Neles Easyflow™ compact rack and pinion pneumatic actuators Series RNP

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Installation, maintenance and operating instructions



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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the installation, operation and maintenance of Neles Easyflow™ RNP series actuators. Please read these instructions carefully and save them for future reference.

The manual can be changed or revised without any prior notice. Any changes in product's specification, structure, and/or any components may not result immediate revised version of the manual.

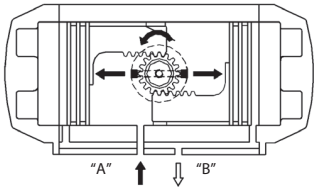
1.2 STRUCTURE AND OPERATION

The RNP series actuators are pneumatic quarter turn cylinder actuators designed for control and shut-off service.

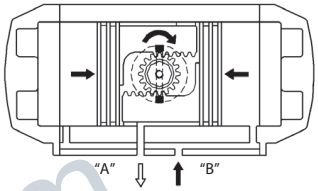
A rack and pinion actuator is a type of actuator that comprises a pair of gears which converts piston linear motion into drive shaft rotational motion.

Pinion engages teeth on a rack; linear motion applied to the rack causes the pinion to move relative to the rack, thereby translating the linear motion of the rack into rotational motion.

Double-Acting (Top View)



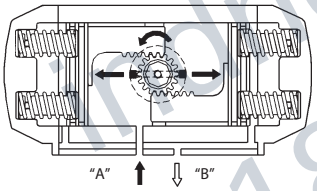
Air supplied to **Port A** forces pistons apart and toward end positions with exhaust air exiting at **Port B** (a counterclockwise rotation is obtained).



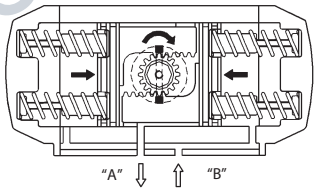
Air supplied to **Port B** forces pistons toward center with exhaust air exiting at **Port A** (a clockwise rotation is obtained).

Figure 1. Operating principle of the double acting version

Spring-Return (Top View) Spring-to-Close



Air supplied to **Port A** forces pistons apart and toward end position, compressing springs. Exhaust air exits at **Port B** (a counterclockwise rotation is obtained).



Loss of air pressure allows springs to force pistons toward center position with exhaust air exiting at **Port A** (a clockwise rotation is obtained).

Figure 2. Operating principle of the spring to close version

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1.3 ACTUATOR MARKINGS

The actuator is provided with an identification plate, see Fig. 3.

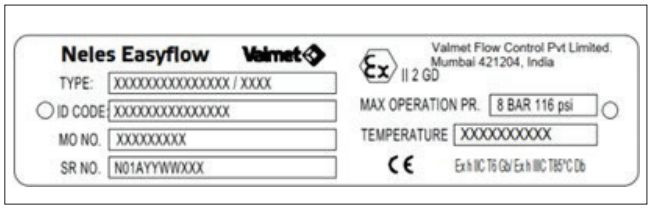


Figure 3. ID plate

Identification plate markings are:

1. Type
2. Manufacturing site, date, successive no.
3. SO number or ID number
4. Max. operating pressure
5. ATEX category and protection level

1.4 SPECIFICATIONS

Operating media: Air, Nitrogen

Max supply pressure: 8 barg

Design pressure: 12 barg

Temperature range: -20 °C...+80 °C (Normal)
-20 °C...+125 °C (High)
-55 °C...+80 °C (Artic)

Construction: Suitable for indoor and outdoor use
Ingress protection class IP66, IP67

Actuator model		Cyl. Volume (litres)		Ref. Stroke speed (sec.)	Weight (kg)
		Open	Close	Open / Close	kg
RNP40	DA	0.10	0.20	0.2 / 0.2	1.3
	SR		–	0.2 / 0.2	1.5
RNP50	DA	0.15	0.26	0.2 / 0.2	1.7
	SR		–	0.4 / 0.4	2.0
RNP63	DA	0.27	0.43	0.2 / 0.2	2.3
	SR		–	0.7 / 0.4	2.8
RNP80	DA	0.44	0.69	0.3 / 0.3	3.1
	SR		–	0.7 / 0.5	3.9
RNP90	DA	0.72	1.15	0.4 / 0.4	5.1
	SR		–	1.0 / 0.6	6.5
RNP100	DA	1.02	1.64	0.6 / 0.6	7.3
	SR		–	1.5 / 0.7	9.1
RNP110	DA	1.24	1.94	0.6 / 0.6	8.3
	SR		–	1.6 / 0.9	10.6
RNP125	DA	1.71	3.44	0.8 / 0.8	11.7
	SR		–	1.8 / 0.9	15.4
RNP150	DA	2.88	5.18	1.2 / 1.2	17
	SR		–	3.8 / 1.6	25.7
RNP175	DA	4.12	6.70	1.2 / 1.2	22.1
	SR		–	5.0 / 2.0	28
RNP200	DA	7.24	11.76	2.5 / 2.5	33
	SR		–	5.5 / 1.3	51
RNP250	DA	11.04	14.41	4.0 / 4.0	48
	SR		–	7.1 / 2.0	69
RNP300	DA	17.37	38.56	1.5 / 1.5	60
	SR		–	7.2 / 2.3	111
RNP350	DA	23.70	42.63	1.6 / 1.6	77
	SR			8.0 / 3.2	133

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NOTES:

1. The above times are based on following conditions:

A) Solenoid valve orifice of 1/4 in. for sizes RNP40 to RNP250 and 1/2 in. for sizes RNP300 to RNP350

B) Minumum inner piping diameter of 6mm for sizes RNP40 to RNP250 and 10mm for sizes RNP300 to RNP350

C) 4 bar air supply pressure

D) Without valve loading

2. SR model mentioned in above table is SR55 model considering full set of springs.

Table 2. Single acting actuator torque table																				
Actuator model			SPRING		3 bar		3.5 bar		4 bar		4.5 bar		5 bar		5.5 bar		6 bar		6.5 bar	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
040	SR	30	4	6	4	6	6	8	8	10	10	12	11	13	13	15	15	17	16	19
040	SR	40	5	8	2	5	4	7	6	8	7	10	9	12	11	14	12	15	14	17
040	SR	55	8	12	-	-	-	-	2	6	3	8	5	9	7	11	9	13	10	15
050	SR	30	6	10	7	10	10	13	12	16	15	18	18	21	20	24	23	26	26	29
050	SR	40	9	13	3	8	6	11	9	13	12	16	14	19	17	21	20	24	22	27
050	SR	55	13	19	-	-	-	-	3	9	5	12	8	15	11	17	14	20	16	23
063	SR	30	11	17	12	18	17	23	22	28	27	33	32	38	37	43	42	48	47	53
063	SR	40	15	24	-	-	11	19	16	24	21	29	26	34	31	39	36	44	41	49
063	SR	55	23	35	-	-	-	-	5	17	10	22	15	27	20	32	25	37	30	42
080	SR	30	18	28	20	29	28	37	36	45	44	53	52	61	60	69	68	77	76	85
080	SR	40	24	37	11	24	19	32	27	40	35	47	43	55	51	63	59	71	67	79
080	SR	55	37	56	-	-	-	-	8	27	16	35	24	43	32	51	40	59	48	67
090	SR	30	29	44	32	47	45	60	57	72	70	85	83	98	95	111	108	123	121	136
090	SR	40	39	59	18	38	30	50	43	63	56	76	68	89	81	101	94	114	107	127
090	SR	55	58	89	-	-	-	-	-	-	25	56	38	69	51	81	64	94	76	107
100	SR	30	42	64	45	67	64	85	82	104	100	122	118	140	136	158	155	176	173	195
100	SR	40	55	84	25	54	43	72	61	90	80	108	98	127	116	145	134	163	152	181
100	SR	55	84	127	-	-	-	-	-	-	36	80	55	98	73	116	91	135	109	153
110	SR	30	52	79	56	83	79	106	101	128	124	151	146	173	169	196	192	219	214	241
110	SR	40	68	104	31	67	54	89	76	112	99	134	121	157	144	179	166	202	189	225
110	SR	55	104	158	-	-	0	54	23	77	45	99	68	122	90	144	113	167	135	189
125	SR	30	72	113	74	115	106	146	137	178	168	209	199	240	231	271	262	303	293	334
125	SR	40	97	151	37	91	68	122	99	153	131	185	162	216	193	247	224	278	256	310
125	SR	55	135	211	-	-	8	84	39	115	70	146	102	177	133	209	164	240	195	271
150	SR	30	121	195	117	191	169	242	221	294	273	346	325	398	377	450	429	502	480	554
150	SR	40	162	260	52	150	104	202	156	254	208	306	260	358	312	410	364	462	416	514
150	SR	55	226	363	-	-	0	137	52	189	104	241	156	293	208	345	260	397	312	449
175	SR	30	168	274	176	283	251	358	326	433	401	508	476	583	551	658	626	733	701	808
175	SR	40	223	366	85	227	160	302	235	377	310	452	385	527	460	602	535	677	610	752
175	SR	55	313	512	-	-	13	212	88	287	163	362	239	438	314	513	389	588	464	663
200	SR	30	235	425	259	448	373	562	487	676	601	790	715	904	829	1018	943	1132	1057	1246
200	SR	40	314	566	118	370	231	484	345	598	459	712	573	826	687	940	801	1054	915	1168
200	SR	55	439	793	-	-	5	358	119	472	233	586	347	700	461	814	575	928	689	1042
250	SR	30	383	690	421	729	606	914	791	1099	977	1284	1162	1469	1347	1655	1532	1840	1717	2025
250	SR	40	510	920	191	601	376	786	561	971	747	1157	932	1342	1117	1527	1302	1712	1487	1897
250	SR	55	714	1288	-	-	8	582	193	767	378	953	564	1138	749	1323	934	1508	1119	1693
300	SR	30	693	1055	634	995	915	1277	1196	1558	1478	1839	1759	2121	2040	2402	2322	2683	2603	2965
300	SR	40	924	1406	282	764	563	1046	845	1327	1126	1608	1408	1890	1689	2171	1970	2452	2252	2734
300	SR	55	1294	1969	-	-	1	676	282	957	564	1239	845	1520	1126	1801	1408	2083	1689	2364
350	SR	30	948	1443	867	1362	1252	1747	1637	2132	2022	2517	2407	2902	2792	3287	3177	3672	3562	4057
350	SR	40	1264	1924	386	1046	771	1431	1156	1816	1541	2201	1926	2586	2311	2971	2696	3356	3081	3741
350	SR	55	1770	2694	-	-	1	925	386	1310	771	1695	1156	2080	1541	2465	1926	2850	2311	3235

Table 3. Double acting actuator torque table									
DOUBLE ACTING TORQUE (Nm)									
Actuator model	2.5 bar	3 bar	3.5 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar
40	9	10	12	14	16	17	19	21	23
50	14	16	19	22	24	27	30	33	35
63	25	30	35	40	45	50	54	59	64
80	40	48	56	64	72	80	88	96	104
90	64	76	89	102	114	127	140	153	165
100	91	109	127	145	164	182	200	218	236
110	113	135	158	180	203	225	248	270	293
125	156	188	219	250	281	313	344	375	406
150	260	312	364	415	467	519	571	623	675
175	375	450	525	600	675	750	825	900	975
200	570	684	798	912	1026	1140	1254	1368	1574
250	926	1111	1296	1482	1667	1852	2037	2222	2500
300	1407	1688	1970	2251	2532	2814	3095	3376	3658
350	1925	2310	2695	3080	3465	3850	4235	4620	5005

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1.5 RECYCLING AND DISPOSAL

Most of the actuator parts can be recycled if sorted according to material. Most parts have material marking. A material list is supplied with the actuator. In addition, separate recycling and disposal instructions are available from the manufacturer. An actuator can also be returned to the manufacturer for recycling and disposal against a fee.

1.6 DEFINITIONS

The following definitions given here are used in this document:

WARNING:
IF NOT OBSERVED, USER INCURS A HIGH RISK OF SEVERE DAMAGE TO THE PRODUCT AND/OR FATAL INJURY TO PERSONNEL.

NOTE:
ADVISORY AND INFORMATION COMMENTS PROVIDED TO ASSIST MAINTENANCE PERSONNEL TO CARRY OUT MAINTENANCE PROCEDURES.

WARNING FOR ATEX:
IF NOT OBSERVED, USER INCURS A HIGH RISK OF SEVERE DAMAGE TO ACTUATOR AND/OR FATAL INJURY TO PERSONNEL.

1.7 SAFETY PRECAUTIONS

USER SAFETY

CAUTION:
DON'T EXCEED THE PERMITTED VALUES!
EXCEEDING THE PERMITTED PRESSURE VALUE MARKED ON THE ACTUATOR MAY CAUSE DAMAGE AND LEAD TO UNCONTROLLED PRESSURE RELEASE IN THE WORST CASE. DAMAGE TO THE EQUIPMENT AND PERSONAL INJURY MAY RESULT.

CAUTION:
DON'T DISMANTLE A PRESSURIZED ACTUATOR!
DISMANTLING A PRESSURIZED ACTUATOR LEADS TO UNCONTROLLED PRESSURE RELEASE. SHUT OFF THE SUPPLY PRESSURE AND RELEASE PRESSURE FROM THE CYLINDER BEFORE DISMANTLING THE ACTUATOR. OTHERWISE, PERSONAL INJURY AND DAMAGE TO EQUIPMENT MAY RESULT.

CAUTION:
FOLLOW THE INSTRUCTIONS GIVEN ON THE ACTUATOR WARNING PLATES!

CAUTION:
BEFORE OPENING THE CYLINDER FASTENING SCREWS (11), RELEASE SPRING TENSION DIRECTED ON ACTUATOR WARNING PLATE AND IN THESE INSTRUCTIONS!

CAUTION:
DON'T DISMANTLE THE SPRING MODULE!
DO NOT REMOVE THE SPRING MODULE WHILE THE SPRING IS COMPRESSED OR UNDER PRESSURE.

CAUTION:
TAKE THE WEIGHT OF THE ACTUATOR OR VALVE COMBINATION INTO ACCOUNT WHEN HANDLING IT!
LIFTING LUGS ON THE ACTUATOR ARE MEANT ONLY FOR LIFTING ACTUATOR AND NOT COMPLETE VALVE ASSEMBLY.
DO NOT LIFT THE VALVE COMBINATION FROM THE ACTUATOR, POSITIONER, LIMIT SWITCH OR THEIR PIPING. LIFT THE ACTUATOR AS DIRECTED IN SECTION 2, LIFTING ROPES FOR A VALVE COMBINATION SHOULD BE FASTENED AROUND IT. THE WEIGHTS ARE SHOWN IN SECTION 9. DROPPING MAY RESULT IN PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT.

ATEX/EX SAFETY

CAUTION:
ENSURE THE GENERAL PROCESS AND WORKER PROTECTION FROM STATIC ELECTRICITY IN THE FACILITIES.

NOTIFICATION:
THE ACTUAL SURFACE TEMPERATURE OF ACTUATOR IS DEPENDED ON THE PROCESS AND AMBIENT CONDITIONS. THE PROTECTION FROM HIGH OR LOW TEMPERATURE MUST BE CONSIDERED BY THE END USER BEFORE PUT INTO SERVICE.

WARNING FOR ATEX:
WHILE LIFTING ACTUATOR HOUSING SHOULD NOT IMPACT ON THE OTHER LIGHT OR RUSTY METAL .

CAUTION:
POTENTIAL ELECTROSTATIC CHARGING HAZARD, DO NOT RUB SURFACE WITH DRY CLOTH.

WARNING FOR ATEX:
INSPECT FOR PAINT DAMAGED, TO ENSURE CONTINUED CORROSION PROTECTION.

WARNING:
Valve on which actuator is installed should be earthed properly to discharge static charge.

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2. TRANSPORTATION AND STORAGE

Make sure that the actuator and associated equipment have not been damaged during transportation. Store the actuator carefully before installation, preferably indoors in a dry place. Do not take it to the installation site or remove the protective caps of ports for piping until just before installation.

Lift the actuator as shown in Fig. 4: in a horizontal position from the lifting lugs. Refer to Section 1.4 for weights.

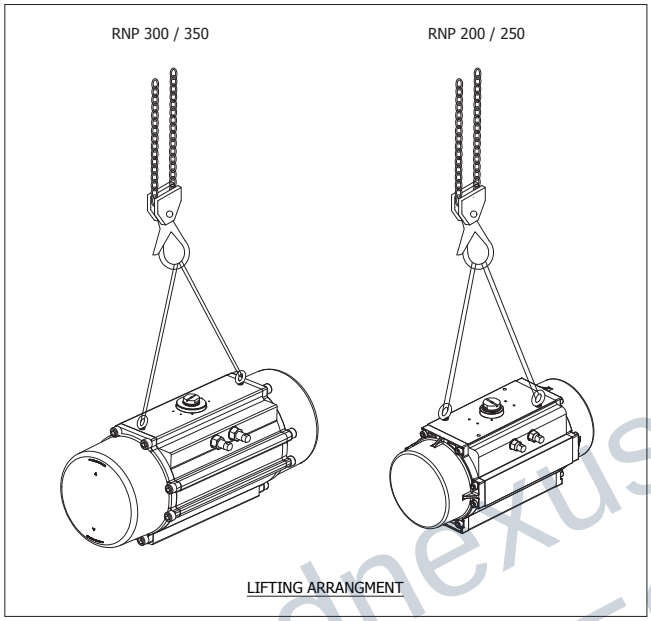


Figure 4. Lifting the actuator

Upon receiving the product check the limit actuator and the accompanying devices for any damage that may have occurred during transport.

