Easytork Control Actuator (F-Series) IOM

General

Always refer to the most up-to-date IOM on www.easytork.com

Storage

The Easytork Control Actuator (“ECA”) is a high-quality product and as such must be handled, transported and stored with care. Prior to storage, inspect the actuator for shipping damage. Keep the actuators in their original packing boxes during storage. It is recommended to keep the actuators in a clean and dry environment until ready for use. Store the actuators indoors to protect them from humidity and dust.

Operating Conditions

Lubricants

The actuator’s vane seal comes lubricated with grease from the factory and does not require re-lubrication under normal operating conditions.

Air Supply

Instrument Air:
Clean instrument air is to be used. The operating medium is to be filtered to 30 micron particle size or less. Always consult with a representative of ECA for suitability and recommended practice.

Other Media:
Non inert gases cannot be used and will void Easytork’s warranty. Pure oxygen, hydrogen, combustible natural gas must not be used.

Corrosive gas cannot be used.

Piping connected to the actuator or accessories should be fitted according to recommended instrumentation piping practice. Prior to connection, make sure that all lines have no loops and are free of water, oil, or other contaminants that may be trapped in the pipes. Pipes must be flushed with air to clean the passages. Where sealants have been used for threaded connections, care must be taken to avoid excess material from being forced into the actuator ports.

Supply Pressure

The supply pressures for the ECA are as follows:

2-10 bar (30-150 psi).

When sizing an actuator to available air supply, make sure you have adequate power in the actuator to allow the valve to complete its operation and leave enough power for safety margin.

Temperature

The standard ECA has a temperature limits of -40°C (-40°F) to +120°C (+248°F). For temperatures below or above the standard temperature limits please consult with Easytork.

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

Humidity and Corrosion

When assembled with the NAMUR Trip Valve (“NTV”), the ECA operates on double acting principle in both double acting or fail-safe functions, therefore the ECA will never create a vacuum effect and pull air from the environment into the actuator.

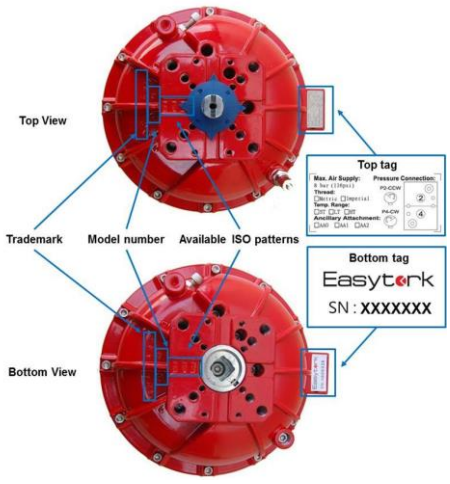
Speed Regulator

Slower operation of actuator is possible, without significant torque output reduction, by external fitting of flow regulator valves.

High Vibration Area

Apply Loctite on the shaft connect bolt prior to final assembly.

Identification and Marking

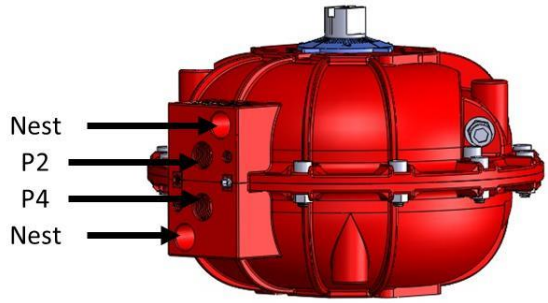


Principle of Operation

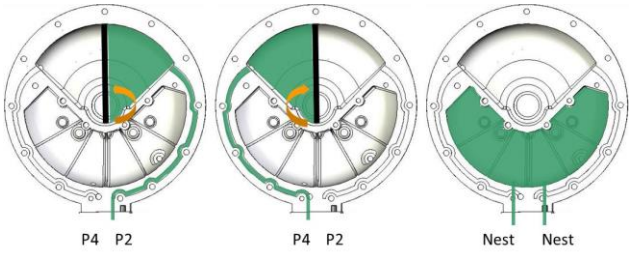
The Easytork Control Actuator is a pneumatic quarter-turn vane actuator. Air pressure applied to the vane surface area generates pure rotary torque.

Air Connection

The actuator air pressure connections are marked **2** and **4**. Port 2 and 4 are NAMUR standard. There are two nest holes marked **Nest** for interface with the air reservoir.



Port 2 and port 4 pass to the vane chamber, the nest holes are connected to the air reservoir chamber. Pressure entering port 4 rotates vane clock wise, pressure entering port 2 rotates vane counter-clockwise.



