Easytork Solenoid Valve IOM

General

This installation document is to be read in conjunction with the Easytork Vane Actuator IOM.

Description

The Easytork Solenoid Valve ("ESV") series is intended for the control of Easytork Vane Actuator ("EVA") with compressed air. The equipment can be mounted on the destined actuator with the enclosed material.

Intended Use

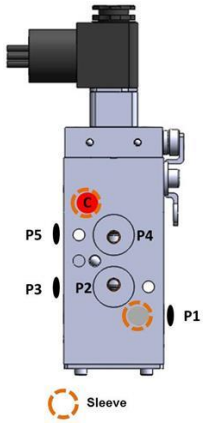
ESV series may be used in explosive atmospheres, if labeled accordingly. Therefore, it is necessary to use suitable magnet coils described in this manual.

Coil	Connection	Category	Width (mm)
Standard	DIN 43650 industrial form B connection or 1/2" conduit with 18" leads	NEMA 4X	22
Explosion Proof	1/2" conduit with 24" leads	NEMA 4, 4X, 7C, 7D, 9 CSA & FM Approved CL. I; Zone1 Ex m II T4; AEx m II CL. I; Div.1; GR. A, B, C, D CL. II; GR. E, F, G CL. III T4 Ta=-20°C to +60°C	36
ATEX EX	3m cable & strain relief	Ex m II T5 PTB 03 ATEX 2018 X Ex II 2 G EEx m II T5 Ex II 2 D IP65 T95°C	22
Intrinsically-Safe	EN175301-803-A/ISO4400	Exia CL. I; GR. A, B, C, D CL. II; GR. E, F, G CL. III; Div. 1;T5	30
Low Temperature	DIN 43650 industrial form B connection or 1/2" conduit with 18" leads	NEMA 4X	22
Low Power (1.1W)	DIN 43650 industrial form B connection or 1/2" conduit with 18" leads	NEMA 4X	22
Low Power (0.7W)	EN175301-803-A/ISO4400	NEMA 4X	30

Note: This manual is to be used along with the manual of the magnet coil manufacturer. This manual refers only to the mechanical part. Magnet coil manufacturer manual refers to the electrical part of the equipment.

Easytork warrants and represents only the ESV body, and not the magnet coil. Consult with magnet coil manufacturer for additional information.

Applications



ESV is meant for adaptation to the EVA. The ESV is a 5 port, four-way, two-position (5/2) valve. There are two pressure ports 2 & 4 (**P2** & **P4**), two exhaust ports 3 & 5 (**P3** & **P5**) and a common air supply port 1 (**P1**). There is one open hole (**C**) for interface with air reservoir. The provided sleeve should fit in the actuator's nest hole, as identified in the illustration.

Caution: Do not close unused ports. The solenoid valve will not be able to operate properly.

Air Supply

All ESV has a minimum operating pressure of 30 psi (2 bar); maximum operating pressure of 150 psi (10 bar), except for Intrinsically-Safe and Low Power Series with a minimum operating pressure of 30 psi (2 bar); maximum operating pressure of 120 psi (8 bar).

Operate the ESV only with clean and lubricated or non-lubricated compressed air with a quality level 5 according to ISO 8573-1. Non inert gases cannot be used. In case of lubricated compressed air, users need to dissipate the exhaust air with suitable measures. The intake may not happen from explosive atmospheres.

In the fail-safe mode, environment air never enters ESV through vacuum associated with spring-return actuators.

ESV Temperatures Limitations

The standard temperature limits for the ESV are -20°C (-4°F) to +80°C (+176°F).

Always consult with a representative of EVA for suitability and recommended practice.

It is essential to use an air dryer for the air supply to avoid any moisture for use in sub-zero Celsius temperatures.

