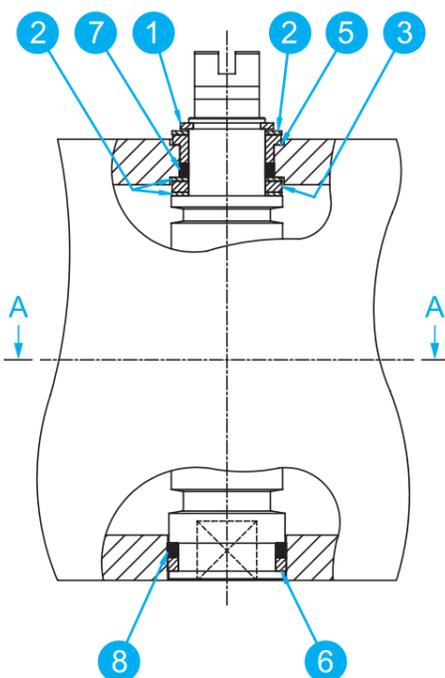


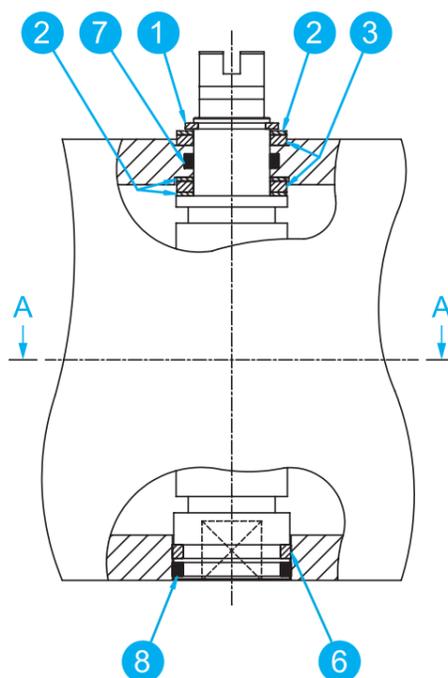
Repair Kit For ALL NORBRO 39R and 40R Pneumatic Actuators Sizes 10 to 42

PINION Pre Rev. D

Only one off size 40 & 42
Omitted size 40 & 42

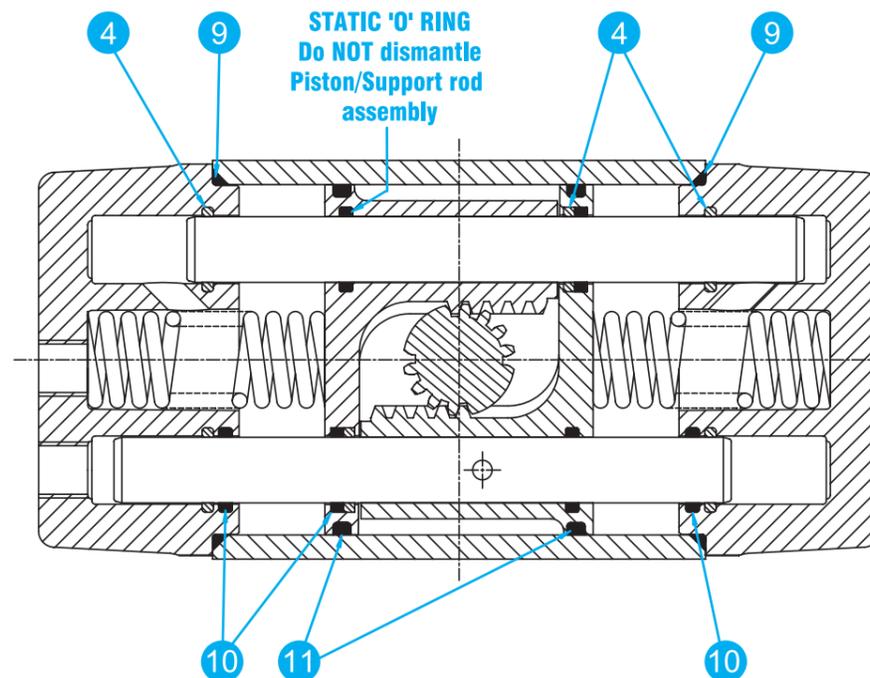


PINION Rev. D



END CAPS, PISTON, SUPPORT RODS

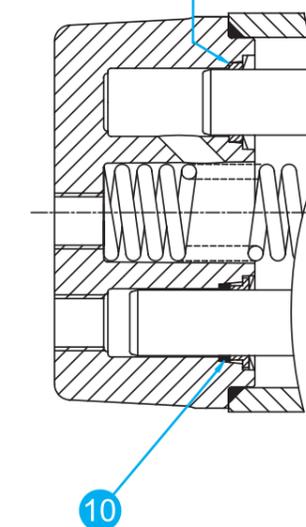
SECTION A-A



END CAPS Style 1

'O' RING NOTE:
Replace without removing interlocking ring or bearings

INTERLOCKING RING & BEARING
Not supplied



DO NOT REMOVE INTERLOCKING RINGS. If bearings are loose or oval contact Flowserve Flow Control or official distributor.

