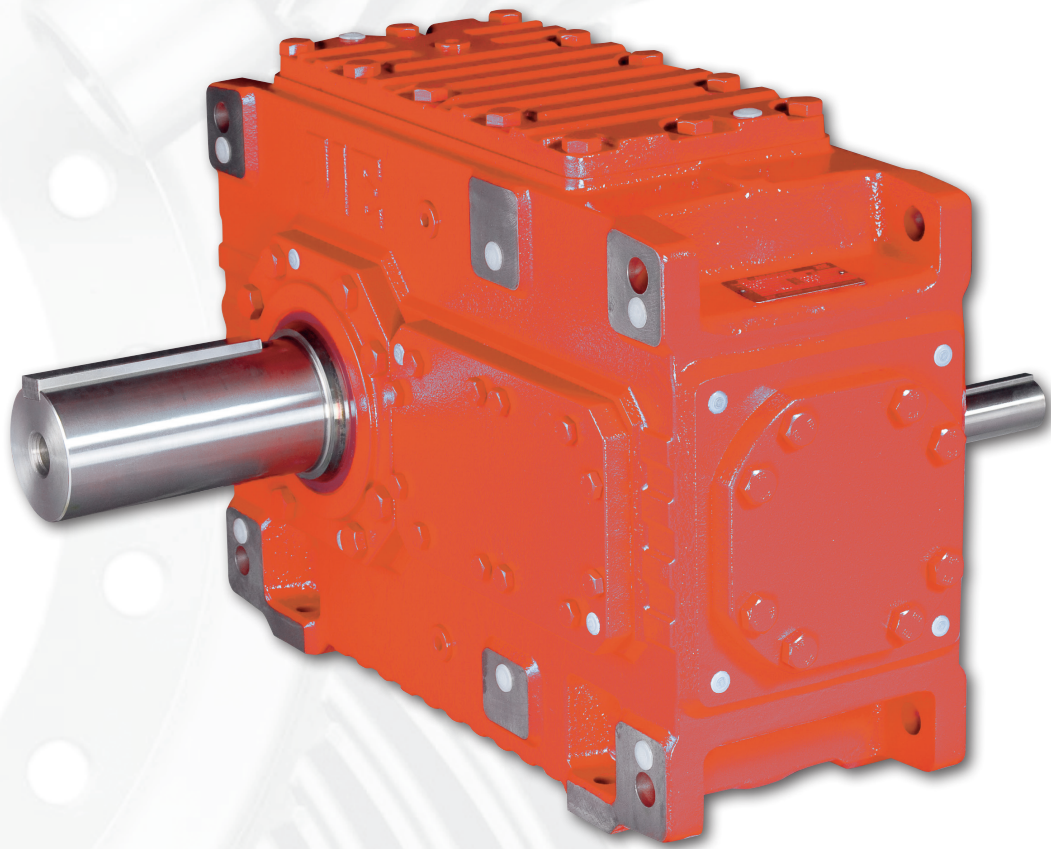


# EURONorm

DRIVE SYSTEMS



JRH Series Standard Gear unit Instruction manual

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## 1. Safety warning description



This symbol indicates the safety measures and procedures that must be followed to avoid personal injury and/or damage to the equipment or materials.

This symbol indicates a section of particular importance in the operating instructions.

## 2. Safety notes

### 2.1 Reasonable use

- The reducer is designed and manufactured according the latest technologies, and as such fully safe and reliable to be used as shipped. Any modification of the reducer that may affect the safety and reliability of the reducer is not permitted.
- Use and Operation of the reducer must be in strict conformity with the relevant performance and supply conditions stated in the sales contract.
- With ambient temperatures below 0°C the oil in the reducer must warmed up before the reducer is started by using an oil heating system.
- The reducer type plate contains important technical data. The technical data on the type plate and the information in the sales contract and general trading conditions determine the limits of reasonable use of the reducer.

### 2.2 User responsibility

- The user will ensure that personnel involved with the use and maintenance or repair of the speed reducer will have read and understand this manual and will act in compliance with its contents.
- To avoid personal injury or material damage
- To enable the safe and reliable use of the reducer
- To avoid environmental damage or pollution
- During transport, assembly, installation, operation and maintenance, safety and environmental rules and regulations must always be followed.
- Only authorized, trained and qualified personnel may install maintain, repair or decommission the reducer.
- The reducer may not be cleaned using high pressure cleaning equipment.
- The reducer must be stopped and disconnected from its power source before any maintenance or repair work may be carried out.
- Welding onto the reducer is not permitted. Welding can cause irreparable gear and bearing damage to the reducer.
- If welding work near the reducer cannot be avoided, the reducer may not be operated during the welding activities.
- If during the operation of the reducer anything unusual is observed (e.g. overheating, unusual noises), the reducer must be stopped immediately.
- To prevent accidents, all rotating parts (including couplings, chains and drive belts) and parts that may get hot should be provided with a protective guard according the applicable health and safety legislation.
- If the reducer is integrated into a complete machine, the instruction manual for the reducer should be included in the manual for the complete machine.
- The instructions and operational information provided on the reducer type plate and on the reducer itself (e.g. directional arrows) must be followed.
- The type plate and other information on the reducer may not be overpainted or removed and must be kept clean.
- If during assembly or installation a bolt or other fastener is damaged, it should be replaced by one of the same dimensions and material quality.

### 2.3 Special risks

- Depending on the operational conditions, the surface of the reducer may get very hot. Do not touch the reducer surface, serious burn wounds may be the result.
- When changing the oil it is advised to do this with the oil being warm, make sure NOT to do this with HOT oil as serious burn wounds may result.

## 3. Handling and storage

### 3.1 Scope of supply

Check the packaging upon receipt for any damage to the packaging or to the contents of the packaging. Immediately inform the forwarder about the damage. Also inform the EURONORM sales office in writing or e-mail about the damage, and await further instructions.

The scope of supply is as per the packing list accompanying the shipment. Check the goods received against the packing list for completeness. If any anomalies are found, inform the EURONORM sales office in writing/e-mail about the anomaly, and await further instructions.

**Caution!** In case of any damage to the reducer or one of its components, the reducer may not be used.

### 3.2 Transport

 Always use suitable lifting and transport equipment to handle the reducers

Depending on the type of reducer and the mode of transport the packaging may vary. Unless otherwise specified or agreed the packaging is in line with the HPE packaging guidelines.

The packaging can be marked with the following symbols:

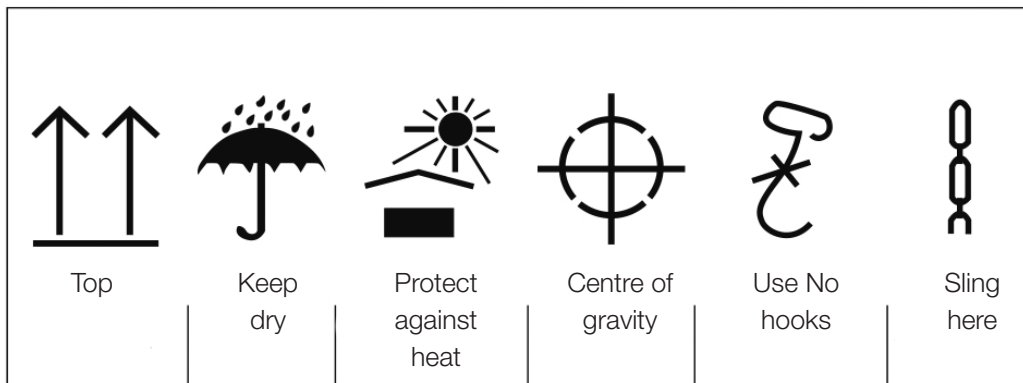


Fig. 1 Symbols used on the packaging

**Caution!** Transporting the reducers must be done in a prudent and careful manner to avoid damage to the reducers.

**Note:** Only transport the reducers with suitable equipment.

Do not fill the reducer with oil until after installation, transporting the reducer filled with oil is not advised.

**Caution!** Only use the designated holes in the casing to attach lifting equipment, as shown in Fig. 2.

Never lift the reducer with an eye bolt screwed into the output shaft.

Use suitable fabric slings to lift the reducers.

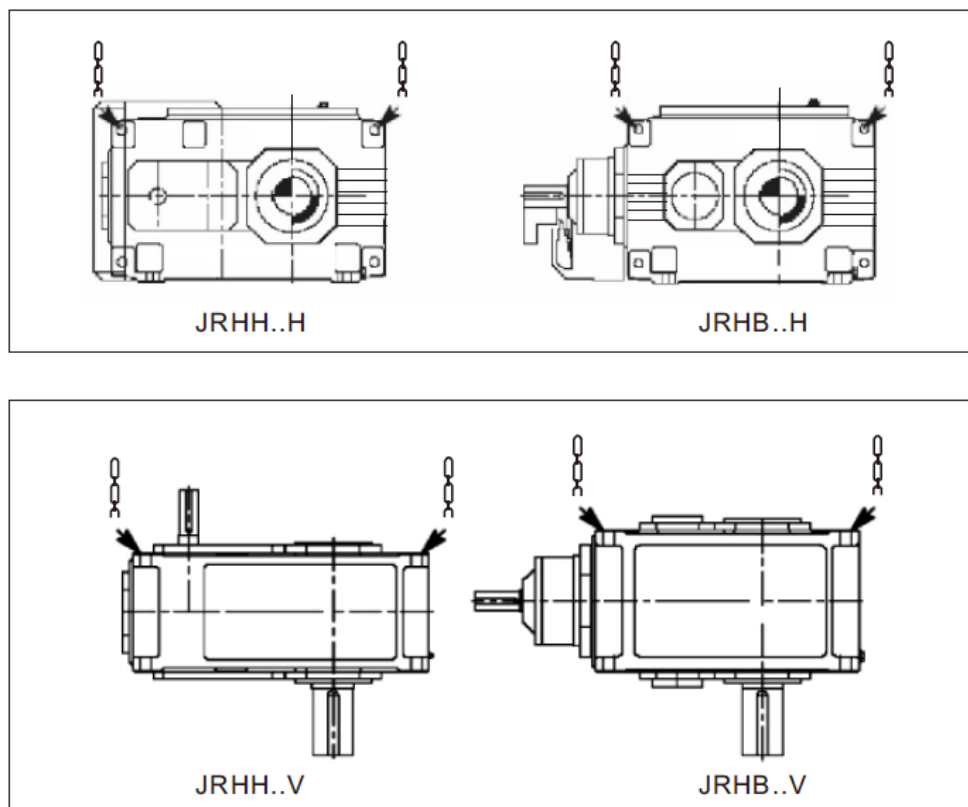


Fig. 2 Designated lifting holes

### 3.3 Storage of the speed reducers

The speed reducers must be stored in a dry and sheltered location. The reducers must be placed on dry wooden supports free of the floor, and covered. When stored the unpainted parts of the reducer (shafts, mounting surfaces) must be treated with a suitable protective coating to prevent rusting.



