
Manual

Water Pump & Filter Controller ESDI Model 251

ESDI Part No. 000251

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By: M. A. Stern

Electronic Systems Design, Inc.

1010 North Maclay Ave., San Fernando, California 91340 USA
Phone: (818) 365-0864 Fax: (818) 365-1308 Web Site: www.esdi.net

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Manual

R.O. Process Controller ESDI Model 251

1.0 General:

The ESDI Model 251 is a low cost electronic control board that performs all of the tasks necessary to control a water pumping and filtration system.

The Controller operates from a 24VAC power transformer and directly controls 24VAC valves. The pump output is via an isolated onboard power relay, so it can control any pump voltage up to 2HP, 240VAC.

The controller is available as a single circuit board assembly, with or without power transformer. The controller's description, features, and specifications are presented in this document.

2.0. Features:

2.1. Filter Flush Cycles:

To help improve system efficiency, this controller features several filter flush cycles. These flush cycles can be enabled or disabled by their associated program option switch.

2.1.1. Flush Duration:

Switch S2 sets the Flush Duration. The selectable flush times are 1, or 2 minutes. During this time, the Flush and Feed Valves are opened and feed water is allowed to pass over the filter and out the Flush Valve to the drain. This will help rinse off the filter and remove some of the contaminants. At the completion of the flush cycle, the Flush Valve will close, and the controller will go back to the process it was performing prior to the beginning of the flush cycle. This flush duration will be the same for all flush cycles that are initiated by the controller.

2.1.2. One Hour Flush Interval:

When the system has been processing water for an extended period of time, it is important that the system periodically stops and flushes the filter. This helps clean the filter and improve its efficiency. This One hour Flush Cycle can be enabled by switch S3. The flush duration will be the same as that set by switch S2.

2.1.3. Start Flush:

When enabled by switch S4, a flush cycle will occur each time the system starts up and begins to process water, or returns from a lockout condition.

2.1.4. Stop Flush:

When enabled by switch S5, a flush cycle will occur each time the tank is filled and prior to the system shutting down and going into standby.

3.0. Inputs:

3.1. Tank Level Input:

The Tank Level input connects to a float located at the top of the water storage tank. This float is used as feedback to the controller so it can maintain a full storage tank. The Tank Level input requires an isolated contact closure when the tank is low, and an open circuit when the tank is full. The Tank float should have built-in hysteresis to prevent the system from cycling on and off from small changes in water level. A pressure switch may also be used for this application.

3.2. Lockout Input:

The Lockout input allows an external device to disable the controller. It can be connected to a pre-conditioner (water softener) to disable it while the unit is reconditioning and inlet water is unavailable. It can also be connected to an inlet pressure switch, or TDS monitor to shut down the system if the TDS is too high. These peripherals can be used individually or wired in series to the Lockout input.

An isolated contact closure will enable the system while an open circuit will disable it and place it into Lockout. If this input is not used, place a jumper across the Lockout terminals.

Upon returning from Lockout, the system will time out for ten minutes, and then execute a flush cycle (if selected by S4 Start Switch) and then it will return to its previous status prior to Lockout.

4.0. Outputs:

4.1 Pump Relay:

The Model 251 is designed to work with both low-pressure systems that require no pump, and high-pressure systems that do.

In order to control a pump, an external relay or contactor is required. The coil voltage of the relay should be 12VDC. Connect the relay coil to the Pump Relay output (note polarity). The contacts of the relay can then be used as an On/Off switch, wired in series with the line power, to control the pump. This allows you to choose any power (120/240VAC) to run the pump.

To help insure that the pump will not run dry, the system is programmed to open the Feed valve one second prior to turning on the pump. Upon shutting off the pump, the Feed valve will remain open, and then close one second after the pump is turned off.

4.2. Flush Valve:

This output connects to the Flush Valve. This valve, when open, should allow water to pass over the filter and route the rinse water into the drain. This valve should be rated for 24VAC operation.

4.3. Inlet Valve:

The Inlet (or Feed) Valve is connected to this output. This valve, when open, should allow water to pass into the system from the municipal water line. This valve should be rated for 24VAC operation.

