Tork'MAX
Pneumatic Actuator

High Performance Compact Pneumatic Actuators

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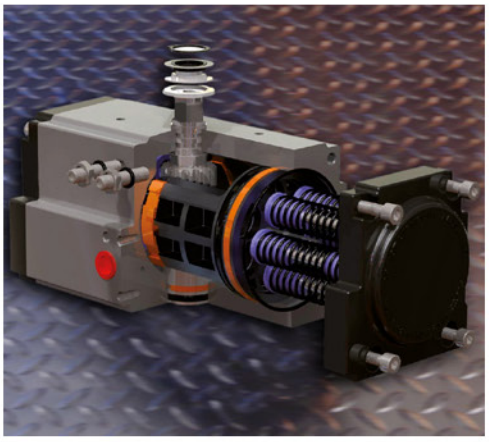


Why Tork'MAX Pneumatic Actuator

The Tork'MAX Pneumatic Actuator pneumatic rack & pinion actuator is manufactured using the latest materials and methods to provide dependable and smooth operation in demanding process control conditions.

This feature-rich design uses a minimum number of seals, low friction technologies, maximum gear face engagement and corrosion resistant components for trouble-free, high performance valve automation.

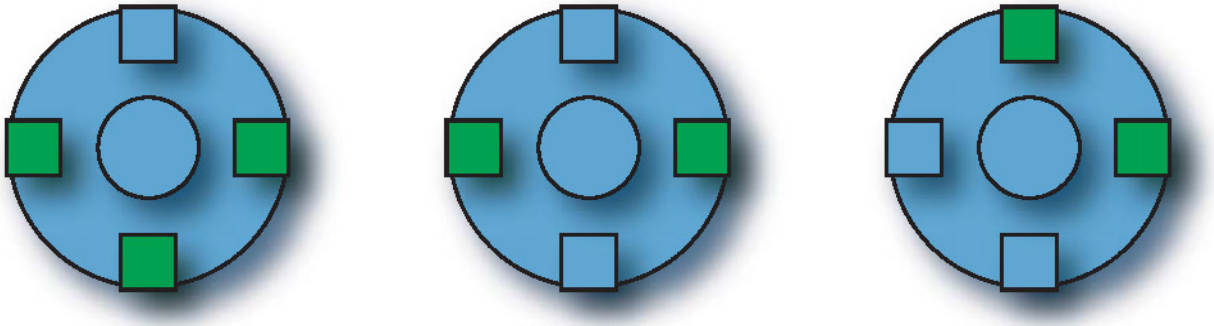
Applications and Solutions

Dependable valve control is a critical function in today's demanding process schemes. The Tork'MAX Pneumatic Actuator is designed for universal operation of all quarter-turn (ball, plug, butterfly) valves and comes with a full array of control options for On/Off and modulating service.

The compact, high performance design is ideal for high-density installations and can be supplied with extended rotation (180°), nickel-infused corrosion protection and all of the common control accessories and "bus" devices.

Versa-View Indicator

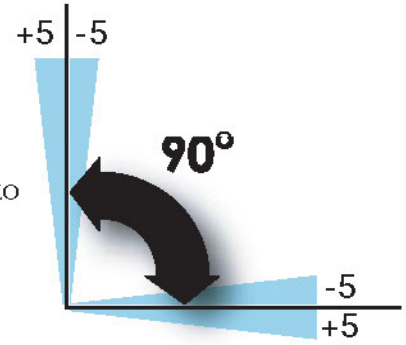
Tork'MAX Pneumatic Actuator actuators are supplied with our exclusive ***Versa-View*** high visibility position indicator. This versatile device may be setup to indicate for simple two-way on/off valves or for multi-ported valves in "T" or "L" port configurations. The ***Versa-View*** is also designed to remain on the actuator for continuous indication even when a limit switch is being used.