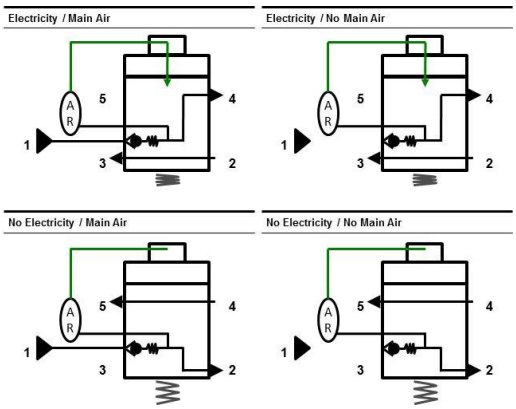
Coil Temperatures

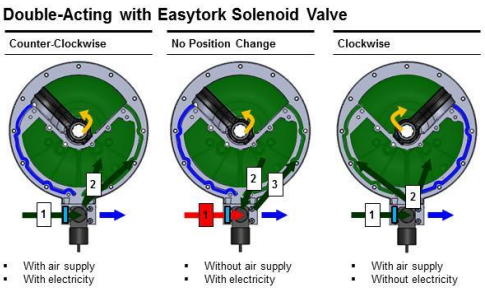
ESVs are supplied with coils designed for continuous duty service. When the solenoid is idle for a long period, the solenoid coil becomes hot and can be touched with the hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by smoke and odor.

Operation

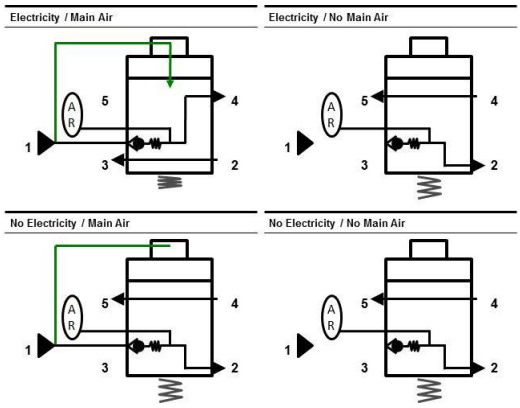
The ESV is able to set the EVA as either fail-safe (fail-open or fail-close), or double acting mode. ESV can also run manual override in the event of electrical AND/OR air supply outage.

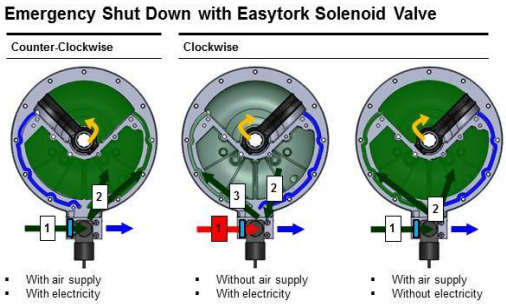
Double Acting





Fail-safe





Manual Override

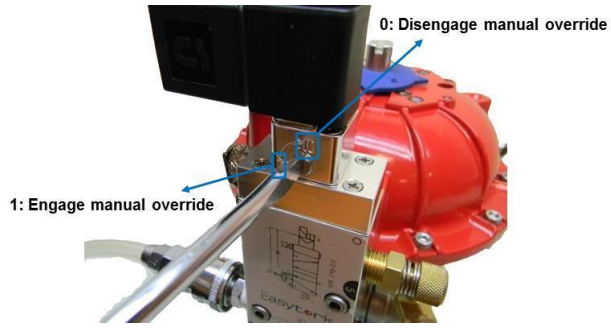
In conjunction with the EVA, the ESV manual override provides desired movement during an electrical AND/OR air supply outage.

First set ESV into double acting mode.

Rotate manual override counter-clockwise to “I”. Valve will now be in the same position as when the solenoid is energized. To disengage manual override, rotate manual override clockwise to “0”. Valve will be in the same position as when the solenoid valve is de-energized.

Caution: Always disengage manual override “position 0” during normal course of operation.

Caution: Switch ESV back to intended function (double acting or fail-safe) after engaging manual override.



Installation

Basic

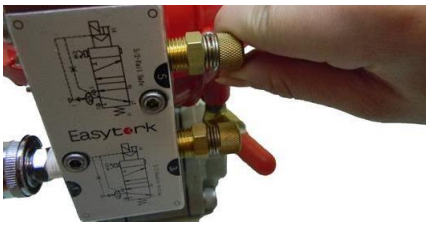
Check coil label for correct voltage and frequency. Never apply incompatible fluids or exceed pressure rating of the valve.

