ROTEX

SERVICE INSTRUCTIONS

FOR MODELS

DRC250 THROUGH DRC500

”O” SERIES

PNEUMATIC ACTUATORS

REVISION: “0”

DATE: 24rd February 2007

SECTION 1 - INTRODUCTION

1.1 GENERAL SERVICE INFORMATION

1.1.1 This service procedure is offered as a guide to enable general maintenance to be performed on **Rotex** DRC250, DRC300, DRC400 and DRC500 Double Acting and Spring Return Series Pneumatic Actuators.

1.1.2 Normal recommended service interval for this actuator series is five years.

NOTE: Storage time is counted as part of the service interval.

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

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

1.1.5 This procedure should only be implemented by a technically competent technician who should take care to observe good workmanship practices.

1.1.6 Numbers in parentheses, ( ) indicate the bubble number (reference number) used on the **Rotex** Assembly Drawing and Actuator Parts List.

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

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

CAUTION: Apply the thread sealant per the manufacture's instructions.

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

1.2 DEFINITIONS

WARNING: If not observed, user incurs a high risk of severe damage to actuator and/or fatal injury to personnel.

CAUTION: If not observed, user may incur damage to actuator and/or injury to personnel.

NOTE: Advisory and information comments provided to assist maintenance personnel to carry out maintenance procedures.

1.3 GENERAL SAFETY INFORMATION

Products supplied by **Rotex**, in its "as shipped" condition, are intrinsically safe if the instructions contained within this Service Instruction are strictly adhered to and executed by well-trained, equipped, prepared and competent personnel.

WARNING: For the protection of personnel working on Rotex actuators, this procedure should be reviewed and implemented for safe disassembly and reassembly. Close attention should be noted to the WARNINGS, CAUTIONS and NOTES contained in this procedure.

1.4 ROTEX REFERENCE MATERIALS

1.4.1 Assembly Drawing for DRC250 through DRC1100 Double Acting Pneumatic Actuators use drawing number 12-60-00-503.

1.4.2 Assembly Drawing for DRC250 through DRC1100 Spring return Pneumatic Actuators use drawing number 12-60-00-504.

1.5 SERVICE SUPPORT ITEMS

1.5.1 Seal kit.

1.5.2 Bearings

SECTION 2 - ACTUATOR DISASSEMBLY

2.1 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.

2.1.1 Actuator Disassembly is written to either completely disassemble the entire actuator or can be used to disassemble individual Modules as needed (Pneumatic cylinder or spring retainer assembly, etc.).

WARNING: DO NOT REMOVE SPRING RETAINER ASSEMBLY WHILE SPRING IS COMPRESSED.

2.1.2 When the Spring retainer assembly is to be removed it should be removed from the central block drive assembly prior to the Pneumatic cylinder assembly removal or disassembly.

2.1.3 To ensure correct re-assembly, mark or tag mating surfaces.

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

2.2 SPRING RETAINER DISASSEMBLY

NOTE: If the actuator is double acting skip section 2.2 and go to section 2.3.

NOTE: Review Section 2 General Disassembly before proceeding with spring retainer disassembly.

WARNING: If not already removed disconnect all operating pressure from actuator power cylinders.

WARNING: The spring cartridge must be checked to verify that the spring(s) are in their extended position before the spring retainer assembly is disassembled from the central block drive assembly. This can be checked by verifing stopper bolts(22) are not in tension.

2.2.1 Unscrew the hex nut(16) on E-cover(3) diagonally for few threads. Repeat this till E-cover(3) is not in tension. Support the E-cover(3) with the help of eye bolt provided on the top of the it. Then unscrew the hex nut(16) completely.

2.2.2 Lift and remove the E-cover(3).

2.2.3 Remove o-ring(19) from E-cover(3) with proper tool.

2.2.4 Screw eye bolt to threading provided on the pipe-2 E-type(13). Then lift, slide and remove pipe-2(13) by means of eye bolt.

2.2.5 Remove the tie rod-2(15).

2.2.6 Unscrew connecting rod nut (24),and provide support to spring retainer assembly.

2.2.7 Lift and remove the spring retainer assembly.

2.3 CYLINDER DISASSEMBLY

2.3.1 Support E-cover(2) with the help of eye bolt provided on the top of the it. Unscrew the hex socket head screw(16) and lift and remove E-cover(2).

