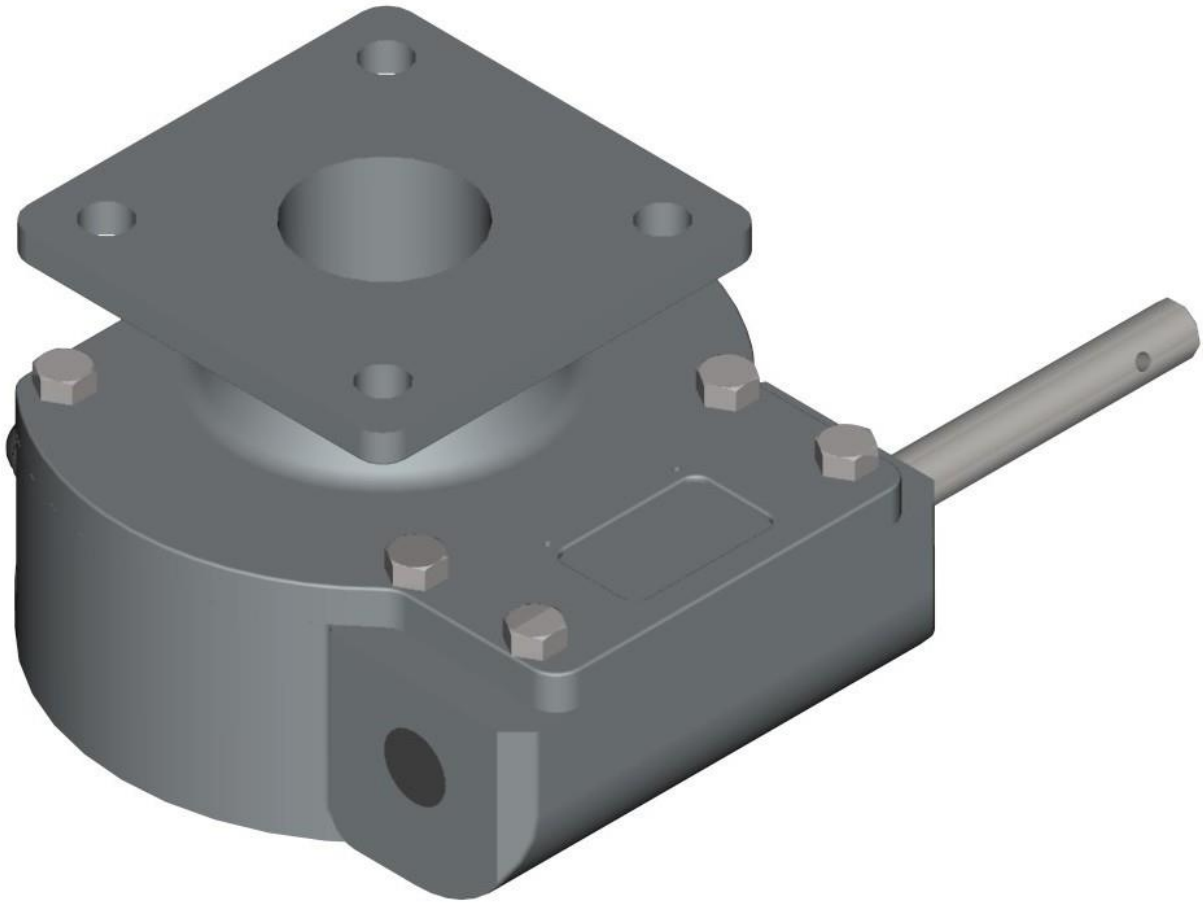
MANUAL
FOR
INSTALLATION
AND
OPERATING

For gearbox model ILG/S



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1. Preface

1.1 Introduction.

Rotork Gears BV produces gearboxes of different types and sizes. The ILG/S gearbox from Rotork Gears is a manual override quarter turn gearbox for single acting actuators. The ILG/S gearbox is intended to be used for the manual operation of valves in pipelines, in case of failure of the automatic actuator system.

NB. This manual is valid only for the standard ILG/S gearboxes of Rotork Gears BV. For special versions, the specifications and model can differ. Rotork Gears BV is not responsible for any damage caused by incorrect use of the gearbox.

