

NOTICE! No mixing valve will work satisfactorily if improperly installed. We suggest, therefore, that you read these instructions carefully before installing and follow directions as outlined. Handle the mixing valve with care.

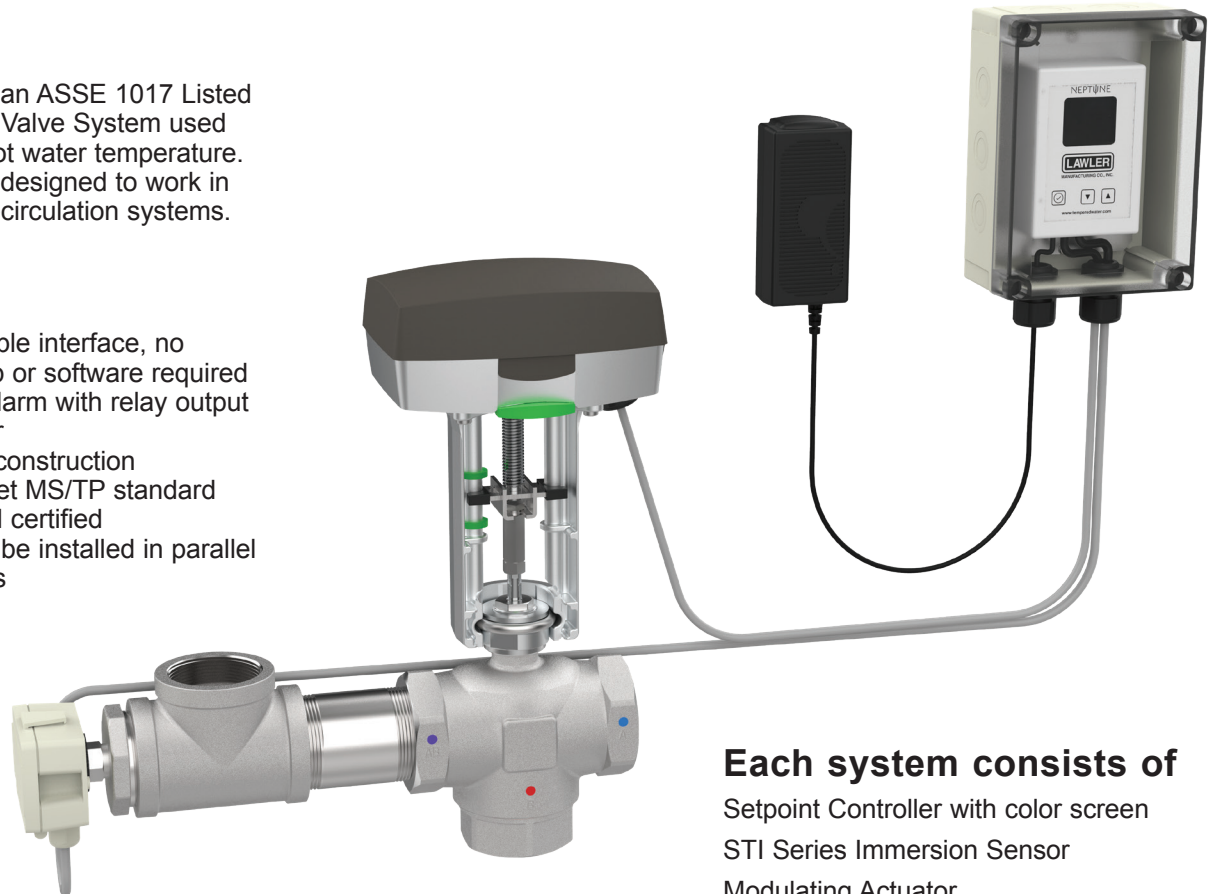
Neptune EMX Electronic Mixing Valve

Description

The Neptune EMX is an ASSE 1017 Listed Electronic Tempering Valve System used to control domestic hot water temperature. The Neptune EMX is designed to work in domestic hot water recirculation systems.