The reducers may not be stacked one upon the other.  
No objects may be placed on top of the reducers.

**Caution!** If the reducers are to be stored outside, make sure they are adequately covered against the elements and are kept free of debris and are protected against moisture.

**Note:** Unless otherwise specified in the contract, the reducer may not be exposed to harmful environmental factors (such as chemicals, heavily polluted air, high ambient temperatures etc.)

If during transport or storage special measures are required such as during sea transport or storage in adverse climatological conditions or against pests (rats, termites etc.) this should be stipulated in the contract.

### 3.4 Rust proofing measures

The reducer is filled with a protective agent and the reducer shaft is coated with a rust preventive.

The top layer of the paint on the reducer should be kept free of solvents, alkali and acids.

Also protect the top layer of the paint from air pollution, temperatures above 120°C and tropical climates.

Note) Restore any paint damage as soon as it is discovered to prevent corrosion damage.

Mechanical damage (scratches), chemical damage (acids, alkalis) and thermal damage (sparks, welding and excessive heat) will deteriorate the outer protective layer and may lead to corrosion.

Unless otherwise stated, the reducer is internally and externally sufficiently protected for storage for a period of 6 months after shipment when stored in a dry and frost free indoor location.

For longer storage periods (over 6 months) regular inspections are advised, and if necessary re-cote the (unpainted) internal and external surfaces with a protective layer. See Section 6. "Start"

The output shaft must be rotated ca. 3/4 turn to change the points of contact of the gears, shaft, bearings and seals. (Note) make sure the shaft is in a different position after rotating, use mark on shaft to be sure.

## 4. Assembly

### 4.1 Information for installation

Assembly and installation work must be carried out by qualified and trained staff. Damage caused by incorrect assembly or installation is not the responsibility of the manufacturer.

Make sure that after installation enough space is available around the reducer to carry out maintenance work, or in case a fan is fitted the supply of clean cooling air is not hindered.

**Caution!** For reducers installed outdoors, provisions must be made to protect them from direct sunlight and rain and snow. Mounting a suitable cover over the reducer is recommended.

It must be made sure that normal reducer performance is not affected by foreign objects or matters. (E.G. falling objects or the accumulation of debris or dust).

**Caution!** All mounting holes provided in the reducer must be used during the installation using the correct dimension and grade of fasteners. If any of the fastener is damaged, it should be replaced by a fastener of the correct dimension and grade.

To ensure correct lubrication make sure lubrication is carried out in keeping with the mounting position and the relevant lubricating instructions.

### 4.2 Reducer mounting surface

#### 4.2.1 Mounting surface

Make sure the mounting surface is level, straight and smooth. With fully tightened mounting bolts, the reducer should not be exposed to any stress.

The design of the mounting surface should be such that it does not produce any resonance and does not transmit any vibrations. Make sure the mounting surface is large and strong enough to support the weight of the reducer and the acceleration and deceleration forces acting on the reducer. Mounting bolts and nuts should be tightened to the correct torque, and bolts should be class 8.8 as a minimum. When mounting rails in a concrete floor are used for mounting the reducer make sure they are accurately spaced for the reducer to be mounted and is securely attached to the concrete floor.

#### 4.2.2. Installation of the reducer

- Use a rag moistened with a mild solvent (e.g. petrol) to remove the protective agent from the unpainted surfaces (e.g. output shaft) of the reducer

**Caution!** Let the petrol not come into contact with the oil seals in the reducer.

\*Drive components (such as coupling components) to be fitted to the in- or output shafts that require heating before installation, must be heated to the temperature stated in the documentation of the said drive component. If no instructions are provided, induction heating is preferred, but heating with a burner or furnace is acceptable.

**Caution!** To protect the oils seals in the gearbox during possible heating operations, make sure the oil seals in the immediate surroundings of the seal do not reach temperatures over 100°C.

Use a suitable thermal screen if necessary.

**Caution!** When installing a coupling or similar onto the reductor only use appropriate tools, and never use force or heavy blows to install the accessories.

If force or inappropriate tools are used damage to gears and/or bearings may result.

In particular during removal of the accessories great care must be taken to prevent damage to oil seals and the shafts surface.

**!** Make sure when installing a reductor and connected equipment that they are properly aligned, and the maximum axial alignment error is not exceeded. Failing to do so can lead to premature wear or failure of the reductor or equipment.

Check for possible relative movement of the reductor or driven components under load.

**If the mounting structure or mounting method is inadequate movement under load may be present that is not visible stationary. If this observed corrective measures must be undertaken.**

### 4.3 Coupling

Generally speaking a flexible coupling must be installed on the input side of the reductor.

Note: When the reductor is equipped with a cooling fan make sure that the coupling and possibly associated motors do not interfere with the cooling air flow.

If the reductor has a solid output shaft, a flexible coupling must also be installed on the output shaft.

When rigid couplings are used additional radial and axial forces will be exerted on the reductor.

The use of rigid couplings and associated components is subject to approval, which must be included in the sales contract complete with a list of the associate components such as gears, pulleys flywheels hydraulic couplings etc.

**!** When the circumferential coupling speed is 30 m/s or less, the coupling must be statically balanced.

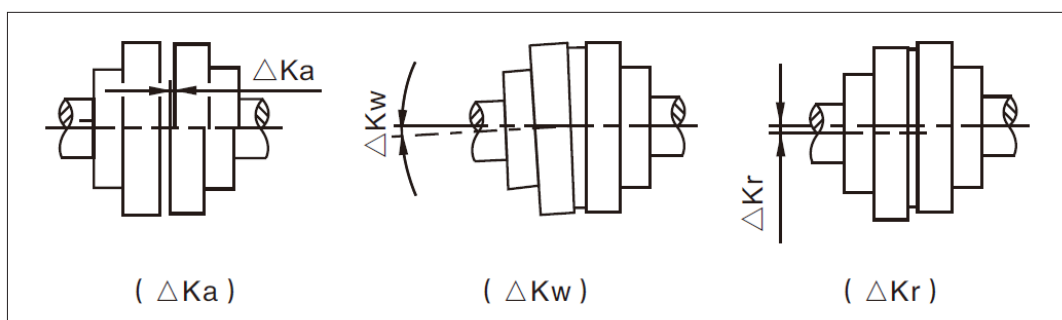
**!** When the circumferential coupling speed is above 30 m/s, the coupling must be balanced dynamically.  
Operation and maintenance instructions for the coupling can be found in the coupling instructions.

**Note:** Minimizing the angular misalignment between the transmission components to improve service life and reliability of the reductor, and to reduce operational noise production.

**Note:** Minimizing the radial misalignment and direction tolerance between the transmission components will improve service life and reliability of the reductor, and improves the balancing.

**Note:** For the maximum permissible alignment of components and accessories refer to the relevant manufacturer documentation.

Possible misalignments



Alignment has to be checked in two axial planes arranged perpendicular to each other. This can be done by means of a ruler (radial misalignment -  $K_r$ ) and a feeler gauge (angular misalignment -  $K_w$ ).

Accuracy can be increased by the use of measuring dial or a laser alignment system.

$K_a$  is the axial misalignment.

**Caution!** During operation none of the misalignments or centration shall exceed the maximum permissible values. The specific values can be found in the documentation of the coupling.

The sum of the radial and angular misalignments may not exceed the maximum value for either of them.

#### **Postscript**

To ensure a perfect vertical alignment it may be required to fit spacers under the mounting feet of the reducer.

Alternatively mounting feet with a vertical adjustment facility may be used.

### **4.4 Installation of a reducer with a hollow shaft and straight key.**

The driven machine should be fitted with a key way according to DIN 6885 in the shaft to be connected.

The shaft to be connected should also have a threaded centre hole in the shaft front face according to DIN 322 DS.

#### **4.4.1 Preparation for installation**

- Use a rag moistened with a mild solvent (e.g. petrol) to remove the protective agent from the unpainted surfaces (e.g. output shaft) of the reducer

**Caution!** Let the solvent not come into contact with the oil seals in the reducer.

#### **Postscript**

Apply a suitable lubricant or anti fretting compound to the shaft of the driven machine to prevent fretting corrosion to the contact surfaces.

