

# Operating Instructions Planetary Gear Motors Series P/R





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#### 1 -How To Use This Manual

Please pay attention to the following safety and warning signs for a proper understanding and quick reference.



Electrical Hazard ; Can cause severe or fatal injuries.



Mechanical Hazard; Can cause severe or fatal injuries.



Likely to be Hazardous; Can cause minor or fatal injuries.



Damage Risk; Can damage gearbox or environment.



Important Information.



#### EC Machinery Directive:

Within terms of the EC machinery directive 2006/42/EC, the gearboxes are not considered as autonomous machines.

Operation is prohibited within the area of validity of the EC directive, until it has been determined that the machine, in which this product is installed, corresponds to the regulations within this directive.

The operating instructions contain important information to ensure;

- Trouble-free operation
- Fulfilment of any rights to claim under guarantee

These operating instructions must be stored close to the gearbox and must be available in case they are needed.

These operating instructions are written for P/R series gear units and are only applicable for K series. If any different type of gearbox is used please ask JS-Technik GmbH for the operating instructions of that type.

These instructions can only be used for standard type JS-Technik GmbH gear units. For special application and modified gear units ask JS-Technik GmbH for validity.

This manual does not cover 94/9/EC compatible gearboxes. For 94/9/EC contact JS-Technik GmbH.



## 2- Unit Designation

### 2-1 Detailed Unit Designation

Detailed P Series gear units designation for ordering (This Designation is different from the short nameplate designation)

#### P N 11 0 2 L . 01 - Additional Information



#### Output Shaft Properties:

01 : Solid Output Shaft  
0K : Splined Hollow Shaft DIN 5480  
0L : Splined Hollow Shaft DIN 5482  
0S : Shrink Disc  
1K : Splined Solid Shaft DIN 5480  
1L : Splined Solid Shaft DIN 5482

#### Optional for P24:

10 : Solid Output Shaft  
K0 : Splined Hollow Shaft DIN 5480  
L0 : Splined Hollow Shaft DIN 5482  
S0 : Shrink Disc  
K1 : Splined Solid Shaft DIN 5480  
L1 : Splined Solid Shaft DIN 5482

#### Shaft Condition:

L: Input and Output Shafts on Same Axis  
K: Input and Output Shafts Perpendicular

#### Number of Stages:

1 : Single Stage  
2 : Two Stages  
3 : Three Stages  
4 : Four Stages

#### Revision Number

#### Gearbox Sizes:

11, 12, 15, 16, 19, 23, 24, 27, 29, 35

#### Version of Gearbox:

V : With Electric or Hydraulic Motor  
N : Motor Connection Flange (IEC, C26, M46)  
T : Solid Input Shaft

#### Gearbox Series:

P : Planetary Gearbox – Flange Mounted  
R : Planetary Gearbox – Foot Mounted

#### Additional Information: (For PN, PV, RN, RV)

#### - If the gearbox unit is PN, RN Type:

A06 63 size IEC B5 motor connection flange  
A07 71 size IEC B5 motor connection flange  
A08 80 size IEC B5 motor connection flange  
A09 90 size IEC B5 motor connection flange  
A10 100 / 112 size IEC B5 motor connection flange  
A13 132 size IEC B5 motor connection flange  
A16 160 size IEC B5 motor connection flange  
A18 180 size IEC B5 motor connection flange  
A20 200 size IEC B5 motor connection flange  
A22 225 size IEC B5 motor connection flange  
A25 250 size IEC B5 motor connection flange  
C26 Flange code C, Shaft code 26 (HE Hydraulic Motor)  
M46 Flange code M, Shaft code 46 (HG Hydraulic Motor)

#### - If PN, RN type gearbox unit connected with hydraulic motor:

HE330  
Geometric displacement  
Hydraulic motor type (HG or HE)

#### - If the gearbox unit is PV, RV type:

90S/4  
Number of poles  
Frame length  
Motor size (63...-250...)

#### - If PN, RN type gearbox unit coupled with a worm gearbox:

EV063-71/4b  
Iron core length  
Number of poles  
Motor size (63...-132...)  
Size of worm gearbox (63-125)  
Worm gearbox type  
EV: With motor  
EN: With motor flange  
ET: Without motor

#### Examples

PT1202K.01  
Without motor, solid output shaft, gearbox size 12, 2 stages, perpendicular input and output shaft with flange

PV1902L.01-160M/6  
Motor with 11 kW 900 rpm, solid output shaft, gearbox size 19, 2 stages, parallel input and output shaft with flange

RV1502L.00-90S/6  
Motor with 0,75 kW 900 rpm, hollow output shaft, gearbox size 15, 2 stages, parallel input and output shaft, with foot




PN1102L.01-EV063-71/4b  
Motor with 0,37 kW 1400 rpm, connected with worm gearbox size 63, solid output shaft, 2 stages, parallel input output shaft, planetary gearbox size 11 with flange



**i** **2.2- Nameplate, unit designation**

Nameplate unit designation is a short abbreviation of the detailed designation

A sample name plate for P/R Series

<b>JS-Technik GmbH</b> www.js-technik.de		
<b>Type</b> : PV1902L.01.132M/4		
<b>Serial N.</b> :100109820		
	<b>Power:</b> 7,5 kw	<b>Ratio</b> : 56,25
	<b>Speed:</b> 16 rpm	<b>M.Position</b> : M1
<b>Oil</b> : ISO VG 320 (Synthetic Oil)		<b>Oil Quantity:</b> 2.0 l

**Abbreviations:**

Serial N. : Serial Number

M.Position. : Mounting Position

**Type Designation;**

PV1902 L.01.132M/4

Type

Motor Type

**Output Shaft Properties:**

- 01**...:Solid Output Shaft
- 0K**...:Splined Hollow Shaft DIN 5480
- 0L**...:Splined Hollow Shaft DIN 5482
- 0S**...:Shrink Disc
- 1K**...:Splined Solid Shaft DIN 5480
- 1L**...:Splined Solid Shaft DIN 5482

Optional for P24:

- 10**...:Solid Output Shaft
- K0**...:Splined Hollow Shaft DIN 5480
- L0**...:Splined Hollow Shaft DIN 5482
- S0**...:Shrink Disc
- K1**...:Splined Solid Shaft DIN 5480
- L1**...:Splined Solid Shaft DIN 5482