5.0 Specifications:

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|--------------------------|---|
| 5.1. Tank Level Input: | Isolated contact closure.
Open = Stop.
Close = Run. |
| 5.2. Lock Out Input: | Isolated contact closure.
Open = Stop.
Close = Run. |
| 5.3. Pump Relay Coil: | 12VDC, 300ma max |
| 5.4. Flush Valve Output: | 24VAC, 2 Amps max. |
| 5.5. Inlet Valve Output: | 24VAC, 2 Amps max. |
| 5.6. Circuit board Size: | 4.125" X 4.875" X 1.25". |
| 5.7. Power Requirements: | 24VAC, 50/60 Hz, 100ma (nominal).
Voltage tolerance: ± 10 % Minimum. |

6.0. Power Transformer Selection:

It is important to select the proper power transformer. If the transformer is not capable of supplying the required current, the voltage will collapse and the system may not operate correctly. To do this, one must totalize all of the current drawing components. Two examples follow:

Nominal Secondary Voltage: 24 VAC, 50/60 Hz

Example 1:

Inlet Valve (6W):	250 ma
Flush Valve (6W):	250 ma
Control Board:	100 ma
Pump Relay Coil:	<u>100 ma</u>
Total Secondary Current (Minimum):	700 ma

Example 2:

Inlet Valve (24W):	1000 ma
Flush Valve (24W):	1000 ma
Control Board:	100 ma
Pump Contactor:	<u>300 ma</u>
Total Secondary Current (Minimum):	2.4 Amps

7.0. Switches & Indicators:

7.1. Option Settings DIP Switch:

7.1.1. Flush Duration:

<u>S2</u>	<u>Time:</u>
On	1 minute
Off	2 minutes

7.1.2. One Hour Flush Interval :

<u>S3</u>	<u>Select</u>
On	Enabled
Off	Disabled

7.1.3. Start Flush:

<u>S4</u>	<u>Select</u>
On	Enabled
Off	Disabled

7.1.4. Stop Flush:

<u>S5</u>	<u>Select</u>
On	Enabled
Off	Disabled

- 7.2. Power LED (GRN): Indicates that there is power to the board.
- 7.3. Tank Full LED (GRN): Indicates that the water storage tank is full.
- 7.4. Process LED (GRN): Indicates that the system is processing water.
- 7.5. Flush LED (YEL): Indicates that the system is in a flush cycle.
- 7.6. Lock Out LED (YEL): Indicates that the system is locked out.

8.0. Connectors:

The terminal block is pluggable and can be removed without having to remove the individual wires from the terminal block. The pluggable terminal blocks can be oriented either vertically or at right angles to the circuit board headers.

It is recommended that all interconnect wiring be with UL type 1015, 20 AWG minimum, with the power input being 18 AWG minimum. The terminal blocks will accommodate up to 16 AWG wire.

8.1. Inputs:

All inputs are low voltage (+5VDC). Signals are either open, or closed. **DO NOT APPLY ANY EXTERNAL VOLTAGES TO ANY OF THESE INPUTS, OR CIRCUIT BOARD MAY BE DAMAGED.**

J1-1	Tank Level Input Return
J1-2	Tank Level Input
J1-3	Lock Out Input Return
J1-4	Lock Out Input

8.2. Outputs:

Outputs are either 24VAC or 12VDC. These outputs are not fused, or current limited. Therefore, **CARE MUST BE TAKEN TO PREVENT SHORTING OF THESE OUTPUTS TOGETHER, TO COMMON, OR TO ANY OTHER VOLTAGE SOURCE, OR CIRCUIT BOARD MAY BE DAMAGED.**

J1-5	Pump Control Relay Coil -12VDC
J1-6	Pump Control Relay Coil +12VDC
J1-7	Flush Valve 24 VAC Return
J1-8	Flush Valve 24VAC
J1-9	Inlet Valve 24VAC
J1-10	Inlet Valve 24VAC Return

8.3. Power Input:

The power input should be connected to the secondary of the power transformer, with the transformer primary being connected to the primary power line. It is recommended that a fuse of appropriate current rating be used in series with this input, to help prevent damage to the transformer and circuit board.

J1-11	Power Input 24VAC
J1-12	Power Input 24VAC Return