2. Technical data and specifications

2.1 Maximum allowable input- and output torque

Gearbox	connection to actuator	connection to valve	Max. Torque [Nm]	
size	ISO 5211	ISO 5211/1	Inputshaft	Output
ILG/S 210 (LB)	F05-F07-F10	F05-F07-F10(-F12)	28.5	330
ILG/S 550 (LB)	F07-F10-F12	F07-F10-F12-F14(-F16)	78	934
ILG/S 880 (LB)	F10-F12-F14	F10-F12-F14-F16	123	1620
ILG/S 1250 (LB)	F12-F14-F16	F10-F12-F14-F16(-F25)	139	2640
ILG/S 1950 (LB)	F16-F25	F12-F14-F16-F25(-F30)	160	3050
ILG/S 1950 SP4 (LB)	F16-F25	F12-F14-F16-F25(-F30)	103	6800
ILG/S 1950 PR4 (LB)	F16-F25	F12-F14-F16-F25(-F30)	103	6800
ILG/S 6800 (LB)	F25-F30	F16-F25-F30(-F35)	160	4400
ILG/S 6800 SP4 (LB)	F25-F30	F16-F25-F30(-F35)	134	12500
ILG/S 6800 PR4 (LB)	F25-F30	F16-F25-F30(-F35)	130	12500
ILG/S 6800 SP6 (LB)	F25-F30	F16-F25-F30(-F35)	108	17000
ILG/S 6800 PR6 (LB)	F25-F30	F16-F25-F30(-F35)	121	17000
ILG/S 200 SP9	F25-F30-F35	F25-F30-F35	166	26000
ILG/S 200 PR10	F25-F30-F35	F25-F30-F35	124	26000
ILG/S 250 SP9	F25-F30-F35	F25-F30-F35-F40	142	32000
ILG/S 250 PR10	F25-F30-F35	F25-F30-F35-F40	142	32000

Table 1 : Connection data of the gearbox

For more specified information, you can contact our sales department.

3. Handling and safety precautions

Be sure to read and understand this manual before installation and use of our gearboxes. All personnel working with this gearbox must be familiar with the instructions in this manual and observe the instructions given. Safety instructions must be observed to avoid personal injury or property damage.

3.1 Qualification of staff

Assembly, commissioning, operation, and maintenance must be carried out exclusively by suitably qualified personnel authorised by the end user or contractor. Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety. Work performed in explosive atmospheres is subject to special regulations which have to be observed. The end user or contractor is responsible for respect and control of these regulations, standards, and laws.

3.2 Commissioning

Prior to commissioning, it is important to check that all settings are in compliance with the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation. The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

3.3 Operation

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the gearbox if it is in perfect condition while observing these instructions.
- Immediately notify Rotork Gears BV about any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety. Observe the national regulations.

3.4 Protective measures

The end user or the contractor is responsible for implementing the required protective measures on site, such as enclosures, barriers or personal safety equipment for the staff.

3.5 Maintenance

To ensure reliable gearbox operation, the maintenance instructions included in this manual must be observed. Any gearbox modification requires the consent of the manufacturer. A Rotork Gears BV gearbox requires only little maintenance. To ensure that the gearbox is always ready to operate, we recommend for gearboxes the following measures. Three (3) months after commissioning and each year:

- Check the bolts on top of the gearbox;
- Check the bolts on the valve flange;
- Perform a test run every six months;
- Check the gearbox for leakage of grease;
- For gearboxes with permanently vibration and exposure above 60ºC, checks should be performed at shorter intervals.

3.6 Storage

The gearboxes need to be stored inside in a safe way to avoid accidents. Also avoid storage in areas subjected to high temperature extremes and /or areas subjected to large amounts of humidity and dust. Protect against floor dampness by storage on a shelf or on a wooden pallet. Apply suitable corrosion protection agent to bare surfaces.

3.7 Long-term storage

If the Gearbox must be stored for a long period (more than 6 months) the following points must be observed.
Prior to storage:

- Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.

At an interval of approximately 6 months:

- Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

3.8 Packing

Our products are protected and packed by special packaging for the transport ex works. The packaging consists of environmentally friendly materials which can easily be separated and recycled. We use the following packaging material: wood, cardboard, paper, and PE foil. For the disposal of the packaging material, we recommend recycling and collection centres.

3.9 Handling

Never drop the gearbox or otherwise subject it to strong impact. Lift the gearbox horizontal on the valve. The input shaft or hand wheel cannot be used for lifting the gearbox. Do not lift the gearbox when it is assembled to the valve

3.10 IP rating and environmental conditions

The enclosure protection IP65 (on request 67 and 68) only refers to the interior of the gearboxes and not to the stem shaft coupling compartment. (*See table. 6 - IP rating*) The Rotork Gears ILG/D gearboxes can be used at ambient temperatures from –20 to + 120°C. Other temperature ranges are available on request. Suitability for any specific application is not claimed. IP rating is done in accordance to a standard test protocol. It is recommended that users carry out tailor made tests to prove the product is fit for purpose for the specific environmental conditions. For example marine environment, tropical conditions, cold or very hot conditions, chemical sites with acids or salty conditions requires the end user to assess the fit for purpose.
When the product is used in areas with high temperature fluctuations it is recommended to use pressure compensators to prevent pressure differences between the outside environment and the interior of the gearbox.

3.11 Stem shaft water ingress

Water can enter into the coupling compartment along the valve shaft, this would lead to corrosion. Therefore a suitable anticorrosive (or sticky grease) must be applied on the inside top bore hole of the gearbox and coupling before mounting. When water ingress protection towards the stem shaft is required, we recommend to use a liquid sealing on top and bottom of the flange side from the gearbox.

