

Neles™ high performance heavy duty scotch yoke actuator Series N1

Installation, maintenance and
operating instructions

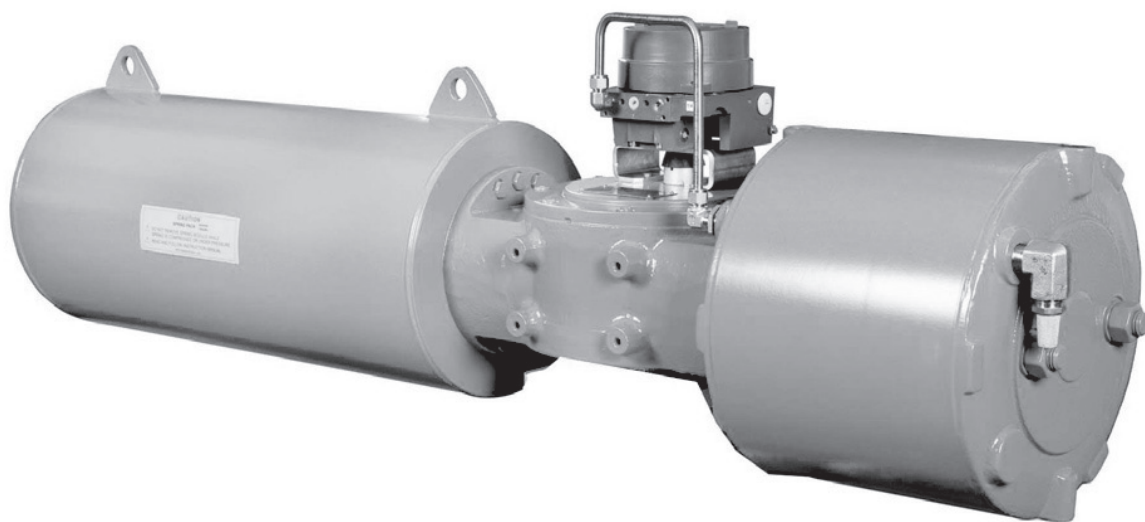


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READ THESE INSTRUCTIONS FIRST!

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 N1 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 N1 series actuators are pneumatic quarter turn cylinder actuators designed for control and shut-off service. Design is modular and enables an ideal configuration of pneumatic, central block and spring modules. Ductile cast iron center body, fabricated carbon steel pneumatic module and spring module provides rugged actuator construction.

The spring provides the required safety function; the valve either opens or closes if the air supply is interrupted.

The mounting face dimensions of the N1 actuator comply with the ISO 5211 standard.

The N1_E_C is spring to close type actuator. The yoke of the actuator, when operated by the spring, rotates clockwise as seen from the pointer cover side. The piston then moves towards the frame side of the cylinder. The two keyways in the yoke are positioned at an angle of 90° to each other, making it possible to change the position of the actuator in relation to the valve, see Fig. 1.

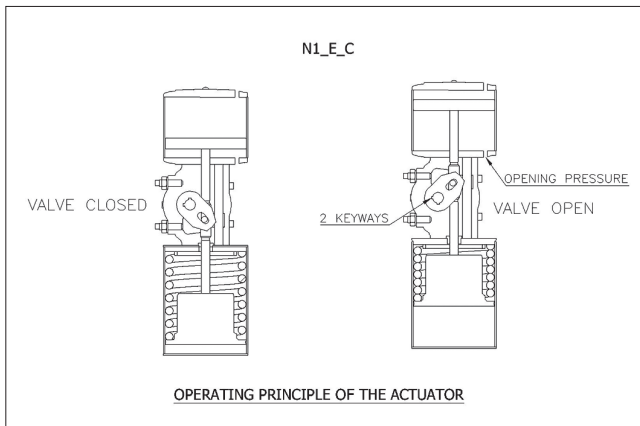


Fig. 1 Operating principle of the N1_E_C actuator

The N1_E_A is spring to open type actuator. The yoke of the actuator, operated by the spring, rotates counter clockwise as seen from the pointer cover side. The piston then moves towards the frame side of the cylinder. The two keyways in the secondary shaft (yoke) are positioned at an angle of 90° to each other, making it possible to change the position of the actuator in relation to the valve, see Fig. 2.

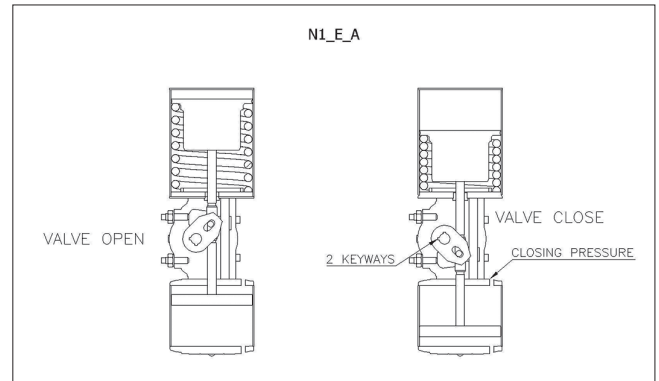


Fig. 2 Operating principle of the N1_E_A actuator

The N1_D is a double acting actuator. The linkage mechanism converts linear motion (provided by an air supply and piston) to rotary motion. The yoke of the actuator rotates clockwise (close) when cylinder supply is in rear port and counter clockwise (open) when cylinder supply is in front port, see Fig. 3.

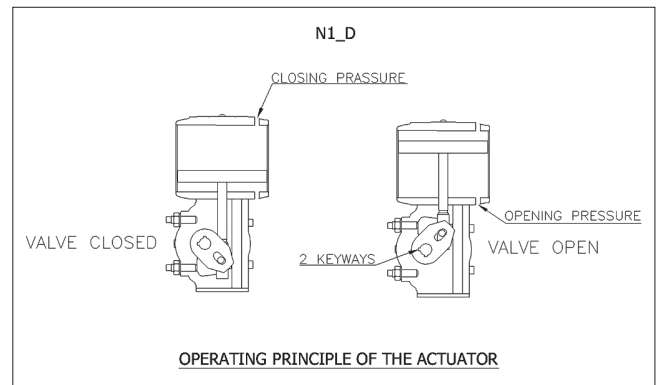


Fig. 3 Operating principle of the N1_D actuator

1.3 Actuator markings

The actuator is provided with an identification plate, see Fig. 4.

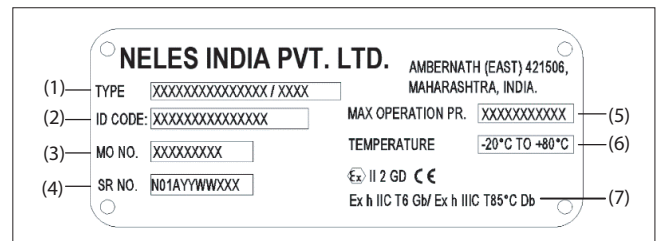


Fig. 4 ID plate

Identification plate markings are:

1. Type
2. ID Code
3. MO No
4. Sr No
5. Max operating pressure
6. Temperature
7. Atex category & protective level

1.4 Specifications

Protection class:	IP66M & IP67M	Torque Output range	
Ambient temperatures:		Spring Return Model:	
Standard design	-20° to 80° C / -4° to 176° F	- Spring Nominal:	25 Nm - 147425 Nm - Nm
High temperature design	-20° to 125° C / -4° to 257° F	- Air Brake @ 4 barg:	26 Nm - 218765 Nm
Maximum Supply pressure:	Depends on model, See Table 3	Double Acting Model:	
		- Air Break @ 4 Barg:	71 Nm - 311333 Nm

Table 1 Stroke volume, dm³ - Single acting for 90° stroke

Cyl. Diam	63	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	800-2	900-2	1000-2	1100	1200	1300	1100-2	1200-2	1300-2
Actuator	Stroke volume, dm ³																								
N1X	0.2	0.3	0.4	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1A	-	-	0.9	1.4	2.0	3.6	5.7	8.2	11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1B	-	-	-	-	-	-	7.4	10.6	14.4	18.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1C	-	-	-	-	-	-	-	13	17	23	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1D	-	-	-	-	-	-	-	-	21	27	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1E	-	-	-	-	-	-	-	-	-	-	51	74	-	-	-	-	-	-	-	-	-	-	-	-	-
N1H	-	-	-	-	-	-	-	-	-	-	-	-	152	199	-	-	-	-	-	-	-	-	-	-	-
N1J	-	-	-	-	-	-	-	-	-	-	-	-	200	261	331	408	-	-	-	-	-	-	-	-	-
N1M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	526	-	-	-	-	637	758	-	-	-

Table 2 Stroke volume, dm³ - Double acting for 90° stroke

Cyl. Diam	63	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	800-2	900-2	1000-2	1100	1200	1300	1100-2	1200-2	1300-2
Actuator	Stroke volume, dm ³																								
N1X	0.3	0.6	0.9	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1A	-	-	1.7	2.7	4.0	7.1	11.2	16.2	22.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1B	-	-	-	-	-	-	14.3	20.7	28.4	37.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1C	-	-	-	-	-	-	-	25	34	45	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1D	-	-	-	-	-	-	-	-	41	53	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1E	-	-	-	-	-	-	-	-	-	-	101	146	-	-	-	-	-	-	-	-	-	-	-	-	-
N1H	-	-	-	-	-	-	-	-	-	-	-	-	302	395	-	-	-	-	-	-	-	-	-	-	-
N1J	-	-	-	-	-	-	-	-	-	-	-	-	396	518	657	811	-	-	-	-	-	-	-	-	-
N1M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1044	-	-	-	-	1265	1505	-	-	-

Note: Actuator output torques - consult factory.

Table 3 Maximum operating pressure

Cyl. Diam	63	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	800-2	900-2	1000-2	1100	1200	1300	1100-2	1200-2	1300-2
Actuator	maximum operating pressure, barg																								
N1X	8.0	8.0	8.0	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1A	-	-	8.0	8.0	8.0	8.0	8.0	6.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1B	-	-	-	-	-	-	8.0	8.0	6.0	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1C	-	-	-	-	-	-	-	8.0	8.0	7.0	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1D	-	-	-	-	-	-	-	-	8.0	8.0	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1E	-	-	-	-	-	-	-	-	-	-	6.0	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-
N1H	-	-	-	-	-	-	-	-	-	-	-	-	5.5	5.5	-	-	-	-	-	-	-	-	-	-	-
N1J	-	-	-	-	-	-	-	-	-	-	-	-	5.5	5.5	5.5	5.5	-	-	-	-	-	-	-	-	-
N1M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.5	-	-	-	-	5.5	5.5	-	-	-

Note: Actuator output torques - consult factory.

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.



CAUTION:

If not observed, user may incur damage to the product and/or 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.

CAUTION:

1. Actuator should not be operated beyond MOP.
2. We recommend to use AFR and PRV for better functioning with safety.
3. Maintenance cycle should be followed for better working and safe operation.



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. Actuator speed should not faster than specified in the following chart.



MODEL	STROKE (mm)	MINIMUM OPENING/CLOSING TIME (SECONDS)
N1X	56	0.1
N1A	116	0.1
N1B	150	0.2
N1C	180	0.2
N1D	216	0.3
N1E	260	0.3
N1H	396	0.5
N1J	520	0.7
N1M	670	0.9

WARNING:

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

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. 5: in a horizontal position from the lifting lugs. Refer to Section 9 for weights.

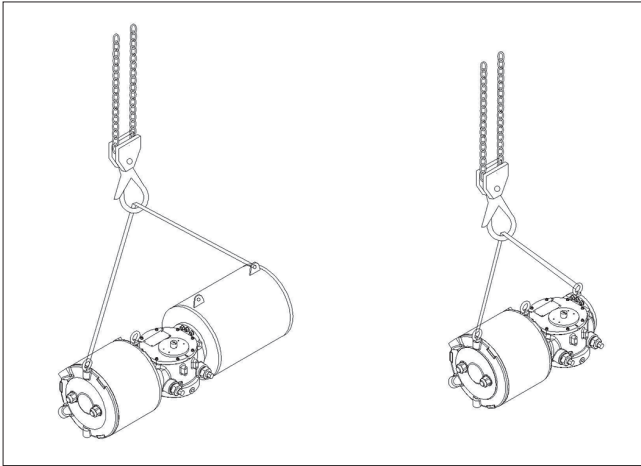


Fig. 5 Lifting the actuator

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 6. The maximum supply pressure is depending on 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.

N1 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 Neles.

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.

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 a keyed shaft adapter, sleeve or bushing. There are two key way slots in the shaft bore of the actuator at an angle of 90°. These allow the installation position of the actuator to be changed in relation to the valve. Neles valves have a bevel at the end of their shafts to facilitate installation.

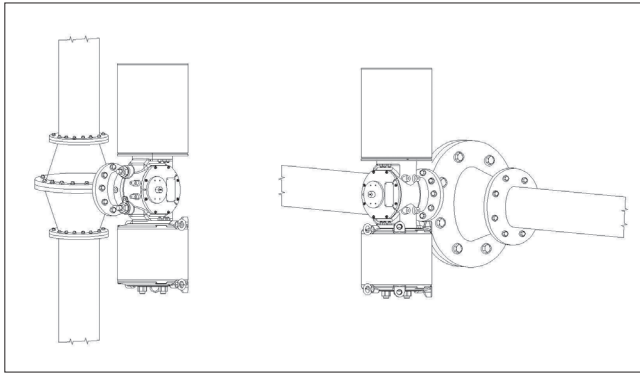


Fig. 6 Ways to install the actuator

The installation position can be selected freely, but Neles recommends installation of spring return version with the pneumatic cylinder pointing towards the ground. Double acting version can be installed at any position. The actuator is thus best protected against damage due to supply air impurities or water. 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 Neles 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 butterfly valves. Refer to the installation, operating and maintenance instructions of the valve.

N1_E_C actuator spring -to-close direction

Install the actuator on the valve with the spring return position (fail safe) and the valve in the closed position, see Fig. 5. The cylinder must be de-pressurized and the air ports open. Adjust the closed-position setting using the stop screw (52a) on center block. The open-position setting is adjusted with stop screw (52b) on the center block while the actuator is pressurized, and the piston is at the rear end of the cylinder.

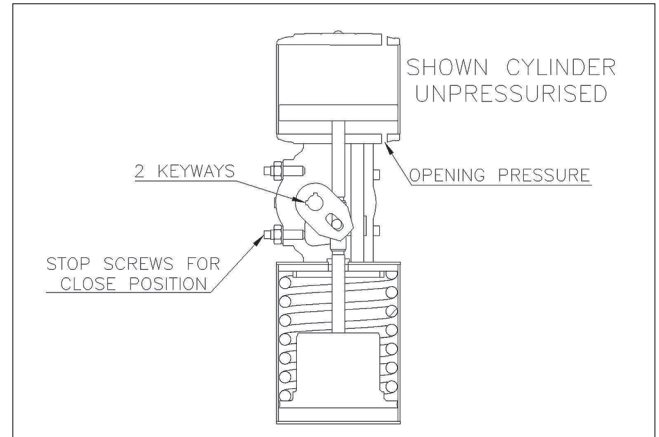


Fig. 7 N1_E_C actuator

N1_E_A actuator spring -to-open direction

Install the actuator on the valve with the spring return position (fail safe) and the valve in the open position, see Fig. 6. The cylinder must be de-pressurized and the air ports open. Adjust the open-position setting using the stop screw (42b) on center block. The closed-position setting is adjusted with stop screw (42a) on the center block while the actuator is pressurized and the piston is at the rear end of the cylinder.

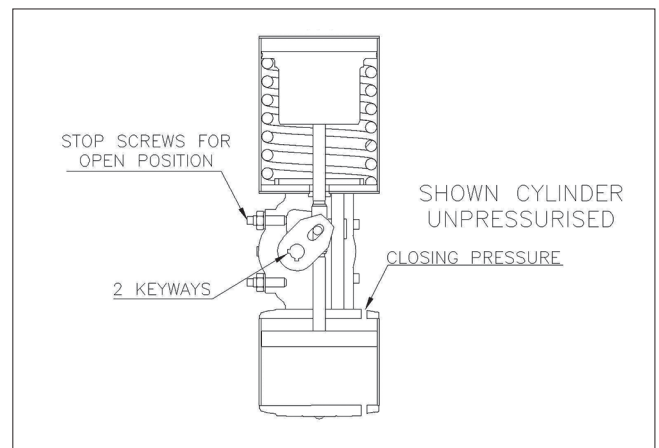


Fig. 8 N1_E_A actuator

Demounting the actuator from the valve

CAUTION:

Depressurize 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. This is best done by lifting the actuator from lifting lugs by crane. Note the mutual positioning of the valve and the actuator to ensure correct functioning after reassembly.

4. MAINTENANCE

4.1 Maintenance general

CAUTION:
Observe the safety precautions mentioned in Section 1.7 before maintenance!

Although Neles 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. Neles 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 Neles 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 Neles office. The part numbers in parentheses () in the text refer to the exploded view and to the parts list in Section 5, unless otherwise stated.

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 are subjected to sliding and rotating motion.

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

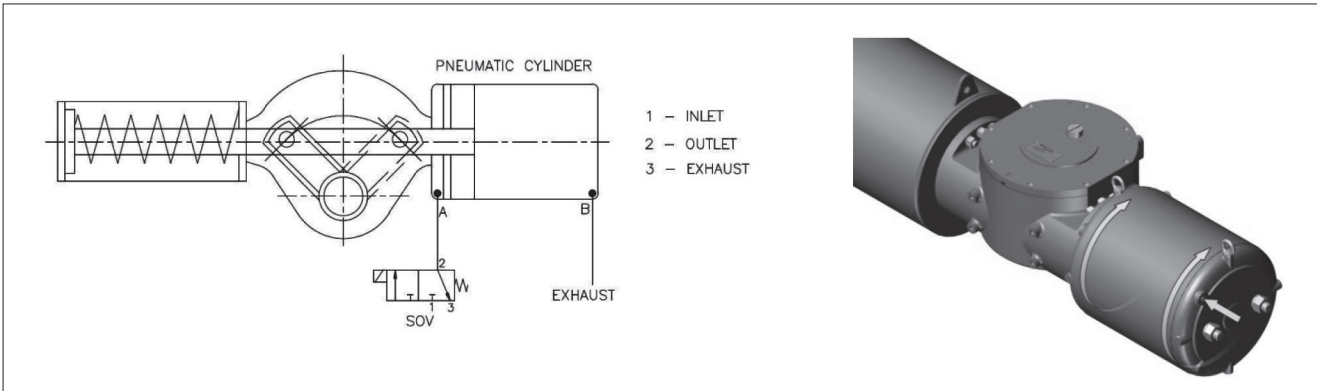
Neles recommends that disassembly of the actuator modules should be done in a clean area on a workbench.

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

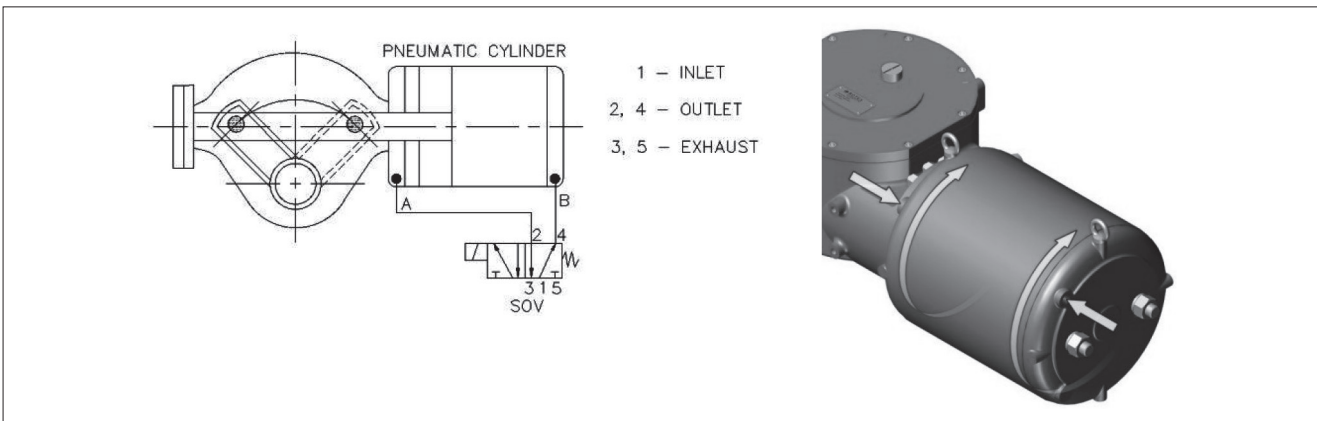
If you remove the stop screw, adjust the limits after lubrication or grease filling!

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

For single acting actuator if port A is connected then check air leakage from exhaust port.



For double acting actuator if port B is connected then check air leakage from exhaust port.



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 N1_E_C and N1_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 spring module has a warning sticker. When servicing the unit, check that the sticker is in place and legible. See Fig. 9. Also check that the spring module has the arrow sticker indicating the spring operating direction.

