



Model HP
Rack and Pinion Actuators

Series 81 Non-Spring
Series 82 Spring Return

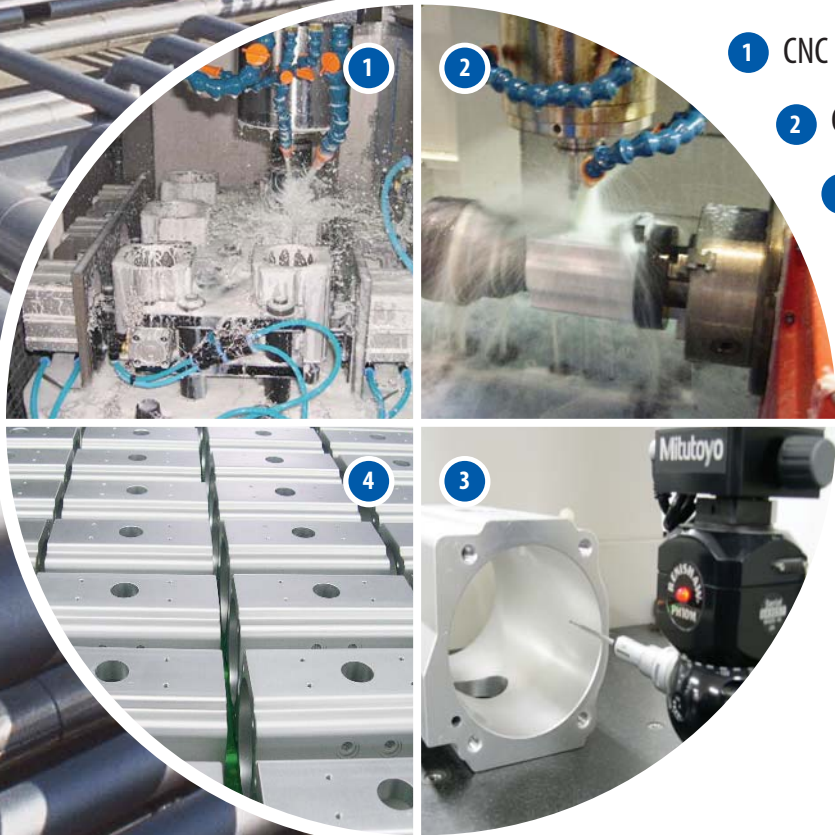
Pneumatic Actuator Solutions

For Industrial Applications

The Notus pneumatic high pressure rack and pinion actuators have excellent linear output torque and smooth operation in a compact design. HP actuators are available in double acting Series 81 and spring return Series 82. These pneumatic actuators are ideal for the operation of ball, butterfly, damper, and plug valves.

The Notus pneumatics are manufactured by the latest technology. The body is made from extruded aluminum and is polished internally to reduce friction. The end caps and pistons are die cast in house at our aluminum die cast foundry. The machining is also performed in house with state of the art CNC horizontal and vertical machining centers to ensure strict quality control in all stages.

Quality has been our primary goal in the actuator development, every actuator is 100% factory pressure and leak tested to ensure our goal of a quality actuator is achieved.



- 1 CNC Machining
- 2 CNC Drilling
- 3 Quality Control
- 4 Assembly

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Performance

Operation

The Series 81 "Double Acting Actuator" allows compressed air to turn the pistons thus rotating 1/4 turn. To move the pistons back to previous position compressed air must be applied to the opposite air port to allow the pistons to rotate back to the start position. The Series 82 "Spring Return Actuator" allows compressed air to turn the pistons thus rotating 1/4 turn. Upon loss of air the springs located in the end caps allow the actuator to fail to the predesignated default position.

High Cycle Life

- Full bearing support on all sliding, rotating and moving parts ensure long life.
- Die cast dual pistons are mechanically guided for precise movement, low friction, and high cycle life.
- Precision machined teeth on rack and pistons ensure precise rack and pinion engagement and maximum efficiency.
- Aluminum extruded body is hard anodized with the internal surface polished, which is then nickel plated for strength and lower coefficient of friction.
- One-piece heat-treated steel shaft drive pinion is nickel plated to provide strength and corrosion resistance.