##### **4.4.1.1 Installation**

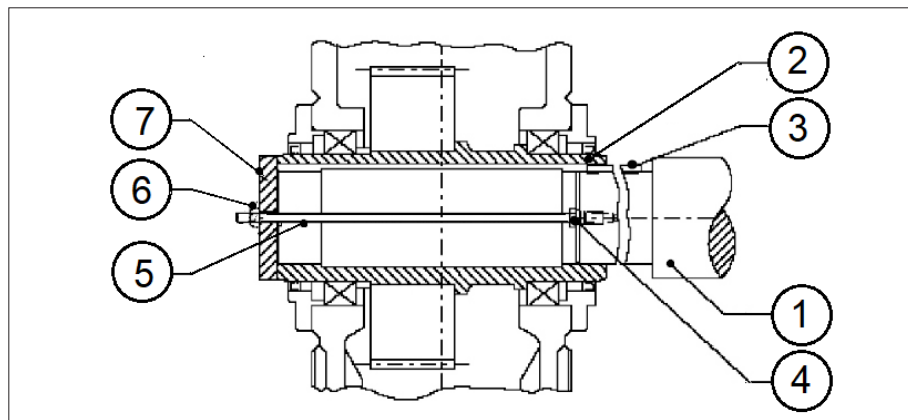
Make sure the reducer and the shaft of the driven machine are aligned correctly.

Place a threaded rod of sufficient length into the threaded hole in the front of the shaft of the driven machine.

Place an endplate over the threaded rod and fit a nut. Rotating the nut will pull the reducer onto the shaft of the driven machine. See illustration on the next page.

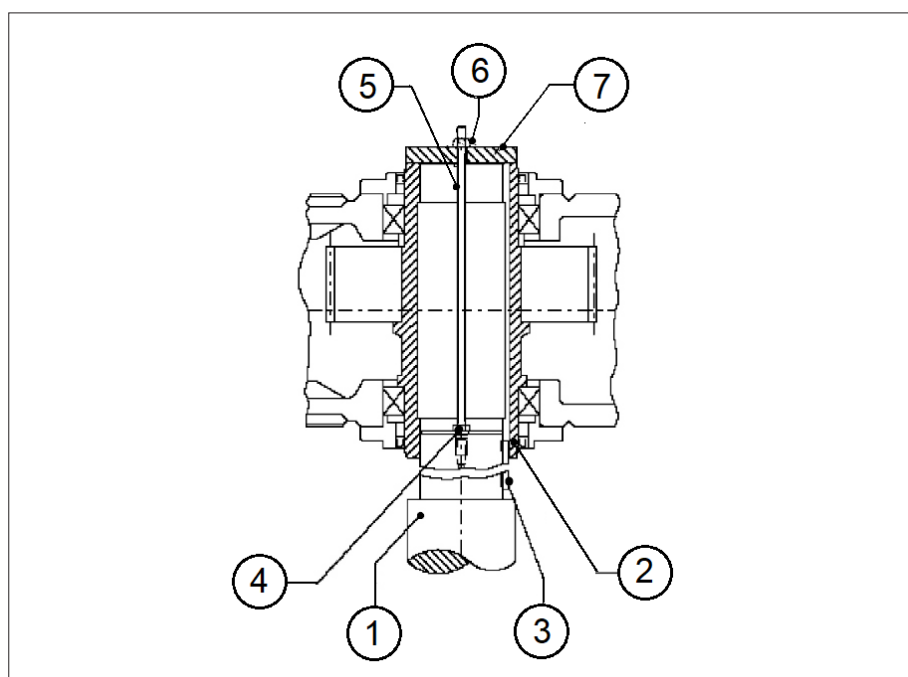
**Caution!** The hollow shaft of the reducer and the solid shaft of the driven machine must be perfectly aligned to prevent damage during installation and operation.





- 1 Solid shaft of driven machine
- 2 Hollow shaft of reducer
- 3 Key
- 4 Nut
- 5 Threaded rod
- 6 Nut
- 7 End plate

Fig. 1



- 1 Solid shaft of driven machine
- 2 Hollow shaft of reducer
- 3 Key
- 4 Nut
- 5 Threaded rod
- 6 Nut
- 7 End plate

Fig. 2

In addition to the method shown in figure 1 and 2, other suitable methods of installation such as hydraulic equipment may be used.

**Caution!** The hollow shaft of the reducer can be pushed onto the driven machine solid shaft shoulders, but only when equipped with a torque arm or when fitted to a rotating driven machine. In all other cases the bearings will be subjected to excessive pressure which may lead to damage.

#### 4.4.1.2 Axial fixation

Reducers with a hollow shaft must be axially fixated to the driven machines solid shaft.

Use position rings, end plate, set screws or similar.

#### 4.4.2 Removal

- First remove the axial fixation from the shaft.
- If friction (corrosion) is observed, inject a rust remover or similar into the bore of the hollow shaft, and into the threaded hole in the driven machines hollow shaft.
- Pull the reducer from the driven machines shaft using suitable equipment.

**Caution!** Avoid distortion and tilt when removing the reducer.

### 4.5 Installation of a reducer with a hollow shaft and shrink disc

The driven machine should have a threaded centre hole in the shaft front face according to DIN 322 DS.

#### 4.5.1 Preparation for Installation

- Use a rag moistened with a mild solvent (e.g. petrol) to remove the protective agent from the unpainted surfaces (e.g. output shaft) of the reducer

**Caution!** Let the solvent not come into contact with the oil seals in the reducer.

**Caution!** The sections of the hollow shaft of the reducer and the solid shaft of the driven machine in contact with the shrink disc, should NOT have any grease on them. This is necessary to ensure a safe and reliable transmission of the nominal torque. Only use new clean lint free rags and or uncontaminated solvent to clean the contact surfaces.

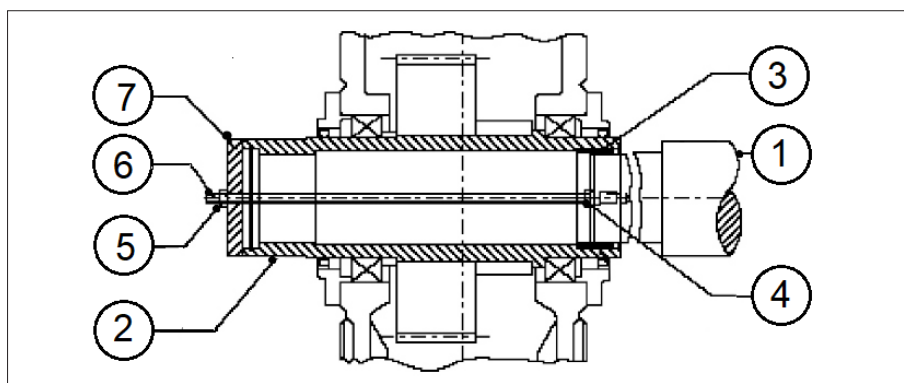
##### 4.5.1.1 Installation

Place the loose bushing onto the shaft of the driven machine

Make sure the reducer and the shaft of the driven machine are aligned correctly.

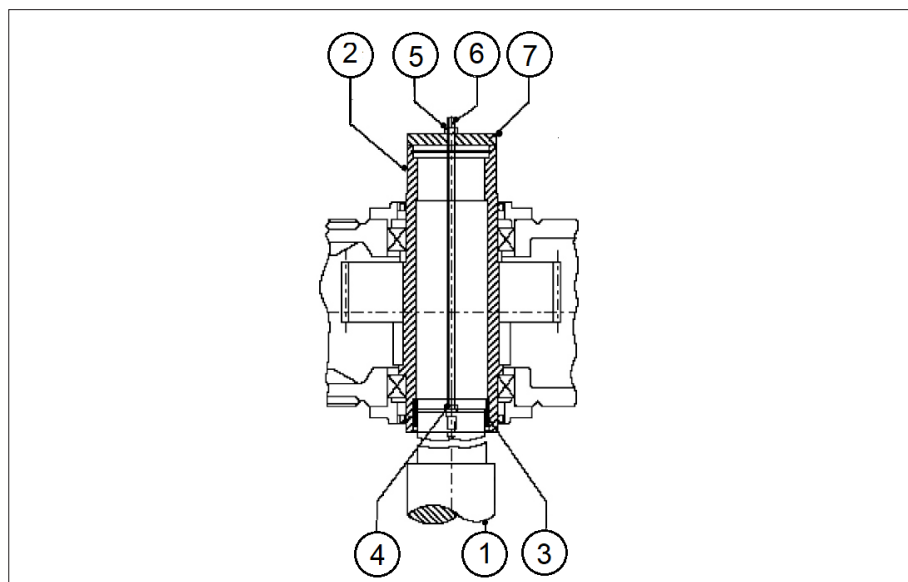
Place a threaded rod of sufficient length into the threaded hole in the front of the shaft of the driven machine. Place an endplate over the threaded rod and fit a nut. Rotating the nut will pull the reducer onto the shaft of the driven machine. (See Fig. 3 and 4).

**Caution!** The hollow shaft of the reducer and the solid shaft of the driven machine must be perfectly aligned to prevent damage during installation and operation.



- 1 Solid shaft of driven machine
- 2 Hollow shaft of reducer
- 3 Bush
- 4 Nut
- 5 Threaded rod
- 6 Nut
- 7 End plate

Fig. 3



- 1 Solid shaft of driven machine
- 2 Hollow shaft of reducer
- 3 Bush
- 4 Nut
- 5 Threaded rod
- 6 Nut
- 7 End plate

Fig. 4

In addition to the method shown in figure 3 and 4, other suitable methods of installation such as hydraulic equipment may be used.