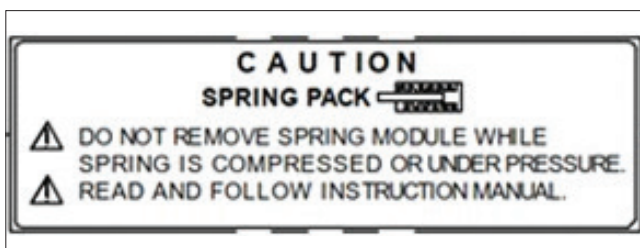
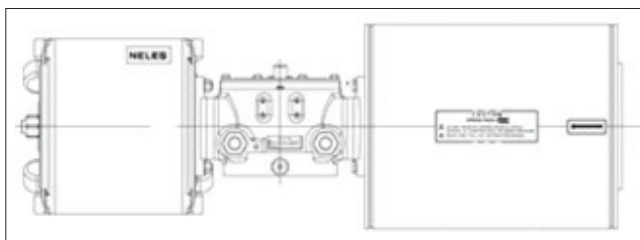


Fig. 9 Warning plate of the N1_E_C and N1_E_A actuator



4.3 Module removal and installation

4.3.1 Spring module removal

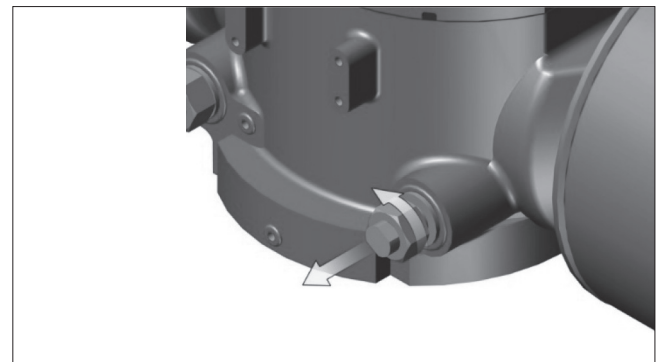
WARNING:

Do not remove spring module while spring is compressed

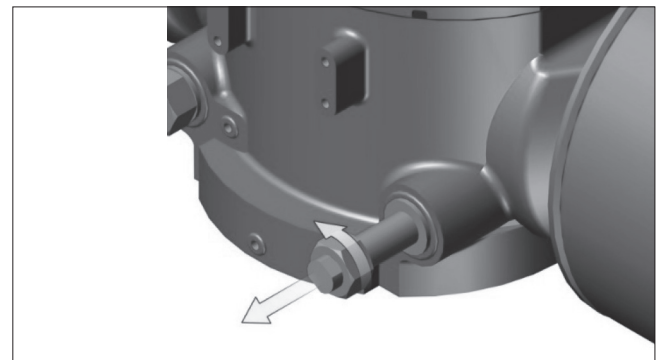
**NOTE:**

Review section 4.4.1 General Disassembly before proceeding with spring module disassembly. The setting of stop screws should be checked and setting recorded before stop screws are loosened or removed.

Step 1. Apply pneumatic pressure to front cover (3) to compress the spring enough to move the yoke off the stop screw of spring module side of the central block module.



Step 2. Loosen the screw nut (53) located on the stop screw that is closest to or next to Spring Module.



Step 3. Unscrew stop screw (52) that is closest to or next to Spring Module (unscrew or back out until the load is removed from the stop screw).

Step 4. Remove pneumatic pressure from pressure inlet port of front cover (3).

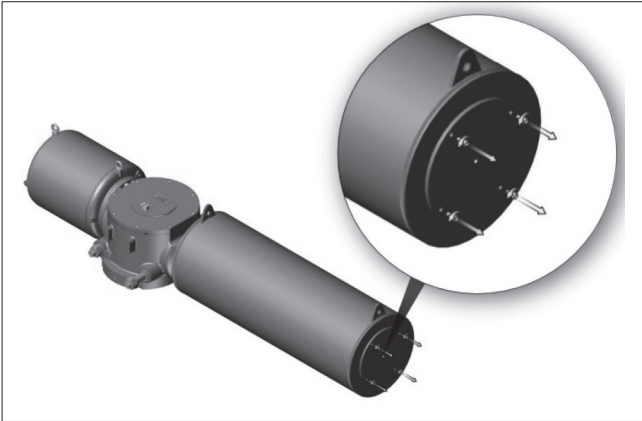
CAUTION:

Due to the weight and size of spring cartridge assembly, heavy duty support equipment will be required when removing module from actuator assembly.

Step 5. Spring cartridge preload must be removed before spring module is removed from actuator assembly. To remove spring cartridge preload. Apply pneumatic pressure to rear cover (10) to move the spring cartridge connecting rod (27).

CAUTION:

Maximum pressure to be applied in the above step is 1 barg (1 kg/cm²).



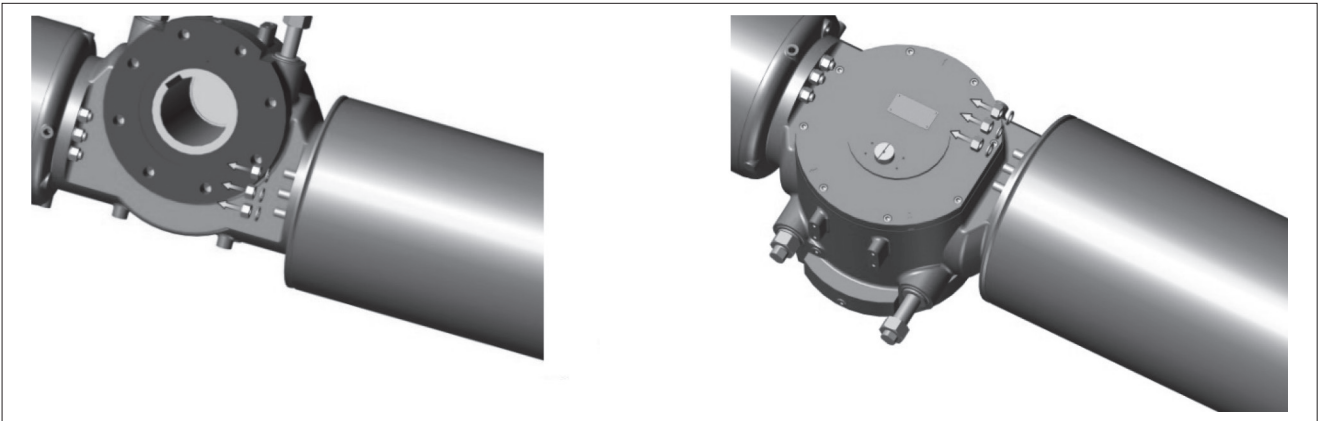
Step 6. Unscrew bolts (60) of rear side end cap (28) and remove end cap.



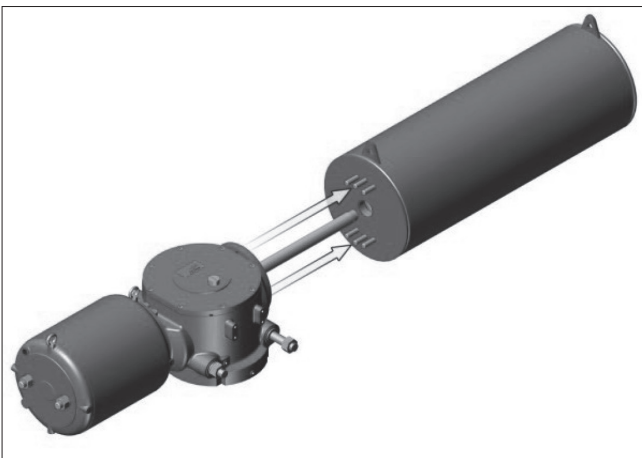
Step 7. Unscrew lock nut (59) of connecting rod (27) to remove lock nut with the help of Spring cartridge disassembly tool.

NOTE:

If pneumatic pressure is not available to apply, use special Neles spanner for ring nut.



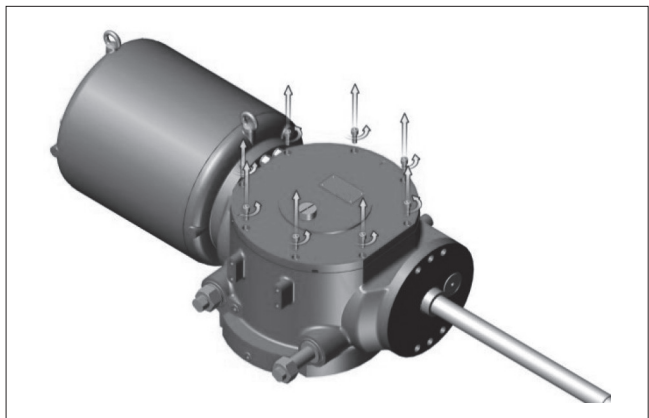
Step 8. Remove hex cap screw / stud (11) & nut (47) with lock washer (46) from central block.



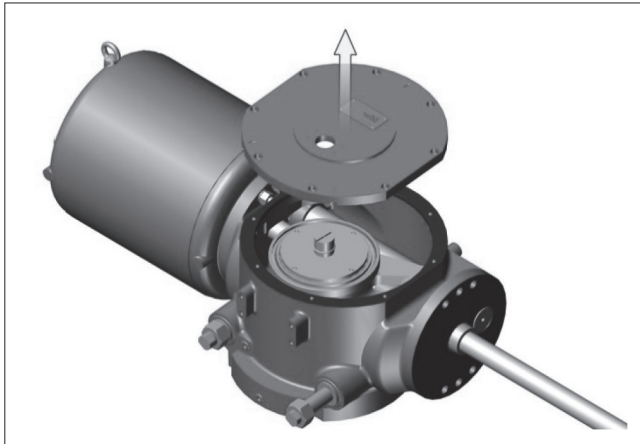
Step 9. Remove spring module from actuator assembly, use lugs provided on spring module assembly for lifting.

WARNING:

Under no circumstances should the spring module assembly be cut apart, as the spring is preloaded and spring cartridge is welded assembly.



Step 10. Un-screw and remove hex. Soc. Head cap screw (55) from top cover (12) of central block module.



Step 11. Fitment between top cover (12) and central block (1) is tight, use screw driver as crowbar and put it in slot provided on central block cover to lift the cover.

CAUTION:

Do not damage O-ring or O-ring groove while removing top cover (12).



Step 12. Unscrew connecting nut (54) to dismantle connecting rod (27) from carrier (15).

4.3.2 Spring Module Installation

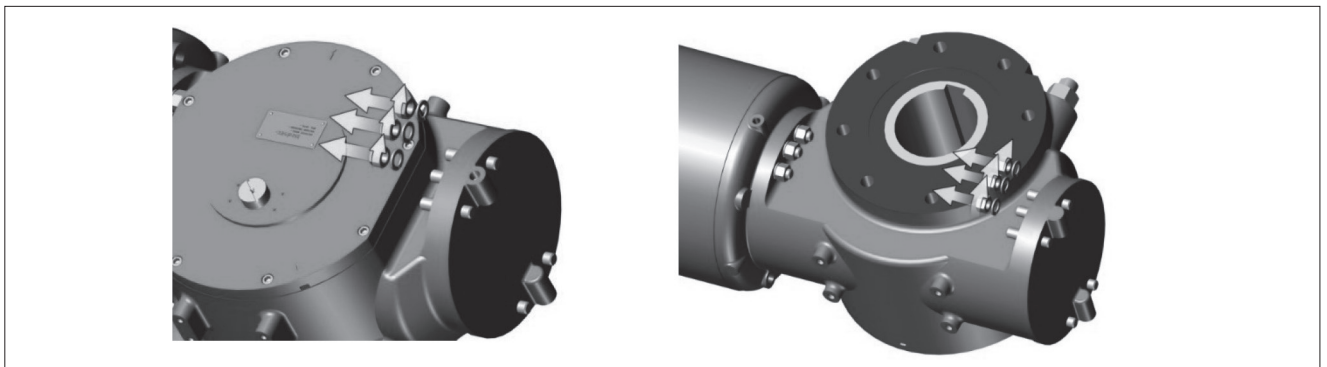
NOTE:

Review section 4.4.1 General Disassembly before proceeding with spring module disassembly.

This procedure is required to convert double acting actuator to single acting spring return actuator or to replace existing spring module assembly.

Step 1. To replace existing spring module first remove existing spring module from actuator refer chapter 4.3 section 4.3.1 spring module removal. Skip procedure steps from 2 to 4 for single acting.

Step 2. For double acting actuator before starting spring module installation procedure actuator must be at over travel position. To over travel the actuator unscrew the stroke adjustment screw (52) refer Chapter 4.3 section 4.3.1 from step 2 to 3..



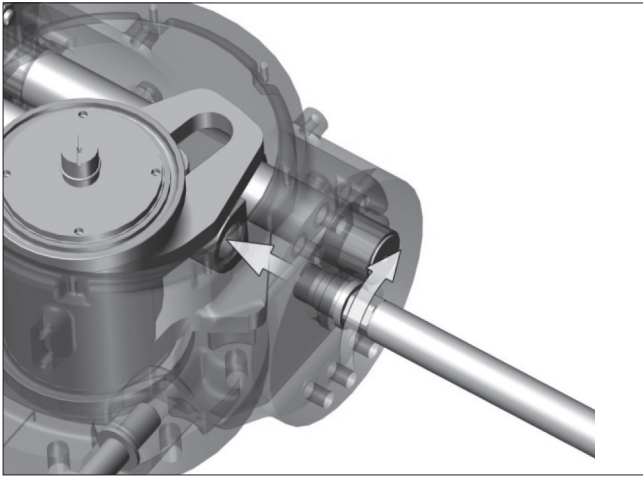
Step 3. Remove studs / hex cap screw (11) & nut (47) with lock washer (46) from central block to remove rear cap.

Step 4. Remove rear cap from central block housing.

NOTE:

When removing rear cap from actuator assembly, be careful to lose O-ring seals.

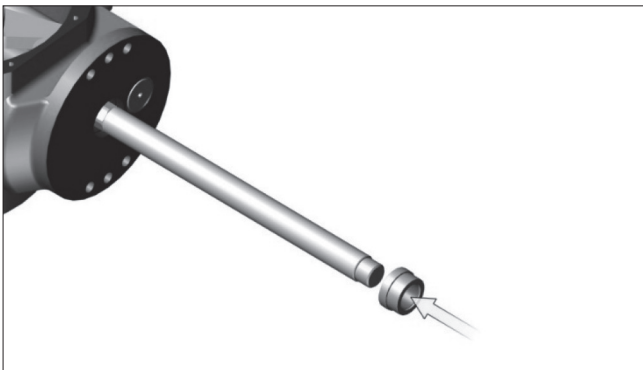




Step 5. Align connecting rod (27), connecting nut (54) and connecting bolt (21) assembly with carrier (15) and screw it in carrier (15).

NOTE:

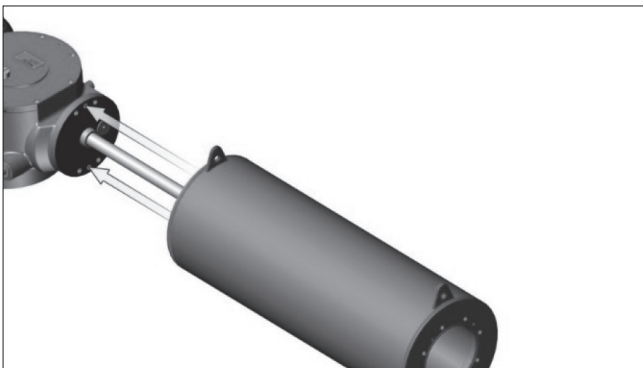
Clean the connecting rod and apply grease before installation.



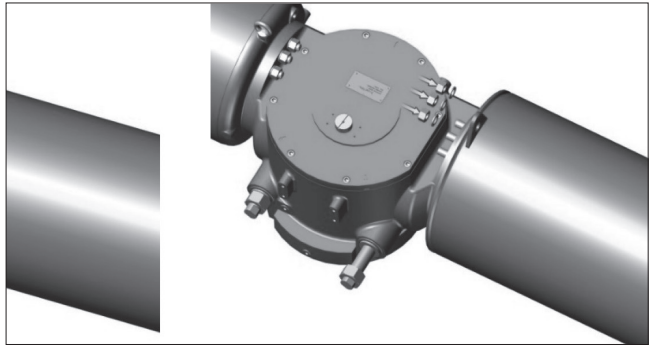
Step 6. Align guide bush (26) with connecting rod and central block

NOTE:

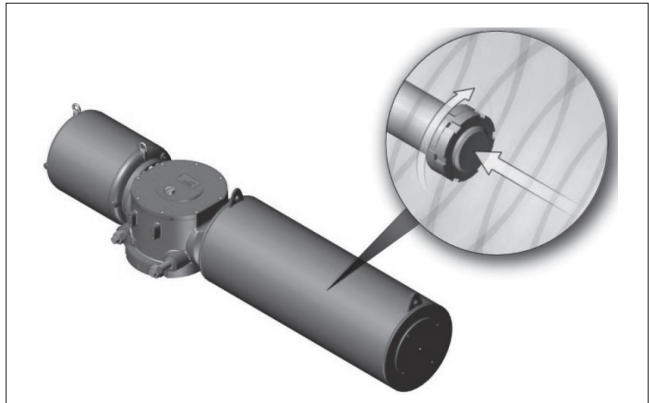
Apply grease inside diameter of bearing bush (26).



Step 7. Align spring assembly with actuator assembly and install o-ring seal (32) at front face of spring assembly and also install o-ring (42) at the guide rod (14).



Step 8. Install hex. Cap screw / stud (11) thru housing in spring module tighten to assembly the spring module with actuator.



Step 9. Using Spring cartridge disassembly fixture, go thru the open end of spring module & rotate fixture until the initial thread engagement of lock nut (59) with connecting rod (27) is achieved.



Step 10. Install o-ring seal (41) into the o-ring groove in the outboard end of spring module and then install rear cap (28).

4.3.3 Pneumatic Cylinder Module Removal

CAUTION:

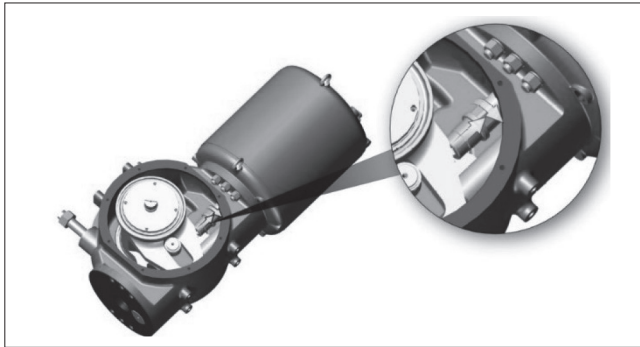
Spring module should be removed before starting pneumatic cylinder module removal procedure.

Also follow steps 10 & 11 from section 4.3.1. Spring module removal.

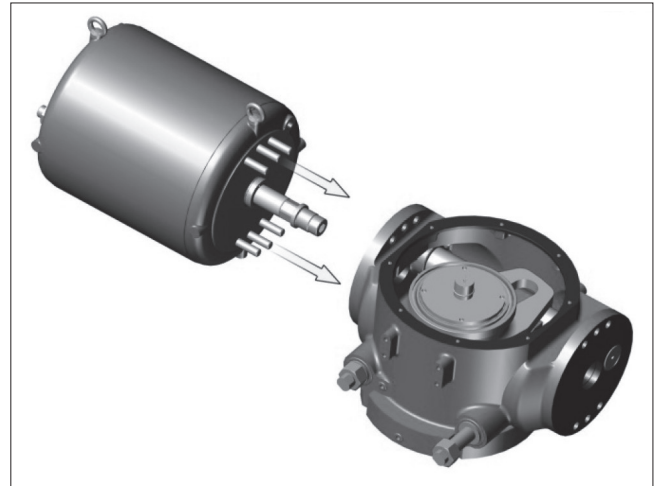
Step 1. Apply pneumatic pressure to front cover (3) to rotate actuator by 45 degree.

CAUTION:

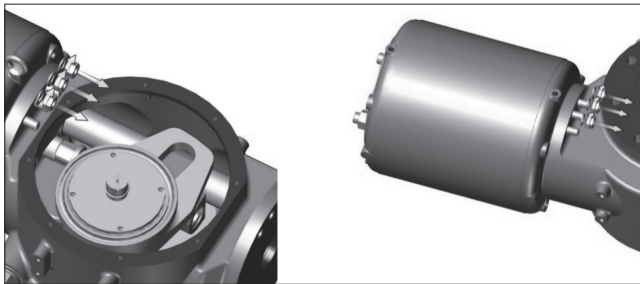
Maximum pressure to be applied in the above step is 1 barg (1 kg/cm²).



Step 2. Unscrew connecting nut (54) to dismantle piston rod (9) from carrier (15).



Step 2. Using lifting equipment move the pneumatic cylinder module up to central block module and align the piston rod to the centre of central block (1).

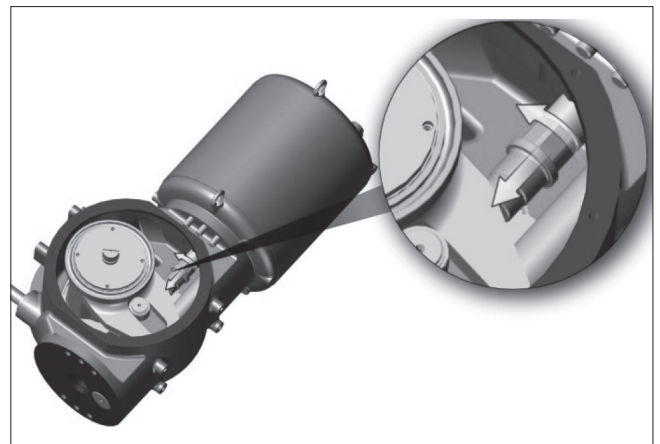


Step 3. Remove 6 studs/ hex cap screw (11) & nut (47) pneumatic cylinder assembly sides with lock washer (46) from central block (1).