Installation and maintenance to be performed by qualified personnel.

Caution: To prevent the possibility of electrical shock from the accessibility of live parts, connections to all open frame solenoid coils must be through the supplied DIN style connector with sealing gasket installed.

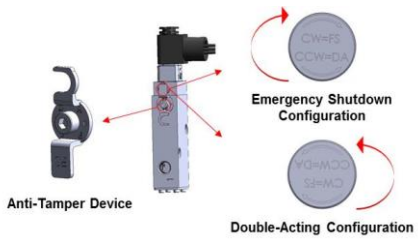
Flow Reducer

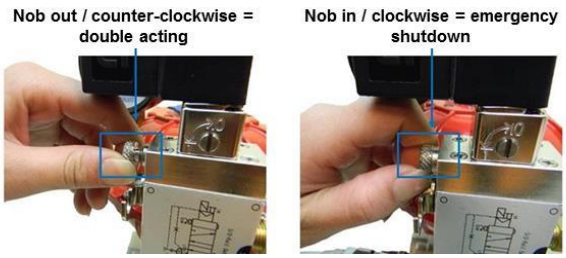
Any usage of Easytork actuator without speed control could void warranty.

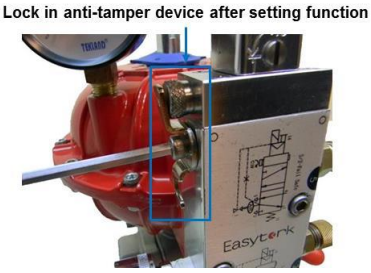


Double Acting or Fail-Safe

The ESV is able to set the EVA as either fail-safe (open or close), or double acting mode. To switch the actuator configuration from fail-safe to double-acting or vice-versa, a user only has to rotate a switch on the ESV.





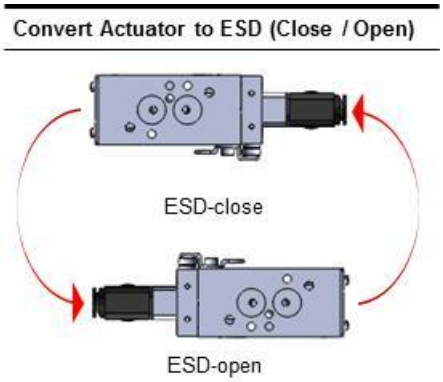


Caution: Ensure that the anti-tamper device is locked after double-acting or fail-safe switch is set in place. The standard anti-tamper device will discourage accidental tampering of actuator function. For other anti-tamper setups, consult with Easytork.

Note: Under no circumstances will Easytork accept responsibility or be liable for installation negligence or intentional tampering of the ESV.

Fail-Safe in Open or Close

To convert from fail-safe open to close, or vice-versa, reattach the EPV to the EVA by rotating the ESV 180º. Ensure ESV set as fail-safe configuration. Switch orientation of grub screw to ensure non-interference with installation.

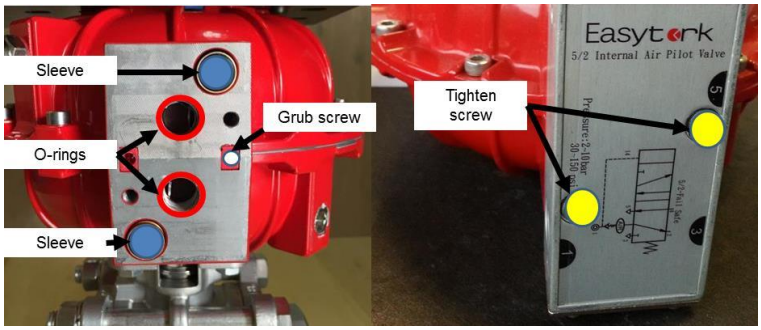


Mounting to EVA

The ESV may be mounted in any position.