**Caution!** The hollow shaft of the reducer can be pushed onto the driven machines solid shaft shoulders, but only when equipped with a torque arm or when fitted to a rotating driven machine. In all other cases the bearings will be subjected to excessive pressure which may lead to damage.

#### 4.5.1.2 Axial fixation

When the shrink disc is fitted according to the instructions given (see 4.5.2.1) the reducer will be firmly axially locked onto the shaft, no additional axial fixation is required.

### 4.5.2 Shrink disc

#### 4.5.2.1 Shrink disc installation

The shrink disc can be installed immediately as supplied.

**Caution!** The shrink disc may not be taken apart before fitting.

**Caution!** The sections of the hollow shaft of the reducer and the solid shaft of the driven machine in contact with the shrink disc, should NOT have any grease on them. This is necessary to ensure a safe and reliable transmission of the nominal torque. Only use new clean lint free rags and or uncontaminated solvent to clean the contact surfaces.

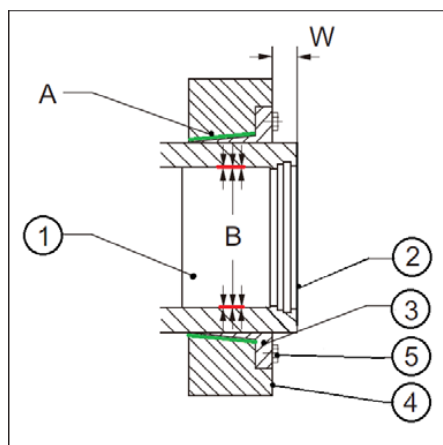


Fig. 5

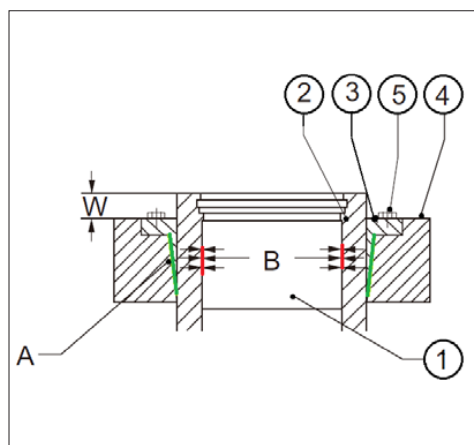


Fig. 6

- A Greased section
- B No grease allowed
- W Installation height
- 1 Solid shaft of driven machine
- 2 Hollow shaft of reducer
- 3 Inner ring
- 4 Outer ring
- 5 Clamping bolt

**Tip:** The outer surface of the hollow shaft can deposit grease on the shrink disc clamping position.

**Note!** Do not tighten the bolts before installing the shrink disc on the driven machine solid shaft.

Tighten the clamping bolts in small steps in a symmetrical square pattern.

Do so until the inner and outer ring are flush.

Types JRHH2D, JRHH3D, JRHH4D, JRHB3D, JRHB4D																														
Gear units size	Driven machine shaft <sup>1)</sup>								End plate								Circlip DIN 472	Hollow shaft				Shrink disk				Screw				
	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	f <sub>1</sub>	l	l <sub>1</sub>	r	c <sub>1</sub>	c <sub>2</sub>	D <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	m	s	Qty		D <sub>2</sub>	D <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	Type	d	d <sub>1</sub>	H	W	S <sub>1</sub>	H	T	N·m
4	85g6	85h6	84.5	95	4	326	48	2	17	7	90	70	22	50	M8	2	90x3	85	85	140	205	110-32	110	185	51	20	M10		59	
5	100g6	100h6	99.5	114	5	383	53	2	20	8	105	80	26	55	M10	2	105x4	100	100	165	240	125-32	125	215	53	20	M10	58	59	
6	110g6	110h6	109.5	124	5	383	58	3	20	8	115	85	26	60	M10	2	115x4	110	110	165	240	140-32	140	230	58	20	M12	68	100	
7	120g6	120h6	119.5	134	5	453	68	3	20	8	125	90	26	65	M12	2	125x4	120	120	195	280	155-32	155	265	62	23	M12	72	100	
8	130g6	130h6	129.5	145	6	458	73	3	20	8	135	100	26	70	M12	2	135x4	130	130	195	285	165-32	165	290	68	23	M16	81	250	
9	140g6	145m6	139.5	160	6	539	82	4	23	10	150	110	33	80	M12	2	150x4	140	145	235	330	175-32	175	300	68	28	M16	81	250	
10	150g6	155m6	149.5	170	6	559	92	4	23	10	160	120	33	90	M12	2	160x4	150	155	235	350	200-32	200	358	85	28	M16	86	250	
11	165f6	170m6	164.5	185	7	644	112	4	23	10	175	130	33	90	M12	2	175x4	165	170	270	400	220-32	220	370	103	30	M16	114	250	
12	180f6	185m6	179.5	200	7	649	122	4	23	10	190	140	33	100	M16	2	190x4	180	185	270	405	240-32	240	405	107	30	M20	121	490	
13	190f6	195m6	189.5	213	7	789	137	5	23	10	200	150	33	110	M16	2	200x4	190	195	335	480	260-32	260	430	119	30	M20	133	490	
14	210f6	215m6	209.5	233	8	784	147	5	28	14	220	170	33	130	M16	2	220x5	210	215	335	480	280-32	280	460	132	30	M20	147	490	
15	230f6	235m6	229.5	253	8	899	157	5	28	14	240	180	39	140	M16	2	240x5	230	235	380	550	300-32	300	485	140	35	M20	155	490	
16	240f6	245m6	239.5	263	8	899	157	5	28	14	250	190	39	150	M20	2	250x5	240	245	380	550	320-32	320	520	140	35	M20	155	490	
17	250f6	260m6	249.5	278	8	982	177	5	30	14	265	200	39	150	M20	2	265x5	250	260	415	600	340-32	340	570	155	35	M20	169	490	
18	280f6	285m6	279.5	306	9	982	177	5	30	14	290	210	39	160	M20	2	290x5	280	285	415	600	360-32	360	580	162	35	M20	175	490	
19	285f6	295m6	284.5	316	9	1100	187	5	32	15	300	220	39	170	M24	2	300x5	285	295	465	670	380-32	380	640	166	40	M20	175	490	
20	310f6	315m6	309.5	336	9	1100	187	5	32	15	320	230	39	180	M24	2	320x6	310	315	465	670	390-32	390	650	166	40	M20	181	490	
21	330f6	335m6	329	358	9	1160	205	5	40	20	340	250	45	190	M24	2	340x6	330	335	490	715	420-32	420	670	186	45	M20	189	490	
22	340f6	345m6	339	368	9	1170	215	5	40	20	350	260	45	200	M24	2	350x6	340	345	490	725	440-32	440	720	194	45	M20	194	490	

<sup>1)</sup> The shrink disc does not belong to our scope of supply. Please order separately if required.

**Note:** Use visual inspection to check the extent of the clamping

 **For safety reasons shrink discs should be covered with an appropriate cover to prevent injury.**

#### 4.5.2.2 Disassembly of the shrink disc

Remove the protective cover fitted

Remove any rust or contamination from the solid shaft of the driven machine.

The disassembly is the reverse of the installation.

Untighten the clamping bolts in small steps in a symmetrical square pattern.

This is gradually and safely releasing the clamping forces present in the outer ring.

**Note!** Never release the bolts in a radial pattern going from one bolt to the bolt next to it.

When all bolts are released the shrink disc may be removed. If this is not possible, the disc may be separated by placing an (evenly spaced) number of clamping bolts in the threaded removal holes in the inner ring that must be screwed in using small steps in a symmetrical square pattern.

The shrink disc may now be removed.

#### 4.5.2.2 Clean and regrease the shrink disc

There is no need to completely disassemble the shrink disc. Regrease the areas indicated in Fig. 5 and 6, and refit. Only if the shrink disc is heavily contaminated, it must be taken apart for cleaning.

**Note!** After cleaning the shrink disc must be relubricated as described above.

#### 4.5.3 Removal

- If (friction) corrosion is observed, inject a rust remover or similar into the bore of the hollow shaft, and into the threaded hole in the driven machines hollow shaft.
- Pull the reducer from the driven machines shaft using suitable equipment.

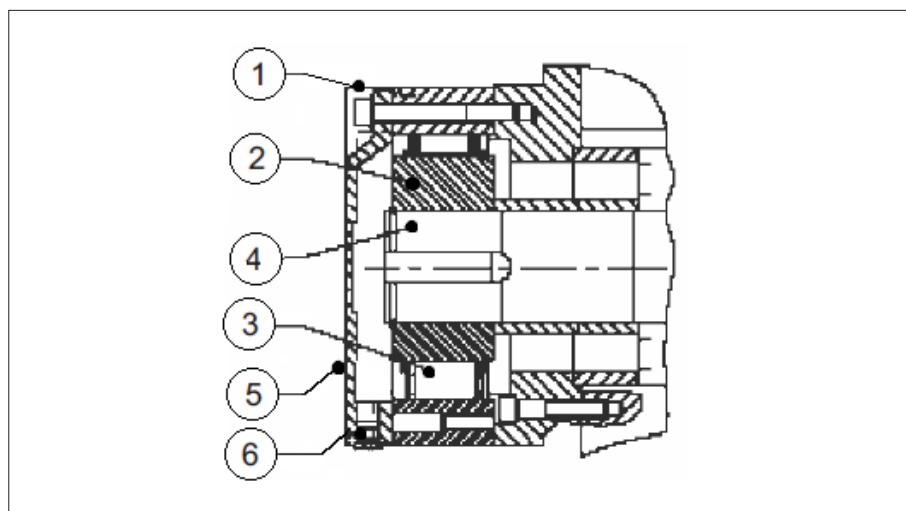
**Caution!** Avoid distortion and tilt when removing the reducer.