Two direct airline to ECA (double-acting)
Users can directly pipe two airline to actuator, respectively P2 and P4. However, the two Nest holes should be plugged with a M6 allen head to prevent foreign environment getting into the actuator.

Air Reservoir

ECA utilizes an internal air reservoir to assure fail-safe. When there is air failure, the pressurized air stored in the air reservoir is released and diluted with the vane chamber.

Double-Acting or Fail-Safe Setup

The NAMUR Trip Valve ("NTV") directly utilize the air reservoir for fail-safe. Refer to NTV IOM for additional information. Otherwise, not installing the NTV allows for double-acting setup.

Installation

Consult with valve manufacturer for details on the valve. This document will only cover the ECA and installation of the ECA.

ECA Selection

The suggested safety factor for the double acting and fail-safe version in normal working conditions is 15-20%. Actuator is designed to continuously operate no less than 15% of specified air pressure.

End Loading

There must be no end load on actuator drive shaft. Check clearance between actuator and driven unit drive shaft. When the mounting is tightened down, check there is end play to avoid end load on actuator shaft.

High Performance Butterfly Valve

The ECA can only be used to fail-safe close position a high performance butterfly valve when the high performance butterfly valve seat retainer is downstream. The ECA can only be used to fail-safe 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.

Adapting ECA for Valve

Actuator Rotation

The actuator movement is governed by which port air is applied to. ECA can come with or without an NTV installed for fail-safe or double-acting setup respectively. Refer to table below for actuator movement. Refer to NTV IOM as required.

ECA without NTV / Double-Acting Setup		
NTV Mounting Style	Air to ECA Port 2	Air to ECA Port 4
No Install	CCW	CW

ECA + NTV / Fail-Safe Setup (Under Normal Operating Circumstances)		
NTV Mounting Style	Air to NTV Port 3	Air to NTV Port 4
Fail-CW	CCW	CW
Fail-CCW	CW	CCW

Valve MAST & Max Allowed Air Supply to Actuator

All valves have a maximum allowable torque (MAST). Ensure that the actuator is not providing more torque than the valve MAST, otherwise the actuator will irreversibly damage the valve. Use the following link or scan the QR code for proper actuator sizing to avoid exceeding valve MAST:

https://www.easytork.com/downloads/ECA%20F%20selection%20and%20ordering%20made%20easy.pdf

Use a filter regulator to limit the max air supply to the actuator.

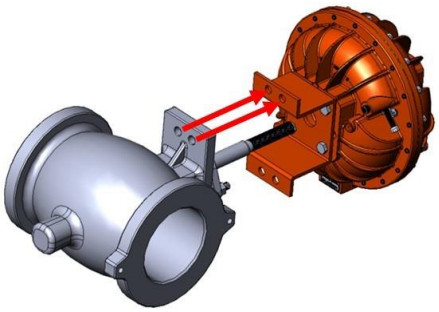
It is recommended to use a metal tag to document the preset air pressure for any given actuator-valve combination.

Note: Easytork's warranty and liability are voided if the ECA exceeds the valve MAST.

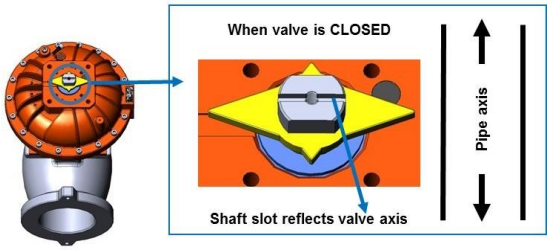
In either **double-acting** or **fail-safe** setup, the maximum allowed air pressure to the actuator is based on the actuator's double-acting torque. For example, a 5/8" shaft usually has a maximum allowed torque of 1,225 in-lb, an ECA-07 produces double-acting torque of 1,178 in-lb at 70 psi, which is under 1,225 in-lb – this satisfies the valve threshold. Supplying higher air pressure can result in the damage of the valve spline.

Installation and Alignment to Valve

Before assembling actuator to the valve, disconnect air supply line and all electric power to actuator. With the bracket (or yoke) installed on the actuator, bring the valve and the actuator together. The relative bolt circle position on the bracket (or yoke) and the valve will help align the assembly.

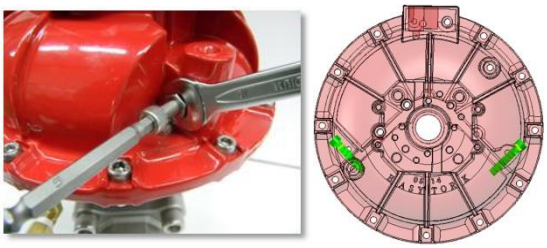


When installing the actuator to the valve, the shaft slot on the actuator must indicate the valve axis at the time of assembly.



