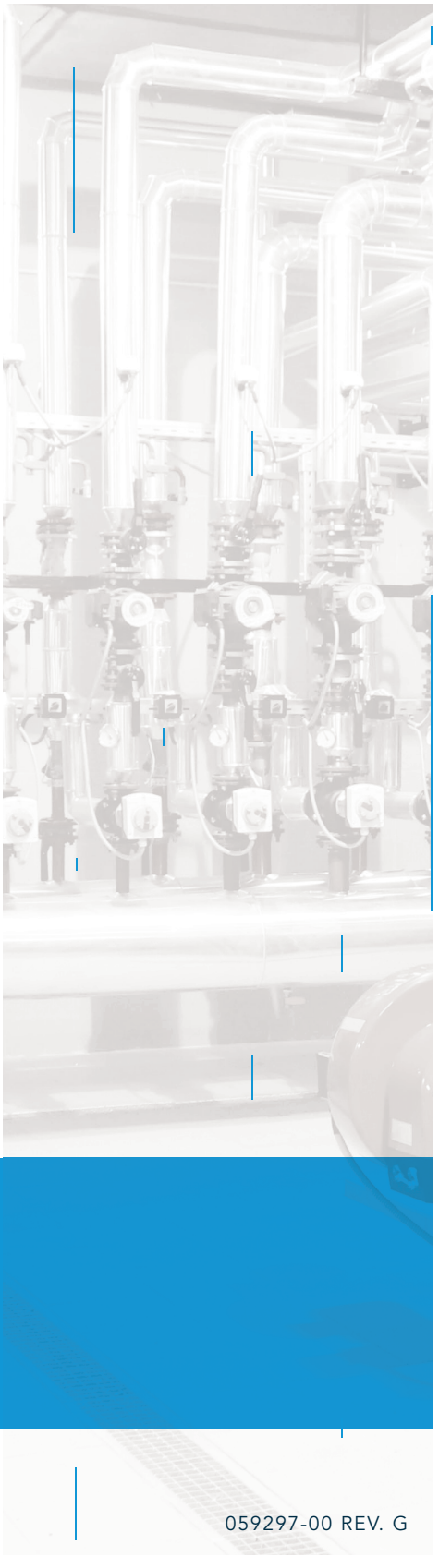
INSTALLATION AND
OPERATION MANUAL

HEAT-TIMER® CORPORATION



HTC ACTUATORS

059297-00 REV. G

⚠ WARNING

This Heat-Timer Motorized Tempering Valve is strictly an operating valve. It should never be used as a “Fail Safe“ or “Anti-Scald“ valve.

A separate Anti-Scald device can be installed in conjunction with this motorized tempering valve. All equipment must have their own certified limit and safety controls required by local codes.

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The HTC (Blue Oval) Actuator is available in 2 main configurations—the standard configuration and the configuration with the Loss of Power (LOP) Capacitor. The HTC is also available with IP 65 rating that allows outdoor installation of the valve and actuator, but not the Heat Timer controller. The HTC actuator with IP 65 is only available with the LOP Capacitor. Finally, the HTC actuator can accept either a current voltage input signal or a floating (OPEN/CLOSE) signal.

The HTC Actuator is a direct replacement of the earlier actuators, M800 and TR1000 models, found on ETV Plus—electronic tempering valves installations. The HTC Actuator is also found in the valve and actuator only kits used in dual valve applications for the current ETV Platinum Plus applications. The following is a listing of part numbers on the HTC Actuator can be ordered:

HTC ACTUATOR ONLY FOR REPLACEMENT

HTC Actuator Standard (without LOP Capacitor)	**P/N 905040-00**
HTC Actuator with LOP Capacitor	**P/N 905048-00**
HTC Actuator with IP 65 Rating	**P/N 905048-65**

ETV STAINLESS VALVE AND ACTUATOR KITS

STAINLESS STEAL VALVE AND ACTUATOR	CV	PART NUMBER
½″	5	915640-00
¾″	7	915641-00
1″	12	915642-00
1 ¼″	18	915643-00
1 ½″	29	915644-00
2″	46	915645-00
2 ½″	73	915646-00

NOTE

The kits include ETV stainless steel valve body, the HTC actuator and a 24V transformer.

IP 65 RATED HTC ACTUATOR

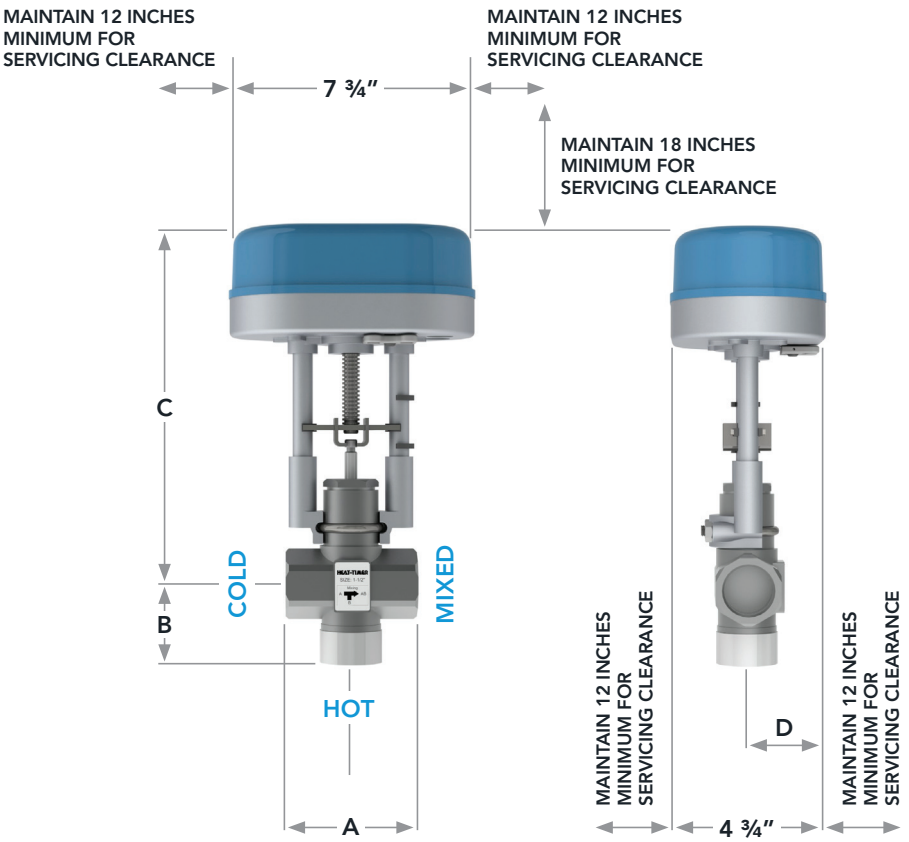
When ordering an ETV Platinum PLUS complete assembly or an ETV Valve and Actuator kit (as describe above) or the HTC actuator as a replacement only, the following part number extension is required: -65.

Example: If you have an application requiring a 2 inch ETV Platinum PLUS complete assembly (P/N 915675-00) that is to have the valve and actuator installed outdoors, then you would order the following: P/N 915675-65.

NOTE

An IP 65 rate actuator will allow the valve and actuator to be mounted outdoors, The Heat-Timer controller is **NOT** approved for outdoor installations.

