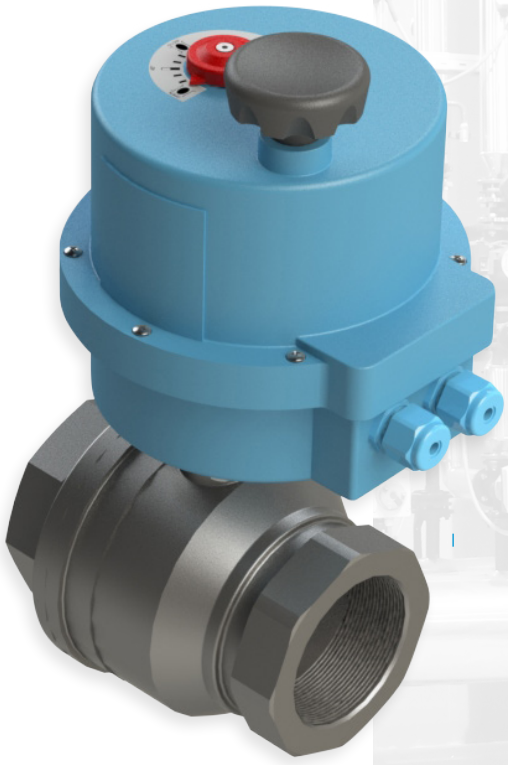
INSTALLATION AND
OPERATION MANUAL

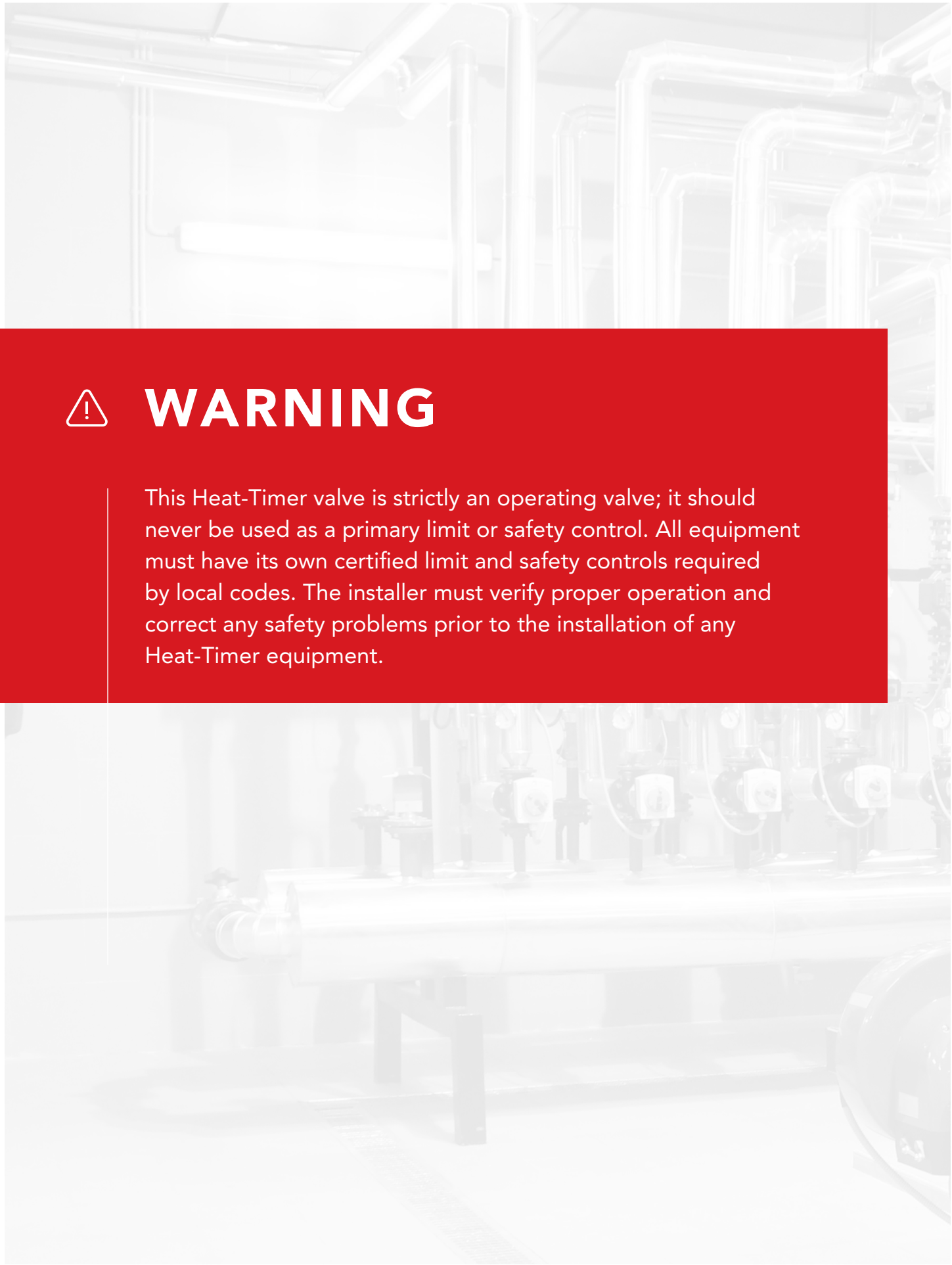
HEAT-TIMER® CORPORATION



MOTORIZED STAINLESS 2-WAY VALVES

HTLV VALVE—ETV/ETS APPLICATIONS

059435–00 REV. A



⚠ WARNING

This Heat-Timer valve is strictly an operating valve; it should never be used as a primary limit or safety control. All equipment must have its own certified limit and safety controls required by local codes. The installer must verify proper operation and correct any safety problems prior to the installation of any Heat-Timer equipment.

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OVERVIEW

The Stainless 2-way Motorized Valve actuator is available in 3 main configurations—valve sizes 2 ½" and smaller the actuator has a Loss of Power (LOP) Capacitor actuator. The actuator for the 3 inch valve is configured with or without a battery backup.

The 2-way Motorized Valve is typically used as a High Temperature Limit (HTL) valve on ETV Platinum PLUS and ETS—electronic tempering station applications. In these applications the 2-way valve helps protects against excessive water temperatures from entering the DHW system. If the ETV Platinum PLUS controller detects an outlet water temperature that exceeds the high temperature limit set point for a delayed period, the ETV control closes the HTL valve blocking all hot water flow to the ETV mixing valve. For additional information on the function of the HTL valve reference the ETV Platinum PLUS installation manual.

The 2-way Motorized valve can also be used as a 2-way shut off valve with 100% closure in many other applications such as a boiler isolation valve.

LOSS OF POWER FUNCTION

For valves 2 ½" and smaller the actuator has a Loss of Power capacitor. The capacitor will power the valve CLOSE during periods in which power is loss to the actuator. Once the power is restored, the valve actuator will return to normal operation and OPEN the valve. Once wiring is complete and power is supplied to the actuator, the power loss capacitor requires about 2 minutes to fully charge and become functional.

For the 3 inch valve without the optional battery backup, when a loss of power occurs the valve will remain in the OPEN position. The valve will not CLOSE due to a loss of power and this may cause an unsafe condition depending on the application.

For the 3 inch valve with the optional battery backup, the valve will CLOSE during a loss of power event. Once the power is restored, the valve actuator will return to normal operation and OPEN the valve.

The battery backup actuator contains a Red status LED that displays the level of charge of the battery:

- **Fast Flashing:** The battery is not connected to the power supply board or the battery is charging.
- **Light ON:** The battery is not charge at a nominal value and it could not guarantee a complete safety operation.
- **Light OFF:** The battery is charged at the nominal value.

The LED display is only functional if the battery is not deteriorated or damaged.