2.3.2 Remove tie rod-1(14) and pipe-1(12).

2.3.3 Remove o-ring(19) from E-cover(2) with proper tool.

2.4 CENTRAL BLOCK DISASSEMBLY

2.4.1 Support the piston(4).

2.4.2 Unscrew the socket head screw(30) and remove the pistons from rack(7)

2.4.3 Remove the piston strip(20) and lip seal(21) with proper tool.

2.4.4 Piston support rods(6).

2.4.5 Unscrew the plug(1).

2.4.6 Remove the bearing from shaft (18).

2.4.7 Remove the shaft(18) from central block(1),simultaneously remove spacers(11) and pinion(8).

2.5 CENTRAL BLOCK ASSEMBLY

2.5.1 Clean the shaft(9), apply grease on the shaft(9) and bearing (18) and insert the bearing(18) on the shaft(9). [left of the central block(1)].

2.5.2 Insert the shaft(9) in to the central block(1),simultaneously insert the spacer(11) and pinion(8) on the shaft(9) properly.

2.5.3 Insert bearing(18) (right of the central block(1)) on the shaft(9) properly and screw the lock nut(17) on the shaft(9).

2.5.4 Apply grease on the inside surface of the pipe(12).

2.5.5 Apply sufficient amount of grease on rack(7) and pinion(8). Place the rack(7) on the pinion(8) ensuring that mark on the pinion(8) and rack(7) are matching.

2.5.6 Apply grease on the lip seal(21) and piston strip(20).

2.5.7 Insert the piston strip(20) and lip seal(21) in the resp. groove provided on the piston.

2.5.8 Assemble pistons(4) to rack(7) with socket head screw(30).

2.5.9 Move the piston and rack assembly at the centre of the rack and suitably tighten the plug(22).

2.6 CYLINDER ASSEMBLY

2.6.1 Place the pipe-1(12) on the left hand side of central block(1).

2.6.2 Insert tie rod(14).

2.6.3 Apply grease on the o-ring(19) and in groove on the E-type cover (2). Place o-ring(19) in to the groove provided on the E-type cover(2).

2.6.4 Place E-type cover(2) on pipe-1(12) through tie rod(14).

2.6.5 Screw the nut(16) on tie rod(14) and suitably tighten ensure o-ring(19) on E-type cover(2) should not damage.

2.7 SPRING TENSIONER SIDE ASSEMBLY

2.7.1 Place the base of spring tensioner plate(34) (spring retainer assembly) on right hand side piston of central block(1).

2.7.2 Place the pipe-2(13) through spring tensioner assembly.

2.7.3 Place middle cover(5) on pipe-2(13).

2.7.4 Place pipe-2(13) on the middle cover.

2.7.5 Place spring cover(3) on the pipe-2(13) and assemble with tie rod-2(15)

2.7.6 Screw the nut(16) on tie rod-2(15) and suitably tighten ensure o-ring(19) on E-type cover-3 should not damage.

2.8 REAR END CYLINDER ASSEMBLY

NOTE: If the actuator is double acting then follow the steps of section 2.8

2.8.1 Place pipe-1(12) on the central block(right side of central block).

2.8.2 Place cover(3) on the pipe-1(12) and assemble with tie rod-2(15)

2.8.3 Screw the nut(16) on tie rod-2(15) and suitably tighten ensure o-ring(19) on cover-3 should not damage.

SECTION 3 – CONVERTING SPRING RETURN ACTUATOR FROM COUNTER CLOCKWISE TO CLOCKWISE AND VICE VERSA

3.1 DISASSEMBLY OF CYLINDER AND REAR SIDE CYLINDER

3.1.1 Follow step 2.2 and 2.3

3.1.2 Do not disassemble pipe 1(12) at both end.

3.1.3 Loosen nut(25).

3.1.4 Place the cover(2) on pipe 1(12) on the opposite side of the central block from it disassembled position. i.e. if the cover(2) was disassembled form the right of the centre block(1), then assemble on the left side or vice versa.

