

T-Series Models TVF, TVH & TVL Quick Start Guide



STOP

This document contains only basic setup and calibration information. For more detailed information, please refer to our website at:

www.topworx.com

Certifications and Specifications

Wiring Diagram

Installation Notes

T-Series products can be used on both linear and rotary valve automation applications. Always use sound mechanical practices when mounting. When fastening the TopWorx™ switch box to the bracket on the actuator, torque the fasteners to 224 in·oz (1.58 N·m) after cycling the valve a couple of times. This allows the shaft to self-center in the pinion slot, or coupler. Be cautious not to allow undue axial (thrust) load on the shaft.



This product comes shipped with conduit covers in an effort to protect the internal components from debris during shipment and handling. It is the responsibility of the receiving and/or installing personnel to provide appropriate permanent sealing devices to prevent the intrusion of debris, or moisture, when stored outdoors or when installed.



It is the responsibility of the installer, or end user, to install this product in accordance with the National Electrical Code (NFPA 70 or any other national or regional code defining proper practices.

Factory Preset

All TopWorx™ products are factory set for 90° rotation on normal acting actuators. The switch at full clockwise is for process valve closed and uses the red striker. When changing orientation the target disk will have to be relocated for your application. The Target is designed to be adjusted on 90° increments allowing the TopWorx™ unit to be rotated 90°, 180°, or 270° from standard. On reverse acting units the switch function will be transposed. Clockwise for open will become clockwise for closed. On units with indicator domes, the dome cover with mask will have to be rotated to give proper indication.

Switch Calibration Procedure



Never perform the switch calibration procedure while in an area that could be hazardous. Intrinsically Safe models, unit must be wired in accordance the control drawing included with the product.

For Options Q, G, M, K, T, P, R, AS, DN & PB, calibration may be performed using a Volt-Ohm meter by using the Ohm setting across COM and NO. When switch is active, the meter will read <0.5 Ohms, or the Diode setting may be used simply to indicate continuity. If a direct power source is being used, an appropriately sized resistor must be used in series with the contacts, or permanent damage will occur.

For all INDUCTIVE sensor options, a power source and resistors will be required for calibration. (Refer to the product nameplate for current limitations.)

Setting Switches

GO™ Switch, Mechanical Switches, Reed Switches, AS-i, DeviceNet, Profibus, & ALL threaded, cylindrical inductive sensor options.

Each TV-Series unit is equipped with 2 or 4 adjustable targets with a usable range between 45° and 90°. For normal acting applications the targets are color coded red for closed and green for open (except the Q & G option). The color code would be reversed for reverse acting units. After installing the unit on the actuator or valve assembly, the targets must be set.

LOCKED
(aligned)



UN-LOCKED
(not aligned)



Normal Acting Actuator:

Step 1: Rotate the valve full clockwise to the closed position.

Step 2: Unlock/push/twist the target as required to engage the switch and lock target if applicable.

Step 3: Rotate the valve full counterclockwise to the open position.

Step 4: Unlock/ push/twist the target as required to engage the switch and lock target if applicable.

Reverse Acting Actuator:

Step 1: Rotate the valve full clockwise to the open position.

Step 2: Unlock/push/twist the target as required to engage the switch and lock target if applicable.

Step 3: Rotate the valve or push and move the target a full counterclockwise to the closed position.

Step 4: Unlock/push/twist the target as required to engage the switch and lock target if applicable

For switching angle under 45° (Not applicable for Q and G options.)

When the switch box is mounted to a linear actuator or when the actuator strokes less than 45°, we recommend the following:

Step 1: Remove shaft from switch box by removing the circlip underneath the switch box.

Step 2: Remove the circlip underneath the cam if equipped, then push the cam down the shaft by 3-4mm and turn it 90°.

Step 3: Push the cam back up, you will see the flats fit snugly between the locating lugs inside the hub.

Step 4: Replace the circlip

Step 5: Remove the closed switch from the bracket and install it on the inside of the bracket next to the open switch

To re-assemble (Not applicable for Q and G options).

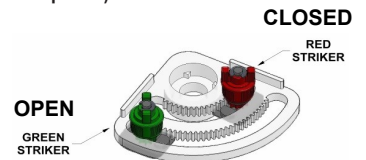
Step 1: Replace the screws with M3 X 25mm long screws (insert through both switches and bracket and fasten with the nut on the inside closest to the switch box bearing).

Step 2: Remove the Closed striker assembly (red) by removing the circlip or screw on top, and install it on the inner rack.

Step 3: Unlock target and twist the green striker to the other end of the cam's rack and lock target (The red striker assembly should be twisted to the other end of the inner rack).

Step 4: Re-install the shaft in the switch box and fit the s/s washer and circlip to the underside of the switchbox.

Step 5: The switches can now be set anywhere between 0° & 45°.



For switching angle up to 180° (Q/G-2 option only goes to 90°. Q/G-4 option can go up to 180° if only 2 targets are utilized):

Step 1: Remove shaft from switch box by removing the circlip underneath the switch box.

Continued:

Step 2: Remove the open switch from the bracket and install it on the inside of the bracket.

Step 3: Remove the Open striker assembly (green) by removing the circlip or screw on top, and install it on the inner rack next to the red striker assembly.

