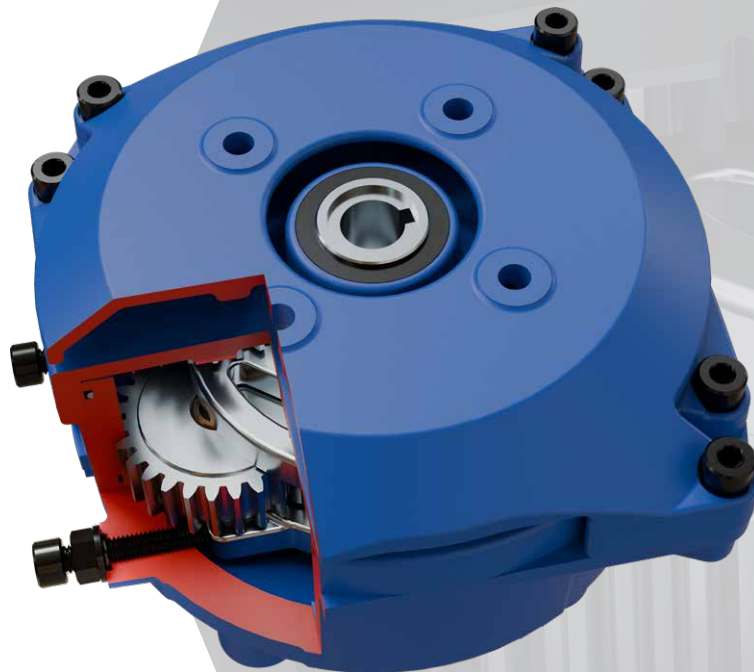


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for Future Generations



GBX Gearbox Instruction Manual

For CMR-89, CMR-125
and CMR-250 actuators



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This manual contains important safety information. Thoroughly read and understand it before installing the gearbox.

This manual enables a competent person to install, operate, adjust and inspect Rotork gearboxes. Only persons competent by their training or experience should install, maintain and repair Rotork gearboxes.

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1. General Information

GBX

Quarter-turn planetary gearbox with adjustable stop screws.

GBX-R


Multi-turn planetary gearbox.

Both the GBX and GBX-R are designed to be mounted directly to a CMR-89, CMR-125 or CMR-250.

2. Health and Safety

Work undertaken must be carried out in accordance with the instructions in this and any other relevant manuals. The user and those persons working on this equipment should be familiar with their responsibilities under any statutory provisions relating to the Health and Safety of their workplace. Due consideration of additional hazards should be taken when using the gearbox with other equipment. Should further information and guidance relating to the safe use of Rotork products be required, it will be provided on request.

The mechanical installation should be carried out as outlined in this manual and in accordance with relevant standards such as British Standard Codes of Practice. No inspection or repair should be undertaken unless it conforms to the specific hazardous area certification requirements. For maintenance of the actuator, refer to the actuator installation and maintenance manual.

 **WARNING: The gearbox enclosure materials may include cast iron, SG iron, carbon steel or stainless steel.**

3. Storage

Gearboxes must be stored inside and elevated from the floor on pallets to avoid ingress of damp.

We recommend the following environmental conditions for storage:

- Temperature between 0 to +40°C (+32 to +104°F)
- Avoid high levels of humidity
- Ensure areas are clean and avoid dusty environments

Additionally, ensure a suitable corrosion protection is used on all bare surfaces.

This corrosion protection should be checked and re-applied at regular intervals if products are stored for long periods (greater than 6 months).

4. Unpacking

Do a risk assessment before unpacking and handling the gearbox. The risk assessment is the responsibility of the person doing this work.

Gearboxes are packed in a variety of configurations depending on size, type and quantity. Gearboxes are normally supplied fully-assembled except for the handwheel.

The gearbox weight is recorded on the packaging and on a label attached to the gearbox.

Packaging materials used may include wood, cardboard, polyethylene and steel. Packaging should be recycled following local regulations.

5. Handling

⚠ Individual weights for gearboxes are recorded on their respective nameplates.

⚠ Only trained and experienced personnel should carry out handling. At all times, safe handling must be ensured.

⚠ Each combination must be assessed to identify all risks associated with handling.