Features

- Easy to set-up, simple interface, no programming laptop or software required
- High temperature alarm with relay output
- Fast reading sensor
- Full stainless steel construction
- ModBus and BACnet MS/TP standard
- Lead free listed and certified
- Multiple valves can be installed in parallel for higher capacities



Each system consists of

- Setpoint Controller with color screen
- STI Series Immersion Sensor
- Modulating Actuator
- Stainless Steel Valve Body
- NEMA 4 Enclosure for the controller
- Power supply

Selection

Valves should be selected based on a 5 to 10 PSI pressure drop. The valve is typically smaller than the system piping for most applications.

Model	Size	CV
EMX-075	3/4"	7.3
EMX-100	1"	11.6
EMX-125	1-1/4"	18.5
EMX-150	1-1/2"	29.0
EMX-200	2"	46.3

Valve	Inlet Size	Pressure Drop PSI			
		5	10	20	30
NEPTUNE EMX 075	3/4	17	24.3	34	43
NEPTUNE EMX 100	1	25.5	37	52	64
NEPTUNE EMX 125	1-1/4	41.4	58.6	83	101
NEPTUNE EMX 150	1-1/2	64.4	91	128	157
NEPTUNE EMX 200	2	102	145	205	252

Minimum flowrate 1/4 gpm in properly recirculated system.
5 gpm minimum recirculation flow rate.

WARNING: The Neptune EMX system is not a safety device. It is not an anti scald device. The Neptune EMX is a temperature control system. For anti-scald devices see consult ASSE, see point of use valves.

INSTALLATION AND FIELD ADJUSTMENTS ARE THE RESPONSIBILITY OF INSTALLER.

Incorrectly maintained, installed or sized systems will result in poor operation, premature failure and increases the risk of serious injury or death.

Technical Data

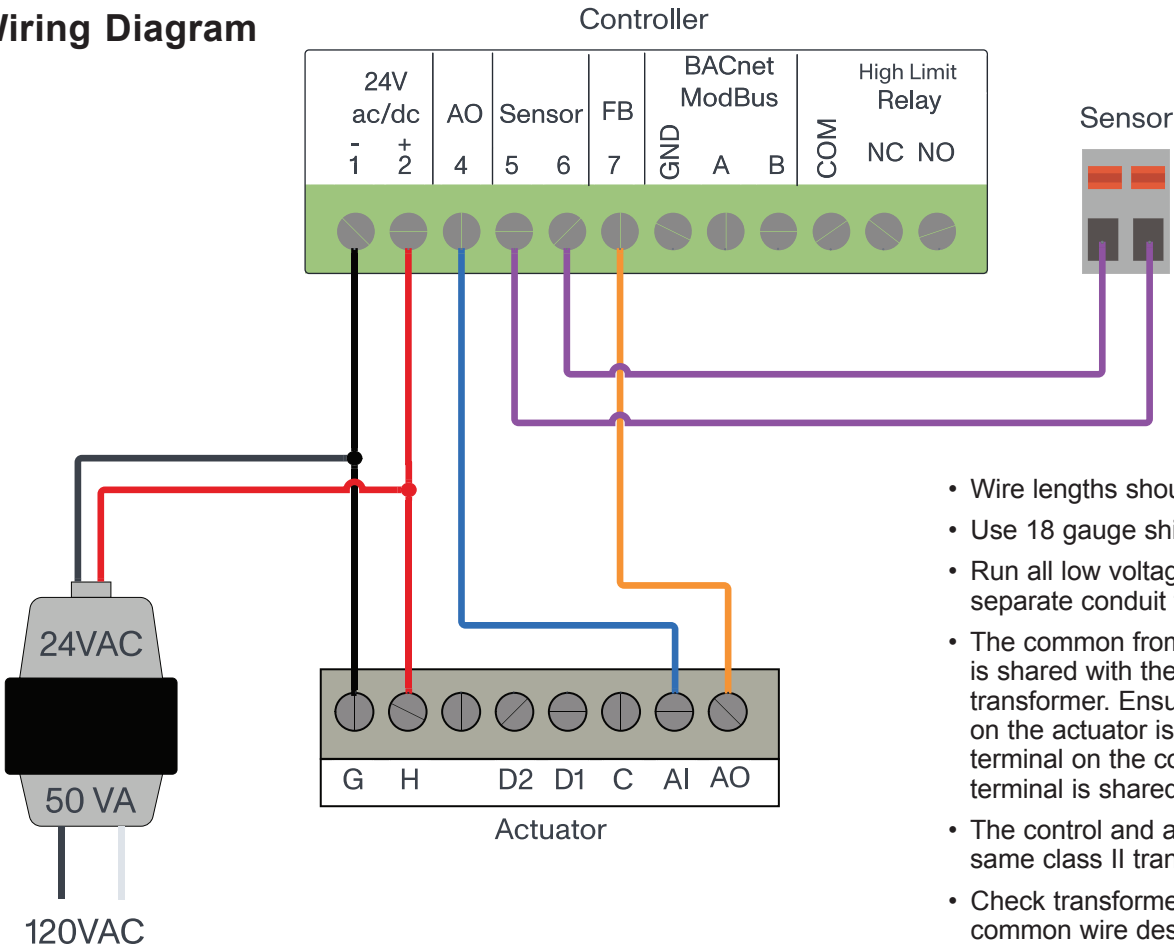
CONTROLLER:

Operating Voltage: 24V AC/DC 50VA
 Control Signal: 0-10VDC / 2-10VDC
 Action: Direct or reverse acting
 Sensor Rate: 10 samples/second
 Relay: 10 Amps at 220 V

VALVE:

Cold inlet: 39 F to 80 F
 Hot inlet: 120 F to 205 F
 Outlet: 95 F to 140 F
 Maximum Temperature: 250 F
 Maximum Working Pressure: 250 PSIG

Wiring Diagram



- Wire lengths should not exceed 200'.
- Use 18 gauge shielded wire.
- Run all low voltage and sensor wires in separate conduit from 120VAC circuits.
- The common from the control signal is shared with the neutral side of the transformer. Ensure that the H terminal on the actuator is shared with the 2 (+) terminal on the control and that the G terminal is shared with the 1 (-) terminal
- The control and actuator must share the same class II transformer.
- Check transformer label for hot and common wire designation.

Installation Diagram

Figure 1

When used in a single temperature recirculating system

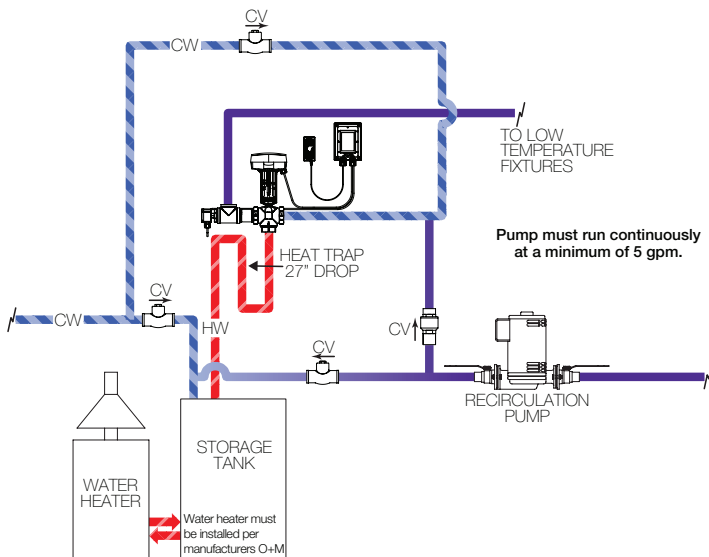
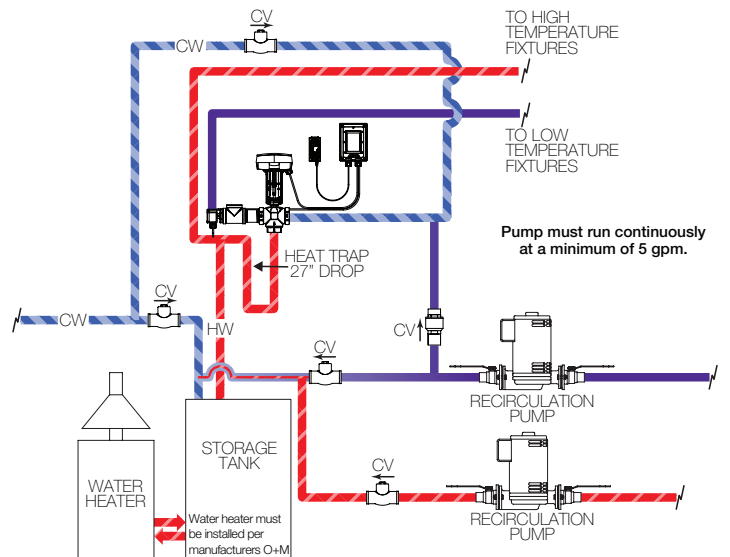
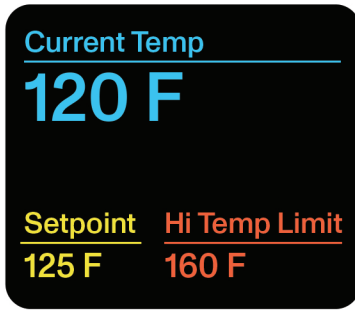