**Shaft Arrangement**

**L** : Input and Output shafts are on same axis

**K** : Input and Output shafts are perpendicular.



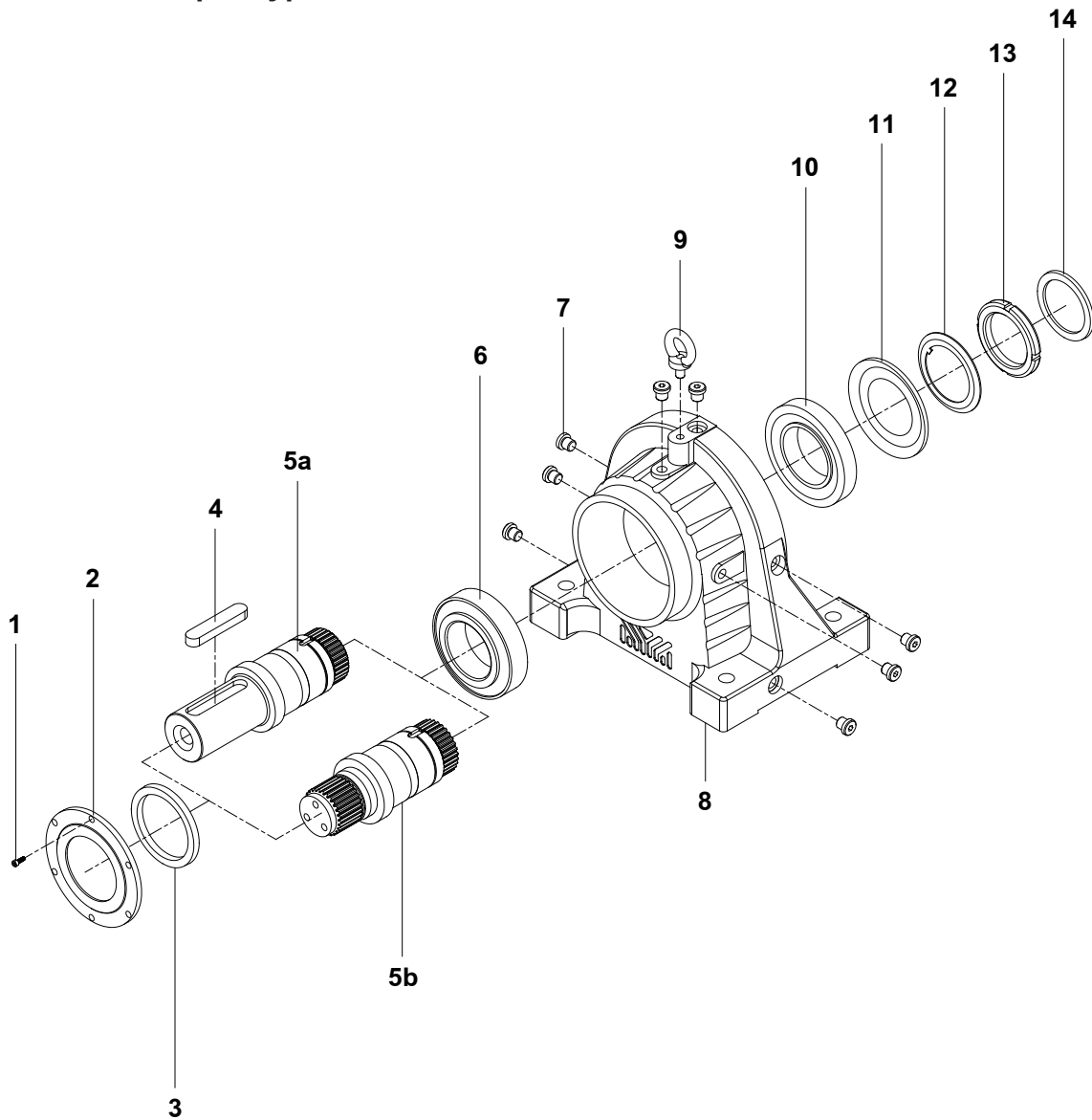
**3. Standard Type Gearbox Parts**

**List 3.1- Output Group**

**3.1-1 Version of Gearbox : RV / RN / RT**

**Gearbox Size** :11 / 12 / 15 / 16 / 19 / 23 / 24 / 27 / 29 / 35

**Output Type** :01 / 1K / 1L



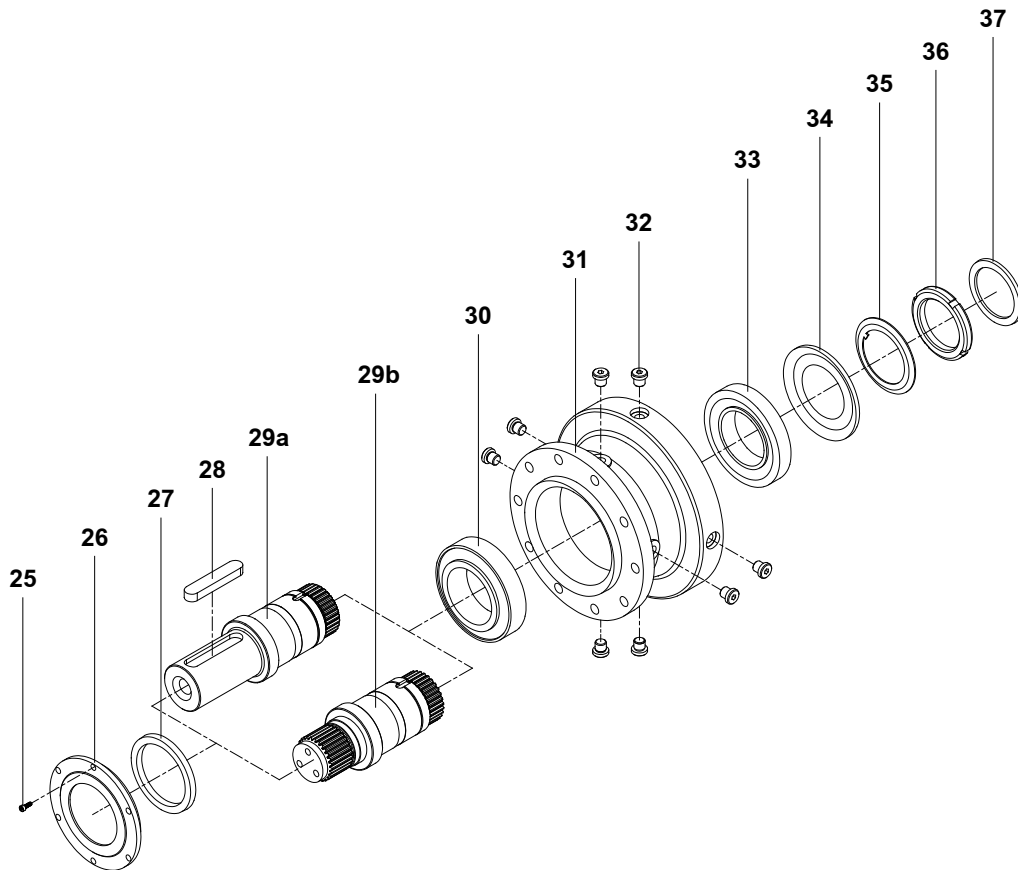
Parts may differ for special applications.

**Standard Parts List**

1- Bolt	5b- Splined Output shaft	10- Bearing
2- Seal Cover	6- Bearing	11- Nilos Ring
3- Seal	7- Oil Plug	12- Tab washer
4- Key	8- Footed output	13- Locknuts
5a- Output Shaft	9- Lifting Bolts	14- Spacer



**3.1.2- Version of Gearbox : PV / PN / PT**  
**Gear Size :11 / 12 / 15 / 16 / 19 / 23 / 24**  
**Output Type :01 / 1K / 1L**



Parts may differ for special applications.

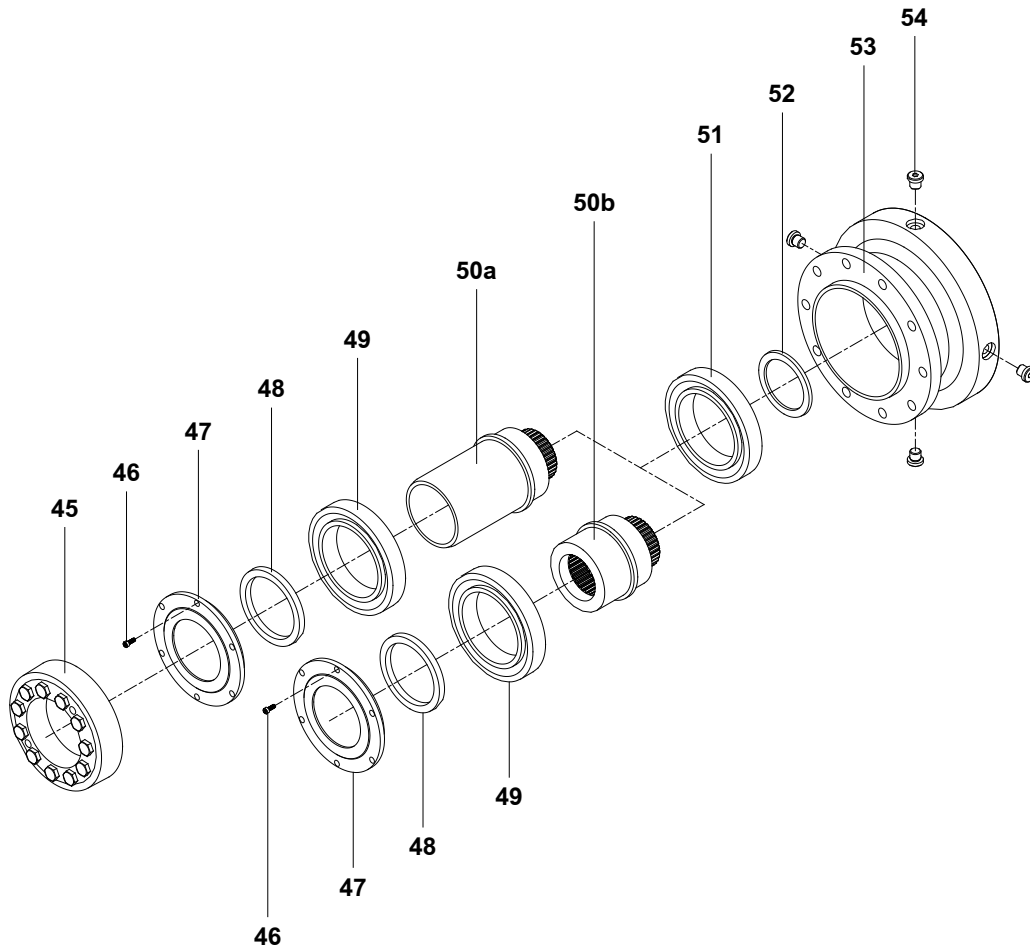
Standard Part List

25- Bolt	29b- Spline Output Shaft	34- Nilos Ring
26- Seal Cover	30- Bearing	35- Tab washer
27- Seal	31- Output Flange	36- Locknuts
28- Key	32- Oil Plug	37- Spacer
29a- Output Shaft	33- Bearing	





**3.1.3- Version of Gearbox : PV / PN / PT**  
**Gear Size :11 / 12 / 15 / 16 / 19 / 23 / 24**  
**Output Type :0S / 0K / 0L**

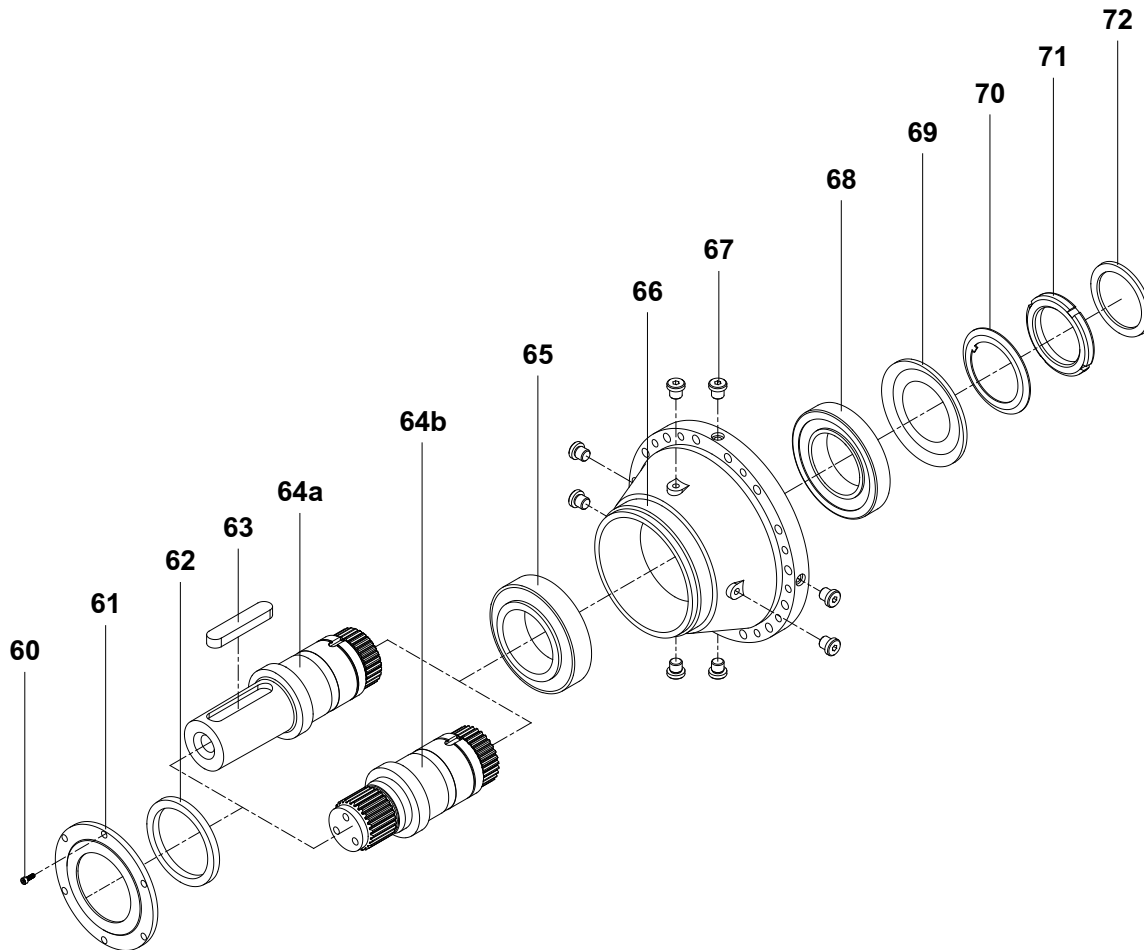


Parts may differ for special applications.