Travel Adjustment

The actuator is factory adjusted to produce 90° rotation. Each stopper bolt allows +/- 5° in travel limits. Other intermediate positions can be achieved with a long set of stopper bolts and are available on request.

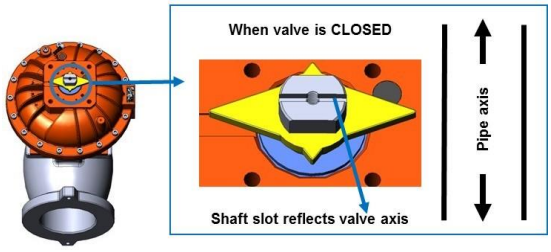


The rotation of the control valve package is to be stopped by the actuator's stopper bolt, and not on the stops on the valve. Failure of using the actuator's travel stop may 1. Possibly compromise the valve if *"Valve MAST & Max Allowed Air Supply to Actuator"* is not adhered to 2. Possibly result in damage to the actuator and will void Easytork's warranty and liability.

Mounting Style

The ECA can be mounted relative to the pipeline and valve with the following actions.

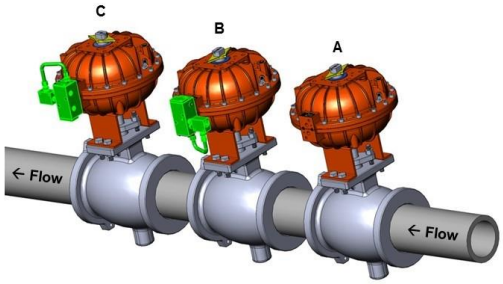
Caution: Regardless of actuator action, style or positions, shaft slot must indicate valve axis. For example, when shaft slot is perpendicular to the pipe axis, the valve is closed.

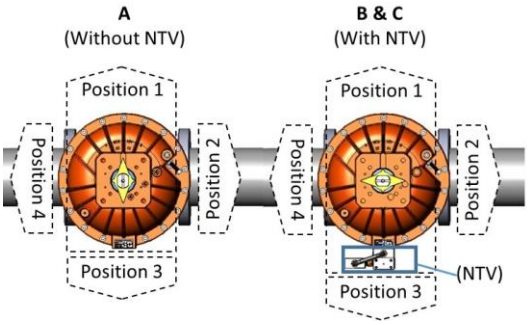


NTV governs the fail-safe action of the actuator, refer to NTV IOM for specifics on NTV mounting style. Not installing the NTV allows for double-acting setup. The mounting style of the NTV governs the fail-safe action of the actuator.

Mount Style To Pipe

Style	Action	NTV Mounting Style	Positions Available
A	Double-Acting	No Install	1, 2, 3, 4
B	Fail-CW	Fail-CW	1, 2, 3, 4
C	Fail-CCW	Fail-CCW	1, 2, 3, 4





Maintenance

Maintenance is limited to replacement of seals when wear affects actuator performance. Seal life will vary according to application, conditions of cycle frequency, temperature, condition of air supply, etc.

Disassembly

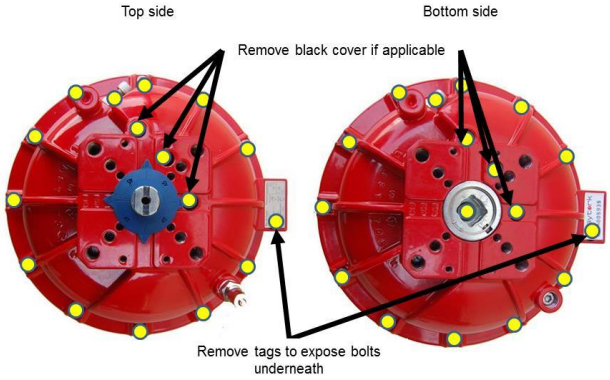
General

Note: Easytork's warranty and liability of the ECA are voided with the disassembly of the product.

Before performing any disassembly operation, make sure you read all the warnings and safety instructions in this booklet.

Do not attempt to disassemble the actuator while it is still connected to the valve or to any ancillary. Verify that the actuator is not pressurized. Work in a clean area, free of dust, debris, grease, corrosives and moisture. For security and comfort, do the repairs on a table with a vice.

1. Remove all bolts.



2. Remove upper shaft, lower shaft and position indicator.
3. After step 1 and 2 are complete, supply an airline directly to port 2 or port 4 of the actuator to blow apart the two actuator halves.