NOTE:

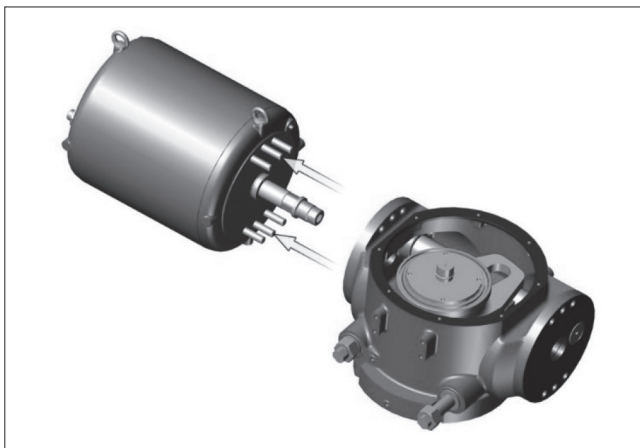
When removing cylinder module from actuator assembly, be careful to lose o-ring seals.

Step 4. Remove pneumatic cylinder module from actuator assembly.

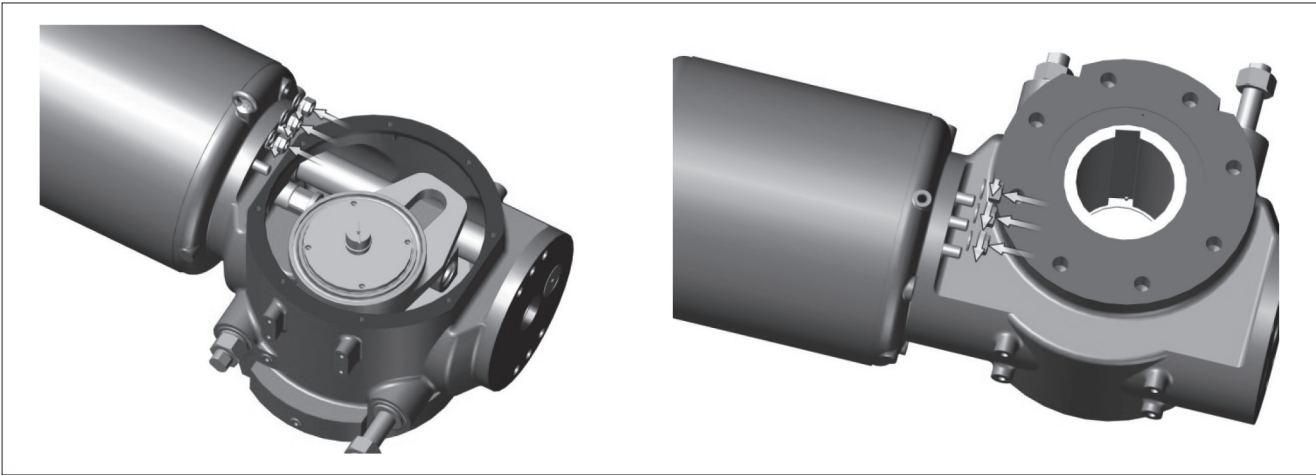


Step 3. Align piston rod (9), connecting nut (54) and connecting bolt (20) assembly with carrier (15) and screw it in carrier (15).

4.3.4 Pneumatic Cylinder Module Installation



Step 1. Check to verify that o-ring seals (39), (42) are properly fitted in its seal groove on the front cover (3) and guide rod (14) respectively.



Step 4. Install hex cap screw / nut with spring washer to install pneumatic module on central block module.

4.4 Actuator Disassembly

4.4.1 General Disassembly

WARNING:

It is possible, that the actuator may contain a dangerous gas and/or liquids. Ensure that all proper measures have been taken to prevent exposure or release of these types of contaminants before commencing any work.



Actuator disassembly is written to either completely disassemble the entire actuator or can be used to disassemble individual Units as needed (pneumatic cylinder or spring cartridge).

When the spring cartridge unit is to be removed it should be removed from the central block unit prior to the Pneumatic cylinder unit removal or disassembly. Then rotate actuator by 45 degree for Pneumatic cylinder assembly removal or disassembly.

To ensure correct reassembly, mark or tag mating surfaces.

Actuator central block base should be rigidly mounted before disassembly of any component.

4.4.2 Pneumatic cylinder module disassembly

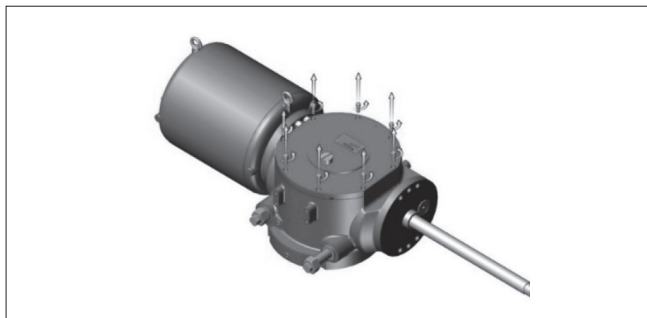
NOTE:

Review section 4.4.1 General Disassembly before proceeding with pneumatic cylinder module disassembly.

If the actuator model is a N1_S2_D00D_ (two same size pneumatic cylinder units with one unit mounted on each side of the central block unit) then do the following steps on both pneumatic cylinder Units simultaneously or complete one pneumatic cylinder unit and then repeat section 4.3.3. **Central block module disassembly** on the second pneumatic cylinder unit.

WARNING:

If not already removed disconnect all operating pressure from actuator pneumatic cylinder.



Step 1. Unscrew and remove hex. Soc. Head cap screw (55) from top cover (12) of central block module.

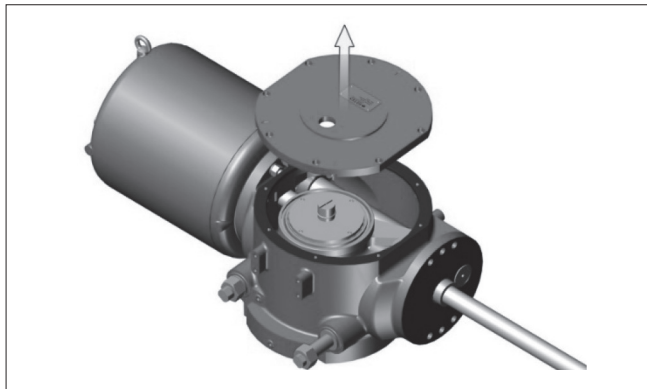
Step 2. Fitment between top cover (12) and central block (1) is tight, use screw driver as crowbar and put it in slot provided on central block cover to lift the cover.

CAUTION:

Do not damage O-ring or O-ring groove while removing top cover (12).

CAUTION:

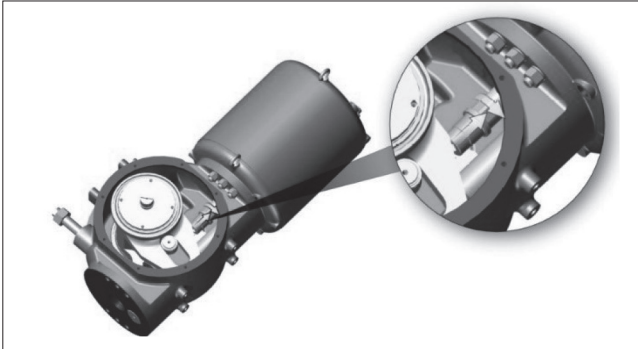
Spring module should be removed before starting pneumatic cylinder module removal procedure.



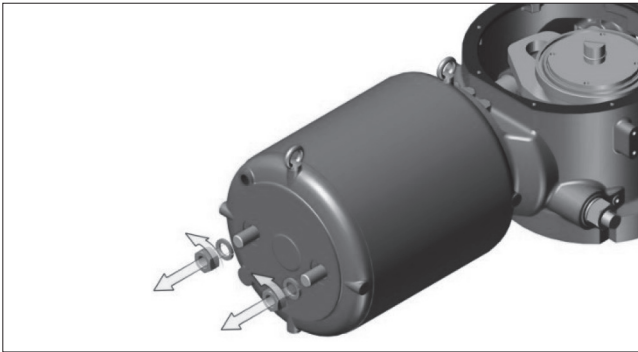
Step 3. Apply pneumatic pressure to front cover (3) to rotate actuator by 45 degree.

CAUTION:

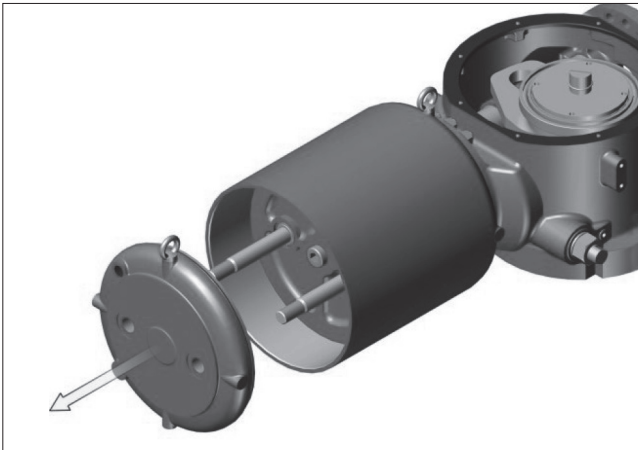
Maximum pressure to be applied in the above step is 1 barg (1 kg/cm²).



Step 4. Unscrew connecting nut (54) to dismantle piston rod (9) from carrier (15).



Step 5. Remove two tie rod (8) hex nut (50) with spring washer (49) from outboard side of rear cover (10).



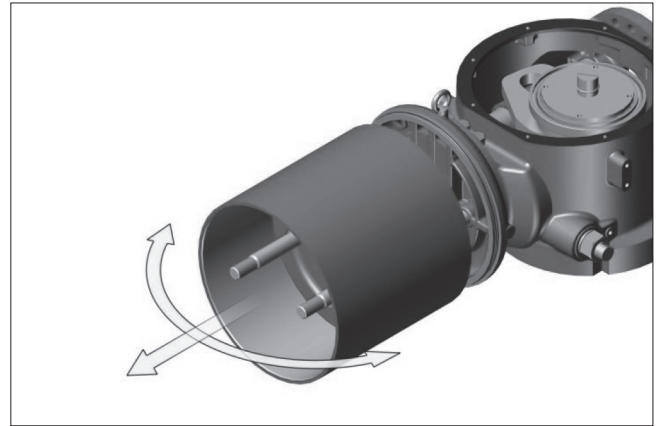
Step 6. The fit between cylinder tube (2) and rear cover (10) is very tight. Use screwdriver as crowbar to remove rear cover (10) from cylinder tube (2), remove rear cover from cylinder tube.

CAUTION:

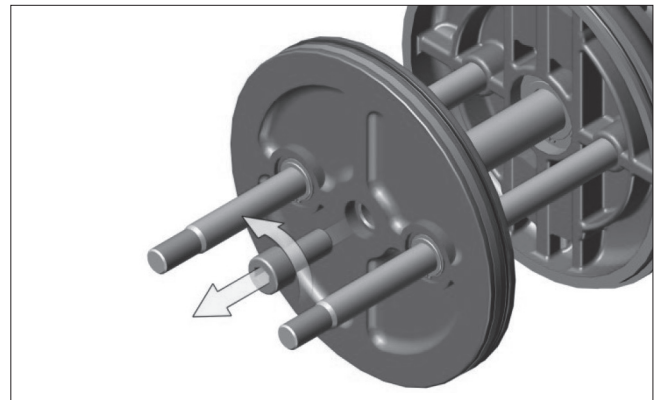
Do not damage O-ring groove when removing rear cover from cylinder tube.

NOTE:

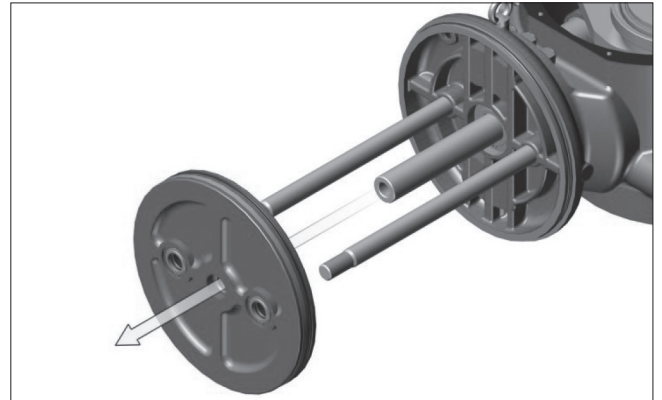
Use cover taping hole for lifting.



Step 7. When removing cylinder tube (2) off of piston (6), tilt respect to actuator centerline, remove cylinder tube from piston (6) and front cover (3).



Step 8. Unscrew hex. soc. Head cap screw (51) and remove it from piston (6) and piston rod (9).



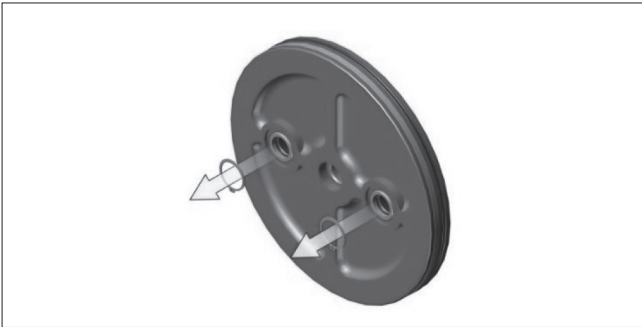
Step 9. Remove piston assembly (6) from tie rod.

CAUTION:

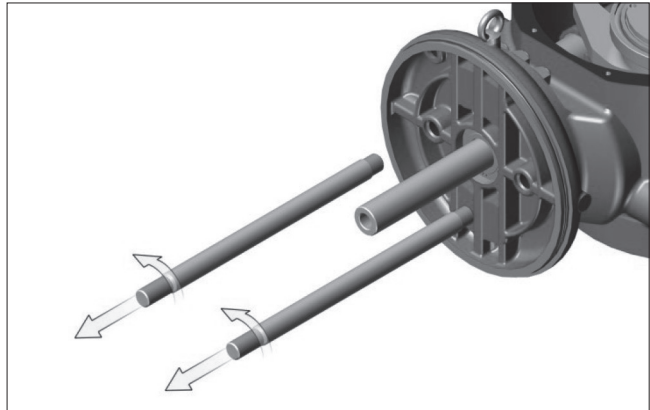
No not damage seals of guide bushing (7) while removing piston assembly (6).

NOTE:

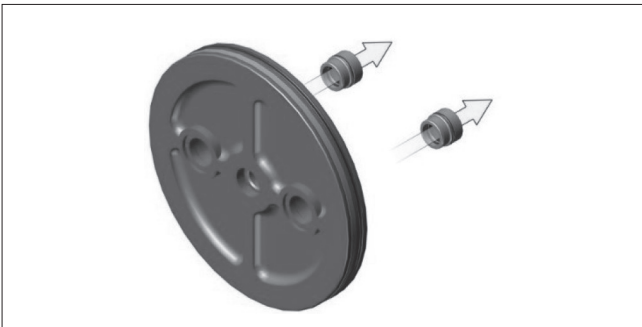
Use piston taping hole for lifting.



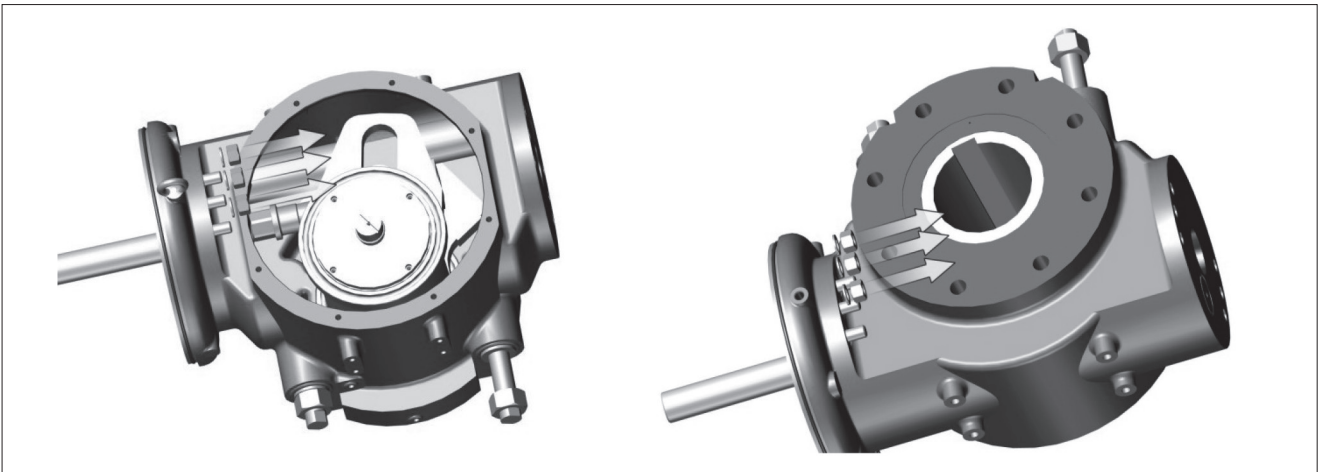
Step 10. Remove retaining ring (62) of guide bushing to remove guide bushing.



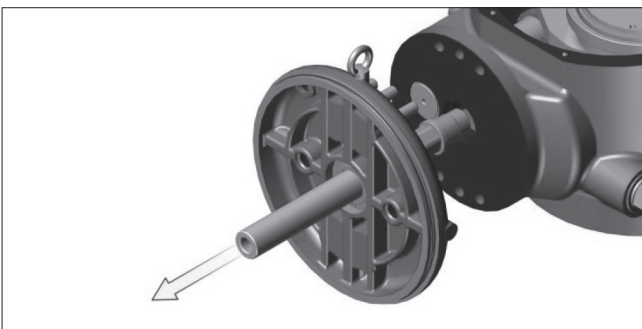
Step 12. Remove tie rod (8) from front cover. To remove tie rod use two lock nuts assemble them on tie rod and tighten them with each other then turn one lock nut to remove tie rod.



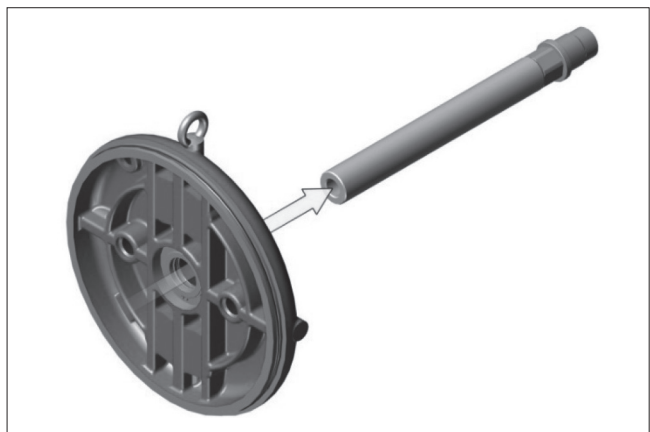
Step 11. Remove guide bushing (7) from opposite side of piston.



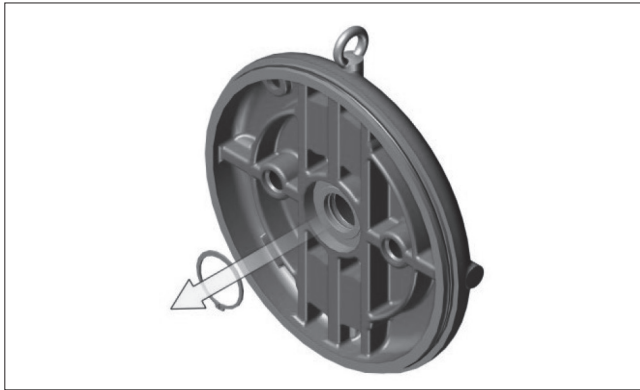
Step 13. Remove 6 hex cap screw/ stud (11) and nut (47) pneumatic cylinder assembly sides with lock washer (46) from central block housing (1).



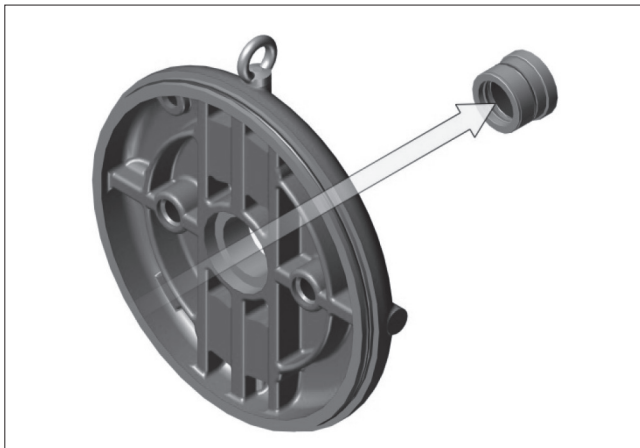
Step 14. Remove front cover (3) from actuator assembly with piston rod (9).



