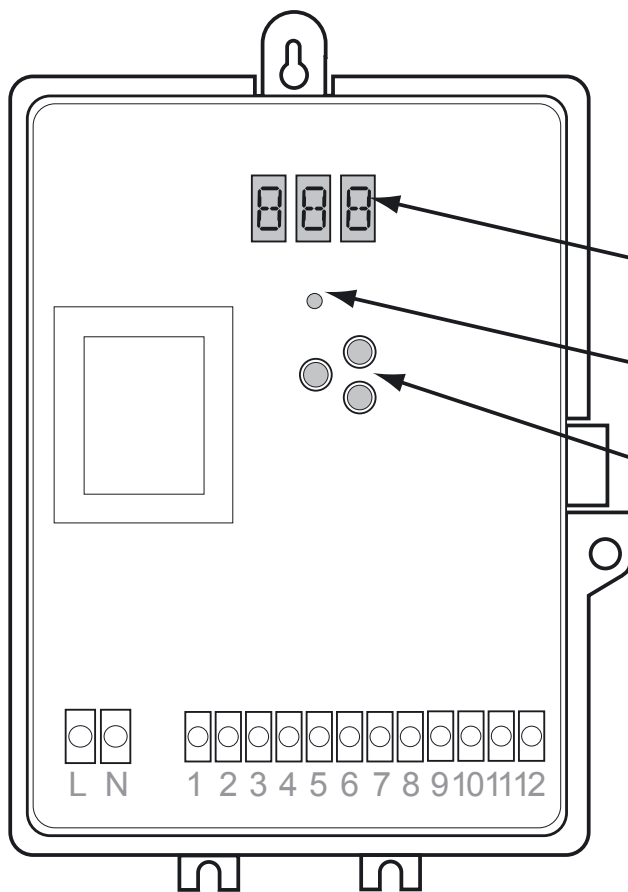


HEAT-TIMER®

INSTALLATION/OPERATING INSTRUCTIONS

ELECTRONIC TEMPERING VALVE (ETV)



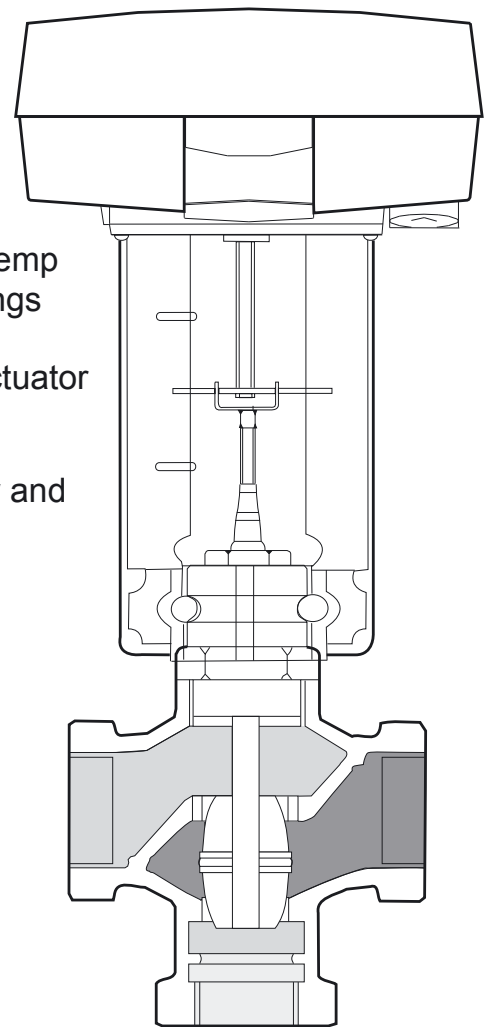
ETV Control

Display current temp and control settings

LED indicates actuator operation

3 buttons to view and change settings

ETV Actuator



ETV Valve

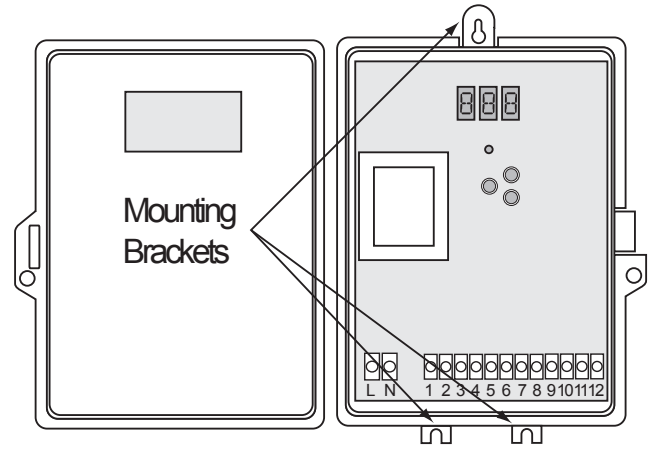
⚠ WARNING

The Heat-Timer tempering valve is a primary tempering valve and is NOT designed or recommended to be used as a "Failsafe" or "Anti-Scald" valve. For safety, it may be required to install separate anti-scald and safety devices.