ETV VALVE AND HTC ACTUATOR DIMENSIONAL



ETV ASSEMBLY	DIMENSION			
	A	B	C	D
½"	3 1/8"	2"	10 ½"	2 3/8"
¾"	3 1/8"	2"	10 5/8"	2 3/8"
1"	4"	2 1/8"	10 ¾"	2 3/8"
1 ¼"	4"	2 ½"	11"	2 3/8"
1 ½"	4 ¾"	2 ¾"	11 3/16"	2 3/8"
2"	5 ½"	3 3/8"	11 3/8"	2 3/8"
2 ½"	6 5/16"	4"	11 ¾"	2 3/8"

SPECIFICATIONS

Voltage Input	24Vac 60Hz
Power Consumption	18VA max
Capacitor Charging Phase Consumption	32VA/8W
Input Signal	Proportional 0–10V (default), 0–5V, 5–10V, 2–10V, 4–20mA
Input Signal	24Vac Floating
Force	1000 N
Weight	2.6 lbs (1.2kg)

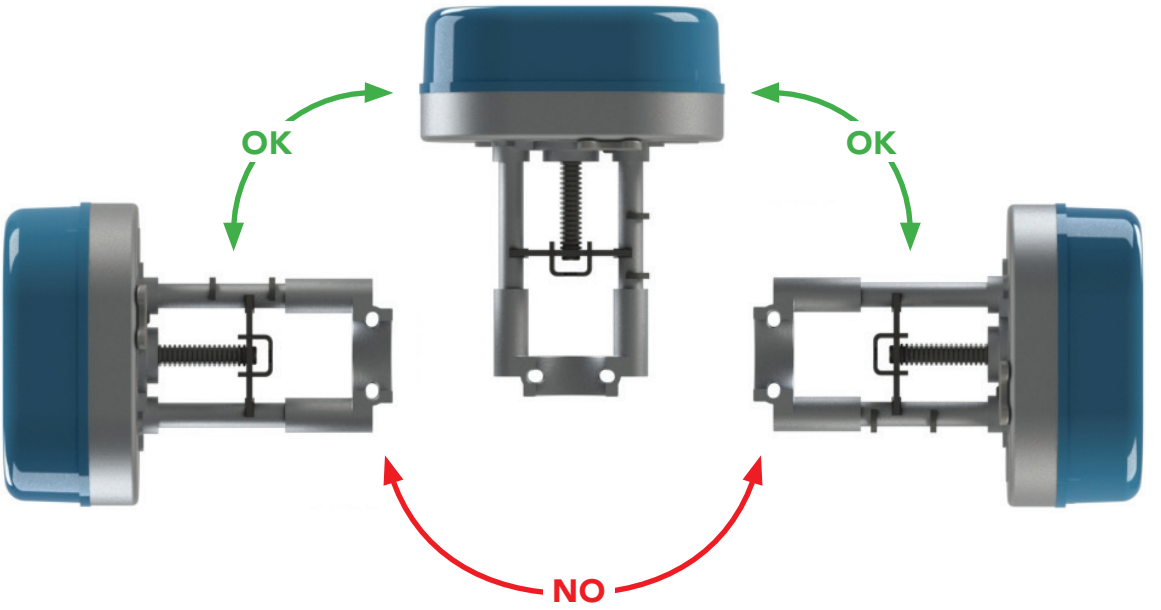


FIGURE 1

ALLOWABLE MOUNTING POSITION FOR THE HTC ACTUATOR STANDARD AND HTC ACTUATOR WITH LOP CAPACITOR

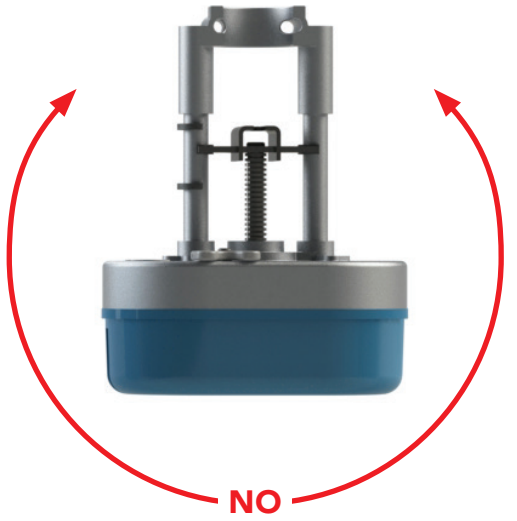


FIGURE 2

HTC ACTUATOR WITH IP 65 RATING MOUNTING POSITION

NOTE

The HTC Actuator with IP 65 Rating can only be mounted in the vertical position to avoid potential penetration of water into the motor circuit.

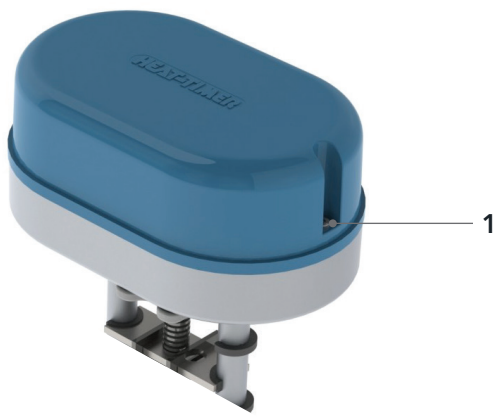
MANUAL OVERRIDE OPERATION

1. The HTC Actuator can be manually position by lowering the Manual tab (1) down.
2. Once the Manual tab is lowered (2), rotate the tab to lower or raise the actuator.
3. Prior to mounting the HTC Actuator, the actuator must be in its lowest position.
4. To return the HTC Actuator back to automatic operation simply return the Manual tab to its upward position.

WIRE TERMINAL ACCESS

To gain access to the HTC 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.



ETV VALVE AND ACTUATOR INSTALLATIONS—DUAL VALVE APPLICATIONS

In applications where the ETV valve and actuator kit is applied in a dual application with an ETV Platinum Plus complete assembly, reference the ETV Platinum Plus installation manual for guidelines on installing the valve and the wiring of the actuator and 24V transformer.

REPLACEMENT OF THE ETV PLUS M800 ACTUATOR

⚠ 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.

⚠ WARNING ⚠

SCALD HAZARD! To avoid any potential of a scald hazard it is recommended to isolate the valve from the system by closing at a minimum the isolation valve on the HOT supply to the valve.

1. Disconnect power to the ETV module through a service switch or circuit breaker.
2. Remove the actuator cover to access the wire terminals by unsnapping the front of the black cover and lifting toward the rear of the actuator.
3. Prior to removing the wires from the terminals, it is a best practice to label the wiring to ensure proper wiring to the HTC Actuator.
   - Label Terminal G wire as 24V
   - Label Terminal GO wire as 24V
   - Label Terminal MX wire as V(-)
   - Label Terminal X1 wire as V(+)
4. Remove the wiring from the bottom of the actuator. If needed remove any electrical NM connector or conduit attached to the actuator housing.
5. Pull down the Manual Tab on the actuator and manually lower the actuator and valve stem to the lowest position.
6. Loosen and remove the (2) locking nuts from the U-bolt. Then remove the U-bolt from the actuator and valve body.
7. On the bronze valve body it may be require to loosen the jam nut from the U channel on the actuator. *See Figure 3A page 9.*

8 Slide the actuator off the valve, removing the U channel of the actuator from the valve stem.

9 To assemble the new HTC Actuator reference the following pages:

- For bronze valve body *reference page 14*.
- For stainless steel valve body *reference page 15*.

10 For wiring of the new HTC actuator *reference page 16*.

11 For Dip Switch and Capacitor Jumper (if applicable) settings based on valve configuration *reference page 20*.

12 For installation completion and calibration of the HTC actuator *reference page 23*. To remove the actuator cover remove the mounting screw (1) using a Phillips screwdriver *as shown on page 7*.

13 Lift the actuator cover and slide toward the mounting screw direction disengaging the actuator cover clip from the actuator housing.

