

IOM for Indicating Mechanism

Objective

The main objective of this document is to provide the assembly guidelines for assembling indicating Mechanism in IB4 and IB5 Rotork gear boxes.

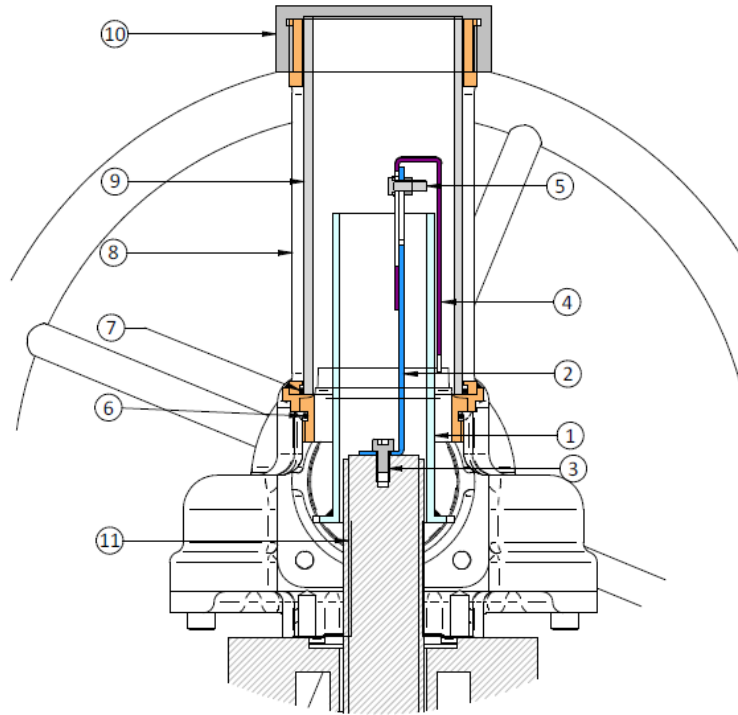
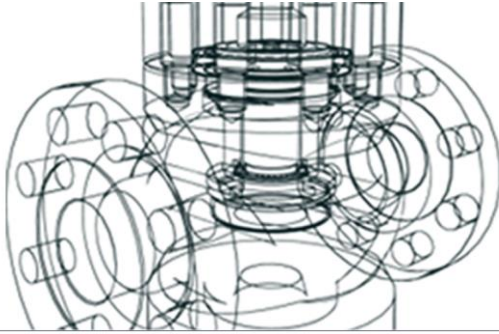


Fig 1: Indicating Mechanism Components

List of components used in indicating mechanism

S.No	Description
1	Indicating Cylinder
2	Rising Pin
3	Cap Screw
4	Adjusting Pin
5	Fastener Set (Hexagonal bolt and nut)
6	O ring in Cover tube
7	O ring at acrylic tube
8	End Cover tube
9	Acrylic tube
10	End cap
11	Connecting Rod

Note: Apart from these parts, rivets, stickers, washers will be used for assembling the indicating mechanism