#### 4.6 Reducer with a back stop device

In some cases the use of a reducer fitted with a mechanical back stop device is required.

This device makes operation of the reducer possible in only one sense of direction. The direction of rotation is indicated on the reducers input and output sections. The back stop device is installed in the gearbox flange, and is provided with an oil seal to prevent oil leakage. The back stop device is integrated in the reducers lubricating system.

The back stop device operates under centrifugal force. With the reducer being operated in the correct direction above the minimum indicated speed, the locking elements are retracted and will not be in contact with any moving parts preventing wear and tear.



- 1 Backstop outer ring
- 2 Back stop inner ring
- 3 Cage with backstop elements
- 4 Shaft (mounting flange)
- 5 Cover
- 6 Emission hole for residual oil

**Tip:** Changing the direction of rotation can be achieved by reversing the cage with the backstop elements.

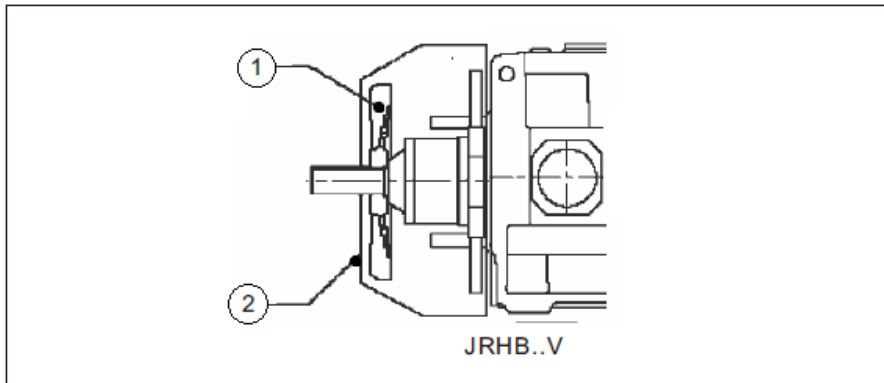
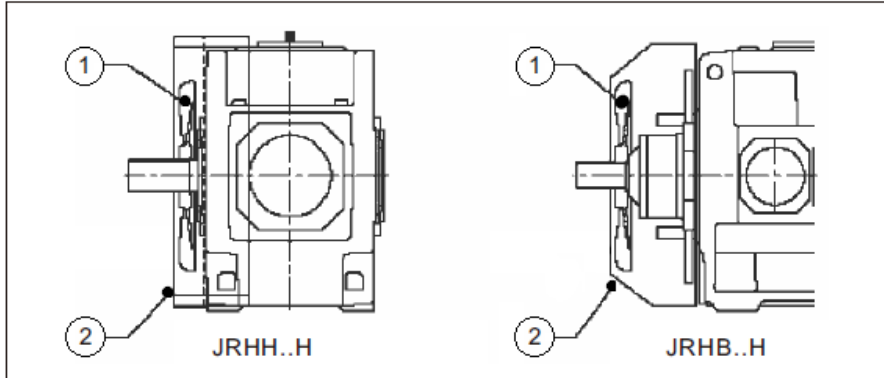
**Note!** In order to avoid damage to the back stop device or the reducer a provision must be made to prevent the drive motor to run the wrong way. Please observe the instructions on the reducer.

The minimal operational speed shall not be lower than minimum speed specified.

## 4.7 Reducer with fan

The fan installed on the reducer input shaft has a cover fitted to prevent accidental contact.

The fan draws the cooling air through the grill of the protective cover, and blows it through a channel on the side of the reducer to cool the unit.



1 Cooling fan

2 Protective cover

**Note!** When installing a reducer with a cooling fan fitted, make sure to leave enough space around the protective cover to ensure an unhindered flow of cooling air.

The minimum required space is indicated in the dimensional drawing of the gearbox.

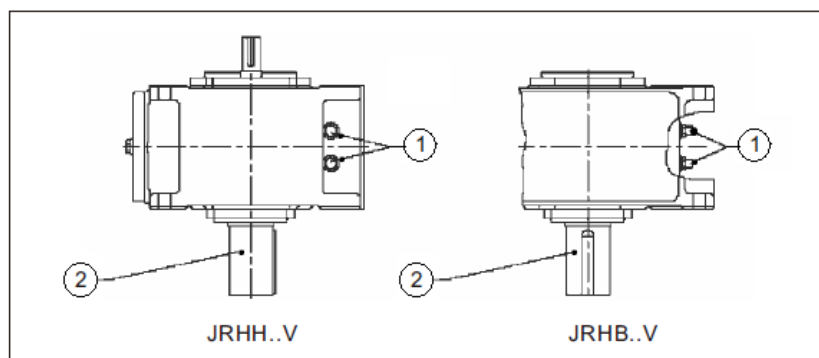
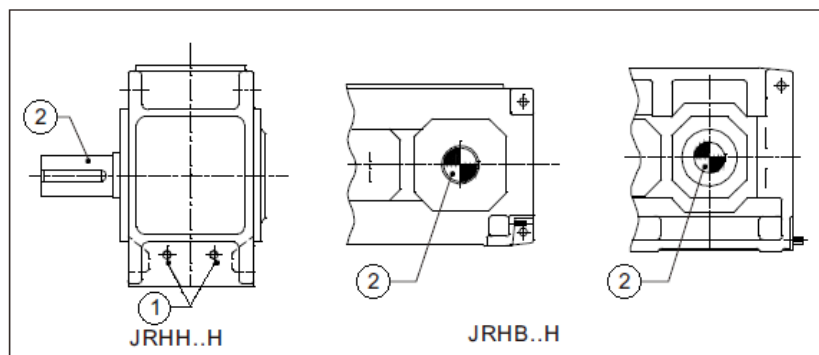
Make sure the protective cover is securely installed and the fan cannot be touched.

**Tip:** A dirty fan or a dirty reducer will restrict the flow of cooling air severely.

Clean the fan and reducer at regular intervals.

#### 4.8 Reducer with a cooling coil for external water supply

The cooling coil is installed inside the lubricating sump of the reducer. The cool water running through the coil will cool the lubricating oil. The water flow should be provided by the end user be it tap water, sea water or brackish water. After absorbing the heat from the oil, the water is discarded.



- 1 Cooling water connection
- 2 Output shaft

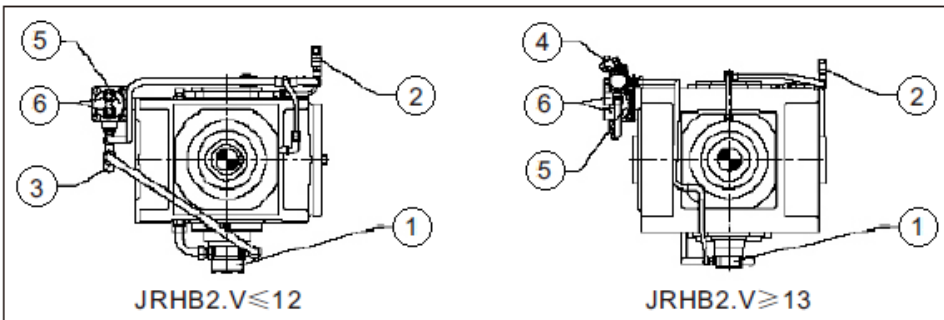
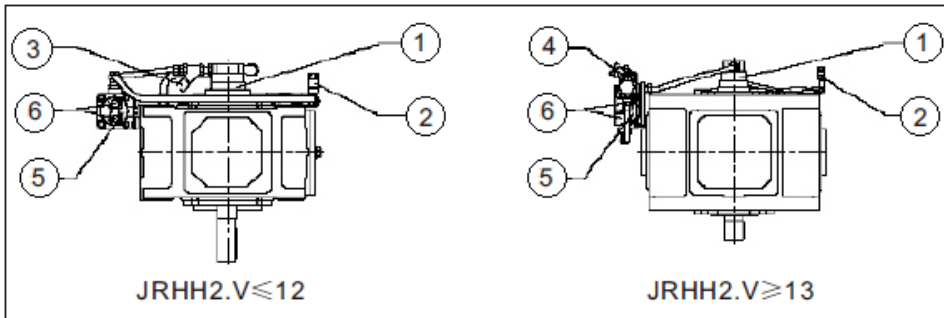
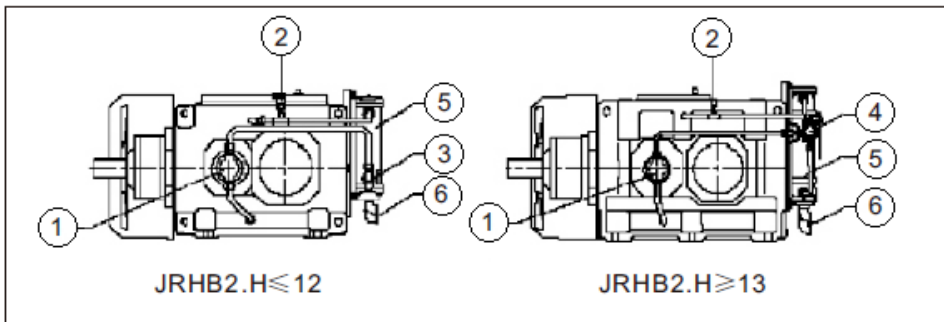
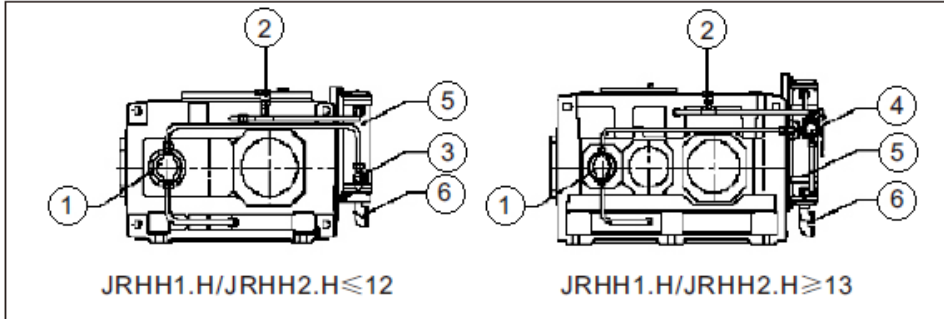
**Tip:** There is no specific direction of flow of the water through the coil. Maximum water pressure in the coil is 8 bar. If the reducer is not to be used for a long time, or in case it is used under freezing conditions, the water supply should be disconnected, and the coil must be blown empty and dried with the aid of compressed air. The external parts of the cooling coil must not be damaged to prevent invisible damage to the coil inside the reducer. The reducing screw must not be tightened or disassembled to prevent damage to the cooling coil.