3.1.5 Insert tie rod(14).

3.1.6 Apply grease on the o-ring(19) and in groove on the cover(2). Place o-ring(19) in to the groove provided on the cover(2).

3.1.7 Place cover(2) on pipe-1(12) through tie rod(14).

3.1.8 Screw the nut(16) on tie rod(14) and suitably tighten ensure o-ring(19) on cover(2) should not damage.

3.1.9 Place the middle cover(5) on pipe 1(12) on the opposite side of the central block from it disassembled position. i.e. if the middle cover was disassembled form the right of the centre block(1), then assemble on the left side or vice versa.

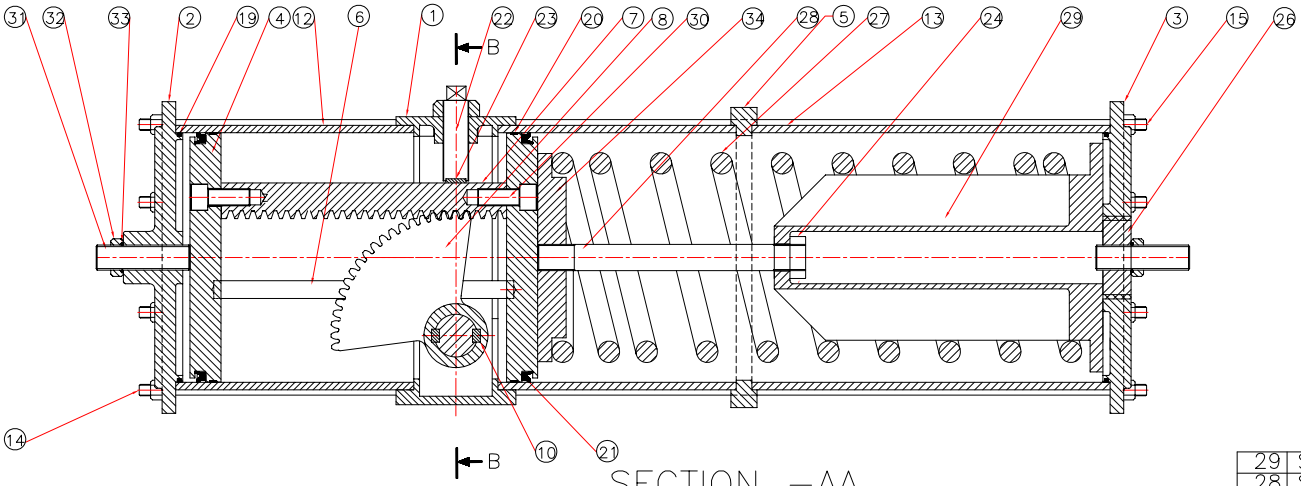
3.1.10 Place the pipe 2(13) on the middle cover

3.1.11 Place the base of spring tensioner plate(34) (spring retainer assembly) on piston in central block(1).

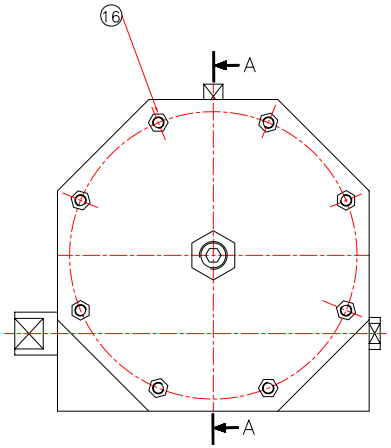
3.1.12 Place spring cover(3) on the pipe-2(13) and assemble with tie rod-2(15)

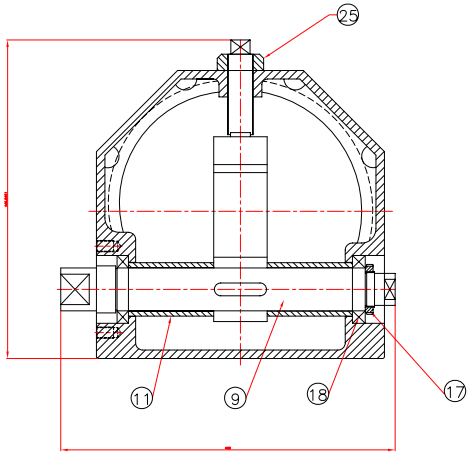
3.1.13 Screw the nut(16) on tie rod-2(15) and suitably tighten ensure o-ring(19) on E-type cover-3 should not damage.