NOTES:
Size 15 Actuators with Style 1 End Caps. This is an old design and if maintenance is required on units of this age we recommend you replace the actuator.
Size 35 Actuator with Style 1 End Caps, require one (1) Top bearing 84-35-109. If required contact Flowserve Flow Control.

Each size of actuator has its own repair kit.

The appropriate column in the table below shows the contents of the repair kit.

Actuator Size and Series			10-39R/40R	15-39R/40R	20-39R/40R	25-39R/40R	30-39R/40R	33-39R/40R	35-39R/40R	40-39R/40R	42-39R/40R	
Item No	Description/Repair Kit Code	Qty	10-ARK40-0* Rev.D	15-ARK40-0* Rev.D	20-ARK40-0* Rev.D	25-ARK40-0* Rev.D	30-ARK40-0* Rev.D	33-ARK40-0* Rev.D	35-ARK40-0* Rev.D	Qty	40-ARK40-0* Rev.0	42-ARK40-0* Rev.0
1	Spiral Retaining Ring	1	Ø15.1 x 1.1	Ø16.9 x 1.3	Ø20.9 x 1.3	Ø26.4 x 1.6	Ø32.1 x 1.6	Ø36.8 x 1.9	Ø41.3 x 1.9	1	Ø46.8 x 2.2	Ø66.7 x 2.7
2	Thrust Washer	3	B08410-52100	B08415-52100	B08420-52100	B08425-52100	B08430-52100	B08433-52100	B08435-52100	2	B08440-52100	B08442-52100
3	Thrust Bearing	2	B08410-28300	B08415-28300	B08420-28300	B08425-28300	B08430-28300	B08433-28300	B08435-28300	-	N/A	N/A
4	Support Rod Bearing	6	B08410-28400	B08415-28400	B08420-28400	B08425-28400	B08430-28400	B08433-28400	B08435-28400	6	B08440-28400	B08442-28400
5	Top Bearing	1	B08410-28100	B08415-28100	B08420-28100	B08425-28100	B08430-28100	B08433-28100	B08435-28100#	1	B08440-28100	B08442-28100
6	Bottom Bearing	1	B08410-28200	B08415-28200	B08420-28200	B08425-28200	B08430-28200	B08433-28200	B08435-28200	1	B08440-28200	B08442-28200
7	'O'-Ring Pinion Top	1	R016	R115	R118	R122	R125	R222	R224	1	R329	R335
8	'O'-Ring Pinion Bottom	1	R020	0225-30	R123	R129	R133	R226	R228	1	R333	R339
9	'O'-Ring End Cap	2	R038	R152	R155	R158	R161	R262	R264	2	R268	R274
10	'O'-Ring Support Rod	4	R014	R114	R117	R120	R122	R220	R222	4	R328	R330
11	'O'-Ring Piston	2	R229	R234	R240	R348	R354	R440	R441	2	R674	R448

*** Repair Kit Temperature Ranges**

Standard Temperature Kit -20°C to +100°C e.g. 10-ARK40-0S Rev.D (Rocol Sapphire Lo-Temp 2 Grease)
 High Temperature Kit -20°C to +150°C e.g. 10-ARK40-0H Rev.D (Rocol Sapphire Hi-Temp 2 Grease)
 Low Temperature Kit -40°C to +85°C e.g. 10-ARK40-0L Rev.D (Rocol Sapphire Lo-Temp 2 Grease)

Flowserve Flow Control (UK) Ltd.

Burrell Road, Haywards Heath, West Sussex, RH16 1TL England

Tel: +44 (0)1444 314400 Fax: +44 (0)1444 314401

Website: www.worcestercontrols.co.uk

Repair Kit For ALL NORBRO 39R and 40R Pneumatic Actuators Sizes 10 to 42

Section 1. Dismantling

Warning: Before starting to dismantle, the actuator must be depressurised and isolated pneumatically, electrically and mechanically.