INSTALLATION

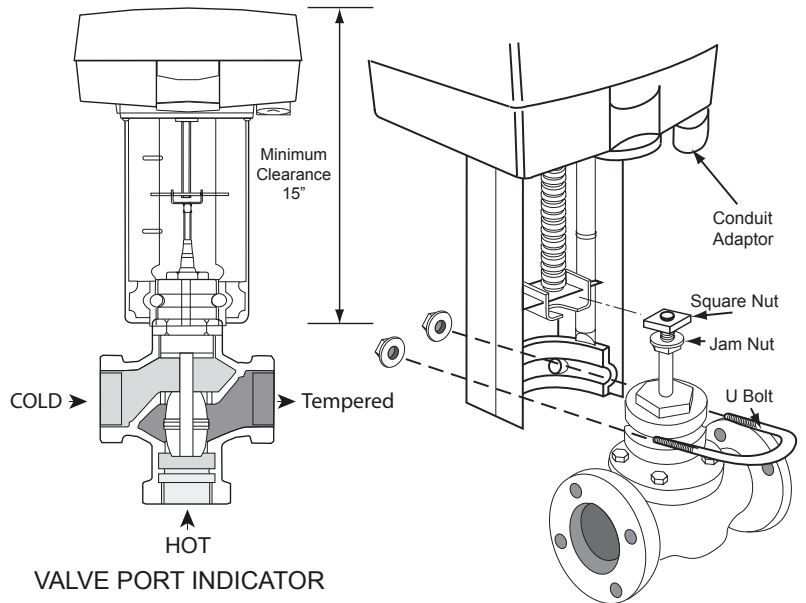
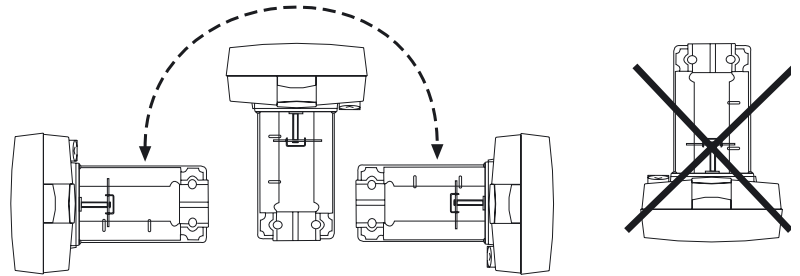
Mounting The Control

- The Electronic Tempering Valve (ETV) control can be located up to 500' from the Heat-timer ETV valve actuator.
- Locate the control in a convenient indoor location near the valve actuator.
- Use the three mounting brackets on the outside of the enclosure to secure the controller to the selected surface.



Installing the Valve and Actuator

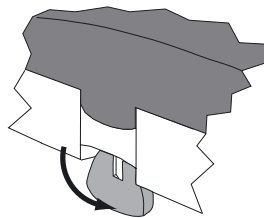
- The valve and actuator can be mounted upright vertical or sideways or any angle in between. They must not be mounted upside down.
- Make sure the valve ports and piping are correct. (See Diagram.)
- Calculate a clearance of a minimum of 15" for mounting and servicing the actuator.
- Mount actuator to valve body using U bolt and nuts provided. Use manual override (Red Tab) to adjust actuator shaft open or closed in order to align square nut to actuator shaft bracket. Tighten jam nut. Install supplied conduit adaptor to actuator housing knockout.



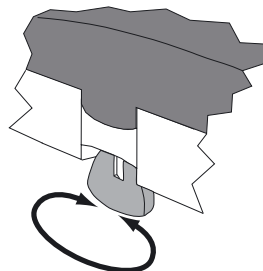
⚠ ALERT
When the manual operation handle is lowered, the actuator does not respond to control signals.