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Assembly sequence

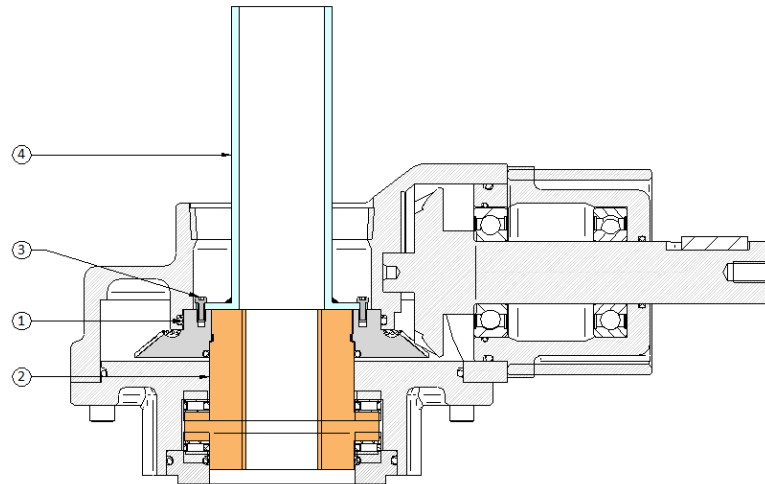


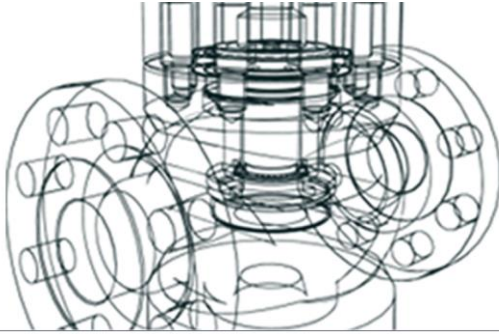
Figure 2

IB4 Assembly Components required to mount indicating cylinder inside IB4 and IB5 gear box are listed below

S.No	Description
1	Rotating Gear
2	Bronze Bush
3	Fastener
4	Indicating Cylinder (1)

The first component that is to be assembled is the indicating cylinder.

- Assembling indicating cylinder (1) is different for IB4 and IB5, For IB4 removal of casing is required and for IB5 removal of casing may not be needed.
- The gear (1) shall be taken out from the IB gear box assembly as per guidelines provided in Rotork IOM (PUB027-027-00-1013 RG-INSTALL-006)
- After taking out, Tap Four holes of M3 x 9mm thread depth and hole depth of 6mm shall be done matching indicating cylinder (4) PCD
- Assemble the gear (1) and indicating cylinder (4) using fastener (3)
- Re-assemble the gear box along with indicating cylinder (4) as per Rotork IOM
- Now the indicating cylinder (4) will rotate along with gear (1).
- In IB5 assembly removal of gear (1) is not required
- Indicating cylinder (4) can be assembled directly on bronze bush (2) by providing four holes of M3 x 9mm thread depth and hole depth of 6mm on bronze bush.
- Tapping shall be done while machining ACME thread in bronze bush.



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10. After placing the indicating cylinder, the rising pin (2) shall be assembled into the tap provided in the connecting rod (11) by using Cap screw (3)
11. Sticker with markings shall be pasted on indicating cylinder, for pasting the sticker it is very important that initial marking "0" Shall be above the starting point of acrylic tube (9), for that it is better to paste the sticker 5mm below from top of indicating cylinder as shown in fig 4 and fig 5.