Step 15. Remove piston rod (9) and connecting nut (54) assembly from front side of the front cover (3).



Step 16. Remove retaining ring (45) to remove bearing bush (5).



Step 17. Remove guide bush (5) from front cover (3).

CAUTION:

Do not damage seals of bearing bush (5) while removing it

4.4.3 Central block module disassembly

CAUTION:

Spring module and pneumatic cylinder module should be removed before starting central block module removal procedure.

(Review chapter 4.3 section 4.3.1 Spring module removal and 4.3.3 Spring Module Installation.)

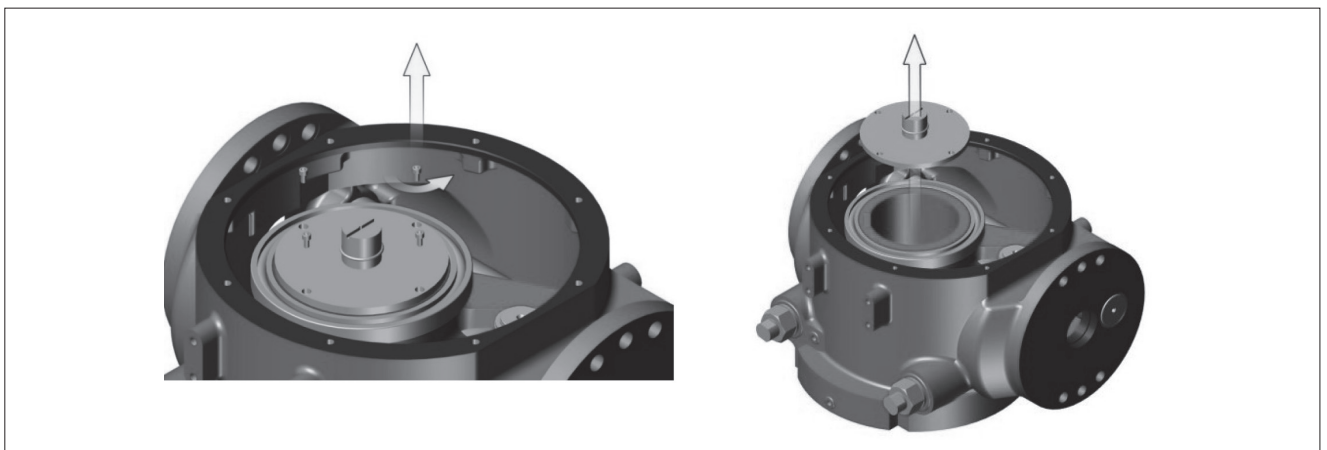
The setting of stroke adjustment screw (52) should be checked and recorded before stroke adjustment screw are loosen or removed.

NOTE:

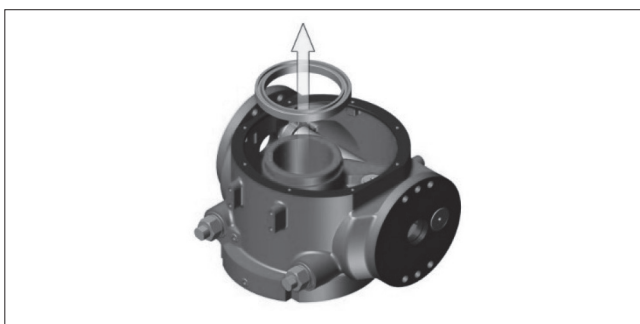
Stroke adjustment screw will be removed later in this procedure.

NOTE:

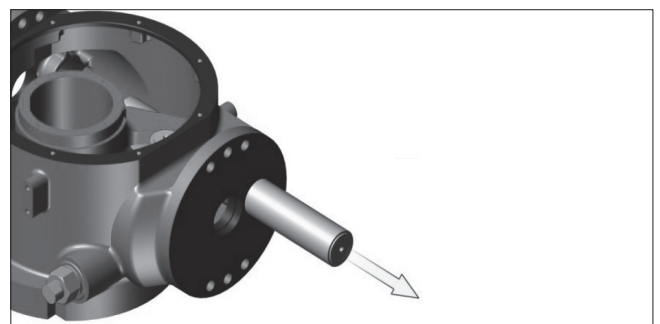
This procedure considers top cover (12) was removed while disassemble the pneumatic cylinder module and spring module.



Step 1. Unscrew and remove hex. Soc. Head cap screw (57) from yoke inserts (19) and remove yoke insert (19) from yoke (13).



Step 2. Remove yoke top bearing (56) from yoke (13).



Step 3. Remove guide rod (14) from central block housing (1).

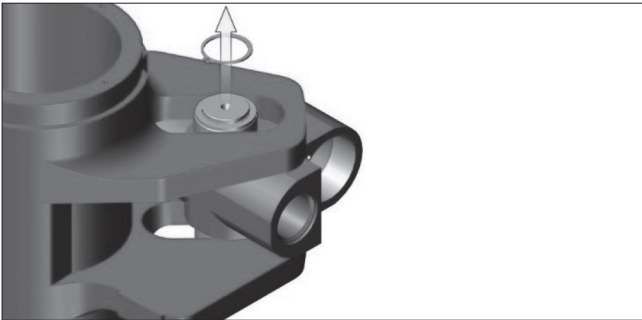
NOTE:

Taping provided on guide rod to pull out the guide rod from central block housing.

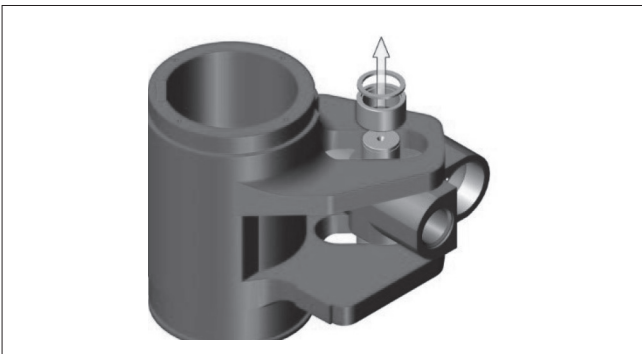
When removing guide rod from actuator assembly, be careful to lose O-ring seals.



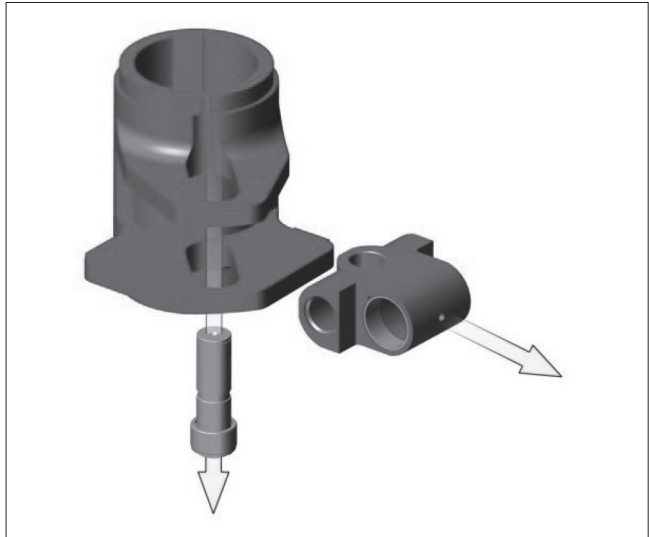
Step 4. Remove yoke (13) with carrier assembly (15) from central block housing.



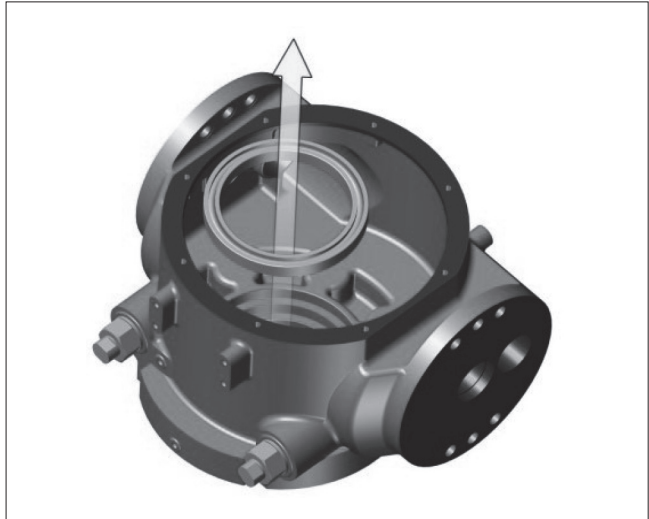
Step 5. Put the yoke assembly on clean and dry place and remove top retaining ring (61) from yoke pin (16).



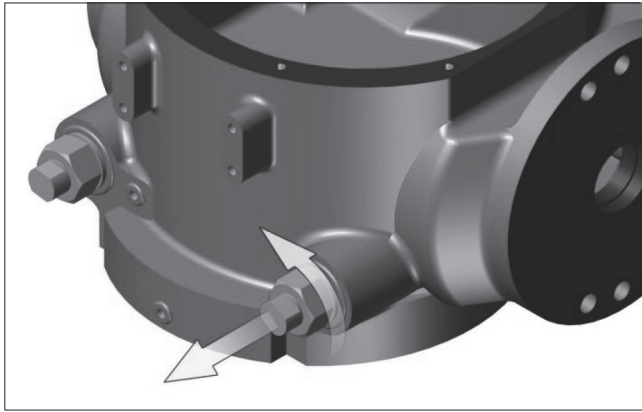
Step 6. Remove top roller (17) with yoke pin washer (18) from yoke (13) and yoke pin (16).



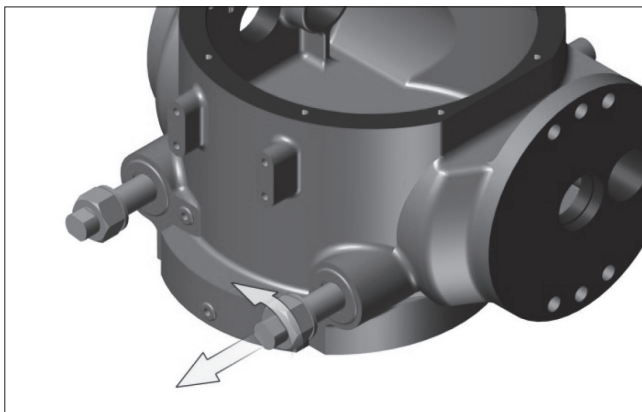
Step 7. Remove yoke pin (16) from bottom side of carrier (15) and then remove carrier (15) from yoke (13).



Step 8. Remove bottom side bearing (56) of yoke (13) from central block housing (1).



Step 9. Unscrew and remove two stroke adjustment screw nuts (53) from stroke adjustment screw (52).



Step 10. Unscrew and remove two stroke adjustment screws (52) from housing (1).

4.5 Actuator Reassembly

4.5.1 General reassembly

CAUTION:

Only new seals, which are still within the seal's expectant shelf life, should be installed into the actuator being refurbished.

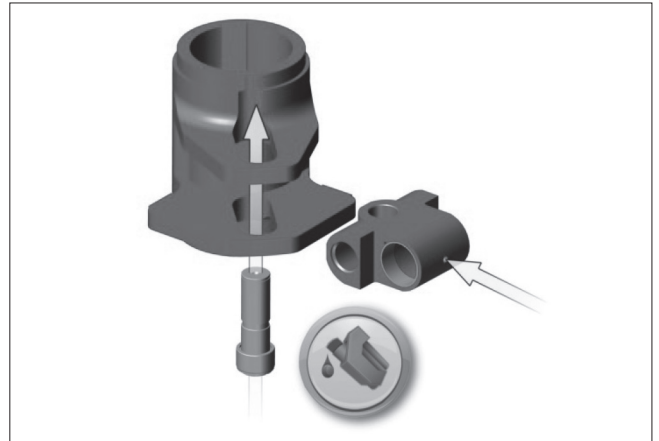
Remove and discard all old seals and gaskets.

Parts should be cleaned to remove all dirt and other foreign material prior to inspection.

Parts should be thoroughly inspected for excessive wear, stress cracking, galling and pitting. Attention should be directed to threads, sealing surfaces and areas that will be subjected to sliding or rotating motion. Sealing surfaces of the cylinder, tie rods and piston rod must be free of deep scratches, pitting, corrosion and blistering or flaking coating.

CAUTION:

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



Before installation apply film of lubricant on all moving parts. Apply film of lubricant on all seals before installing into seal grooves

NOTE:

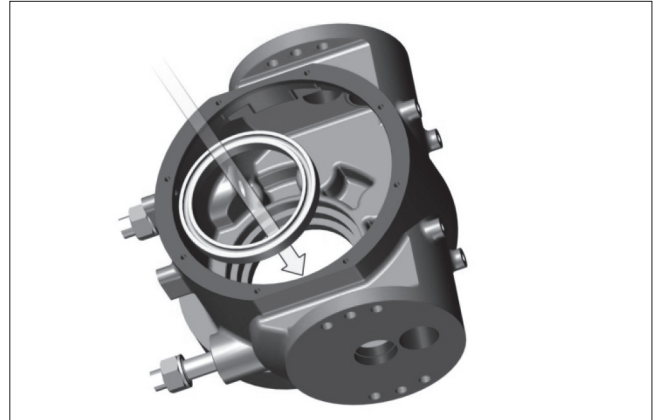
Parts and seals used in the actuator will be assembled using lubricant as identified in unit 1 section 1.8.

For Spring Module Installation refer chapter 4.3 section 4.3.2.

4.5.2 Central block module reassembly

NOTE:

Review unit 4.5 - section 4.5.1 General Re-assembly before proceeding with central block Module reassembly.

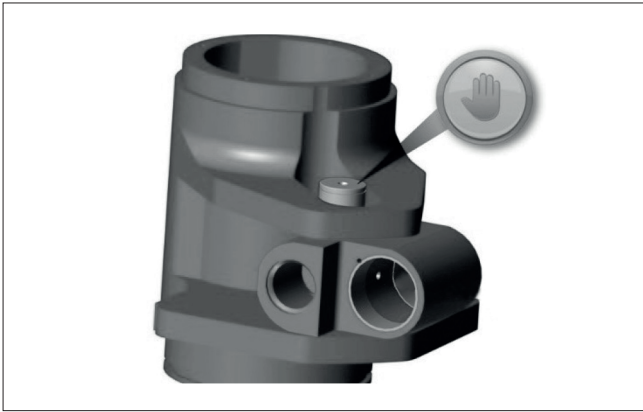


Step 1. Install bottom yoke bearing (56) in central block housing (1). Apply grease on bearing seat on central block housing for ease of assembly.

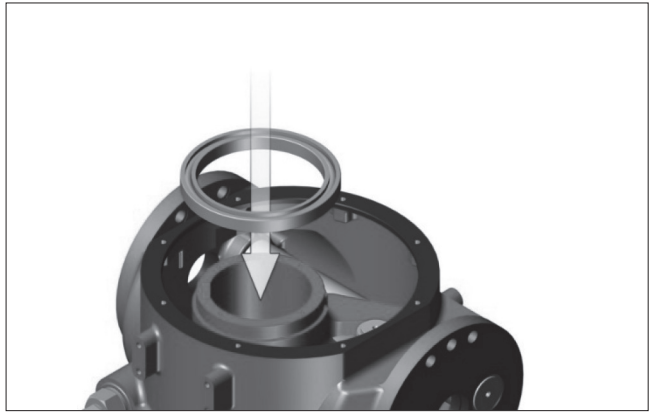
Step 2. Install carrier (15) in yoke (13) then insert yoke pin assembly (16) with roller (17) and washer (18) from bottom side for carrier.

NOTE:

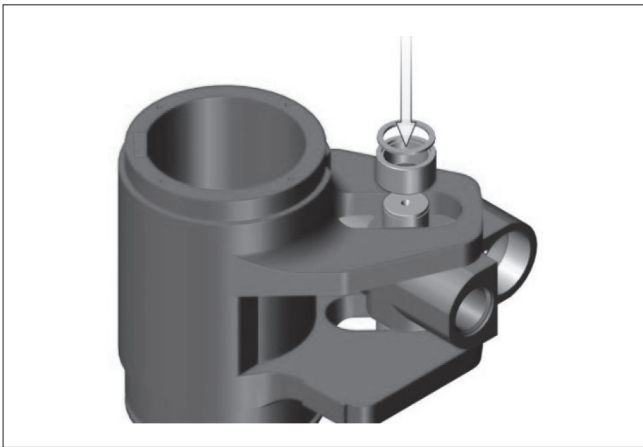
Lubricate yoke pin (16), roller (17) and carrier (15).



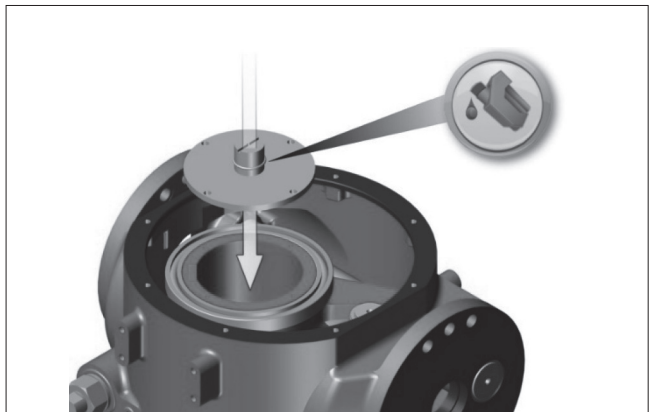
Step 3. Install hex. Head cap screw in carrier to locate the yoke pin at the center of carrier.



Step 6. Install top bearing (56) on yoke apply grease layer on bearing.



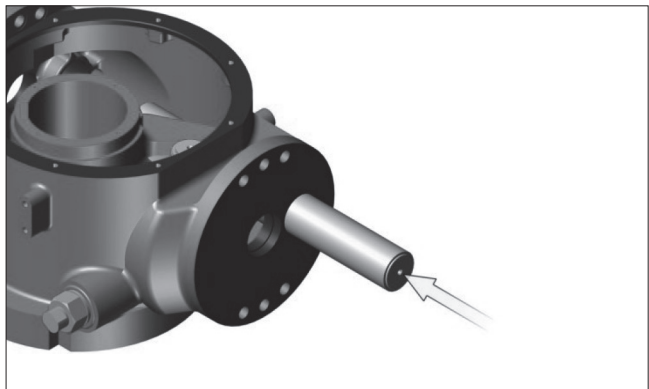
Step 4. Install top side roller (17), washer (18) and retaining ring (61) on yoke pin (16).



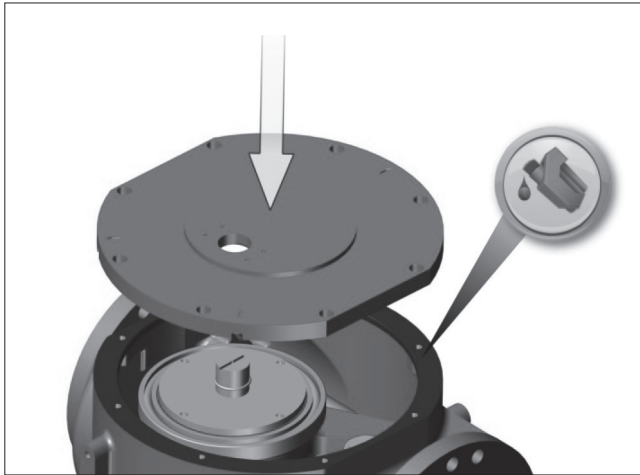
Step 7. Install yoke insert (19) with O-ring (35) on the top of yoke with the help of hex. head cap screw (57), apply grease on top side for yoke insert.



Step 5. Install the yoke assembly in the bottom bearing (56) of actuator with bottom side O-ring seal (36).



Step 8. Install guide rod (14) in central block housing (1) and carrier (15).



Step 9. Install top cover (12) with O-ring (33) on central block housing (1) with the help of hex.soc. head cap screw (55) apply coat of lubricant on O-ring, and mating surfaces before installation.