PART NUMBERS

MODELS	DESCRIPTION						
	¾"	1"	1 ¼"	1 ½"	2"	2 ½"	3"
STANDARD VALVE	920571-00	920572-00	920573-00	920574-00	920575-00	920576-00	920547-00
POWER LOSS CLOSE	920581-00	920582-00	920583-00	920584-00	920585-00	920586-00	920557-00

NOTE

All valve assemblies include the following:

- **Motorized Stainless 2-Way Valve with Actuator**
- **Hex "L" Key (P/N 200240–025)—3 inch valves only**
- **24Vac Transformer (P/N 210006–00)**
- **Installation and Operation Manual (P/N 059435–00)**
- **Warranty Card (P/N 059115–00)**

The following guidelines must be observed when piping the system.

1. All piping, including the piping of the valve body, must meet or exceed local, state, and/or federal guidelines, codes, and regulations.
2. Support all piping using hangers. DO NOT support piping by the unit or its components.
3. Use isolation valves to isolate system components.
4. Use unions to allow for servicing and, if required, removal of the valve.
5. Include drain valves to assist in servicing of the valve.

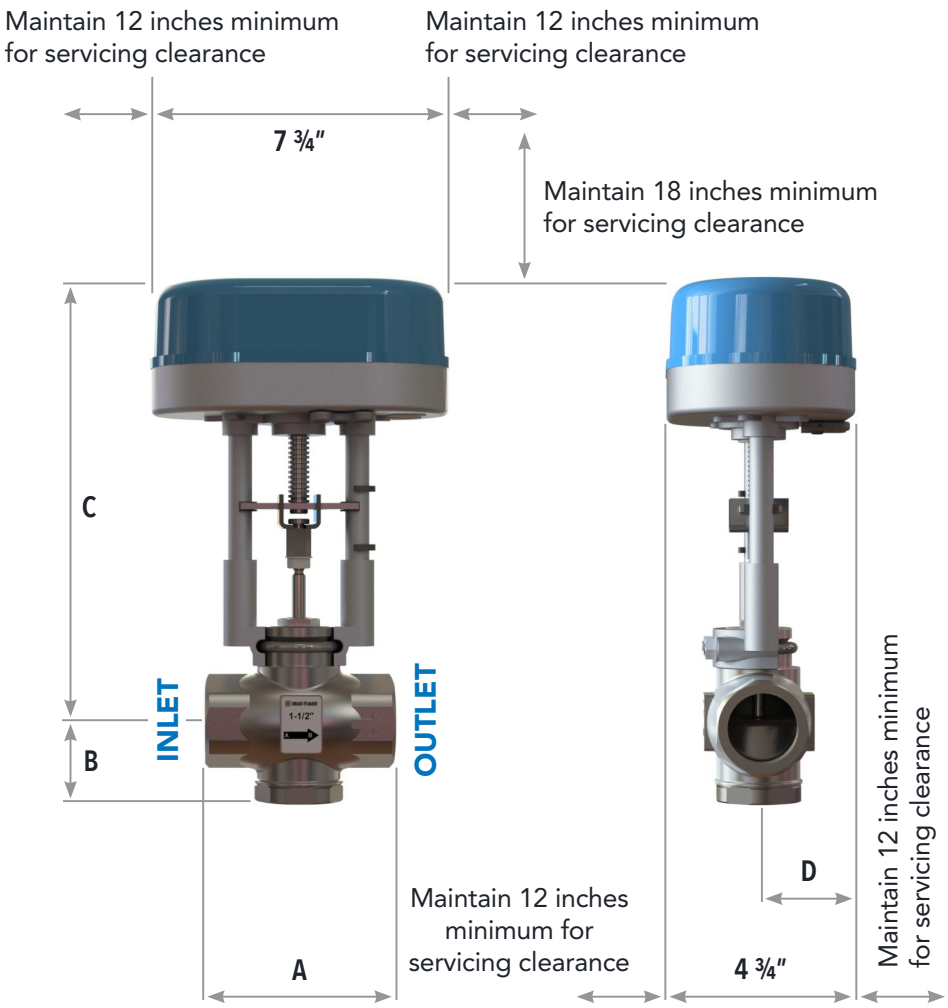
NOTE

The valve and actuator can be mounted vertically (upright) or horizontally as shown in *Figure 1, page 12* and *Figure 7, page 22*. DO NOT mount the valve and actuator upside down. Leave at least 12 inches (30.5cm) service clearance on all sides between the valve/actuator and any objects (walls, pipes, controls, etc.).

⚠ CAUTION ⚠

Use a two-wrench method (using one wrench to prevent the valve body from turning or twisting) when tightening piping onto the valve body connections. Failure to support the valve body in this manner may cause damage to the valve body, resulting in water leakage.

STAINLESS 2-WAY MOTORIZED VALVE DIMENSIONAL—VALVES 2 ½" AND SMALLER



ETV ASSEMBLY	DIMENSION				WEIGHT
	A	B	C	D	
¾"	3 ⅛"	1 ½"	10 ⅞"	2 ⅜"	6.00 lbs.
1"	4"	1 ¾"	11"	2 ⅜"	6.75 lbs.
1 ¼"	4"	1 ⅞"	11"	2 ⅜"	7.25 lbs.
1 ½"	4 ¾"	2"	11 ¼"	2 ⅜"	8.25 lbs.
2"	5 ½"	2 ½"	11 ½"	2 ⅜"	10.50 lbs.
2 ½"	6 ¼"	3"	11 ⅞"	2 ⅜"	13.75 lbs.

ETV ASSEMBLY	VALVE CONNECTIONS–NPSC	
	INLET	OUTLET
¾"	¾"	¾"
1"	1"	1"
1 ¼"	1 ¼"	1 ¼"
1 ½"	1 ½"	1 ½"
2"	2"	2"
2 ½"	2 ½"	2 ½"

STAINLESS 2-WAY MOTORIZED VALVE SPECIFICATIONS—VALVES 2 ½" AND SMALLER

ACTUATOR

Voltage Input	24Vac 60Hz
Power Consumption	18VA max
Capacitor Charging Phase Consumption	32VA/18W
Force	1000 N