Actuator Manual / Override Operation

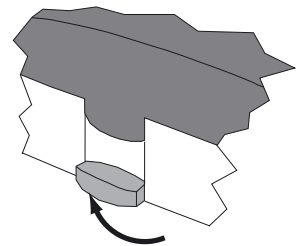
- Lower the manual Red Tab handle. The actuator stops.
- Operate the actuator manually by turning the Red Tab clockwise or counter clockwise.
- When the actuator has been manually operated, the handle must be raised completely in order for the actuator to work.



Flip Red Tab downward for manual operation



Turn Red Tab clockwise or counter clockwise to make adjustment to valve opening



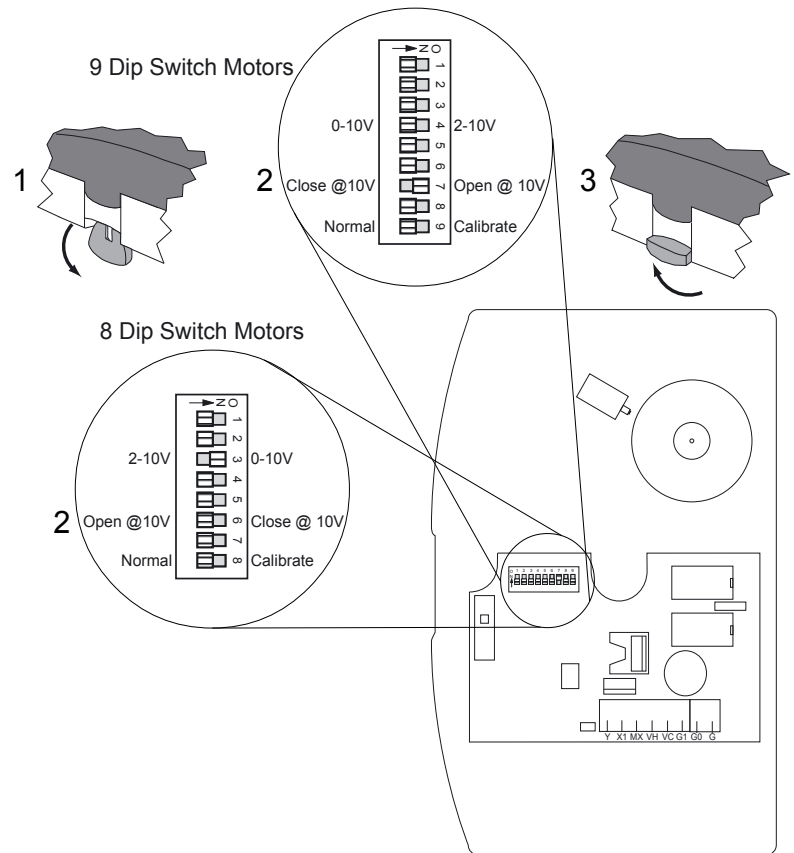
Flip Red Tab upward for normal operation

Setting Actuator Dip Switches

- Before changing any dip switch positions, either the power must be off to the actuator or flip the Red Tab to the Manual position (Down).
- For the Actuator to move the valve in the correct direction, Set Dip Switch 7 to ON (on 9 Dip Switch Actuators) or Set Dip Switch 6 to OFF (on 8 Dip Switch Actuators). All other dip switches must be OFF.

Calibrating Actuator End Positions

- The Actuator must be calibrated to the valve size it is mounted on. This allows the actuator to find the valve end positions.
- Start by moving the blue and red tabs on actuator path closer to each other.
- Flip the Red Tab down and switch Dip Switch 9 to ON then OFF (on 9 Dip Switch Actuators) or switch Dip Switch 8 to ON then OFF (on 8 Dip Switch Actuators).
- Then, flip the Red Tab up for the calibration to start. The Actuator will move up and down. Then, it will resume normal operation.



⚠ WARNING

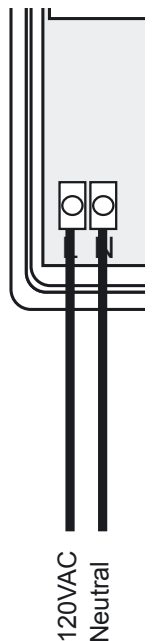
To Avoid scalding, prior to powering the ETV or prior to calibrating the ETV Motor, make sure that the valve hot input port is closed using an additional ball or shutoff valve or by installing the Heat-Timer TMC (Temperature Monitoring Control). The ETV Motor will fully open to calibrate its highest and lowest points prior to following the ETV control signal and resuming normal operation. If the supply to the building is excessively hot, scalding or serious injury might occur.