WARNING:
DO NOT USE THE DEVICE IF IT IS DAMAGED DURING TRANSPORTATION!
IF THE DEVICE HAS SUFFERED DAMAGE DURING TRANSPORTATION DO NOT INSTALL AND USE IT. IN CASE OF NOTICING DAMAGE TO THE DEVICE UPON RECEIVING IT PLEASE CONTACT THE SUPPLIER.

Store the actuator carefully. Storage indoors in a cool, dry place. Temperature limit for the storing is from 4 °C to 40 °C. The actuator should be left in its original packing until it is required for the use. Do not remove protective plugs until installing the actuator.

3. MOUNTING AND DEMOUNTING

3.1 ACTUATOR GAS SUPPLY

Dry compressed air, nitrogen or natural gas (sweet) can be used as supply medium, no oil spraying is needed. The air supply connections are presented in the dimensional drawings in Chapter 9. The maximum supply pressure is depending the selected model.

3.2 INSTALLATION INFORMATION

Before installation please take care of the safety precautions mentioned in the Section 1.7.

Ensure that the actuator will not be exposed to pressure in excess to the maximum rating as indicated on the actuator nameplate or technical documents.

Ensure that throughout the installation that there are no leaks of the supply media.

The maximum operating temperature for the actuator depends on individual build of actuator. Refer nameplate for operating temperature range.

Ensure that the maximum operating temperature as indicated on the nameplate is not exceeded during operation, transportation or storage of the actuator.

The environment and surrounding should not affect or limit the operational safety of the product.

Ensure the product is protected against impact, vibration or any kind of movement during operation, transportation and storage.

Product should not be installed in hazardous area that is not compatible with the gas group and temperate class indicated on the nameplate.

RNP series actuators can be mounted on valve in any desired position. However it is recommended to align the centerline of the pneumatic cylinder module along the pipeline.

Ensure proper tightening of fasteners and mounting accessories to avoid loosening during operation.

All the tubing, fitting and actuation media should be free from contamination and filtered to the desired level. Quality of media should be as per ISO 8573-1 [5:3:4]. For additional information consult Valmet.

Ensure proper adjustments of the stopper bolt to desired opening and closing of the valve.

Once proper installation is done, check for smooth continuous operation. If undesired operation occurs, check for correct pressure and volume flow.

NOTE:
FLOW MAY BE RESTRICTED BY UNDERSIZE TUBING OR FITTING. THESE MAY THROTTLE THE FLOW RESULTING IN REDUCE PRESSURE OR VOLUME CAUSING INTERMITTENT OR UNDESIRED MOVEMENT.

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3.3 MOUNTING THE ACTUATOR ON THE VALVE

CAUTION:
BE AWARE OF THE CUTTING MOVEMENT OF THE VALVE!

Install the actuator so that the shaft of the valve or any other device to be actuated goes into the shaft bore of the actuator. If the bore is larger than the shaft diameter, use an adapter / sleeve / bushing. RNP series actuator has double square female shaft bore. Square bores are at an angle of 45° which allows the installation position of the actuator to be changed in relation to the valve.

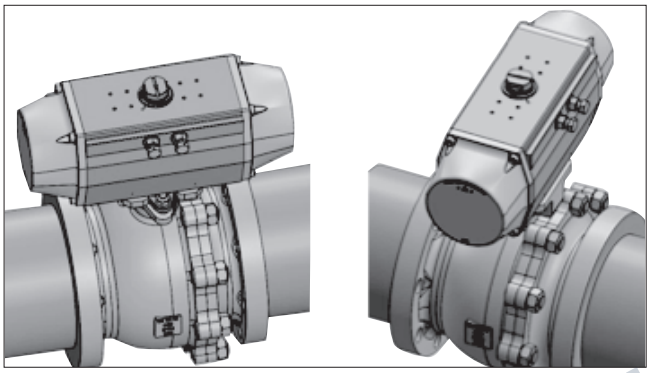


Figure 5. Ways to install the actuator

RNP series actuator can be mounted on valve in any desired position. However it is recommended to align the centerline of the pneumatic actuator along the process pipeline. When the installation position of the actuator is altered, the arrow indicating the operating direction must be turned to correspond with the actual operation of the valve.

When necessary, lubricate the actuator bore and collar with grease or anti-corrosive agent to prevent it from jamming due to rust.

The actuator must not be allowed to come in contact with the pipework, because the vibrations may damage it or cause unsatisfactory operation.

In some cases, e.g. when using large actuators or with extensive pipework vibrations, the actuator should be supported. Consult Valmet for instructions.

If the actuator is used with devices other than Neles valves, any additional parts attached to the actuator must be properly protected.

3.4 OPERATING DIRECTIONS

NOTE:
SEPARATE INSTRUCTIONS ARE AVAILABLE FOR ADJUSTING THE CLOSE LIMIT OF METAL-SEATED BUTTERLY VALVES. REFER TO THE INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS OF THE VALVE.

RNP DOUBLE ACTING VERSION

Double acting actuator should be in close position when installed on the valve in close position.

RNP SPRING RETURN VERSION

Install spring return actuator in fail safe position on the valve being in corresponding position. In other words: spring to close actuator in close position and valve in close position / spring to open actuator in open position and valve in open position.

DEMOUNTING THE ACTUATOR FROM THE VALVE

CAUTION:
DEPRESSURISE THE ACTUATOR BEFORE STARTING DEMOUNTING!

The actuator must be de-pressurized and the supply air disconnected. Unscrew the actuator-side screws of

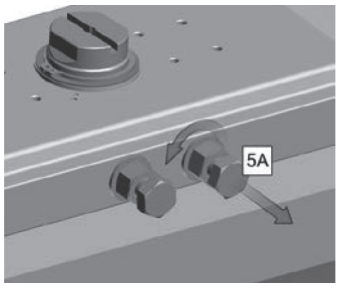
the bracket and pull the actuator off the valve shaft. For larger actuators this is best done lifting the actuator from lifting lugs by crane. Note the mutual positioning of the valve and the actuator to ensure correct functioning after reassembly.

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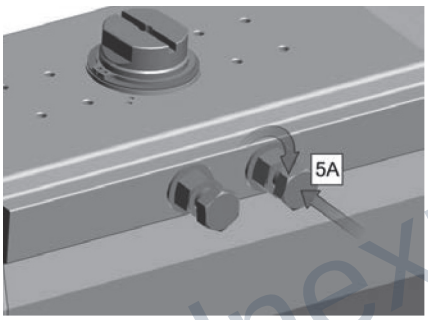
3.5 SETTING

All actuators are factory set to 0 and 90 degrees. Even minor adjustments of the stroke adjustment screws (5A and 5B) will result in over travel or incomplete travel of the pinion.

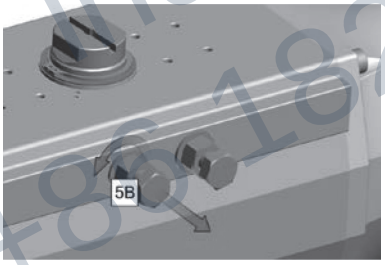
Loose nut #13 and rotate screw 5A in counter clock wise direction (CCW) to set over travel (close)



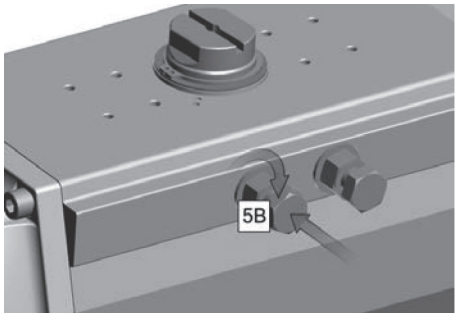
Loose nut #13 and rotate screw 5A in clock wise direction (CW) to set under travel (close).



Loose nut #13 and rotate screw 5B in counter clock wise direction (CCW) to set over travel (open).



Loose nut #13 and rotate screw 5B in clock wise direction (CW) to set under travel (open).



Pie chart below shows the exact degree of pinion travel.

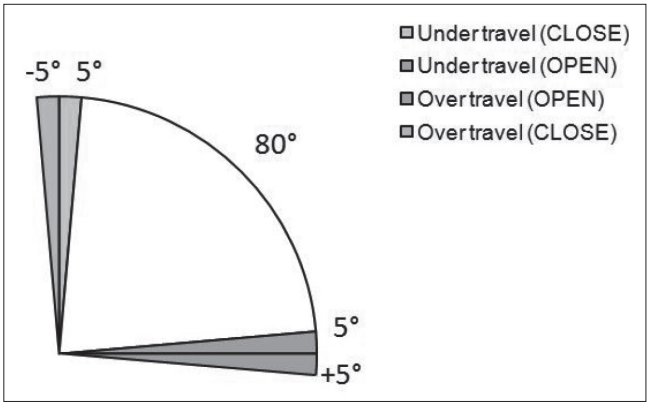


Table below shows required revolution of the bolts for 1° travel of pinion for each actuator.

Actuator size	Revolution of bolts for 1° travel of pinion
RNP 40	Half quarter turn
RNP 50	Half quarter turn
RNP 63	Half quarter turn
RNP 80	Quarter turn
RNP 90	Quarter turn
RNP 100	Quarter turn
RNP 110	Quarter turn
RNP 125	Quarter turn
RNP 150	Quarter turn
RNP 175	Quarter turn
RNP 200	Quarter turn
RNP 250	Quarter turn
RNP 300	Quarter turn
RNP 350	Quarter turn

4. MAINTENANCE

4.1 MAINTENANCE GENERAL

CAUTION:
OBSERVE THE SAFETY PRECAUTIONS MENTIONED IN SECTION 1.7 BEFORE MAINTENANCE!

Although Neles Easyflow™ actuators are designed to work under severe conditions, proper preventative maintenance Can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting the actuators at least every five (5) years. The inspection and maintenance interval depend on the actual application and process condition. The inspection and maintenance intervals can be specified together with your local Valmet experts.

During this periodic inspection the parts detailed in the Spare Part Set should be replaced. Time in storage should be included in the inspection interval.

If maintenance assistance is required, please contact your local Valmet office. The part numbers in parentheses () in the text refer to the exploded view and to the parts list in Section 8, unless otherwise stated.

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This procedure is applicable with the understanding that all pneumatic pressure has been removed from the actuator.

Remove all piping and mounted accessories that will interfere with the module that are to be worked on.

When removing seals from seal grooves; use a commercial seal removing tool or a small screwdriver with sharp corners rounded off.

Use a non-hardening thread sealant on all pipe threads.

CAUTION:
APPLY THE THREAD SEALANT AS PER THE MANUFACTURER'S INSTRUCTIONS.

All parts should be thoroughly inspected for excessive wear, stress cracking and pitting. Attention should be directed to threads, sealing surfaces and areas that will subjected to sliding and rotating motion.

Actuator parts that reflect any of the above listed characteristics should be replaced with new parts.

Valmet recommends that disassembly of the actuator modules should be done in a clean area on a workbench.

After reassembly, the actuator needs to be stroke for several times to ensure the desired function and safety.

If you remove the stop screw, adjust the limits after lubrication or grease filling!

Before doing maintenance, check actuator for leakage at inlet, outlet and cover.

NOTE:
IN ORDER TO ENSURE SAFE AND EFFECTIVE OPERATION, ALWAYS USE ORIGINAL SPARE PARTS TO MAKE SURE THAT THE ACTUATOR FUNCTIONS AS INTENDED.

NOTE:
WHEN SENDING GOODS TO THE MANUFACTURER FOR REPAIR, DO NOT DISASSEMBLE THEM.

NOTE:
FOR SAFETY REASONS, REPLACE BOLTING IF THE THREADS ARE DAMAGED, HAVE BEEN HEATED, STRETCHED OR CORRODED.

4.2 MAINTENANCE PRECAUTIONS OF THE RNP_E_C AND RNP_E_A ACTUATOR

CAUTION:
DON'T DISMANTLE A PRESSURIZED ACTUATOR!

CAUTION:
TO RELEASE SPRING TENSION, THE SPRING DIRECTION STOP SCREW AT THE CENTRAL BLOCK MUST BE REMOVED BEFORE THE CYLINDER FASTENING SCREWS ARE OPENED!

CAUTION:
DON'T DISMANTLE THE SPRING PACKAGE!
THE SPRING PACKAGE WITHIN THE CYLINDER IS PRELOADED. NEVER OPEN OR DISMANTLE THE SPRING PACKAGE. THE SPRING MODULE IS ALWAYS DELIVERED AS A PRE-ASSEMBLED PACKAGE.

The actuator has a caution sticker. When servicing the unit, check that the sticker is in place and legible. See Fig. 6.

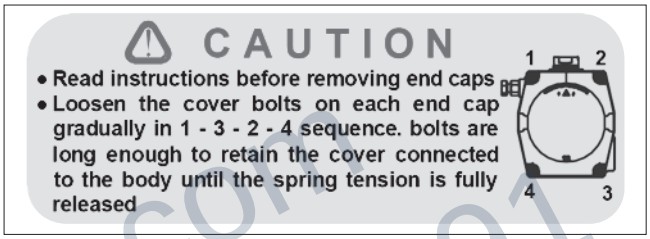


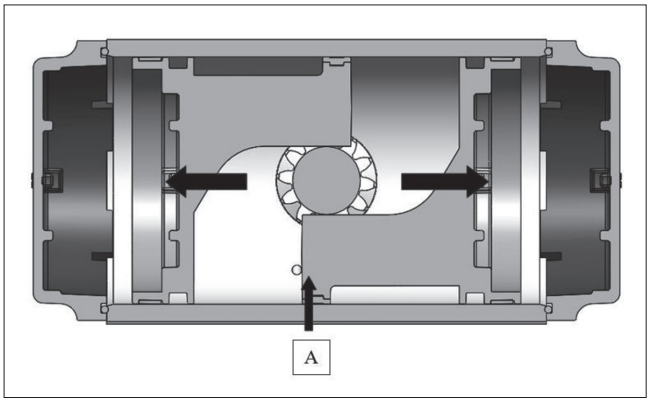
Figure 6. Caution sticker of the RNP series size 040 - 110

5. OPERATION

- Actuator is fitted with NPT connection.
- Provide air connections using proper fittings.
- Air supply to meet above specifications and not to exceed 8 Bar.
- Ensure air supply pressure is regulated to ensure maximum air supply is not exceeded.

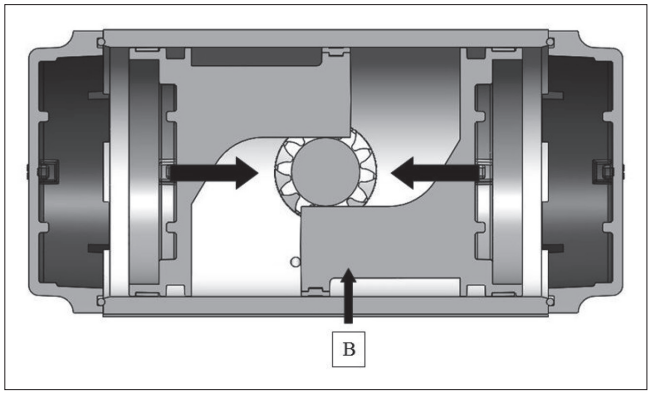
5.1 OPERATING PRINCIPLE (STANDARD MODE) FOR DOUBLE ACTING

- Both ports A and B are used as inlet ports.
- When air is supplied to Port A, the pistons are moved away from each other, and the pinion is rotated CCW.



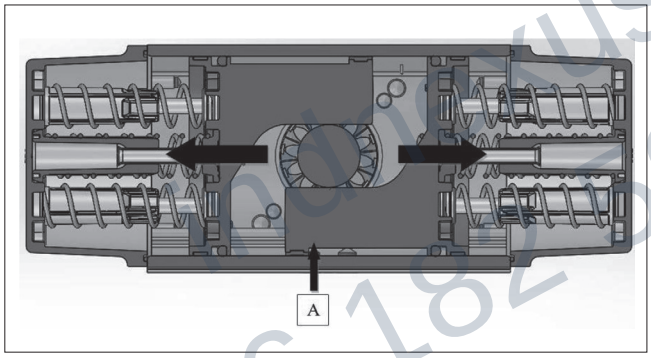
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- When air is supplied through Port B, the pistons come closer and return to their home position, rotating the pinion CW.

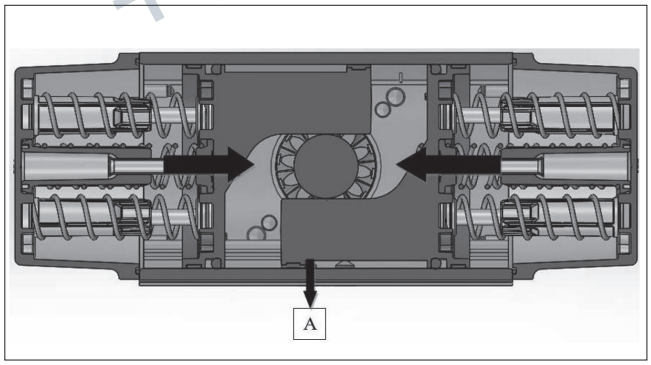


5.2 OPERATING PRINCIPLE (STANDARD MODE) FOR SPRING RETURN– FAIL CW

- Port A is used as inlet.
- When air is supplied to Port A, the pistons are moved away from each other, the springs are compressed, and the pinion is rotated CCW.