14 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 3A

ASSEMBLY OF THE M800 ACTUATOR TO A BRONZE BODY VALVE

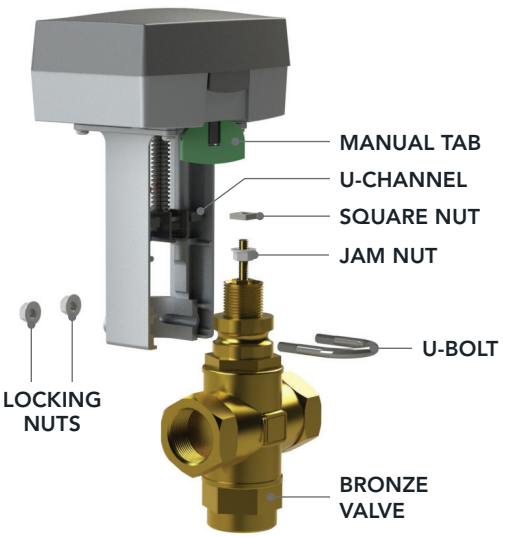
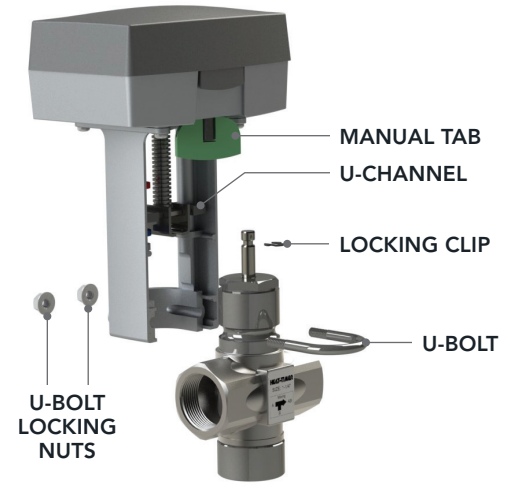


FIGURE 3B

ASSEMBLY OF THE M800 ACTUATOR TO A STAINLESS STEEL BODY VALVE



REPLACEMENT OF THE ETV PLUS TR1000 ACTUATOR

⚠ 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.

⚠ WARNING ⚠

SCALD HAZARD! To avoid any potential of a scald hazard it is recommended to isolate the valve from the system by closing at a minimum the isolation valve on the HOT supply to the valve.

1. Disconnect power to the ETV module through a service switch or circuit breaker.

   NOTE: Although the TR1000 actuator contains a service switch it is not recommended for this type of servicing to use it as power will still be present on the wiring from the ETV module and a shock hazard is still present.

2. Remove the actuator cover to access the wire terminals by removing the (2) mounting screws on the front red cover.
3. Prior to removing the wires from the terminals, it is a best practice to label the wiring to ensure proper wiring to the HTC Actuator.
   - Label Terminal B wire as 24V.
   - Label Terminal O (right of Terminal B) wire as 24V.
   - Label Terminal O (left of Terminal E) wire as V(-).
   - Label Terminal E wire as V(+).
4. Remove the wiring from the bottom of the actuator. If needed remove any electrical NM connector or conduit attached to the actuator housing.
5. Push the Red Manual Crank Handle down and lift the lever. With the Crank Handle pushed down, rotate the handle counterclockwise to lower the actuator and valve stem down to its full position.
6. Loosen and remove the (2) screws from the Actuator Stem Locking Bracket and remove the bracket from the valve stem.
7. Loosen and remove the (2) screws from the Actuator Valve Locking Bracket and remove the bracket from the valve body.

8 Slide the actuator bracket out the valve groove.

9 To assemble the new HTC Actuator reference the following pages:

- For bronze valve body *reference page 14*.
- For stainless steel valve body *reference page 15*.

10 For wiring of the new HTC actuator *reference page 16*.

11 For Dip Switch and Capacitor Jumper (if applicable) settings based on valve configuration *reference page 20*.

12 For installation completion and calibration of the HTC actuator *reference page 23*.

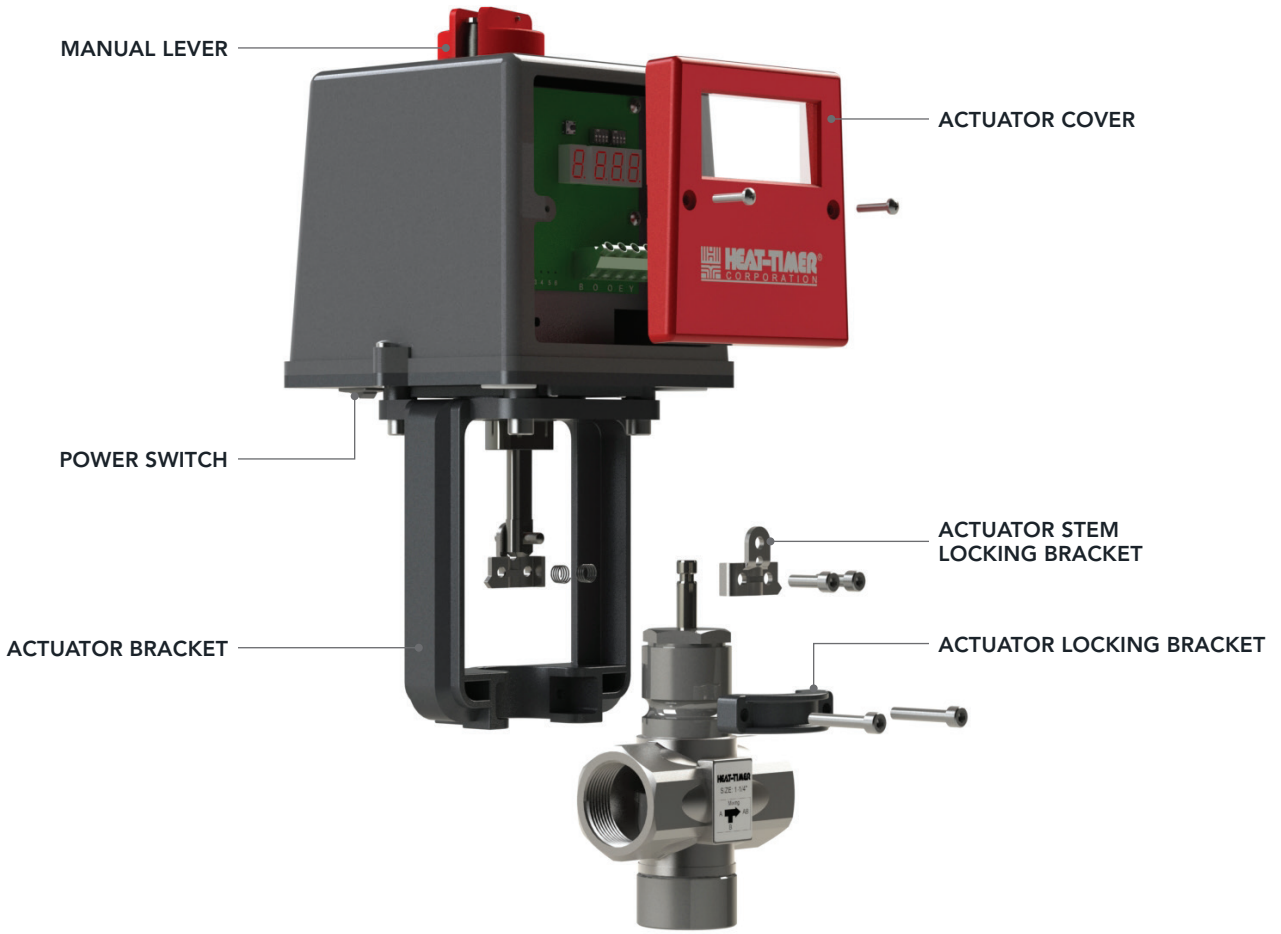


FIGURE 4

ASSEMBLY OF THE TR1000 ACTUATOR TO A STAINLESS STEEL BODY VALVE

REPLACEMENT OF AN EXISTING HTC ACTUATOR

⚠ 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.

⚠ WARNING ⚠

SCALD HAZARD! To avoid any potential of a scald hazard it is recommended to isolate the valve from the system by closing at a minimum the isolation valve on the HOT supply to the valve.

1. Disconnect power to the ETV module through a service switch or circuit breaker.
2. Remove the actuator cover to access the wire terminals by removing the mounting screw on the top cover. *See page 7*.
3. Prior to removing the wires from the terminals, it is a best practice to label the wiring to ensure proper wiring to the HTC Actuator.
   - Label Terminal LN wire as 24V.
   - Label Terminal L1 wire as 24V.
   - Label Terminal M wire as V(-).
   - Label Terminal Y wire as V(+).
4. Remove the wiring from the bottom of the actuator. If needed remove any electrical NM connector or conduit attached to the actuator housing.
5. Pull down the manual tab on the actuator and manually lower the actuator and valve stem to the lowest position. *See figure 5 page 13*.
6. Loosen and remove the (2) locking nuts from the U-bolt. Then remove the U-bolt from the actuator and valve body.
7. Slide the actuator off the valve, removing the U channel of the actuator from the valve stem.