**Standard Parts List**

45- Shrink Disc	50a- Hollow Shaft	54- Oil Plug
46- Bolt	50b- Spline Shaft	
47- Seal Cover	51- Bearing	
48- Seal	52- Spacer	
49- Bearing	53- Output Flange	

**3.1.4- Version of Gearbox :** PV / PN / PT  
**Gear Size** : 27 / 29 / 35  
**Output Type** : 01 / 1K / 1L



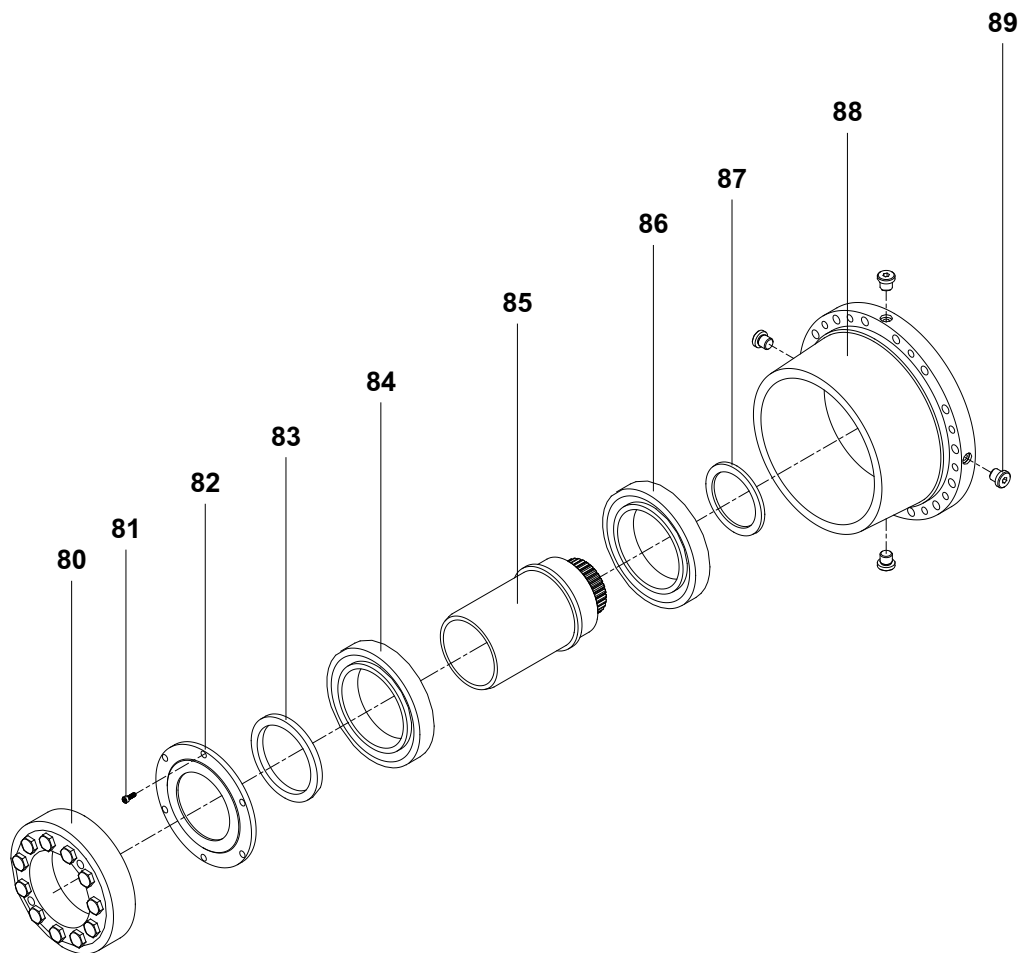
Parts may differ for special applications.

**Standard Parts List**

60- Bolt	64b- Spline Output Shaft	69- Nilos Ring
61- Seal Cover	65- Bearing	70- Tab washer
62- Seal	66- Housing	71- Locknuts
63- Key	67- Oil Plug	72- Spacer
64a- Output shaft	68- Bearing	



3.1.5- Version of Gearbox : PV / PN / PT  
Gear Size : 27 / 29 / 35  
Output Type : S0



Parts may differ for special applications.



Standard Parts List

80- Shrink Disc	85- Hollow Shaft
81- Bolt	86- Bearing
82- Seal Cover	87- Spacer
83- Seal	88- Output shaft
84- Bearing	89- Oil Plug

# Operating Instructions

## P/R Series

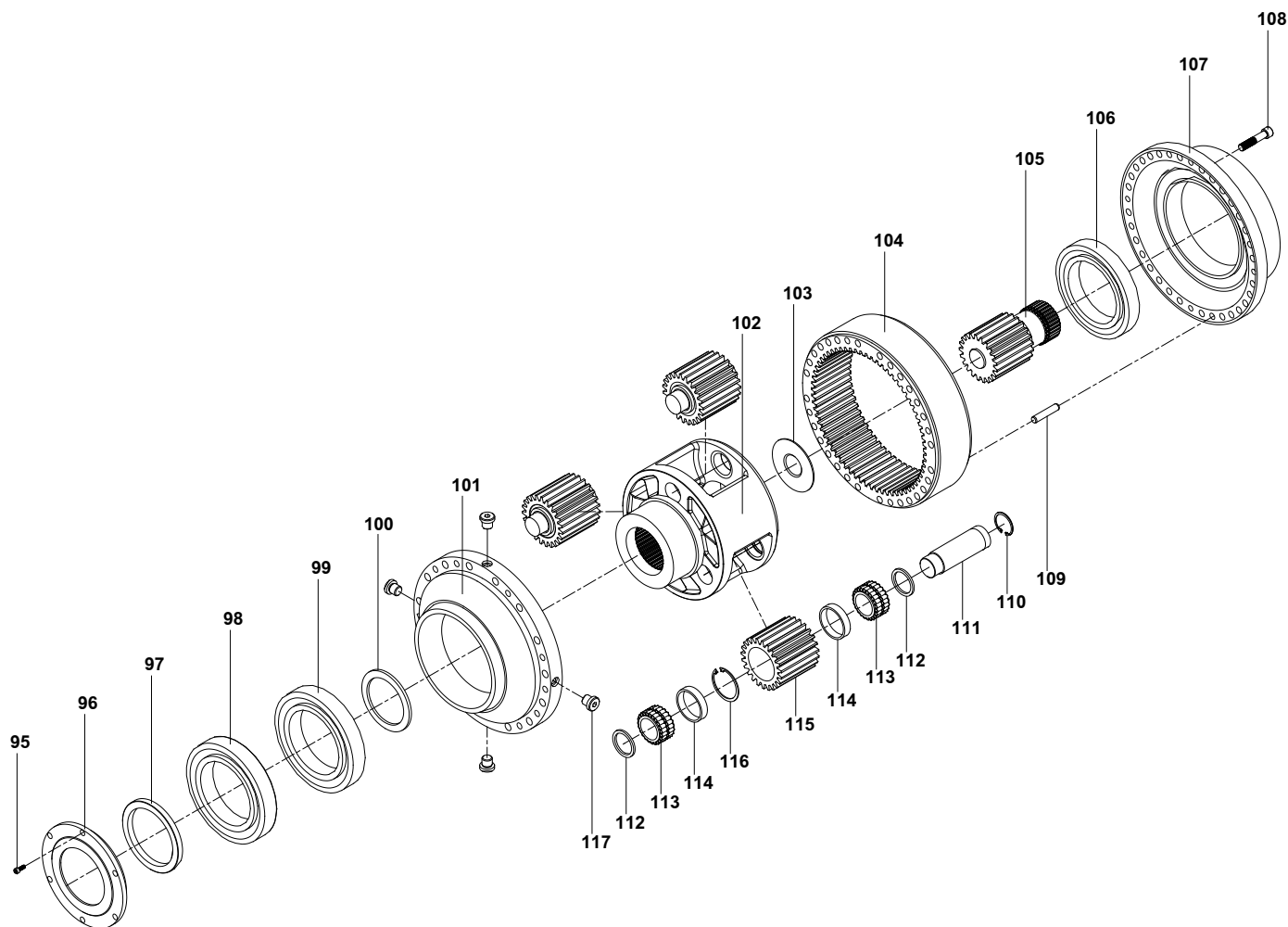
### Part Designations



#### 3.1.6- Version of Gearbox : PV / PN / PT

**Gear Size** : 27 / 29 / 35

**Output Type** : 0K / 0L



Parts may differ for special applications.