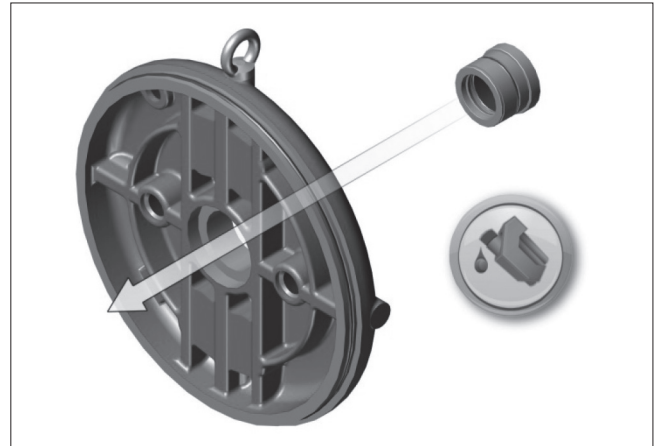
NOTE:

Above step should be done after installation of pneumatic cylinder module and spring module

4.5.3 Pneumatic cylinder module reassembly

NOTE:

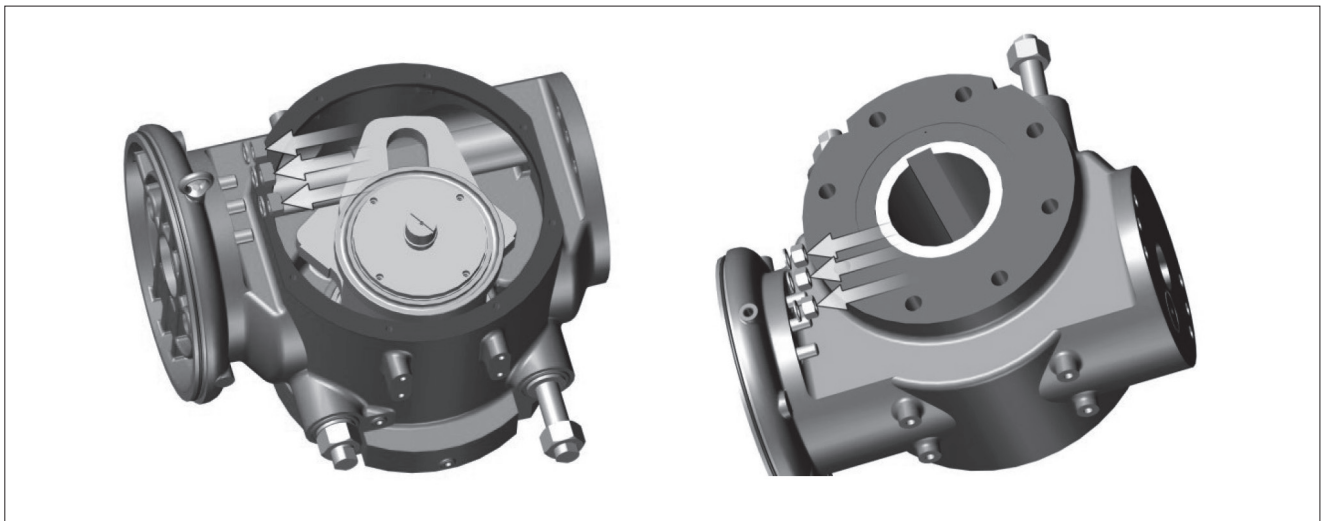
The actuator must be in appropriate over travel position



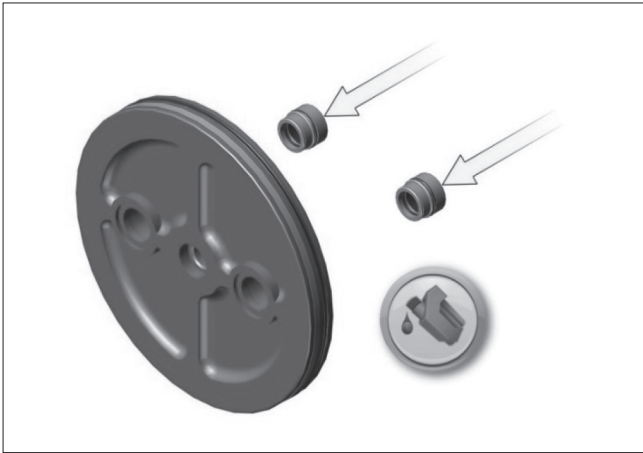
Step 1. Install outer O-ring (40) and rod seal (5) on bearing bush, lubricate guide bush. Install assembly in front cover (3).



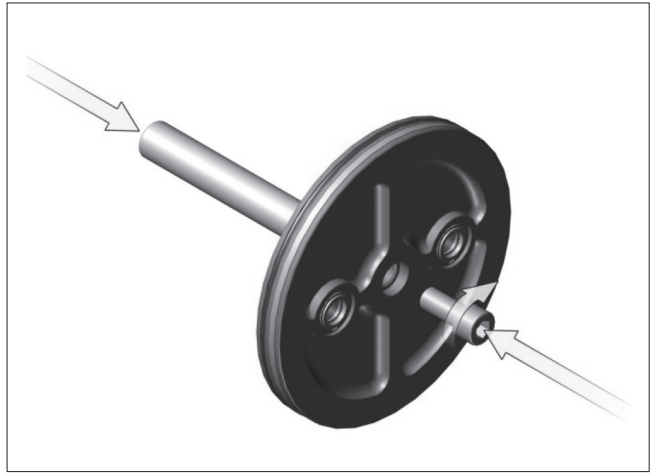
Step 2. Install retaining ring (45) on guide bush.



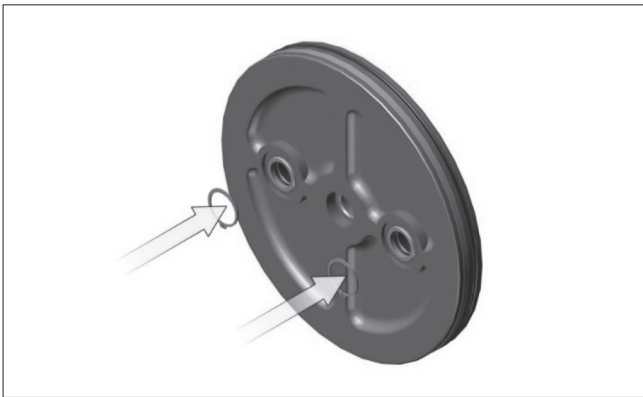
Step 3. Install O-ring (24, 31) on front cover apply film of lubricant on cover O-ring then install front cover on central block (1).



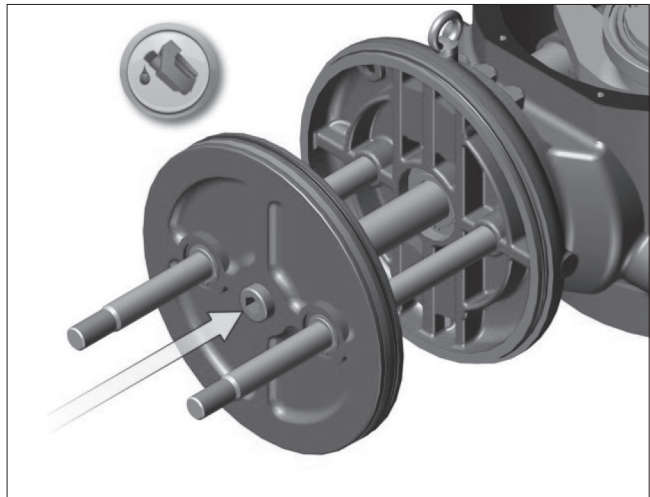
Step 4. Install outer O-ring (37) and internal x-ring (44) on guide bush (7), apply lubricant on outer and inner diameter of guide bush (7) then install guide bush in piston (6).



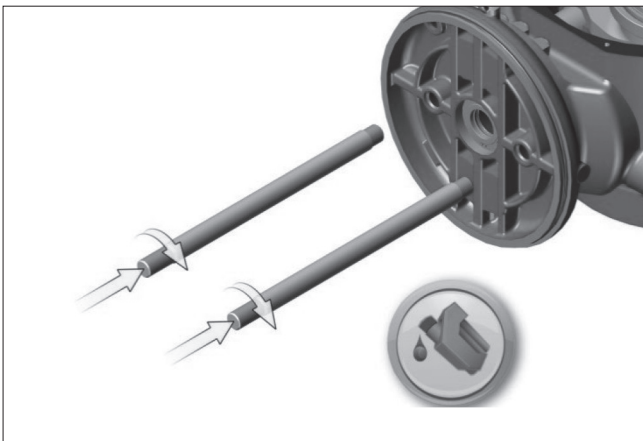
Step 7. Install piston rod (9) on piston (6) by using soc hex head cap screw (51).



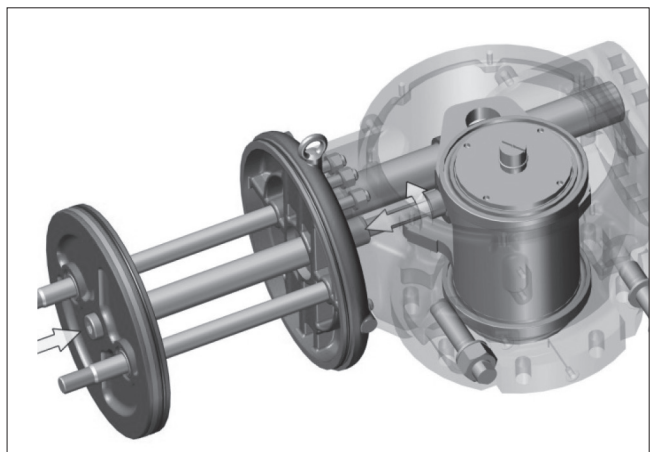
Step 5. Install retaining ring (62) on guide bush (7) to hold the guide bush in piston (6).



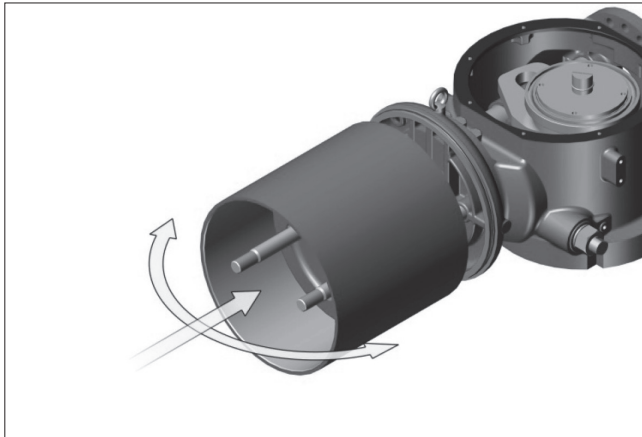
Step 8. Install piston assembly on tie rod (8), install piston strip (30) and piston seal (43) on piston (6) and apply film lubricant on piston strip and piston seal.



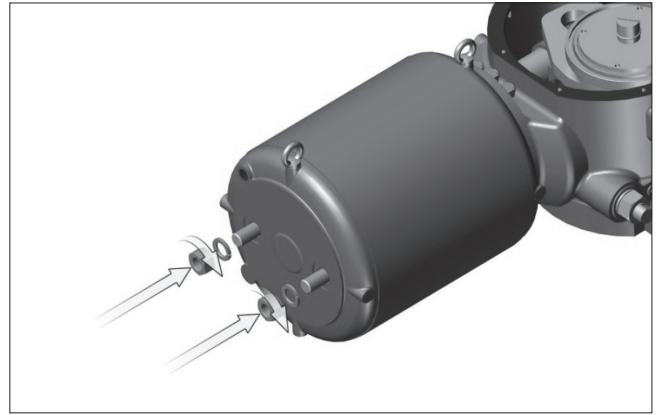
Step 6. Apply film of lubricant on tie rod (8) then install tie rod on front cover (3).



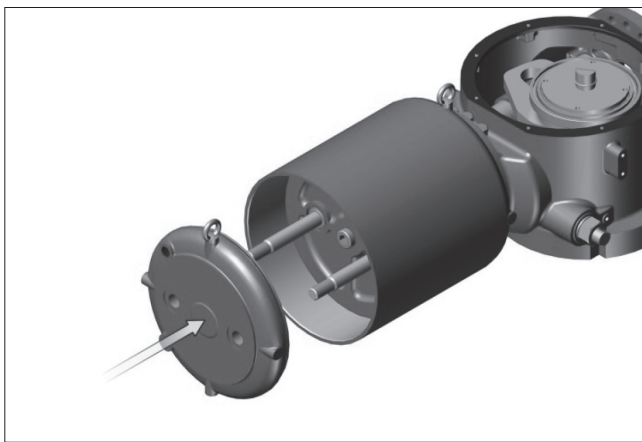
Step 9. Install connecting bolt (20) thru connecting nut (54) on piston rod tapping tighten connecting bolt, connecting nut should rotate freely after tightening of connecting bolt.



Step 10. Apply lubricant on cylinder tube (2) then install cylinder tube thru piston (6) on front cover (3).



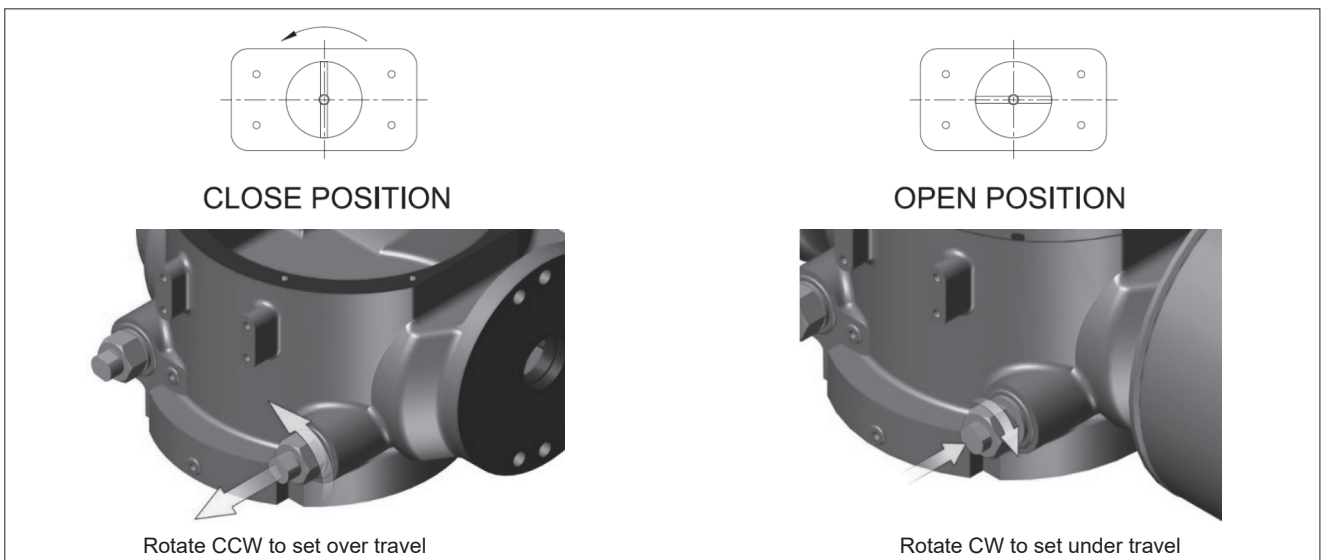
Step 12. Install hex nut (50) with spring washer (49) on tie rod to assemble the rear cover (10) on actuator.



Step 11. Install O-ring (38, 39) on rear side cover (10) apply lubricant on both O-ring then install rear cover in cylinder tube (2).

4.6 Stroke screw adjustment

1. Limit stop screw (52a, b) can be adjusted to get desired close & open setting of the valve respectively.
2. With stroke adjustment screw setting of $\pm 5^\circ$ can be achieved in both positions.
3. Loosen nut (53) & rotate stroke adjustment screw in counter clockwise (CCW) direction to set over travel and clockwise (CW) direction to set under travel.



4.7 Field conversions

Fail mode reversal (CW to CCW or CCW to CW)

NOTE:

Actuators must not undergo fail mode reversal without specific knowledge and acceptance of the resulting torque output. If a symmetrical yoke is being used during the process, then fail mode reversal will not affect the torque output.

Step 1. Remove spring module as per Chapter 4.3 - Section 4.3.1.

Step 2. Remove pneumatic cylinder module as per Chapter 4.3 - Section 4.3.3.

Step 3. Re-install the Spring Module onto the opposite end of central block housing (1), as it was previously located per Chapter 4.3 - Section 4.3.2.

Step 4. Re-install the pneumatic cylinder module onto the opposite end of central block housing (1), as it was previously located per Chapter 4.3 - Section 4.3.4.

Converting double acting actuator to spring return

Step 1. Remove end cap as shown in Chapter 4.3 - Section 4.3.2 step 2 and 4.

Step 2. If Pneumatic cylinder Module needs to be relocated due to fail mode requirements (fail counter-clockwise) use Chapter 4.3 - Section 4.3.3 for removal and Section 4.3.4 for installation.

Step 3. Install the Spring Module on the central block housing (1), as it was previously located per Chapter 4.3 - Section 4.3.2.

Converting spring return actuator to double acting

Step 1. Remove the Spring module as per Chapter 4.3 - Section 4.3.1.

Step 2. If Pneumatic cylinder Module needs to be relocated due to fail mode requirements (fail counter-clockwise) use Chapter 4.3 - Section 4.3.3 for removal and Section 4.3.4 for installation.

Step 3. Install end cap as shown onto the opposite end of central block housing (1).

4.8 Malfunctions

Table 4 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 necessary.
	Moving parts corroded in harsh, humid conditions	Replace the corroded parts.
Backlash in joint between actuator and valve	Replace parts as necessary.	

4.9 Tools

For maintenance of the N1 series actuator, you will need a few common tools.

Table 5 List of needed tools

Tool Style	Location	X	A	B	C	D	E	H	J	M
		TOOL SIZE								
Ring Spanner	38	8	10	17	17	19	19	24	30	30
Allen Key	41	4	5	5	5	5	5	6	6	8
Jaw spanner	44	30	46	65	65	65	75	95	125	-
Jaw spanner	43	24	36	46	46	55	55	95	105	180
Allen Key	45	8	14	19	19	19	22	27	-	-
Ring Spanner	47	13	17	19	19	24	30	36	46	55
Ring Spanner	50		Ø200-22	Ø250-22	Ø300-36	Ø350-36	Ø500-46	Ø700-55	Ø700-55	Ø1000-95
			Ø250-22	Ø300-36	Ø350-36	Ø400-46	Ø600-55	Ø800-65	Ø800-65	Ø1100-105
			Ø300-36	Ø350-36	Ø400-46	Ø500-46			Ø900-75	Ø1200-105
			Ø350-36	Ø400-46	Ø500-46				Ø1000	

NOTE:

1. *Marked tools are used in single acting actuator only.

2. **Marked tools shows sizes in ØXXX-YY format where ØXXX- represents pneumatic bore diameter & YY represents tool size.

4.10 Tightening torque table

Table 6 Tightening torque table

Central frame	Part no.	Tightening torque in Nm
N1X	47	2,5
	57	1,2
	54	122
	53	68
	55	18
	51	10
N1A	47	4
	57	4,2
	54	346
	53	228
	55	75
	51	20
N1B	47	20
	57	4,2
	54	857
	53	452
	55	252
	51	35
N1C	47	20
	57	4,2
	54	857
	53	452
	55	252
	51	35
N1D	47	35
	57	4,2
	54	857
	53	791
	55	252
	51	87
N1E	47	35
	57	4,2
	54	1519
	53	791
	55	500
	51	170
N1H	47	87
	57	10
	54	3733
	53	4604
	55	874
	51	293
N1J	47	170
	57	10
	54	8767
	53	6696
	55	2100
N1M	47	170
	57	10
	54	15284
	53	37603
	55	3377
	51	1017

Part no.	Pneumatic bore dia.	Tightening torque in Nm
50	200	40
	250	40
	300	209
	350	209
	400	416
	500	416
	600	728
	700	728
	800	1165
	900	1750
	1000	4238
	1100	6166
	1200	6166
	1300	10409

4.11 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.