8 To assemble the new HTC Actuator reference the following pages:

- For bronze valve body *reference page 14*.
- For stainless steel valve body *reference page 15*.

9 For wiring of the new HTC actuator *reference page 16*.

10 For Dip Switch and Capacitor Jumper (if applicable) settings based on valve configuration *reference page 20*.

11 For installation completion and calibration of the HTC actuator *reference page 23*.

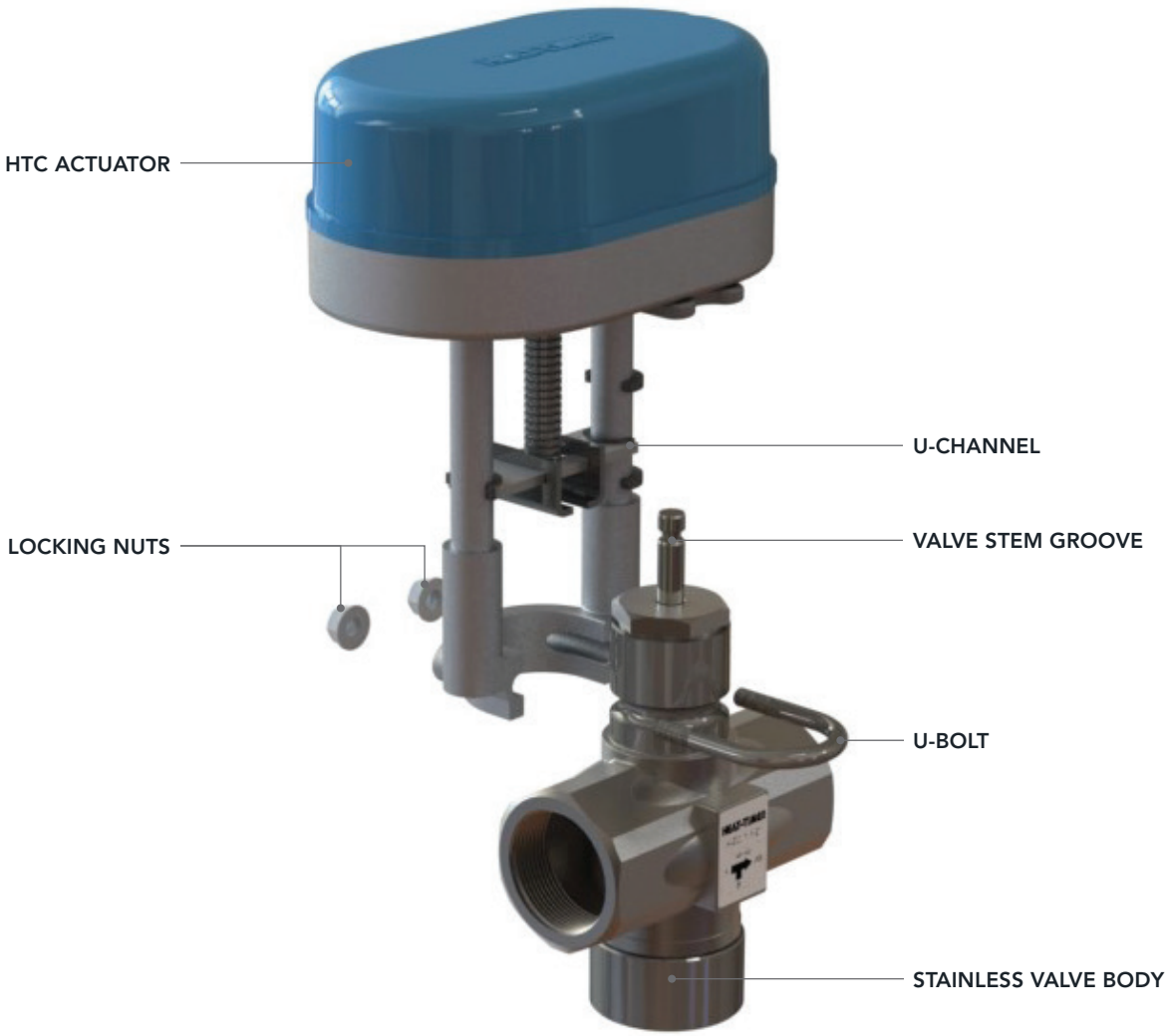


FIGURE 5

ASSEMBLY OF THE HTC ACTUATOR TO A STAINLESS STEEL BODY VALVE

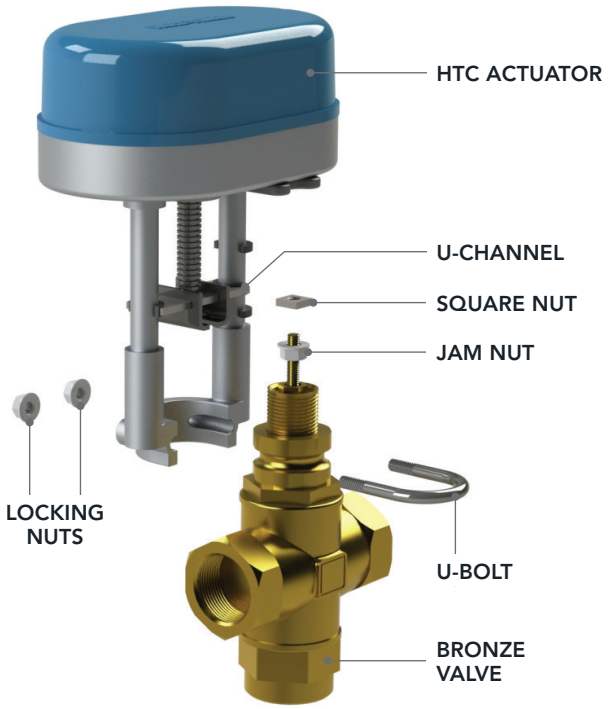
INSTALLATION ON BRONZE VALVE BODY

1. Ensure the HTC Actuator is at the lowest position by manual positioning it. *See page 7*.
2. Ensure the valve stem is at its lowest position by pressing down on the stem.
3. Ensure the valve stem contains both a Jam Nut and a Square Nut. It may be require to loosen the Jam Nut further down the valve stem *as shown in figure 6*.
4. Mount the HTC Actuator onto the valve body making sure the Square Nut is in the U-channel of the actuator.
5. Insert the U-bolt aligning the valve body groove with the actuator. If needed adjust the position of the actuator manually.
6. 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.
7. Tighten the Jam Nut against the bottom of the U channel on the actuator.
8. For wiring of the new HTC actuator in replacement of a M800 or a TR1000 actuator *reference page 16*.
9. For Dip Switch and Capacitor Jumper (if applicable) settings based on valve configuration *reference page 20*.
10. For installation completion and calibration of the HTC actuator *reference page 23*.