3.12 Paint

We deliver our gearboxes in different RAL colours, our standard average paint thickness is 60 microns, suitable for installation in a clean and dry industrial indoor environment. Our process consists of a phosphating pre-treatment followed by our standard DTM (direct to metal) paint system (Polyaspartic) or primer paint. Other paint systems are on request. For exposure to corrosive outside environment and other non-standard environments, paint system are to be advised by the customer including IP rating. On request we can deliver other paint systems and thicknesses (*see table 5 standard conditions and options*)

3.13 Primer

On request we deliver gearboxes in primer. Standard primer is a 1K industry primer which has a maximal lifetime of 1, 5 month and must be stored only in indoor, clean and dry conditions. On request zinc primer can be supplied which has a maximal lifetime of 3 months when free from zinc salts and free from contamination and stored in a clean exterior. In industrial or marine conditions this should be reduced to the practical minimum.

3.14 Seals

Rotork Gears BV is using a silicone low volatile liquid seal between cover lid and body. Loosening the top bolts of the cover plate from the gearbox can break the seal resulting to leakage. Rotork Gears BV will not be held liable when the top bolts are opened without notification. Once opened a new liquid sealing must be applied. Liquid seals kits may be obtained from Rotork Gears BV. During the order process it should be mentioned when gearboxes are exposed to high- or low temperatures. Seals made of elastomeric materials are subject to ageing. All NBR seals subject to rotating parts are lubricated with MI-setral 9-M. Gearboxes up to minus 60 degrees Celsius are built with special O-rings.

3.15 Grease

Rotork Gears BV is applying grease that is non-self-igniting and do not present an explosion hazard. Dependent on the environmental conditions different greases can be used such as high temperature grease, silicone free grease, foodgrade grease or oxygen free grease. Gearboxes for minus 60 degrees Celsius are built with 75% filling level of grease. Gearboxes are filled for life but on customer request grease nipples are an option to be mentioned during order process.

3.16 Correct use

Prior to installation, be sure the gearbox will **NOT** be overloaded during normal use. To verify this the combined spring torques + safety factor (spring start torque + spring end torque) x 1.2 = required torque. Do not exceed the values given for the gearbox. For the maximum allowable torque on the gearbox, (see table 1). ILGS gearboxes can only be used for manual operation.

3.17 Installation and operating

Not observing the rules as stated in this manual, can lead to damage and/or personal injuries. Qualified personnel must be fully aware of the instructions as described in this manual. Only when the instructions are observed, correct operation of the gearboxes can be guaranteed.

3.18 Disposal

Never dispose a gearbox at a general disposal site/depot. The gearbox has to be offered to a disposal depot for recycling. The iron parts can be used for recycling. The seals are of nitrile and can be used for plastic recycling. The grease may not be discharged to sewer- or surface water. It has to be disposed according to local regulations.

3.19 Identification

Each gearbox has a nameplate. On this nameplate you find the following standard information:

- Model type - Rotork Gears BV order.nr with line.nr - Production date and other customer information, when required.

N.B. Information on the name plate is important and is required in case of non-conformities or requests. In case of non-conformity, please send a description of the complaint, details from the nameplate with clear photograph(s) to sales.gearsbv@rotork.com.

3.20 Handweel type

	Handwheel Type - weight Kgs (lbs)				
Size in mm	**CD (casted)**	**PS (pressed steel)**	**SG (Steel welded)**	**S (Stainless steel)**	**F (Steel welded)**
50	0.11 (0.24)	-	-	-	-
75	0.21 (0.46)	-	-	-	-
100	0.32 (0.71)	0.15 (0.33)	-	-	-
125	0.54 (1.19)	0.2 (0.44)	-	-	-
150	-	-	1 (2.20)	0.4 (0.88)	-
160	-	0.35 (0.77)	-	-	-
200	1 (2.20)	0.75 (1.65)	1.35 (2.98)	1 (2.20)	1 (2.20)
250	-	1.5 (3.31)	1.4 (3.09)	-	-
300	-	-	1.8 (3.97)	-	1.5 (3.31)
315	-	2 (4.41)	-	-	-
350	-	-	2.3 (5.07)	1.5 (3.31)	-
400	-	3.5 (7.72)	2.8 (6.17)	-	2.2 (4.85)
450	-	-	3 (6.61)	-	-
500	-	-	3.5 (7.72)	-	3 (6.61)
600	-	-	4.5 (9.92)	-	3.2 (7.05)
700	-	-	5 (11.02)	-	5.5 (12.13)
800	-	-	5.5 (12.13)	-	6.6 (14.55)
900	-	-	6 (13.23)	-	7.2 (15.87)

Table 2. Handwheel type – weight Kgs (lbs)

3.21 Drive options and bottom side PCD options

Figure 1 shows the different drive options. Special drive requirements on request. We deliver ILG/S standard off-center. On request we can deliver on center with reduced tapping depths and dowel pin holes (*See figure 2*)