- When the air is exhausted through Port A, the springs return the pistons to the home position, rotating the pinion CW.



6. MAINTENANCE

6.1 LUBRICATION

- All the mountings, accessories and spare parts used or replaced must be original from Valmet.
- Use Valmet recommended grease for greasing rack and seals.
- Apply the grease with soft brush.

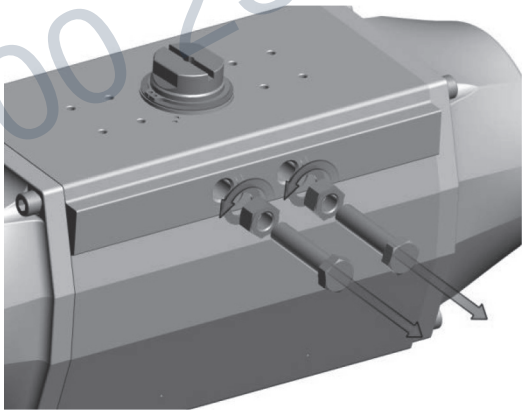
NOTE:

- Carry out maintenance involving disassembling of actuator in a safe indoor place free from dust, water.
- Ensure that air supply has been disconnected.
- Ensure proper lifting procedures are followed when moving or lifting actuators.
- DO NOT use accessory, mounting holes on top of actuator for lifting.
- If actuator is spring return, ensure actuator is in the failed position and springs are de- energized before disassembling.

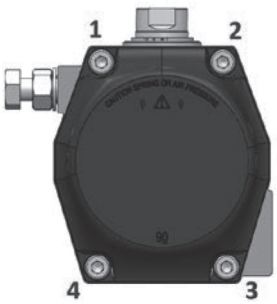
7. DISASSEMBLY

Refer the view on page 22/23/24.

a. Loosen the lock nuts #13, and remove stroke adjustment screws #5A and #5B, washers #10, and o-rings #23.

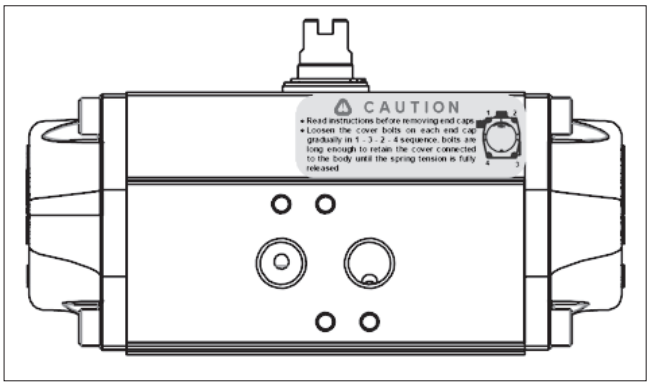


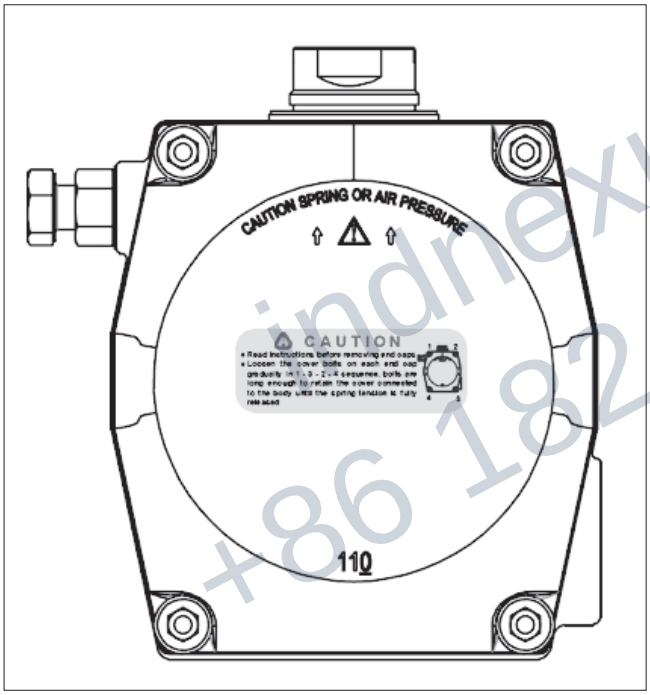
b. Loosen the cover bolts #9 on each end cap gradually in 1– 3 - 2 – 4 sequence. The bolts are long enough to retain the cover connected to the body until the spring tension is fully released.



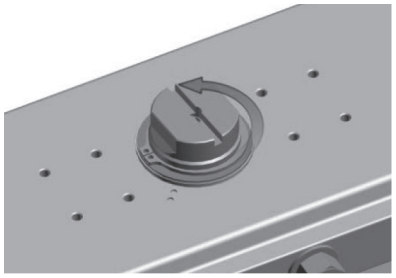
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CAUTION:
SPRING RETURN ACTUATOR END CAPS ARE UNDER SPRING TENSION. CAUTION MUST BE USED WHILE REMOVING END CAP BOLTS AND END CAPS. IT IS RECOMMENDED TO PUT ACTUATOR INTO A PRESS DURING REMOVAL OF END CAPS TO ENSURE SAFE RELEASE OF SPRING TENSION.

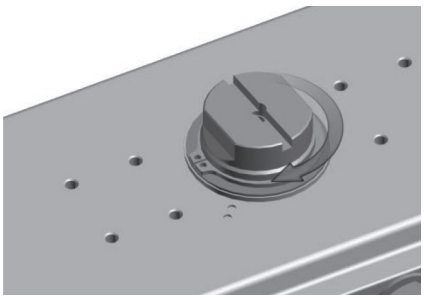




c. Rotate the pinion #2 in the counter clockwise direction (For double acting & Spring return fail safe close actuators) until the pinion becomes free.

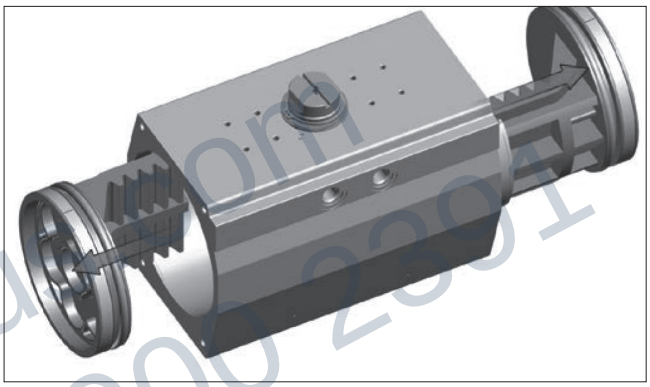


Rotate the pinion #2 in the clockwise direction (For Spring return fail safe open actuators) until the pinion becomes free.

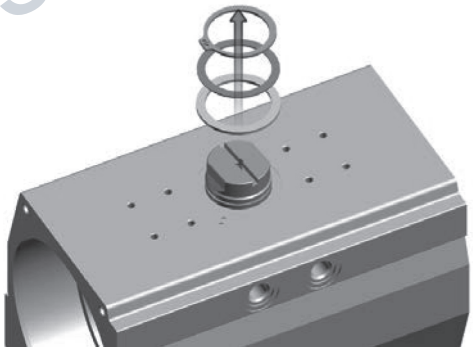


d. Pull the piston out from each side by holding with pliers.

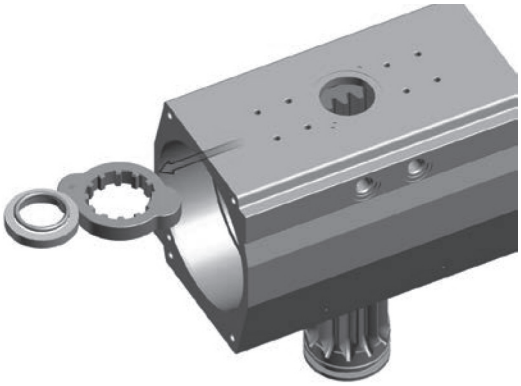
CAUTION:
NEVER attempt to remove pistons from actuator body using air pressure when the end caps have been removed!!



e. Remove external circlip # 17 and then washers #10 and #19.

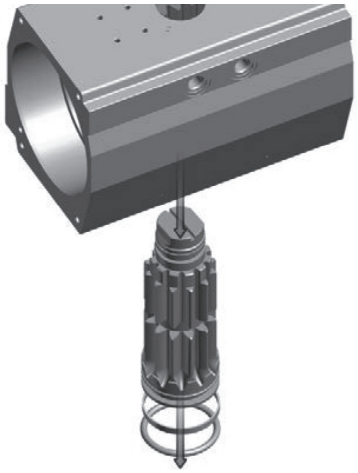


f. Tap the pinion gently from the top using a rubber mallet until the pinion is approximately half way into the body. Remove the top pinion seal #14 and the top pinion bearing #18. Remove the cam #08.



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g. Pull the pinion the rest of the way out of the body. Check the pinion bearing #5 for its condition. If removal and replacement of the pinion bearings are required, carefully push the pinion bearing off with the help of a screw driver and remove from the body. Remove the rack bearing #12. Remove the bottom pinion bearing #15, the bottom pinion seal #11, and the end cap seals #16.



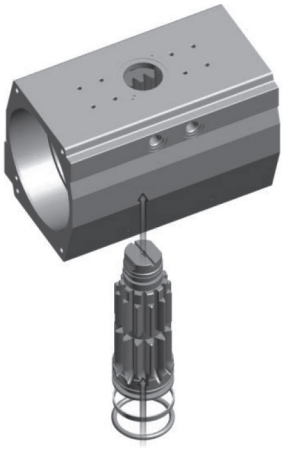
8. ASSEMBLY FOR DOUBLE ACTING & STANDARD MODE SPRING TO RETURN (FAIL CLOCKWISE, CW)

NOTE:

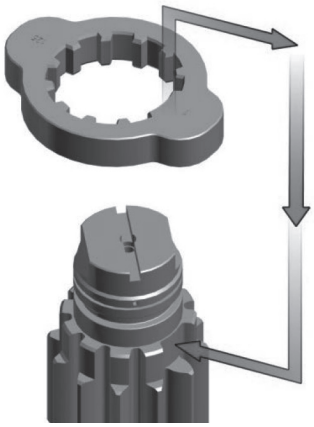
- Follow the sequences as given below to ensure proper assembly.
- Use only the recommended accessories and lubricants.

a. Clean all the parts.

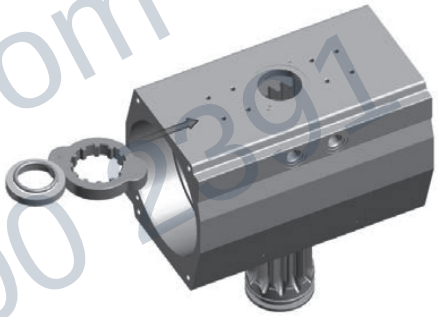
b. Fit bottom pinion bearing #15 and bottom pinion seal #11 on to the pinion #2. Apply recommended grease over the pinion bearing surface #15 and on the bottom pinion seal #11. Apply a thin coat all over the surface; avoid excess grease. Insert pinion carefully into the body #1 from the bottom, approximately half way.



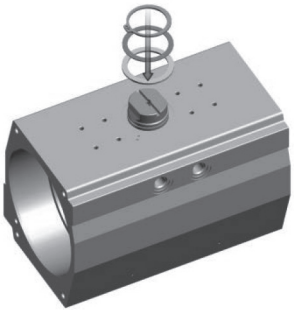
c. While installation of cam #8 match cam slot with pinion #2 slot properly as shown.



d. Install top pinion seal #14 on pinion and apply a light layer of grease. Install top pinion bearing #18 on pinion. Push the pinion the rest of the way into the body.
Apply gentle force while rotating the pinion to facilitate the insertion.



e. Install polyacetal washer #10, SS washer #19, and external circlip #17 on top of pinion. Check for free rotation of pinion.

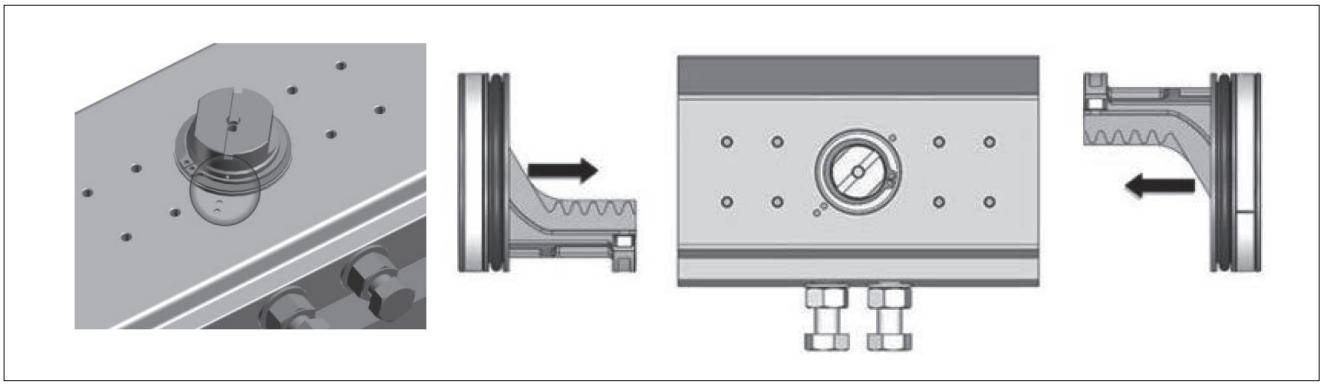


f. Apply recommended grease over the bore of the body; avoid excess grease.

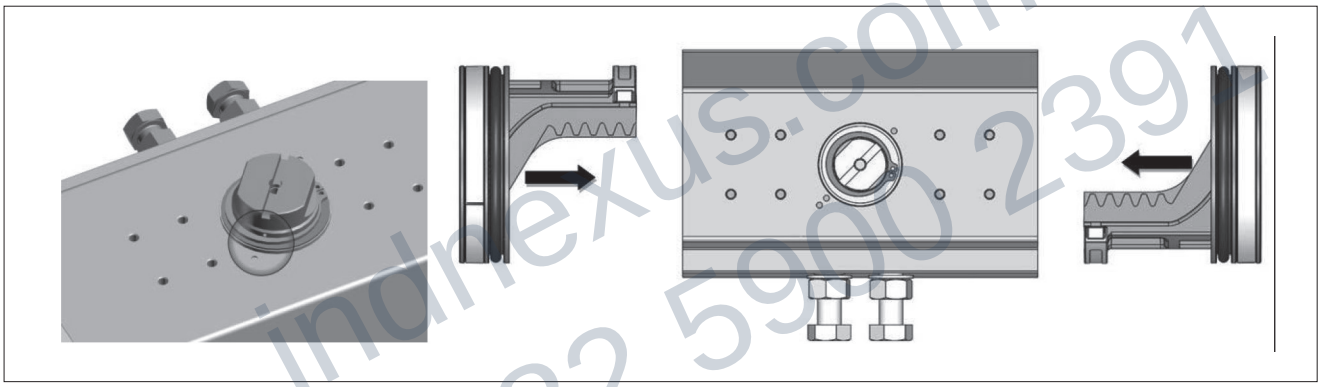
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g. Rotate the pinion so that the dot on the pinion is positioned close to the two dots on the top pad of the actuator body for accurate pinion alignment.

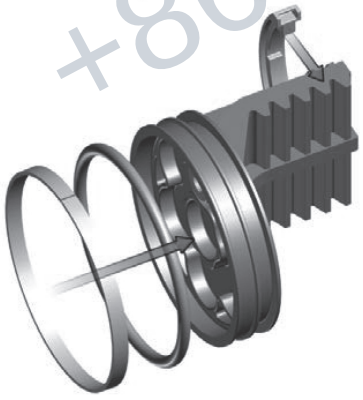
For counterclockwise (CCW) assembly dot on the pinion is positioned close to the two dots on the top pad of the actuator body, then assemble piston.



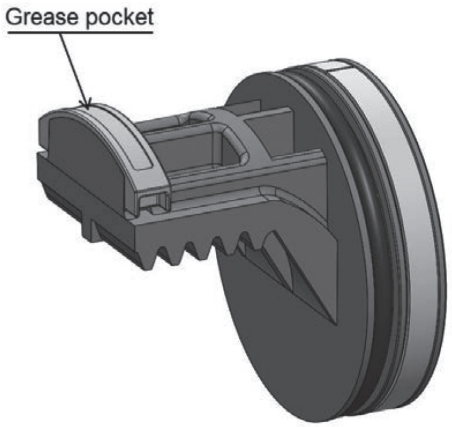
For clockwise (CW) assembly dot on the pinion is positioned close to the single dot on the top pad of the actuator body, then assemble piston



h. Fit rack bearing in piston with rack.



i. Apply grease on outer surface of rack bearing and put some grease in pocket



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j. Ensure both the pistons are engaged in the same position. Same amount of gap between the face of each piston and the end of the body will confirm this.

k. For spring return actuators, insert the springs.