Step 4: Re-install the shaft in the switch box and fit the s/s washer and circlip to the underside of the switchbox.

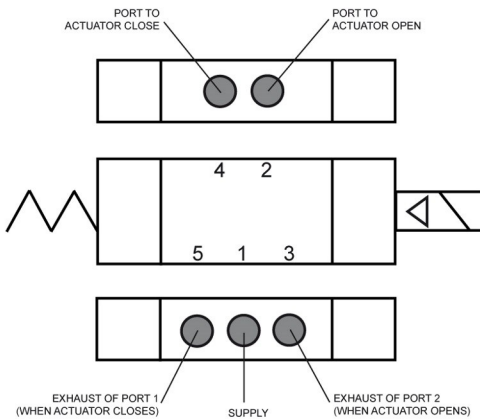
Step 5: The open switch can now be set anywhere between 90° & 180°.

Pneumatic Hookup Procedures

Prior to connecting the supply air to the spool valve, flush the system to remove any debris or contaminants. Galvanized pipe can easily flake and contaminate the system and therefore is not recommended. A 40 micron point of use filter at every device is recommended.

4-Way Spool Valves

The TopWorx™ spool valve is a 5 port, 4-way valve driven by an internally mounted pilot valve. The spool valve supply port and work ports are marked as follows:



STOP Never Plug, Block, or Restrict Port 5

Highly Recommended

TopWorx™ highly recommends Loctite 567 brand thread sealant. Do not use a hard setting pipe compound. If Teflon thread seal tape is used, start the wrap on the second thread from the leading thread of the fitting. This will prevent tape shreds from contaminating the spool valve seals.

Breathers (AL-M30 1/8" NPT) should be installed in the exhaust ports to keep debris from falling into the spool valve and damaging the seals. This must be addressed prior to installation, or storage.



A flow control may be used in Port 3, but should NEVER BE USED in Port 5. Any blockage or restriction may cause an internal pressure build-up inside the enclosure and pose a safety issue.

Spool Valve Specifications	
Medium	Dried, filtered air (40 micron)
Operating Pressure	30psi (2.76Bar) - 100psi (6.89Bar)
Flow Coefficient	1.0Cv
Environmental Rating	Type 4, 4X, IP67 (metal enclosures only)
Port Size	1/4" NPT or BSP for 1.0Cv valve, exhaust ports are 1/8" NPT or BSP
Ambient Temper Range	Refer to product nameplate marking
Valve Body	Available in Hardcoat Anodized Aluminum or 316 Stainless Steel
Valve Seals	Silicone/EPDM

Special Conditions of Safe Use (All installations)

Clean only with a damp cloth to prevent possibility of electrostatic discharge. For Explosion Proof installations, the internal ground connection shall be used and the external ground connection, if supplied in addition, is supplemental bonding allowed where local authorities permit, or is required. Refer to the TV-Series Master IOM for Proof Testing instructions.

When installing with a third party listed nipple-mount solenoid, it is the responsibility of the installer to provide fittings, and apparatus, suitable for the area classification in accordance with the National Electrical Code. All cable entry devices or conduit stopping boxes shall be certified in type of explosion protection, suitable for the conditions of use, and correctly installed. The IIC enclosures are excluded from use in Carbon disulphide atmospheres. The air pressure to the valve block, when fitted, shall not exceed 7 bar.

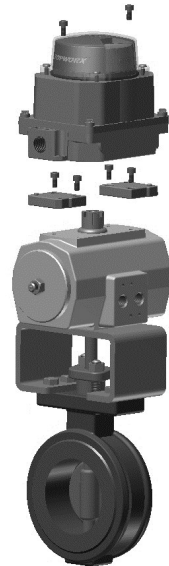
Preventative Maintenance

TopWorx™ switch boxes are designed to operate for one million cycles without servicing. Call TopWorx™ when you are approaching this milestone for a preventative maintenance kit and instructions.

EC Declaration of Conformity

The products described herein, conform to the provisions of the following European Community Directives, including the latest amendments:
 Low Voltage Directive (2006/95/EC)
 EMC Directive (2004/108/EC)
 Machinery Directive (2006/42/EC)
 ATEX Directive (94/9/EC).

Typical Mounting Assembly



About Emerson-TopWorx

Emerson Process Management, is the global leader in valve control and position sensing for the process industries. Our solutions enable management and controlling of operations more intelligently and efficiently under the most demanding and extreme conditions.

TopWorx™ discrete valve controllers enable automated on/off valves to communicate via FOUNDATION Fieldbus, Profibus, DeviceNet, AS-Interface, and HART protocols. They attach to all rotary and linear valves and actuators and carry a variety of global certifications.

GO™ Switch proximity sensors and limit switches provide the ultimate position sensing reliability and durability in extremely hot, wet, cold, dirty, abusive, corrosive, and explosive environments.

For more information please visit www.topworx.com. Or contact us at: info.topworx@emerson.com

Global Locations

Americas
 3300 Fern Valley Road
 Louisville, Kentucky
 40213 USA
 +1 502 969 8000

Europe, Middle East, Africa
 Horsfield Way
 Bredbury Industrial Estate
 Stockport SK6 2SU
 United Kingdom
 +44 0 161 406 5155

Asia-Pacific
 1 Pandan Crescent
 Singapore 128461
 +65 6891 7550



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