1. Install grub screw onto EVA using a 2 mm hex key wrench. This ensures the correct orientation of the solenoid if removed in future.
2. Verify O-rings are over port 2 and port 4 to interface with the NAMUR pad on the actuator. Also verify O-rings are on both sides of the sleeve.
3. Position the solenoid valve to the actuator. Then install two socket head cap screws in offset center holes on either side. Hand screw a few turns into the actuator. Then tighten the screws evenly, using a 5 mm hex key wrench.

Note: Do not over-tighten mounting screws. This may damage the threading of the EVA.



Electrical Connections

Electrical connections are only to be made by trained personnel and have to be in accordance with local regulations and standards.

Caution: Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting to work.

Depending on the electrical component's voltage, unit must be provided with an earth connection and satisfy local regulation and standards.

The equipment can have one the following electrical terminals:

- Spade plug connections according to ISD-4400 or 3x DIN-46244 (when correctly installed this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland.
- Spade terminals (AMP type).
- Flying leads or cables.

Testing Coil

First carry out an electrical test before pressurizing the system. Energize the coil a few times and pay notice to a metal click which signifies the solenoid operation.

Piping

Connect piping or tubing to valve according to markings on valve body. Refer to flow diagrams in the "operation" section. Apply pipe compound sparingly to male pipe threads only. If applied to female valve threads, the compound may enter the valve and may cause operational difficulty. Easytork recommends the use of flexible pneumatic tube and push-type fittings rather than hard pipe. This avoids pipe strain on the valve and provides easier and faster installation and removal. When tightening the fittings, do not use pilot assembly and coil as lever. Locate wrenches applied to valve body or fittings as close as possible to connecting point.

Caution: To avoid damage to the valve body, do not over-tighten pipe connections. If Teflon tape, paste, spray or similar lubricant is used, use extra care when tightening due to reduced friction.

When Teflon tape, paste, spray or similar lubricant is used, make sure debris does not enter into solenoid valve body as it may damage solenoid valve.

Note: To protect the solenoid valve, install a strainer or filter, suitable for the service involved, on the inlet side as close to the valve as possible. Clean periodically depending on service conditions.

Maintenance

Provisions should be made for performing seal leakage, external leakage, and operational tests on the valve.

Caution: To prevent the possibility of a serious injury or property damage, turn off electrical power, depressurize valve, and discard vent fluid in safe area before inspecting or servicing the valve.

Preventive Maintenance

Prepare and follow a routine inspection schedule based on the media, environment and frequency of use.

The medium flowing through the ESV should be free from dirt and foreign material. Clean the valve strainer or filter as required to keep the valve free of contamination. In extreme cases, contamination will cause faulty valve operation and the valve may fail to shift.

While in service, the valve should be operated at least once a month to ensure proper operation.

Note: Easytork's warranty and liability of the ESV are voided if improper protection results in dirt inside the ESV.

Disassembly

1. Ensure that the solenoid valve is separated from the supply voltage and supply air.
2. Disconnect all leads from the solenoid valve.
3. Release the two hexagon socket screws and remove the solenoid valve from the actuator.

Causes of Improper Operation

Incorrect pressure: Pressure must be within the range described in this manual.

- Faulty control circuits: Check the electrical system by energizing the solenoid. A metallic click signifies that the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown fuses, open circuited or grounded coil, broken lead wires or splice connections.
- Burned-out coil: Check for open circuited coil. Replace coil as necessary. Check supply voltage; it must be the same as printed on the coil.
- Low voltage: Check voltage across the coil terminals. Voltage must be at least 85% of specified rating.

Coil Replacement

1. Verify that the power is off.
2. Disconnect grounding and supply wires from coil.
3. Remove coil nut and slip coil off the armature assembly tube.
4. Install new coil and replace nut.
5. Make electrical hookup to coil.

Service Notice

Except for coil replacement, all ESV series valves are not repairable. When any performance problems are detected during routine inspection, replace valve immediately.

High Performance Butterfly Valve

When the ESV is in the fail-safe mode, the ESV can only be used to fail-safe to close position a high performance butterfly valve when the high performance butterfly valve seat retainer is downstream. The ESV can only be used to fail-safe to open position a high performance butterfly valve when the high performance butterfly valve seat retainer is upstream. All other setup cannot be used and will void Easytork's warranty.