NOTE:

- While assembling springs and end caps on spring return actuators, it is necessary to have the actuator body in the vertical position. This is required to ensure that springs remain properly aligned and centered during assembly.

q. Fix the seals #16 on the left and right end caps and install on to body. Ensure the air ports on the end caps are aligned properly. Ensure uniform tightening sequence of the bolts 1 – 3 – 2 – 4.

r. Install stroke adjustment screws #5A and 5B with o-rings #23, washers #24, and lock nuts #13.

s. Apply air to Port A to move pistons to the extended 90 degree position.

t. Adjust stroke adjustment screw #5A for the 90 degree position, turning clockwise until the screw is barely touching the piston. Tighten the lock nut.

u. For spring return actuators, release the air pressure, for double acting actuators, apply air to Port B. This will bring the pistons back to the 0 degree position.

v. Adjust the stroke adjustment screw #5A for the 0 degree position, turning clockwise until the bolt is barely touching the piston. Tighten the lock nut.

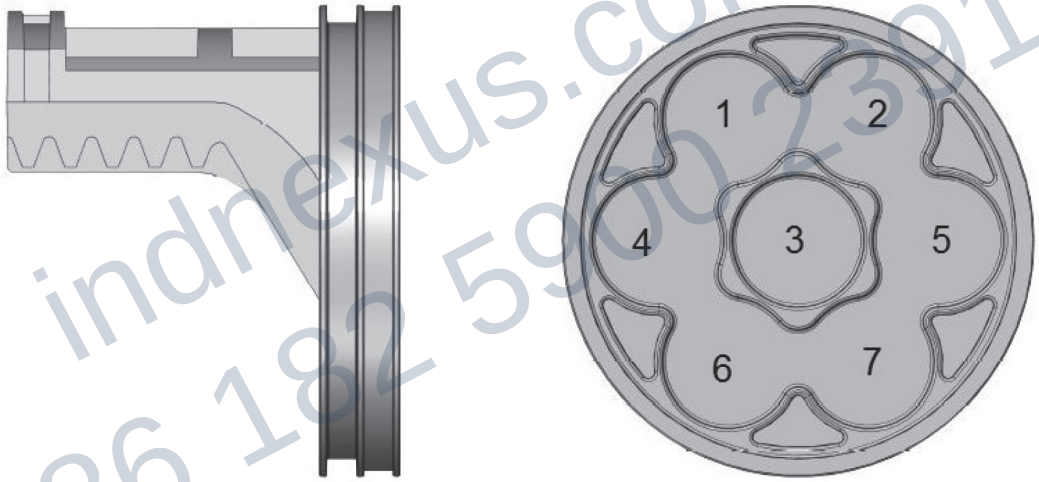
w. Apply air as required to stroke the actuator several times to confirm that the stroke adjustment screws are set correctly and ensure that there is no air leakage from any of the seals.

x. Re-install or repack for storage (see section 11 for Packaging and Storage).

y. For flower spring structure follow the instructions same as that of concentric structure.

z. For positioning of flower spring structure please refer fig.

Spring capsule positions for different number of springs



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WARNINGS

- Use only genuine spares parts supplied by Valmet.
- Use only the recommended accessories and lubricants.
- Install, operate and maintain as per the instructions and recommendations of this manual.
- No metal should fall on actuator body to ensure no spark generation in actuator body.
- All accessories should have explosion protection or intrinsically safe.
- Any deviation from the above warnings will cease the responsibilities of Valmet.

9. MALFUNCTIONS

Table 5. lists malfunctions that might occur after prolonged use		
Symptom	**Possible cause**	**Action**
Irregular or slow operation	Low supply pressure	Make sure that supply pressure complies with minimum torque required by valve. Check that supply air pipes are large enough.
	Positioner fault	Check positioner operation.
	Valve fault	Check that valve functions properly without actuator.
	Incorrect actuator rating	Contact manufacturer to check rating.
	Leak in piston or piston rod seal	Replace seals.
	Cylinder damaged by impurities	Note installation position recommendation. Replace cylinder if damaged.
	Worn-out actuator bearings	Check bearings. Replace bearings when neccessary.
	Moving parts corroded in harsh, humid conditions	Replace the corroded parts.
	Backlash in joint between actuator and valve	Replace parts as necessary.

10. TOOLS

For maintenance of the RNP series actuator, you will need a few common tools.

10.1 TIGHTENING TORQUE TABLE

RNP cover bolt tightening torque		
Actuator model	**Bolt size (#9)**	**Tightening torque (Nm)**
RNP 40	M6	8
RNP 50		
RNP 63		
RNP 80		
RNP 90	M8	20
RNP 100		
RNP 110		
RNP 125		
RNP 150	M10	40
RNP 175		
RNP 200	M12	70
RNP 250		
RNP 300		
RNP 350		

RNP stopper bolt nut tightening torque		
Actuator model	**Bolt size (#9)**	**Tightening torque (Nm)**
RNP 40	M6	8
RNP 50		
RNP 63	M8	20
RNP 80		
RNP 90	M12	70
RNP 100		
RNP 110		
RNP 125	M14	110
RNP 150		
RNP 175	M16	173
RNP 200	M18	238
RNP 250		
RNP 300	M24	582
RNP 350		

11. ORDERING SPARE PARTS

NOTE:
USE ONLY ORIGINAL SPARE PARTS. THIS ENSURES PROPER FUNCTIONING OF THE ACTUATOR.

When ordering spare parts, always include following information.

- Type code, sales order number, serial number
- Number of the parts list, part number, name of the part and required quantity

This information can be found from the identification plate or documents.

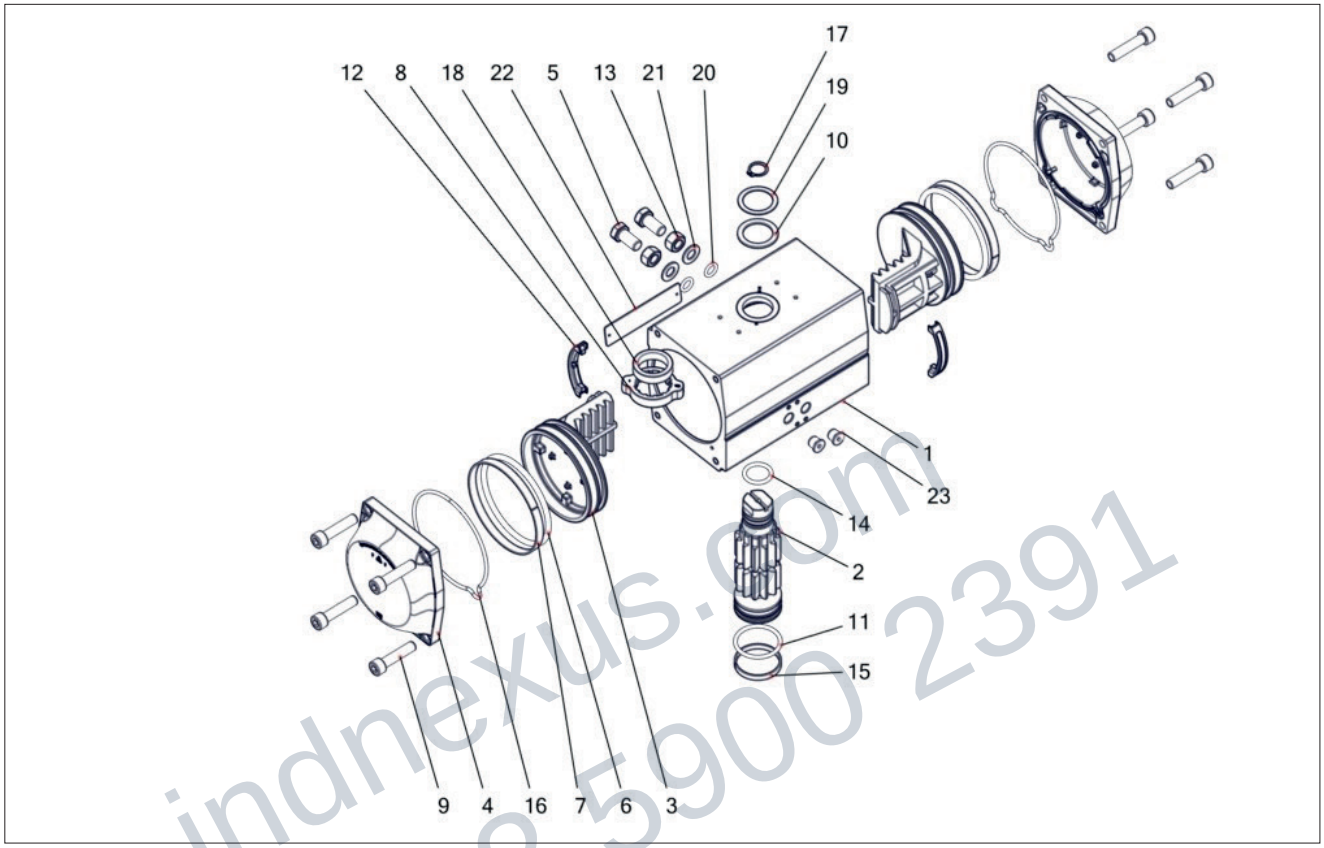
Spare part kit ID-codes per model					
Sr. No.	**Actuator Model**	**NBR Seal Kit**	**Viton Seal Kit**	**Fluorosilicone Seal Kit**	**Bearing Kit**
1	RNP 40	MA0248830	MA0248844	MA0456722	MA0248858
2	RNP 50	MA0248831	MA0248845	MA0456405	MA0248859
3	RNP 63	MA0248832	MA0248846	MA0456406	MA0248860
4	RNP 80	MA0248833	MA0248847	MA0456407	MA0248861
5	RNP 90	MA0248834	MA0248848	MA0456409	MA0248862
6	RNP 100	MA0248835	MA0248849	MA0456410	MA0248863
7	RNP 110	MA0248836	MA0248850	MA0456411	MA0248864
8	RNP 125	MA0248837	MA0248851	MA0456412	MA0248865
9	RNP 150	MA0248838	MA0248852	MA0456413	MA0248866
10	RNP 175	MA0248839	MA0248853	MA0456415	MA0248867
11	RNP 200	MA0248840	MA0248854	MA0456416	MA0248868
12	RNP 250	MA0248841	MA0248855	MA0456417	MA0248869
13	RNP 300	MA0248842	MA0248856	MA0456418	MA0248870
14	RNP 350	MA0248843	MA0248857	MA0456419	MA0248871

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12. EXPLODED VIEWS AND PARTS LIST

12.1 DOUBLE ACTING VERSION

DOUBLE ACTING RNP 40...110 DA



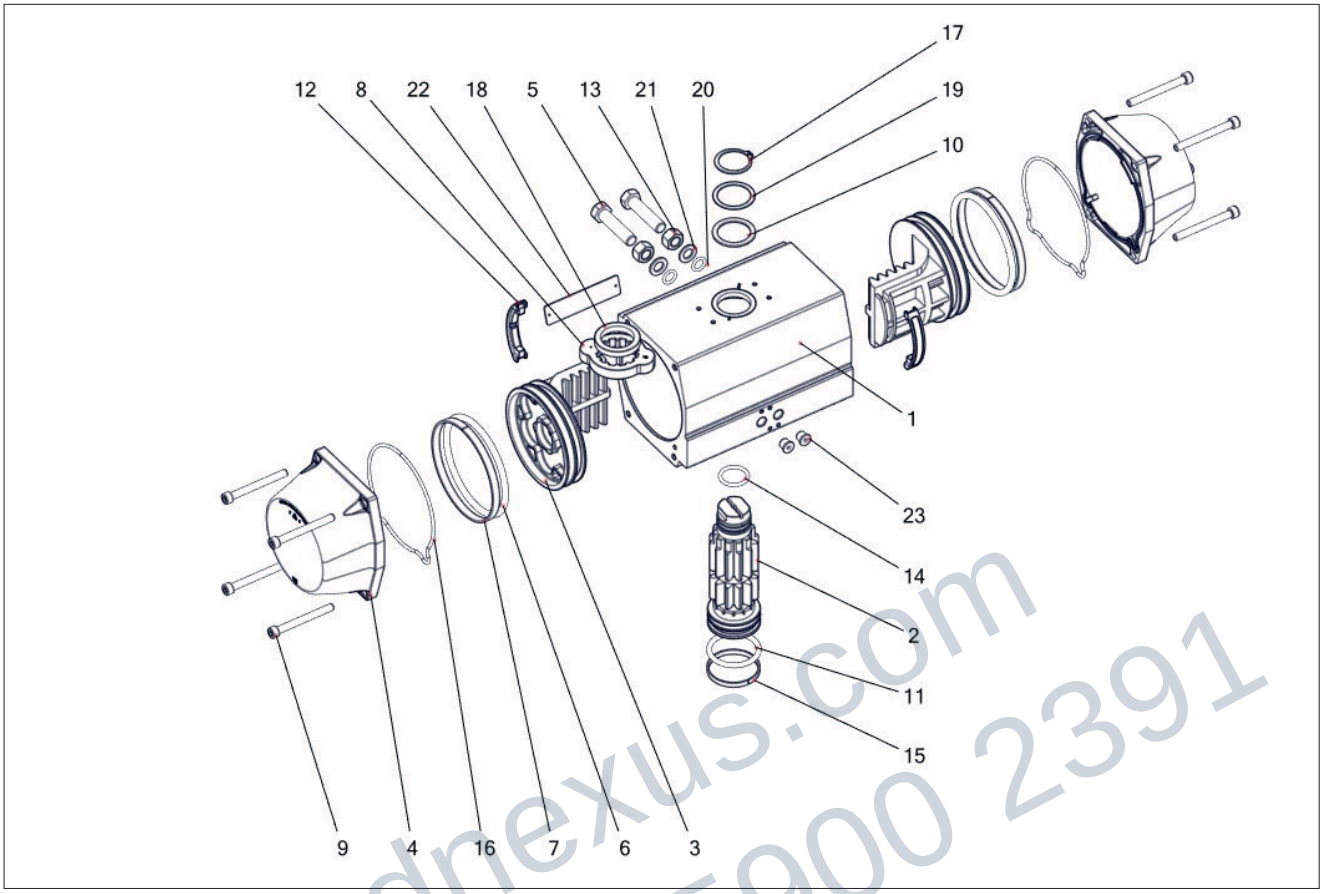
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	

NOTE
1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

DOUBLE ACTING RNP 125...175 DA



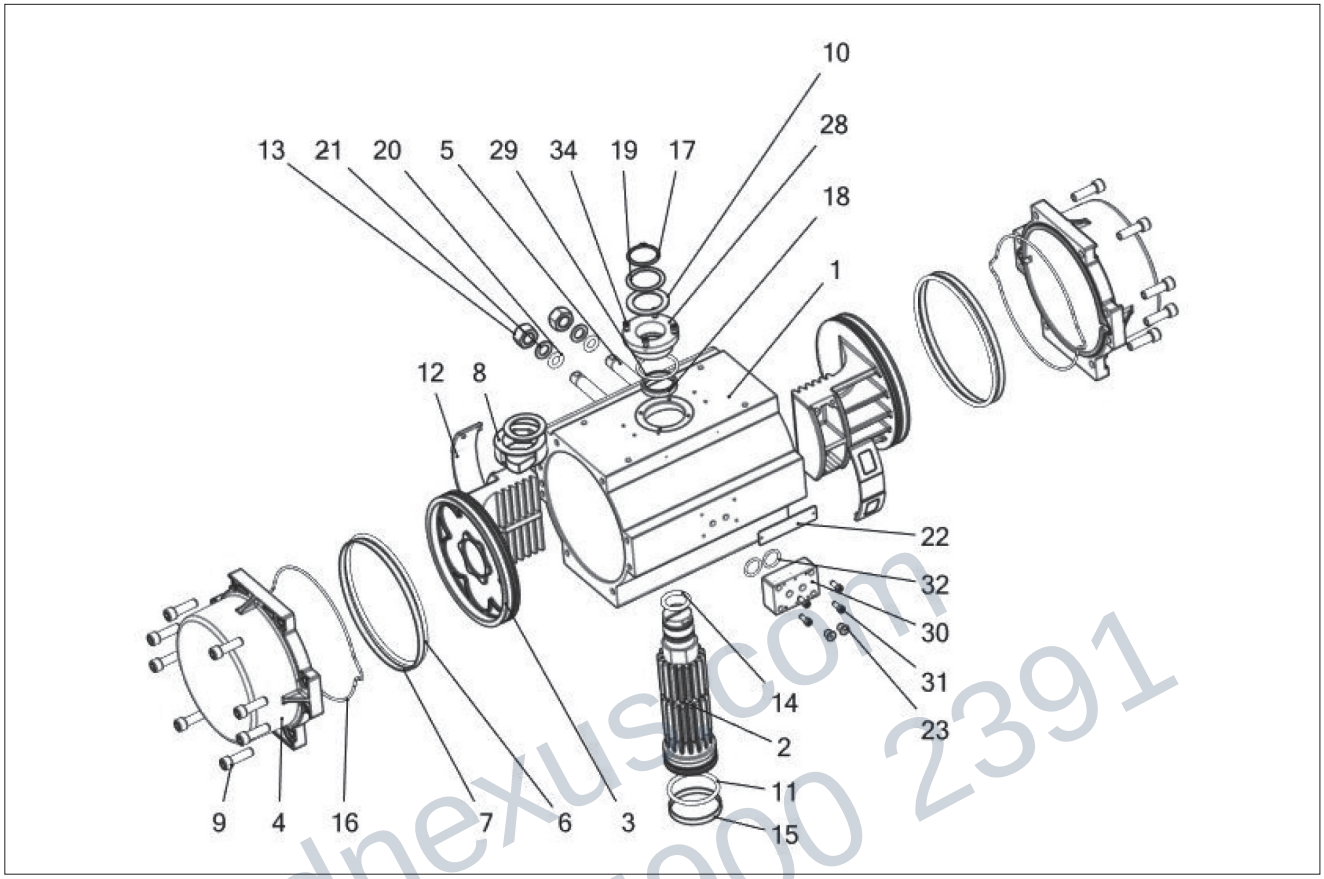
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	