FIGURE 6

ASSEMBLY OF THE HTC ACTUATOR TO A BRONZE BODY VALVE



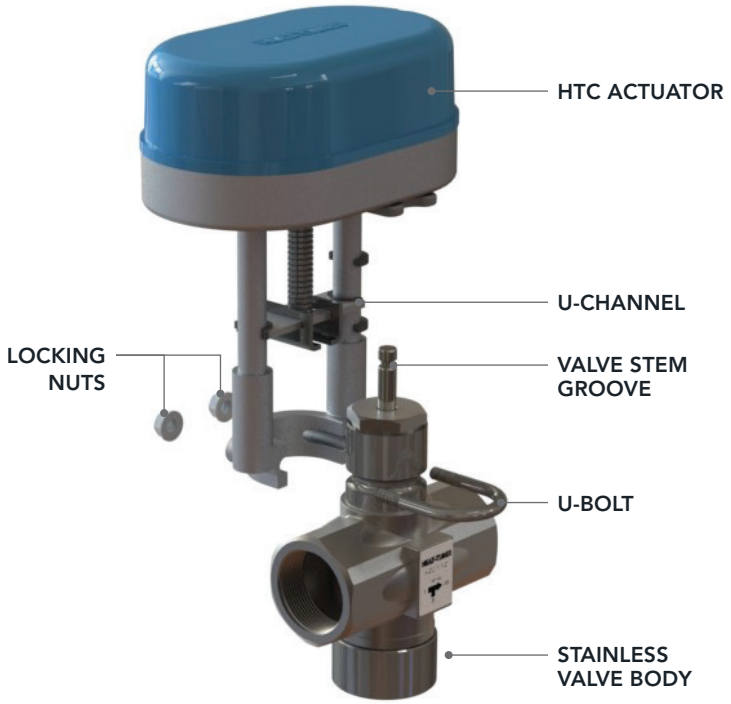
INSTALLATION ON STAINLESS STEEL VALVE BODY

1. Ensure the HTC Actuator is at the lowest position by manual positioning it. *See page 7*.
2. Ensure the valve stem is at its lowest position by pressing down on the stem.
3. Mount the HTC Actuator onto the valve body making sure the U-channel of the actuator aligns with the valve stem groove.
4. Insert the U-bolt aligning the valve body groove with the actuator. If needed adjust the position of the actuator manually.
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. For wiring of the new HTC actuator in replacement of a M800 or a TR1000 actuator *reference page 16*.
7. For Dip Switch and Capacitor Jumper (if applicable) settings based on valve configuration *reference page 20*.
8. For installation completion and calibration of the HTC actuator *reference page 23*.

FIGURE 7

ASSEMBLY OF THE HTC ACTUATOR
TO A STAINLESS STEEL BODY VALVE



GENERAL WIRING

⚠ 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.

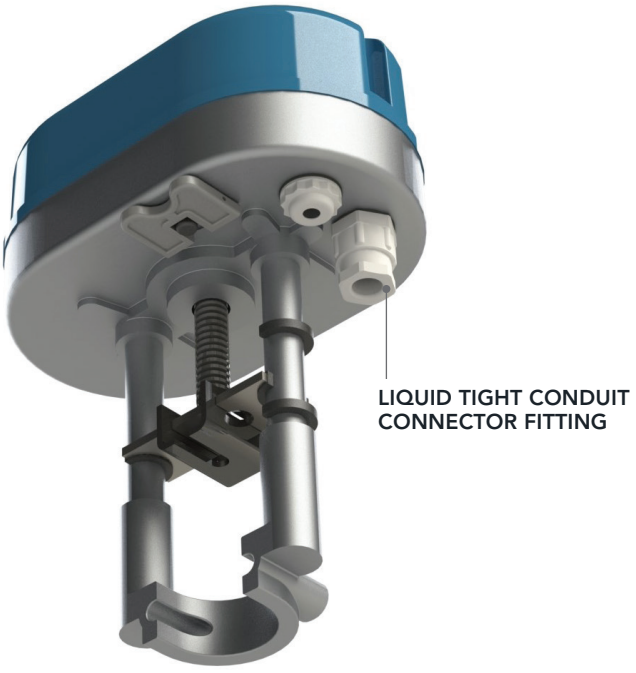
Follow all local and state electrical codes when installing the unit. All wiring must meet or exceed local, state, federal codes and requirements.

1. Disconnect power to the ETV module or 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.

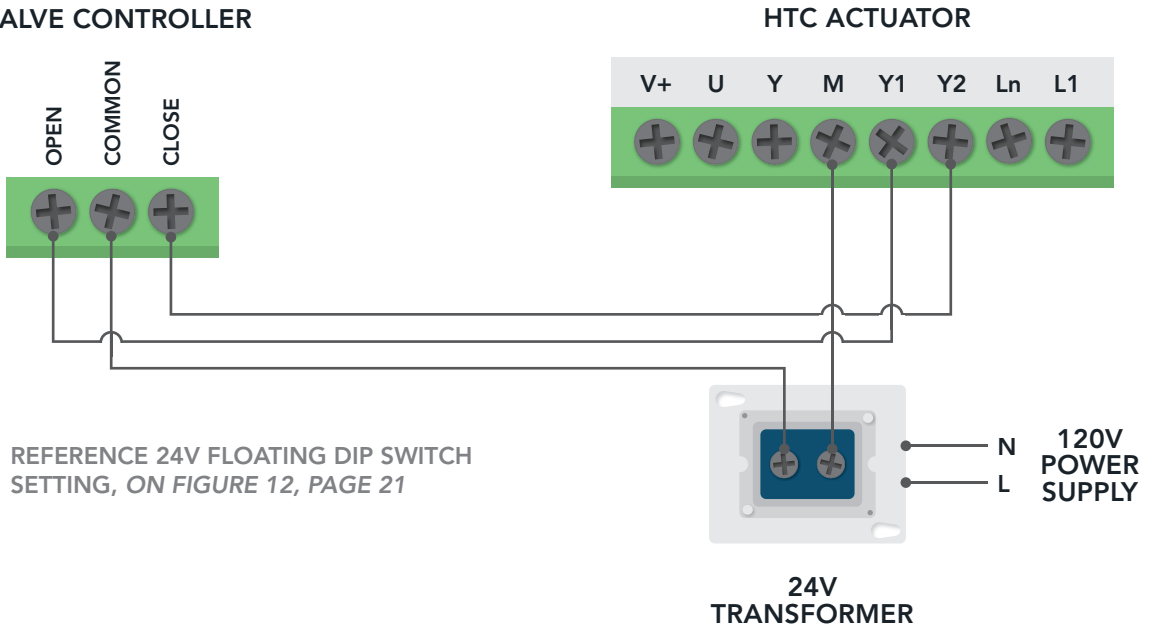
   NOTE: On HTC Actuator with IP 65 rating the actuator is provided with a Liquid Tight Conduit Connector fitting, *see figure 8*. Liquid Tight conduit is required for any outdoor installations. Check local, state electrical codes for compliance.
3. Terminal designations for current voltage proportional modulation input see ETV and Modulation wiring *on pages17–19*.
4. Terminal designations for floating signal input *see page 17*.
5. Once all wiring is complete return power to the ETV module or control, placing the actuator into service.
6. If the actuator contains a LOP Capacitor it will require about 2 minutes of power being supplied to fully charge.