VALVE

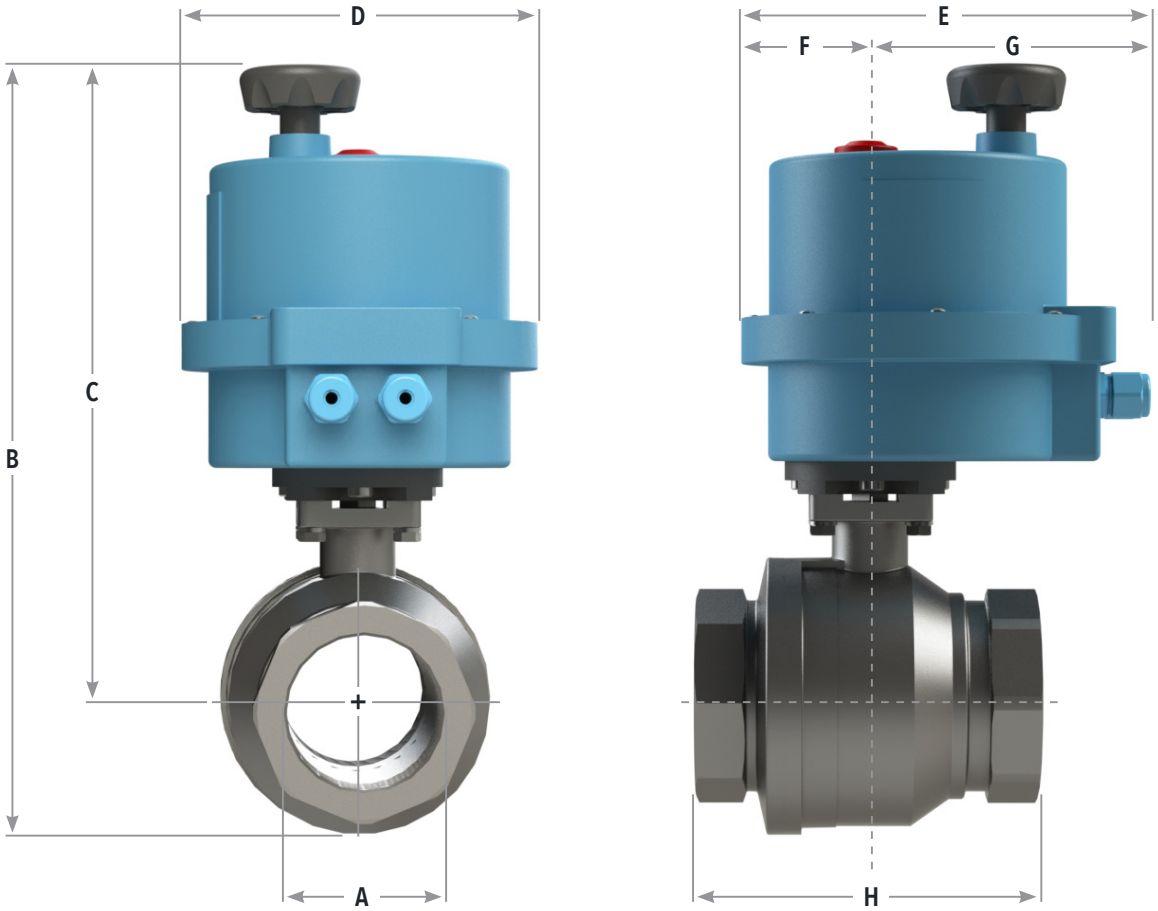
Body and Trim	304 Stainless Steel
Maximum Operating Temperature	300°F (149°C)
Maximum Working Pressure	225 psi
Stem Material	640 Stainless Steel

PRESSURE DROP PSI	VALVE SIZE					
	¾"	1"	1 ¼"	1 ½"	2"	2 ½"
Cv	7	12	18	29	46	73
3	12	20	32	50	80	126
4	15	23	37	58	93	145
5	16	26	41	64	103	162
6	18	28	45	71	113	178
7	20	31	50	78	125	192
8	21	33	53	83	132	205
9	22	35	56	88	140	218
10	23	36	58	91	145	230
11	24	38	62	97	154	241
12	25	40	64	100	160	252
	GALLONS PER MINUTE					

STAINLESS 2-WAY MOTORIZED VALVE SPECIFICATIONS—3" VALVE

Valve Model	Voltage Input	Absorbed Current	Absorbed Power	Temp. Rating	Working Time	Max. Torque	Limit Switches	Battery Backup Option
3"	24Vac	1.0–0.7A	24–17 VA	-4°F to 131°F	8 sec. 27 sec.	266 in-lbs 975 in-lbs	(2) SPDT 1A @250	Yes

Dimensions (inches)								Heat-Timer P/N	
A	B	C	D	E	F	G	H	With Battery Backup	No Battery Backup
3	16.51	13.77	8.31	9.33	3.31	6.02	7.01	920557–00	920547–00



STAINLESS 2-WAY MOTORIZED VALVE SPECIFICATIONS—3" VALVE

Valve Body Material	ANSI B16.1 Iron
Port Size	3" (76.2mm)
Pressure Rating	1000 psi/150 psi Steam
Temperature Rating	–4°F to 366°F (–20°C to 186°C)
Packing	P.T.F.E. Seals and Double O-ring Stem Packing Blowout-Proof Valve Stem
Actuator Mount	ISO 5211 Pad

PRESSURE DROP	DESCRIPTION
	3"
CV/1 psi	1009
2 psi	1427
3 psi	1748
4 psi	2018
5 psi	2256
	GALLONS PER MINUTE

The Stainless 2-way Motorized Valve installation process consists of the following basic steps:

1. General piping—unions, isolation valves.
   - When using the Stainless 2-way Motorized Valve as a HTL valve in an ETV Platinum installation, the valve is typically piped between the hot water source (a storage tank or boiler coil) and the Hot inlet of the ETV valve. Reference the ETV Platinum Installation manual for additional information and piping diagrams.
2. Mounting the Actuator to the valve body (refer to page 13 for vales 2 ½" and smaller, the 3 inch valve is factory mounted.
3. Wiring of the actuator to a Heat Timer controller (refer to *page 17* for vales 2 ½" and smaller or *page 25* for the 3 inch valve.
   - When using the Stainless 2-way Motorized Valve as a HTL valve in an ETV Platinum application, it is recommended to reference the ETV Platinum Installation manual for additional information on the installation of the HTL valve and programming the ETV Platinum controller.
4. Calibrating the Actuator (refer to *page 18* for vales 2 ½" and smaller).

REQUIRED MATERIALS (SUPPLIED)

The following materials/tools are supplied with each valve and actuator:

- Motorized Stainless 2-Way Valve and Actuator
- 24Vac Transformer (P/N 210006–00)
- Installation and Operation Manual (P/N 059434–00)
- Warranty Card (P/N 059115–00)

REQUIRED MATERIALS (NOT SUPPLIED)

The following materials/tools are required for installation, but are not supplied:

- General hand tools (screwdrivers, wire strippers, power drill, etc.)
- General plumbing tools (wrenches, pipe cutters, etc.)
- 18 AWG cable (Heat-Timer P/N 703001–01 or equivalent #18/2 cable)

