

PART NUMBER	DESCRIPTION	MATERIAL
1	BODY	EXTRUDED ALUMINUM
2	ANTI-BLOWOUT PINION	NICKEL PLATED STEEL
3	LOWER PINION O-RING*	NBR70 OR VITON
4	PINION SPACER RING	POM
5	STOP ADJUSTMENT	STAINLESS STEEL
6	TOP PINION O-RING	NBR70 OR VITON
7	CAM SPACER RING*	POM
8	PINION WASHER	STAINLESS STEEL
9	PINION SNAP RING	STAINLESS STEEL
10	POSITION INDICATOR	NYLON
11	INDICATOR BOLT	NYLON+SS
12	ANTI-FRICTION RING*	POM
13	PISTON O-RING*	NBR70 OR VITON
14	PISTON THRUST BLOCK	POM
15	PISTON	DIE CAST ALUMINUM
16	END CAP SEALS	NBR70 OR VITON
17	END CAP	DIE CAST ALUMINUM
18	END CAP BOLTS	STAINLESS STEEL
19	STOP BOLT	STAINLESS STEEL
20	STOP NUT	STAINLESS STEEL
21	STOP BOLT WASHER	STAINLESS STEEL
22	STOP BOLT O-RING*	NBR70 OR VITON
23	SPRING SETS	ZINC COATED STEEL

WEIGHTS

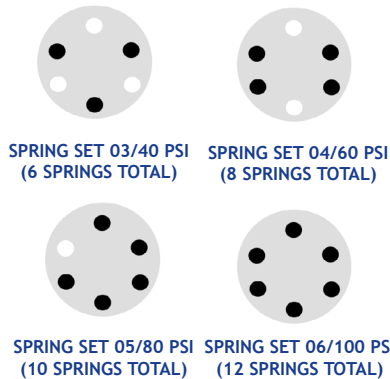
MODEL	WEIGHT (LBS)	MODEL	WEIGHT (LBS)
PN-161DA	46.9	PN-161SR	54.0
PN-181DA	59.0	PN-181SR	70.5
PN-201DA	80.8	PN-201SR	94.3
PN-241DA	132.3	PN-241SR	154.3
PN-271DA	189.6	PN-271SR	227.1

DOUBLE ACTING TORQUE

MODEL	40PSI	50PSI	60PSI	70PSI	80PSI	90PSI	100PSI	115PSI
PN-161DA	2513	3009	4018	5018	5523	6027	7027	8036
PN-181DA	3390	4262	5425	6780	7452	8134	9488	10842
PN-201DA	4708	5846	7532	9417	10356	11294	13179	15064
PN-241DA	10267	12325	16436	20543	22596	24650	28757	32863
PN-271DA	13719	16462	21950	27438	30182	32926	38422	43910

SPRING RETURN TORQUE

MODEL	SPRING SET	SPRING TORQUE START-END	40PSI AIR TORQUE START-END	60PSI AIR TORQUE START-END	70PSI AIR TORQUE START-END	80PSI AIR TORQUE START-END	90PSI AIR TORQUE START-END	100PSI AIR TORQUE START-END	115PSI AIR TORQUE START-END
PN-161SR	03	1761-1195	1823-1247	2823-2257	3832-3257	4238-3761			
	04	2354-1593		2425-1663	3434-2080	3928-3168	4434-3673	5443-4673	
	05	2938-1983			3035-2080	3540-2584	4036-3089	5045-4089	6045-5089
	06	3531-2380				3142-1991	3637-2496	4646-3505	5647-4505
PN-181SR	03	2514-1681	2390-1549	3744-2912	5098-4266	5779-4939			
	04	3354-2293		3186-2071	4540-3425	5213-4107	5895-4779	7249-6133	
	05	4195-2796			3982-2584	4655-3266	5337-3939	6691-5302	8045-6656
	06	5027-3355				4098-2425	4779-3107	6133-4461	7488-5815
PN-201SR	03	3345-2257	3390-2301	5275-4186	7152-6072	8099-7010			
	04	4461-3009		4523-3071	6399-4956	7346-5895	8284-6833	10170-8718	
	05	5576-3762			5646-3841	6593-4779	7532-5717	9417-7603	11130-9480
	06	6691-4514				5841-3664	6780-4602	8665-6487	10550-8373
PN-241SR	03	7452-4983	7346-4868	11453-8975	15560-13082	17613-15135			
	04	9939-6638		9798-6488	13905-10603	15958-12657	18012-14710	22193-18817	
	05	12427-8293		8143-4010	12250-8116	14303-10169	16357-12213	20463-16330	24570-20437
	06	14914-9949				14896-7922	17791-10807	20676-13701	26456-19472
PN-271SR	03	10479-6992	10338-6850	16117-12630	21888-18401	24783-21295			
	04	13976-9329		13781-9134	19560-14905	22446-17799	25340-20685	31111-26464	
	05	17472-11657		11453-5638	17233-11418	20118-14303	23004-17188	28783-22968	34563-28748
	06	20968-13984				14896-7922	17790-10807	20676-13701	26455-19472