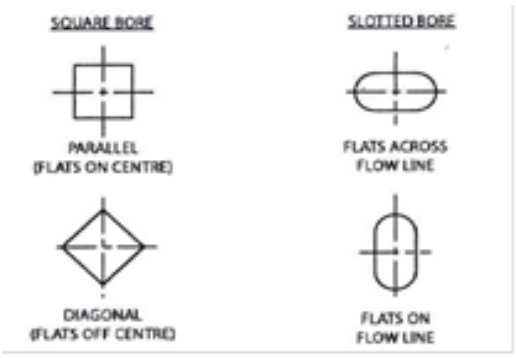

Figure 1. Drive options

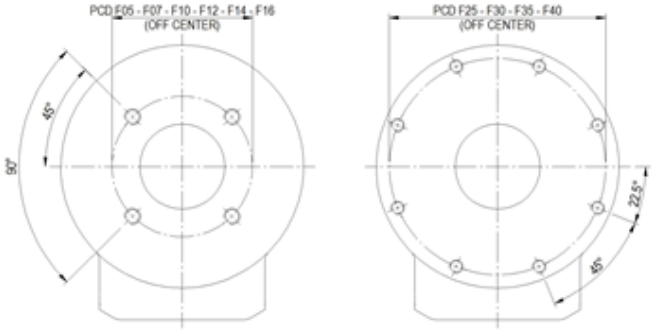

Figure 2: Bottom PCD options

4. Installation: mounting to the valve

The ILG/S is a manual override quarter turn gearbox for single acting pneumatic or electric actuators. For maximum allowable input- and output torque, refer to table 1 or the (not included) datasheet. Standard we deliver our ILG/S gearboxes in left handed position, the gearbox is observed from above (top view) with set screws pointing downwards. The shaft is than at the top pointing to the left (left handed gearbox)

This manual describes the installation of the gearbox and its parts. The purpose from the ILG/S gearbox is to open a valve with the gearbox in case of a failing actuator system. If the power supply fails the spring returns the actuator (and valve) to the "secure" (closed) position.

1. The gearbox is standard delivered in closed position.
2. It is recommended to mount a handwheel or chainwheel on the inputshaft prior to assembling the gearbox to the valve.

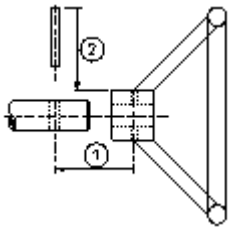

Figure 3: mounting handwheel

3. Check if the bolt circle of the flanges (of gearbox and valve) coincide. Also check if the valve stem and the bore of the driveshaft match.
4. Make sure the valve is in the fully closed position. If not, close the valve before continuing.
5. For fail-close actuators (90° clockwise close), the gearbox has to be positioned fully closed. This is achieved by turning the handwheel clockwise.
6. In case of use of studbolts for fixing the gearbox to the valve, it is recommended to screw them into the bottom flange of the gearbox prior to mounting the gearbox on top of the valve.
7. The use of a gasket between the flange of the valve and gearbox is recommended. Put the driveshaft from the bottomside into the gearbox (see figure 4). The size and shape of the connections of the driveshaft and the gearbox can differ from figure 4.
8. Put the gearbox on top of the valve.
9. The gearbox is mounted perpendicular to the valve (see figure 7).
10. Fix the gearbox to the valve appropriate studs and nuts with washers or bolts. Take into account Table 3 for maximum screw dept. For tightening, refer to standard VDI 2230.
11. The (fail-close = spring-return) actuator can be mounted on top (see chapter 6).
12. The assembly is ready for adjustment (see chapter 6).
13. For another kind of actuator (operation), above mentioned points may not apply to the situation. When the valve has to be opened with the gearbox in case of a malfunction of the actuator-system, position the gearbox in the open position and the driveshaft key at '12 o'clock'. Be sure the driveshaft can be freely turned by the actuator, from close to open, without interfering with the worm wheel.

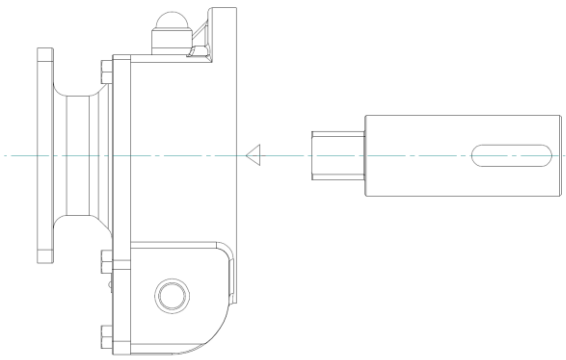

Figure 4: assembly of driveshaft into gearbox ILG/S

For fail-close actuators -clockwise close- be sure the driveshaft can make a free quarter turn clockwise (seen from the bottomside) from its endposition; refer to figure 5 (the position of the 'free-run' can differ from the figure). By this the gearbox can open the valve in case of actuator or power supply failure.

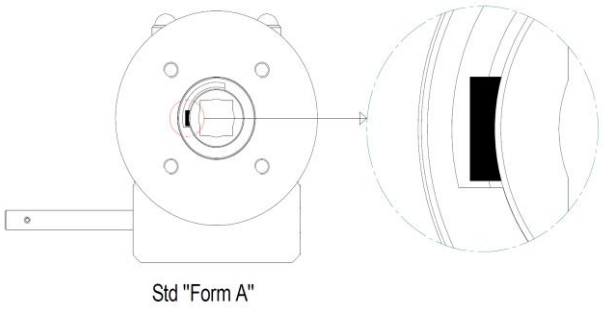

Figure 5: Standard position of driveshaft form A

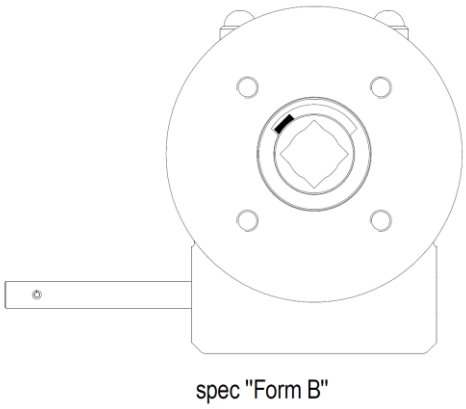

Figure 6: Position of driveshaft optional form B used for couplings for maximum stem acceptance