STAINLESS 2-WAY MOTORIZED VALVE INSTALLATION GUIDELINES—VALVES 2 ½" AND SMALLER

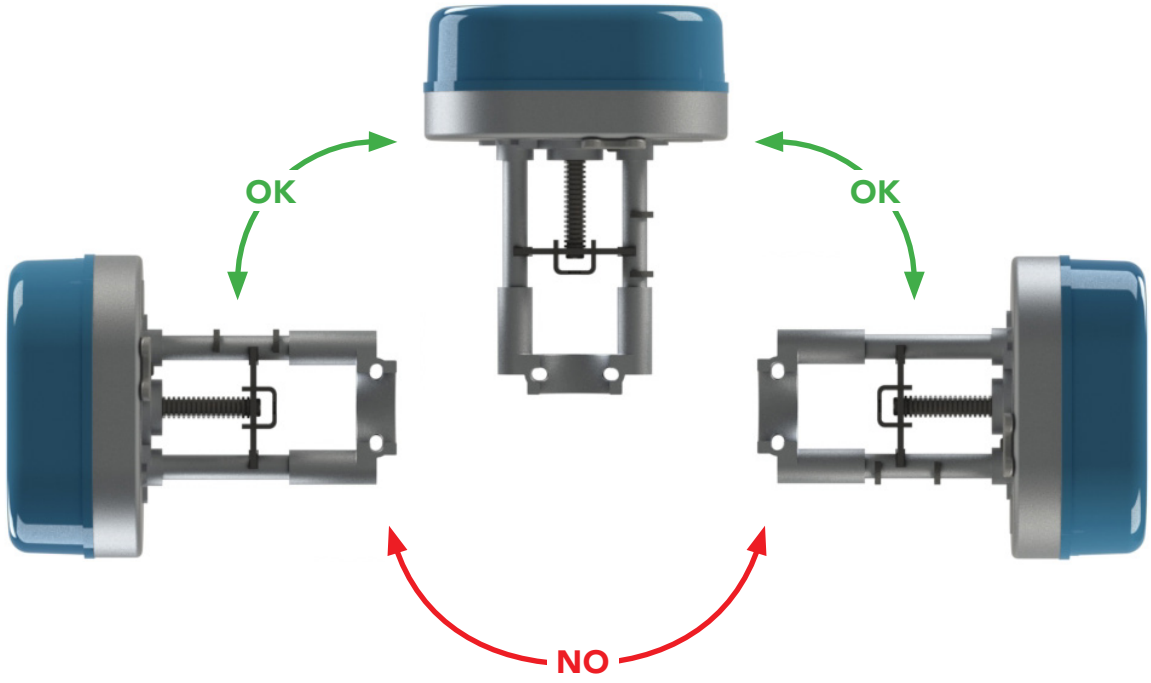


FIGURE 1

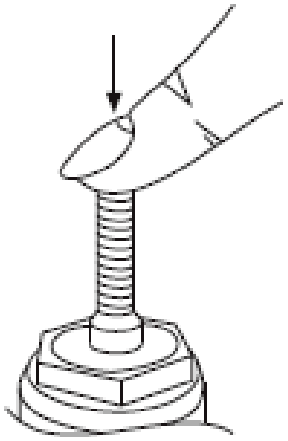
ALLOWABLE MOUNTING POSITION FOR THE STAINLESS 2-WAY MOTORIZED VALVE

MOUNTING THE ACTUATOR TO THE VALVE

1 Before mounting the Actuator to the valve, manually close the valve by pushing down on the valve stem as shown in Figure 2.

FIGURE 2

MANUALLY CLOSING THE VALVE



2 Before mounting the Actuator to the valve, manually lower the Actuator as shown in Figure 3.

- a Lower the Manual Tab to place the Actuator in Manual Override mode.
- b Turn the Manual Tab counter-clockwise to drive the threaded shaft to the full lower position.
- c Raise the Manual Tab to place the Actuator in Normal Operation mode.

FIGURE 3

MANUALLY CLOSING THE ACTUATOR

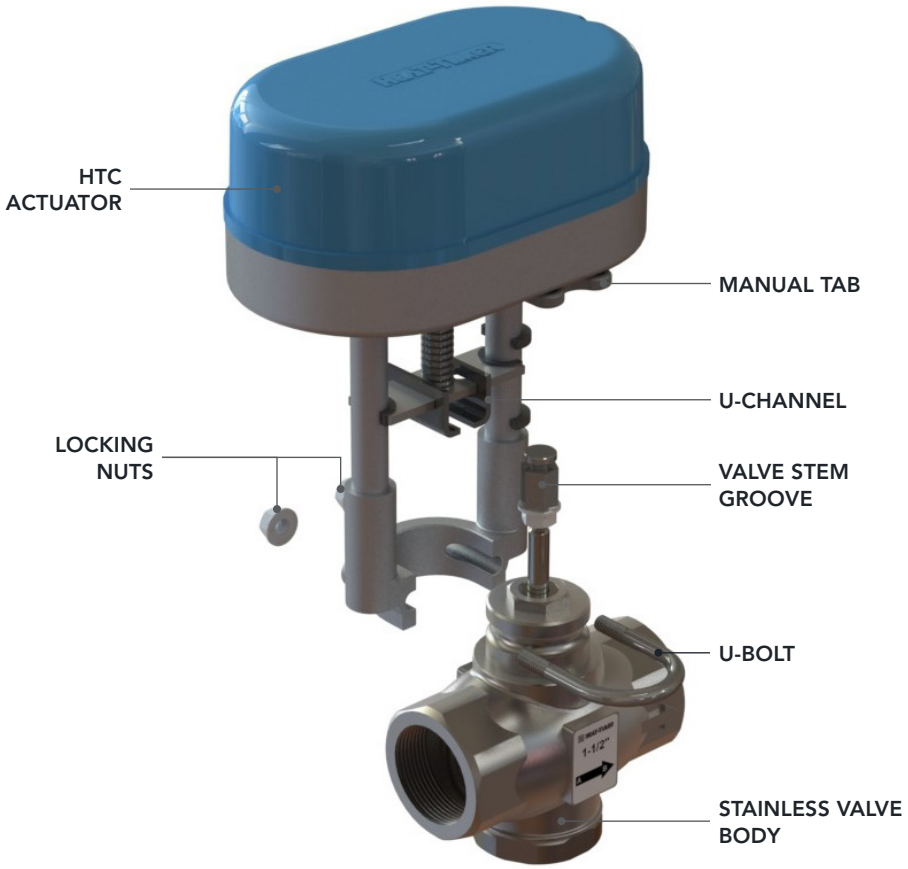
3 Mount the Actuator to the valve by sliding the valve stem groove into the Actuator U-channel as shown in Figure 4. If necessary, use the Actuator manual tab to adjust the position of the U-channel until it is aligned with the valve stem groove.

NOTE

The U-bolt must also be aligned with the valve groove, as shown in Figure 4. If necessary use the actuator manual tab to adjust the position of the actuator frame and mounting holes to align the U-bolt with the valve body groove.

FIGURE 4

MOUNTING THE ACTUATOR TO THE VALVE



4 Insert the U-bolt around the valve body groove and into the Actuator assembly.

5 Secure the U-bolt in place with two locking nuts, ensuring the locking nuts are tightened evenly.

NOTE

The actuator may make a grinding noise if the locking nuts are not tightened evenly and resulting in potential damage to the actuator motor.

6 Once the actuator is completely mounted onto the valve, the actuator cover can be remove to allow access for wiring, and startup calibration of the actuator. Simply remove the retaining screw on the cover and lift the cover off.

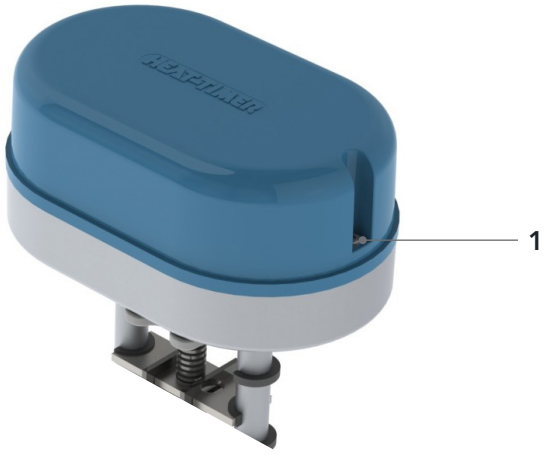
ACTUATOR WIRE TERMINAL ACCESS

To gain access to the Actuator wire terminals, dip switches and on those actuators with a LOP Capacitor the Capacitor Jumper, the cover must be remove.

1. To remove the actuator cover remove the mounting screw (1) using a Phillips screwdriver.
2. Lift the actuator cover and slide toward the mounting screw direction disengaging the actuator cover clip from the actuator housing.
3. To mount the cover once the wiring, calibration of the actuator, any dip switch and Capacitor Jumper settings are completed, slide the actuator cover tab into the actuator. Ensure the actuator cover is seated on the actuator housing and secure with the mounting screw.

FIGURE 5

REMOVING ACTUATOR COVER



MOUNTING THE ACTUATOR POWER TRANSFORMER

NOTE

Actuators must be powered using the provided 24Vac transformer(s). For configurations where a control device is operating two actuators in series, a single transformer can be used to power both actuators. If a control device is operating two actuators in parallel, external double-throw relays and two transformers (one for each actuator) must be installed.

1. Select an appropriate location to mount the 24Vac power transformer(s). The location must meet the following minimum requirements:
   - The location should be within close proximity of the actuator to reduce wiring length.
   - The mounting surface should be flat and strong enough to hold the weight of the transformer.
   - **DO NOT** mount the device in a location where it will be exposed to extreme heat, cold, humidity, or moisture.
2. Secure the transformer(s) to the mounting surface using two screws (not supplied).

