

BI-TORQ PN SERIES SPECIFICATIONS



EXTRUDED ALUMINUM RACK AND PINION PNEUMATIC ACTUATORS

PN-SERIES

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ON THE WEB AT WWW.BITORQ.COM/PNEUMATIC-ACTUATORS.HTML

- COMPACT, RELIABLE DESIGN
- OPEN-CLOSED ADJUSTMENT STOPS
- DOUBLE ACTING AND SPRING RETURN
- HIGH-VISIBILITY INDICATOR

STANDARD FEATURES

MAXIMUM PRESSURE RATING

120 PSI/8 BAR

STANDARD TEMPERATURE RATING*

-4° F/-20° C to +180° F/+85° C

MAX/MIN TEMPERATURE RATING**

-40° F/-40° C to +302° F/+150° C

*with standard NBR70 seals

**with Viton or HNBR seals (available upon request)

- 100% FACTORY TESTED
- RACK AND PINION DESIGN FOR CONSISTENT TORQUE OUTPUT
- PRE-LUBRICATED FOR LIFE OF ACTUATOR
- OPTIONAL COATINGS AVAILABLE

MOUNTING OPTIONS

VALVE MOUNTING: ISO 5211 standard base mounting bolt patterns and a double square female output shaft provide multiple options for direct mounting to valve stems and a greater flexibility of actuator rotation. Double D pinions and inserts also are available for additional mounting options.

ACCESSORY MOUNTING: The top mounting pad is drilled and tapped to international NAMUR and ISO standards, providing quick and economical accessory mounting in conjunction with the NAMUR pinion shaft. The standard NAMUR slotted and threaded shaft allows for direct mounting of NAMUR limit switches and valve positioners.

SOLENOID MOUNTING: All BI-TORQ® actuators have an international NAMUR solenoid mounting pattern for direct mounting of a wide range of solenoid models. The NAMUR mount eliminates the need for pipe nipples or solenoid brackets.

DOUBLE ACTING ACTUATORS

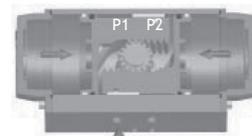
ACTUATOR OVERVIEW

- All listed output torques are expressed in inch pounds of torque (in. lbs.).
- Charts for available air pressure are expressed in pounds per square inch (P.S.I.).
- BI-TORQ® PN-series actuators offer $\pm 5^\circ$ adjustment in the open and closed positions.

DOUBLE ACTING ACTUATOR SIZING (PLEASE SEE DOUBLE ACTING TORQUE CHART)

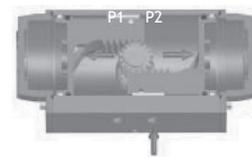
1. Establish the valve manufacturer's breakaway or seating/unseating torque, then add 20% as a safety factor (e.g. 115 in. lbs. valve breakaway torque x 20% = 138 in. lbs.).
2. Determine available air pressure to the actuator (e.g. 60 P.S.I.).
3. Refer to the chart, find the 60 P.S.I. column and scan down until a torque value greater than the valve torque is found (e.g. 141 in. lbs.). Then go to the left to determine the BI-TORQ® model number. In this sample case, the selected actuator would be the PN-52DA. Contact our sales staff for slurry or steam services.

NOTE: The BI-TORQ® double acting actuator has no torque drop through the full 90° stroke.



CLOSED

Air to Port 1 (P1) forces the pistons inwards, causing the pinion to turn clockwise.



OPEN

Air to Port 2 (P2) forces the pistons outwards, causing the pinion to turn counterclockwise.

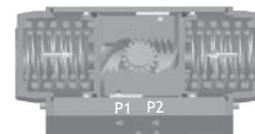
SPRING RETURN ACTUATORS

SPRING RETURN ACTUATOR TERMINOLOGY

1. **AIR STROKE:** When air is supplied to the actuator, the pistons compress the springs. The greater the spring compression, the less torque output the actuator can supply.
2. **SPRING STROKE:** When air is removed from the actuator, the stored energy in the springs forces the pistons inward. At full compression, the spring is at its maximum torque output. This is the **SPRING START**. When springs are uncompressed, this is the **SPRING END**.
3. **FAIL POSITION:** Standard BI-TORQ® actuators are preset for fail closed (CW) operation, but can be adjusted easily for fail open (CCW) rotation.

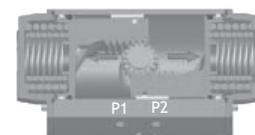
SPRING RETURN ACTUATOR SIZING (PLEASE SEE SPRING RETURN TORQUE CHART)

1. Establish the valve manufacturer's seating torque (closing) and breakaway torque (opening). Add a 20% safety factor (e.g. a valve torque of 80 in. lbs. x 20% = 96 in. lbs.).
2. Refer to the spring torque column and select the **SPRING END TORQUE** that equals or exceeds the required valve torque (i.e. the BI-TORQ® model PN-63 with a 80# spring set, which has an **spring end** of 111 in. lbs. and a **spring start** of 196 in. lbs.).
3. Determine the available air line pressure to the actuator (e.g. 80 P.S.I.). Refer to the 80 P.S.I. column and scan down to where it intersects with the PN-63 with an 80# spring. In this case, the end spring torque is 111 in. lbs., which exceeds the required 96 in. lbs. required. Contact our sales staff for slurry or steam services.