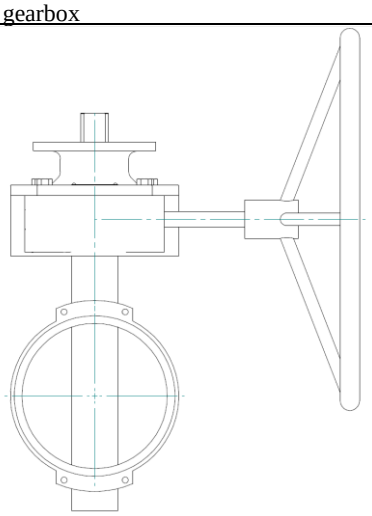

Figure 7: Gearbox perpendicular to the valve

PCD	F05	F07	F10	F12	F14	F16	F25	F30	F35	F40
Max. screw depth	8	11	13	16	18	18	18	18	30	36

Table 3: maximum screw depth per pitch circle diameter (PCD) for ILG/S range

5. Mounting instructions chainwheel

Following instructions need to be followed for mounting the chainwheel on the shaft. It is advised to use a suitable anticorrosive (or sticky grease) on the inside bore hole of the chainwheel and guide sleeve. When used outside or in a wet or humid environment then we recommended the use of a stainless steel shaft for which we have different classifications to suit several environmental specifications and not a protected or painted C45 steel shaft. Corrosion between the shaft and the chain guide can cause the combination of the chainwheel and the guide to fail. When ordering chain please order 2x the necessary operation distance + full diameter of chainwheel. The chainwheel needs to be sized on the maximum rimpull of 700N.

1. The gearbox is standard delivered in the closed position, setscrews are loosely tightened.
2. It is recommended to mount the chainwheel on the input shaft before assembling the gearbox to the Valve (see figure 8).
3. Mount item 1, 2, 3, 4 and 5 on the input shaft (see figure 8)
4. Locate the holes of the chainwheel and shaft opposite each other, insert item 6 (slotted springtype Straightpin) by hammering.
5. Mount item 7b (set screw with cone point) in front of the chainwheel. **Optional** item 7a (hexagon head bolt) can be mounted, this for additional locking of the chain wheel. This extra option need to be ordered in the preliminary stages of the order.
6. Slide item 4, 3, 2 and 1 together and mount item 8 (hexagon head bolt) in tapped hole of item 1 (Axial disc)
7. Mount the chain after you have fixed the gearbox to the valve. Connect the loose ends of the chain with the supplied splitlink (see figure 9)