3.1.14 Tighten nut(25).



SECTION –AA





SECTION –BB

SR.NO	DESCRIPTION	QTY	MATERIAL
29	SPRING TENSIONER	1	M.S
28	SPRING TENSIONER SUPPORT ROD		M.S
27	SPRING	1	EN47
26	INSERT	1	M.S
25	NUT	1	M.S
24	NUT	1	M.S
23	BEARING WASHER	1	BRASS
22	PLUG	1	M.S
21	LIP SEAL	2	NBR
20	TEFLON STRIP	2	CARBON FILLED PTFE
19	O–RING	2	NBR
18	BEARING	2	SKF–STD
17	LOCK NUT	1	HGA STEEL
16	NUT	16	HGA STEEL
15	TIE ROD–2	8	SS304
14	TIE ROD–1	8	SS304
13	PIPE–2	1	M.S SEAMLESS
12	PIPE–1	2	M.S SEAMLESS
11	SPACER	2	M.S
10	KEY	2	M.S
9	SHAFT	1	M.S
8	PINION	1	M.S
7	RACK	1	M.S
6	PISTON SUPP.ROD	2	SS410
5	MIDDLE COVER	1	CAST IRON
4	PISTON	2	CAST IRON
3	SPRING COVER	1	CAST IRON
2	COVER	1	CAST IRON
1	CENTRE BLOCK	1	ALUMINIUM

SR.NO	DESCRIPTION	QTY	MATERIAL
34	SPRING TENSIONER PLATE	1	M.S
33	O–RING	2	NBR
32	NUT	2	HGA STEEL
31	HEX.SOC.SETS SCREW	2	HGA STEEL
30	SHC SRCEW	2	HGA STEEL

DATE	ALTERATION	NAME

ADDITIONAL INFORMATION

MATERIAL :

UNSPECIFIED TOLERANCE
00––010 :±0.05
10––030 :±0.1
30––100 :±0.15
Above100 :±0.2

ROTEX
VALVE AUTOMATION SYSTEM
MANPADA ROAD,NEAR BHOPAR VILLAGE,
DOMBIVLI (E)–421204.MAHARASHTRA (INDIA).

	NAME	DATE
DRAWN	SSB	21/06/04
CHECKED		
APPROVED		

SCALE
N.T.S.