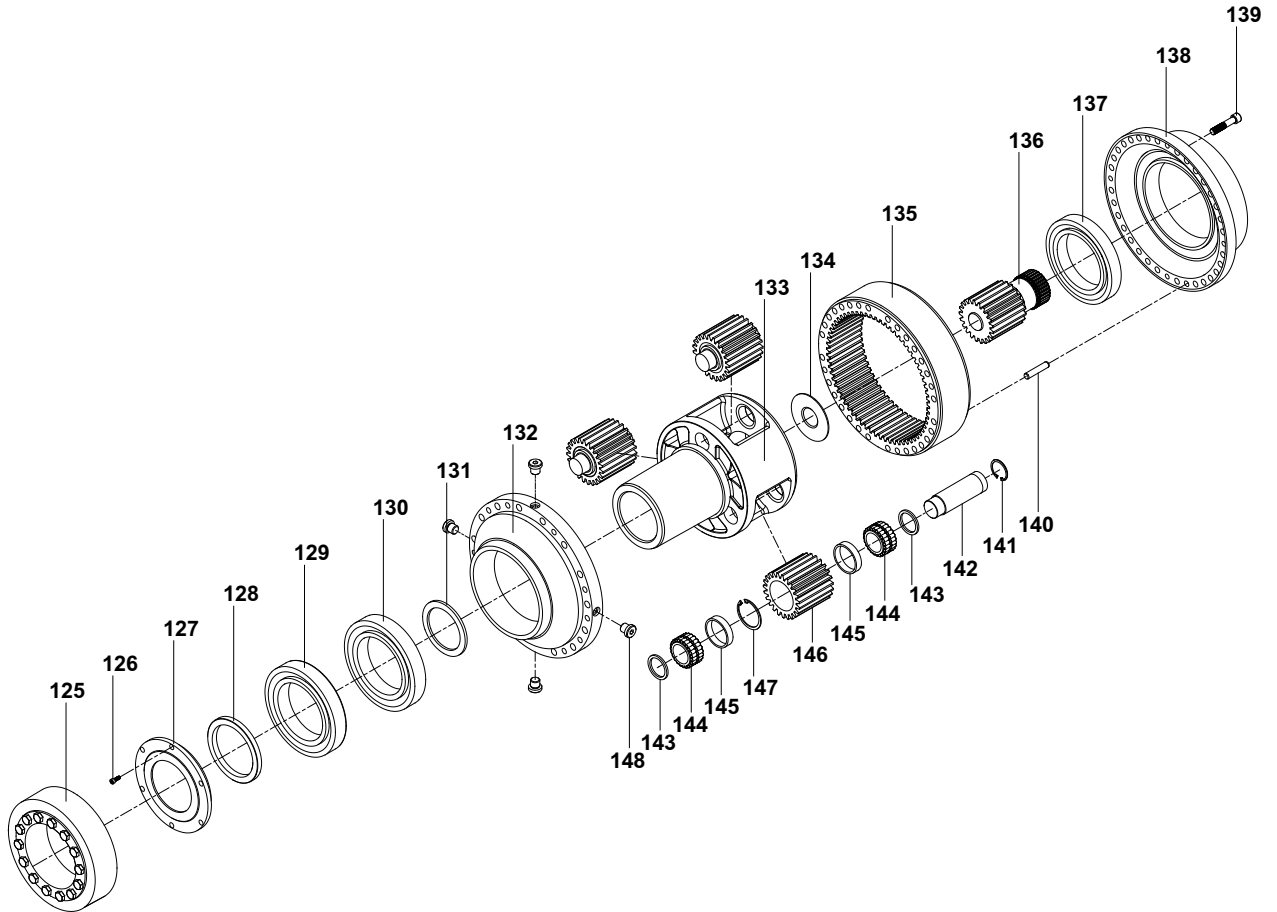
#### Standard Parts List

95- Bolt	100- Spacer	105- Sun Gear	110- Circlip	115- Planetary Gear
96- Seal Cover	101- Output shaft	106- Bearing	111- Pin	116- Circlip
97- Seal	102- Carrier	107- Flange	112- Washer	117- Oil Plug
98- Bearing	103- Washer	108- Bolt	113- Bearing	
99- Bearing	104- Internal Gear	109- Pin	114- Spacer	



**3.1.7-Version of Gearbox : PV / PN / PT**

**Gear Size** :29 / 35  
**Output Type** :0S



Parts may differ for special applications.

**Standard Parts List**

125- Shrink Disc	130- Bearing	135- Internal Gear	140- Pin	145- Spacer
126- Bolt	131- Spacer	136- Sun Gear	141- Circlip	146- Planetary Gear
127- Seal Cover	132- Output Flange	137- Bearing	142- Pin	147- Circlip
128- Seal	133- Carrier	138- Flange	143- Spacer	148- Oil Plug
129- Bearing	134- Washer	139- Bolt	144- Bearing	

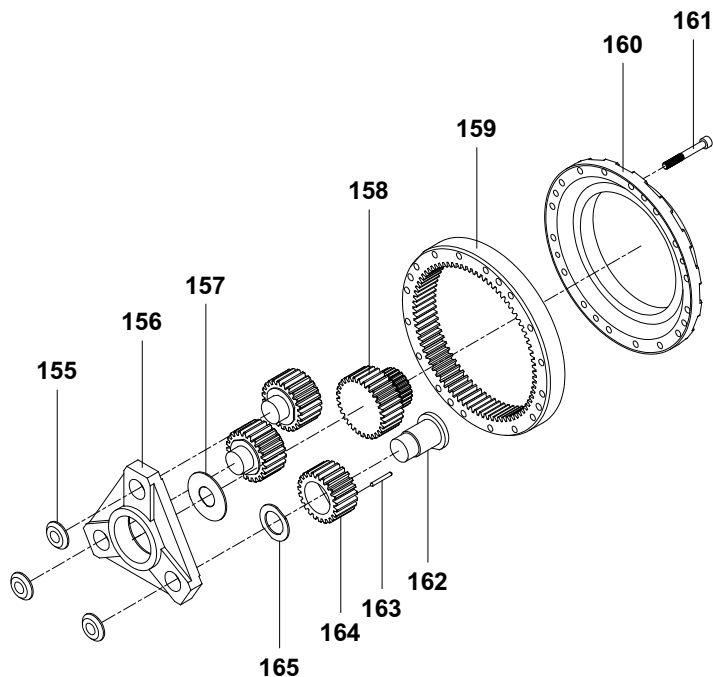


**3.2- Gear Group**

**3.2.1 Version of Gearbox :** PV / PN / PT / RV / RN / RT

**Gear Size :**11/ 15

**Output Type :** ALL

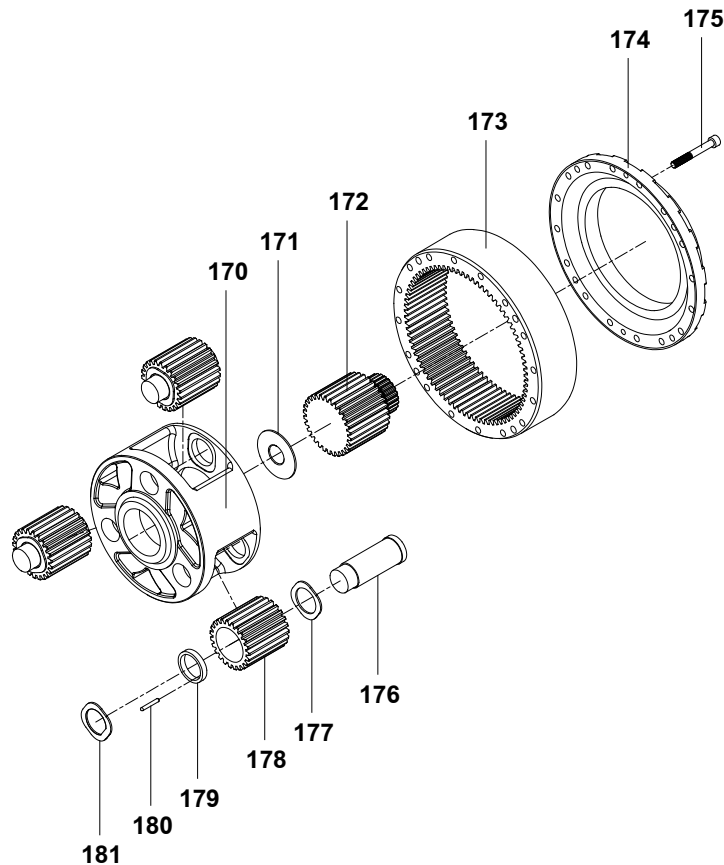


Parts may differ for special applications.

Standard Parts List

155- Washer	160- Flange	165- Washer
156- Carrier	161- Bolt	
157- Washer	162- Pin	
158- Sun Gear	163- Needle Roller	
159- Internal Gear	164- Planetary Gear	

3.2.2 Version of Gearbox : PV / PN / PT / RV / RN / RT  
Gear Size :12 / 16 / 19 / 23 / 24 / 27 / 29 / 35  
Output Type :ALL



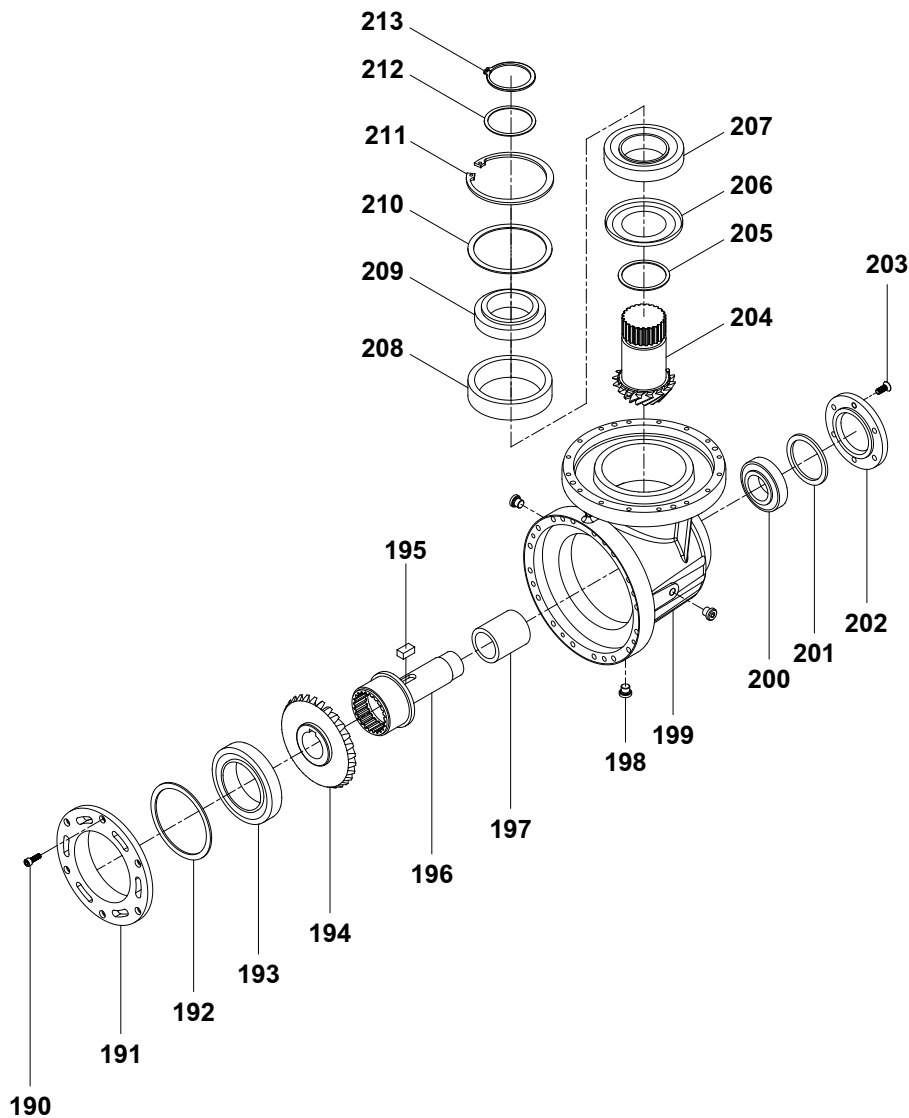
Parts may differ for special applications.

Standard Parts List

170- Carrier	175- Bolt	180- Needle Roller
171- Spacer	176- Pin	181- Washer
172- Sun Gear	177- Spacer	
173- Internal Gear	178- Planetary Gear	
174- Flange	179- Spacer	



**3.2.3 Version of Gearbox :** PV / PN / PT / RV / RN / RT  
**Gear Size :** 11 / 12 / 15 / 16 / 19 / 23 / 24 / 29 / 35  
**Output Type :** ALL



Parts may differ for special applications.