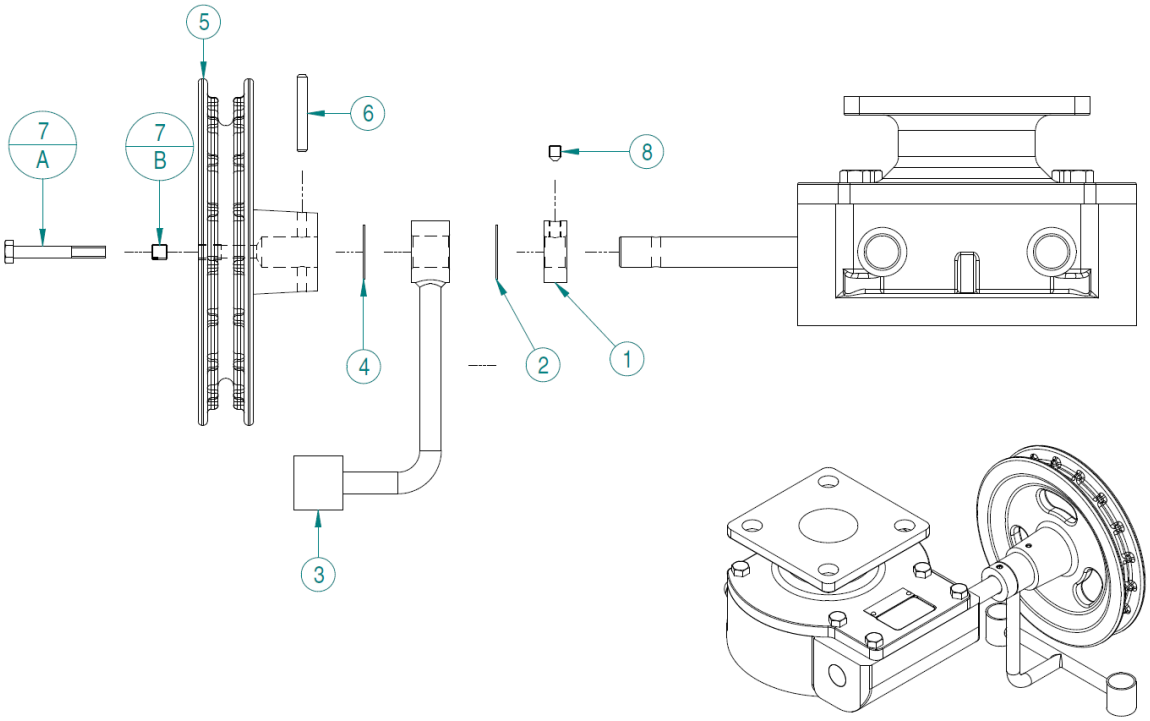

Figure 8: Mounting chainwheel kit

Figure 9: Chain splitlink

6. Adjustment of the stopscrews

The gearbox is already mounted on top of the valve (see installation). This manual only applies to fail-close (clockwise) actuators.

1. Be sure gearbox and valve are in fully closed position. If not, turn the gearbox in opened position by turning the handwheel clockwise.
2. Turn the valve in the fully closed position.
3. Mount the (spring-clockwise-return) actuator. Do not pressurize the actuator! Be sure the actuator is ready for use (stopscrews are adjusted)
4. Check if the valve is in fully closed position. If not, then adjust the setscrews either of the gearbox or the actuator.
5. Turn the handwheel counterclockwise to put the gearbox (and valve) in fully open position. When the full open position can not be achieved, loosen the stopscrew-open of the gearbox (see figure 10) and check the travel stop adjustment of the actuator. Continue turning the handwheel until the valve is fully opened.
6. Turn the screw back into the gearbox until blocked (handtight). Secure the stopscrew–open with the counternut.

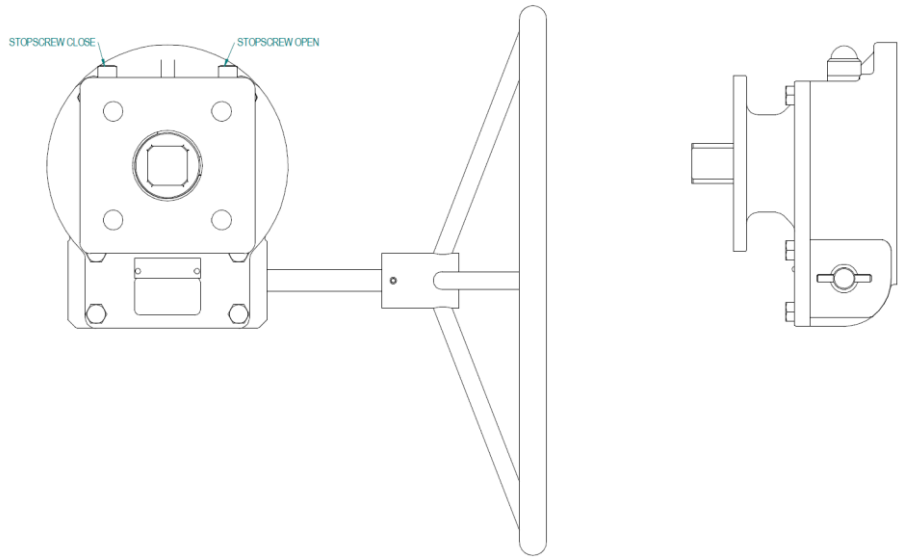

Figure 10: left-handed ILG/S gearbox stopscrew adjustment

7. Put the gearbox into the fully closed position by turning the handwheel clockwise.
8. The actuator must also return (the valve) to its fully closed position. When the fully closed position can not be achieved, loosen the stopscrew-close of the gearbox (see figure 10) and check the travel stop adjustment of the actuator.
9. Turn the stop-screw back into the gearbox until blocked (handtight). Secure the stopscrew–open with the counternut.
10. If still no return to closed position is achieved, check if any obstacles prevent the valve from returning back into its closed position.
11. Be sure the gearbox and valve are in fully closed position.
12. Adjustment completed. The assembly is ready for automatic operation.

For the ILGS gearboxes, the set screws contain bonded seals. This is to prevent oil leakage from inside the gearbox when the gearboxes are mounted on the valve. When adjusting the set screws more than once it may result in a loss of the bonded seal and it is advised to apply Loctite Threadlock 242. It is also important to lock the screws properly with a torque according to the table below.

TYPE	SCREW SIZE	TORQUE TIGHTNESS lbs ft	TORQUE TIGHTNESS Nm
SOCKET HEAD	M4	2 - 3	3 - 4
	M5	4 - 6	5 - 8
	M6	7 - 10	9 - 13
	M8	16 - 24	21 - 32
	M10	32 - 47	42 - 63
	M12	55 - 82	74 - 110
	M16	136 - 204	182 - 247
	M20	266 - 400	357 - 535
	M24	460 - 690	616 - 924
HEXAGON HEAD	M6	4 - 6	5 - 8
	M8	10 - 15	13 - 20
	M10	19 - 29	26 - 39
	M12	34 - 51	46 - 68
	M16	84 - 126	113 - 169
	M20	170 -255	231-364
	M24	294 - 441	399 - 598
DURLOK	M8	30 - 45	40 - 60
	M10	57 - 86	77 - 115
	M12	101 - 151	135 - 203
	M16	246 - 370	330 - 496
	M20	476 - 713	638 - 956
SOCKET CAP w / NORDLOCK WASHER	M8	18 - 27	24 – 36
	M10	35 - 52	47 – 71
	M12	60 - 91	82 – 124
	M16	148 - 221	200 – 300
	M20	289 - 434	392 – 588
	M24	502 - 752	680 – 1020

Table 4: Tighten force in Nm

7. Operating

Under normal circumstances the valve is operated by an automatic actuator. The ILG/S gearbox allows manual operation (closing or opening) of the valve in case of malfunction in the automatic actuator-system.