TWO YEAR OR TWO MILLION CYCLE WARRANTY

Note: Easytork's warranty and liability of the ESV are voided if there are damages caused by negligence, misuse, improper application, service or operation or lack of service of product.

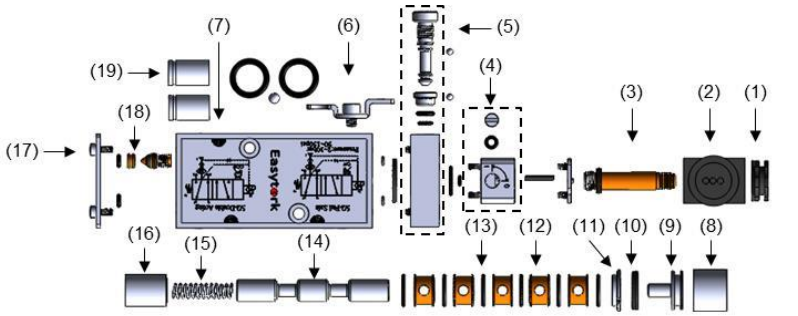
EASYTORK offers a limited repair or replacement warranty on all EASYTORK Vane Actuator (EVA) Series, Easytork Solenoid Valve (ESV) Series, and Easytork Air Pilot Valve (EPV) Series (the "Products"). Simply stated, if any of Goods fails within two years or two million cycles, whichever comes first, of delivery by Distributor, despite being properly installed, operated in accordance with industry standard operating procedures, and properly serviced and maintained, EASYTORK will repair the product, or at our option replace the unit with another of equivalent material and design in exchange for the defective unit. This warranty only applies to failures due to defective materials, workmanship, or premature wear in the Goods.

Under no circumstances will EASYTORK accept responsibility or be liable for any costs other than to repair or provide a replacement of the defective Goods. EASYTORK shall not have any liability to any customer for the loss of product, loss of profit, loss of use, or any other indirect, incidental, special or consequential damages as a result of this express limited warranty.

Actuator is designed to continuously operate within 15% of specified air pressure in either DA or FS design.

EASYTORK DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER IMPLIED WARRANTY IN CONNECTION WITH THE CUSTOMER'S PURCHASE OF ANY PRODUCT UNDER THIS AGREEMENT.

Parts List



Ref No	Description	Standard Version	Chemical Version	Quantity
1	Coil retention nut	Polyamide 6.6	Polyamide 6.6	1
2	Solenoid body	Polyamide 6.6	Polyamide 6.6	1
3	Solenoid stem	Brass	Stainless steel (SS303)	1 set
4	Pilot / manual override	Composite	Stainless steel (SS304)	1 set
5	DA / FS switch system	Aluminum	Stainless steel (SS304)	1 set
6	Anti-tamper system	Nickel-plated steel	PTFE coated steel	1 set
7	Valve body*	Aluminum	PTFE coated aluminum	1
8	Piston sleeve*	Aluminum	Aluminum	1
9	Piston	Aluminum	Aluminum	1
10	Piston seal*	NBR (1) / silicone (2)	NBR (1) / silicone (2)	1
11	Retainer	Aluminum	Aluminum	1
12	Spacer	Brass	Brass	5
13	Lip seal*	NBR (1) / silicone (2)	NBR (1) / silicone (2)	6
14	Spool*	Aluminum	Aluminum	1
15	Spring	Stainless steel (SS304)	Stainless steel (SS304)	1
16	Sleeve	Aluminum	Aluminum	1
17	All bolting	Stainless steel (SS304)	Stainless steel (SS304)	1 lot
18	Internal check valve	Brass w/ stainless steel spring	Brass w/ stainless steel spring	1
19	Air reservoir sleeve	Composite w/ silicone O-rings	Composite w/ silicone O-rings	1 lot

Note (*): Items marked with an asterisk require thin film of lubricant.
Note (1): Standard temperature. Paired with all coil types besides low temperature coil.
Note (2): Low temperature. Paired with only low temperature coil.