Travel Adjustment

- Actuators have travel stop adjustments in both the clockwise and counter clockwise directions at 0° and 90°.
- Actuators can be adjusted from -5°min and +5°max.

Corrosion Resistant

- Hard anodized extruded body provides high wear resistance and long service life.
- End caps are electrostatic powder coated ensuring the highest level of corrosion resistance.

Modular Design

- Modular design features the same body and end caps for double acting and spring return to reduce inventory.
- Springs can be added in the field to convert double acting to spring return.
- Failure direction is easily reversed from (CCW) spring-to-close to (CW) spring-to-open orientation by simply inverting the pistons.
- Actuator mounting pad to valve complies to ISO 5211/1
- Solenoid and limit switch mounting pad complies to NAMUR VDI/VDE 3845.



Specifications

Compact Rack and Pinion Design

Independent Travel Stops in Both Directions

Hard Anodized Extruded Aluminum Body

Permanently Lubricated Units

Rotation 1/4 Turn

Star Female Input Allows Actuator to Turn Every 90°

ISO/NAMUR Solenoid and Accessory Mounting

Pistons Have Low Friction Bearings and Glides

One-Piece Nickel Plated Steel Pinion Bearing

Visual Indication Shows the Valve Position

Gear teeth on Pistons and Pinions are Precision Machined

Stainless Steel Fasteners

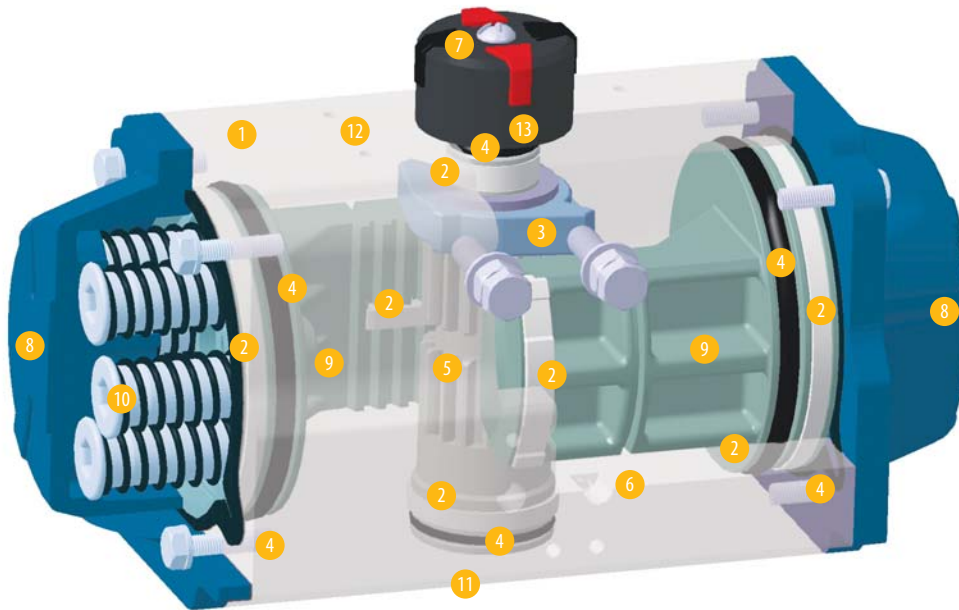
Operating Media: Clean, Dry Air, Non-Corrosive Gas or Light Hydraulic Oil

Minimum Air Supply 40 Psig

Maximum Working Pressure 150 Psig

Standard Working Temperature -20°F to 175°F

Construction



DESIGN FEATURES

▶ 1. Actuator Body

Precision extruded aluminum body, hard anodized externally, internally polished to 45-50 microns and nickel plated to protect against wear, corrosion and to reduce piston friction to a minimum.