ACTUATOR WIRING—VALVES 2 ½" AND SMALLER

⚠ WARNING ⚠

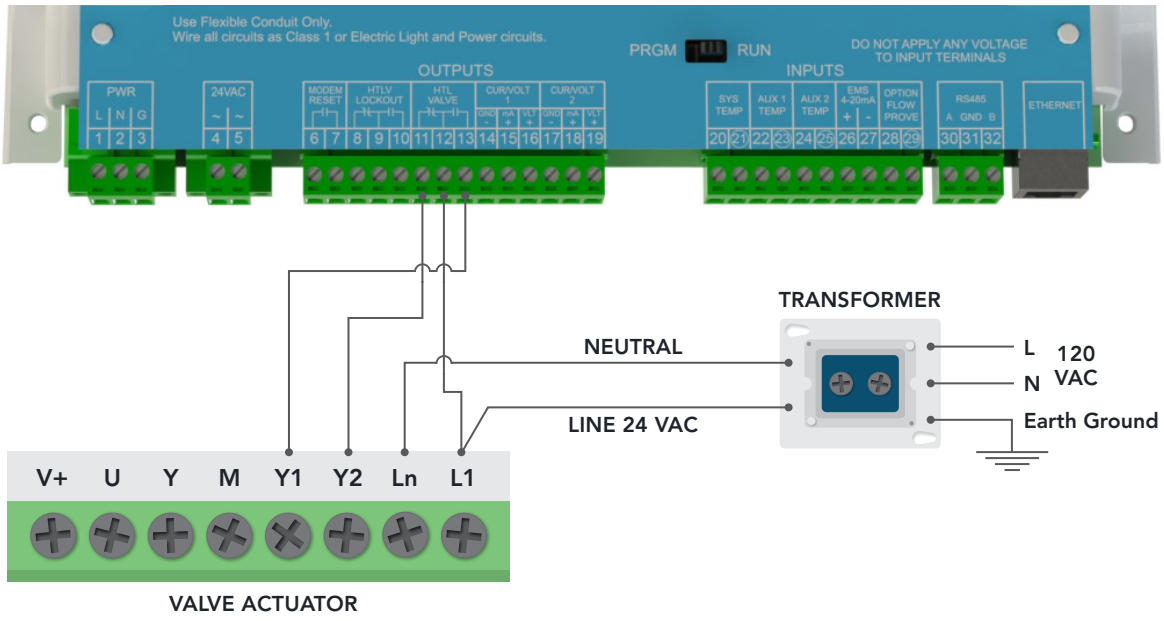
ELECTRICAL SHOCK HAZARD! Disconnect electrical power to the device before servicing or making any electrical connections. Failure to do so may result in severe personal injury or death.

Follow all local and state electrical codes when installing the unit. All wiring must meet or exceed local, state, federal codes and requirements.

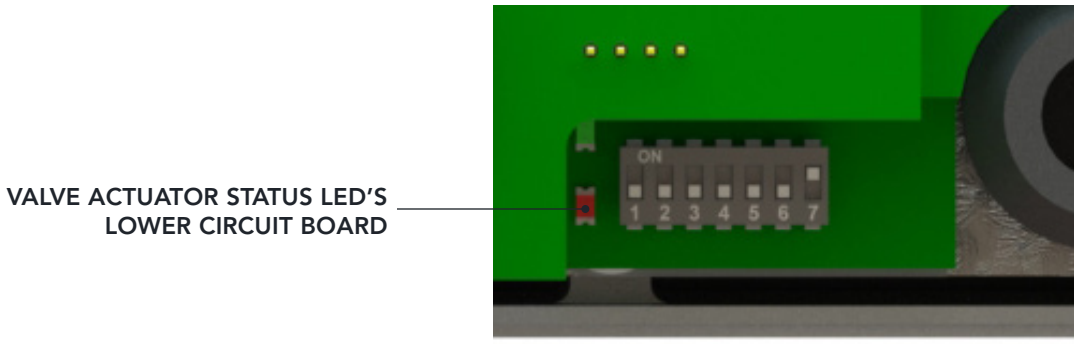
1. Disconnect power to the ETV module or Heat Timer control through a service switch or circuit breaker.
2. Route all wiring through the bottom of the actuator. Use the proper NM connector to secure the wiring and avoid potential damage to the wiring.
3. Once all wiring is complete return power to the ETV module or control, placing the actuator into service.
4. If the actuator contains a LOP Capacitor it will require about 2 minutes of power being supplied to fully charge.

FIGURE 6

ETV PLATINUM PLUS WIRING—2 ½" VALVE AND SMALLER



ACTUATOR LED STATUS—2 ½" VALVE AND SMALLER



Green LED ON	The actuator has reached its extreme point of the stroke
Green LED Blinking	The actuator is moving based on input signal or has arrived at it intermediate point of the stroke
Green and Red LED Blinking Alternately	The actuator is conducting its calibration or initialization
Green and Red LED ON	The actuator is manual mode and will ignored any input signal. Manual tab is locked in the down position
Green and Red LED Blinking Simultaneous	The actuator is in loss of power return phase.

ACTUATOR CALIBRATION—2 ½" VALVE AND SMALLER

NOTE

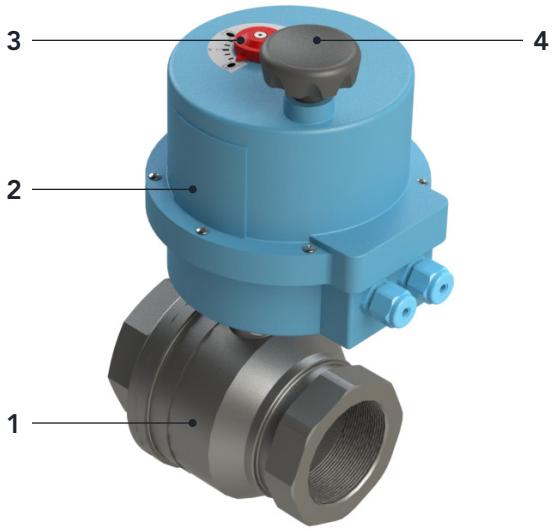
Each time the Actuator is mounted onto the valve, the steps outline in Actuator Calibration must be performed to ensure proper operation and to determine optimum stroke of the actuator.

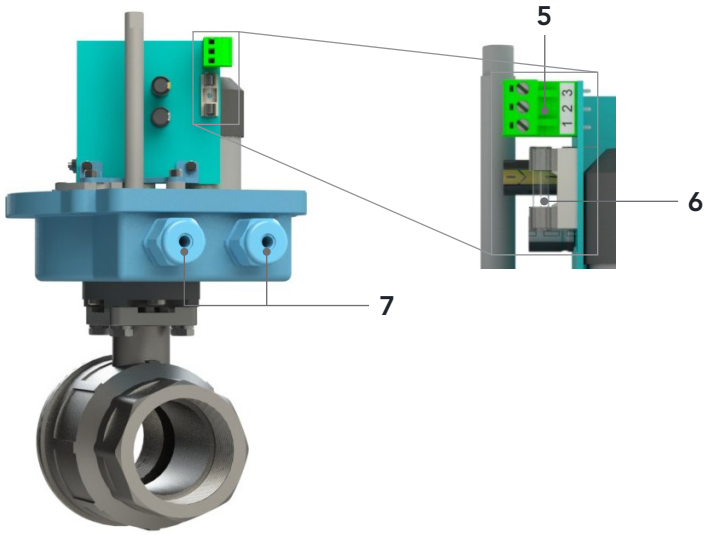
1. Ensure the inlet to the valve is isolated by closing the isolation valve on the inlet piping.
2. Ensure the manual tab on the actuator is in the up position and the actuator is not in the manual mode.
3. Ensure Dip Switch 7 is in the ON (MAN) position.
4. Switch Dip Switch 7 from the ON position to the OFF (AUTO) position and then back to the ON position.
   - The Green and Red Status LED's should start blinking in an alternating pattern indicating calibration has started. The actuator will move the valve stem up and down during the calibration. When the calibration is completed the Green LED should be steady ON.