- In order to prevent excessive pressures the cooling water supply must be fitted with a flow controller such as a reducing valve or a stop valve.
- During installation remove the plugs from the connection points and clean out the coil before connecting it to the water supply.
- Connect the water supply.

#### 4.9 Reducer with a cooling coil for recirculating water

Reducers H1, H2 and B2 can be fitted with recirculating water cooling system for the lubricating oil.

It consists of a flange mounted pump, a coarse strainer, a pressure monitoring device, a temperature controlled valve, oil cooling device and the necessary pipes and fittings. Depending specification a 13 to 20 double switching strainer can be used instead of the coarse strainer.



- 1 Flange pump
- 2 Pressure monitoring device
- 3 Coarse strainer
- 4 Switching strainer
- 5 Water cooling device
- 6 In and outlet

**Note!** To achieve the best cooling effect, the correct direction of flow must be observed.

Cooling water inlet and outlet must not be interchanged. Max. pressure of the cooling water must not exceed 8 bar.

If the reducer is not to be used for a long time, or in case it is used under freezing conditions, the water supply should be disconnected, and the coil must be blown empty and dried with the aid of compressed air.

- During installation remove the plugs from the connection points and clean out the coil before connecting it to the water supply.
- Connect the in- and outlet pipes
- Connect the pressure monitoring device

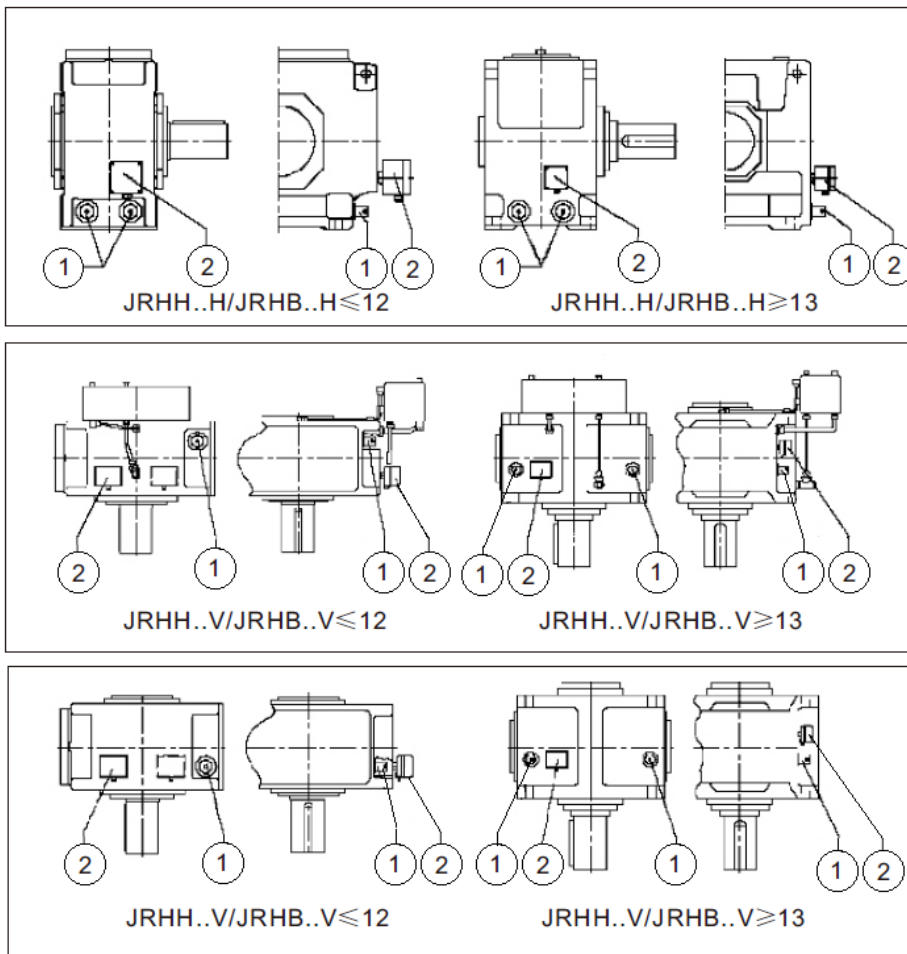


#### 4.10 Reducer heaters

When operated in low temperatures, the lubricant inside the reducer needs to be warmed up before starting the reducer, or even during operation of the reducer. In these cases one or two heating elements may be fitted.

The heating elements convert electrical energy into heat to warm up the lubricant. The heating element is placed inside a protective tube inside the reducers. Therefore there is no need to drain the lubricating oil when replacing the heating element. The heating element must be fully immersed into the lubricant. A high oil level is required for this purpose, therefore radial oil seals must be used when specifying the heating elements.

The heating element is controlled by a temperature monitoring device. A signal is given when maximum or minimum oil temperatures are reached. The signal needs to be amplified.



Please refer to the above drawings for the position of the reducer and its accessories.

**Notes:** Plug in the power for the heating element only when it is fully immersed in the lubricant, otherwise it a fire may be started! The maximum heating capacity of the heating elements is 0.8W/cm<sup>2</sup> this is relevant when the heating elements are to be fitted later.

- Electrically connect the temperature monitoring device.
- Electrically connect the heating elements.

## 5. Starting and running

### 5.1 Adding lubricant

- Remove the bolts, and remove the cover of the speed reducer (complete with seals). Also the appropriate plug may be used. Take care not to damage or loose the seals.
- Remove the plug from the rear cover and add ca. 0,5 L of fresh lubricant.
- Use a strainer (25µm) if the reducer is fitted with a back stop device.
- Refit the plug(s) and seals and tighten.

**Note!** Use a strainer (25µm) when filling with fresh lubricant, and fill up to the max. level indicated on the scale or level glass. Remember to fill the reducer with lubricant above the bearing level and input shaft groove with bevel gear reducers.

**Note!** Make sure the sealing surface is kept clean.

**Note!** Use the correct type of lubricant. The viscosity commonly used is VG320 or VG220.

The lubricant volume given on the type plate is for reference only. Please full the lubricant to the level indicated by the scale or the level glass.

**Note!** The lubricant should be filled into the lubricating pipe when the reducer is equipped with a pressure lubrication system or a cooling device.

Please full the lubricant to the level indicated by the scale or the level glass.

**Note!** Refit the cover (and its seals) install the bolts and tighten.

### 5.2 Starting up the reducer

Check the following points and make a written report:

1. Oil level
2. Correct and tight connections of the oil cooler pipes
3. Absence of leakage from the shaft seals
4. Inspection of freedom of movement of rotating parts (that they do not touch other parts with the reducer running).

### 5.3 Running

1. The speed reducer should run free of any load for a number of hours when first started up.  
If there are no abnormal noises, vibrations or heating up the load can gradually be increased to the nominal load indicated for the reducer.
2. During operation inspect the following at regular intervals:  
Oil temperature (during continuous operation of the reducer) with mineral oil is typically 90°C, for very short periods of time 100°C is permissible. If temperatures are above 90°C during normal operation, a synthetic oil must be used.

**Tip:** If any abnormalities are observed, or if the pressure monitoring device sounds the alarm, the reducer/machine should be stopped immediately, and the cause of the problems investigated.

The table in section 6 can be used to find out about possible malfunctions and suggested measures.

Contact EURONORM for advice if the reason for the abnormalities cannot be found.

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## 5.4 Stopping

1. Switch off the power of the motor driving the reducer.
2. Make sure the motor driving the reducer cannot be accidentally switched on again, in particular when inspection or maintenance work is to be undertaken or in progress.



Place a notice near the power switch and provide a mechanical lock to prevent unauthorised operation of the power supply.

- Shut off the inlet and outlet stop valve of the reducer cooling system. To prevent frost damage, empty the cooling water pipes completely.
- Start up the reducer every 3 weeks for a brief period of time if the reducer is not used on a regular basis. For periods of inactivity longer than 6 months a preservative should be added.

## 6. Malfunctions, causes and remedies

### 6.1 General information about malfunctions

**Tip:** Malfunctions under warranty must be assessed and repaired by the EURONORM service department unless otherwise agreed. For malfunctions outside the warranty period the end user is advised to contact the EURONORM customer in cases no conclusive cause for the malfunction can be established.