Power Wiring The Control

- Bring the 120VAC 60Hz power wires through the Power Knockout (KO) on bottom of enclosure (Do not use REAR knockouts). The left KO is preferred.
- Class 1 voltages must enter the enclosure through a different opening from any Class 2 voltage wiring.
- Connect the hot line to terminal marked L.
- Connect the neutral line to the terminal marked N.

⚠ ALERT

When powering controls, Heat-Timer recommends installing a surge suppressor before connecting the power line to the control.



Valve Actuator Wiring

- The ETV control is designed to connect directly to the ETV actuator.
- Terminal 1 of the ETV control connects to ETV actuator terminal G (24VAC power).
- Terminal 2 of the control connects to valve terminal G0 (24VAC neutral).
- Terminal 3 of the control connects to valve terminal X1 (0 - 10VDC Signal)
- Terminal 4 of the control connects to valve terminal MX (0 - 10VDC Ground)
- Class 2 voltages must enter the enclosure through different opening from any Class 1 voltage wiring.

Sensor Wiring

- The temperature sensor wires can be extended up to 500' by splicing with 18 gauge shielded wire.
- Do not run sensor wires in conduit with line voltage.
- The sensor should be inserted into a 3/8" ID well (HT#904011 or equivalent).
- The ETV will control the water temperature based on the temperature it reads at the sensor location. Therefore, select a sensor location which is representative of the entire system. (Min. 3-5 ft. from outlet)
- The sensor wires must be connected to terminals 6 and 7.
- Polarity is not important. Either wire from the sensor can be connected to either input terminal.
- Class 2 voltages must enter the enclosure through a different opening from any Class 1 voltage wiring.

Setback Wiring

- The Setback feature can be used to provide a lower domestic hot water (DHW) setting during the night or when hot water use is minimal.
- The Setback signal must be a dry contact only. No voltage can be placed across ETV terminals 7 and 8.
- When terminals 7 and 8 are shorted, the Setback is enabled and the ETV will hold the lower Set Point. The right decimal point of the right digit will blink indicating this condition.

Setting the Temperature Display Mode (°F or °C)

- The temperature display mode is set when the ETV control is powered up. Once set, it won't need to be set again. Power outages will not cause the display mode to be reset.
- Note: If you change the temperature display mode, you will need to reset the Set Point and Setback.
- To set the temperature display mode, use the following steps:
 1. Remove power to the ETV controller (if it was powered) and reapply power. (Valve will self adjust through its full stroke, open/close)
 2. The display will show the software version number.
 3. Wait approximately 5 seconds and the display will change to read either °F or °C. If the display shows °F then the ETV controller will operate in Fahrenheit degrees. If the display shows °C then it will operate in Celsius degrees.
 4. Hold down the center button while pushing either the UP or DOWN button to toggle between the displays of °F and °C.
 5. When the correct temperature mode is selected, release the buttons and wait approximately 5 seconds.
 6. If the temperature display mode was changed, the display will flash. Then the ETV will display the sensor temperature.

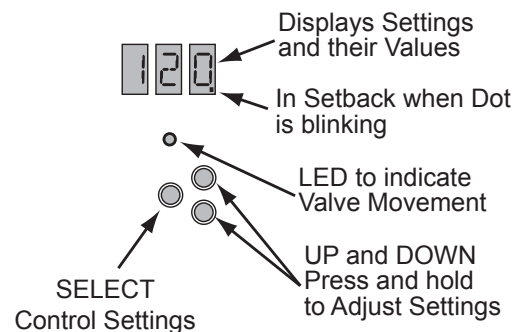
OPERATION

Digital Display

- During normal operation, the ETV three digit display will show the temperature of the DHW (at the sensor location).
- If the right decimal of the right hand display digit flashes, this indicates the ETV is holding the lower Setback water temperature.

Viewing and Adjusting the Control Settings

- The SELECT, UP, and DOWN buttons are used to view and adjust the Set Point, Setback, and Gain.
- Repeatedly press the center SELECT button to advance through the control settings
- A setting can only be adjusted when it is being displayed.
- Use the UP and DOWN buttons to adjust the setting.
- The display will always revert back to the actual DHW temperature measured by the sensor after 30 seconds.
- Settings will not be lost if power is interrupted.
- The Control Settings chart describes each setting and how to adjust it.