Standard Parts List

190- Bolt	195- Key	200- Bearing	205- Spacer	210- Spacer
191- Seal Cover	196- Shaft	201- Spacer	206- Nilos Ring	211- Circlip
192- Seal	197- Spacer	202- Cover	207- Bearing	212- Washer
193- Bearing	198- Oil Plug	203- Bolt	208- Spacer	213- Circlip
194- Bevel Gear	199- Flange	204- Gear	209- Bearing	



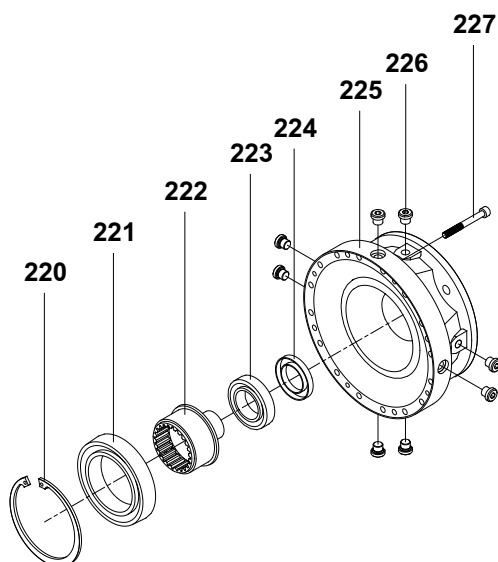


### 3.3 Input Side

3.3.1 Version of Gearbox : PV / PN / RV / RN

Gear Size : 11 / 12 / 15 / 16 / 19 / 23 / 24 / 29 / 35

Input Type : IEC B5 Flange Type



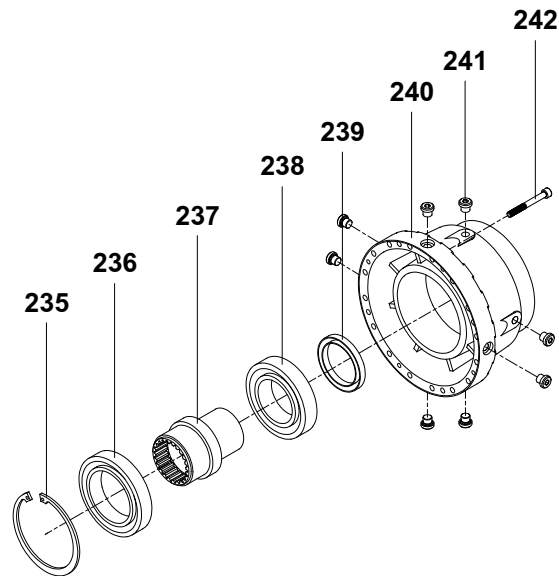
Parts may differ for special applications.

#### Standard Parts List

220- Circlip	225- Input Flange
221- Bearing	226- Oil Plug
222- Input Shaft	227- Bolt
223- Bearing	
224- Seal	



**3.3.2 Version of Gearbox :** PV / PN / RV / RN  
**Gear Size** : 11/ 12 / 15 / 16 / 19 / 23 / 24 / 29 / 35  
**Input Type** : C26 / M46 input type for Hydraulic motor



Parts may differ for special applications.

Standard Parts List

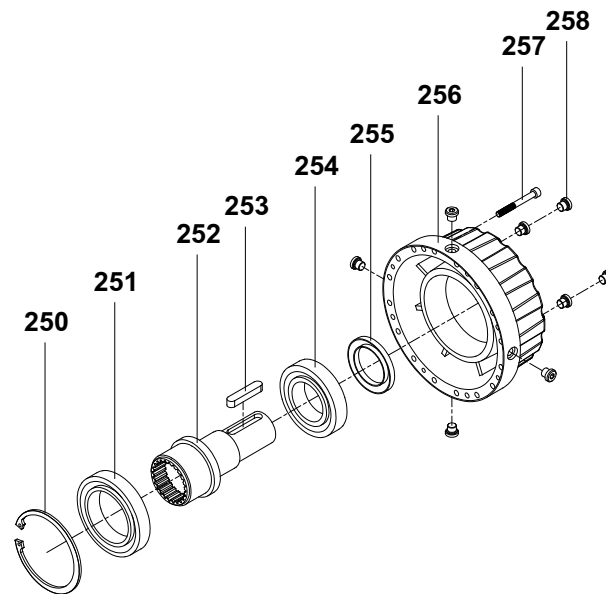
<b>235- Circlip</b>	<b>240- Input Flange</b>
<b>236- Bearing</b>	<b>241- Plug</b>
<b>237- Input Shaft</b>	<b>242- Bolt</b>
<b>238- Bearing</b>	
<b>239- Seal</b>	



**3.3.3 Version of Gearbox : PV / PN / RV / RN**

**Gear Size** :11 / 12 / 15 / 16 / 19 / 23 / 24 / 29 / 35

**Input Type** :Solid input shaft



Parts may differ for special applications.

Standard Parts List

250- Circlip	255- Seal
251- Bearing	256- Input Flange
252- Input Shaft	257- Bolt
253- Key	258- Oil Plug
254- Bearing	



## 4- Safety

### 4.1- Intended Use

These gear units are designed for industrial use. Please refer to our catalogue or our web page for the maximum permitted torques and speeds. The most important maximum permitted values are indicated on the nameplate of the product. The complete information can be found in our product catalogue. Using the product out of the product catalogue / nameplate's permitted ranges will cancel the warranty/manufacturer declaration and JS-Technik GmbH will not take any responsibility.

The gear units are intended for industrial machines and may only be used in accordance with the information provided in this manual, the product catalogue, and the nameplate of the gearbox. They comply with the applicable standards and regulations and meet the requirements of the directive 2006/42/EC. The gearbox must be started up, maintained, and operated according to this manual. The gearbox must be incorporated with 2006/42/EC conforming parts/machines.



Motor installation and/or operation is only permitted if the permissible catalogue values or name plate data are not exceeded. For frequency inverter operation, the speed range can be entered on the type plate. The information must be provided when the order is placed. Without notification, only a fixed speed is entered on the name plate; a subsequent speed change is not permitted. The three-phase motor and frequency inverter must comply with directive 2006/42/EC.



If the gearboxes are to be operated with a speed controller, this must be stated when the order is requested or placed. The permissible maximum and minimum speed range is entered on the name plate. If no information is given when the order is placed, the gearbox will be delivered with a fixed speed and only this speed is permissible.



If the gearboxes are operated with a belt drive / coupling / chain drive etc., only the data on the name plate / catalogue values are permitted. Deviating speeds, higher motor outputs, higher radial/axial loads etc. are not permitted.



The ambient temperature may be between +5 and +40°C, abrasive medium must be kept away from the seals and paint. In the event of deviating operating conditions, JS-Technik must be informed before placing the order.

### 4.2- Improper Use



Every usage which exceeds the limits stated above, on the nameplate of the product or in the catalogue (especially higher torques and speeds) is not compliant with the regulations, and thus prohibited.

The operation of the gear unit is prohibited if:

- It was not mounted/installed according to regulations and this manual
- The gear unit is very dirty
- It is operated without lubricant
- The operating data exceeds the permissible catalogue data.



#### 4.3- Safety Instructions

##### 4.3.1- General Safety Instructions

###### 4.3.1.1- Working on the gear unit



- Inappropriately executed work can lead to injury or damage.

Make sure that the gear unit is only installed, maintained and dismantled by trained technicians.



- Foreign bodies spinning through the air can cause grave injury.

Before putting the gear unit into operation, check that there are no foreign bodies or tools near the gear unit.

###### 4.3.1.2- Operation



- Touching hot surfaces can lead to burns.

Do not touch the gear unit if its operation temperatures are too high or use suitable safety equipment like gloves.



- Rotating machinery can lead to injuries. There is danger of being trapped or pulled in!

Keep sufficient distance and mount a guard in front of the rotating machine parts. See relevant norms EN349+A1, EN13857.

###### 4.3.1.3- Maintenance



- An unintentional start of the machine during maintenance work can lead to serious accidents.

Make sure no one can start the machine while you are working on it.



- Even a brief running of the machine during maintenance work can lead to accidents if the safety devices are not operating.

Make sure that all safety devices are mounted and active.

###### 4.3.1.4- Lubricant



- Extended, intensive contact with oils can lead to skin irritations.

Avoid extended contact with oil, and clean oil off skin thoroughly.



- Hot oil can cause scalding.

When changing oil, protect yourself against contacting hot oil.

###### 4.3.1.5- Ambient Conditions



- Standard gearboxes are allowed to work in ambient temperatures between +5 to +40°C unless differently specified on the nameplate. Using the gear unit out of this range can cause damage to the gear unit or environment. At ambient temperatures above +40°C, touching the gear unit surface can cause burns.



- If the gear unit will be used in outdoor applications, the gear unit must be protected from rain, snow, and dust. Entering substances inside the gear unit from seals can damage the gear unit. Observe the safety instructions for outdoor use EN12100:2010.



#### **4.4- Tightening Torques**

All screwed connections for which a tightening torque is specified, must in principle be tightened with a calibrated torque wrench and checked. Use the following torques for the threaded bores over the gear unit housing. For connecting elements refer to the mechanical installation part.

<b>Bolt Size</b>	<b>Class</b>	<b>Tightening Torque [Nm]</b>
<b>M5</b>	8.8	5.4
<b>M6</b>	8.8	9
<b>M8</b>	8.8	23
<b>M10</b>	8.8	43
<b>M12</b>	8.8	77
<b>M16</b>	8.8	190
<b>M20</b>	8.8	370
<b>M24</b>	8.8	640

#### **4.5- In Case of Fire**

The gear unit itself is not combustible. However, it usually contains a synthetic or mineral gear oil.

Please observe the following if the gear unit is situated in a burning environment:

##### **4.5.1- Suitable extinguishing agents, Protective equipment**

Always keep suitable extinguishing, protective equipment like carbon dioxide, powder, foam, fog easily accessible around the gear unit.



-High temperatures produce irritating steam.

Use protective breathing apparatuses.

##### **4.5.2- Unsuitable extinguishing agents**

Do not spray with water!





## 5- Things to Check Before the Gear Unit or Gear Motor is Installed



If gear motors are used, please also refer to the manual of the motor manufacturer.

Before installing the gear unit, please check that it has been delivered in full and check for any transportation damage. Points to take into consideration before you start to install the unit;

- You have received the correct operation manual for your product.
- The gearbox and all its parts were transported without damage.
- The gearbox is stored correctly according to the instructions in this manual.
- You have the latest product catalogue or you have access to our web page.

### 5.1- Transportation and Lifting

Upon delivery of the gear unit, ensure that the delivery corresponds to the purchase contract and that there is no damage. If there is any transport damage, report it to the shipping company immediately, and inform us about the damage.



Use the upper foot connection holes for lifting up the gear unit by using eyebolts. The eyebolts should be capable to carry the weight of gearboxes. Do not hang additional loads on the gear box by lifting. Use suitable hoisting equipment that can hold the weight of the gear unit. Refer to the catalogue for various types of weights. If the gearbox is delivered with a steel carrying construction, use the construction holes to lift the gear unit. See drawing below for hoisting point



Do not stay beneath / under the lifting/hoisting equipment which may cause serious injuries by falling down objects, accidental movements, unexpected accidents.