Caution: Start from low pressure and gradually build pressure. A high pressure would blow apart the actuator halves at higher velocity. Cover actuator when applying air pressure to prevent accidental collateral damage. A loud pop is normal. Ensure no part of your body is near the actuator, and do not hover on top of the actuator.

4. Remove the vane.
5. Clean both case halves, removing sealant.

Assembly

General

Before performing assembly, clean the grease in all the actuator parts. The surface should be smooth and without any damage, debris, rust or other containments. This may affect the glue, causing air pressure leakage.

1. Evenly coat machined surface with the provided sealant in the replacement kit package.

   Caution: Excess sealant, if extruded inside, will impair operation of seals. Remove all excess sealant especially from inside edge.

(Coat entire surface with sealant)

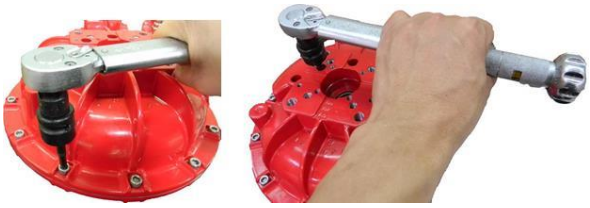
2. Insert two plastic locator inserts. Coat new vane and housing with grease supplied by Easytork. Insert vane into vane compartment.

Insert two plastic locator inserts

Coat vane and vane housing with grease

3. Combine and compress two compartments guided by the two location pins.
4. Use tightening torque table to fasten all the connecting bolts.

Bolt	NM	Ft/Lb
M5	5 – 6	3.7 – 4.4
M6	10 – 11	7.4 – 8.1
M8	23 – 25	17.0 – 18.4
M10	48 – 52	35.4 – 38.4
M12	82 – 86	60.5 – 63.4
M16	200 – 210	147.5 – 154.9
M20	390 – 410	287.6 – 302.4



5. Rotate vane manually to check movement and wipe away extruded sealant.
6. Allow sealant to set for at least 24 hours before applying test air pressure.

Actuator Testing

After completing actuator assembly, it is mandatory to follow the testing procedures listed below to ensure that the actuator has been correctly assembled.

Vane Leak Test

Any leakage across the vane is not acceptable.

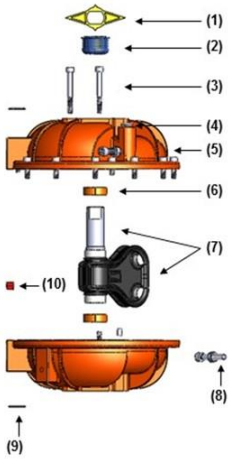
1. Apply the pressure to port 2 and leave port 4 open.
2. Apply a leak-testing soap solution to port 4 and check for leakage.
3. Repeat this by applying pressure to port 4 and check port 2 for leakage.
4. If leakage is observed, disassemble the actuator again and check the seals, surface finish and cleanliness of the internal parts to find the cause of leakage. After doing the repair work, the leakage test must be performed again.

External Leak Test

Install the ESV to ECA and apply the pressure to port 1, in both open and close positions. Spray leak-testing soap solution on the housing joint (or rinse in the water) to check for bubbles to ensure that no external leakage occurred.

If there is no internal and external leakage, proceed to the rest of the assembly for upper and lower shafts and position indicator.

Parts List



Ref No	Description	Standard Version	Chemical Version	Quantity
1	Yellow position & degree indicator	NBR	NBR	1
2	Blue graduated ring	NBR	NBR	1
3	Connecting bolt & nut	Stainless steel	Stainless steel	1 lot
4	Plug	Nickel-plated steel	Stainless steel	1
5	Housing	Aluminum A383 / epoxy external & internal finish	Aluminum A383 / Xylan external finish	2
6	Vane / shaft bearing	PTFE lined steel baked bronze bushing	PTFE lined steel baked bronze bushing	2
7	Vane / shaft assembly*	Stainless Steel or NPS bonded with modified CR	Stainless Steel or NPS bonded with modified CR	1
8	Stopper bolt and nut set	Stainless steel	Stainless steel	2
9	Tag plate*	Stainless steel	Stainless steel	1
10	Locator insert*	Plastic	Plastic	2

* Items marked with an asterisk are included in repair kit.

TWO YEAR OR TWO MILLION CYCLE WARRANTY

Note: Easytork's warranty and liability of the EVA 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 Control Actuator (ECA) Series, Easytork Solenoid Valve (ESV) Series, and Easytork Air Pilot Valve (EPV) Series, Namur Trip Valve (NTV) Series. 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.