⚠ WARNING: The gearbox may present an unbalanced load. The gearbox must be fully supported until full valve shaft/stem engagement is achieved and the gearbox is secured to the valve flange.

⚠ Once connected to the valve, each assembly must be assessed on an individual basis for safe handling/lifting.

⚠ WARNING: Never lift the complete combination-valve assembly via the gearbox.

⚠ If it is necessary to lift the gearbox using lifting equipment, certified soft slings are recommended.

⚠ Damage to protective coatings should be correctly rectified and may invalidate warranty.

6. Installation

6.1 Mounting to the valve

⚠ WARNING: Ensure the valve is fully supported and capable of accepting increased weight and change of centre of gravity resulting from the addition of the gearbox combination.

1. Ensure Gearbox output is at the same relative position as the valve shaft (open, closed or mid travel). Gearbox output position can be moved by changing the position of the mounted actuator via handknob, control signal or local controls.
2. Check that the dimensions of the gearbox output shaft match that of the mating valve.
3. Grease output shaft and valve sleeve.
4. Align baseplate flange square and parallel to valve flange.
5. Engage gearbox output shaft into valve sleeve ensuring both are aligned properly (If necessary rotate output shaft – refer to step 1).
6. It is essential that the gearbox baseplate is flush with the valve bonnet flange before the mounting screws are fully tightened. Mounting screws or studs/nuts must be high tensile steel (grade 8.8 or higher). Firmly tighten down fixings onto valve flange to the torque required. See Table 5.

6.2 Mounting thread depths

Gearbox	Base	Min thread depth	Max drill depth
GBX, GBX-R	F12	18	21

Table 1 – Gearbox mounting hole details

6.3 Mounting an actuator to the gearbox

The GBX/GBX-R is supplied with a mounted CMR-89, CMR-125 or CMR-250. If the actuator must be replaced:

1. Ensure gearbox is detached from valve and actuator is de-energized.
2. Remove M8 x 25 screws securing actuator mounting bracket to gearbox.
3. Decouple actuator by lifting perpendicularly to gearbox mounting flange.
4. Remove M8 x 20 screws securing mounting bracket to actuator.
5. Attach bracket to new actuator ensuring protruding mounting feet are to the rear. Firmly tighten down M8 x 20 screws onto bracket to the torque required. See Table 5.
6. Ensure actuator output shaft is at the same relative position as the gearbox input shaft. Actuator position can be changed via handknob, control signal or local controls.
7. Grease actuator shaft and input sleeve.
8. Align bracket flange square and parallel to gearbox bracket mounting flange.
9. Engage actuator output shaft into the gearbox input sleeve ensuring the shaft keyway is in alignment. (If necessary rotate actuator output shaft – refer to step 6)
10. It is essential that the actuator mounting bracket is flush with the gearbox bracket mounting flange before screws are tightened. Firmly tighten down M8 x 25 screws onto bracket to the torque required. See Table 5.

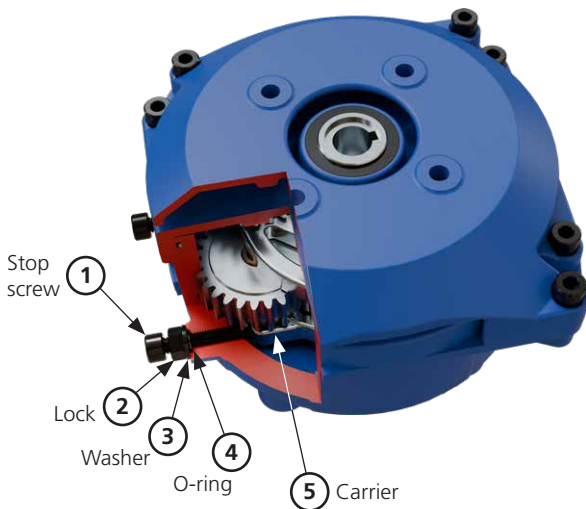
6. Installation

6.4 Setting the gearbox stops to suit the valve (GBX only)

The gearbox stops are factory set but require adjusting for optimum valve performance.

This procedure should be carried out by the valve maker/supplier and should be done when the valve opening and closing operations can be visibly checked. Once the valve is installed, the stops should not be altered without the authorization of the valve maker/supplier.