1.0 Double Acting Actuator (No Springs - Code A) e.g. 25-RDA40-1SD1E0

- Remove end cap screws.
- Remove end caps.
- Rotate pinion (anti-clockwise) until pistons disengage (reach their end of travel).
- Remove piston/support-rod assemblies from body by pulling longest protruding support-rod ends.
- Remove circlip or spiral retaining ring, thrust washer and bearing from pinion top.
- Push pinion out through the base of the body.
- It is unnecessary to separate the support rod from the piston. If either component is damaged or worn to excess, a complete piston/support-rod set must be fitted (The Rev. D Size 10, 15 & 20 piston/support-rod assembly is an integral unit and cannot be separated).

1.1 Spring Return Actuator (Springs - Code B, C, D or E) e.g. 25-RDC40-1SD1E0

The conventional end cap screws used on spring return actuators are of sufficient length to safely release spring compression.

CAUTION: To avoid bolt seizure - Disassembly under load after an extended period may result in bolt seizure.

To minimise damage during filed disassembly without precompression tooling, the following preliminary procedure is recommended. Check to ensure all four end cap bolts are present and secure. Remove one end cap bolt completely, leaving the other three fully tight. Thoroughly lubricate the bolt threads and under head surface with grease or heavy lubricant. Replace and fully tighten the bolt. Repeat each sequence with each of the remaining three bolts before proceeding below.

- Undo the end cap screws of one end cap at a time, diagonally, evenly and in small stages. N.B. If this is not done, the springs will tilt the end cap - preventing complete removal of the screws. Once both end caps are removed further dismantling procedures on all sizes of spring return actuator are identical to double acting units. Spring replacement procedure is detailed in Section 2.1.

1.2 Remove all Bearings and 'O' rings taking care not to damage grooves or journals.

1.3 Carefully clean components and check for damage.

Section 2. Re-assembly

Where greasing is specified, use Rocol Sapphire Lo-Temp 2 Grease for -40°C to +100°C ('OS' standard and 'OL' low temperature kits) and Rocol Sapphire Hi-Temp 2 Grease for -20°C to +150°C ('OH' high temperature kit).

2.0 Double Acting Actuator (No Springs - Code A) e.g. 25-RDA40-1SD1E0

2.0.1 Body

- Ensure that the piston and pinion bores in the body are clean and apply grease.
- Fit correct greased 'O' ring into groove in top pinion bore of body. Body groove will be found in Rev. D and all size 40 and 42 actuators only. Note: On pre-Rev. D size 10 to 35 actuators the top 'O' ring groove is created around the pinion by the stepped bearing (See note 2.0.2 c) below).

2.0.2 Pinion

- Fit greased bearing and 'O' ring to bottom of pinion.
- Fit arrangement of two thrust washers and one thrust bearing to top of pinion (See diagram overleaf). Note: Size 40 and 42 have only one thrust washer and no thrust bearing at this position.
- On all size 10-35 prior to Rev. D, grease and assemble top pinion 'O' ring to pinion journal, above thrust washer.
- Grease the pinion top and bottom journals and insert pinion into the larger body pinion bore, simultaneously rotate and push into position, taking care not to trap or damage the 'O' ring(s).
- On all size 10-35 prior to Rev. D, grease and assemble stepped bearing over the pinion top to locate and secure 'O' ring.
- On all size 40 and 42, grease and assemble stepped bearing over the pinion top and into the body counterbore.
- On Rev. D size 10-35 actuators, grease and assemble the plain thrust bearing over the pinion top.
- Assemble thrust washer over the pinion and retain with the spiral retaining ring ensuring correct seating into groove.

2.0.3 Piston Set (Stage 1)

- Check and identify the 'Inlet' piston/support-rod assembly - item with the 'cross hole' through the support-rod.
- Check and identify the 'Blank' piston/support-rod assembly - No 'cross hole' through rod.
- Check that all bearing and 'O' ring grooves are clean.
- Fit greased 'O' Ring and bearing into each piston short bore with the 'O' ring towards piston face.
- Grease and fit main piston 'O' ring to each piston support-rod assembly.
- Liberal grease the piston racks.
- Align pinion flats and groove with body with rotate 30° anti-clockwise to achieve engagement position for insertion of piston support-rod assemblies. See diagram Stage 1.
- Position body 'side on' with Norbro label facing you.
- Select 'Inlet' piston assembly and insert rack end to the right of the body keeping support rod nearest you, do not engage 'O' ring into body bore.
- Select 'Blank' piston assembly and insert rack end to the left of the body keeping the support rod away from you. Engage both support rod ends into the corresponding piston short bores.
- Push pistons together simultaneously ensuring the rack and pinion teeth engage correctly.
- Rotate the pinion clockwise so that the pistons come together. When fully together the pinion flats and groove should be square to body.