NOTE
1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

DOUBLE ACTING RNP 200...250 DA



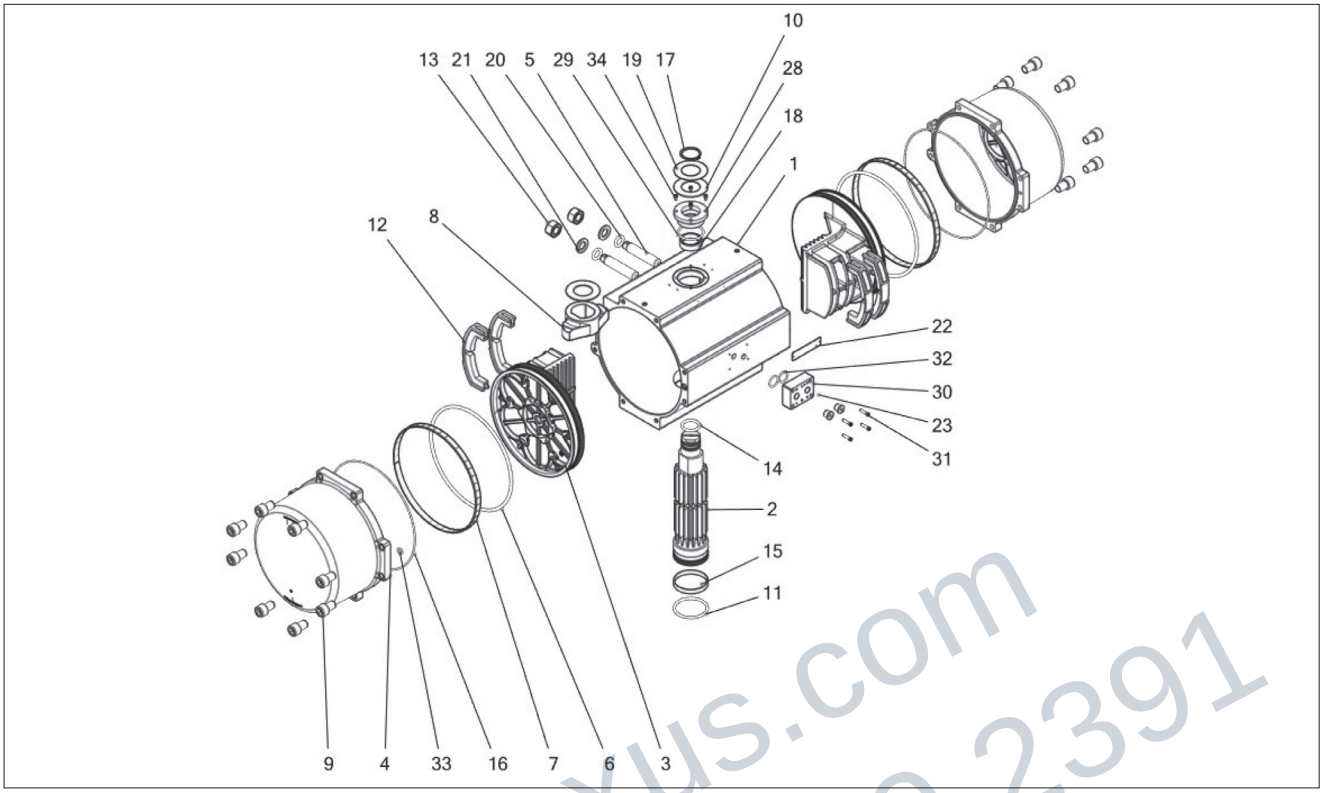
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	16	COVER BOLT	STAINLESS STEEL	AISI304	
10#	2	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (BOTTOM PINION)	NITRILE RUBBER	NBR 70SHORE A	
12#	4	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (TOP PINION)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
28	1	BEARING BUSH HOUSING	ALUMINIUM	6063T5/T6; 6005-T6/T5	
29*	1	O-RING (BEARING BUSH HOUSING)	NITRILE RUBBER	-	
30	1	MANIFOLD	ALUMINIUM	6351-T6	
31	4	MANIFOLD BOLT	STAINLESS STEEL	AISI304	
32*	2	MANIFOLD O-RING	NITRILE RUBBER	-	
34	4	BEARING BUSH HOUSING BOLT	STAINLESS STEEL	AISI304	

NOTE
1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

DOUBLE ACTING RNP 300 - 350 DA



BILL OF MATERIALS AND PARTS LIST

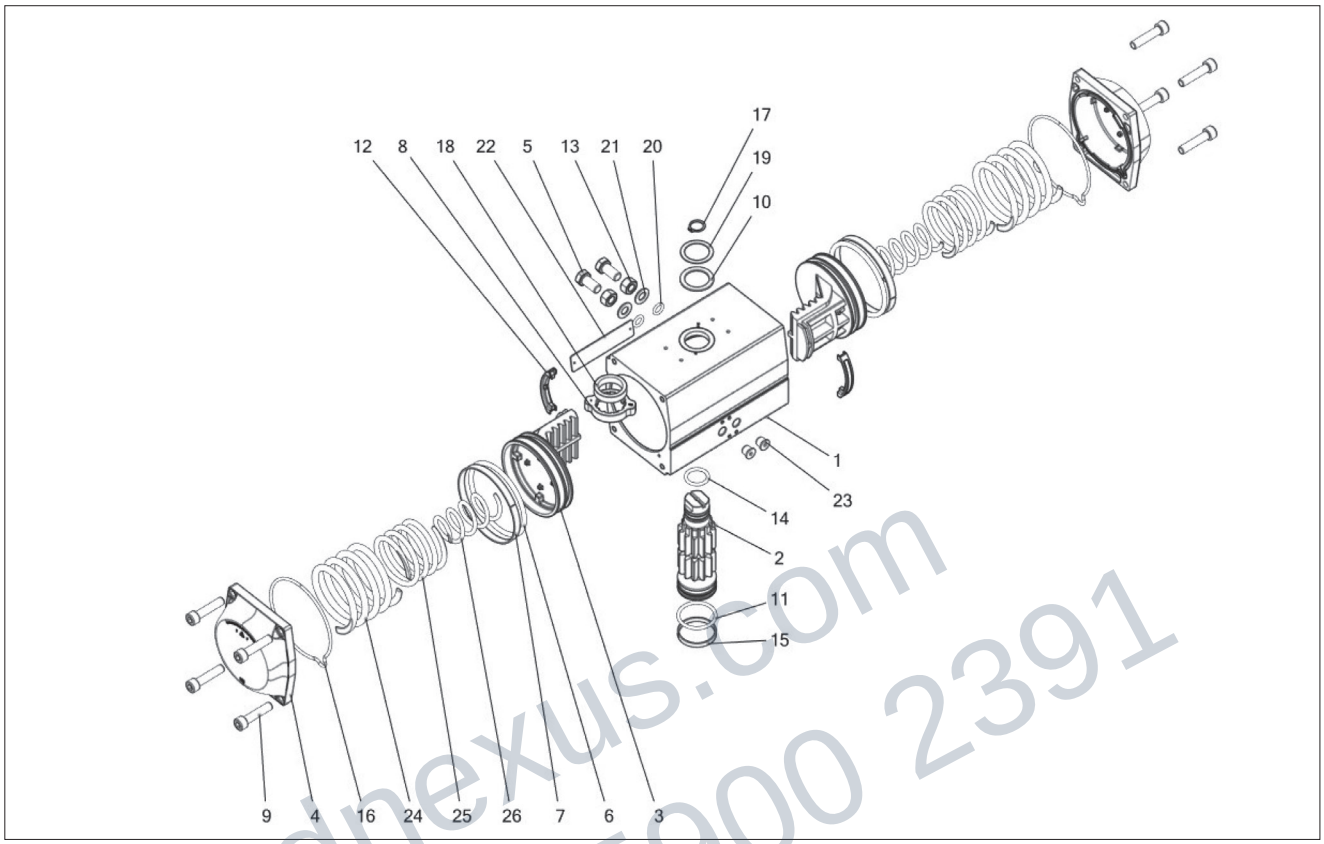
ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	16	COVER BOLT	STAINLESS STEEL	AISI304	
10#	2	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (BOTTOM PINION)	NITRILE RUBBER	NBR 70SHORE A	
12#	4	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (TOP PINION)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
28	1	BEARING BUSH HOUSING	ALUMINIUM	6063T5/T6; 6005-T6/T5	
29*	1	O-RING (BEARING BUSH HOUSING)	NITRILE RUBBER	-	
30	1	MANIFOLD	ALUMINIUM	6351-T6	
31	4	MANIFOLD BOLT	STAINLESS STEEL	AISI304	
32*	2	MANIFOLD O-RING	NITRILE RUBBER	-	
33*	2	O-RING SMALL (BODY)	NITRILE RUBBER	-	
34	4	BEARING BUSH HOUSING BOLT	STAINLESS STEEL	AISI304	

NOTE
1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components

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12.2 SINGLE ACTING VERSION

SINGLE ACTING RNP 40...110 SA



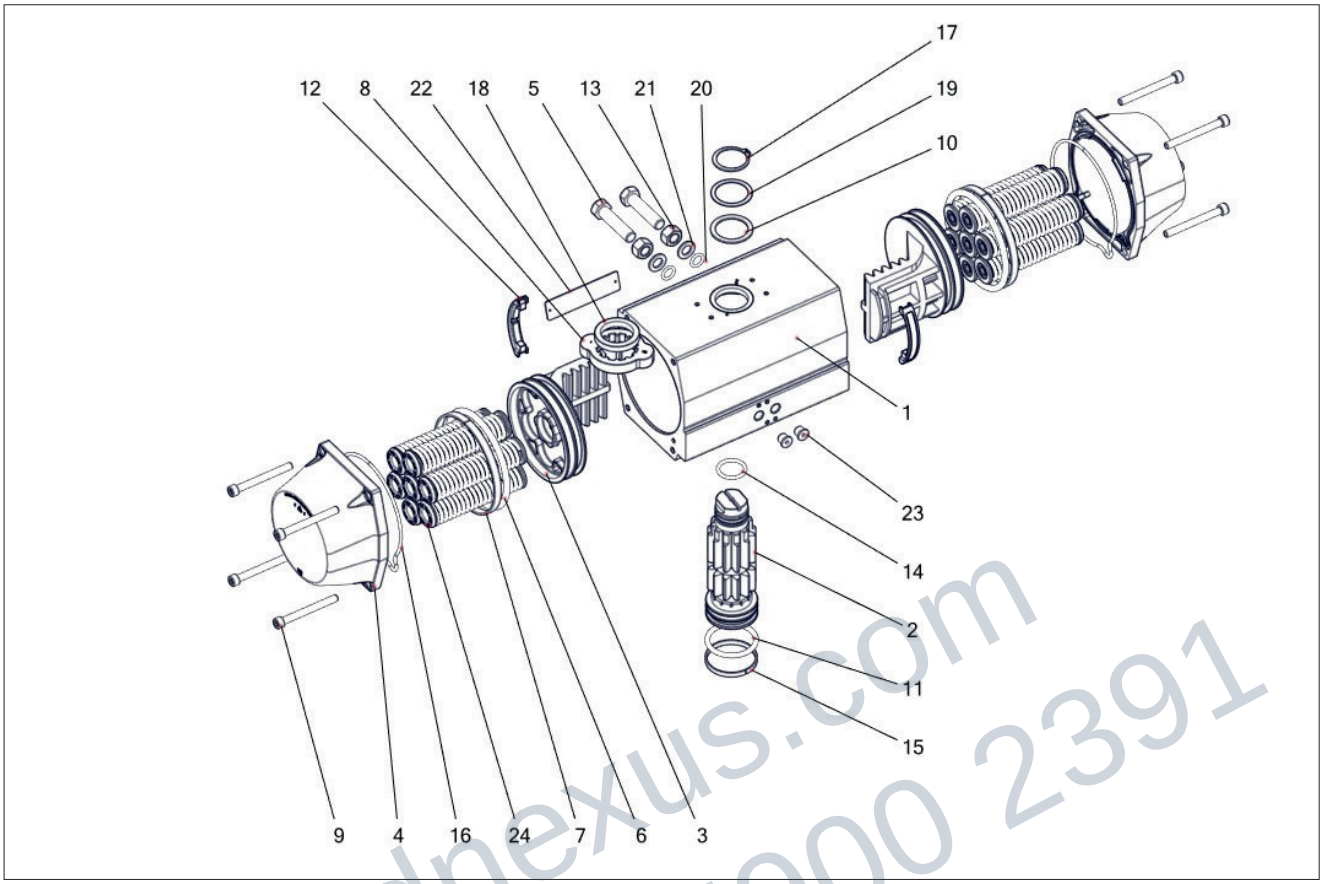
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN. 1 / MAX. 2	OUTER SPRING	SPRING STEEL	-	EPOXY POWDER COATED
25	MIN. 1 / MAX. 2	MIDDLE SPRING	SPRING STEEL	-	EPOXY POWDER COATED
26	MIN. 1 / MAX. 2	INNER SPRING	SPRING STEEL	-	EPOXY POWDER COATED

NOTE
1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
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SINGLE ACTING RNP 125...175 SA



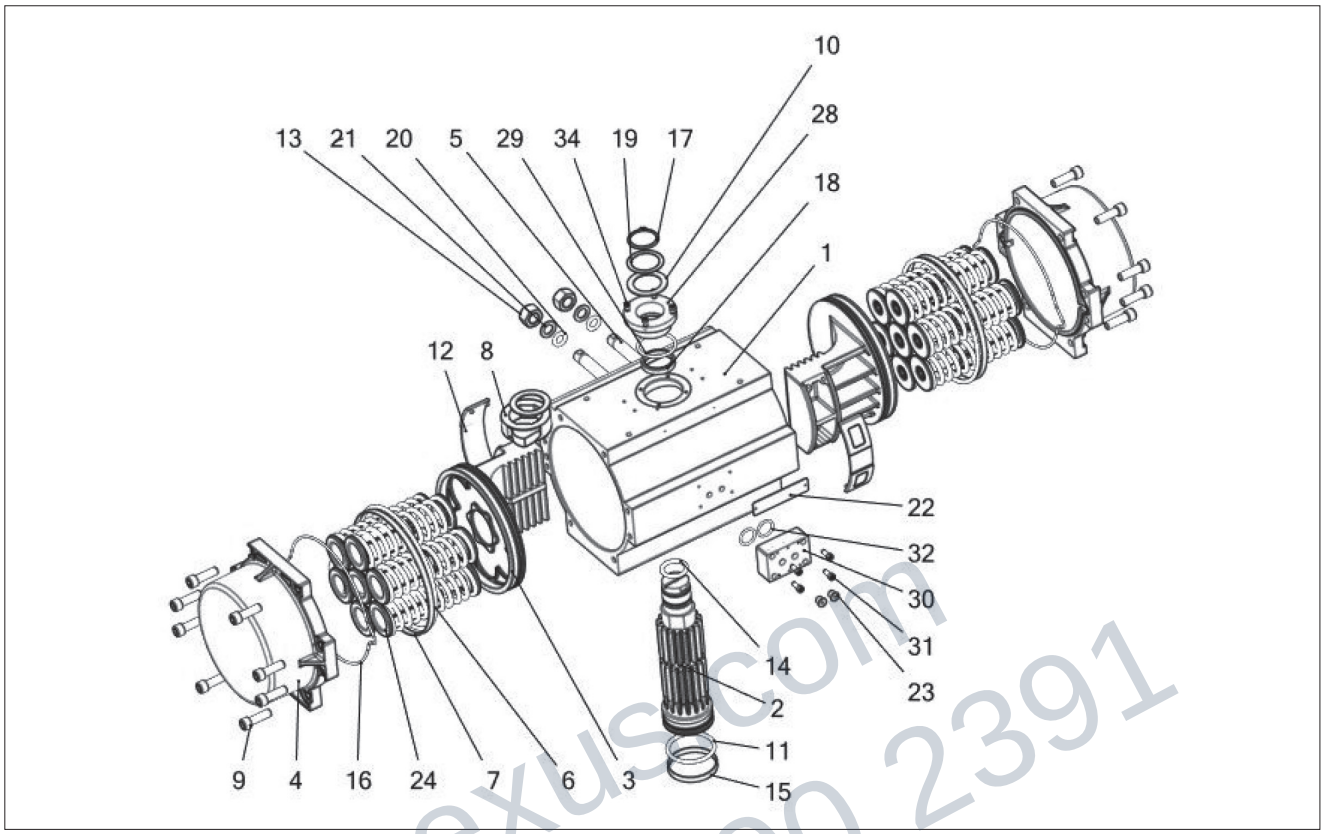
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 14	SPRING (CARTRIDGE)	SPRING STEEL	-	EPOXY POWDER COATED

NOTE
1 * Marked components are the parts of the seal kit
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SINGLE ACTING RNP 200...250