1. The gearbox is operated by handwheel.
2. The valve is closed by turning the handwheel clockwise.
3. Stop turning when the required valve position is achieved. The number of rotations of the handwheel needed to turn the valve from fully opened to fully closed position is listed in table 4.
4. When the valve cannot be totally closed, first detect and solve the cause of failure.
5. In case of malfunction of the gearbox, this has to be replaced (see chapter 4 for dismounting). Return the gearbox to your supplier for repair.
6. In case of malfunction of the gearbox ask directly assistance from Rotork Gears and explain the malfunction of the complaint with details from the nameplate with clear photograph(s). Send your mail to sales.gearsbv@rotork.com.
7. When it is decided to do the repair in house, all replacement parts must be obtained from Rotork Gears to assure proper operation of the gearbox.
8. The gearbox is self-braking. Therefore no fixation needs to be installed to retain the valve position[1]. Turn the handwheel until blocked to open or closed position. The system is ready for us.

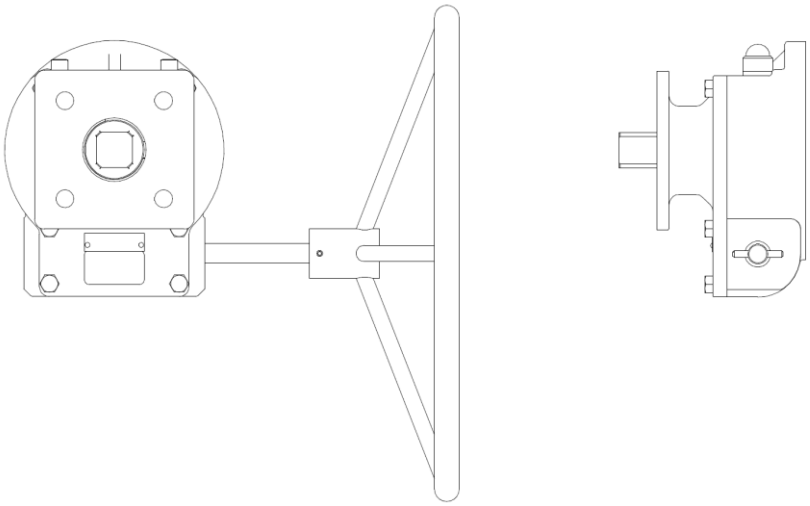

Figure 11: left-handed ILG/S gearbox

[1] Option is the possibility to fix the input shaft to prevent (not allowed) turning.

8. Number of turns opening or closing

type gearbox	number of turns to close		type gearbox	number of turns to close
ILG/S 210 (LB)	9,25		ILG/S1950/SP4 (LB)	52,75
ILG/S 550 (LB)	8,5		ILG/S1950/PR4 (LB)	54,34
ILG/S 880 (LB)	9,5		ILG/S 6800 (LB)	19,5
ILG/S 1250 (LB)	13,75		ILG/S 6800/SP4 (LB)	79,25
ILG/S 1950 (LB)	13		ILG/S 6800 SP6 (LB)	120
			ILG/S 6800 PR4 (LB)	81,5
			ILG/S 6800 PR6 (LB)	117
			ILG/S 200/SP9	148
			ILG/S 200 PR10	182,25
			ILG/S 250 PR10	182,25
			ILG/S 250/SP9	176

Table 5: number of turned for totally opening / closing.

9. Standard conditions

Conditions	
Enclosure protection (See table 6: IP rating)	Standard: IP65 Option: IP67 Option: IP68
Paint protection Options:	Standard: • ILG/S range 60 microns. Suitable for installation in clean and dry industrial indoor units. • 120 microns. Suitable for installation in industrial outdoor units water, gas or power plants with a low pollutant concentration • Higher thickness on request. Suitable for installation in occasionally or permanently outdoor atmosphere with a moderate pollutant concentration (e.g. in waste water treatment plants, chemical/oil/gas industry) • Other paint systems on request
Pre treatment	Standard: Chemical treatment (phosphating) Option: Sandblasting SA 2.5 Option: Other pre-treatments on request
Paint Paint Primer Zinc primer	Standard: QD polyaspartic direct to metal paint Options: Epoxy coat, other paint systems on request Standard: 1K industry primer (maximum lifetime 1,5 month stored only in indoor, clean and dry conditions) Options: Zinc primer (maximum lifetime 3 months when free from zinc salts and free from contamination and stored in clean exterior conditions. In industrial or marine conditions this interval should be reduced to the practical minimum.
Colour Paint thickness Paint thickness Paint thickness Paint thickness	Standard: different RAL colours on request Standard: 60 microns (QD polyaspartic) Options: 120 microns higher thickness on request (Epoxy coat or QD polyaspartic) Standard: 40 microns (1K industry primer) Options: 40 – 60 microns (zinc primer)
Grease Ambient temperature	Standard: Renolit CLX 2 grease Standard: – 20°C to + 120°C Options: – 40°C to + 120°C Options: – 60°C to + 120°C Options: Other types of grease (low temperature, food, silicone free or high temperature) on request