ACTUATOR STARTUP—2 ½" VALVE AND SMALLER

1. Once all wiring and actuator calibration is complete, the valve and actuator is ready to be placed into service.
2. Open all isolation valve on the inlet piping to the valve.
3. Replace the top cover to the actuator by inserting the tab into the housing and secure with the mounting screw.
4. Ensure the ETV module or other control panel is reassembled and ready for service.

MOTORIZED STAINLESS 2-WAY VALVES (3" VALVE SIZE ONLY) CONTROLS, INDICATORS, AND CONNECTIONS





ITEM	DESCRIPTION
1	Valve Body
2	Valve Actuator
3	Valve Position Indicator
4	Actuator Manual Control Knob

ITEM	DESCRIPTION
5	Wiring Connections—Terminal F • Terminal 1—Closing • Terminal 2—COM • Terminal 3—Opening
6	Fuse (2A)
7	Wiring Entry Fittings

ACTUATOR STATUS LEDS

2-way Motorized Valve Actuator with battery backup actuators have three status LED's.

LED	DESCRIPTION
Green	Lights when power is provided to the actuator.
Yellow	Flashes when the actuator is in "working" mode. The flash speed indicates the actuator power source. • **Slow:** Voltage is supplied on terminal block F. • **Fast:** Voltage is supplied from an optional battery backup.
Red	Lights when the actuator is in fault mode due to one of the following conditions: • Unblock operation failed, actuator exceeded torque limit. • Power supply voltage is under the minimum allowance. • Exceeded the maximum working time of a single operation/actuator timed out.

ACTUATOR MANUAL OPERATION FOR 3 INCH VALVE

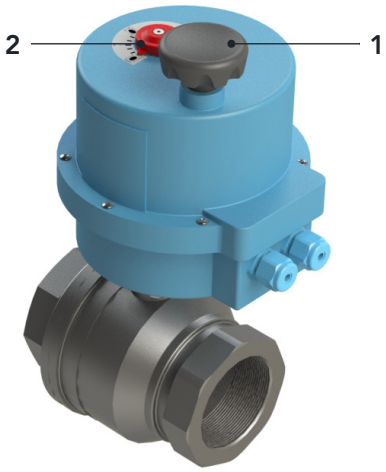
NOTE

This section applies to valves without battery backup actuators. For those valves with the optional battery backup actuators contact Heat-Timer Tech Support for additional instructions. Motorized valves can be manually operated during power outages or when servicing the equipment.

⚠ CAUTION ⚠

DO NOT manually operate the valve when power is supplied to the actuator. Manually operating the valve while the controller is also positioning the valve may result in damage to the equipment. Only manually operate the valve when power has been removed from the actuator.

1. Ensure power has been removed from the valve actuator.
2. Press down on the actuator manual control knob (1) and rotate slightly to engage the valve stem to the knob.



NOTE

If the manual control knob is not fully engaged with the valve stem can result in damage to the manual control knob.

3. While continuing to press down on the actuator manual control knob, turn the knob until the valve is in the desired position. The valve position indicator (2) shows the current position of the valve.
4. When the valve is in the desired position, release pressure on the manual control knob. The knob is disengaged from the valve stem and the actuator returns to automatic positioning operation.
5. Return the valve back to service by restoring power to the actuator.

⚠ CAUTION ⚠

Use a two-wrench method (using one wrench to prevent the valve body from turning or twisting) when tightening piping onto the valve body connections. Failure to support the valve body in this manner may cause damage to the valve body or the actuator.

1 Ensure all debris (dirt, metal shavings, etc.) is flushed from the piping system before installing the valve body.

2 Ensure all service clearances are met. See "Actuator Specifications" valve and actuator assembly dimensions *on page 9*.

NOTE

The installation should account for an additional clearance of 4–6" (101.6mm—152.4mm) above the actuator. This space is needed to allow for the manual operation of the actuator. *Refer to "Actuator Manual Operation" on page 21*.

3 Install the valve body while observing the following precautions:

- The preferred orientation of the valve stem and actuator is upright (vertically). However, where space restrictions dictate, the valve assembly can be mounted diagonally or horizontally (see Figure 7).
- DO NOT install motorized valves upside down. Doing so can stress the valve stem.

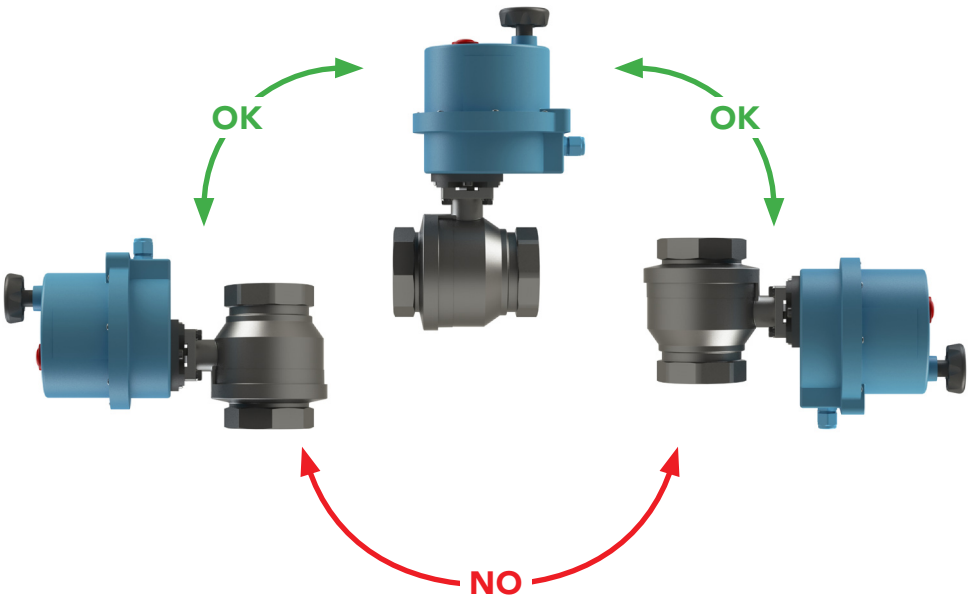


FIGURE 7

ACCEPTABLE VALVE BODY AND ACTUATOR ORIENTATION

MOUNTING THE ACTUATOR POWER TRANSFORMER

NOTE

Actuators must be powered using the provided 24Vac transformer(s). For configurations where a control device is operating two actuators in series, a single transformer can be used to power both actuators. If a control device is operating two actuators in parallel, external double-throw relays and two transformers (one for each actuator) must be installed.

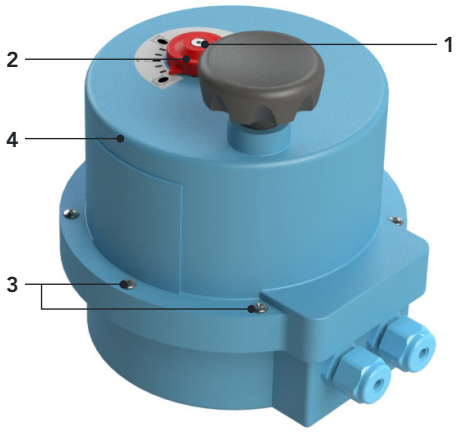
1. Select an appropriate location to mount the 24Vac power transformer(s). The location must meet the following minimum requirements:
   - The location should be within close proximity of the actuator to reduce wiring length.
   - The mounting surface should be flat and strong enough to hold the weight of the transformer.
   - DO NOT mount the device in a location where it will be exposed to extreme heat, cold, humidity, or moisture.
2. Secure the transformer(s) to the mounting surface using two screws (not supplied).