TITLE :
SECTIONAL DRAWING FOR
SINGLE ACTING DRC ACTUATOR

DRAWING NUMBER
12–60–00–504
REV.NO. 0

SHEET 1 OF 1

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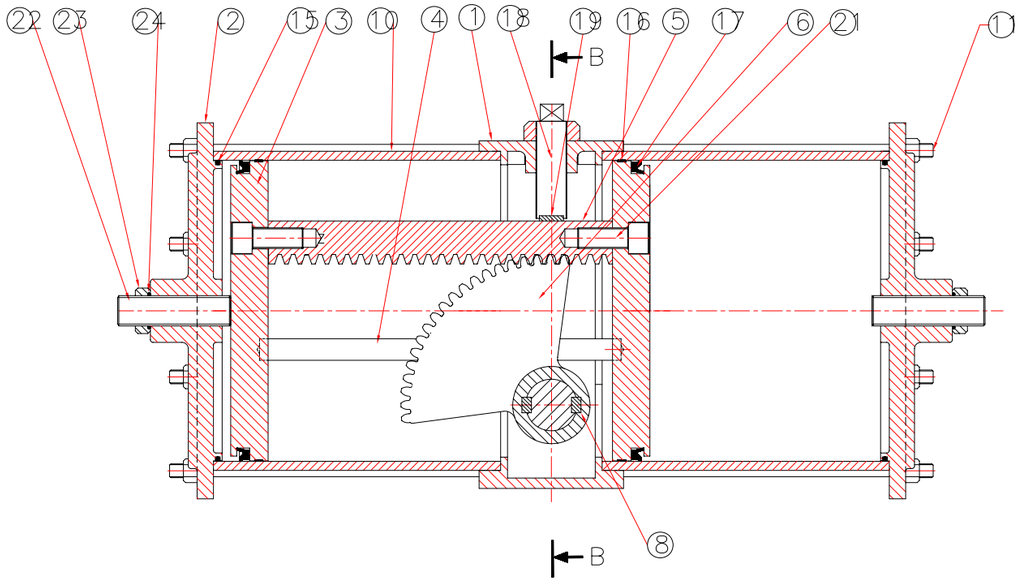
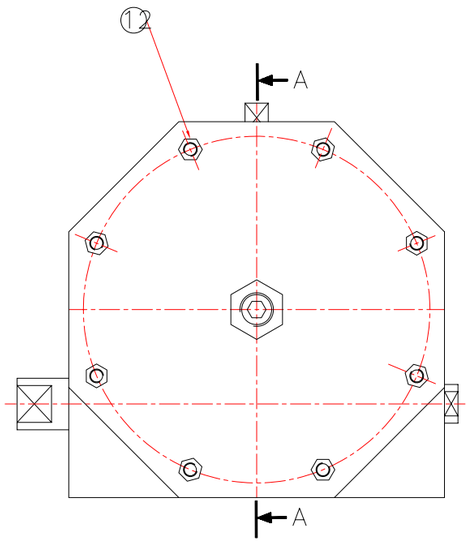
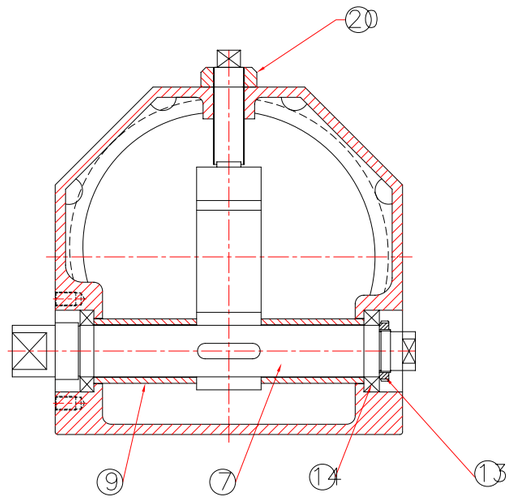


SECTION –AA





SECTION –BB

SR.NO	DESCRIPTION	QTY	MATERIAL	
24	O–RING	2	NBR	
23	NUT	2	HGA STEEL	
22	HEX.SOC.SETS SCREW	2	HGA STEEL	
21	SHC SRCEW	2	HGA STEEL	
20	NUT	1	M.S	
19	BEARING WASHER	1	BRASS	
18	PLUG	1	M.S	
17	LIP SEAL	2	NBR	
16	TEFLON STRIP	2	CARBON FILLED PTFE	
15	O–RING	2	NBR	
14	BEARING	2	SKF–STD	
13	LOCK NUT	1	HGA STEEL	
12	NUT	16	HGA STEEL	
11	TIE ROD	16	SS304	
10	PIPE	2	M.S SEAMLESS	
9	SPACER	2	M.S	
8	KEY	2	M.S	
7	SHAFT	1	M.S	
6	PINION	1	M.S	
5	RACK	1	M.S	
4	PISTON SUPP.ROD	2	SS410	
3	PISTON	2	CAST IRON	
2	COVER	2	CAST IRON	
1	CENTRE BLOCK	1	ALUMINIUM	

DATE	ALTERATION	NAME

ADDITIONAL INFORMATION

MATERIAL :

UNSPECIFIED TOLERANCE
00––010 :±0.05
10––030 :±0.1
30––100 :±0.15
Above100 :±0.2

ROTEX
VALVE AUTOMATION SYSTEM
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	NAME	DATE
DRAWN	SSB	21/06/04
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APPROVED		

SCALE
N.T.S.

TITLE :
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DRAWING NUMBER
12–60–00–503
REV.NO. 0

SHEET 1 OF 1

DRAWING PATH :– C: \ PROGRAMME FILES \ AUTOCAD 14 \