▶ 2. Bearings

Replaceable top, bottom, bearings are made of Nylon 46. Replaceable thrust bearing and piston bearings are made of polyphthalamide. These internally lubricated thermoplastic materials contribute to extend cycle life, wear resistance and efficiency.

▶ 3. Bi-directional Travel Adjustment

HP actuators feature bi-directional pinion travel stops. Side located stops allow a full $\pm 5^\circ$ of valve travel adjustment. These travel stops are designed to absorb the maximum rated torque of the actuator.

▶ 4. Piston Seals

Replaceable piston seals are permanently lubricated nitrile BUNA and are standard. Optional Viton seals are available for lower temperature applications and silicone Viton for higher temperature applications.

▶ 5. Pinion Gear

One-piece high strength alloy steel pinion shaft has precision machined teeth for precise engagement. The pinion gear is then nickel plated to reduce friction, increase wear resistance and protect against corrosion.

▶ 6. Internal Porting

Internal porting allows for quick operation and eliminates external tubing.

▶ 7. Position Indicator

Indicator shows opening or closing status of valve. Indexable indicators allow for position indicating of multiport valves.

▶ 8. Die Cast Aluminum End Caps

Heavy duty die cast aluminum end caps are polyester coated to provide maximum resistance to potentially corrosive elements. Spring return and double acting models use the same common end caps. Die cast pockets in the end caps allow field conversion to spring return by simply adding spring sets.

▶ 9. Die Cast Pistons

Precision heavy duty aluminum die cast pistons are fitted with high quality guides and seals, providing highly efficient output torque versus input air pressure. The fully machined depth of the teeth on the pistons provide maximum engagement with minimum backlash.

▶ 10. Heavy Duty Springs

Multiple high tensile spring sets for spring return fail safe operation are manufactured in high strength alloy steel that is guaranteed to provide high performance in fail safe and emergency operations. Double acting actuators can be easily converted to spring return by simply removing the end cap and adding a spring set.

▶ 11. Actuator Mounting

Drilling is in accordance with ISO 5211 allowing easy installation of the actuator directly to ISO valves or sandwich de clutch overrides. The star drive is machined to conform to DIN 3337 standards.

▶ 12. Accessory Mounting

Side and top mounting connections are designed in accordance with VDI/VDE 3845 Namur standards to allow easy installation of solenoid valves, positioners and limit switch boxes.

▶ 13. Namur Slotted Shaft

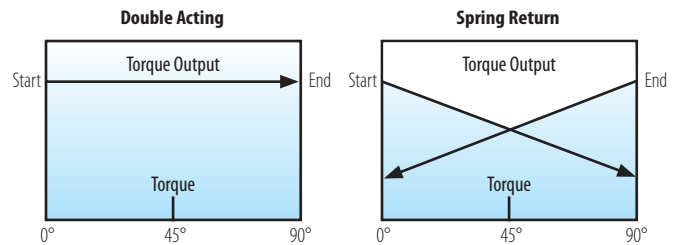
Shaft has Namur interface slot that provides a self-centering positive drive for positioners and switches.

Torque Data

Double Acting Output

MODEL	AIR SUPPLY				
	40 psi	60 psi	80 psi	100 psi	120 psi
HP35DA	38	50	71	89	102
HP50DA	89	119	163	207	236
HP63DA	157	209	286	364	416
HP75DA	310	412	567	721	825
HP88DA	487	649	895	1134	1293
HP100DA	709	941	1295	1649	1887
HP125DA	1478	1974	2708	3443	3929
HP160DA	3018	4027	5532	7037	8045
HP200DA	5656	7541	10365	13188	15073