Falling or hard placement can damage the gear unit.

Only use hoisting and securing equipment which is permitted for the size / weight of your gear unit. Ensure that the load is slowly and carefully handled and placed.

Lifting and carrying types are indicated on following pages.

# Operating Instructions

## P/R Series

### Lifting



#### 5.1.1 P..01L Types Lifting Positions

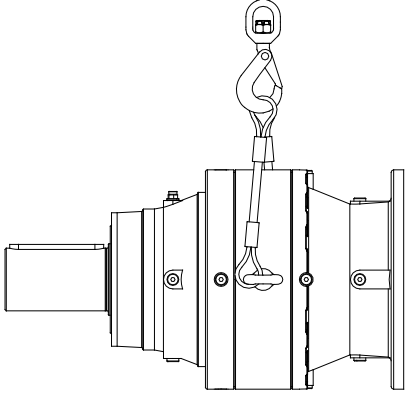
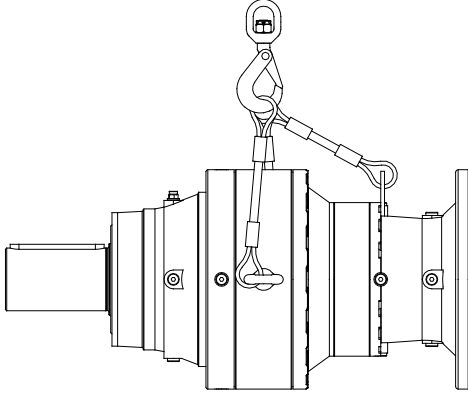
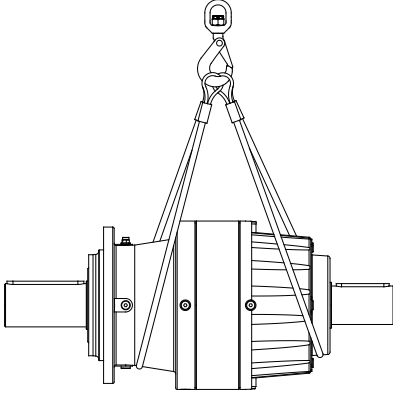
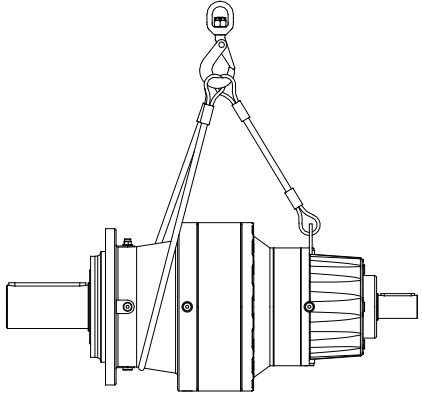
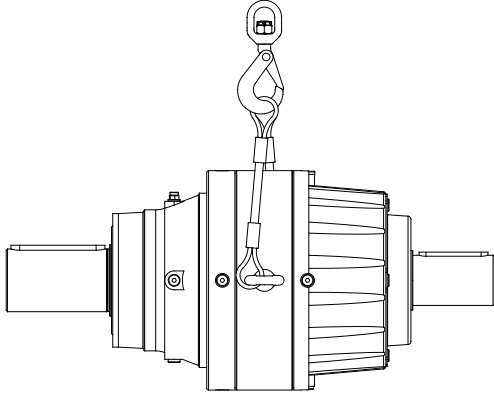
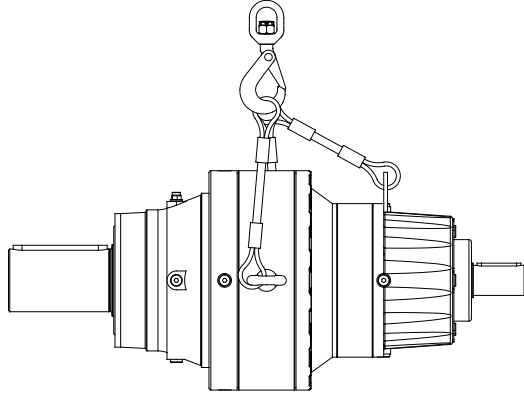
Type	Single Stage	Multi Stage
<b>PV..01L</b> (For P11 To P24)		
<b>PV..01L*</b> (For P24 To P35)		
<b>PN..01L</b> (For P11 To P24)		



**Operating Instructions**  
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**5.1.1 P..01L Types Lifting Positions**

Type	Single Stage	Multi Stage
<p><b>PN..01L*</b> (For P11 To P24)</p>		
<p><b>PT..01L</b> (For P11 To P24)</p>		
<p><b>PT..01L*</b> (For P24 To P35)</p>		

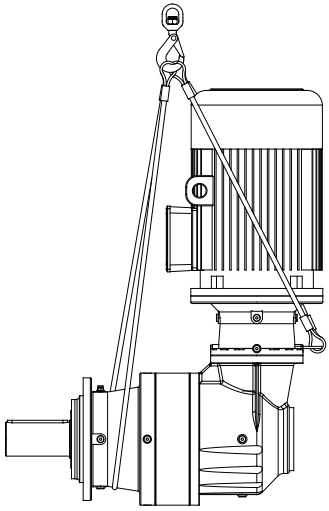
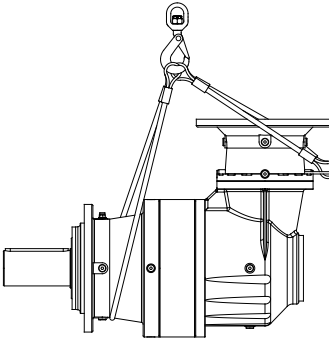
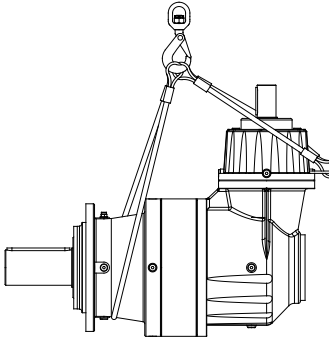
# Operating Instructions

## P/R Series

### Lifting

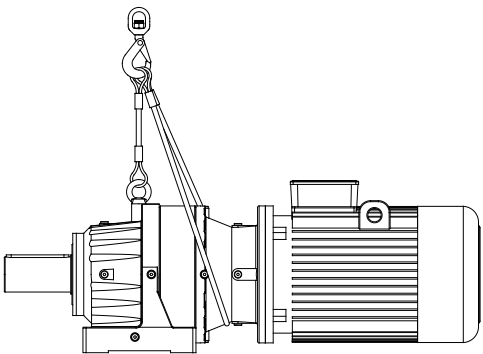
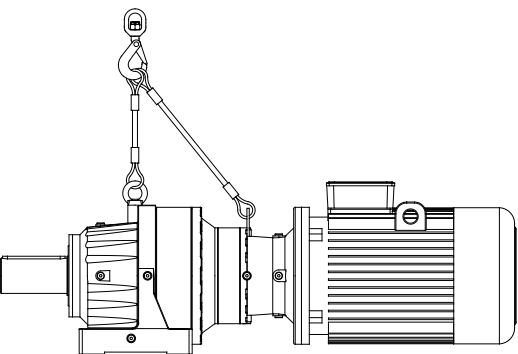
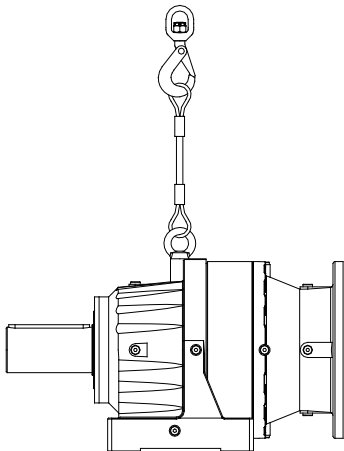
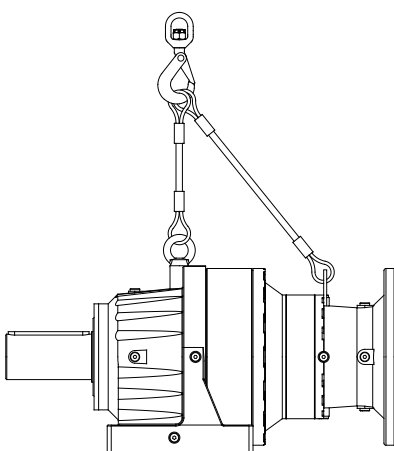
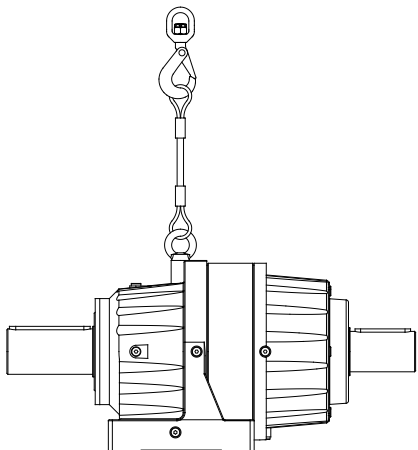
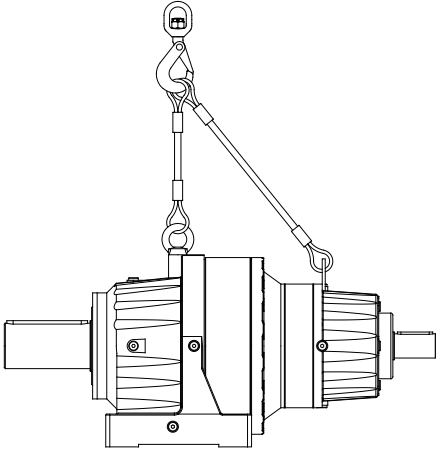


#### 5.1.2 P..01K Types Lifting Positions

Type	Single Stage	Multi Stage
<b>PV..01K</b> (For P11 To P24)	<b>NOT APPLICABLE</b>	
<b>PN..01K*</b> (For P24 To P35)	<b>NOT APPLICABLE</b>	
<b>PT..01K</b> (For P11 To P24)	<b>NOT APPLICABLE</b>	

