

Automatic Freeze Protection Option

For MicroProcessor Regulated Water Supply Systems (MPR-AFP)

Installation, Operation, and Maintenance Manual

Features

- Completely Self-contained Plug-in Board
- All Solid State (no moving parts)
- State-of-the-art Digital Electronics
- Manufactured using SMT (Surface Mount Technology) Components
- Selectable Drain Time

Description

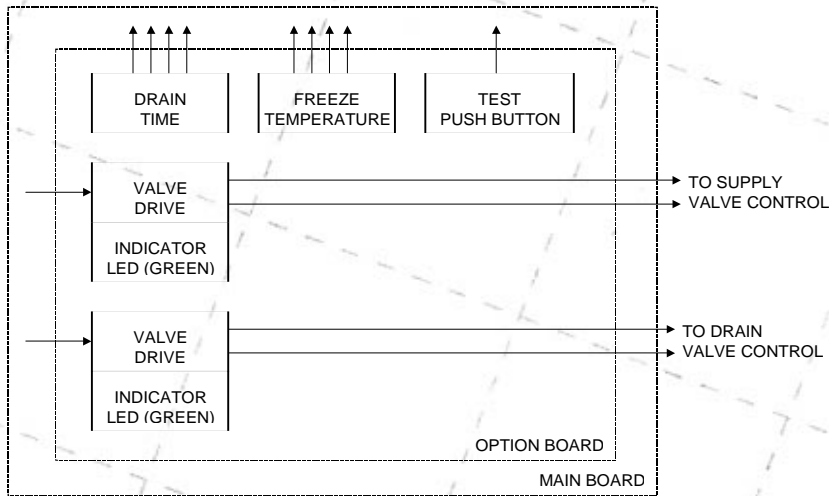
Energy Saver's model MPR-AFP is an optional plug-in board designed to expand the capabilities of the MicroProcessor Regulated Water Supply Systems (MPR).

The MicroProcessor Regulated Water Supply Systems were designed to automatically detect the presence of this board and, if present, extend the system's capabilities to protect the evaporative system plumbing from damage caused by unexpected freezing temperatures.

Energy Saver's model MPR-AFP option provides a highly reliable and automated solution to safeguarding the system plumbing should freezing conditions occur.

Energy Saver has a policy of continuous product improvement and reserves the right to change designs and specifications without notice. This manual is dated May 2, 2002 and supersedes all previous literature. This manual is the property of ES, all rights reserved.

Block Diagram



Specifications

SUPPLY VALVE CONTROL OUTPUT	24VAC - 60 Hz @ 10VA
DRAIN VALVE CONTROL OUTPUT	24VAC - 60 Hz @ 10VA

USER CONTROLS AND INDICATORS

Four-bit DIP switch for setting the drain time.

Four-bit DIP switch for setting the freeze temperature.

Momentary push button for testing the option.

Green LEDs (Light Emitting Diodes) indicate the status of each valve control.

The model MPR-AFP expands the capabilities of the *MicroProcessor Regulated Water Supply Systems* by allowing the system to control two additional electrically controlled valves.

With the addition of these two valves, the system can then completely drain the evaporative system's supply plumbing should it sense freezing temperatures. The temperature that will cause the system to respond is adjustable over a reasonable range. The time required to drain the system is also adjustable for different system installation requirements.

A pushbutton is provided on the board to allow the installer or maintenance personnel a means to easily test the system.

Installation

Turn off the 24VAC power to the MPR's main board. Plug the optional board into the main board by carefully aligning the two sets of pins on the option board with the corresponding two sockets on the main board. Gently press down on the optional board until the pins are securely seated into their sockets.