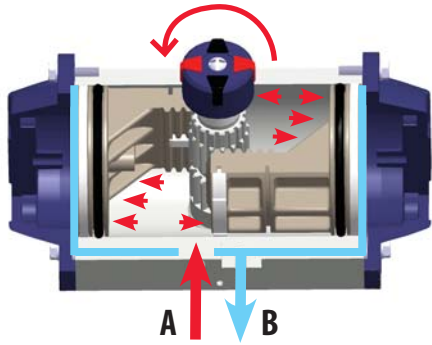
Torque Curves



Spring Return Output

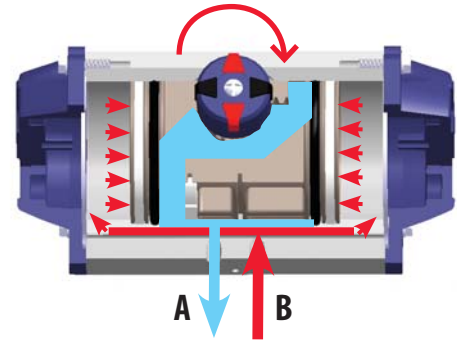
MODEL	springs per side	AIR SUPPLY									
		40 psi END	40 psi BREAK	60 psi END	60 psi BREAK	80 psi END	80 psi BREAK	100 psi END	100 psi BREAK	END	BREAK
HP50SR	2	46	59	75	90						
	3	37	52	66	83	111	126			36	52
	4			50	71	94	115	138	159	48	70
	5					76	103	120	147	60	87
	6					59	91	104	135	72	104
HP63SR	2	82	107	133	159						
	3	67	97	145	149	196	227			60	90
	4			89	130	166	208	244	285	80	120
	5					137	188	215	266	99	150
	6					107	168	185	246	119	180
HP75SR	2	156	211	259	315						
	3	125	192	229	296	383	450			119	185
	4			167	255	322	411	476	565	158	246
	5					261	372	415	526	196	307
	6					199	333	354	487	235	368
HP88SR	2	231	324	392	486						
	3	180	292	342	454	585	697			196	220
	4			239	389	483	632	726	875	260	410
	5					381	567	624	811	326	512
	6					279	503	521	745	390	614
HP100SR	2	358	482	593	717						
	3	288	438	524	673	877	1027			270	419
	4			384	583	737	938	1089	1292	359	558
	5					598	847	947	1195	449	698
	6					458	757	815	1106	539	837
HP125SR	2	743	1006	1230	1495						
	3	596	913	1088	1407	1823	2142			558	877
	4			794	1217	1531	1956	2266	2690	744	1168
	5					1239	1770	1974	2505	929	1460
	6					947	1584	965	2319	1115	1752
HP160SR	2	1540	2018	2549	3027						
	3	1247	1823	2257	2823	3762	4328			1195	1761
	4			1663	2425	3168	3929	4673	5443	1593	2354
	5					2584	3540	4089	5045	1983	2939
	6					1991	3142	3505	4646	2381	3532
HP200SR	2	2858	3770	4744	5646						
	3	2301	3389	4186	5275	7010	8099			2257	3346
	4			3071	4523	5894	7346	8718	10,169	3009	4460
	5					4780	6593	7603	9417	3762	5576
	6					3664	5842	6487	8665	4514	6691

Mechanical Data



Double Acting
(viewed from top of actuator)

■ Air in ■ Air out



Counter Clockwise Rotation

Air is supplied to port "A" forcing the pistons away from each other (toward ends), rotating drive pinion counter clockwise and exhausting.

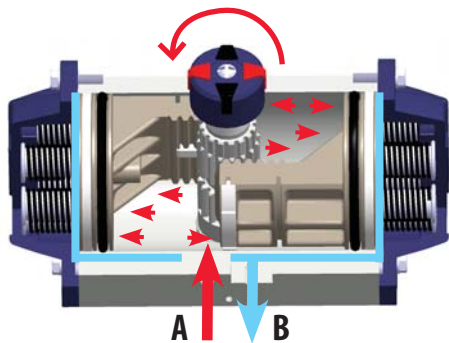
Model D.A.	Torque @ 80 psi start	Speed 90° (seconds)	Volume CW Cu. In. (Ins ³)	Volume CCW Cu. In. (Ins ³)
HP35DA	71	0.2	3	3
HP50DA	163	0.3	9	5.5
HP63DA	286	0.3	16	10
HP75DA	567	0.4	30	19
HP88DA	895	0.5	48	31
HP100DA	1,295	0.7	68	43

Clockwise Rotation

Air is supplied to port "B" forcing the pistons into each other (toward center), rotating drive pinion clockwise and exhausting air out.