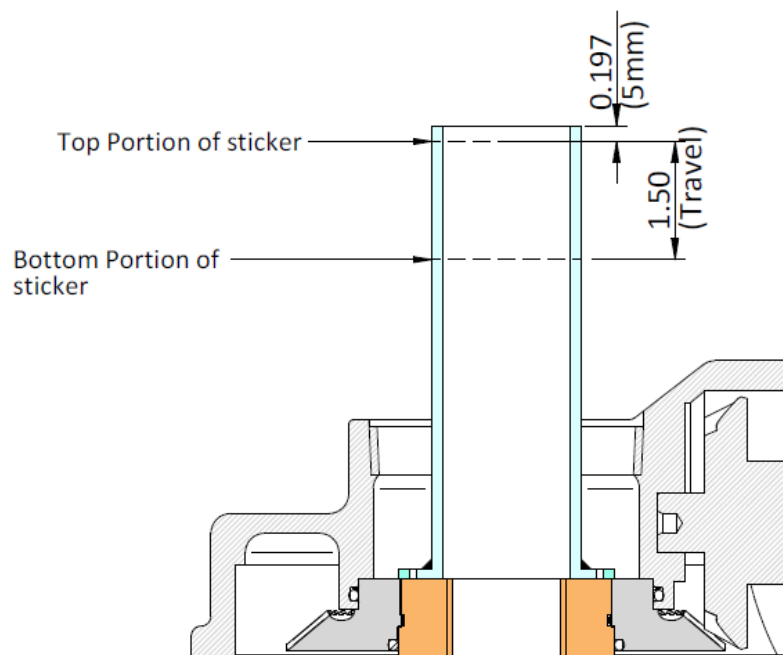


Figure 3

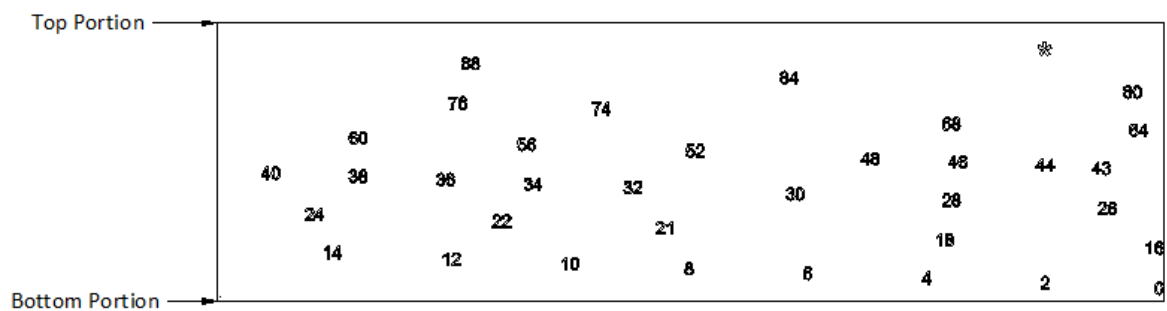
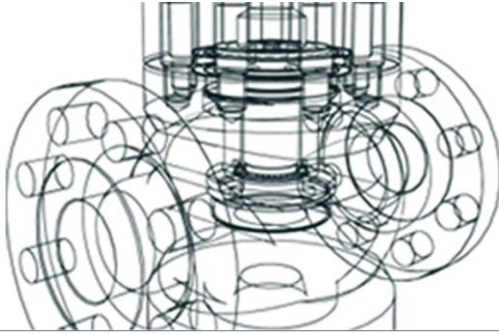


Figure 4

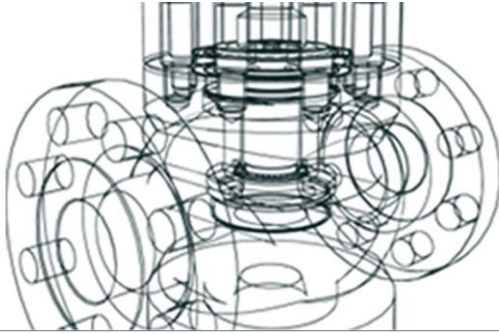
12. Top portion of Sticker (fig 4) shall be pasted in location marked as top portion of sticker in fig 5 (i.e. leaving 5mm gap from top)
13. After pasting the sticker, the adjusting pin (4) shall be assembled. The pin has been given as a separate component for calibrating purpose.



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14. -The above table shown is the sample table that contains information regarding CV and percentage of lift for respective bean size. This table will be seen in GAD of the respective serial in project folder.
15. The adjusting pin (4) shall be fixed pointing either “0” (bean size) position in sticker (Fig 4) at closed position (0% lift) or at” **” position in sticker (Fig 4) at fully open position (100% lift) and shall be tightened by using fastener set (5).
16. -After fixing calibration shall be done at three different positions:
 - 25 % percent of lift- at 25% percent the adjusting pin shall point “22” bean size (refer fig 4 and bean size table)
 - 50 % percent of lift- at 50% percent the adjusting pin shall point “42” bean size (refer fig 4 and bean size table)
 - 75 % percent of lift- at 75% percent the adjusting pin shall point “76” bean size (refer fig 4 and bean size table)
17. The bean size table and the sticker (Fig 4) changes according to CV, seat bore and travel, above shown example is a sample case. Please refer to the respective GAD for the corresponding project.
18. O ring (6) outside end cover tube (8) shall be located properly to avoid flow of fluid in gear box.
19. O Ring (7) outside the acrylic tube (9) to be assembled to avoid flow of fluid through the window opening provided in end cover tube (8)
20. Acrylic tube (9) along with O ring (7) shall be placed inside end cover tube (8).
21. Tighten the end cover tube (8) (Consist of 2.5” BSP thread) along with acrylic tube (9) with the 2.5” BSP thread provided in IB gear Box. Ensure that O ring (6) is squeezed properly.
22. Finally tighten the end cap (10) with thread provided in end cover tube (8)