REMOVING THE ACTUATOR COVER—3 INCH VALVE

1 De-energize the circuit that will provide power to the actuator transformer by turning off the appropriate circuit breaker.

2 Remove the actuator wiring enclosure:

- a Remove the position indicator screw (1).
- b Remove the position indicator (2).
- c Remove the four enclosure cover screws (3).



⚠ CAUTION ⚠

Use care when removing the actuator upper cover to avoid damaging the internal electronic parts.

- d Remove the actuator upper cover (4).

POWER INPUT WIRING

⚠ WARNING ⚠

ELECTRICAL SHOCK HAZARD! For your safety, to avoid the risk of electric shock, disconnect electrical power to the device before servicing or making any electrical connections. DO NOT re-connect electrical power until ALL wiring to the actuator is completed. Failure to do so may result in severe personal injury or death.

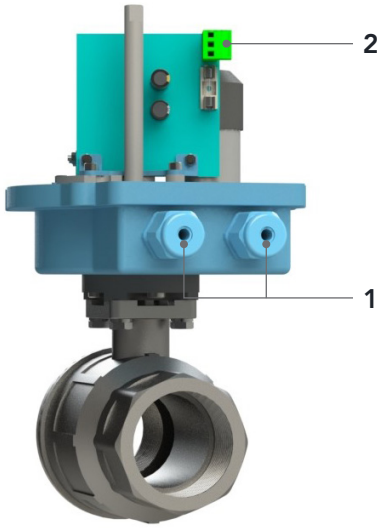
All wiring must meet or exceed all applicable local, state, and/or federal guidelines, codes, regulations, and laws.

1 De-energize the circuit that will provide power to the actuator transformer by turning off the appropriate circuit breaker.

2 Route the 24Vac wiring from the transformer through one of the actuator electrical entry fittings (1).

3 Route the 24Vac wiring within the actuator to Terminal Block F (2).

4 Connect the wiring to the appropriate terminal based on the application and control being used. *See "Connecting the Actuator to an ETV Platinum Plus Control" on page 25.*



CONNECTING THE ACTUATOR TO AN ETV PLATINUM PLUS CONTROL

Refer to the following diagram when connecting actuators to an ETV Platinum Plus control.

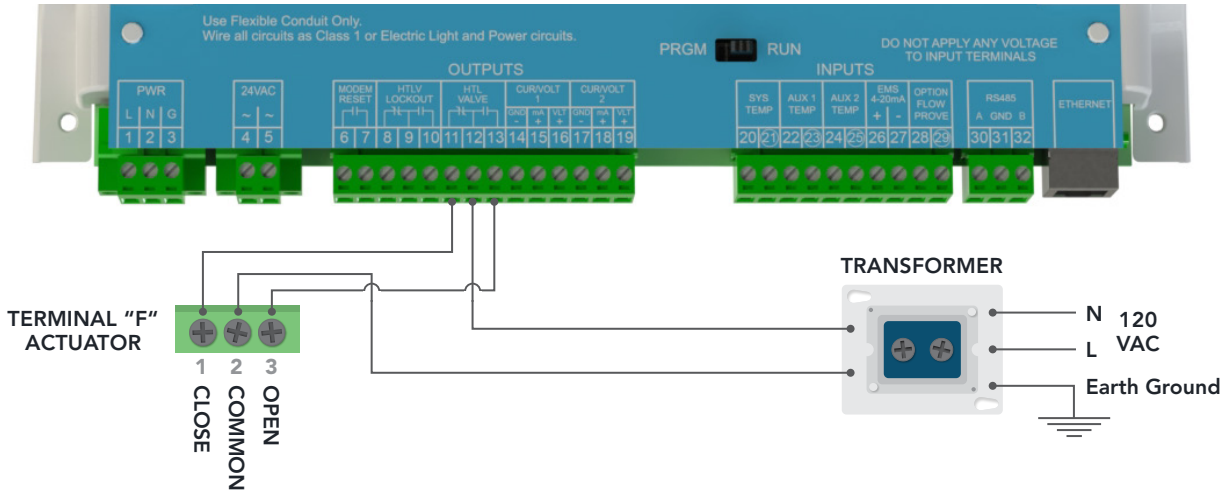


FIGURE 8

VALVE ACTUATOR WIRING DIAGRAM—ETV PLATINUM PLUS CONTROL

⚠ WARNING ⚠

ELECTRICAL SHOCK HAZARD! For your safety, to avoid the risk of electric shock, disconnect electrical power to the device before servicing or making any electrical connections. DO NOT re-connect electrical power until ALL wiring to the actuator is completed. Failure to do so may result in severe personal injury or death.

All wiring must meet or exceed all applicable local, state, and/or federal guidelines, codes, regulations, and laws.

1. Connect one of the 24Vac transformer outputs to the actuator Common terminal (2) on Terminal Block F.
2. Connect the second 24Vac transformer output to the TMC Valve Common terminal (12) on the ETV Platinum Plus.
3. Connect the TMC Valve normally closed (NC) terminal (11) to the actuator CLOSE terminal (1) on Terminal Block F.
4. Connect the TMC Valve normally open (NO) terminal (13) to the actuator OPEN terminal (3) on Terminal Block F.
5. Continue with "**Completing the Wiring**" *on page 26*.

COMPLETING THE WIRING

1 After all wiring is complete, install the actuator wiring enclosure:

> **⚠ CAUTION ⚠**
>
> **Use care when installing the actuator upper cover to avoid damaging the internal electronic parts.**

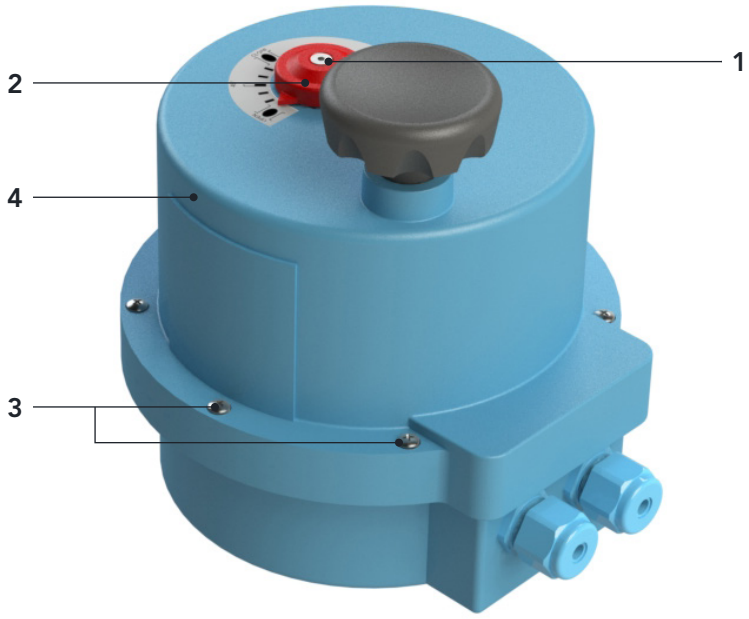
a Place the actuator upper cover (4) on the actuator.

b Secure the upper cover with the four enclosure cover screws (3).

c Install the position indicator (2).

d Secure the position indicator with the screw (1).