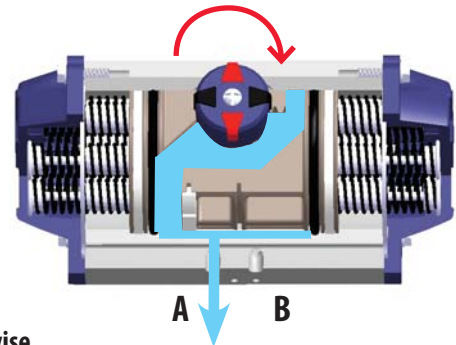
Model D.A.	Torque @ 80 psi start	Speed 90° (seconds)	Volume CW Cu. In. (Ins ³)	Volume CCW Cu. In. (Ins ³)
HP125DA	2,708	1.2	143	94
HP160DA	5,532	1.8	300	192
HP200DA	10,365	3.5	577	362

Air consumption (Scf per 90 Deg) = $\frac{\text{Volume}}{1,728} \times \frac{\text{Supply Pressure}}{14.7} + 14.7$
NOTE: Volume CW + CCW = 1 Cycle



Spring Return
(viewed from top of actuator)

■ Air in ■ Air out



Counter Clockwise Rotation

Air is supplied to port "A" forcing the pistons away from each other (toward ends), rotating drive pinion counterclockwise and exhausting.

Model S.R.	Torque @ 80 psi start	Torque @ 80 psi end	Speed 90° (seconds)	Volume CW Cu. In. (Ins ³)	Volume CCW Cu. In. (Ins ³)
HP50SR	103	60	0.3	9	5.5
HP63SR	188	99	0.4	16	10
HP75SR	372	196	0.5	30	19
HP88SR	567	326	0.6	48	31
HP100SR	847	449	0.9	68	43
HP125SR	1,770	929	1.4	143	94