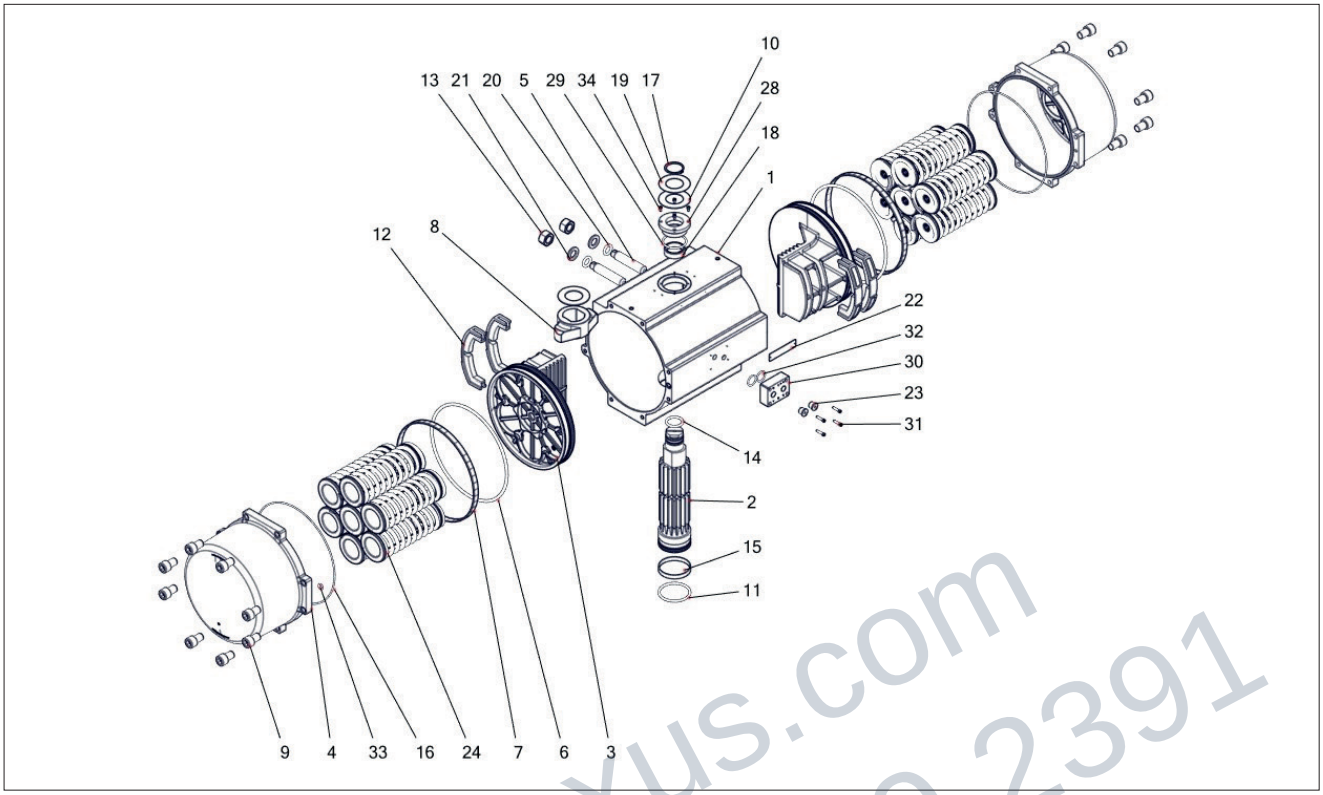
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	16	COVER BOLT	STAINLESS STEEL	AISI304	
10#	2	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (BOTTOM PINION)	NITRILE RUBBER	NBR 70SHORE A	
12#	4	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (TOP PINION)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 14	SPRING (CARTRIDGE)	SPRING STEEL	-	EPOXY POWDER COATED
28	1	BEARING BUSH HOUSING	ALUMINIUM	6063T5/T6; 6005-T6/T5	
29*	1	O-RING (BEARING BUSH HOUSING)	NITRILE RUBBER	-	
30	1	MANIFOLD	ALUMINIUM	6351-T6	
31	4	MANIFOLD BOLT	STAINLESS STEEL	AISI304	
32*	2	MANIFOLD O-RING	NITRILE RUBBER	-	
34	4	BEARING BUSH HOUSING BOLT	STAINLESS STEEL	AISI304	

NOTE
1 * Marked components are the parts of the seal ki
2 # Marked components are the parts of bearing kit.
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SINGLE ACTING RNP 300...350 SA



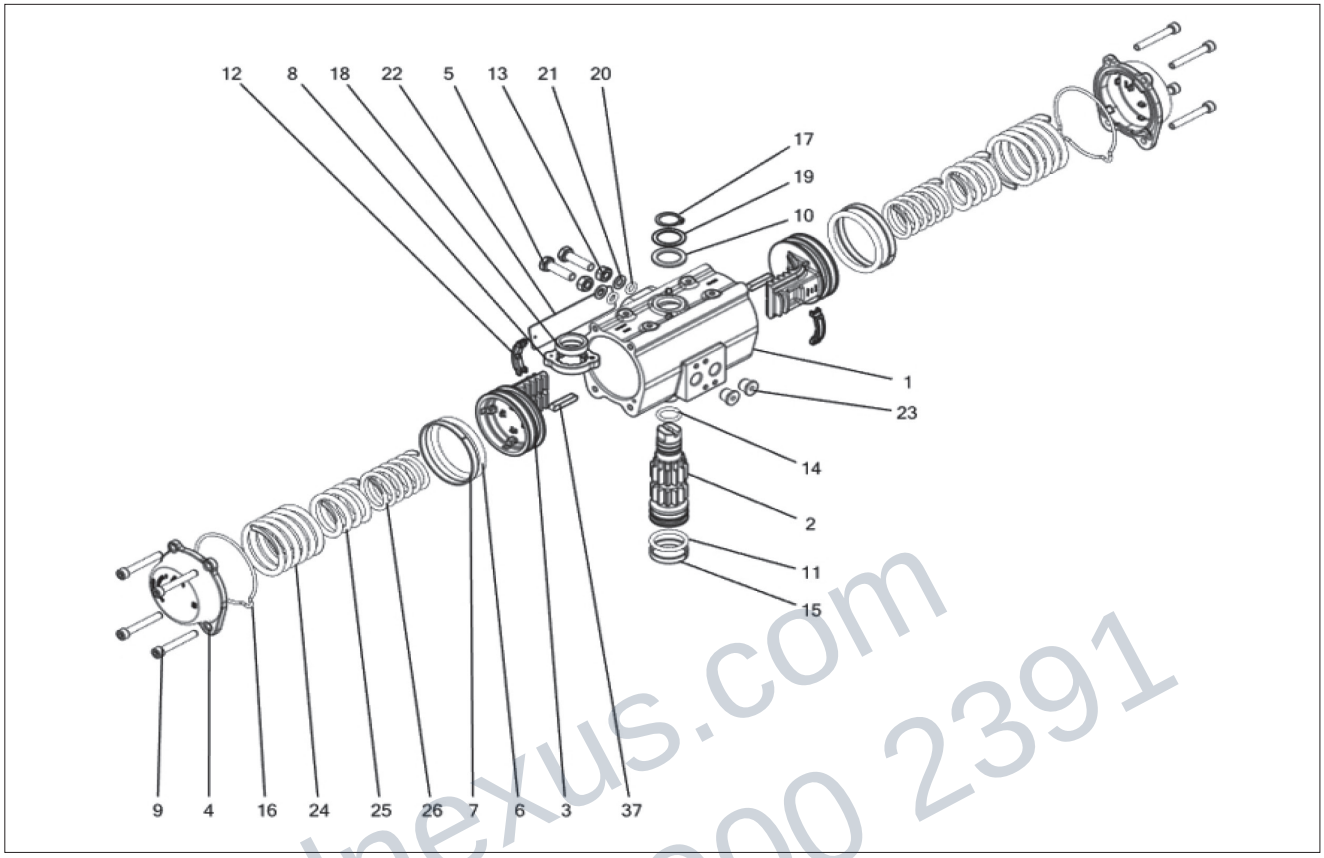
BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	ALUMINIUM	6063T5/T6; 6005-T6/T5	HARD ANODISED
2♦	1	PINION	STEEL	EN8	ZINC FLACKING
3♦	2	PISTON WITH RACK	ALUMINIUM	LM13	HARD ANODISED
4♦	2	COVER	ALUMINIUM	LM6	EPOXY POWDER COATED
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	16	COVER BOLT	STAINLESS STEEL	AISI304	
10#	2	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (BOTTOM PINION)	NITRILE RUBBER	NBR 70SHORE A	
12#	4	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (TOP PINION)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 14	SPRING (CARTRIDGE)	SPRING STEEL	-	EPOXY POWDER COATED
28	1	BEARING BUSH HOUSING	ALUMINIUM	6063T5/T6; 6005-T6/T5	
29*	1	O-RING (BEARING BUSH HOUSING)	NITRILE RUBBER	-	
30	1	MANIFOLD	ALUMINIUM	6351-T6	
31	4	MANIFOLD BOLT	STAINLESS STEEL	AISI304	
32*	2	MANIFOLD O-RING	NITRILE RUBBER	-	
33*	2	O-RING SMALL (BODY)	NITRILE RUBBER	-	
34	4	BEARING BUSH HOUSING BOLT	STAINLESS STEEL	AISI304	

NOTE 1 * Marked components are the parts of the seal kit
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

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SINGLE ACTING RNP 40, 63, 90, 110 SA STEEL VERSION



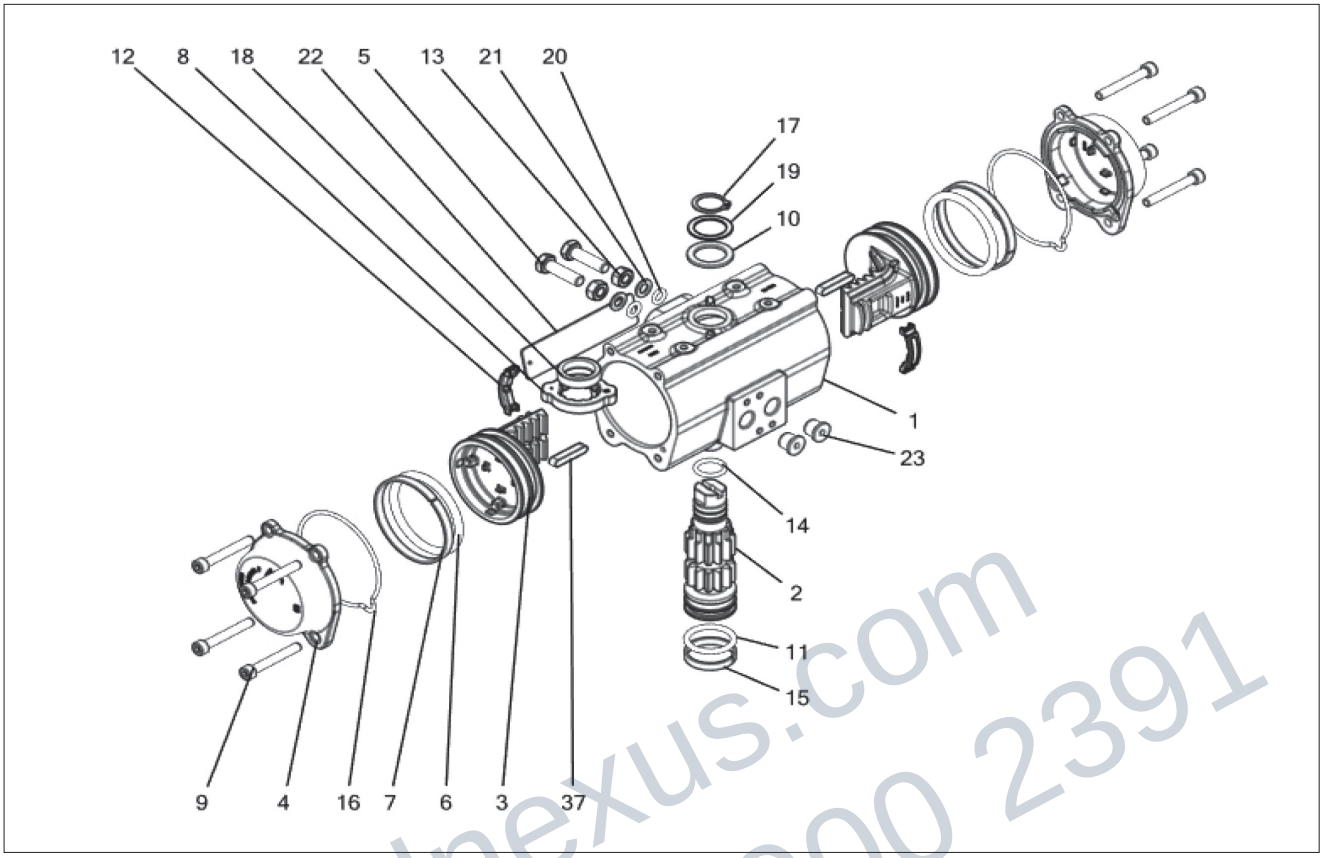
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 2	OUTER SPRING	SPRING STEEL	-	EPOXY POWDER COATED
25	MIN.1 / MAX. 2	MIDDLE SPRING	SPRING STEEL	-	EPOXY POWDER COATED
26	MIN.1 / MAX. 2	INNER SPRING	SPRING STEEL	-	EPOXY POWDER COATED
37	2	PISTON KEY	STEEL	EN8	

NOTE 1* Marked components are the parts of the seal kit.
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

DOUBLE ACTING RNP 40, 63, 90, 110 DA STEEL VERSION



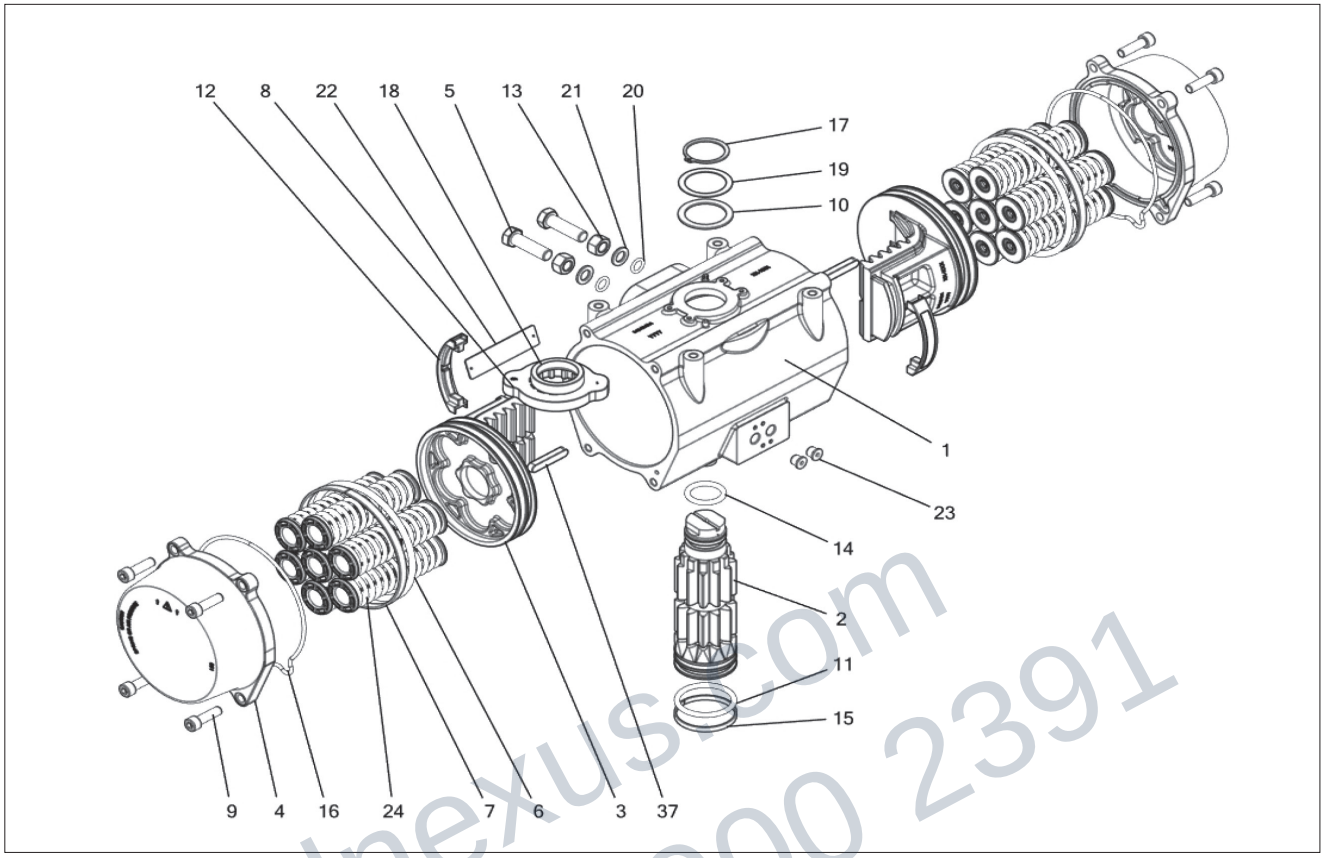
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
37	2	PISTON KEY	STEEL	EN8	

NOTE 1* Marked components are the parts of the seal kit.
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