2 Restore power to the circuit powering the actuator transformer.



SYMPTOM	POSSIBLE CAUSE	RECOMMENDED ACTION(S)
Actuator does not open.	No power to the actuator or control.	• Ensure there is power between actuator COMMON terminal and OPEN terminal. • Check the 2A fuse on the actuator circuit board. Replace the fuse if necessary. *(See NOTE below.)* • Ensure the ETV Platinum Plus control has power. If the control is in an alarm condition, the control should close the valve as long as there is power on the control TMC terminals, or on loss of power if the battery backup option is installed.
Actuator does not close.	No power to the actuator or control.	• Ensure there is power between actuator COMMON terminal and CLOSE terminal. • Check the 2A fuse on the actuator circuit board. Replace the fuse if necessary. *(See NOTE below.)* • Ensure the ETV Platinum Plus control has power. If the control is in an alarm condition, only the battery backup option will close the valve on loss of power.

NOTE

The 2A fuse only applies to 3 inch valve actuators with battery backup.

MAINTENANCE—3 INCH VALVE

TYPE	NOTES
Lubrication	The valve and actuator do not require any formal maintenance to operate. The internal lubrication of the actuator is sufficient for the life of the actuator.
Cleaning	Any cleaning of the actuator external enclosure should be done with a light detergent with a low level of chemical aggressiveness.
Battery Testing	Actuators with Battery Backup Only. It is recommended that the actuator battery backup annually to ensure proper operation. To test the battery backup: 1 Remove power from the actuator. 2 Observe the actuator. Ensure the actuator closes the valve. **NOTE: Contact Heat-Timer for information on replacing the battery, if necessary.**

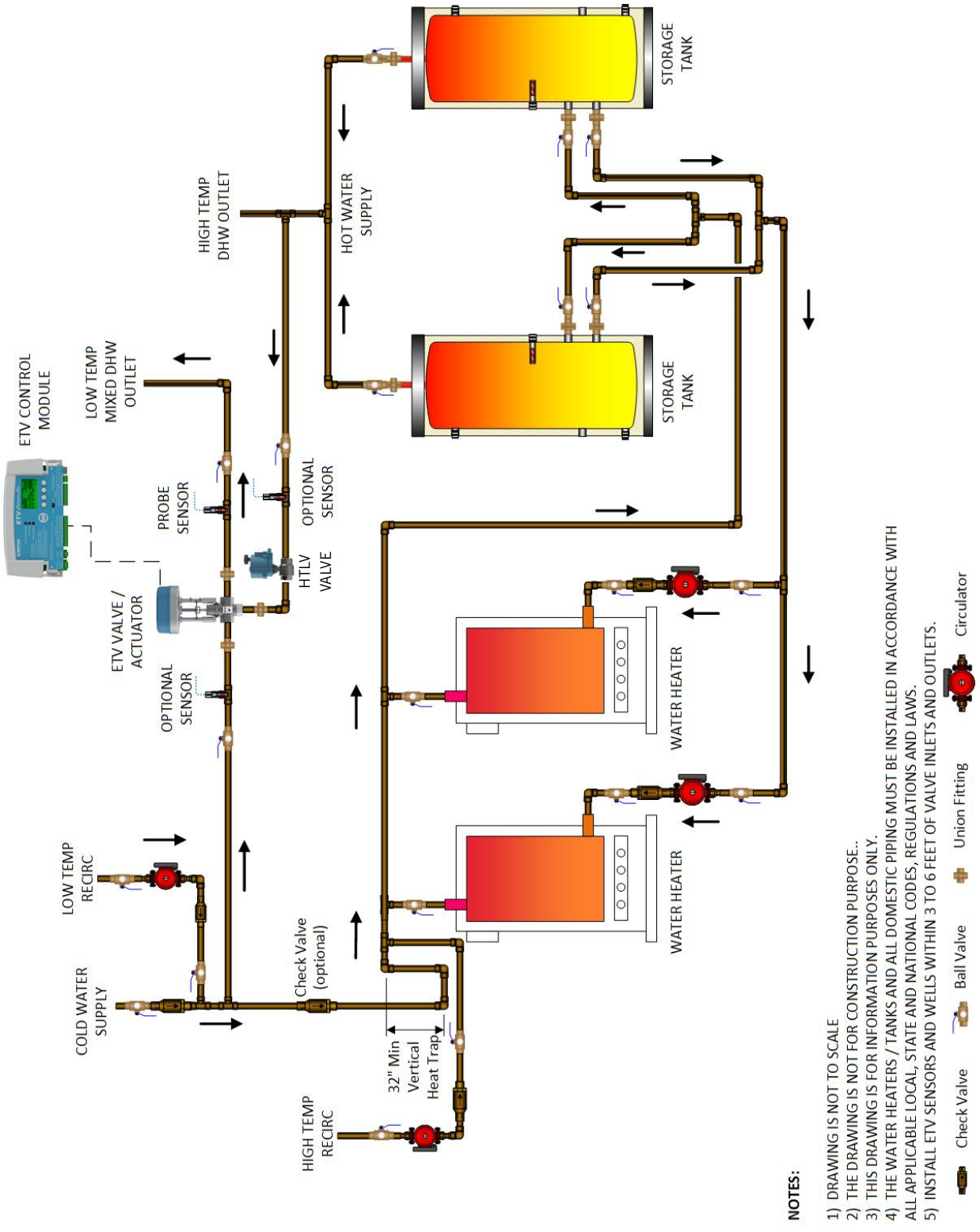


FIGURE 9

SINGLE MIXING VALVE AND A HTLV 2-WAY STAINLESS VALVE

10 NOTES

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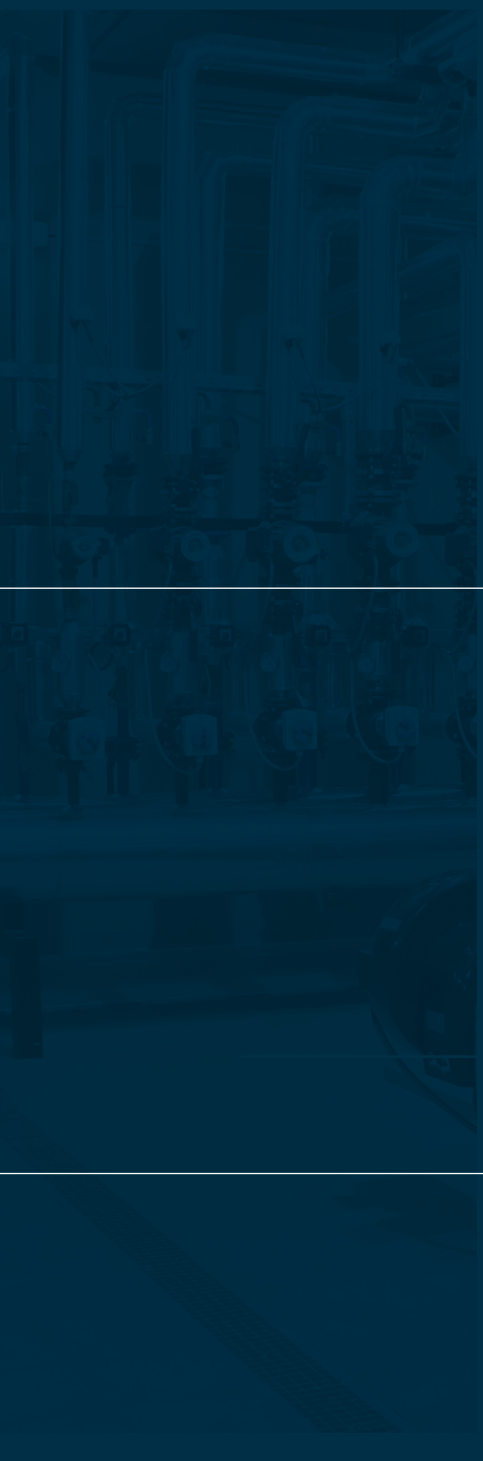

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