"T" On/Off "L"

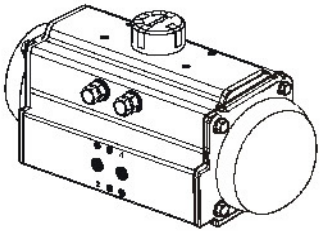
Bi-Directional Stroke Adjustment

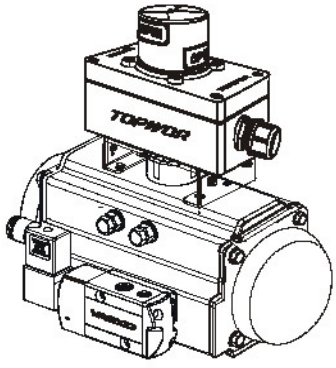
Tork'MAX Pneumatic Actuator actuators feature bi-directional pinion travel stops. Located on the side of the actuator, these stops allow for true +/-5° for valve travel adjustment to ensure precise positioning in all flow control services. The Tork'MAX Pneumatic Actuator travel stops are designed to absorb the maximum rated torque of the actuator and the maximum impact loads associated with the recommended stroke speed.



NiEX Nickel Infused Actuators

The Tork'MAX Pneumatic Actuator NiEX is a unique nickel infused actuator that employs an autocatalytic nickel infusion process to deliver a uniquely effective corrosion resistant actuator for use in aggressive environments, under high humidity and in application areas where an attractive, long lasting surface finish is desirable.





Actuators for Extended Rotation

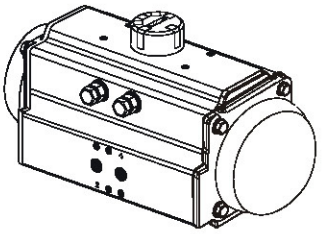
The Tork'MAX Pneumatic Actuator actuator is available in a full range of model sizes for 180° of operation. These actuators have all of the design features of the standard Tork'MAX Pneumatic Actuator with the advantage of extended rotation for multiported valves.

High Performance Pneumatic Actuators

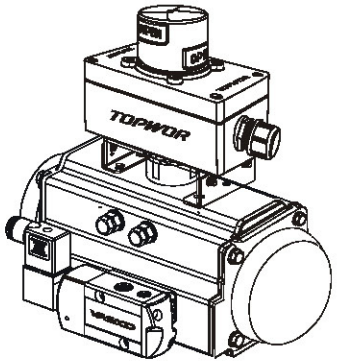
Tork'MAX Pneumatic Actuator Stainless Steel Actuators

Tork'MAX Pneumatic Actuator

The Tork'MAX Pneumatic Actuator Stainless Steel actuator features a cast housing of 300 SS that offers the user excellent corrosion protection. This series of actuators has ISO mounting, NAMUR topworks and all SS construction including the housing, end caps, shaft and fasteners.



Device-ID two wire "bus" protocol



The Device-ID accessory program includes a range of top-mounted devices that are available for AS-I and Device Net protocols for simple two-wire control. HART and Foundation fieldbus devices are also available for specific control schemes and system requirements.

Application Questions for Pneumatic Actuators

The following questions should be asked when determining the correct actuator for an application:

- Air-to-Air (Double Acting) or Air-to-Spring (Spring Return).If Spring Return, Fail-Open or Fail-Closed.
- Supply air pressure available.
- On/Off or Modulating Service.
- Area Rating (NEMAIV or VII) for electrical accessories.
- Special environmental considerations: High or Low Temperature? Corrosive Area?
- If for Modulating Service: Control signal (3-15psig or 4-20mA).
- Is the application for 90^{O} or 180^{O} valve operation.

This specification covers the design of rack and pinion pneumatic actuators used in plant-wide valve automation applications.

1.0 TORKMAX PNEUMATIC RACK AND PINION ACTUATORS

1.1 The pneumatic actuator shall be quarter-turn, opposed piston rack and pinion type of a totally enclosed design with no external moving linkages.
1.2 The actuator shall be capable of 100° rotation and shall include open and closed position stops with minimum 5° total travel adjustment in each direction.
1.3 Trims shall be available for temperature ranges from -40°F to +350°F (-40°C to +177°C).