4.12 N1 Spring Cartridge Disassembly tools:

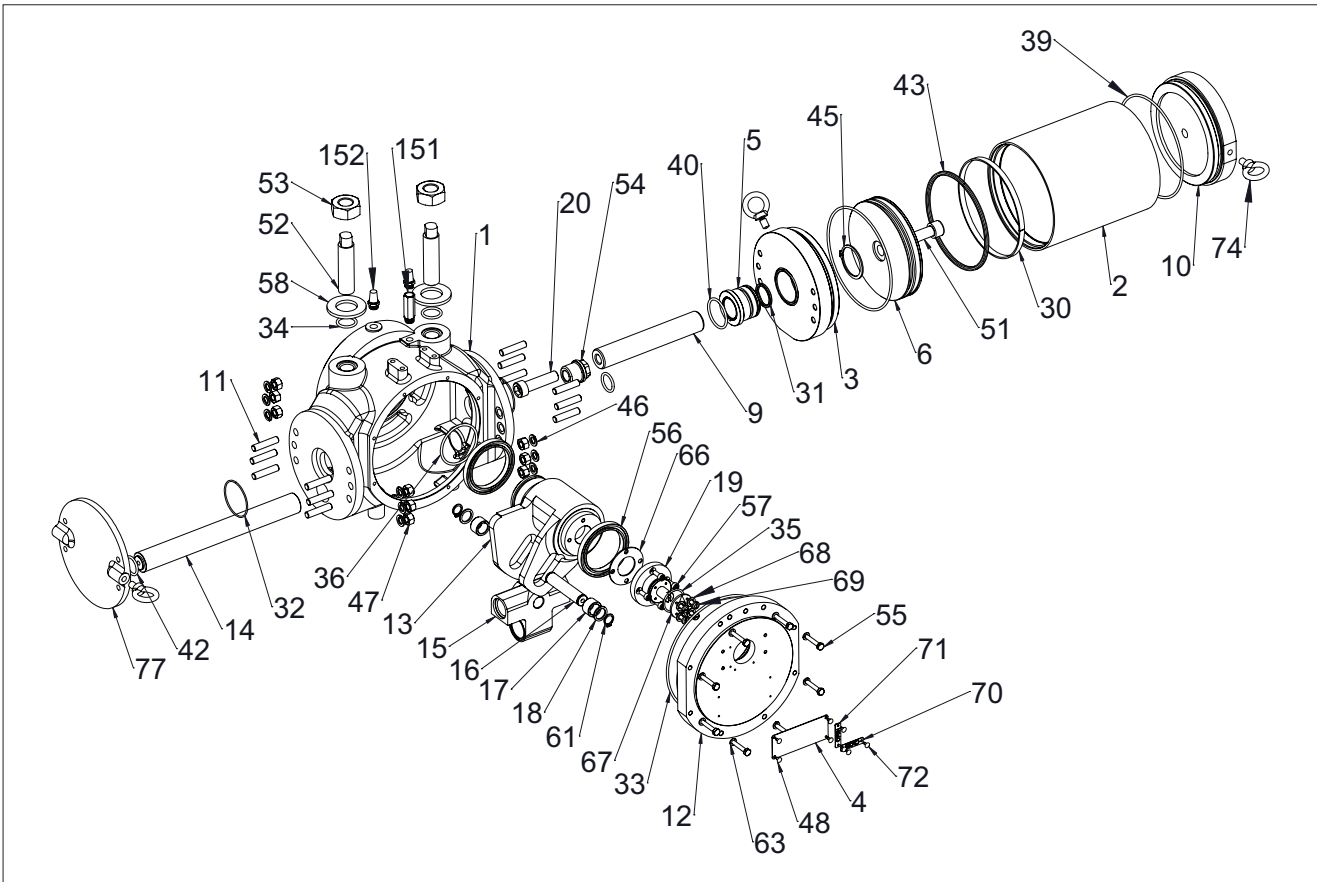
Table 7

Sr No	Central Frame	Part Description	Item No.
1	N1X	N1X SPRING CARTRIDGE DISASSLY FIXTURE	1274050801
2	N1A	N1A SPRING CARTRIDGE DISASSLY FIXTURE	1274100801
3	N1B TO N1E	N1B TO N1E SPRING CARTRIDGE DISASSLY FIXTURE	1274200801
4	N1H	N1H SPRING CARTRIDGE DISASSLY FIXTURE	1274700801
5	N1J	N1J SPRING CARTRIDGE DISASSLY FIXTURE	1274800801
6	N1M	N1M SPRING CARTRIDGE DISASSLY FIXTURE	1274900801
7	N1X to N1E	SOLID ROD FOR MOVEMENT OF N1X TO N1E FIXTURE	1274200802
8	N1H to N1M	SOLID ROD FOR MOVEMENT OF N1H TO N1M FIXTURE	1274900802

5. EXPLODED VIEWS AND PARTS LIST

5.1 Double acting actuators N1_D00

CYLINDER SIZES FROM 63 TO 150

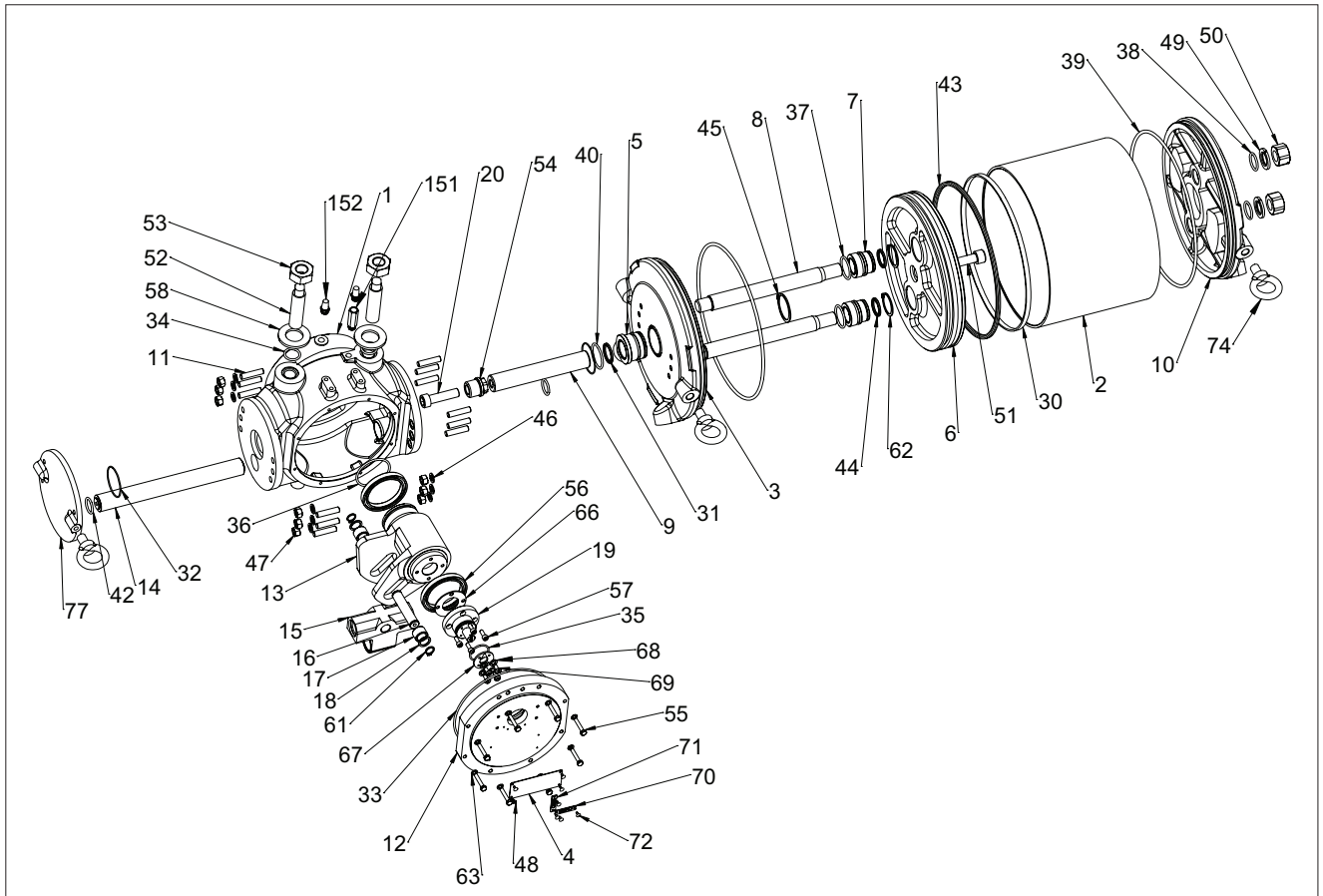


ITEM NO.	DISCRIPTION	QTY.	MATERIAL
1	CENTRAL BLOCK	1	DUCTILE IRON
2	CYLINDER	1	CARBON STEEL / CHROME PLATED
3	CYLINDER FRONT COVER	1	CARBON STEEL / DUCTILE IRON
4	NAME PLATE	1	STAINLESS STEEL
5#	BEARING BUSH	1	CARBONSTEEL + PHOSPHOR BRONZE
6	PISTON	1	CARBON STEEL / DUCTILE IRON
9	PISTON ROD	1	STAINLESS STEEL
10	CYLINDER REAR COVER	1	CARBON STEEL / DUCTILE IRON
11	STUD BOLT	12	ALLOY STEEL
12	CENTRAL BLOCK COVER	1	DUCTILE IRON
13	YOKE	1	DUCTILE IRON
14	GUIDE ROD	1	STAINLESS STEEL
15	CARRIER	1	DUCTILE IRON
16	YOKE PIN	1	ALLOY STEEL
17	ROLLER FOR YOKE PIN	2	ALLOY STEEL
18	WASHER	2	STAINLESS STEEL
19	YOKE INSERT	1	DUCTILE IRON
20	CONNECTING BOLT PNEUMATIC SIDE	1	ALLOY STEEL
30#	PISTON STRIP	1	DELTRIN / PTFE
31*	ROD SEAL	1	NBR
32*	O-RING	2	NBR
33*	O-RING	1	NBR
34*	O-RING	2	NBR
35*	O-RING	1	NBR
36*	O-RING	1	NBR
39*	O-RING	2	NBR
40*	O-RING	1	NBR

ITEM NO.	DISCRIPTION	QTY.	MATERIAL
42*	O-RING	2	NBR
43*	QUAD SEAL	1	NBR
45	EXTERNAL CIRCLIP	1	DIN 471
46	SPRING WASHER	12	DIN 128
47	HEX. NUT	12	DIN 934
48	RIVET	4	-
51	HEX. SOC. HEAD CAP SCREW	1	DIN 912
52	STROKE ADJUSTMENT SCREW	2	CARBON STEEL
53	HEX. NUT	2	DIN 934
54	CONNECTING NUT	1	ALLOY STEEL
55	HEX. SOC. HEAD CAP SCREW	8	DIN 912
56#	RADIAL BALL BEARING	2	-
57	HEX. SOC. HEAD CAP SCREW	4	DIN 912
58	WASHER	2	CARBON STEEL
61	EXTERNAL CIRCLIP	2	DIN 471
63	SPRING WASHER	8	DIN 128
66*	GASKET FOR COVER	1	NBR
67	POSITION INDICATOR	1	ALUMINIUM ALLOY
68	SPRING WASHER	4	DIN 128
69	SLOTTED HEAD CAP SCREW	4	IS 6101
70	CLOSE POSITION INDICATOR	1	STAINLESS SHEEL
71	OPEN POSITION INDICATOR	1	STAINLESS STEEL
72	RIVET	4	-
74	EYEBOLT	3	STD
77	REAR CAP	1	DUCTILE IRON
151	CHECK VALVE	1	STD
152	SILENCER	2	BRASS

1) * Marked components are the parts of the seal kit
2) # Marked components are the parts of the repair kit

CYLINDER SIZES FROM 200 TO 1000



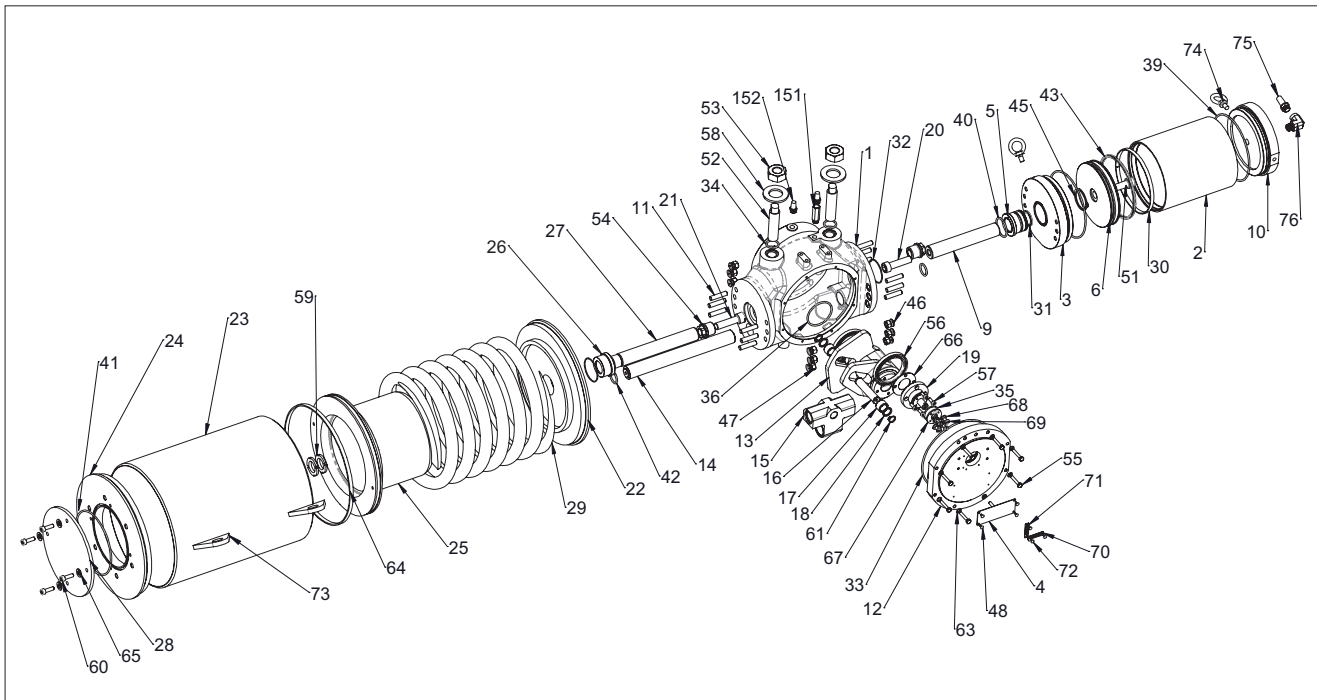
ITEM NO.	DISCRIPTION	QTY.	MATERIAL
1	CENTRAL BLOCK	1	DUCTILE IRON
2	CYLINDER	1	CARBON STEEL / CHROME PLATED
3	CYLINDER FRONT COVER	1	CARBON STEEL / DUCTILE IRON
4	NAME PLATE	1	STAINLESS STEEL
5#	BEARING BUSH	1	CARBONSTEEL + PHOSPHOR BRONZE
6	PISTON	1	CARBON STEEL / DUCTILE IRON
7#	GUIDE BUSH	2	CARBONSTEEL + PHOSPHOR BRONZE
8	TIE ROD	2	STAINLESS STEEL
9	PISTON ROD	1	STAINLESS STEEL
10	CYLINDER REAR COVER	1	CARBON STEEL / DUCTILE IRON
11	STUD BOLT	12	ALLOY STEEL
12	CENTRAL BLOCK COVER	1	DUCTILE IRON
13	YOKE	1	DUCTILE IRON
14	GUIDE ROD	1	STAINLESS STEEL
15	CARRIER	1	DUCTILE IRON
16	YOKE PIN	1	ALLOY STEEL
17	ROLLER FOR YOKE PIN	2	ALLOY STEEL
18	WASHER	2	STAINLESS STEEL
19	YOKE INSERT	1	DUCTILE IRON
20	CONNECTING BOLT PNEUMATIC SIDE	1	ALLOY STEEL
30#	PISTON STRIP	1	DELRIN / PTFE
31*	ROD SEAL	1	NBR
32*	O-RING	2	NBR
33*	O-RING	1	NBR
34*	O-RING	2	NBR
35*	O-RING	1	NBR
36*	O-RING	1	NBR
37*	O-RING	2	NBR
38*	O-RING	2	NBR
39*	O-RING	2	NBR
40*	O-RING	1	NBR

ITEM NO.	DISCRIPTION	QTY.	MATERIAL
42*	O-RING	2	NBR
43*	QUAD SEAL	1	NBR
44*	QUAD SEAL	2	NBR
45	EXTERNAL CIRCLIP	1	DIN 471
46	SPRING WASHER	12	DIN 128
47	HEX. NUT	12	DIN 934
48	RIVET	4	-
49	SPRING WASHER	2	DIN 934
50	HEX. NUT	2	DIN 934
51	HEX. SOC. HEAD CAP SCREW	1	DIN 912
52	STROKE ADJUSTMENT SCREW	2	CARBON STEEL
53	HEX. NUT	2	DIN 934
54	CONNECTING NUT	1	ALLOY STEEL
55	HEX. HEAD SCREW	8	DIN 912
56#	RADIAL BALL BEARING	2	-
57	HEX. SOC. HEAD CAP SCREW	4	DIN 912
58	WASHER	2	CARBON STEEL
61	EXTERNAL CIRCLIP	2	DIN 471
62	EXTERNAL CIRCLIP	2	DIN 471
63	SPRING WASHER	8	DIN 128
66*	GASKET FOR COVER	1	NBR
67	POSITION INDICATOR	1	ALUMINIUM ALLOY
68	SPRING WASHER	4	DIN 128
69	SLOTTED HEAD CAP SCREW	4	IS 6101
70	CLOSE POSITION INDICATOR	1	STAINLESS STEEL
71	OPEN POSITION INDICATOR	1	STAINLESS STEEL
72	RIVET	4	-
74	EYEBOLT	3	STD
77	REAR CAP	1	DUCTILE IRON
151	CHECK VALVE	1	STD
152	SILENCER	2	BRASS

1) * Marked components are the parts of the seal kit
 2) # Marked components are the parts of the repair kit

5.2 Single acting actuators N1_E_C and N1_E_A

CYLINDER SIZES FROM 63 TO 150



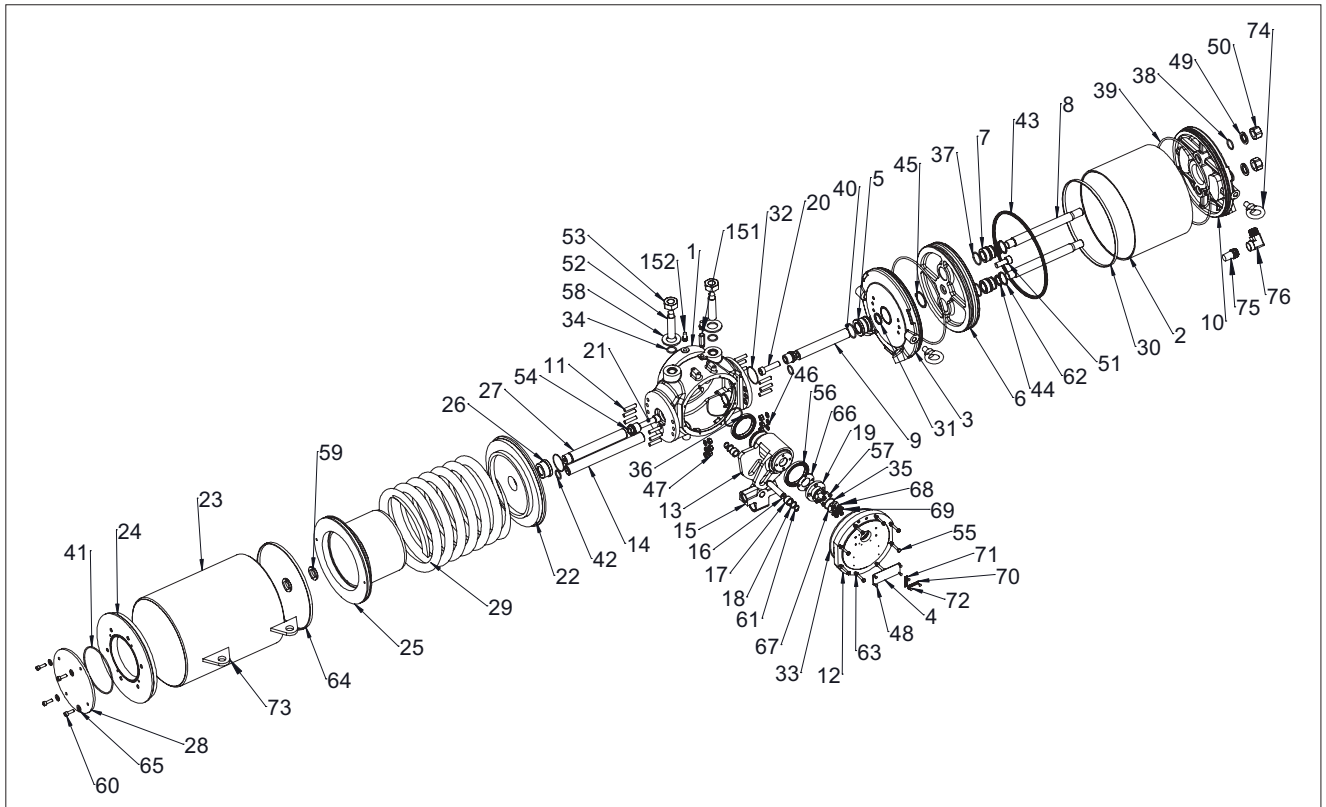
ITEM NO.	DISCRIPTION	QTY.	MATERIAL
1	CENTRAL BLOCK	1	DUCTILE IRON
2	CYLINDER	1	CARBON STEEL / CHROME PLATED
3	CYLINDER FRONT COVER	1	CARBON STEEL / DUCTILE IRON
4	NAME PLATE	1	STAINLESS STEEL
5#	BEARING BUSH	1	CARBONSTEEL + PHOSPHOR BRONZE
6	PISTON	1	CARBON STEEL / DUCTILE IRON
9	PISTON ROD	1	STAINLESS STEEL
10	CYLINDER REAR COVER	1	CARBON STEEL / DUCTILE IRON
11	STUD BOLT	12	ALLOY STEEL
12	CENTRAL BLOCK COVER	1	DUCTILE IRON
13	YOKE	1	DUCTILE IRON
14	GUIDE ROD	1	STAINLESS STEEL
15	CARRIER	1	DUCTILE IRON
16	YOKE PIN	1	ALLOY STEEL
17	ROLLER FOR YOKE PIN	2	ALLOY STEEL
18	WASHER	2	STAINLESS STEEL
19	YOKE INSERT	1	DUCTILE IRON
20	CONNECTING BOLT PNEUMATIC SIDE	1	ALLOY STEEL
21	CONNECTING BOLT SPRING SIDE	1	ALLOY STEEL
22	SPRING COVER FRONT END	1	CARBON STEEL
23	E- TUBE	1	CARBON STEEL
24	SPRING COVER REAR END	1	CARBON STEEL
25	SPRING RETAINER	1	DUCTILE IRON
26#	BEARING BUSH	1	CARBONSTEEL+PHOSPHOR BRONZE
27	CONNECTING ROD	1	STAINLESS STEEL
28	E-COVER REAR CAP	1	CARBON STEEL
29	SPRING	1	ALLOY STEEL / SPRING STEEL
30#	PISTON STRIP	1	DELIRIN / PTFE
31*	ROD SEAL	1	NBR
32*	O-RING	2	NBR
33*	O-RING	1	NBR
34*	O-RING	2	NBR
35*	O-RING	1	NBR