Switch Settings

The drain time is adjustable from 2 to 30 minutes in 2 minute increments and should be set to the appropriate time required to completely drain the system supply plumbing should the temperature drop below the freeze temperature setting. Set the four switch positions for the appropriate time according to the table below:

Drain Time	SWITCH POSITIONS (S2)			
Minutes	1	2	3	4
0 (Disabled)	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF
4	OFF	ON	OFF	OFF
6	ON	ON	OFF	OFF
8	OFF	OFF	ON	OFF
10	ON	OFF	ON	OFF
12	OFF	ON	ON	OFF
14	ON	ON	ON	OFF
16	OFF	OFF	OFF	ON
18	ON	OFF	OFF	ON
20	OFF	ON	OFF	ON
22	ON	ON	OFF	ON
24	OFF	OFF	ON	ON
26	ON	OFF	ON	ON
28	OFF	ON	ON	ON
30	ON	ON	ON	ON

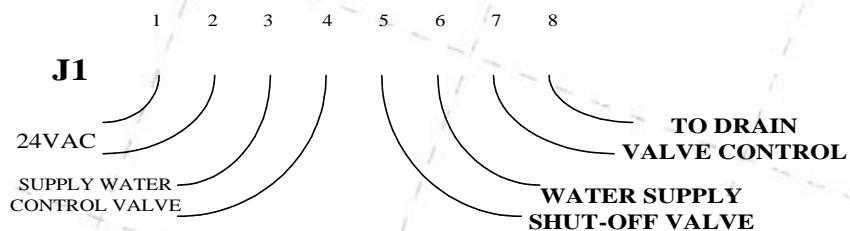
Switch Settings (continued)

The freeze temperature threshold is adjustable over a 15° C (27° F) range by setting the four switch positions according to the table below:

Freeze Temperature		SWITCH POSITIONS (S1)			
°C	°F	1	2	3	4
0	32.0	OFF	OFF	OFF	OFF
1	33.8	ON	OFF	OFF	OFF
2	35.6	OFF	ON	OFF	OFF
3	37.4	ON	ON	OFF	OFF
4	39.2	OFF	OFF	ON	OFF
5	41.0	ON	OFF	ON	OFF
6	42.8	OFF	ON	ON	OFF
7	44.6	ON	ON	ON	OFF
8	46.4	OFF	OFF	OFF	ON
9	48.2	ON	OFF	OFF	ON
10	50.0	OFF	ON	OFF	ON
11	51.8	ON	ON	OFF	ON
12	53.6	OFF	OFF	ON	ON
13	55.4	ON	OFF	ON	ON
14	57.2	OFF	ON	ON	ON
15	59.0	ON	ON	ON	ON

Connections

Connect the supply and drain valve controls to the terminal block on the main board. The water supply shut-off valve control connects to pins 5 and 6 of the terminal block and is configured as a normally open valve. The drain valve control connects to pins 7 and 8 of the terminal block and is configured as normally closed.



Testing

The TEST pushbutton on the option board provides a way to simulate the system response to freezing conditions. This allows the system to be tested to assure that all connections and valves are in working order.

To test the system, press and hold the test button for two seconds or until power is applied to the supply valve then release the pushbutton. The following actions will occur:

1. The water supply shut-off valve will close.
2. Ten seconds later, power will be applied to the drain valve, opening this valve.
3. Ten seconds later, the microprocessor regulated valve will be driven open if it is not already open, and the system will remain in this state for the time period set by the DRAIN TIME switches. After this time period has elapsed:
4. The microprocessor regulated valve will close.
5. Five seconds later, the drain valve will close.
6. Five seconds later, the supply valve will open and the system will resume normal operations.

NOTE: The test sequence may be aborted at any time by pressing the TEST pushbutton.

Operation

When power is applied to the unit, system operation is completely automatic.

The system monitors the ambient temperature and if the temperature falls below the threshold set by the freeze TEMPERATURE dip switches, then normal operation is suspended and the following actions will be performed:

1. The supply valve will close.
2. Ten seconds later, power will be applied to the drain valve, opening this valve.
3. Ten seconds later, the microprocessor regulated valve will be driven open if it is not already open, and the system will remain in this state for the time period set by the DRAIN TIME switches. After this time period has elapsed:
4. The microprocessor regulated valve will close.
5. Five seconds later, the drain valve will close and the system will remain in this state until the ambient temperature rises above the threshold set by the freeze TEMPERATURE dip switches. When this occurs, the supply valve will open and the system will resume normal operations.

