

# BI-TORQ® OPERATION AND SELECTION GUIDE

## DOUBLE ACTING ACTUATORS

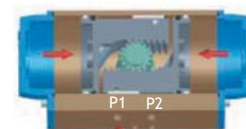
### ACTUATOR OVERVIEW

- 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® actuators offer  $\pm 5^\circ$  adjustment in the open and closed positions on BI-52 through BI-125 models. For all other models, adjustment is in the open position only. The closed position is  $0^\circ$  fixed. Optional retrofit kits are available to allow for adjustment in both open and closed positions on the BI-160, BI-200 and BI-270 models.

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

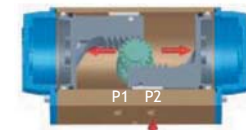
1. Establish the valve manufacturer's breakaway or seating/unseating torque, then add 20% as a safety factor (e.g. 115 in. lbs. valve breakaway torque x 20% = 138 in. lbs.).
2. Determine available air pressure to the actuator (e.g. 60 P.S.I.).
3. Refer to the chart, find the 60 P.S.I. column and scan 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 BI-52DA.

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.

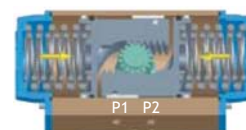
## SPRING RETURN ACTUATORS

### 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.

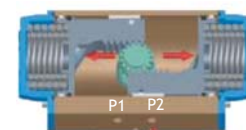
### SPRING RETURN ACTUATOR SIZING (PLEASE SEE SPRING RETURN TORQUE CHART)

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 BI-63 with a 80# spring set, which has a 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 BI-63 with an 80# spring. In this case, the end spring torque is 111 in. lbs., which exceeds the required 96 in. lbs. required.



CLOSED

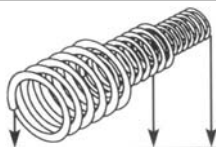
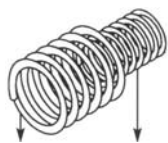
Loss of air pressure on Port 2 causes springs to drive the pistons inward. The pinion turns clockwise to close while air exhausts from Port 2.



OPEN

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

## SPRING SET COMBINATION OPTIONS



BI-52SR TO BI-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

BI-160SR AND BI-200SR				
EXTERNAL SPRING	CENTRAL SPRING	INTERNAL SPRING	AIR SUPPLY	SET #
X	2	X	40PSI	01
2	X	X	50PSI	02
1	2	X	60PSI	03
2	X	2	70PSI	04
2	2	X	80PSI	05
2	2	2	100PSI	06

BI-270SR		
SPRINGS PER SIDE	AIR SUPPLY	SET #
2/3	40PSI	01
3/3	50PSI	02
3/4	60PSI	03
4/4	70PSI	04
4/5	80PSI	05
5/5	100PSI	06
5/6	110PSI	07
6/6	120PSI	08