2.0 CONSTRUCTION

2.1 Actuator body shall be precision extruded aluminum alloy, hard anodized inside and out after finished machining. Optional versions of the actuator shall be with Nickel Infused housing (NiEX) or complete stainless steel construction as indicated in the final specification.
2.2 All metal fasteners shall be 300 series stainless steel.
2.3 The output shaft/pinion shall be one piece stainless steel (see Brochure for model selection), bottom loaded, blowout proof secured by a non-exposed, redundant stainless steel retaining ring for safety.
2.4 End caps shall be cast aluminum, UV and chip resistant polyester powder coated.
2.5 Actuator shall incorporate internal porting to permit use of either NAMUR direct mount or remote controls
2.6 Actuator shall be provided with a mechanical indexable visual position indicator and NAMUR accessory drive.

3.0 DESIGN

3.1 Double-acting and spring-return models shall be field convertible without the use of special tools.
3.2 All spring assemblies shall be of self contained and service safe design.
3.3 All actuators shall be designed and manufactured in accordance with ISO 9001 quality standards to meet NAMUR and ISO/DIN dimensional standards.
3.4 Actuator shall include side located bi-directional pinion travel stops which provide a guaranteed ±5° of valve travel adjustment between 80° and 100° of actuator travel.
3.5 Full tooth engagement, at the pitch line shall be maintained throughout full range of travel.
3.6 Attachment of shaft driven accessories shall not require removal of the visual position indicator.

Pneumatic rack & pinion actuator shall be TORKMAX as manufactured by Flow Controls, Inc.

HTValve Actuator Sizing Guide

Selecting the Correct Actuator (Sizing)

The output torques for each actuator model are listed in the Torque Tables. These values do not include a safety factor. For best results we recommend selecting an actuator model with a minimum output torque that is greater than the highest operating torque of the valve to be automated plus 10%.

Example for Double Acting Actuator Sizing
Published Valve Torque: 300 Lbf-In (plus 10% = 330)
Air Supply: 80psig
TORKMAX Model: TM2033R

Example for Spring Return Actuator Sizing
Published Valve Torque: 300 Lbf-In (10% = 330)
Air Supply: 80psig
TORKMAX Model TM2113S-10

The AB2113S-10 has the following output torque values
Air End: 655 Lbf-In
Spring End: 372 Lbf-In

Sizing Safety Factors

Media and other conditions can effect the operating torque of a valve. Following is a list of common Safety Factors.

MEDIA	SAFETY FACTOR
Oils, Lubricants	0.8
Liquid, clean (particle free)	1.0
Liquid, dirty (slurry), raw water	1.8
Gas, clean and wet (sat. steam)	1.0
Gas, dry (superheated steam)	1.3
Gas, dirty (natural gas)	1.5
Oxygen, Chlorine	1.5

How To Order

Series	Model	Springs	Options
TM R	2023	5	180
	2033	6	for 180 degree
Double Acting	2053	7	operation
	2073	8	
TM S	2113	9	
Spring Return	2163	10	
TM R NI	2253	11	
Double Acting	2403	12	
Nickel Housing	2503	Blank if Double	SS
	2553	Acting	Stainless Steel
TM SNI	2603		
Spring Return	2653		
Nickel Housing	2703		

Part numbers are represented as follows: series-model-springs-options

TORKMAX Flow Controls

INCORPORATED

TorkMAX Pneumatic Actuator

High Performance Valves & Accessories

VASLCO SOLENOID VALVE

MAXEP ACCESSORIES

Full range of control accessories
- Limit Switches
- Positioner
- Pilot Valves
- Mounting Hardware (ISO)
- Speed controls
- Logic and Two-Stage operation

TOPWOR SWITCH-BOXES