FIGURE 8

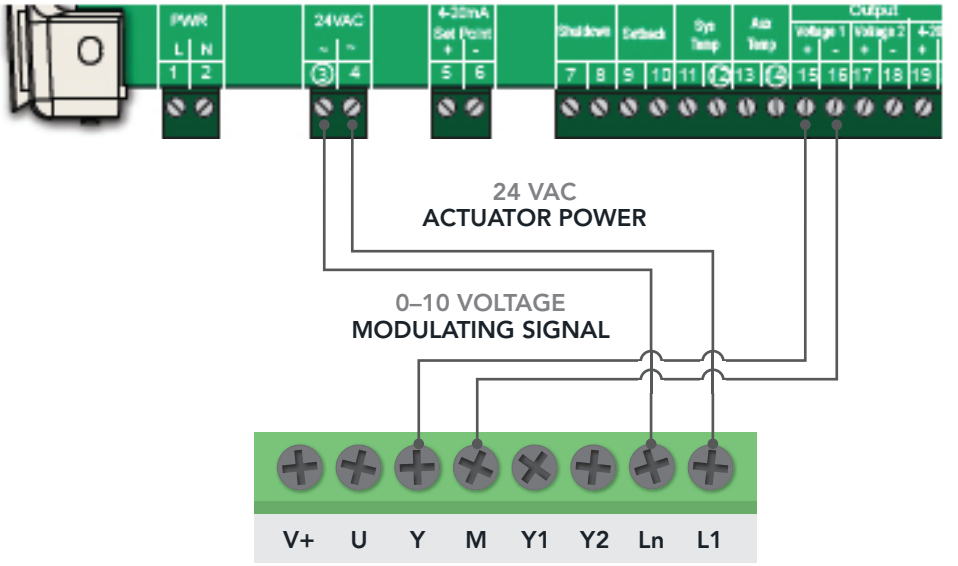
HTC ACTUATOR—IP 65 VERSION
WITH LIQUID TIGHT FITTING



24V FLOATING



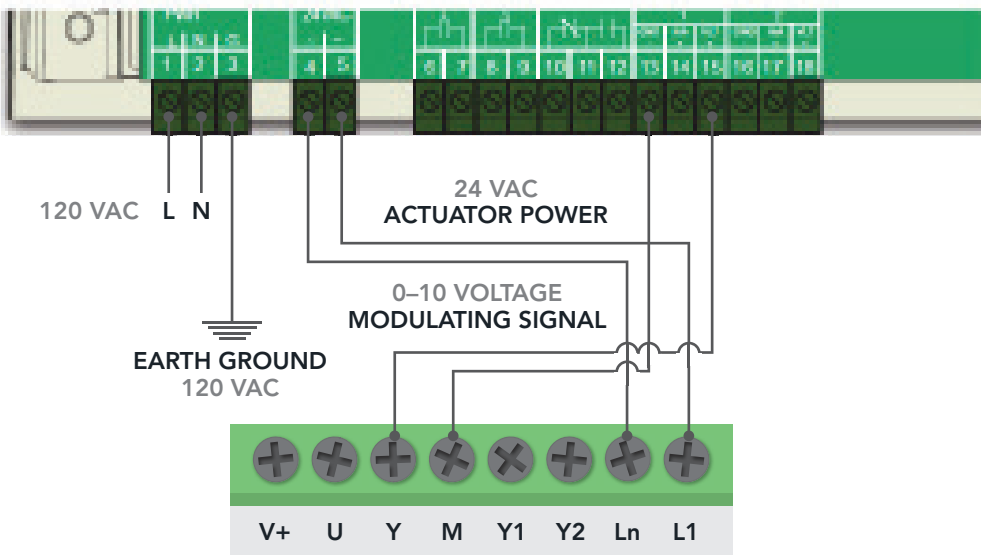
ETV WIRING



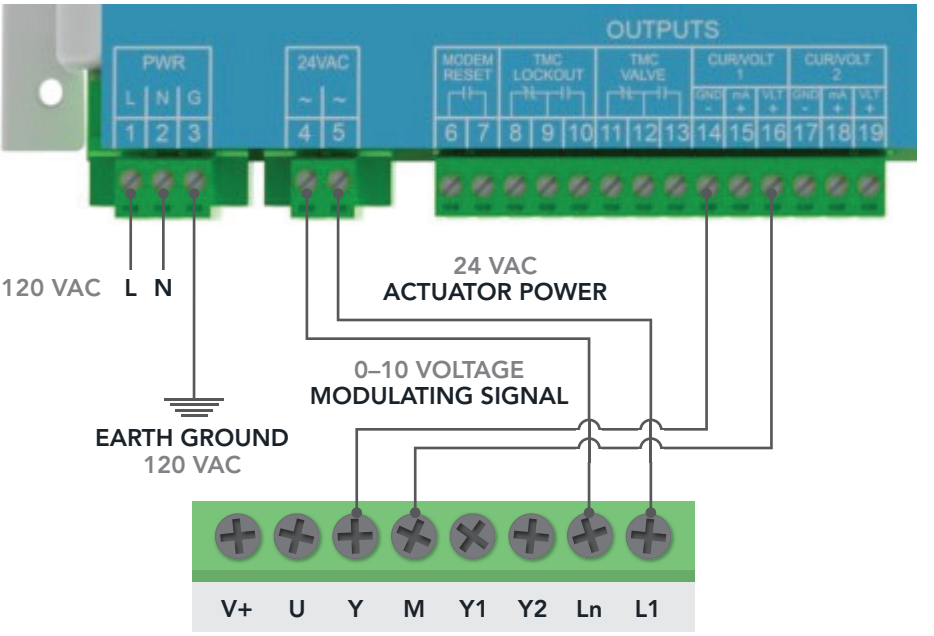
NOTE

On existing wiring with a M800 actuator an external 24V transformer provided power to the actuator. This transformer can be eliminated with the HTC actuator and 24V power can be supplied through the ETV panel.