CLOSED

Loss of air pressure on Port 2 causes springs to drive the pistons inward. The pinion turns clockwise to close while air exhausts from Port 2.



OPEN

Air to Port 2 (P2) forces the pistons outwards, causing the springs to compress. The pinion turns counterclockwise.

the **BI-TORQ®**
INSTRUPAK
AUTOMATED BALL VALVES

BI-TORQ® also provides a full line of automated ball valves with double acting and spring return pneumatic actuators pre-sized for normal operating conditions.

For more information, please visit www.bitorq.com.



BI-TORQ PN SERIES PNEUMATIC ACTUATOR FEATURES

PINION

The hardened steel pinion is precision ground and then nickel plated in order to reduce friction, provide maximum wear resistance, and protect against corrosion under severe conditions. An optional stainless steel pinion is available for corrosive environments.

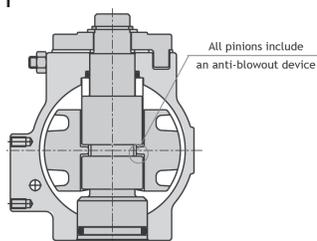
ACTUATOR BODY

The aluminum extrusion is hard anodized to 45-50 microns to protect against wear and corrosion while reducing piston friction to the absolute minimum.

HEAVY DUTY SPRINGS

True-rated spring sets create absolute confidence in all of the fail safe spring return models. The high tensile steel springs are coated with zinc phosphate for corrosion resistance. Springs can be safely and quickly modified into sets ranging from 40 pounds to 80 pounds (through 120 pounds on 201/271 models). Full length end cap bolts allow for easy and safe disassembly.

ANTI-BLOWOUT SYSTEM



INDICATOR

A dome indicator is standard on the PN-52 through PN-125 models. A high visibility open-closed dome indicator is available on all BI-TORQ actuators.

ROTATION ADJUSTMENT

Standard adjustment is $\pm 5^\circ$ in both the open and closed positions through easily accessible external adjustment screws.



END CAPS

Epoxy coated die cast aluminum end caps provide maximum resistance against potentially corrosive elements.

PISTON GUIDES

Large contact areas and self-lubricating, highly-durable materials provide high thrust stability with minimum friction.

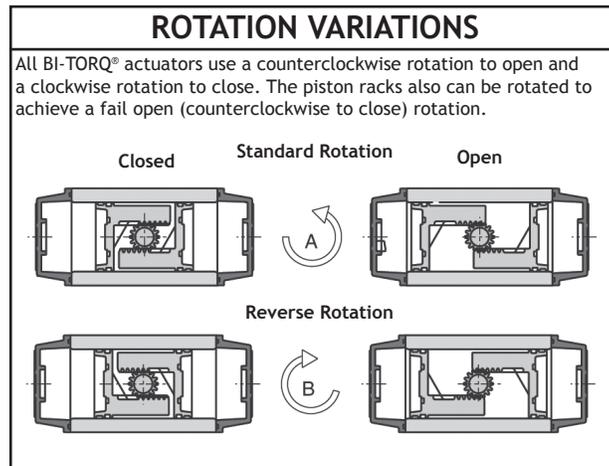
PINION SEALS

NBR-70 rubber pinion seals provide trouble-free operation at standard temperature ranges. Viton® and HNBR seals are available to high or low temperature extremes.

PISTONS

The precisely-balanced die cast aluminum pistons are fitted with high-quality rings and guides, resulting in high ratios of output torque vs. input air pressure. The twin rack and piston design creates a constant torque output on all models.

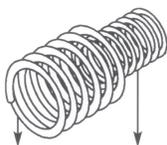
CE APPROVED



OPTION FOR CORROSIVE ENVIRONMENTS

ALL 316 STAINLESS STEEL ACTUATORS ALSO AVAILABLE. PLEASE CONTACT OUR SALES STAFF FOR INFORMATION.

SPRING COMBINATION OPTIONS



PN-52SR TO PN-140SR			
EXTERNAL SPRING	INTERNAL SPRING	AIR SUPPLY	SET #
1	1	40PSI	01
2	X	50PSI	02
1	2	60PSI	03
2	1	70PSI	04
2	2	80PSI	05

PN-161 TO PN-271SR					
SPRINGS PER SIDE	AIR SUPPLY	SET #	SPRINGS PER SIDE	AIR SUPPLY	SET #
2/3	40PSI	01	4/5	80PSI	05
3/3	50PSI	02	5/5	100PSI	06
3/4	60PSI	03	5/6	110PSI	07
4/4	70PSI	04	6/6	120PSI	08



SPRING SET 02/40 PSI (4 SPRINGS TOTAL)



SPRING SET 03/50 PSI (6 SPRINGS TOTAL)



SPRING SET 04/60 PSI (8 SPRINGS TOTAL)



SPRING SET 05/80 PSI (10 SPRINGS TOTAL)



SPRING SET 06/100 PSI (12 SPRINGS TOTAL)