2.0.4 End Caps (Stage 2)

- Check end cap 'O' ring/bearing grooves are clean. Fit one bearing into each support rod bore. The bearing grooves are at a common level and are located deeper than the single 'O' ring groove.
- Fit greased support rod 'O' ring to remaining groove.
- Fit large 'O' ring to end cap over body location spigot. Ensure all bearings and 'O' rings are adequately greased.
- Identify the location of each end cap by reference to the foolproof pin in the flange face which must align with a location hole in the appropriate body end face. See diagram stage 2.
- Slide the end caps over the support-rods, pushing in squarely to contact the end of the body. Secure with end cap screws tightened as follows:-

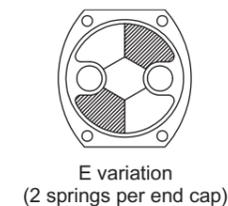
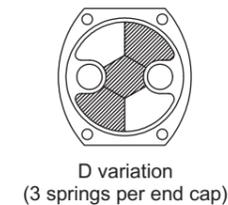
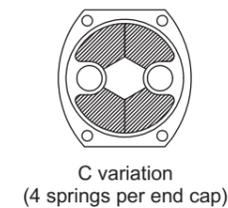
Actuator Size	Size 10 & 15	Size 20 & 25	Size 30 & 33	Size 35 & 40	Size 42
Torque	9NM	19NM	35NM	49NM	98NM

- Repeat for the other end cap.

2.1 Spring Return Actuator (Springs - Code B, C, D or E) e.g. 25-RDC40-1SD1E0

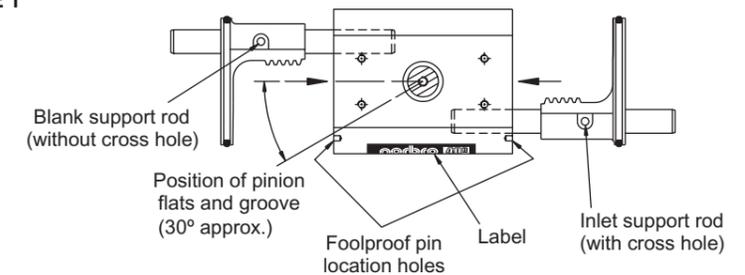
- Follow the above procedure to step 2.0.4 d).
- Heavily grease one end of each spring and locate greased end into the spring pocket in the end cap. If actuator has less than 5 springs in each end cap, position according to spring configuration diagram below.
- Carefully invert end cap with springs onto body assembly ensuring correct orientation of foolproof pin, springs and support rods.
- Insert two end cap screws diagonally and depress end cap by hand to engage screws. Engage remaining two screws, ensuring support-rods locate in end caps.
- Tighten end cap screws diagonally, evenly and in small stages maintaining faces parallel, until tight to body. Repeat for second end cap using torques specified in 2.0.4 e) above.
- To ensure ideal internal location of spring ends, apply a gradually increasing air supply to the actuator up to 5.5 bar. Actuator should open and close smoothly and silently thereafter.

SPRING CONFIGURATIONS FOR REDUCED AIR PRESSURES

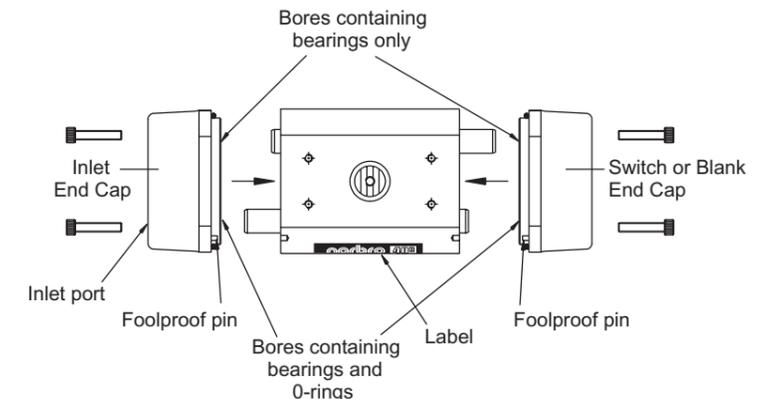


Re-assembly

STAGE 1



STAGE 2



Should you require instructions in French or German, please contact your local supplier