ITEM NO.	DISCRIPTION	QTY.	MATERIAL
36*	O-RING	1	NBR
39*	O-RING	2	NBR
40*	O-RING	1	NBR
41*	O-RING	1	NBR
42*	O-RING	2	NBR
43*	QUAD SEAL	1	NBR
45	EXTERNAL CIRCLIP	1	DIN 471
46	SPRING WASHER	12	DIN 128
47	HEX. NUT	12	DIN 934
48	RIVET	4	-
51	HEX. SOC. HEAD CAP SCREW	1	DIN 912
52	STROKE ADJUSTMENT SCREW	2	CARBON STEEL
53	HEX. NUT	2	DIN 934
54	CONNECTING NUT	2	ALLOY STEEL
55	HEX. HEAD SCREW	8	DIN 912
56#	RADIAL BALL BEARING	2	-
57	HEX. SOC. HEAD CAP SCREW	4	DIN 912
58	WASHER	2	CARBON STEEL
59	SLOTTED ROUND NUT	2	-
60	HEX. SOC. HEAD CAP SCREW	4	DIN 912
61	EXTERNAL CIRCLIP	2	DIN 471
63	SPRING WASHER	8	DIN 128
64	RETAINER GUIDE STRIP	1	PTFE
65	SPRING WASHER	4	DIN 128
66*	GASKET FOR COVER	1	NBR
67	POSITION INDICATOR	1	ALUMINIUM ALLOY
68	SPRING WASHER	4	DIN 128
69	SLOTTED HEAD CAP SCREW	4	IS 6101
70	CLOSE POSITION INDICATOR	1	STAINLESS STEEL
71	OPEN POSITION INDICATOR	1	STAINLESS STEEL
72	RIVET	4	-
73	LIFTING LUG	2	MILD STEEL
74	EYEBOLT	2	STD
75	SILENCER	1	BRASS
76	ELBOW FITTING	1	STAINLESS STEEL
151	CHECK VALVE	1	STD
152	SILENCER	2	BRASS

1) * Marked components are the parts of the seal kit

2) # Marked components are the parts of the repair kit

CYLINDER SIZES FROM 200 TO 1000



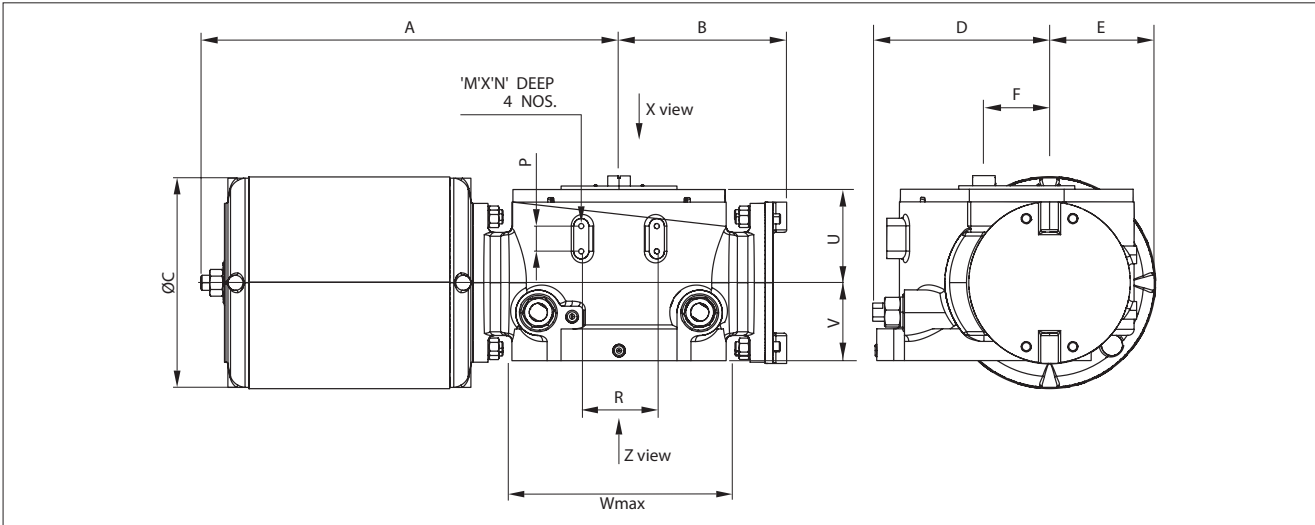
ITEM NO.	DISCRIPTION	QTY.	MATERIAL
1	CENTRAL BLOCK	1	DUCTILE IRON
2	CYLINDER	1	CARBON STEEL / CHROME PLATED
3	CYLINDER FRONT COVER	1	CARBON STEEL/ DUCTILE IRON
4	NAME PLATE	1	STAINLESS STEEL
5#	BEARING BUSH	1	CARBONSTEEL + PHOSPHOR BRONZE
6	PISTON	1	CARBON STEEL/ DUCTILE IRON
7#	GUIDE BUSHING	2	CARBONSTEEL + PHOSPHOR BRONZE
8	TIE ROD	2	STAINLESS STEEL
9	PISTON ROD	1	STAINLESS STEEL
10	CYLINDER REAR COVER	1	CARBON STEEL/ DUCTILE IRON
11	STUD BOLT	12	ALLOY STEEL
12	CENTRAL BLOCK COVER	1	DUCTILE IRON
13	YOKE	1	DUCTILE IRON
14	GUIDE ROD	1	STAINLESS STEEL
15	CARRIER	1	DUCTILE IRON
16	YOKE PIN	1	ALLOY STEEL
17	ROLLER FOR YOKE PIN	2	ALLOY STEEL
18	WASHER	2	STAINLESS STEEL
19	YOKE INSERT	1	DUCTILE IRON
20	CONNECTING BOLT PNEUMATIC SIDE	1	ALLOY STEEL
21	CONNECTING BOLT SPRING SIDE	1	ALLOY STEEL
22	SPRING COVER FRONT END	1	CARBON STEEL
23	E- TUBE	1	CARBON STEEL
24	SPRING COVER REAR END	1	CARBON STEEL
25	SPRING RETAINER	1	DUCTILE IRON
26#	BEARING BUSH	1	CARBONSTEEL + PHOSPHOR BRONZE
27	CONNECTING ROD	1	STAINLESS STEEL
28	E-COVER REAR CAP	1	CARBON STEEL
29	SPRING	1	ALLOY STEEL / SPRING STEEL
30#	PISTON STRIP	1	DELTRIN / PTFE
31*	ROD SEAL	1	NBR
32*	O-RING	2	NBR
33*	O-RING	1	NBR
34*	O-RING	2	NBR
35*	O-RING	1	NBR
36*	O-RING	1	NBR
37*	O-RING	2	NBR

ITEM NO.	DISCRIPTION	QTY.	MATERIAL
38*	O-RING	2	NBR
39*	O-RING	2	NBR
40*	O-RING	1	NBR
41*	O-RING	1	NBR
42*	O-RING	2	NBR
43*	QUAD SEAL	1	NBR
44*	QUAD SEAL	2	NBR
45	EXTERNAL CIRCLIP	1	DIN 471
46	SPRING WASHER	12	DIN 128
47	HEX. NUT	12	DIN 934
48	RIVET	4	-
49	SPRING WASHER	2	DIN 934
50	HEX NUT	2	DIN 934
51	HEX. SOC. HEAD CAP SCREW	1	DIN 912
52	STROKE ADJUSTMENT SCREW	2	CARBON STEEL
53	HEX. NUT	2	DIN 934
54	CONNECTING NUT	2	ALLOY STEEL
55	HEX. HEAD SCREW	8	DIN 912
56#	RADIAL BALL BEARING	2	-
57	HEX. SOC. HEAD CAP SCREW	4	DIN 912
58	WASHER	2	CARBON STEEL
59	SLOTTED ROUND NUT	2	-
60	HEX. SOC. HEAD CAP SCREW	4	DIN 912 CLASS-8.8
61	EXTERNAL CIRCLIP	2	DIN 471
62	EXTERNAL CIRCLIP	2	DIN 471
63	SPRING WASHER	8	DIN 128
64	RETAINER GUIDE STRIP	1	PTFE
65	SPRING WASHER	4	DIN 128
66*	GASKET FOR COVER	1	NBR
67	POSITION INDICATOR	1	ALUMINIUM ALLOY
68	SPRING WASHER	4	DIN 128
69	SLOTTED HEAD CAP SCREW	4	IS 6101
70	CLOSE POSITION INDICATOR	1	STAINLESS STEEL
71	OPEN POSITION INDICATOR	1	STAINLESS STEEL
72	RIVET	4	-
73	LIFTING LUG	2	MILD STEEL
74	EYEBOLT	2	STD
75	SILENCER	1	BRASS
76	ELBOW FITTING	1	STAINLESS STEEL
151	CHECK VALVE	1	STD
152	SILENCER	2	BRASS

1) * Marked components are the parts of the seal kit
 2) # Marked components are the parts of the repair kit

6. DIMENSIONS AND WEIGHTS

6.1 Dimensions double acting

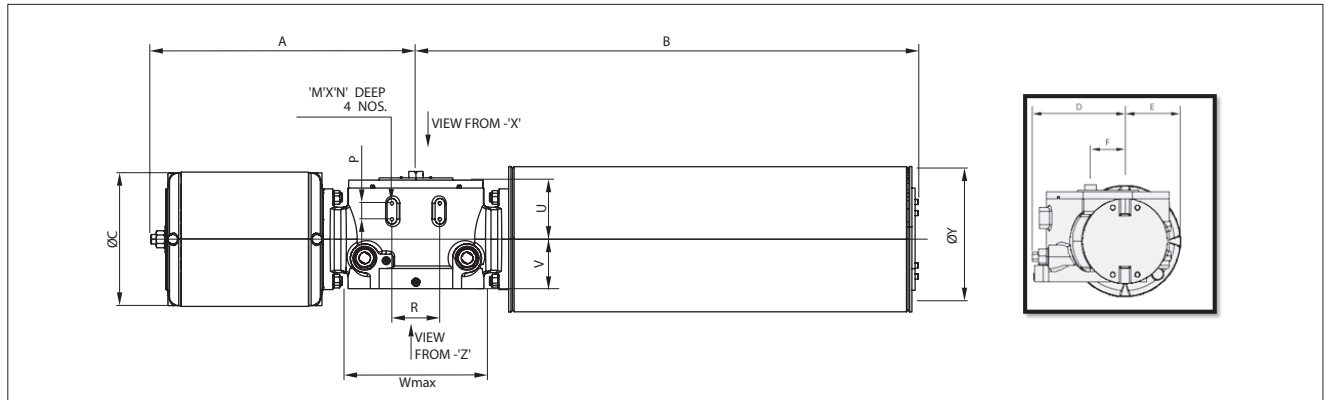


DIMENSION- DOUBLE ACTING ACTUTOR														
MODEL	A	B	Øc	D	E	F	M	N	P	R	W max	U	V	S
N1X0063	239	365	84	116	73	28	M6	9	20	30	125	67	58	1/4" NPT
N1X0080	237	365	100	116	73	28	M6	9	20	30	125	67	58	1/4" NPT
N1X0100	257	365	122	116	73	28	M6	9	20	30	125	67	58	1/4" NPT
N1X0125	285	365	150	116	73	28	M6	9	20	30	125	67	58	1/4" NPT
N1A0100	385	171	122	194	88	58	M8	12	25	60	200	94	86	1/4" NPT
N1A0125	411	171	150	194	88	58	M8	12	25	60	200	94	86	1/4" NPT
N1A0150	395	171	175	194	88	58	M8	12	25	60	200	94	86	3/8" NPT
N1A0200	476	171	210	194	88	58	M8	12	25	60	200	94	86	1/2" NPT
N1A0250	413	171	260	194	130	58	M8	12	25	60	200	94	86	1/2" NPT
N1A0300	456	171	310	194	155	58	M8	12	25	60	200	94	86	3/4" NPT
N1A0350	459	171	360	194	180	58	M8	12	25	60	200	94	86	3/4" NPT
N1B0250	568	230	260	245	130	75	M10	15	25	80	210	102	105	1/2" NPT
N1B0300	548	230	308	245	155	75	M10	15	25	80	210	102	105	3/4" NPT
N1B0350	551	230	360	245	180	75	M10	15	25	80	210	102	105	3/4" NPT
N1B0400	596	230	416	245	208	75	M10	15	25	80	210	102	105	3/4" NPT
N1C0300	599	248	308	252	155	90	M10	15	50	90	294	130	112	3/4" NPT
N1C0350	583	248	360	252	180	90	M10	15	50	90	294	130	112	3/4" NPT
N1C0400	660	248	416	252	208	90	M10	15	50	90	294	130	112	3/4" NPT
N1C0500	675	248	522	252	257	90	M10	15	50	90	294	130	112	3/4" NPT
N1D0300	786	328	308	321	180	108	M12	15	50	150	350	138	121	3/4" NPT
N1D0350	789	328	366	321	180	108	M12	15	50	150	350	138	121	3/4" NPT
N1D0400	736	328	416	321	208	108	M12	15	50	150	350	138	121	3/4" NPT
N1D0500	739	328	522	321	257	108	M12	15	50	150	350	138	121	3/4" NPT
N1E0500	832	365	522	368	257	130	M12	15	50	150	425	199	155	3/4" NPT
N1E0600	849	365	624	368	312	130	M12	15	50	150	425	199	155	1" NPT
N1H0700	1228	566	724	549	404	198	M12	15	50	150	600	222	213	1" NPT
N1H0800	1253	566	824	549	458	198	M12	15	50	150	600	222	213	1" NPT
N1J0700	1498	676	724	677	404	260	M16	32	100	300	686	299	247	1" NPT
N1J0800	1517	676	824	677	458	260	M16	32	100	300	686	299	247	1" NPT
N1J0900	1570	676	926	677	558	260	M16	32	100	300	686	299	247	1 1/2" NPT
N1J1000	1529	676	1040	677	549	260	M16	32	100	300	686	299	247	1 1/2" NPT
N1M1000	1865	851	1040	884	520	335	M20	40	100	300	1164	300	270	1 1/2" NPT
N1M1100	1935	851	1150	884	575	335	M20	40	100	300	1164	300	270	2" NPT
N1M1200	1945	851	1250	884	625	335	M20	40	100	300	1164	300	270	2" NPT

6.2 Weights double acting

Cyl. Diam	63	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	800-2	900-2	1000-2	1100	1200	1300	1100-2	1200-2	1300-2	
Actuator	weight, kg																									
N1X	18	20	22	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1A	-	-	52	57	63	65	68	90	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1B	-	-	-	-	-	-	106	122	135	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1C	-	-	-	-	-	-	-	145	165	207	274	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1D	-	-	-	-	-	-	-	-	245	276	342	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1E	-	-	-	-	-	-	-	-	-	-	450	541	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1H	-	-	-	-	-	-	-	-	-	-	-	1138	1345	-	-	-	-	-	-	-	-	-	-	-	-	-
N1J	-	-	-	-	-	-	-	-	-	-	-	-	1610	1800	2041	3300	-	-	-	-	-	-	-	-	-	-
N1M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4500	-	-	-	-	5644	6130	-	-	-	-

6.3 Dimensions single acting



DIMENSION- SINGLE ACTING ACTUTOR																
MODEL	A	B	Øc	D	E	F	M	N	P	R	W max	U	V	ØY	S	
N1X0063-E1-E5	239	365	84	116	73	28	M6	9	20	30	125	67	58	170	1/4" NPT	
N1X0080-E1-E5	237	365	100	116	73	28	M6	9	20	30	125	67	58	170	1/4" NPT	
N1X0100-E1-E4	257	365	122	116	73	28	M6	9	20	30	125	67	58	170	1/4" NPT	
N1X0125-E1-E2	285	365	150	116	73	28	M6	9	20	30	125	67	58	170	1/4" NPT	
N1A0100-E7	385	573	122	194	88	58	M8	12	25	60	200	94	86	310	1/4" NPT	
N1A0100-E8-E11	385	498	122	194	88	58	M8	12	25	60	200	94	86	255	1/4" NPT	
N1A0125-E7	411	573	150	194	88	58	M8	12	25	60	200	94	86	310	1/4" NPT	
N1A0125-E8-E11	411	498	150	194	88	58	M8	12	25	60	200	94	86	255	1/4" NPT	
N1A0150-E5-E7	395	573	175	194	88	58	M8	12	25	60	200	94	86	310	3/8" NPT	
N1A0150-E8-E11	395	498	175	194	88	58	M8	12	25	60	200	94	86	255	3/8" NPT	
N1A0200-E2-E4	476	612	210	194	88	58	M8	12	25	60	200	94	86	360	1/2" NPT	
N1A0200-E5-E6	476	573	210	194	88	58	M8	12	25	60	200	94	86	310	1/2" NPT	
N1A0250-E1-E4	413	612	260	194	130	58	M8	12	25	60	200	94	86	360	1/2" NPT	
N1A0250-E5-E6	413	573	260	194	130	58	M8	12	25	60	200	94	86	310	1/2" NPT	
N1A0300-E1-E4	456	612	310	194	155	58	M8	12	25	60	200	94	86	360	3/4" NPT	
N1A0300-E5	456	573	310	194	155	58	M8	12	25	60	200	94	86	310	3/4" NPT	
N1A0350-E1-E4	459	612	360	194	180	58	M8	12	25	60	200	94	86	360	3/4" NPT	
N1B0250-E1-E6	568	955	260	245	130	75	M10	15	25	80	210	102	105	321	1/2" NPT	
N1B0300-E1-E6	548	955	308	245	155	75	M10	15	25	80	210	102	105	321	3/4" NPT	
N1B0350-E1-E6	551	955	360	245	180	75	M10	15	25	80	210	102	105	321	3/4" NPT	
N1B0400-E1-E6	596	955	416	245	208	75	M10	15	25	80	210	102	105	321	3/4" NPT	
N1C0300-E1-E4	599	1060	308	252	155	90	M10	15	50	90	294	130	112	379	3/4" NPT	
N1C0350-E1-E4	583	1060	360	252	180	90	M10	15	50	90	294	130	112	379	3/4" NPT	
N1C0400-E1-E4	660	1060	416	252	208	90	M10	15	50	90	294	130	112	379	3/4" NPT	
N1C0500-E1-E4	675	1060	522	252	257	90	M10	15	50	90	294	130	112	379	3/4" NPT	
N1D0300-E4	786	1287	308	321	180	108	M12	15	50	150	350	138	121	434	3/4" NPT	
N1D0350-E3-E4	789	1287	366	321	180	108	M12	15	50	150	350	138	121	434	3/4" NPT	
N1D0400-E1-E4	736	1287	416	321	208	108	M12	15	50	150	350	138	121	434	3/4" NPT	
N1D0500-E1-E4	739	1287	522	321	257	108	M12	15	50	150	350	138	121	434	3/4" NPT	
N1E0500-E3-E4	832	1573	522	368	257	130	M12	15	50	150	425	199	155	454	3/4" NPT	
N1E0600-E1-E4	849	1573	624	368	312	130	M12	15	50	150	425	199	155	454	1" NPT	
N1H0700-E1	1228	2615	724	549	404	198	M12	15	50	150	600	222	213	684	1" NPT	