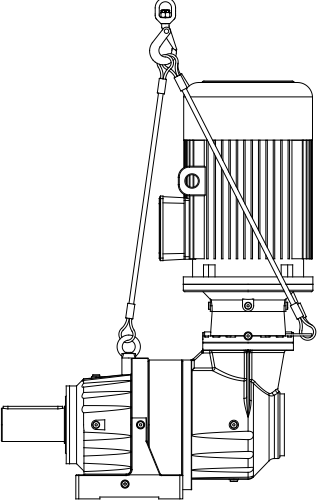
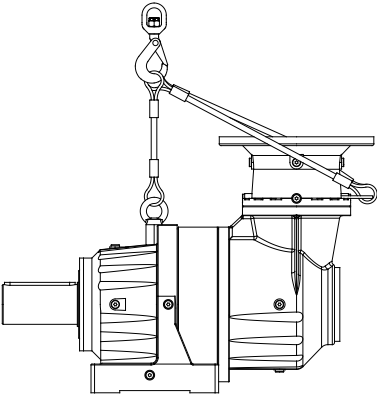
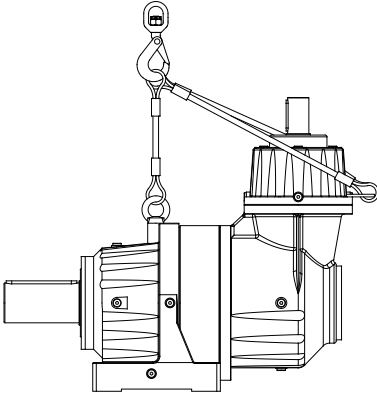


**5.1.2 R...01L Types Lifting Positions**

Type	Single Stage	Multi Stage
RV..01L		
RN..01L		
RT..01L		



#### 5.1.3 R...01K Types Lifting Positions

Type	Single Stage	Multi Stage
RV..01K	<b>NOT APPLICABLE</b>	
RN..01K	<b>NOT APPLICABLE</b>	
RT..01K*	<b>NOT APPLICABLE</b>	



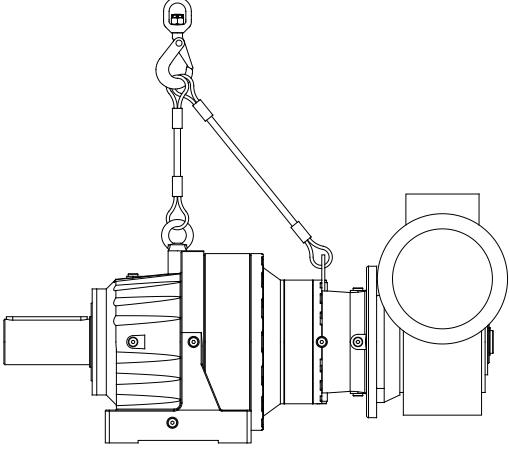
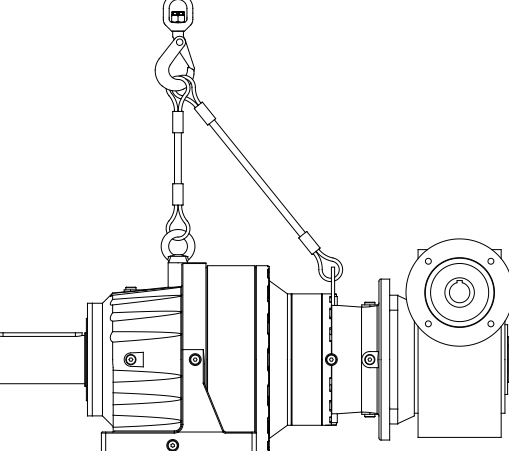
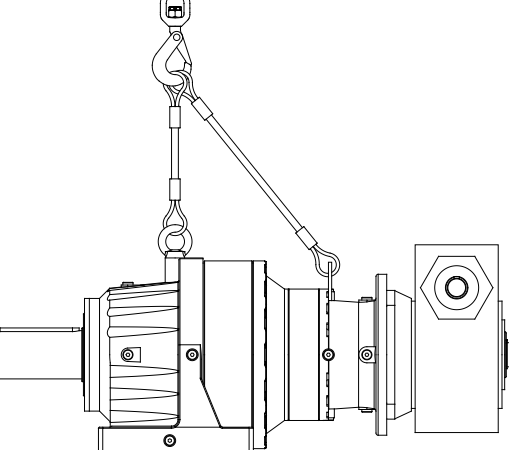
**5.1.4 P Series Combined with E Series Lifting Positions**

Type	For P11 to P24	For P27 to P35
<p><b>PN...L.01+EV125</b></p>		
<p><b>PN...L.01+EN125</b></p>		
<p><b>PN...L.01+ET125</b></p>		

**Operating Instructions**  
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**5.1.5 R Series Combined with E Series Lifting Positions**

Type	For P11 to P24	For P27 to P35
<p><b>RN...L.01+EV125</b></p>		<p><b>NOT APPLICABLE</b></p>
<p><b>RN...L.01+EN125</b></p>		<p><b>NOT APPLICABLE</b></p>
<p><b>RN...L.01+ET125</b></p>		<p><b>NOT APPLICABLE</b></p>



## 5.2- Storage

If the gear unit or gear motor will be stored up to 3 years refer to the following instructions:

### With Packaging

-Use corrosion protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. Seal the unit in plastic wrap and pack it in a container. A moisture indicator should be placed around the container to observe the moisture. Relative atmospheric humidity should not exceed 50%. The container should be kept under a roof which protects from snow and rain. Under these conditions, the gear unit can be stored for up to 3 years with regular checks. The ambient temperature should be between -5° to 60° Celsius.

### Without Packaging

-Use protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. If the packaging is used and the gearbox is stored without packaging, the ambient temperature should be between 5° to 60° Celsius. The gearbox must be kept under an enclosed roof with constant temperature and constant humidity not exceeding 50%. The storage should be free of dust and dirt and ventilated with a filter. If the gearbox is stored without packaging it is recommended not to store it for more than 2 years and regular checks during this time are recommended.

If stored in open areas protect against insect damage.

## 6- Installing The Gear Unit

### 6.1- Before you start

- Observe the gear unit for damages of storage or transportation. If there is any damage, please contact JS-Technik.
- Please ensure that you have all necessary equipment for the installation such as spanners, torque, wrench, shims and distance rings, fixing devices for input and output elements, lubricant, bolt adhesive, etc..



- This manual is not for 94/9/EC (ATEX) conforming gear units. For 94/9/EC conforming gear units refer to the ATEX range manual. ATEX conforming gear units have name plates indicating the zone and the temperature class and are different from standard type gear units. Therefore, standard units cannot be installed in potentially explosive atmospheres.



## 6.2- Check the shaft dimensions to fit

Type	Hollow Shaft Diameter with Shrink Disc	Tolerance (H7)	Customer Shaft Diameter with Shrink Disc	Tolerance (h6)	Solid Output Shaft Diameter	Output Shaft Tolerance
P11..	42	+0.03 0	42	0 -0.02	50	+0.02 0
P12..	52	+0.03 0	52	0 -0.02	50	+0.02 0
P15..	75	+0.03 0	75	0 -0.02	60	+0.02 0
P16..	75	+0.03 0	75	0 -0.02	60	+0.02 0
P19..	90	+0.04 0	90	0 -0.02	80	+0.02 0
P23..	100	+0.04 0	100	0 -0.02	90	+0.04 0.01
P24..	100	+0.04 0	100	0 -0.03	90	+0.04 +0.01
P27..	130	+0.04 0	130	0 -0.03	110	+0.04 +0.01
P29..	135	+0.04 0	135	0 -0.03	120	+0.04 +0.01
P35..	140	+0.04 0	140	0 -0.03	140	+0.04 +0.02

### 6.3- Check the ambient temperature;

The ambient temperature must be between +5 °C to +40 °C for standard type gear units. If different contact JS-Technik GmbH for special solutions.



### 6.4- Check the voltage supply;

Standard gear motors are supplied with 230/400V 50/60 Hz up to 3 kW including 3 kW and 400/690 V 50/60 Hz over 3 kW and are indicated on the motors name plate unless it is differently ordered. If only the gear unit is supplied from JS-Technik GmbH please observe the name plate of the electric motor and the instructions of the supplier. Check the basic electric connection diagrams below. Use experienced electric technician.

Using wrong connection or voltage can damage the electric motor or environme



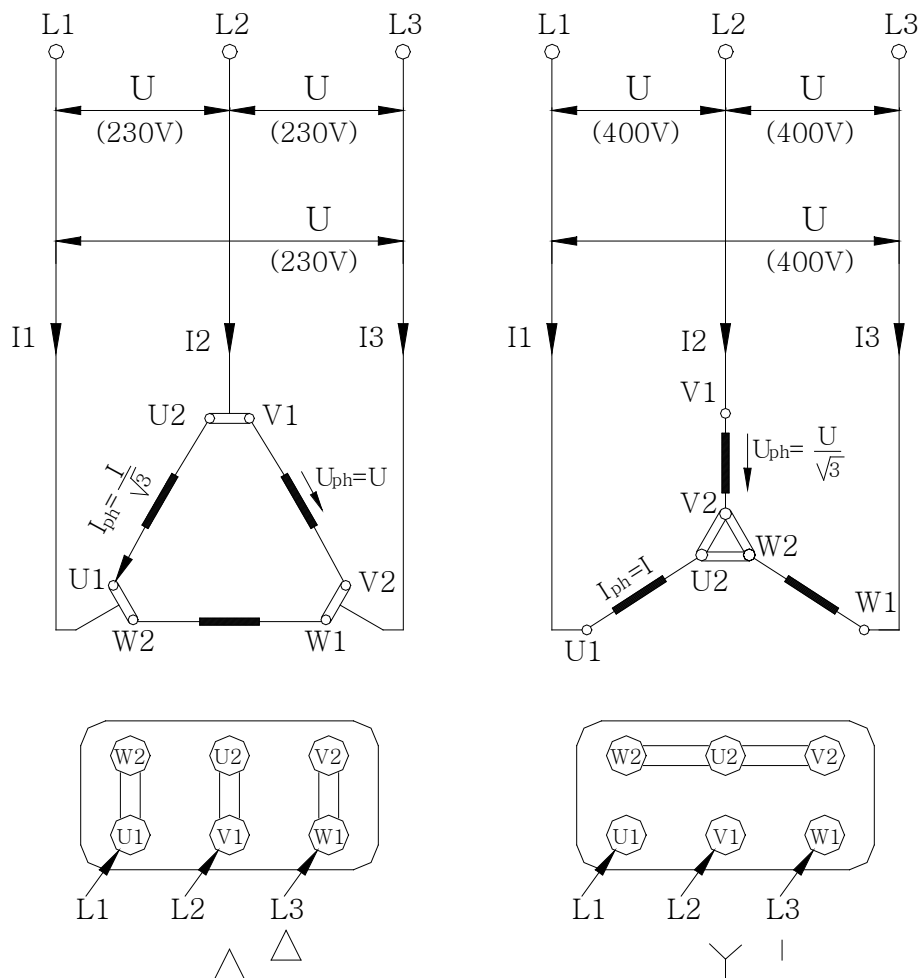


The electrical installation and commissioning may only be carried out by qualified personnel. The gear unit and the motor must both be grounded separately.