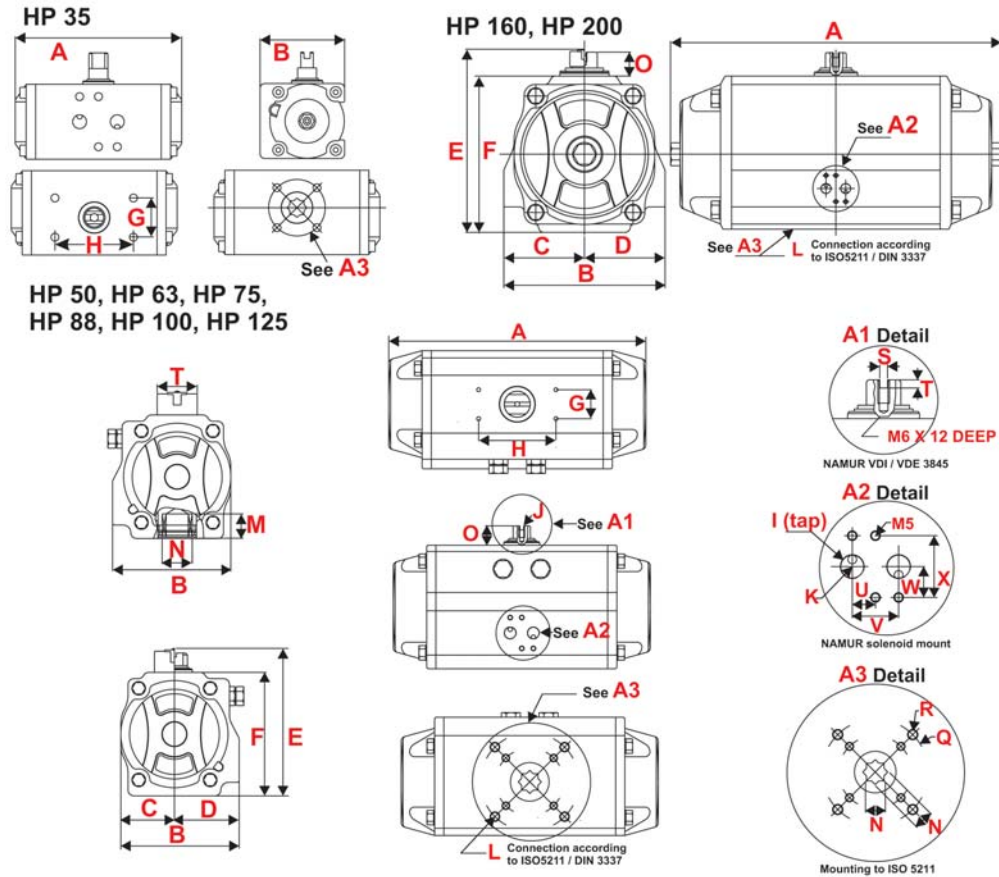
Fail Clockwise

Air failure (loss of pressure) allows compressed springs to force pistons toward each other (toward center), rotating drive.

Model S.R.	Torque @ 80 psi start	Torque @ 80 psi end	Speed 90° (seconds)	Volume CW Cu. In. (Ins ³)	Volume CCW Cu. In. (Ins ³)
HP160SR	3,540	1,983	2.1	300	192
HP200SR	6,593	3,762	4	577	362

Air consumption (Scf per 90 Deg) = $\frac{\text{Volume}}{1,728} \times \frac{\text{Supply Pressure}}{14.7} + 14.7$

