circuit Board detects the presence of the plug-in modules and during a rinse will activate all outputs present, even if no solenoid is wired an output. It will rinse in sequence: **Out. 1**, then **Out. 2**, then **Out. 3**. If a COV is to used to dead head the filter(s), its solenoid coil is always wired to the last available output, and jumper **JP11** is changed to expose its lower pin.

NOTE: Prior to applying power to the controller, verify that the jumpers have been set properly and that the dip switches **S1** & **S2** have been adjusted to their proper values.

When power is first applied to the controller, the controller will activate a rinse cycle.

Upon completion of this initial rinse cycle, the controller will begin monitoring the Dp terminals for closure When the Dp switch terminals close, a 10 second delay is imposed prior to energizing the solenoid.

If a time interval has been selected on switch **S1**, then the filter will rinse when the timer interval is reached. If the Dp switch senses a high differential pressure during this interval, the controller will override the timer and a rinse cycle will be activated based on high Dp. Following the rinse cycle, the timer will automatically reset.

A manual rinse cycle can be activated at any time by depressing the **RESET / MANUAL** pushbutton.

During normal operation, a beeping sound can be heard approximately every second.

At the end of a rinse initiated by a Dp switch closure, the controller will initiate additional consecutive high Dp rinses up to a maximum of 7. There is a 10 second delay between each consecutive rinse. If the Dp switch's contacts are still closed after 7 consecutive high Dp rinses, then the controller will stop rinsing based on high Dp, and automatically rinse on timer only and the beeping sound will change to 2 per second to indicate a high Dp failure. The LED will also flash rapidly. Depressing the pushbutton on the side of the controller will reset the controller.

If a high Dp failure is indicated, the filter's screen should be inspected for excessive particle loading. Additional filtration (more filters) might be required, or the filter's screen might need to be changed to one with larger openings to allow the filter to have a reasonable duty cycle between rinses.

TROUBLESHOOTING AID

The controller is equipped with an **LED** indicator on the side of the enclosure to aid in troubleshooting. **Table 3** shows the possible **LED** status and system condition. See Figure 2 for **LED** location.

If the **LED** is OFF, indicating a problem, first verify that power is present at the controller, and then depress the **RESET / MANUAL** pushbutton, activating a manual rinse cycle. Note that the factory supplied solenoid coil has a light to indicate that the coil is energized, and the controller **LED** will blink during the rinse cycle. If lights are present during the rinse, then the controller is functioning OK. If the lights come on for a rinse then go off then come on again within 10 seconds repeatedly, then this is an indication of a persistently high Dp or a Dp switch problem.

Table 3 - Troubleshooting

LED Status	Meaning	Action to be Taken
LED ON	Normal mode – controller is waiting for activation of rinse cycle	None
Blinking Once per Second	Solenoid energized – filter is in rinse mode	None
Blinking Fast	High DP problem	Waiting between rinses
3 Blinks per second	High DP problem	Rinsing by timer in progress
Double Blink	Occurs during DIP switch changes	None
LED OFF	Possible problem with controller or power supply	Check to ensure that power is available at control box, then press RESET button