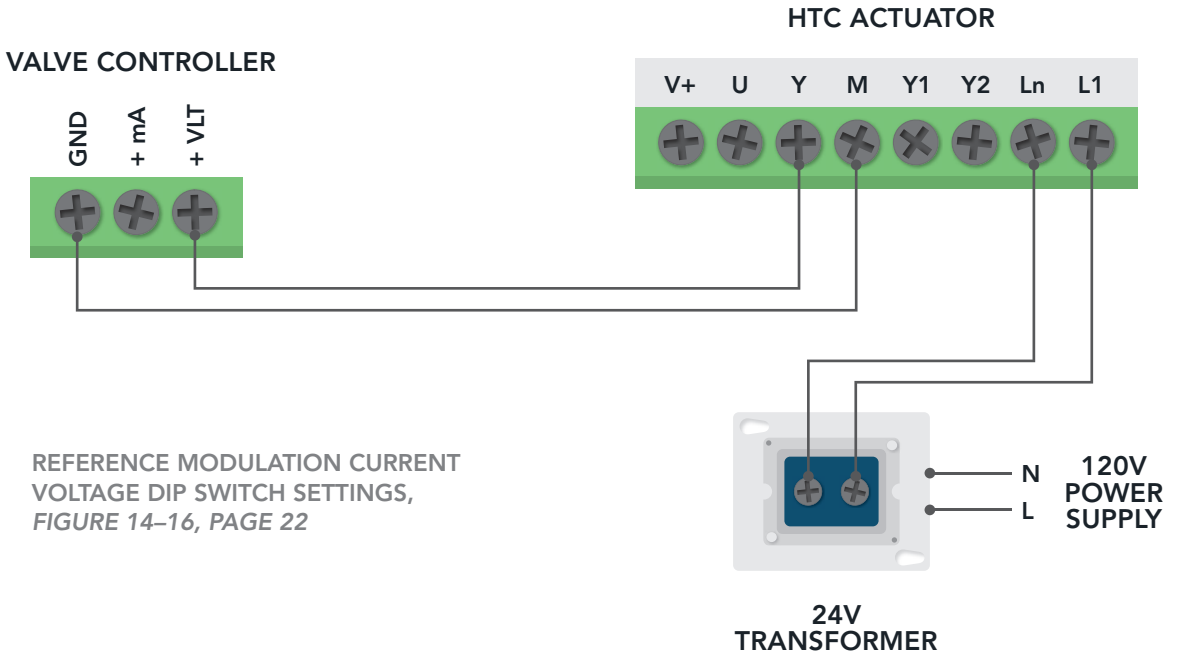
ETV PLUS



ETV PLATINUM PLUS

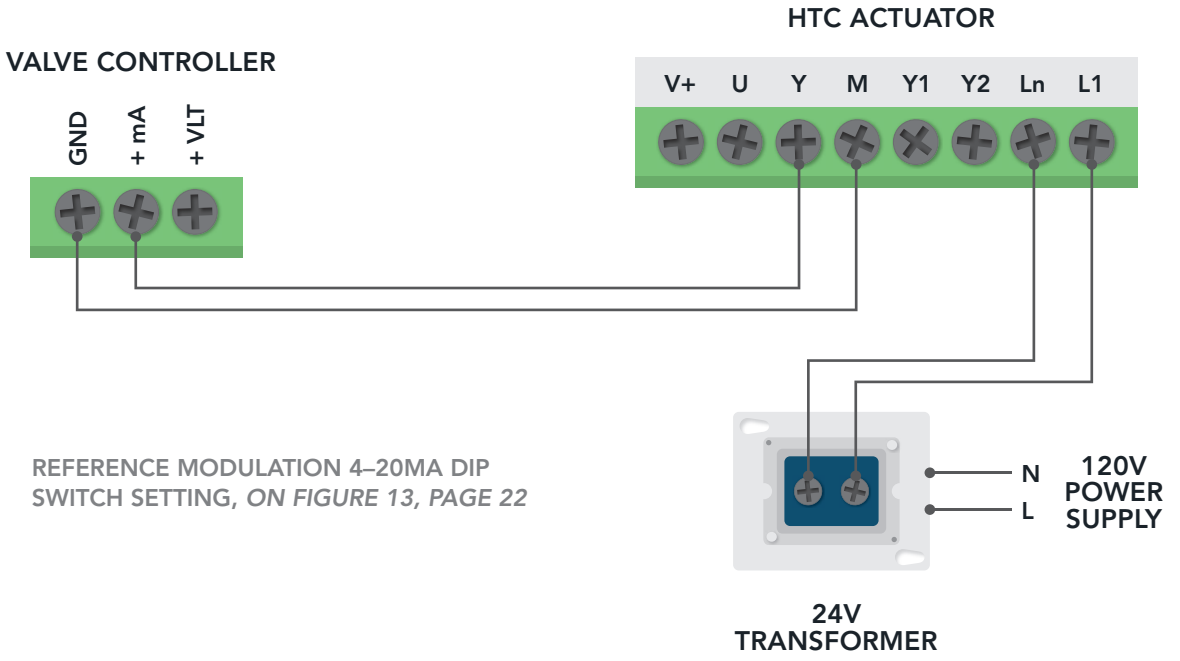


MODULATION CURRENT VOLTAGE



REFERENCE MODULATION CURRENT VOLTAGE DIP SWITCH SETTINGS, *FIGURE 14–16, PAGE 22*

MODULATION 4–20mA

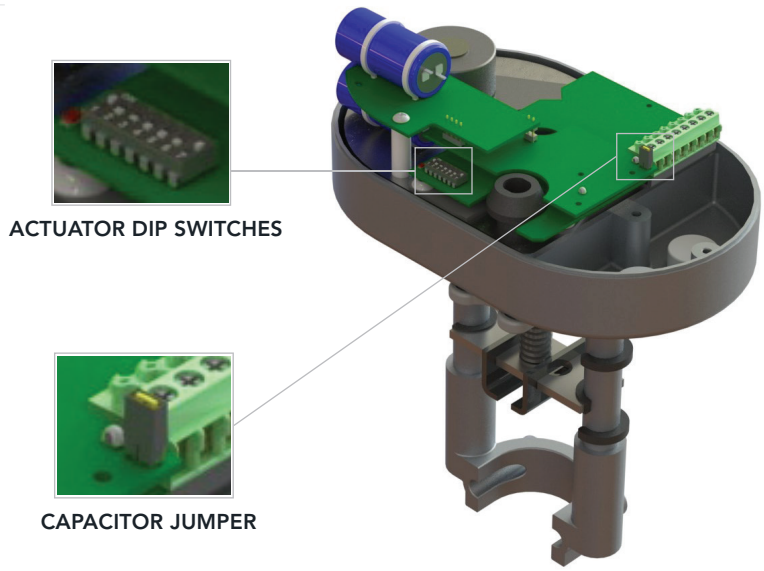


REFERENCE MODULATION 4–20MA DIP SWITCH SETTING, *ON FIGURE 13, PAGE 22*

DIP SWITCHES AND CAPACITOR JUMPER

FIGURE 9

LOCATION OF THE DIP SWITCHES AND CAPACITOR JUMPER (IF APPLICABLE)



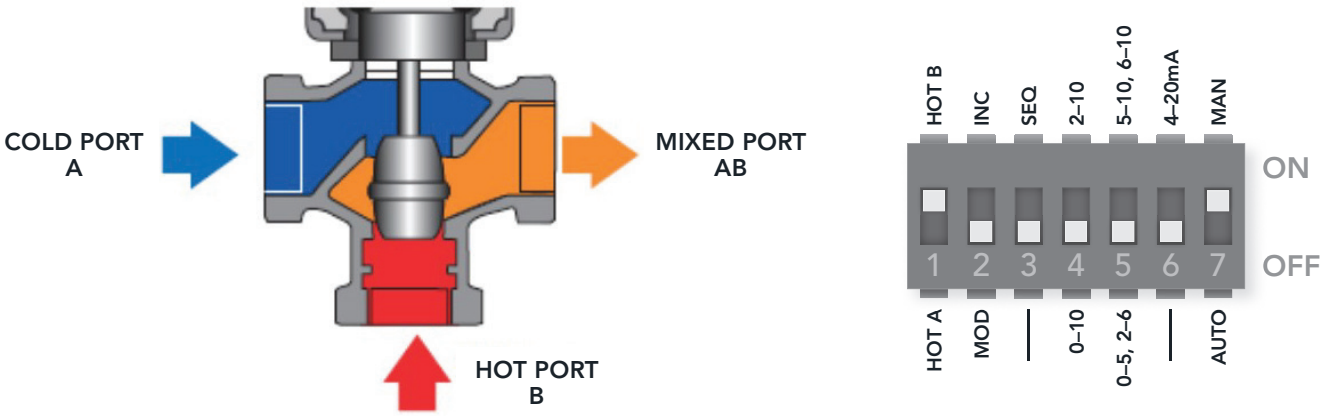


FIGURE 10

VALVE INSTALLATION AND DIP SWITCH SETTING—FACTORY DEFAULT

When the ETV valve is installed as shown in the Factory Default Configuration, the following applies:

1. Dip Switch 1 must be in the ON position as shown.
2. The Capacitor Jumper (if applicable) must remain as installed by the factory. On loss of power the actuator will push the valve stem downward to the full COLD position.

VALVE INSTALLATION—**ALTERNATE CONFIGURATION**

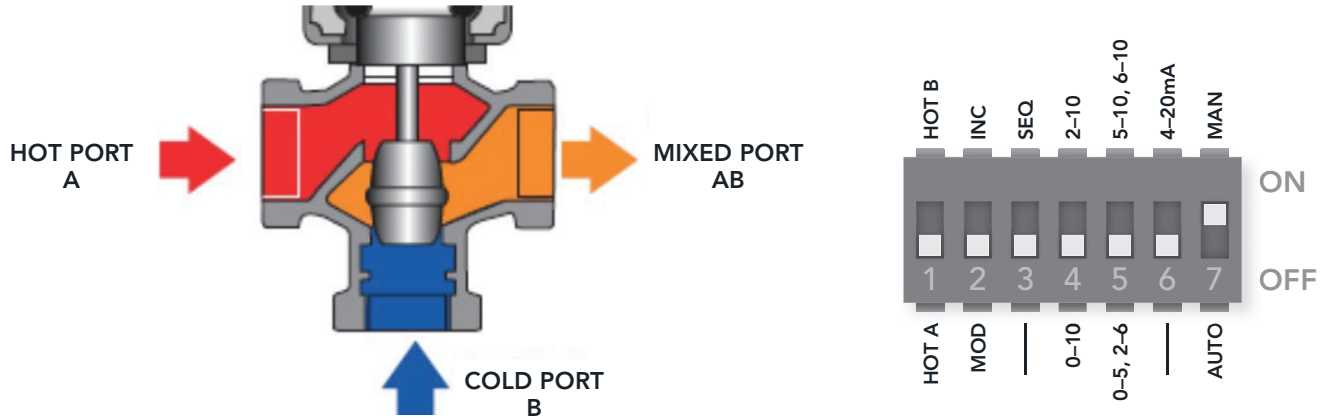


FIGURE 11

HTC ACTUATOR—IP 65 VERSION WITH LIQUID TIGHT FITTING

When the ETV valve is installed as shown in the Alternate Configuration, the following applies:

1. Dip Switch 1 must be in the OFF position as shown.
2. The Capacitor Jumper (if applicable) must be removed. On loss of power the actuator will pull the valve stem upward to the full COLD position.