Dimensions

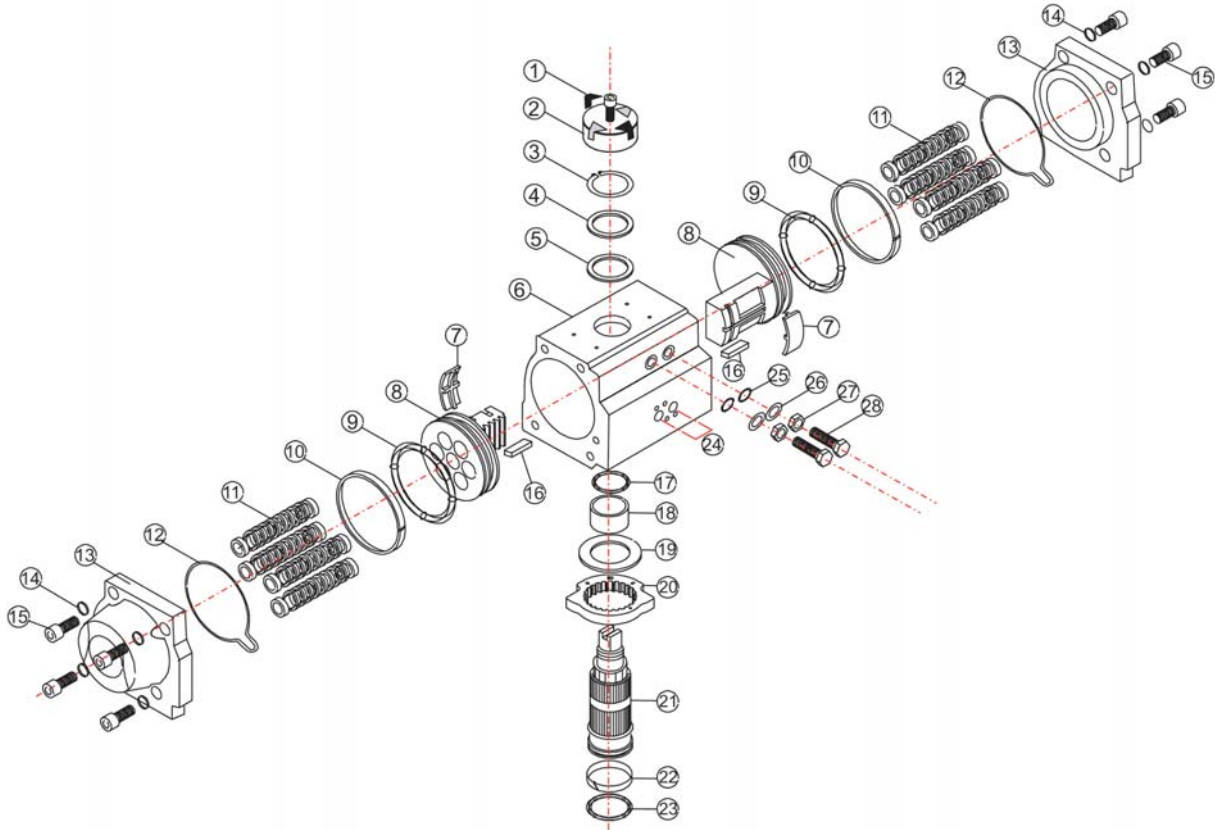


Inches

Model	L	R	A	B	C	D	E	F	G	H	I	J	K	O	P	S	T	U	V	W	X
	Q	M/N																			
HP35	F03/F05	M5/M6	4.25	2.13	0.94	1.18	2.87	1.89	0.98	1.97	NPT	M6	1/8"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	1.42	0.39/0.35																			
HP50	F03/F05	M5/M6	5.67	2.83	1.18	1.65	3.82	2.83	1.18	3.15	NPT	M6	1/8"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	1.42/1.97	0.47/0.43																			
HP63	F05	M6	6.45	3.31	1.46	1.85	4.33	3.35	1.18	3.15	NPT	M6	1/8"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	1.97	0.62/0.55																			
HP75	F05/F07	M6/M8	8.19	3.78	1.67	2.11	5.04	4.06	1.18	3.15	NPT	M6	1/8"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	1.97/2.76	0.75/0.67																			
HP88	F05/F07	M6/M8	9.72	4.25	1.95	2.30	5.59	4.57	1.18	3.15	NPT	M6	1/8"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	1.97/2.76	0.75/0.67																			
HP100	F07/F10	M8/M10	10.55	4.84	2.20	2.64	6.06	5.04	1.18	3.15	NPT	M6	1/4"	0.79	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	2.76/4.02	0.87/0.67																			
HP125	F07/F10	M8/M10	13.58	5.94	2.72	3.23	7.68	6.26	1.18	3.15	NPT	M6	1/4"	1.18	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	2.76/4.02	0.94/0.87																			
HP160	F10/F12	M10/M12	17.72	7.95	3.97	3.98	9.09	7.76	1.18	3.15	NPT	M6	1/4"	1.18	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	4.02/4.92	1.14/1.06																			
HP200	F12/F14	M12/M16	21.46	8.82	4.41	4.41	11.93	9.65	1.18	5.12	NPT	M6	1/4"	1.97	1.63	0.16	0.16	0.47	0.94	0.63	1.26
	4.92/5.51	1.50/1.42																			

NOTE: Model HP160 and HP200 have integral open and closed end travel stop adjustment.