Loosen the lock nuts (2) and turn the stop screws out approximately 3 complete turns, apply a small amount of silicone sealant to the threads where the screws meet the gearcase. Operate the gearbox to the closed position and screw in stop screw (1) until it touches the gearbox carrier (5). Rotate the screw back one turn then tighten the locknut (2) to secure the stop screw. Care should be taken to ensure the O-ring seal (4) is seated properly against the gearcase in the O-ring gland and the washer (3) is seated properly over the O-ring and against the gearcase. Open the valve with the actuator and repeat the process with the open position stop screw. If the stop screws are re-adjusted at a later date, then silicone sealant must be re-applied. For acceptable sealants see Table 3.



7. Gearbox Maintenance

Under normal operating conditions, no maintenance is required for the gearbox. Should the valve be taken out of service for overhaul, the gearbox cover may be removed and lubricant changed using one of the lubricants in Table 2. The cover O-ring (2-164) should be replaced upon reassembly.

Gearbox	Manufacturer	Name	Temp. range
GBX, GBX-R	Balmar	CL200	-54 to +107 °C

Table 2 – Recommended lubrication for gearboxes

Gearbox	Manufacturer	Name
GBX	Loctite	572
	Bostick	100HMA
	Momentive	RTV
	Nanda	704

Table 3 – Recommended sealants for gearboxes

Product is designed with reference to EN ISO 22109:2020. If the product is used beyond the below number of cycles, the product must be inspected.

Rated Torque (Nm)	Class D continuously modulating (number of starts) ^a
0-125	10,000,000
126-1,000	10,000,000
1,001-4,000	5,000,000
4,001-32,000	T.B.A. ^b
32,000+	T.B.A. ^b

- a. One start consists of a movement of 1% in either direction, with a load of 30% of the rated torque.
 b. T.B.A. means to be agreed between manufacturer/supplier and purchaser.

Table 4 – Product cycle limits

8. Gearbox Operation

⚠ IMPORTANT: Under no circumstances should any additional lever device such as a wheel-key or wrench be applied to a gearbox input shaft to develop more force when closing or opening the valve. This may cause damage to the valve and/or gearbox or may cause the valve to become stuck in the seated/back-seated position.

Disclaimer - third party products: please note that, for the avoidance of doubt, whilst Rotork may provide additional parts or modifications to Rotork-supplied products which the Customer chooses to use with Third Party Products, Rotork makes no representation or warranty as to the safety or suitability of either:

- (a) Rotork's modifications to interact and engage with any such Third Party Products; or
- (b) The use of any Third Party Products whether independently or in conjunction with Rotork-supplied products unless expressly certified by Rotork in writing as safe to use in such particular circumstances and will be used entirely at the Customer's own risk.

For the purposes of the above "Third Party Products" means non-embedded products and professional services that are provided by third parties which the Customer chooses to interoperate with or are used in connection with the use of Rotork-supplied products.

9. Paint Repair Procedure

⚠ IMPORTANT: Damage to protective coatings should be correctly rectified as soon as possible.

⚠ Damage to coatings may invalidate warranty.

If paint repair is required, the following procedure should be followed:

- Clean surface using solvent if necessary
- Rinse surface with clean fresh water to remove any foreign matter and traces of solvent
- Abrade area using wet and dry sandpaper, or power sander, feather edges of sound intact paint around damaged area by 2.5 cm
- Apply paint system as per the specification originally applied to unit ensuring that dry film thickness (DFT) limits are met and time is allowed for each coat to cure. All as per the paint manufacturer's data sheets

Ambient Conditions - No cleaning or coating application shall be undertaken if:

- The relative humidity is more than 85%
- The metal temperature is less than 3 °C above the dew point
- The ambient conditions are outside those stated in the paint manufacturer's data sheet for each coating

Coatings shall only be applied or cured at ambient and steel temperatures above 10 °C or otherwise recommended by paint supplier.

10. Tightening Torques

Table 5 shows recommended tightening torques for mounting the gearbox to the valve. Gearbox to valve fitting must conform to Material Specification ISO Class 8.8, yield strength 628 N/mm² to use Table 5 below.

Thread	Torque Nm	Torque lbf.ft
M8	14	9.5
M12	71	53

Table 5 – Torque tightening figures

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PUB094-035-00

Issue 05/26