CONTROL SETTINGS

Press SELECT Button	Display	Press and hold either the UP or DOWN button to adjust the value
Once	SP Set Point	The Set Point is the temperature that the ETV will hold during normal operation. The temperature may fluctuate slightly around the Set Point value. The amount of fluctuation is controlled by the Gain setting. (60°F to 180°F) Default 120°F.
Twice	SB Setback	The setback is the number of degrees the DHW temperature will be lowered when the Setback input is shorted. The Setback provides a lower DHW temperature when demand is low. (0°F to 50°F) Default 20°F.
3 Times	GN Gain	The Gain setting provides PID type control of the ETV valve. The higher the Gain setting, the more aggressively the control adjusts the valve based on a change in water temperature. If the water temperature tends to fluctuate quickly above and below the Set Point, reduce the Gain. If the water temperature tends to stay below the Set Point, increase the Gain. Start with a Gain setting of 0.0, and always wait at the least ten minutes after adjusting the gain to determine its affect on the system. (-10 to +10) Default 3.
4 Times	Default	The ETV returns to the default display of sensor temperature.

TROUBLESHOOTING

No Display

Check the power to the ETV controller. Turn the power off and back on.

OFF or OPN Display

The ETV does not see a sensor connected. Check the sensor wires are continuous from the sensor to the ETV controller's terminals 6 and 7. Then, follow the procedure for Incorrect Temperature Display.

SHT Display

The ETV sees a short across the input terminals 6 and 7. If you remove the sensor wires from the ETV terminals, the display should change to read OPN. If the display does not change to OPN, the ETV may be damaged.

Incorrect Temperature Display

Remove the wires from the sensor input terminals 6 and 7. The display should change to read OPN. If it doesn't, the ETV may be damaged. Take an ohm reading across the detached sensor wires. The ohm reading should correspond to the temperature chart. If the ohm reading is significantly different, the sensor may be damaged.

ETV does not provide Setback

Check input terminals 7 and 8 are shorted together. When shorted, the right decimal point on the right digit of the display should flash. If it does, check the Setback setting is not zero. If the Setback setting is greater than zero, then the displayed Set Point temperature should be lowered by the amount of the Setback when terminals 7 and 8 are shorted. If the control was just switched into Setback, it may take a few minutes for the system water temperature to lower to the new Setback value.

ETV controller does not control the valve

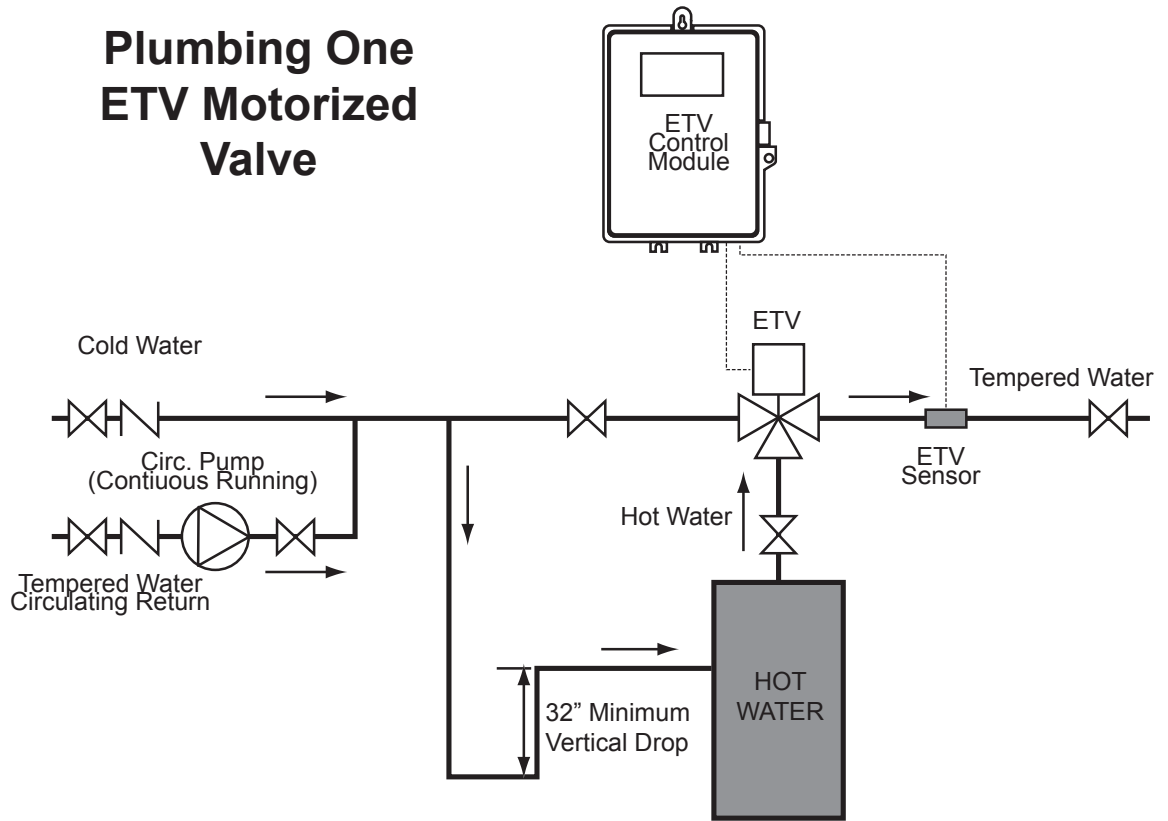
First remove all the wires attached to terminals 1 through 4. Check for 12 to 15VAC across terminals 1 and 2 on newer controllers. Older controllers should read 24 to 30VAC across terminals 1 and 2. If no voltage is present, the ETV may be damaged. Then measure for between 0 to 10VDC across terminals 3 and 4. If there is no voltage across these terminals, adjust the Set Point. If the Set Point was previously above the displayed water temperature, adjust the Set Point until it is now below the displayed water temperature, and vice versa. Wait a couple of minutes, and then check terminals 3 and 4 again for voltage between 0 and 10VDC. If voltage is present, the ETV controller is providing a signal to adjust the valve. Check the valve.