SINGLE ACTING RNP 150,175 SA STEEL VERSION



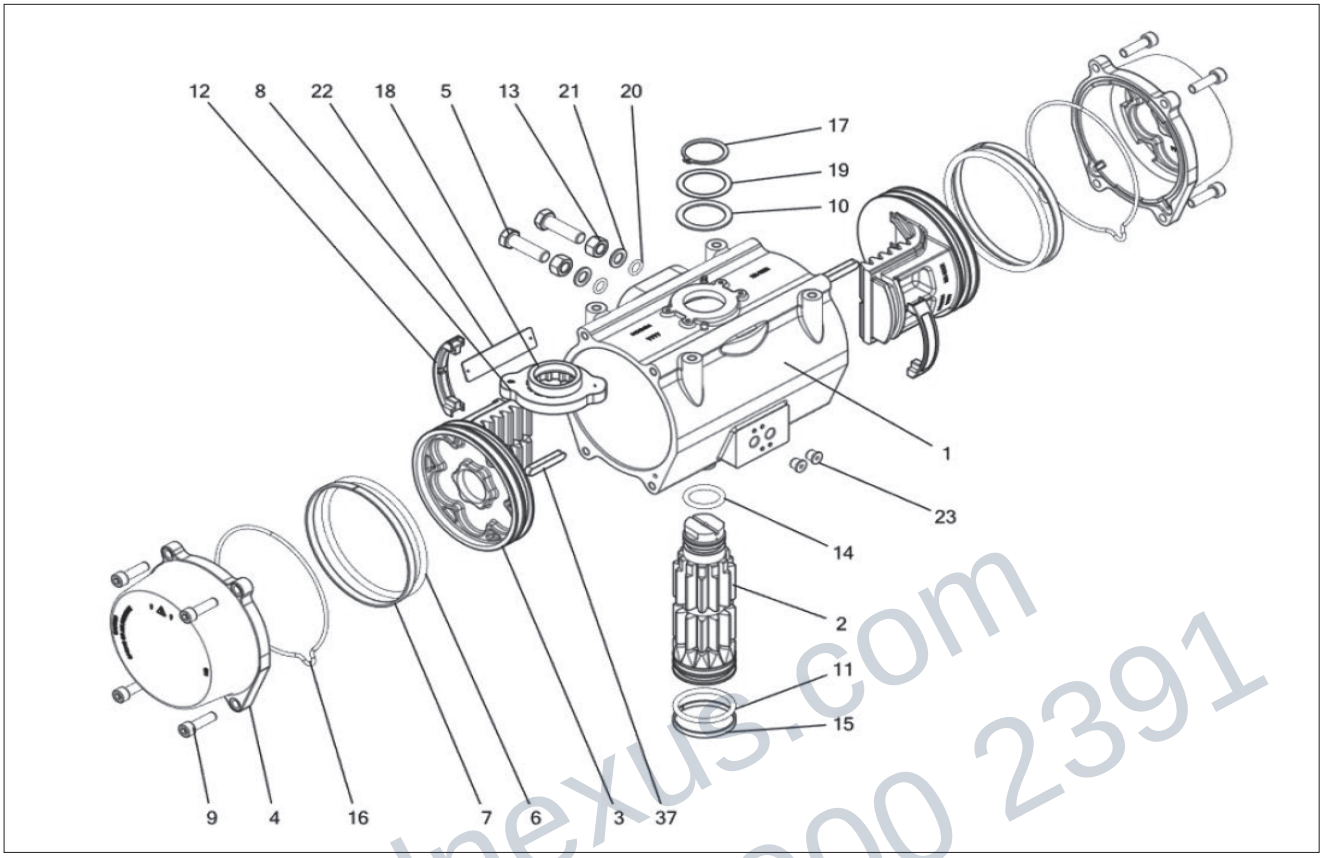
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 14	SPRING (CARTRIDGE)	SPRING STEEL	-	EPOXY POWDER COATED
37	2	PISTON KEY	STEEL	EN8	

NOTE 1* Marked components are the parts of the seal kit.
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

DOUBLE ACTING RNP 150,175 DA STEEL VERSION



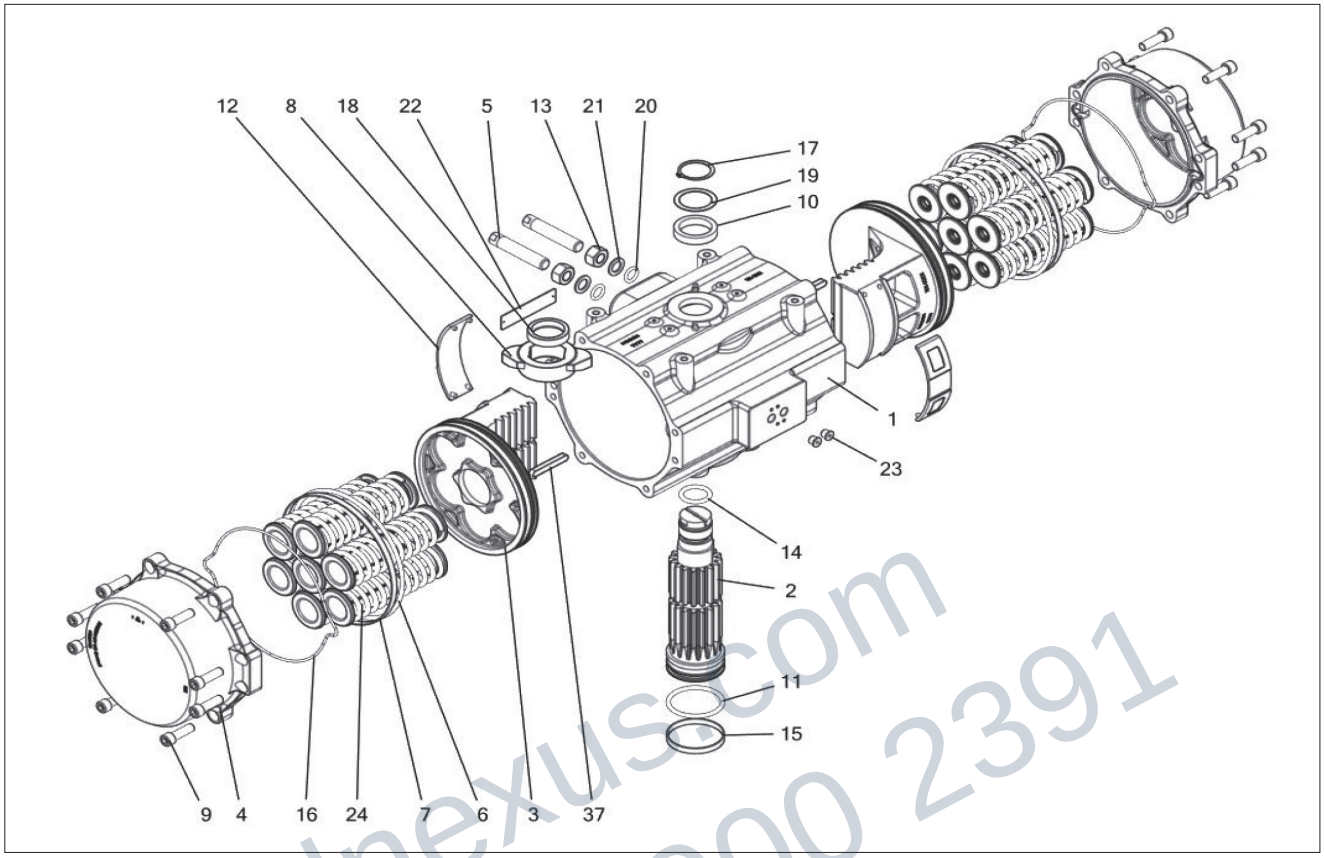
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
37	2	PISTON KEY	STEEL	EN8	

NOTE
1 * Marked components are the parts of the seal kit.
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components

SINGLE ACTING RNP 200 SA STEEL VERSION



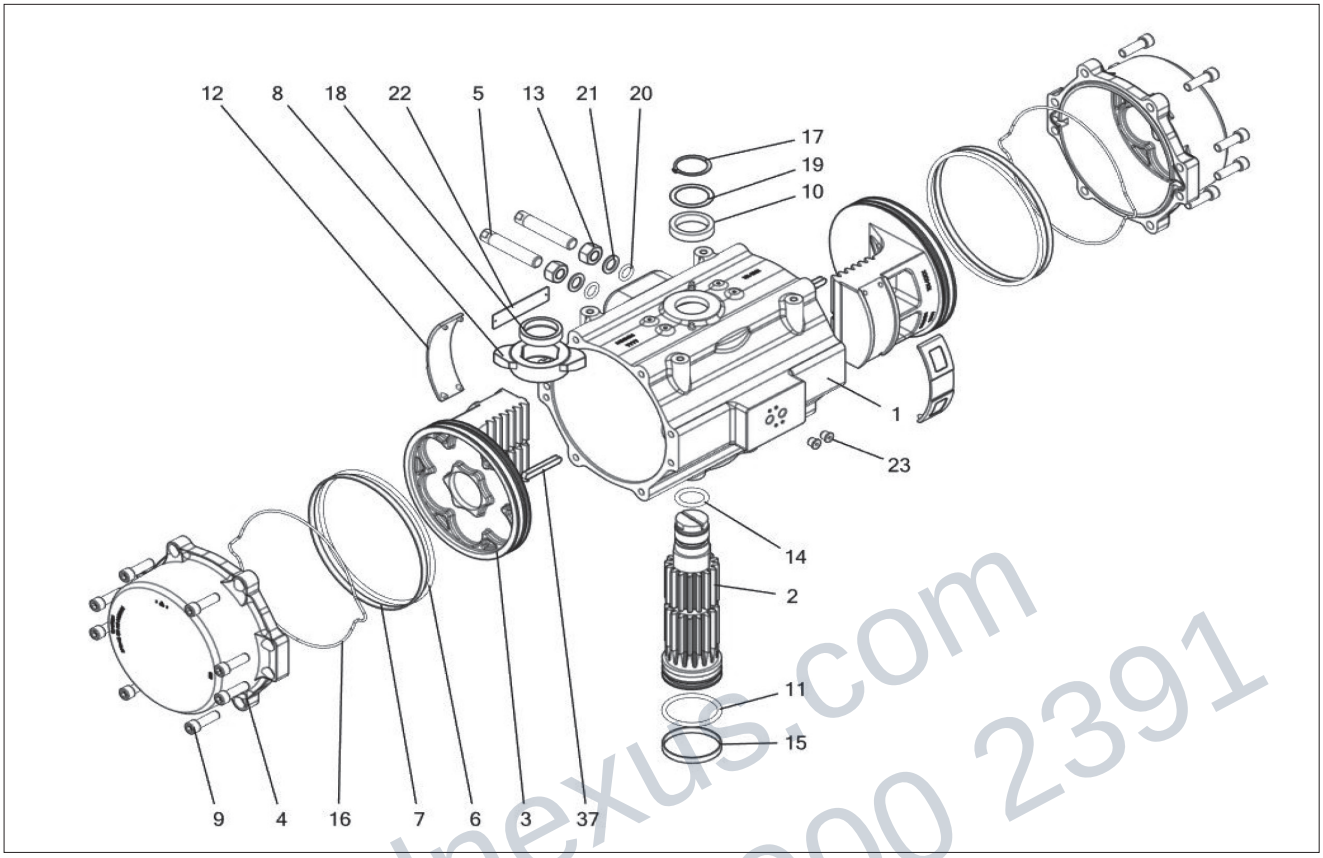
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BILL OF MATERIALS AND PARTS LIST

ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
24	MIN.1 / MAX. 14	SPRING (CARTRIDGE)	SPRING STEEL	-	EPOXY POWDER COATED
37	2	PISTON KEY	STEEL	EN8	

NOTE
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2 # Marked components are the parts of bearing kit.
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DOUBLE ACTING RNP 200 DA STEEL VERSION



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BILL OF MATERIALS AND PARTS LIST

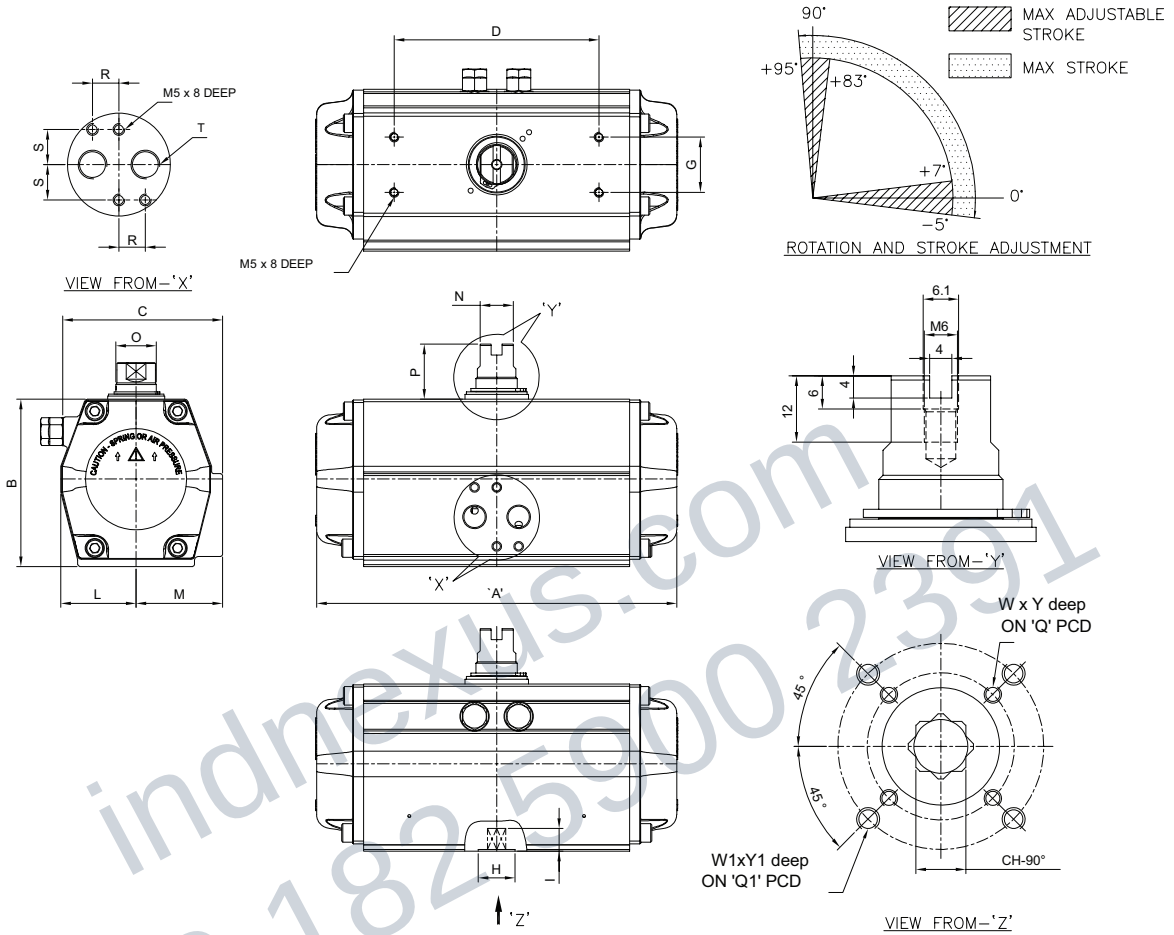
ITEM NO.	UNIT QTY.	PART DESCRIPTION	MATERIAL	SPECIFICATION	CORROSION PROTECTION
1	1	BODY	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	INSIDE BORE HARD CHROME PLATING & OUTSIDE PAINTING / POWDER COATING (WCB)
2♦	1	PINION	STEEL	EN8 (WCB) / SS316 (CF8M)	ZINC FLACKING EN8 (WCB)
3♦	2	PISTON WITH RACK	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB)
4♦	2	COVER	CARBON STEEL/ STAINLESS STEEL	ASTM A216 GR. WCB / ASTM A351 GR. CF8M	OLIVE PASSIVATION (WCB) EPOXY PAINTING/ POWDER COATING
5	2	STOPPER BOLT	STAINLESS STEEL	AISI304	
6*	2	O-RING (PISTON)	NITRILE RUBBER	NBR 70SHORE A	
7#	2	PISTON STRIP	POLYACETAL	-	
8♦	1	CAM	CAST CARBON STEEL	ASTM A216 GR WCB	OLIVE PASSIVATION
9	8	COVER BOLT	STAINLESS STEEL	AISI304	
10#	1	WASHER (PINION)	POLYACETAL	-	
11*	1	O-RING (PINION BOTTOM)	NITRILE RUBBER	NBR 70SHORE A	
12#	2	RACK BEARING	POLYACETAL	-	
13	2	NUT (STOPER BOLT)	STAINLESS STEEL	AISI304	
14*	1	O-RING (PINION TOP)	NITRILE RUBBER	NBR 70SHORE A	
15#	1	PINION STRIP	POLYACETAL	-	
16*	2	COVER SEAL	NITRILE RUBBER	NBR 70SHORE A	
17	1	CIRCLIP (PINION)	SPRING STEEL	EN47-GR.3	ZINC FLAKING
18#	1	BEARING BUSH (CAM)	POLYACETAL	-	
19	1	WASHER (PINION)	STAINLESS STEEL	AISI304	
20*	2	O-RING (STOPER BOLT)	NITRILE RUBBER	NBR 70SHORE A	
21	2	WASHER (STOPER BOLT)	STAINLESS STEEL	AISI304	
22	1	NAME PLATE	POLYESTER ALUMINIUM	-	
23	2	DUST CAP	PLASTIC	-	
37	2	PISTON KEY	STEEL	EN8	

NOTE
1 * Marked components are the parts of the seal kit.
2 # Marked components are the parts of bearing kit.
3 ♦ Marked components are critical components.