Figure 2

When used in a dual temperature recirculating system



How to Change Settings

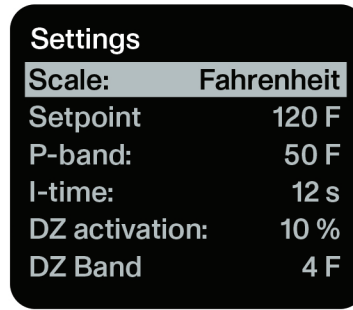


Main Screen 1

On power up, the main screen is displayed.

Use to toggle between main screen views.

To enter settings, press and hold for 3 seconds.

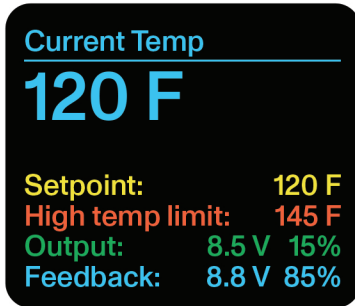


Settings Screen

Use to toggle fields.

Press once to select.

Press and hold for 3 seconds to return to Main Screen.

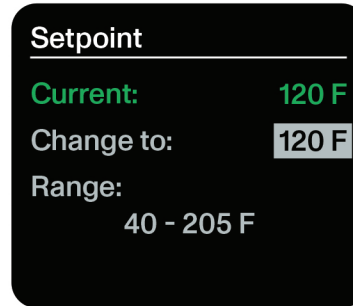


Main Screen 2

Main Screen 2 shows more information.

Output is the percentage open of the hot port.

Feedback is the reading of the actuator position.



Setting Adjustment Screen

Use to set parameter.

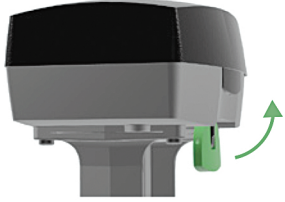
Press once to return to Settings.

Settings Overview

Scale	Changes the system units between Fahrenheit and Celsius.
Set Point	The desired mixed outlet temperature, set in 1 degree Fahrenheit increments or 0.5 degree increments in Celsius. Adjustable from 40-205 F or 4.5-96.0 C. The system will work to maintain this target temperature at all times.
P Band and I-time	<p>Both the Proportional Action “P-band” and Integration Time “I-time” are a function of the responsiveness and speed of the control loop signal change. The P band indicates the required change of control offset to cause a 100% output signal change. i.e., from 0 V to 10 V.</p> <p>Increasing the P-band decreases the speed of change of the control signal. For example, a P-band of 100 F has a 50% slower reaction than an P-band of 50 F.</p> <p>Decreasing the I-time will result in faster, but usually less responsive control.</p> <p>The default settings of P-band and I-time are default for a reason and should work for most domestic hot water mixing valve installations. Let the system run and stabilize before making changes to the P-band or I-time. A valve that is hunting is usually experiencing a system issue rather than the need for adjustment of the gain settings. See troubleshooting section of manual to rule out other issues before attempting to change the P and I settings.</p>
Feedback Range	<p>The controller can read the feedback voltage on terminal 7 from an electronic actuator in 2-10VDC or 0-10VDC. This information is displayed through the main screen as well as the BMS communication.</p> <p>The feedback is optional, has no impact on the controller output. If not connected, feedback will be displayed as 0%.</p>
Output Range	The controllers output can be changed from 0-10VDC to 2-10VDC for flexibility with alternative actuators.
High Limit and High Limit Delay	<p>The high limit alarm is triggered when the leaving water temperature is higher than the alarm temperature setting and the delay time is passed. When this happens, the valve is closed to the hot port and the relay state changes. This is a manually reset alarm. The delay time is adjustable from 3 to 300 seconds.</p> <p>For example if the high limit temperature is set for 145 F with a 20 second delay, if the leaving water temperature exceeds 145 F for 20 seconds, the alarm is triggered.</p>
Modbus and BACnet	These screens are used in conjunction with modbus and BACnet settings for BMS connectivity. See supplemental info for communication settings, registers and wiring.
Defaults	Use this setting to restore the controller to factory default settings.