Set screws cover	Standard:	Plastic nutcaps with dubo ring
	Option:	W-nuts with dubo ring
	Option:	W-nuts with washer for – 60°C specification
	Option:	W-nuts with cupper ring
Shafts	Standard:	Standard protected shafts
	Option:	Stainless steel shaft different classifications
	Option:	extended shaft
Handwheels	Standard:	Pressed steel RAL9005
	Standard:	Steel welded RAL9005
	Option:	Stainless steel handwheels
	Option:	Chainwheel (kit) with zinc plated-, steel zinc plated- or stainless steel chain.
	Note:	When ordering chain please order 2x the necessary operation distance + full diameter of chainwheel.
	Option:	Stainless steel chainwheel on request.
Padlock system	Option:	To prevent unauthorized people to operate the gearbox (padlock material GG25 cast iron) other material types on request.

Table 6: Standard conditions and options

10. IP Rating

Solid Particle protection

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects.

Level	Object size protected against	Effective against
6	Dust tight	No ingress of dust; complete protection against contact

Liquid ingress protection

The second digit indicates the level of protection that the enclosure provides against harmful ingress of water.

Level	Protected against	Testing for	Details
5	Water jets	Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 12.5 litres per minute Pressure: 30 kPa at distance of 3 m
6	Powerful water jets	Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes. Water volume: 100 litres per minute. Pressure: 100 kPa at distance of 3m.
7	Immersion up to 1 m	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion).	Test duration: 30 minutes Immersion at depth of at least 1 m measured at bottom of device, and at least 15 cm measured at top of device
8	Immersion beyond 1 m	The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects.	Test duration: continuous immersion in water Depth specified

Table 7. IP rating

11. Certificates

Atex

Directive EC 94/9/EG states the directive only applies to equipment which is capable of causing an explosion through its own potential sources of ignition. The gearboxes from type AB, 242, 232, 300, ILG/S and ILG/D don't have their own potential source of ignition, so directive EC 94/9/EG doesn't apply. Therefore we state that:

Operation of gearboxes type series AB, 232 and 300 with the marking:

II 2 G D c 120 C

in areas with explosive gas atmospheres Zone I and II Category 2 (and 3)
and explosive dust atmospheres Zone 21 and 22 Categories 2 (and 3)

: this product meets the requirements for explosion prevention

II : in a potential explosive surrounding, other than in mines,
2 : with a high level of safety, based on normal operation and anticipated risks
G D : suitable for a possible explosive atmosphere caused by gases, vapours, mists of air/dust mixtures
c : safety obtained by constructive solutions.
120C : indicating the maximum surface temperature in °C

Certificates of conformity

Rotork Gears BV certify that the Gearbox models AB, 242, 232 and 300 supplied conforms in all respects to our specifications and have been subject to our Quality System conforming to BS EN IS09001:2008

Other certificates

For other certificates please contact our sales department, these are on request an need to be ordered in the preliminary stages. The following certificates we can provide:

- EUR 1 certificate
- Certificate of origin
- GOST certificate
- Certificate of Conformity
- 2.2 certificate
- Long term supplier declaration

12. Reach

rotork®
Gears

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Dear Customer,

REACH REGULATIONS: ROTORK'S POSITION

Rotork's responsibilities with regard to the REACH regulations are under the user section of the regulations; Rotork are not manufacturers or importers of chemicals or substances however we use substances that will contain chemicals.

Statement:

Rotork use only main stream materials such as aluminium, copper and iron and substances such as oil, grease and brand named products, which are highly likely to be registered under REACH. Our products, including finish coatings, contain no substances listed below.

Substance Name	CAS Number
Anthracene	120-12-7
4,4'- Diaminodiphenylmethane	101-77-9
Dibutyl phthalate	84-74-2
Cyclododecane	294-62-2
Cobalt dichloride	7646-79-9
Diarsenic pentaoxide	1303-28-2
Diarsenic trioxide	1327-53-3
Sodium dichromate, dihydrate	7789-12-0
5-tert-butyl-2,4,6-trinitro-mxylene (musk xylene)	81-15-2
Bis (2-ethyl(hexyl)phthalate) (DEHP)	117-81-7
Hexabromocyclododecane (HBCDD)	25637-99-4
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	85535-84-8
Bis(tributyltin)oxide	56-35-9
Lead hydrogen arsenate	7784-40-9
Triethyl arsenate	15606-95-8
Benzyl butyl phthalate	85-68-7

Rotork do not foresee any loss of supply in any of the materials and substances that we current use in our products.