**Tip:** EURONORM is not responsible for malfunctions caused by inappropriate installation or use of the reducer, repairs made to the reducer without authorized permission, the use of non-original spares. Any of the above will immediately cause a loss of warranty.

## 6.2 Trouble shooting chart


Problem	Cause	Remedy
Noise from fasteners	Loose fasteners	Tighten/replace the fasteners
Changes in pitch or volume of the normal reducer noise	Wear of gear wheels	Contact service department • Inspect and replace defective gear wheels
	Excessive backlash	Contact service department • Adjust backlash
	Broken bearing	Contact service department • Replace effected bearing
High operating temperature	Oil level too high	Check and correct oil level
	Oil too old	Contact service department • Change the oil
	Oil contaminated	Contact service department • Change the oil
	For reducers with oil cooling: Insufficient flow of water trough cooling circuit	Adjust input and output. Check for free flow of cooling water trough system
	Coolant temperature too high	Check supply and remedy
	Water cooling device flow low: Blocked oil filter	Clean oil filter
	Faulty oil pump	Contact service department • Check pump • Repair or replace pump
	For reducers with fan cooling: Airflow restricted or blocked due to contamination	Clean fan, fan cover and gear casing
For reducers with a cooling coil: Pollution of coil	Contact service department • Clean or replace coil	
High bearing temperature	Oil level in gear casing too high or too low	Check oil level at room temperature

Problem	Cause	Remedy
High bearing temperature	Oil is too old	Contact service department <ul style="list-style-type: none"> <li>• Check last oil change</li> </ul>
	Defective oil pump	Contact service department Check pump <ul style="list-style-type: none"> <li>• Repair or replace pump</li> </ul>
Strong vibration near bearings	Broken bearing	Contact service department <ul style="list-style-type: none"> <li>• Check and replace bearing</li> </ul>
	Broken gear wheel	Contact service department <ul style="list-style-type: none"> <li>• Check and replace gears</li> </ul>
Non-return device temperature is too high, non-return device stopped working	Non-return device is damaged	Contact service department <ul style="list-style-type: none"> <li>• Check and replace non return device</li> </ul>
Oil leakage	Cover or connection not oil tight	Check seals and connections if needed <ul style="list-style-type: none"> <li>• Replace seal or gasket</li> </ul>
	Shaft seal defective	Replace seal
Water in oil	Contamination of oil	Check the oil
	Oil cooler or cooling coil defective	Contact service department <ul style="list-style-type: none"> <li>• Find location of leak</li> <li>• Replace cooler or coil</li> </ul>
	Reducer in exposed location and condensation gets in oil	Shield or insulate the reducer <ul style="list-style-type: none"> <li>• Close breather plug</li> </ul>
Pressure monitoring device alarm (fitted to reducers with forced lubrication and a water cooling device)	Reducer in exposed location and condensation gets in oil	Check oil level Check oil filter, replace when necessary Contact service department <ul style="list-style-type: none"> <li>• Check pump</li> <li>• Repair or replace pump</li> </ul>
Filter alarm activated	Filter clogged	Clean filter element
Malfunction in oil supply system		Check the manual

## 7. Maintenance

### 7.1 General maintenance instructions

- Maintenance must be carried out by qualified staff that is familiar with this type of equipment.
- In order to keep service down-time as limited as possible, it is advised to keep a small stock of consumables and parts that may have to be replaced during service.
- Please refer to Fig 1(JRHH2...Structure), Figure 2 (JRHH3...Structure) and Figure 3 (JRHB3...Structure).

 Make sure the motor driving the reducer is not accidentally switched on again, in particular when inspection or maintenance work is to be undertaken or in progress.

If possible immobile the drive or driven machine mechanically, and place a notice near the power switch and provide a mechanical lock to prevent unauthorised operation of the power supply.

Operation and maintenance activities should conform to the instructions provided in this manual.

Activity	Interval	Remark
Check oil temperature	Daily	
Check noise	Daily	
Check for leaks	Monthly	
Check oil level	Each time the reducer is started	
Check oil contamination	After 400 hours of operation or 1 year whichever comes first	
First oil change	After 400 hours of operation	
Subsequent oil changes	After 5000 hours of operation or 18 months <sup>1)</sup> whichever comes first	
Clean oil filter	Every 3 months	
Clean breather plug	Every 3 months	
Clean fan, fan cover and reducer casing	Depending on conditions, but at least with each oil change	
Check cooling coil contamination	Every 24 months, but at least with each oil change	
Check oil-water cooler	Every 24 months, but at least with each oil change	
Check fastener tightness	After first oil change, after that every second oil change	
General inspection of reducer	Every two years or with each oil change	

<sup>1)</sup>After 5000 hours or 36 months using synthetic oil

## 7.2 Maintenance work instructions

### 7.2.1. Oil changing

Stop the reducer and take the precautions described in section 7.1 “General maintenance instructions”

**Note!** The reducer casing and the oil can be very hot.

Wait until the reducer casing is hand warm before attempting to work on the reducer.

For reducers with a cooling coil: Close the entrance and exit of the cooling system.

- Drain the oil from the reducer when the oil/reducer is still warm.
- Place a receptacle of sufficient capacity under the drain plug(s).
- Remove the drain plug(s) and also remove the breather/filler plug to improve the draining.



The oil draining from the reducer is hot

Wear protective gloves to prevent burns

Cover spilt oil immediately with an absorbent to remove the oil from the floor.

- If the oil is fully drained, use a compatible type of flushing oil to remove all debris, metal particles and any residual oil from the reducer casing.
- Clean the magnetic drainplug and refit, making sure the seal ring(s) are in good condition, if not, replace plug and seal.
- For reducers with an oil cooling system: Clean the oil filter in the system.
- The reducer can now be filled with fresh oil.  
See section 5.1 “Adding lubricant” for instructions on how to fill the reducer.

**Note!** Always use the same make, grade and type of oil.

Never mix different grades of oil or oil from different manufacturers, in particular never mix mineral and synthetic lubricants. If a change to a different manufacturer or a change from mineral to synthetic oil is to be made, the inside of the reducer casing must be thoroughly cleaned to remove all traces of oil.

### 7.2.2 Cleaning the breather plug

- If it is noticed the breather plug is contaminated with dried oil or dust it must be cleaned immediately. Do not wait until wait until the next scheduled service.
- Remove the breather plug and immerse in clean petrol and blow clean and dry with compressed air.
- The refit the plug to the reducer.

**Note!:** Make sure not to drop foreign objects into the reducer.

### 7.2.3 Cleaning the cooling fan and reducer casing

- Remove the fan cover
- Clean the inside of the cover and the fan itself
- Clean the air passages and surface of the reducer
- Refit the fan cover

**Note!** Never use high pressure cleaning equipment to clean the reducer.

**Note!** Make sure the fan and fan cover are properly mounted to prevent contact with the fan.

#### 7.2.4 Inspection of the cooling coil

- Close the water supply to the coil and disconnect the in- and outlet pipes
- Inspect the inside of the coil and remove any contamination present.

**Note!** If the cooling coil is contaminated the cooling capacity is reduced. Any deposits (most likely calcium) on the inside of the coil must be removed using a suitable cleaning agent.

In extreme cases (if cleaning does not improve the situation) the coil itself must be replaced.

**Warning!** Make sure the cleaning agent to be used will not damage the cooling coil material.

After inspection reconnect the in- and outlet pipes.

#### 7.2.5 Inspection the coil/water cooler unit

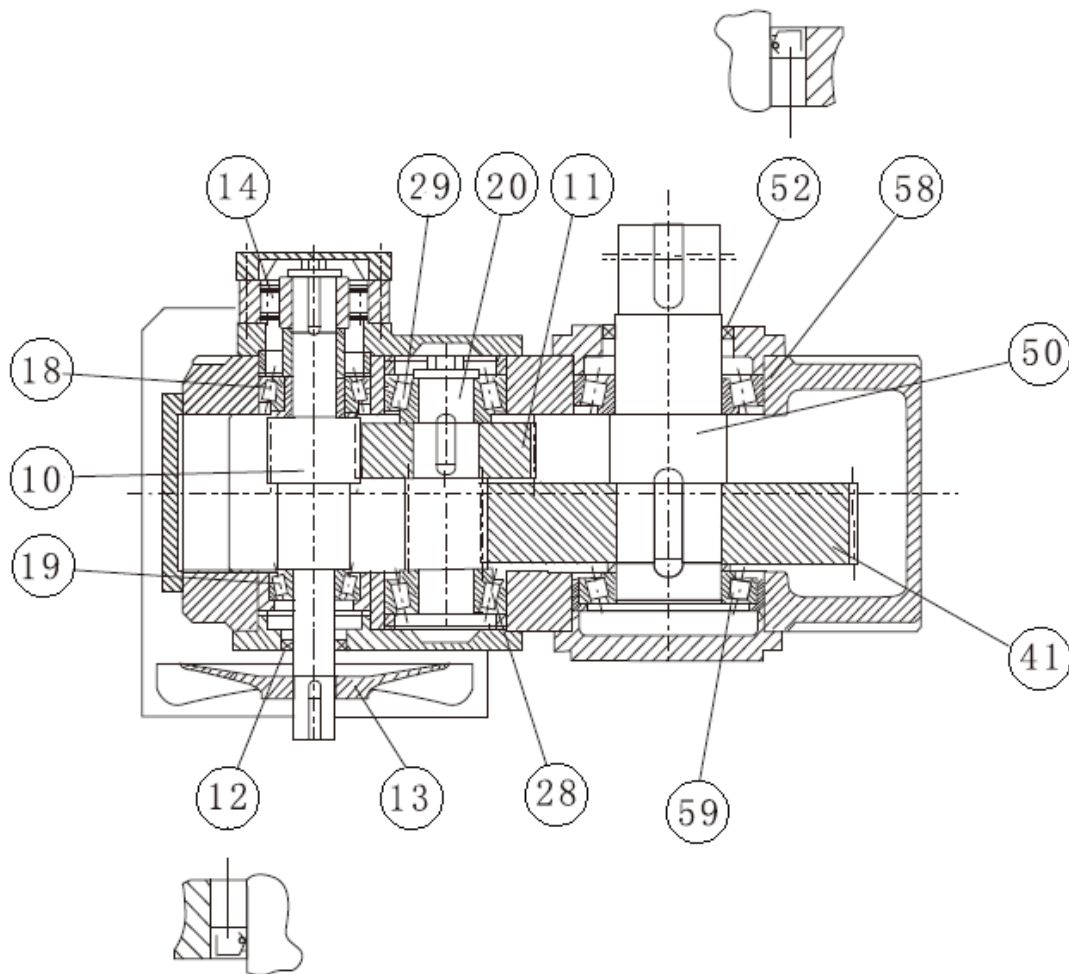
- Close the water supply to the unit.
- Inspect the cooling system pipes for leakage
- Inspect all screw connections for tightness