S.NO	Bean Size	Equivalent CV (Cv _{1,2,3..n})	% LIFT
1	0	0.0	0.0
2	2	0.1	2.1
3	4	0.2	4.1
4	6	0.4	6.2
5	8	0.5	8.2
6	10	0.6	10.3
7	12	0.7	12.3
8	14	0.9	14.4
9	16	1.0	16.4
10	18	1.3	20.1
11	20	1.6	23.9
12	21	1.9	25.0
13	24	2.2	31.0
14	26	2.7	33.7
15	28	3.1	36.4
16	30	3.5	39.1
17	32	3.9	41.8
18	34	4.5	43.6
19	36	5.2	45.1



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S.NO	Bean Size	Equivalent CV (Cv _{1,2,3..n})	% LIFT
20	38	5.8	46.6
21	40	6.4	48.1
22	43	7.0	50.0
23	44	7.7	51.1
24	46	8.3	52.6
25	48	8.9	54.1
26	52	10.5	57.0
27	56	12.3	60.0
28	60	14.1	62.9
29	64	15.9	65.8
30	68	17.8	69.0
31	72	20.0	73.3
32	74	22.3	75.0
33	80	24.6	82.2
34	84	27.1	88.2
35	88	29.7	94.2
36	*	32.0	100.0

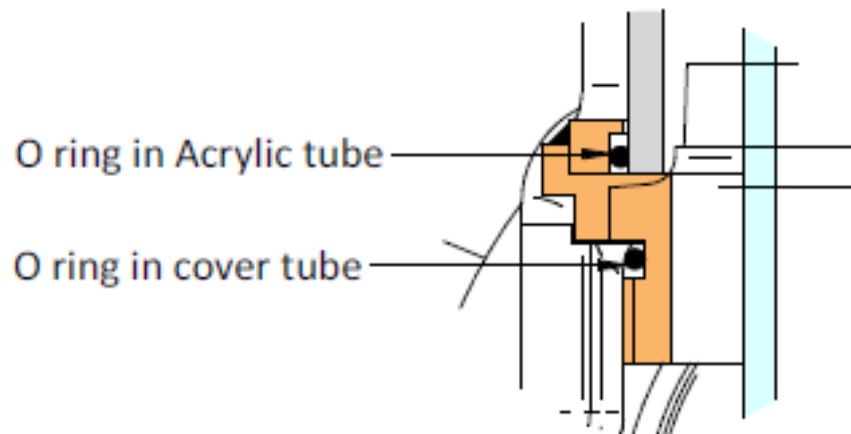


Figure 5

Dis-assembly of indicating mechanism

- 1) Remove end cap (10), end cover tube (8), acrylic tube (9) along with O rings (6&7) in a single attempt.
- 2) Remove the adjusting pin (4) by loosening the fastener set (5).
- 3) Remove the sticker if needed
- 4) Remove the rising pin (2) by loosening the cap screw (3)
- 5) Finally, cylinder can be removed as per IB4 and IB5 assembly
 - * For IB4 casing to be removed as per Rotork manual, then loosen the tapped washer and remove the cylinder
 - * For IB5 remove the riveted cylinder from the gear box.