WARNING

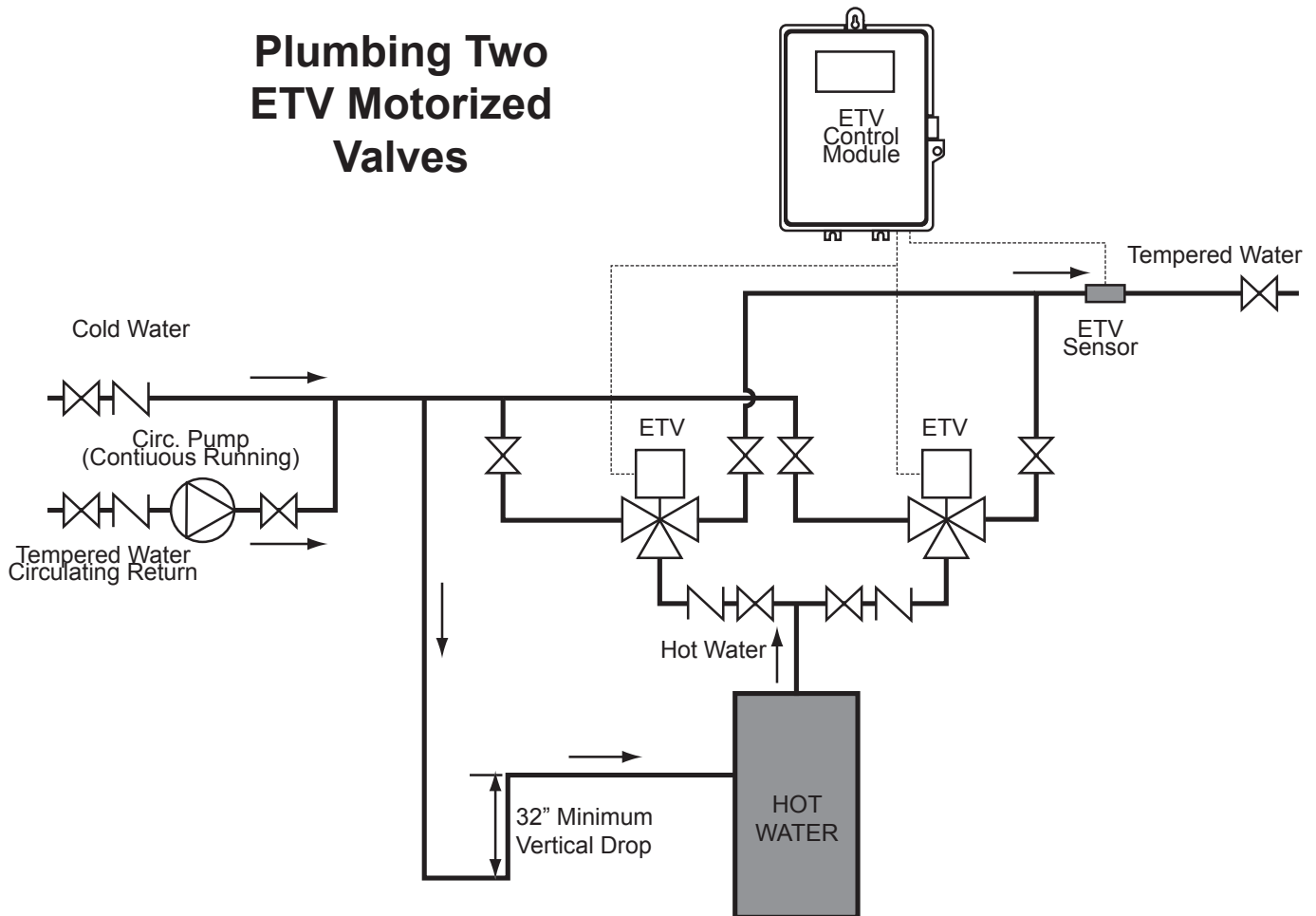
If ETV Sensor is open or shorted, the valve will fully close. If you lose signal voltage, the valve will also close.