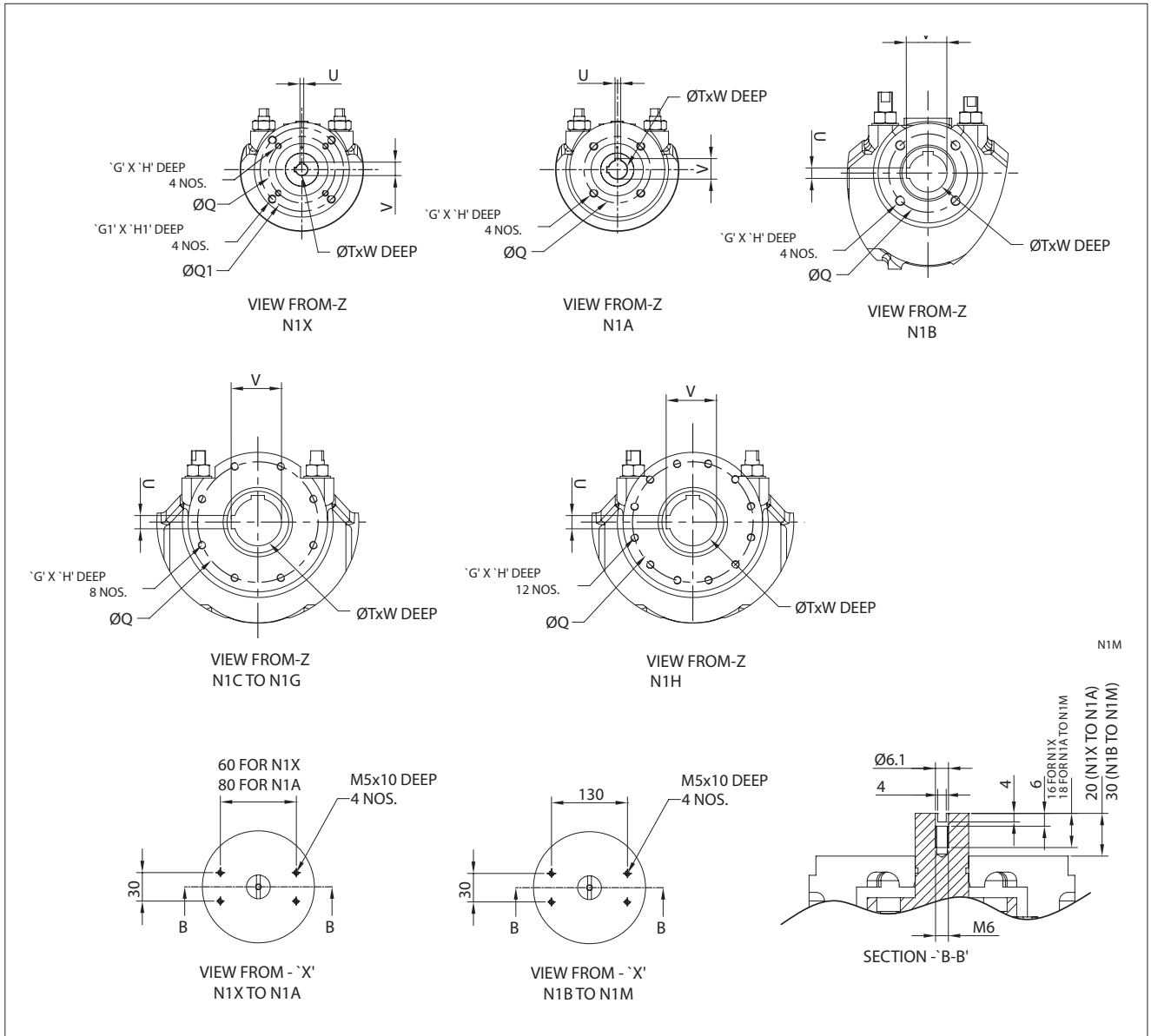
DIMENSION- SINGLE ACTING ACTUTOR															
MODEL	A	B	Øc	D	E	F	M	N	P	R	W max	U	V	ØY	S
N1H0700-E2	1228	2382	724	549	404	198	M12	15	50	150	600	222	213	628	1" NPT
N1H0700-E3	1228	1942	724	549	404	198	M12	15	50	150	600	222	213	605	1" NPT
N1H0800-E1	1253	2615	824	549	458	198	M12	15	50	150	600	222	213	684	1" NPT
N1H0800-E2	1253	2382	824	549	458	198	M12	15	50	150	600	222	213	628	1" NPT
N1H0800-E3	1253	1942	824	549	458	198	M12	15	50	150	600	222	213	605	1" NPT
N1J0800-E4	1517	2868	824	677	458	260	M16	32	100	300	686	299	247	782	1" NPT
N1J0900-E2-E4	1570	2868	926	677	558	260	M16	32	100	300	686	299	247	782	1 1/2" NPT
N1J1000-E2-E4	1529	2868	1040	677	549	260	M16	32	100	300	686	299	247	782	1 1/2" NPT
N1M1100E4	1935	3380	1150	884	620	335	M20	40	100	300	1164	300	270	1240	2" NPT
N1M1200 E3-E4	1945	3380	1250	884	625	335	M20	40	100	300	1164	300	270	1240	2" NPT

6.4 Weights single acting

Cyl. Diam	63	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000	800-2	900-2	1000-2	1100	1200	1300	1100-2	1200-2	1300-2	
Actuator	weight, kg																									
N1X	35	38	40	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1A	-	-	138	143	148	174	180	200	207	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1B	-	-	-	-	-	-	271	286	298	348	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1C	-	-	-	-	-	-	413	426	475	542	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1D	-	-	-	-	-	-	-	622	652	718	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1E	-	-	-	-	-	-	-	-	-	961	1054	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1H	-	-	-	-	-	-	-	-	-	-	-	3530	3730	-	-	-	-	-	-	-	-	-	-	-	-	-
N1J	-	-	-	-	-	-	-	-	-	-	-	-	5100	5580	6680	-	-	-	-	-	-	-	-	-	-	-
N1M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14108	14716	-	-	-	-

6.5 Attachment dimensions

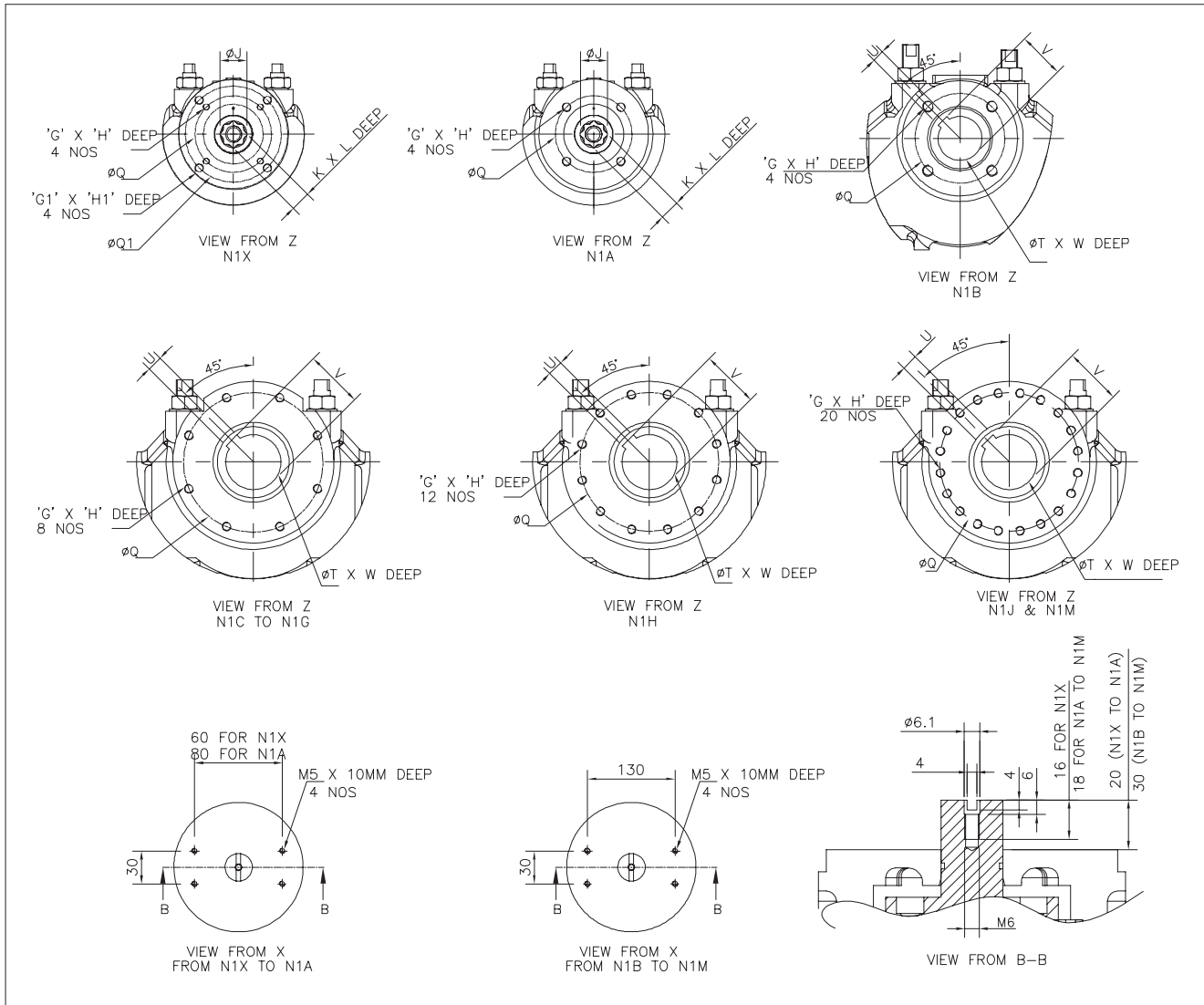
MOUNTING FACE DIMENSIONS WITH NELES BORE



Actuator	Dimensions, mm										Mounting face
	G	G1	H	H1	Q	Q1	T	U	V	W	
N1X	M8	-	12	-	70	-	20	4.76	22.3	35	F07
	-	M10	-	15	-	102	20	4.76	22.3	35	F10
N1A	M16	-	24	-	140	-	40	9.53	44.4	68	F14
N1B	M20	-	30	-	165	-	70	19.05	78.3	173	F16
N1C	M16	-	24	-	254	-	95	22.23	105.0	202	F25
N1D	M20	-	30	-	298	-	105	25.40	116.3	217	F30
N1E	M30	-	45	-	356	-	135	31.75	149.0	309	F35
N1H	M36	-	54	-	483	-	200	50.80	222.1	385	F48

Note: More detailed dimensions with tolerances available in document F102307

MOUNTING FACE DIMENSIONS WITH ISO BORE

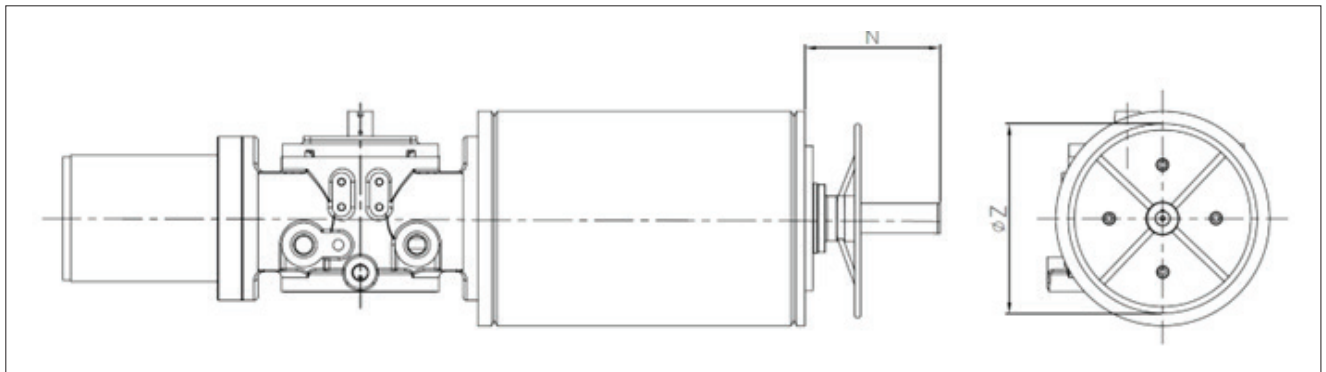


Actuator	Dimensions, mm													Mounting face
	G	G1	H	H1	ØJ	K	L	Q	Q1	T	U	V	W	
N1X	M8	-	12	-	30.5	22	25	70	-	-	-	-	-	F07
	-	M10	-	15	-	-	-	-	102	-	-	-	-	F10
N1A	M16	-	24	-	48.2	36	45	140	-	-	-	-	-	F14
N1B	M20	-	30	-	-	-	-	165	-	80	22	85.4	173	F16
N1C	M16	-	24	-	-	-	-	254	-	100	28	106.4	202	F25
N1D	M20	-	30	-	-	-	-	298	-	120	32	127.4	217	F30
N1E	M30	-	45	-	-	-	-	356	-	160	40	169.4	309	F35
N1H	M36	-	54	-	-	-	-	483	-	220	50	231.4	385	F48
N1J	M36	-	54	-	-	-	-	603	-	280	63	292.4	483	F60
N1M	M42	-	75	-	-	-	-	724	-	336	80	351.4	556	-

Note: More detailed dimensions with tolerances available in document F102307.

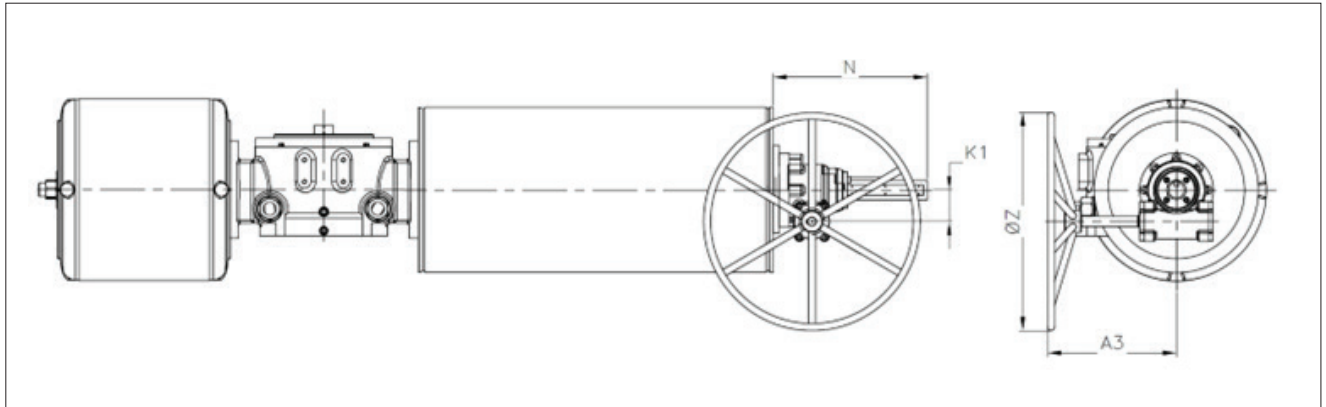
N1 Actuator Details with Manual Overrides

N1 Actuator with Straight Handwheel Dimension details:



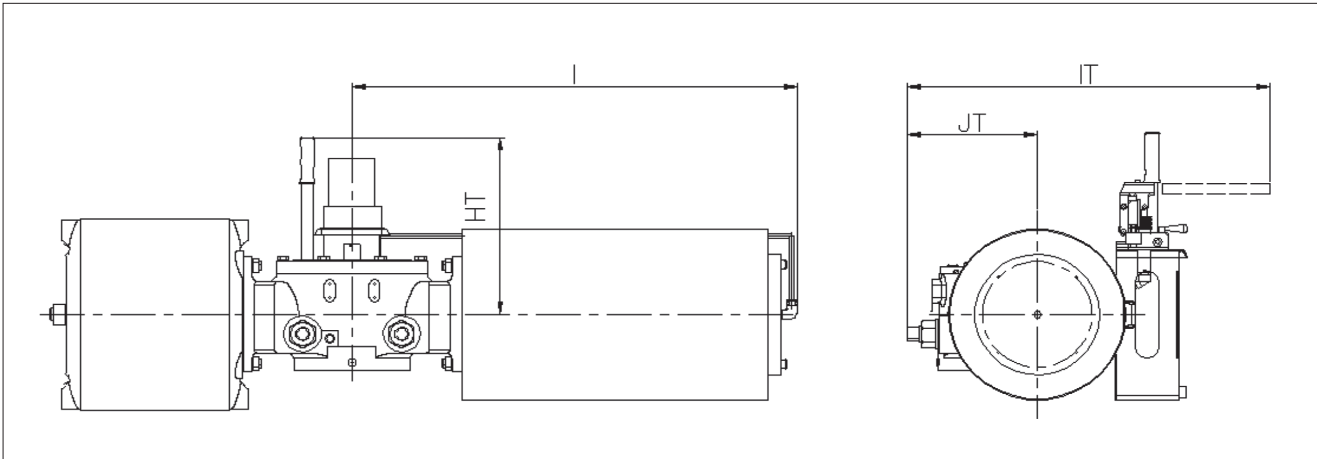
MODEL	N	Z
N1X0063 - 0125	142.5	300
N1A0100 - 0125	219	300

N1 Actuator with Side Handwheel Dimension details:



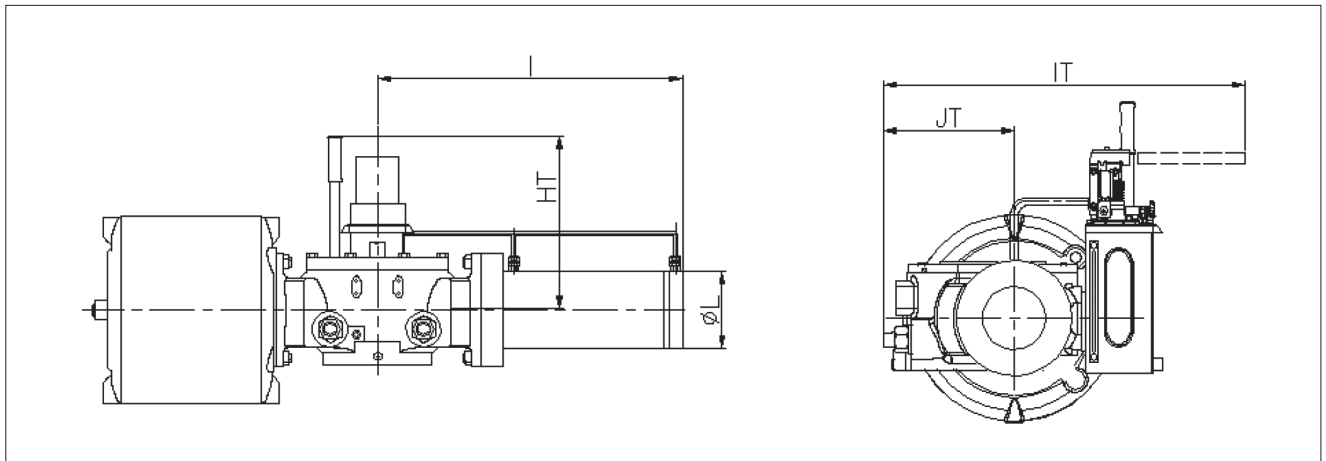
MODEL	N	Z	K1	A3
N1A0150 - 0250	299	290	51	222
N1A0300 - 0350	351.5	500	72	297.5
N1B0250	337	290	51	222
N1B0300 - 0400	389.5	500	72	297.5
N1C0300 - 0400	425	500	72	297.5
N1C0500	471	650	118.3	296.7

N1 Actuator with Spring Return Manual Override



MODEL	I	IT	JT	HT
N1C0300 - 0500	1110	891	252	574
N1D0350 - 0500	1337	975	321	559
N1E0500 - 0600	1623	993	368	525.5
N1H0700 - 0800-E1	2683	1301	549	530
N1H0700 - 0800-E2	2450	1301	549	530
N1H0700 - 0800-E3	2010	1301	549	530
N1J0800 - 01000	2948	1637	677	565
N1M1000-1200	3475	850	899	750

Actuator with Double Acting Manual Override



MODEL	I	IT	JT	L	HT
N1C0300 - 0500	635	891	252	150	574
N1D0350 - 0500	818	975	321	150	559
N1E0500 - 0600	866	801	368	200	525.5
N1H0700 - 0800	1293	1299	549	200	530
N1J0800 - 1000	1631	1637	677	250	565
N1M1000 - 1200	2082	1637	899	300	565

EU DECLARATION OF CONFORMITY



Manufacturer:
 Neles Flow Control (Jiaxing) Co., Ltd.,
 Jiaxing Economic and Technological
 Development Area, Zhejiang Province,
 China
 Neles India Private Limited
 560, Manpada Road, Near Bhopar Village, Dombivli East,
 Maharashtra, 421204,
 India

Product:	Pneumatic actuator
Type:	N1-series
ATEX group and category:	⊕ 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		Certificate No.
ISO 9001:2015	DNV-GL		73538-2010-AQ-FIN-FINAS
PED 2014/68/EU Module H	DNV-GL	0496	142306-2013-CE-FIN-ACCREDIA
ATEX 2014/34/EU Annex IV (China)	Presafe	2460	Presafe 18 ATEX 91983Q Issue 1
EN ISO 3834-2	TÜV Rheinland		01 202 644/A-19 B056/01
AD 2000-Merkblatt HP 0	TÜV Rheinland		01 202 644/A-19 B056

Applicable Directives:

Machinery 2006/42/EC Annex IIB	Applicable parts
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 and EN 80079-36. The actual surface temperature of non-electrical equipment is depended on the process and ambient conditions (EN 80079-36 § 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.

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.

Vantaa 12.10.2020

Juha Virolainen, Global Quality VP

7. TYPE CODE

Heavy duty scotch yoke actuator										
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
N1	B	0250	S	1	G	E03	C	N	/	*(NIL)

1.	Series
N1	Neles heavy duty actuator

4.	Link type
S	Symmertric

2.	Frame size
B	X
	A
	B
	C
	D
	E
	H
	M

5.	Cylinder type
1	Single cylinder

6.	Temperature range
G	-20°...+80° C / -4° ... 176° F
H	-20°...+125° C / -4° ... 257° F

7.	Single / Double acting
E01 ... E11	Single acting
D00	Double acting

3.	Cylinder size	Available frame
0250	0063	X
	0080	X
	0100	X, A
	0125	X, A
	0150	A
	0200	A
	0250	A, B
	0300	A, B, C
	0350	A, B, C, D
	0400	B, C, D
	0500	C, D, E
	0600	E
	0700	H, J
	0800	H, J
	0900	J
1000	J, M	

8.	Spring action
C	Spring to close
A	Spring to open
D	Double acting

9.	Shaft bore-key type
N	Neles bore, female double key way
D	ISO bore, female keyway.

10.	Break
-	Type code break to be left blank if no options specified

11.	Options
HW	Handwheel, manual override
HP	Hydraulic, manual override

Valmet Flow Control Oy

Vanha Porvoontie 229, 01380 Vantaa, Finland.

Tel. +358 10 417 5000.

www.valmet.com/flowcontrol

Subject to change without prior notice.

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For more information www.neles.com/trademarks