#### 7.2.6 Inspection of fastener tightness

- Stop the water supply to the cooling system
- Check all fasteners with a torque wrench



**Figure 1 JRHH2... Structure**

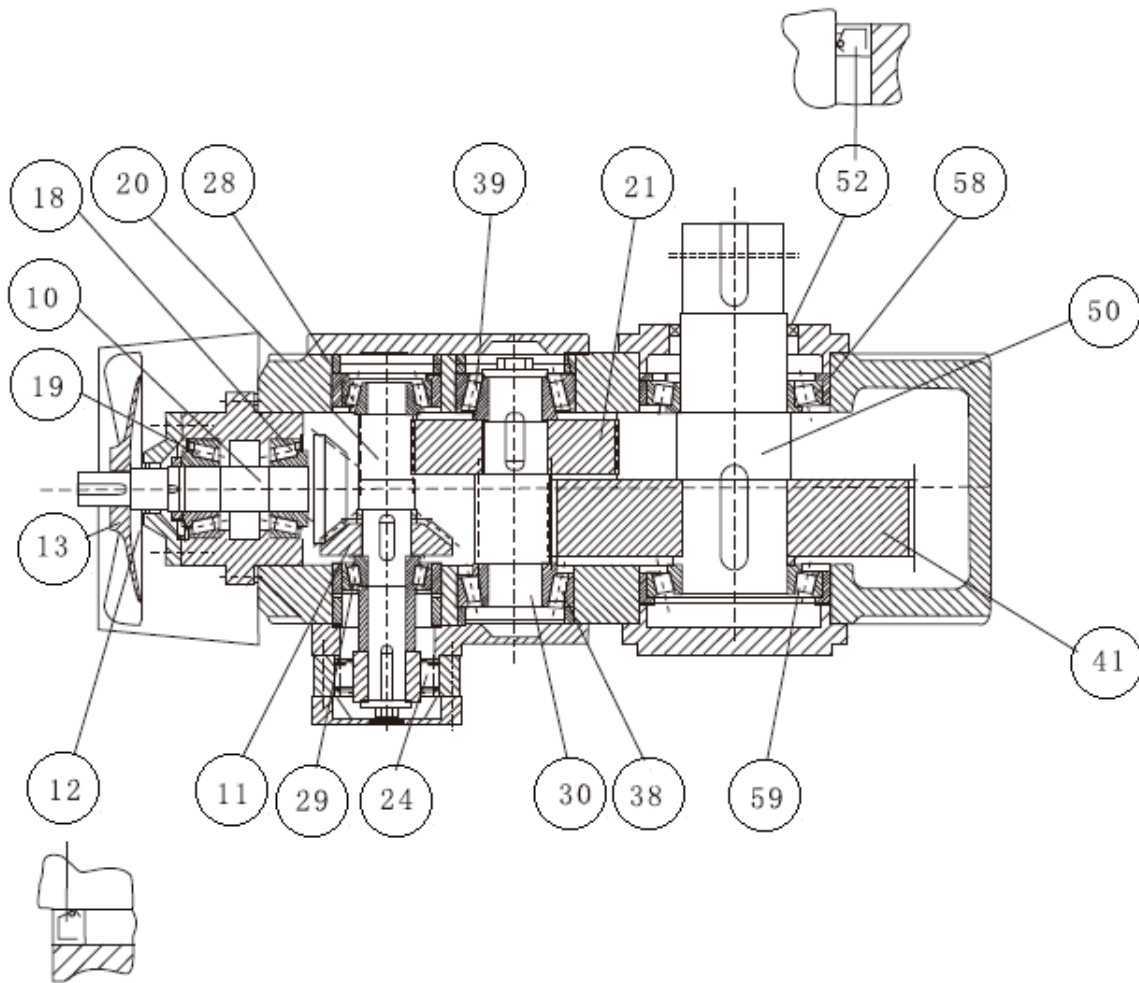


JRHH2... parts list

No	Part name
10	Gear shaft
11	Gear
12	Oil seal
13	Fan
14	Back stop
18	Bearing
19	Bearing
20	Gear shaft

No	Part name
28	Bearing
29	Bearing
41	Gear
50	Output shaft
52	Oil seal
58	Bearing
59	Bearing

Figure 2 JRHH3... Structure

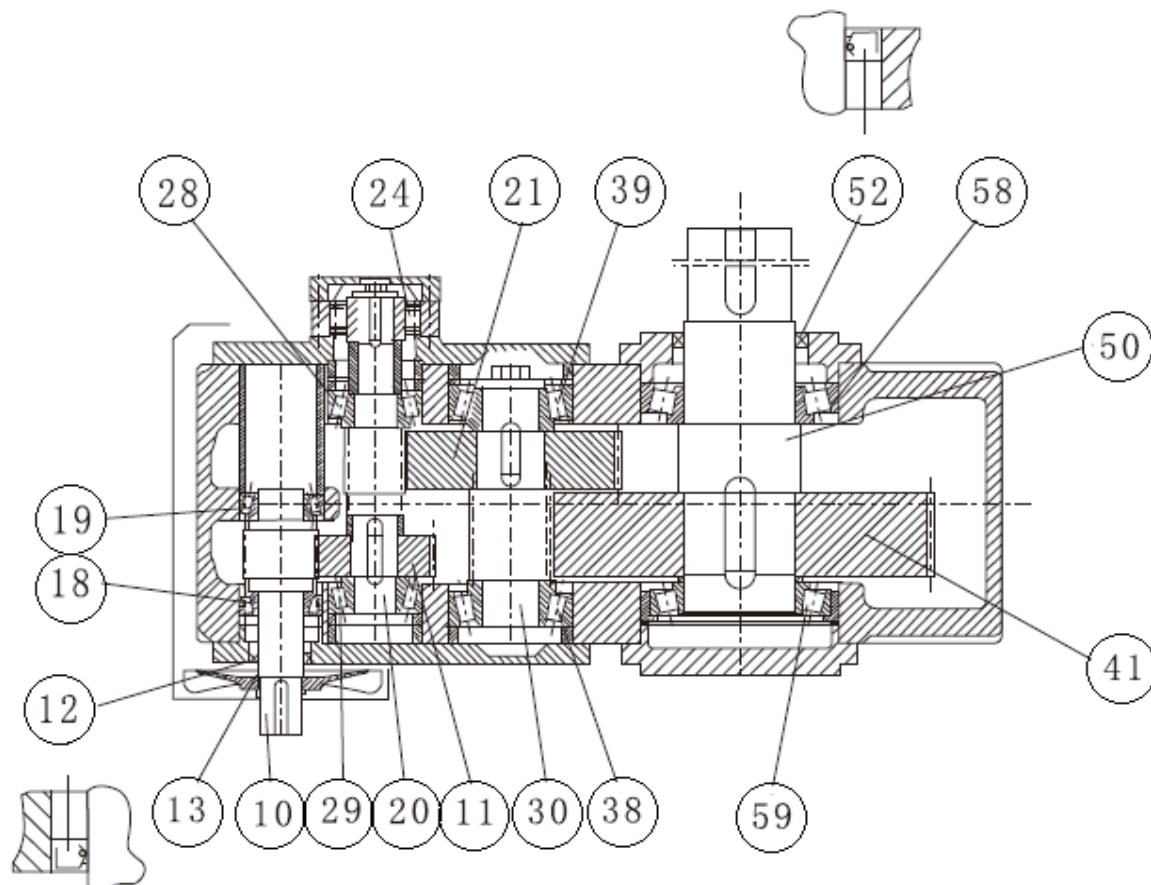


JRHH3... parts list

No	Part name
10	Gear shaft
11	Gear
12	Oil seal
13	Fan
18	Bearing
19	Bearing
20	Gear shaft
21	Gear
24	Back stop
28	Bearing

No	Part name
29	Bearing
30	Gear shaft
38	Bearing
39	Bearing
41	Gear
50	Output shaft
52	Oil seal
58	Bearing
59	Bearing


**Figure 3 JRHB3... Structure**



JRHH3... parts list

No	Part name
10	Bevel gear shaft
11	Bevel gear
12	Oil seal
13	Fan
18	Bearing
19	Bearing
20	Gear shaft
21	Gear
24	Back stop

No	Part name
29	Bearing
30	Gear shaft
38	Bearing
39	Bearing
41	Gear
50	Output shaft
52	Oil seal
58	Bearing
59	Bearing



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