ETV PIPING DIAGRAMS

Plumbing One ETV Motorized Valve

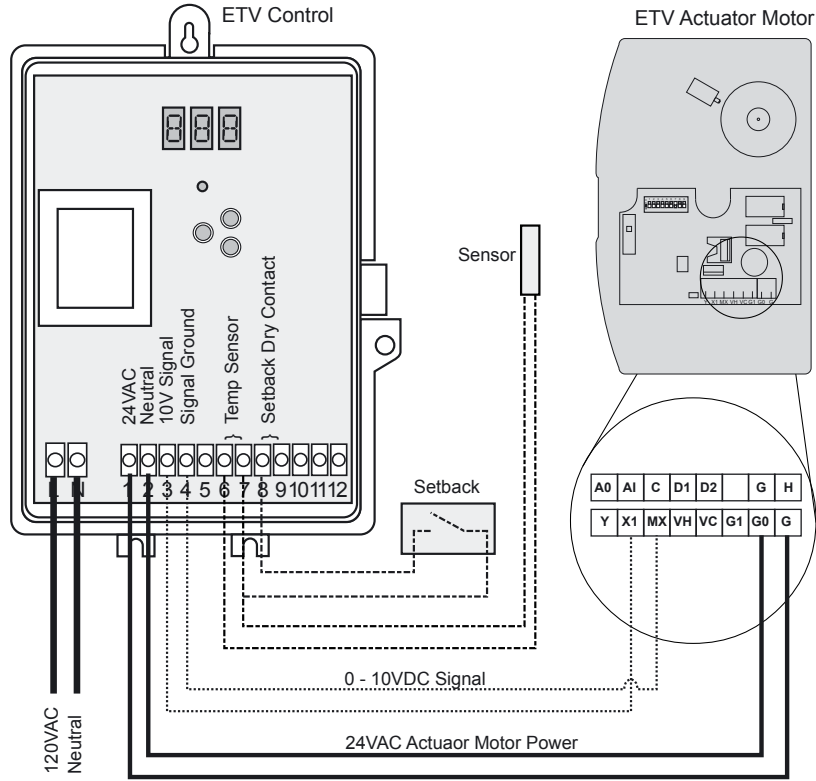


Plumbing Two ETV Motorized Valves

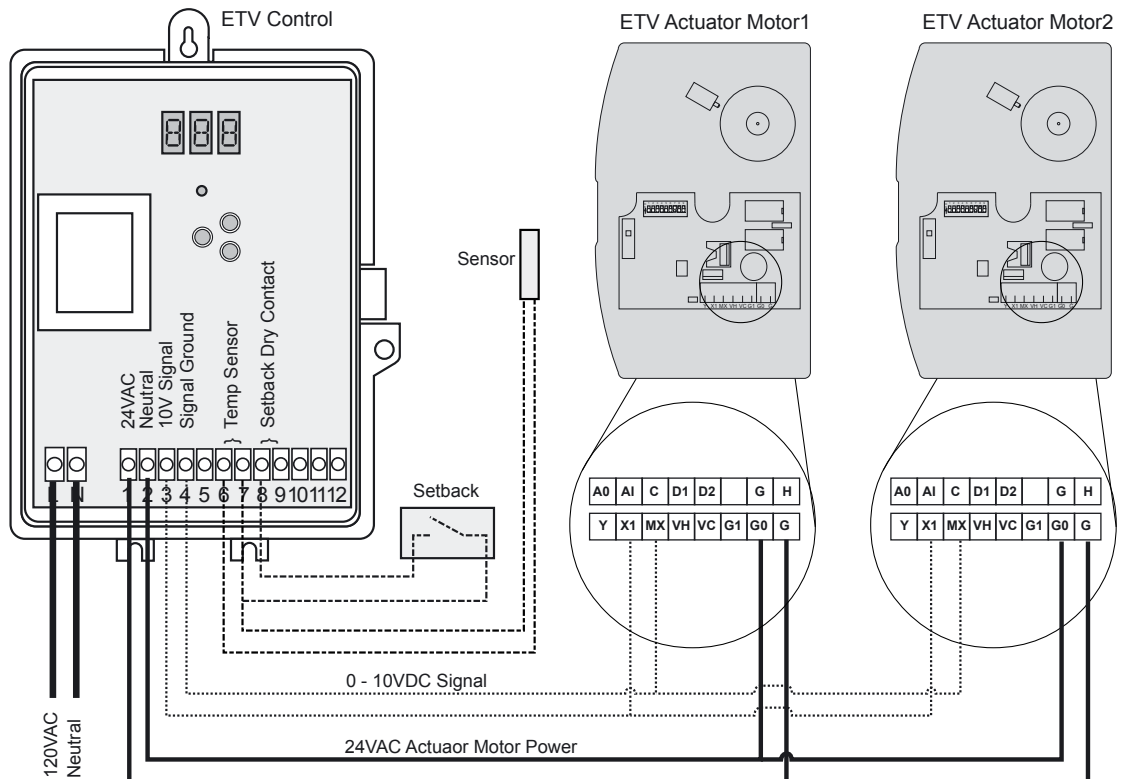


ETV WIRING DIAGRAMS

WIRING ETV CONTROL TO ETV ACTUATOR MOTOR



WIRING ONE ETV CONTROL TO TWO ETV ACTUATOR MOTORS



ETV CONTROL SPECIFICATION

Voltage Input:	120 VAC 60 Hz
Power Consumption:	16 VA Max
Output Power to Actuator:	Power to ETV Actuator 24VAC
Output Signal to Actuator:	0 - 10VDC
Temperature Display:	(°F) Fahrenheit or (°C) Celsius.
Display:	3 7-Segment
Set Point Range:	60°F to 180°F
Setback Range:	0°F to 50°F
Sensor Ranges:	temperature sensor - minus 35°F to 250°F
Gain:	- 10 to + 10
Enclosure:	NEMA 1
Enclosure Dimensions:	7 1/8" W x 9 5/8" H x 3 1/2"D

ETV ACTUATOR SPECIFICATION

Power Input:	24 VAC 60 Hz
Voltage Signal Input:	0 - 10V
Valve Stroke Calibration:	(9 Dip switch motors) Flip Dip Switch 9 ON (8 Dip switch motors) Flip Dip Switch 8 ON
Manual Operation:	Flip Red Tab Down to activate manual Operation. Turn red tab to open or close valve

ETV MIXING VALVE SPECIFICATION

Maximum Pressure:	225 PSI
Maximum Temperature:	300°F
Connections:	NPT
Body and Trim:	Bronze
Stem:	Stainless Steel
Stem Packing:	EPDM Spring Loaded V-Cup

Size (in)	Cv	Max Pressure Drop PSI	Size (in)	Cv	Max Pressure Drop PSI
1/2"	4.7	70	1-1/4"	18.5	55
3/4"	7.3	65	1-1/2"	29	55
1"	11.6	65	2"	46.3	40

LIMITED ONE YEAR WARRANTY

This Heat-Timer device was thoroughly tested for defects and workmanship before leaving our factory. We do warrant the equipment to be free of defects under normal use for a period of one year from the date of installation. Transportation charges for factory repairs must be prepaid. Damage to the Heat-Timer device or any of its components due to misuse, abuse, improper installation, or caused by power failures, fire, flood, or lightning are not covered by this warranty. The company assumes no liability for indirect or consequential damages of any nature. This Heat-Timer warranty applies only to the original purchaser/user, is not assignable or transferable, and does not cover damage to the device occurring in shipment. Any service, repairs, modifications or alterations to the unit not expressly authorized by the company will invalidate the warranty. This warranty is in lieu of all other warranties expressed or implied.