MAINTENANCE & OPERATING INSTRUCTIONS: PN-161 THRU 271

BI-TORQ[®] ACTUATOR OPERATION

NOTE: For optimal operation, BI-TORQ actuators should be run with a supply of filtered, dry air.

SPRING RETURN ACTUATORS

Air to PORT 2 (the right hand port) causes the actuator to turn CCW. Loss of air to PORT 2 causes air to exhaust and the actuator turns CW. This is the FAIL CLOSE operation.

DOUBLE ACTING ACTUATORS

Air to PORT 2 (the right hand port) causes the actuator to turn CCW. Air to PORT 1 (the left hand port) causes the actuator to turn CW.

DISASSEMBLING STANDARD ACTUATORS

IMPORTANT: Before beginning disassembly, ensure that the air supply to the actuator has been disconnected, all accessories have been removed and that the actuator has been dismantled from the valve.

1. Loosen the end cap fasteners (22) with a wrench (size varies depending on actuator model). On the spring return actuator, alternate 3 to 5 turns on each fastener until the springs are completely decompressed. Use caution in removing the cap since the springs are under load until the fasteners are fully extended.
2. Remove the pinion snap ring (10) with a lock ring tool. The indicator (7) may now be removed.
3. Turn the pinion shaft (2) CCW until the pistons are at the full end of travel. Disengage the pistons (11) from the pinion. (NOTE: Low pressure air--3 to 5 P.S.I. **MAXIMUM**--might be required to force the pistons completely from the body.) Note the position of the pistons before removing them from the actuator body. The part numbers of the pistons are located on the side and should be right-side up on an actuator with a standard orientation.
4. Remove the pinion through the bottom of the actuator. The actuator is now completely disassembled. All replacement parts may now be put in. BI-TORQ recommends that all wear parts (3, 4, 5, 6, 12, 13, 14) be replaced before reassembly.

REASSEMBLING STANDARD ACTUATORS

IMPORTANT: Be sure that the actuator surfaces are free of grit and scratches before reassembling.

1. Apply a light film of grease to all o-rings and the pinion before replacing.
2. Put the pinion (2) back through the actuator with the flats of the pinion shaft running parallel with the body.
3. When reassembling the actuator, make sure that the piston racks are square to the actuator body and returned to their original orientation. (NOTE: The normal operation of all BI-TORQ actuators is FAIL CLOSED. If you want to change the orientation to FAIL OPEN, rotate the racks 180° to create a reverse operation.)
4. When replacing springs in a spring return actuator, ensure that the springs are replaced in their identical position in the end cap from which they were removed. (NOTE: In some circumstances, you might want to change the standard 80 pound spring set to fit your application and available air pressure. Changing the spring sets on BI-TORQ actuators requires no special tools. Please refer to the spring combination torque chart in our catalog for the inner and outer spring combinations that will allow you to operate with the spring set that you desire.)
4. Seal the end caps with a petroleum lubricant and bolt to actuator body.
5. Check the seal of the actuator by covering seal areas (pinion, end caps) with soapy water and using low pressure air to the actuator to ensure that no bubbles are produced.