Setting Actuator to Automatic Mode

Flip green tab up towards you to put in automatic mode.



MANUAL MODE



AUTOMATIC MODE

Set Point Test

1. Leave all isolation valves open. Make sure the recirculation pump is running.
2. Adjust the set point to 50 F. The valve should drive down and close off the hot port.
3. Once the hot port is fully closed, watch the output leaving temperature. If this goes cold double check the return line circulator operation as well as the piping. When the recirculation is running, cold water entering should be warm. Anything less than 80 F is a sign the pump is not operational.
4. Often the pump motor will be running, but the volute is clogged or the impeller has become disconnected
5. Check for air in return line, especially after water shut down. It may have to be purged.

Troubleshooting

ISSUE	CAUSE	RESOLUTION
No display	No power	<ul style="list-style-type: none"> • Check to ensure there is 24VAC/DC +/- 10% on terminals 1 and 2. • Check to make sure the actuator has 24VAC/DC on terminals G and H. • Make sure to follow warnings and steps in regard to the ribbon cable connection. Avoid "hot plugging" - make sure power disconnected before removing or installing ribbon cable.
No movement from actuator	Improper wiring Actuator set to manual	<ul style="list-style-type: none"> • Ensure that the wiring from the transformer that powers the actuator and control follows the correct polarity as shown in the wiring diagram. • The wire that powers G on the actuator must be common with 1 and the wire that powers H on the actuator must be common with 2. • Make sure the green tab on the face of the actuator is in the automatic mode position. If the tab is pointing down it is the manual mode. • Do not push the tab backwards, make sure the tab is pulled forwards. The microswitch under the cover needs to be made.
Lag in temperature/wrong temperature	Sensor not in water flow	<ul style="list-style-type: none"> • Ensure the sensor is in the path of the water flow and not in a "dead leg". Do not use excessive fittings. Longer sensors are available if required. • Do not use a thermowell unless instructed otherwise. The ST series sensors are not designed for use with thermowells.
Valve Hunting	Return recirculation not flowing properly	<ul style="list-style-type: none"> • Ensure that the return is piped in such a way that it goes back to the hot water source and the mixing valve, not just one or the other. • When the pump is running, the inlet to the heater and the cold port on the valve should be warm. • Check to make sure the return pump is on and working. Many times it is reported to us that the motor of the pump is running but the impeller has failed. May require pulling the pump to check internals. • Make sure all check valves are holding. • Make sure supply pressures are within 5 PSI of one another. • If there is a pressure boosting system on site, make sure the booster system is not short cycling, this can cause issues with the mixing valve performance. • Perform "setpoint test" at top of page to verify return pump operation.

If you are experiencing issues call the factory at 317-261-1212 or reach out to your local rep.

GUARANTEE

We guarantee the Lawler Mixing Valve to be free from defects in workmanship and material, and for a period of one year from date of purchase, will replace any parts found by us to be defective. We will not be held responsible, however, for any labor incidental to, or for any damages caused by defective material. Each mixing valve is thoroughly inspected and tested under actual conditions at our factory.