DIP SWITCH SETTING—**OPTIONAL SETTINGS**

FIGURE 12

DIP SWITCH SETTING FOR A FLOATING SIGNAL INPUT

Reference 24V Floating wiring diagram *on page 17.*

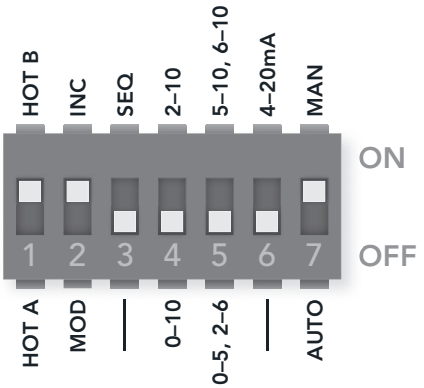


FIGURE 13

DIP SWITCH SETTING FOR A 4–20mA SIGNAL INPUT

Reference Modulation 4–20mA wiring diagram *on page 19*.

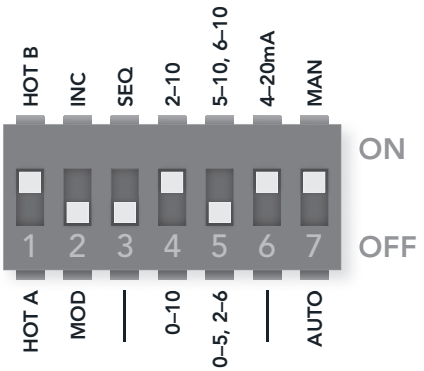


FIGURE 14

DIP SWITCH SETTING FOR A 0–5V PROPORTIONAL SIGNAL INPUT

Reference Modulation Current Voltage wiring diagram *on page 19*.

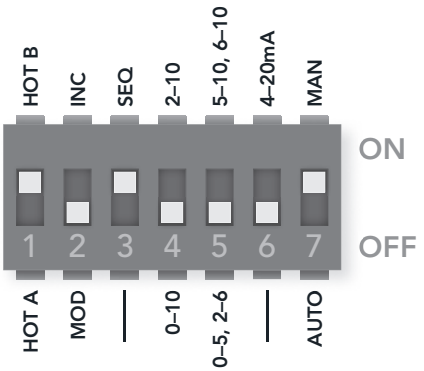


FIGURE 15

DIP SWITCH SETTING FOR A 5–10V PROPORTIONAL SIGNAL INPUT

Reference Modulation Current Voltage wiring diagram *on page 19*.

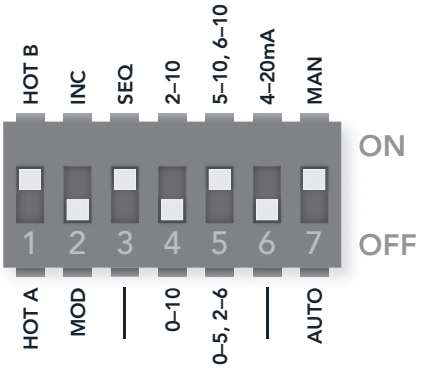
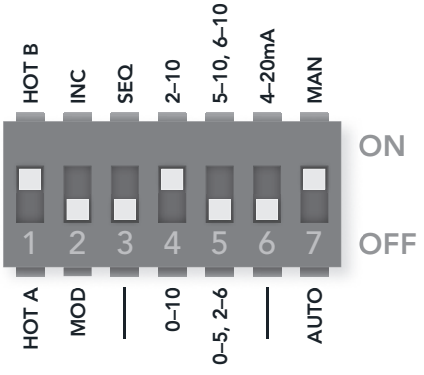


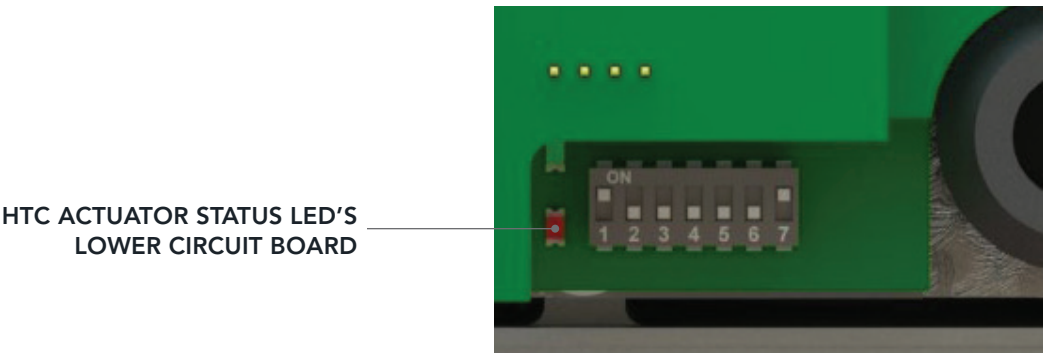
FIGURE 16

DIP SWITCH SETTING FOR A 2–10V PROPORTIONAL SIGNAL INPUT

Reference Modulation Current Voltage wiring diagram *on page 19*.



LED STATUS



Green LED ON	The actuator has reached its extreme point of the stoke
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. Only applies if the actuator contains a LOP Capacitor

CALIBRATION

NOTICE

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

1. Ensure the HOT supply to the valve is isolated by closing the isolation valve on the HOT supply 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.

STARTUP

1. Once all wiring, Dip Switch setting, Capacitor Jumper setting (if applicable) and actuator calibration is complete, the HTC Actuator is ready to be placed into service.
2. Open all isolation valves on the HOT supply and any other isolation valves on 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.

IP 65 INSULATION KIT

To provide additional protection to the HTC Actuator IP 65, an optional insulation boot (P/N 905045-00) is available. The insulation kit consist of a 2 part shell that will Velcro together. The insulation kit only covers the actuator, not the valve body. Insulation of the valve body is done by others.

When assembling the insulation kit around the actuator ensure the water tight conduit is able to exit the insulation. Ensure the conduit does not interfere with the operation of the actuator as it moves the valve stem up and down.

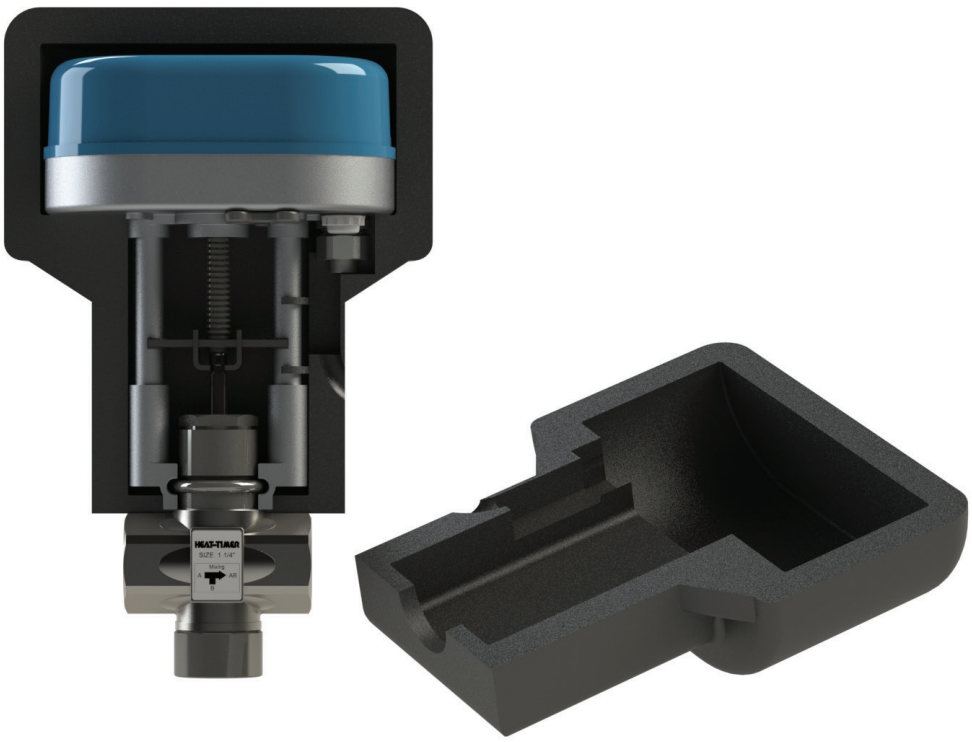


FIGURE 17

ASSEMBLY OF THE IP 65 INSULATION KIT

06 NOTES

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