13. DIMENSIONS

13.1 RNP TECHNICAL DATA SHEET SQUARE DRIVE

TECHNICAL SPECIFICATIONS FOR RNP SQUARE BORE ACTUATOR



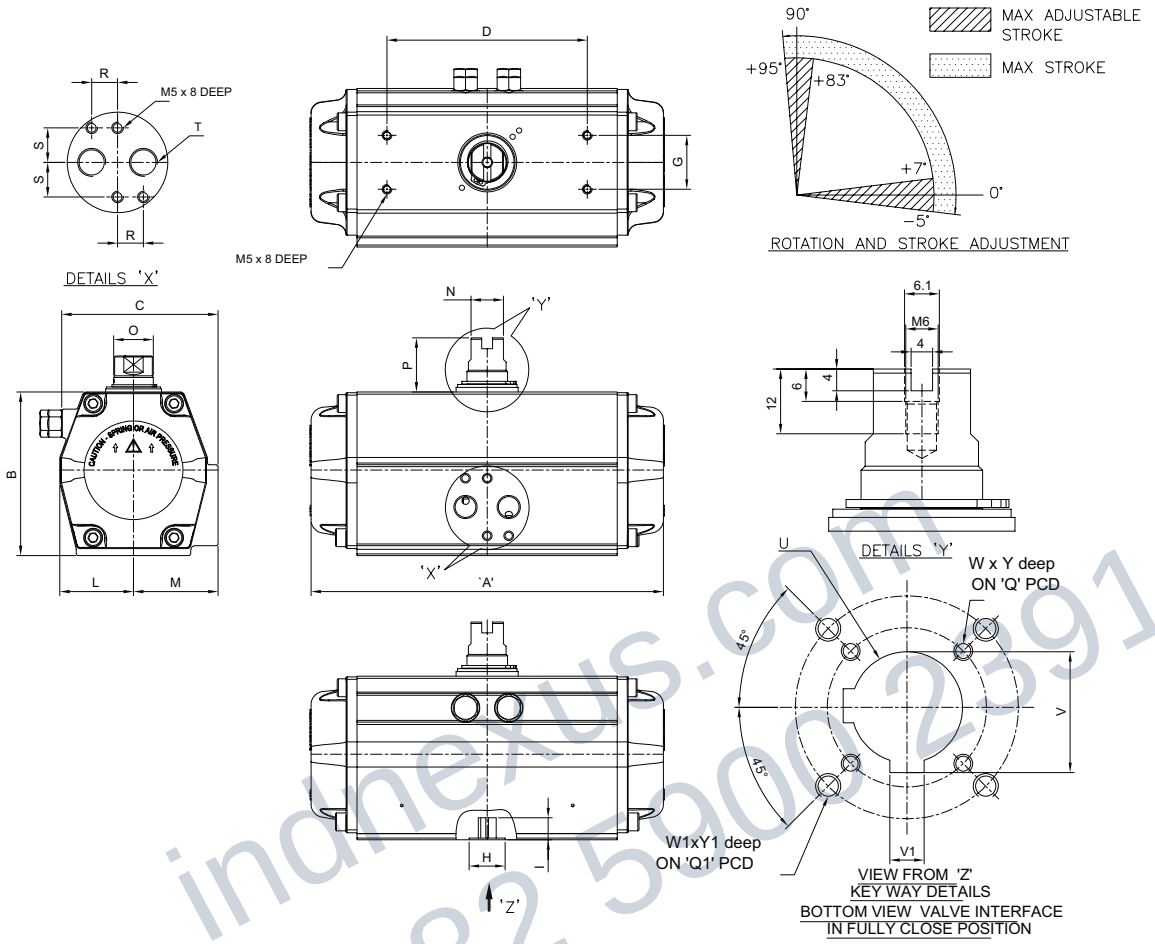
ACTUATOR MODEL	RNP40	RNP50	RNP63	RNP80	RNP90	RNP100	RNP110	RNP125	RNP150	RNP175	RNP200	RNP250	RNP300	RNP350
A	162	175	196	208	238	274	284	395	412	511	528	684	775	882
B	72	81	91	106	126	139	146	161	191	199	253	253	360	360
C	68	76	88	99	113	125	132	145	168	180	267	267	344	344
D	80	80	80	80	80	80	80	80	80	80	130	130	130	130
G	30	30	30	30	30	30	30	30	30	30	30	30	30	30
H	30	30	40	42	43	55	58	70	70	91	90	122	102	127.18
I	12.5	12.5	17	19	19	25	25	25	33	46	45	63	57	57
L	30	34	41	49	58	62	66	73	88	93	132	132	180	180
M	38	42	47	53	57	63	67	76	88	96	157	157	209	209
N A/F	12	14	18	18	23	26	28	32	36	41	41	41	41	41
O	15	17	22	22	28	31	35	38	45	50	45	45	50	50
p	20	20	20	20	20	20	20	20	20	20	30	30	30	30
Q	36	36	50	50	50	70	70	102	102	102	102	-	-	-
Q1	50	50	70	70	70	102	102	125	125	125	140	140	165	165
FLANGE	F3	F3	F5	F5	F5	F7	F7	F10	F10	F10	F10	F14	F16	F16
FLANGE	F5	F5	F7	F7	F7	F10	F10	F12	F12	F12	F14	-	-	-
R	12	12	12	12	12	12	12	12	12	12	12	12	20	20
s	16	16	16	16	16	16	16	16	16	16	16	16	22.5	22.5
T	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"
CH-90°	11	11	14	17	17	22	22	22	27	27	36	46	46	55
W	M5	M5	M6	M6	M6	M8	M8	M10	M10	M10	M10	-	-	-
Y	8	8	9	9	9	12	12	15	15	15	15	-	-	-
W1	M6	M6	M8	M8	M8	M10	M10	M12	M12	M12	M16	M16	M20	M20
Y1	9	9	12	12	12	15	15	18	18	18	24	24	30	30

NOTE. Tolerance details shown in document F102306, please consult factory

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13.2 RNP TECHNICAL DATA SHEET NELES BORE DRIVE

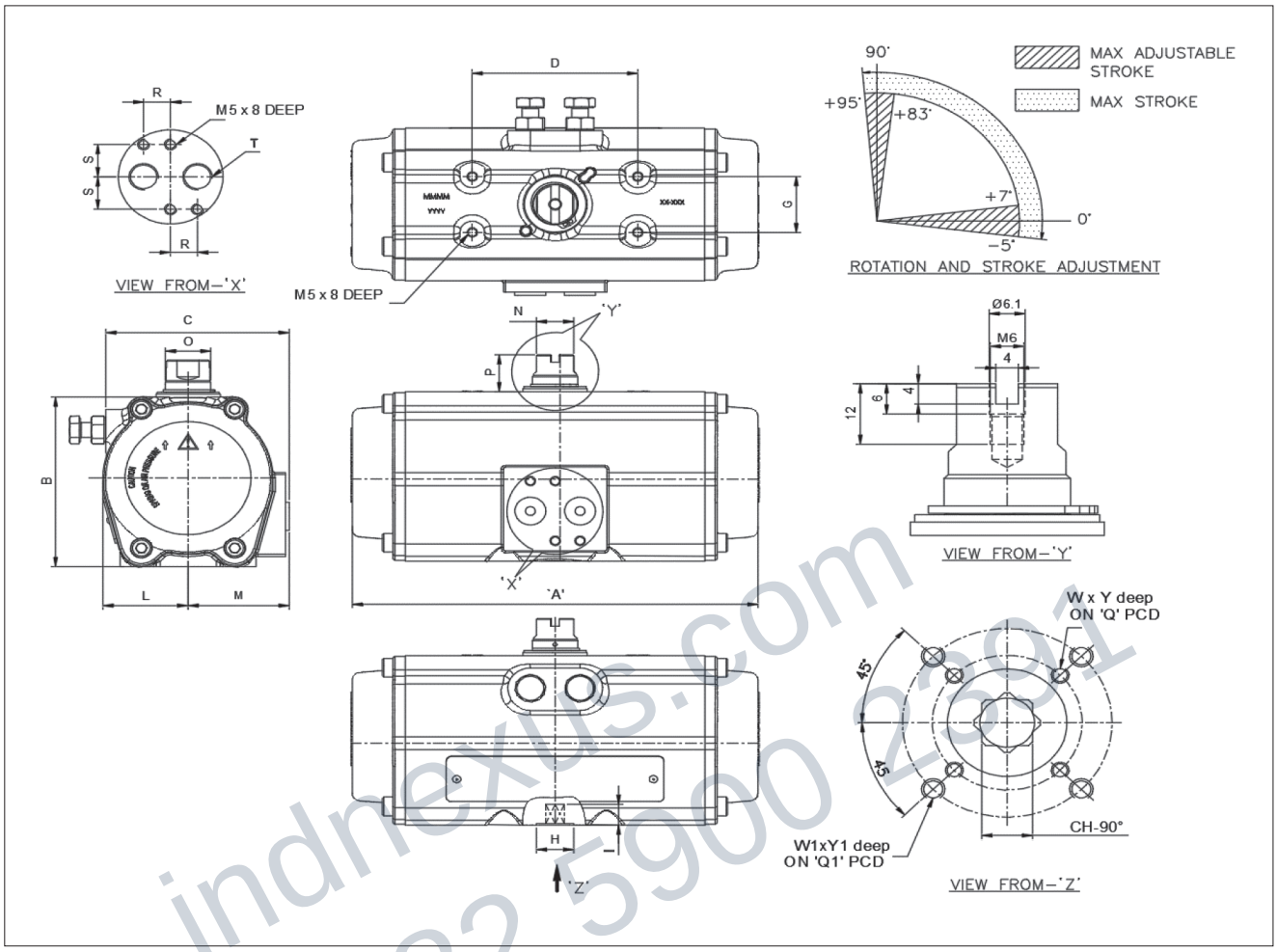
TECHNICAL SPECIFICATIONS FOR RNP NELES BORE ACTUATOR



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ACTUATOR	RNP80	RNP90	RNP100	RNP110	RNP125	RNP150	RNP175	RNP200	RNP250	RNP300	RNP350
A	208	238	274	284	395	412	511	528	684	775	882
B	106	126	139	146	161	191	199	253	253	360	360
C	99	113	125	132	145	168	180	267	267	344	344
D	80	80	80	80	80	80	80	130	130	130	130
G	30	30	30	30	30	30	30	30	30	30	30
H	42	43	55	58	70	70	91	90	122	102	127.18
I	30	30	30	35	40	35	70	70	105	70	100
L	49	58	62	66	73	88	93	132	132	180	180
M	53	57	63	67	76	88	96	157	157	209	209
N A/F	18	23	26	28	32	36	41	41	41	41	41
O	22	28	31	35	38	45	50	45	45	50	50
P	20	20	20	20	20	20	20	30	30	30	30
Q	50	50	70	70	102	102	102	102	-	-	-
Q1	70	70	102	102	125	125	125	140	140	165	165
FLANGE	F5	F5	F7	F7	F10	F10	F10	F10	F14	F16	F16
FLANGE	F7	F7	F10	F10	F12	F12	F12	F14	-	-	-
R	12	12	12	12	12	12	12	12	12	20	20
S	16	16	16	16	16	16	16	16	16	22.5	22.5
T	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"
U	15	15	15	20	20	20	35	35	55	35	55
V	17	17	17	22.3	22.3	22.3	39.3	39.3	60.8	39.3	60.8
V1	4.763	4.763	4.763	4.763	4.763	4.763	9.525	9.525	12.7	9.525	12.7
W	M6	M6	M8	M8	M10	M10	M10	M10	-	-	-
Y	9	9	12	12	15	15	15	15	-	-	-
W1	M8	M8	M10	M10	M12	M12	M12	M16	M16	M20	M20
Y1	12	12	15	15	18	18	18	24	24	30	30

13.3 RNP STEEL VERSION TECHNICAL DATA SHEET SQUARE DRIVE



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ACTUATOR MODEL	RNP40	RNP63	RNP90	RNP110	RNP150	RNP175	RNP200
A	162	196	238	284	412	513	528
B	72	91	126	146	191	199	253
C	68	87	113	132	172	182	269
D	80	80	80	80	80	80	130
G	30	30	30	30	30	30	30
H	30	40	43	58	70	91	90
I	13	17	19	25	33	46	45
L	30	41	58	66	88	93	132
M	38	47	57	67	88	96	159
N A/F	12	18	23	28	36	41	41
O	14	20	27	33	42	48	60
P	20	20	20	20	20	20	30
Q	36	50	50	70	102	102	102
Q1	50	70	70	102	125	125	140
FLANGE	F3	F5	F5	F7	F10	F10	F10
FLANGE	F5	F7	F7	F10	F12	F12	F14
R	12	12	12	12	12	12	12
S	16	16	16	16	16	16	16
T	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
CH-90°	11	14	17	22	27	27	36
W	M5	M6	M6	M8	M10	M10	M10
Y	8	9	9	12	15	15	15
W1	M6	M8	M8	M10	M12	M12	M16
Y1	9	12	12	15	18	18	24

EU DECLARATION OF CONFORMITY

Manufacturer:
Valmet Flow Control Private Limited
Plot no:560, Manpada Road
421204, Dombivli East
Maharashtra, India
*Valmet Flow Control (Jiaxing) Co., Ltd.,
China
*) Also manufactures certain series

EU Authorised Representative: Valmet Flow Control Oy, Vanha Porvoontie 229, 01380 Vantaa, Finland.
Contact details: +358 10 417 5000

Product: Pneumatic actuator	
Type: RNP-series	
ATEX group and category:	Ex II 2 GD
Protection concept of non-electrical equipment	
80°C:	Ex h IIC T6 Gb/ Ex h IIIC T85°C Db
125°C	Ex h IIC T6…T4 Gb/ Ex h IIIC T85°C…T120°C Db

ATEX 2014/34/EU Annex VIII technical files are archived by Notified Body number 0598.

Manufacturer's certificates:

Standard / Directive	Notified Body and NoBo number	Certificate No.
ISO 9001:2015	LRQA (Certification Body)	10531829
ATEX 2014/34/EU Annex IV	DNV Product Assurance AS Norway 2460	Presafe 18 ATEX 91983Q Issue 6

Applicable Directives:

Machinery 2006/42/EC Annex IIB	Actuator
ATEX 2014/34/EU	Non-electrical equipment

As the products within our sole responsibility of design and manufacture may be used as parts or components in machinery and are not alone performing functions as described in Article 6(2) of Machinery Directive 2006/42/EC, we declare that our product(s) to which this Declaration of Conformity relates must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

The product above is manufactured in compliance with the applicable European directives and technical specifications/ standards. The product is in conformity with the customer order.

Non-electrical equipment is according EN 80079-37:2016 and EN 80079-36:2016. The actual surface temperature of non-electrical equipment is depended on the process and ambient conditions (EN 80079-36:2016 § 6.2.5 and 6.2.7). The protection from high or low temperature must be considered by the end user before put into service.

Protection from e.g. static electricity caused by the process or connected equipment must be considered by the user (EN 60079-14 § 6). Follow the caution instruction in identification plate sticker and instruction manual.

The product does not possess any residual risk according to hazard analysis conducted under the applicable directives providing that the procedures stated by the IMO (Installation, Maintenance and Operating) instructions manual are followed and the product is used under conditions mentioned in the technical specifications.

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Dombivli 16.9.2024

Ashok Hosakeri, Senior Quality Manager

indnexus.com
+86 133 5900 2391

14. HOW TO ORDER

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
RNP	150	SR40	C	A	1	G	D	/	* (NIL)

1.	Series
RNP	Rack and pinion actuator

2.	Cylinder size
150	040
	050
	063
	080
	090
	100
	110
	125
	150
	175
	200
	250
	300
	350

3.	Spring version
SR30	Spring set
SR40	Spring set
SR55	Spring set
DN00	Double acting

4.	Action
C	Spring to close (90°)
A	Spring to open (90°)
D	Double acting (90°)

5.	Material
A	Hard anodized aluminum + (Only end caps are powder coated)
B	Hard anodized aluminum + Epoxy paint (Body + end covers)
C	Hard anodized aluminum + Powder coating (Body + end covers)
D	Carbon steel + Epoxy paint
E	Non Anodized Aluminum + C5M Painting (Body + End Covers)
S	Stainless steel (CF8M)

Note 5. sign D and S only available with sizes 63, 90 and 150

6.	Pinion & piston material
1	Carbon steel pinion / aluminum piston (applicable with 5. sign A, B, C)
3	Carbon steel / carbon steel (applicable with CS bodies) 5. sign D
5	S316 / SS316 (applicable with SS bodies) 5. sign S

7.	Temperature range
A	-55 ...+80 °C
G	-20 ...+80 °C
H	-20 ...+125 °C

8.	Shaft bore-key type
D	According to ISO 5211 bi-square drive
N	Neles

9.	Break
/	Type code break to be left blank if no options specified

10.	Options
	* (NIL)

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Valmet Flow Control Private Limited
Plot no:560 Manpada Road
Dombivli East, Maharashtra 421204
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