Bill Of Materials



Part#	Description	Quantity	Material	Corrosion Protection	Repair Kit	Optional Material
1	Position indicator Tabs	4	Polypropylene + GF			
2	Position Indicator	1	Polypropylene + GF			
3	Spring Clip (Pinion)	1	Stainless Steel	HP160, 200 Nickel Plated	Repair Kit	
4	Thrust Washer (Pinion)	1	Stainless Steel		Repair Kit	
5	Thrust Bearing (Pinion)	1	Polyphthalamide		Repair Kit	
6	Body	1	Extruded Aluminum	Hard Anodized		
7	Bearing (Piston Back)	2	Polyphthalamide		Repair Kit	
8	Piston	2	Die Cast Aluminum	Hard Anodized		
9	O-Ring (Piston)	2	Nitrile BUNA (NBR70)		Repair Kit	Viton / Silicon Viton
10	Bearing (Piston Head)	2	Polyphthalamide		Repair Kit	
11	Spring (Cartridge)	min. 4 / max 12	High Alloy Steel Spring	Epoxy Coated		
12	O-Ring (End Cap)	2	Nitrile BUNA (NBR70)		Repair Kit	
13	End Cap (Right and Left)	2	Die Cast Aluminum	Chromate + Polyester Coated		
14	Cap Bolt Washer	8	Stainless Steel			
15	Cap Bolt (End Cap)	8	Stainless Steel			
16	Piston Guide	2	Polypropylene + GF		Repair Kit	Viton / Silicon Viton
17	O-Ring (Pinion Top)	1	Nitrile BUNA (NBR70)		Repair Kit	
18	Bearing (Piston Top)	1	Nylon 46		Repair Kit	
19	Thrust Bearing (Pinion)	1	Polyphthalamide		Repair Kit	
20	Open-Close Cam (Stop Arrangement)	1	Stainless Steel			
21	Drive Shaft	1	Steel Alloy	Nickel Plated		
22	Bearing (Pinion Bottom)	1	Nylon 46		Repair Kit	
23	O-Ring (Pinion Bottom)	1	Nitrile BUNA (NBR70)		Repair Kit	Viton / Silicon Viton
24	Air Ports (Input and Exhaust)	1	NPT Threads			
25	O-Ring (Stop Screw)	2	Nitrile BUNA (NBR70)		Repair Kit	Viton / Silicon Viton
26	Stop Bolt Washer	2	Stainless Steel			
27	Stop Nut	2	Stainless Steel			
28	Stop Bolt	2	Stainless Steel			

NOTE: Model HP160 and HP200 have integral open and closed end travel stop adjustment.

ISO / NAMUR Mounting

ISO

Bottom mounting connection is designed in accordance with ISO 5211. The square and star drive allows for direct mounting to valve shaft.



NAMUR

Side mounting connection is designed in accordance with NAMUR VDI/VDE 3845 standard. Designed to allow for direct mounting of solenoid.



NAMUR

Top mounting connection is designed in accordance with NAMUR VDI/VDE 3845 standard. Designed to allow direct mounting of positioners and limit switch boxes.



Model HP

Model Number Matrix

H	P	50	SR	X	X	X
1	2	3	4	5	6	7

Rack and Pinion Design with Travel Stops, ISO Mount Pad, Model 50, Spring Return Fail Clockwise Std., BUNA Seals Std., (5) Springs Std., Travel Stop Std.

1	Product Group
H	Rack and Pinion design with double end stops

2	Mounting
P	ISO / DIN Mounting Configuration

3	Size
35	Available in double acting only
50	
63	
75	
88	
100	
125	
160	
200	

4	Configuration
DA	Double Acting
DAR	Double Acting (Reverse Acting)
SR	Spring Return Fail Clockwise
S0	Spring Return Fail Counter Clockwise

5	Optional Material
X	Standard Nitrile BUNA Seals (NBR70)
LT	Low Temperature Viton Seals
HT	High Temperature Silicon Viton Seals

6	Spring Cartridge (per side)
X	Standard (5) springs per side
1,2,3,4,6	Special number of springs per side

7	Travel Stops
X	Standard Travel Stop
T	Extra Long Travel Stops

Repair Kit		
Nitrile BUNA (NBR70)	RKN (Actuator Size)	- 4° F ~ + 176° F
Low Temp Viton	RKV (Actuator Size)	- 31° F ~ + 176° F
High Temp Silicon Viton	RKSV (Actuator Size)	- 4° F ~ + 302° F

Example Number RKNHP50 = Nitrile BUNA Repair Kit for HP50 Actuator

Warranty

The seller warrants products to be free from defects in materials and workmanship under normal conditions of use and service. Our obligations under this warranty is limited to repairing or replacing at our option at our factory any product which shall within two (2) years after delivery to original buyer be returned with transportation charges prepaid, and which our examination shall show to our satisfaction to have been defective. For a copy of the full terms and conditions of the Notus Pneumatic Actuator please consult the factory.

VALVE

VT

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