### 6.4.1 Standard Circuit Diagrams for Electric Motors

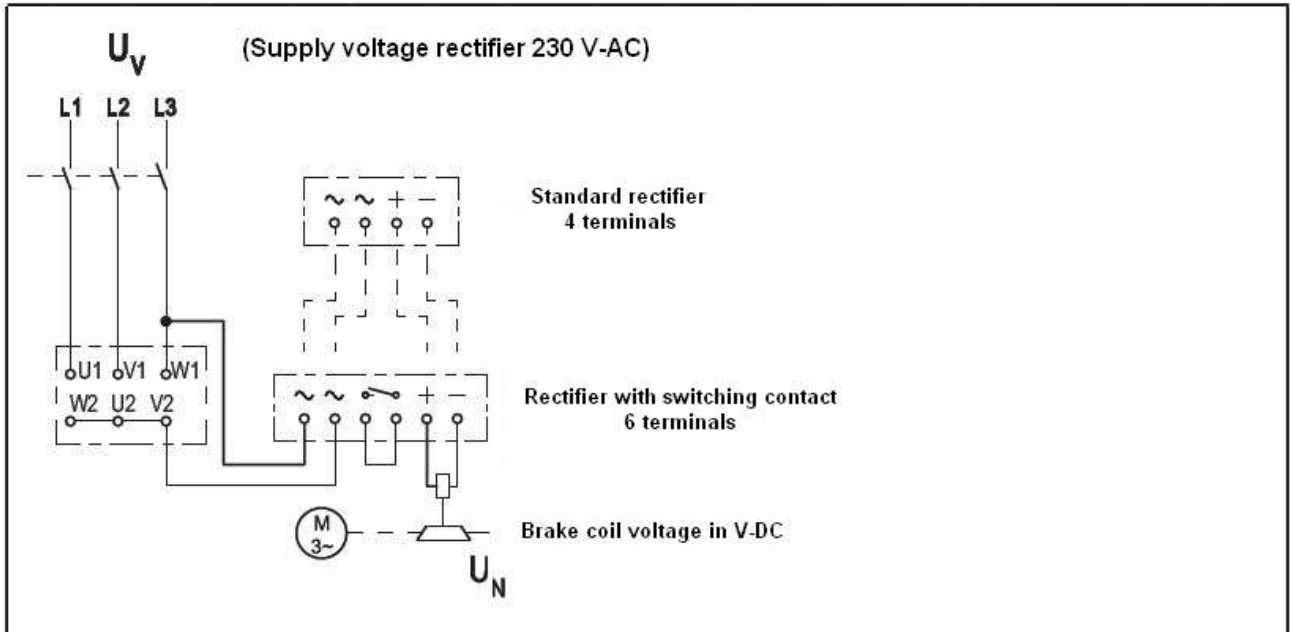
Pole Number	Nominal Powers at 400V, 50Hz	
	230V ( $\Delta$ ) / 400 V ( Y )	400V ( $\Delta$ )
2 or 4	$\leq 3$ kW	$\geq 4$ kW
6	$\leq 2,2$ kW	$\geq 3$ kW
8	$\leq 1,5$ kW	$\geq 2,2$ kW
Starting Principle	Direct	Direct or Y/ $\Delta$

Basic motor connection wiring diagram





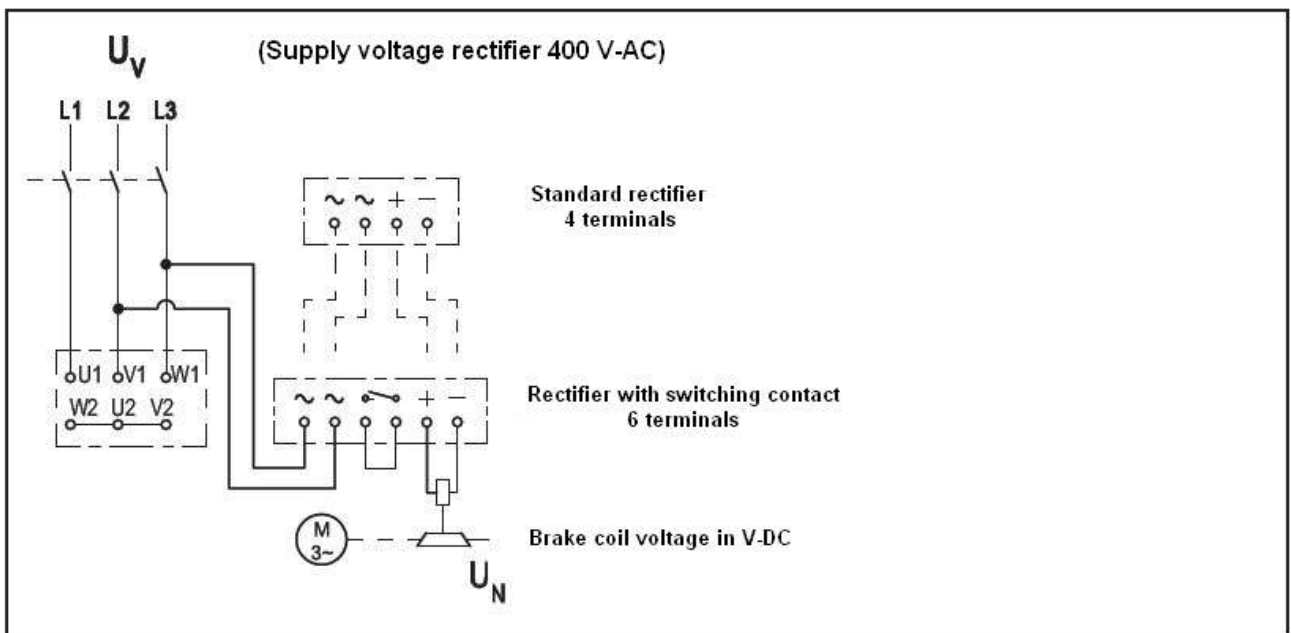
6.4.2 Standard Circuit Diagrams for Brake Motors



Supply: Phase-Starpoint

**Bridge rectifier**

$$U_N [\text{VDC}] = 0.9 \cdot U_V [\text{VAC}]$$



Supply: Phase-Phase

**Half-wave rectifier**

$$U_N [\text{VDC}] = 0.45 \cdot U_V [\text{VAC}]$$



#### **6.5- Check the mounting position**

The mounting position must be in accordance with the mounting position mentioned on the name plate. If different please contact JS-Technik for possibilities of using in a different mounting position. Refer to the mounting positions and oil quantities in this manual and adjust the oil level accordingly with the recommended oil types given in this manual.



Do not mix synthetic oils with mineral oils which can cause serious damage on the gear unit.

#### **6.6- Use of breather plug**

Breather plugs are not needed for P Series under normal ambient and working conditions (up to 30° C ambient temperature and up to 8 hours per day). JS-Technik recommends and delivers breather plugs together with the gearbox if the ambient conditions are heavy and long working hours are required. Replace the breather plug with the top plug according to your mounting position.



Some plug positions are not machined according to the mounting position. If no specific mounting position is requested in the order, the standard M1 position plugs will be applied.

#### **6.7- Check the oil level**

Please refer to the installation position table and make sure that the oil level is correct according to the installation position. If the oil level is below the correct filling level, please use a wire to check. The oil level may be max. 3mm below the correct filling level. Please make sure that you use the correct oil. The required oil fill quantity and oil viscosity can also be found on the name plate.



Do not mix synthetic oils with mineral oils as this can cause serious damage to the gear unit.

#### **6.8- Check shaft ends and mounting faces**

Before starting assembly, make sure that the fasteners are free of dirt and oil. The output shafts are coated with anti-corrosion oil. Remove it with a commercially available solvent. It is essential to avoid solvent coming into contact with the sealing ring lips and the housing paint.

#### **6.9- Cover abrasive ambient**

If the gear motor is to be used in a dirty and abrasive environment, make sure that the shaft seals are protected against abrasive agents as well as chemical products and chemical liquids. Please protect the gearboxes and shaft seals from additional overpressure, which can cause protective particles (solid and liquid) to enter the gearbox via the shaft seal and destroy the gearbox. If gear motors cannot be protected against overpressure and abrasive dirt particles, please contact JS-Technik.



Abrasive material, chemicals, water, positive or negative pressure exceeding 0,2 bar can affect or damage the sealing lip or output shaft. Substances entering inside through the seals can cause serious damage to the gear unit.



#### 6.10- Check accessibility to filling, breather and drain plugs

The oil filler, breather and exhaust plugs must be freely accessible for subsequent service work.

#### 7- Mechanical Installation

The gear unit can only be installed using the supplied connection points like foot and flange assembling points.



Installing the gear unit without the supplied connection points can cause serious injuries by loosening or breaking the gear unit. Even if the gear unit is correctly installed according to this manual, ensure that no one will be harmed by accidental breakdowns or loosening.



Please ensure that the gearbox mountings are stable to prevent vibration and that it can be mounted on a machined surface without distortion. When using chain drives, this is especially important because of the polygon effect. If load shocks, prolonged overloads or blockages are likely to occur, install appropriate protective elements such as hydraulic clutches, etc. Check the radial and axial loads that occur. These must not exceed the permissible values. Take the permissible values from the product catalogue.



If the output or input shaft is overloaded by radial or axial loads it can cause serious damage to the gear unit.

Secure the gear unit using 8.8 or higher quality bolts.



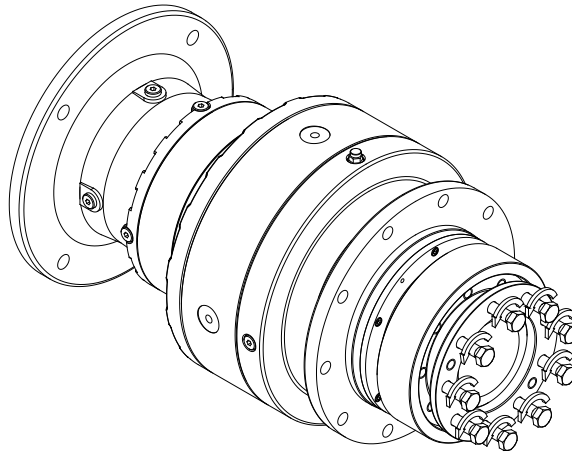
**Cover all the turning parts from human entering or touching. Turning parts can cause severe or fatal injuries.**

For different kind of basic installations refer to the following illustrations.

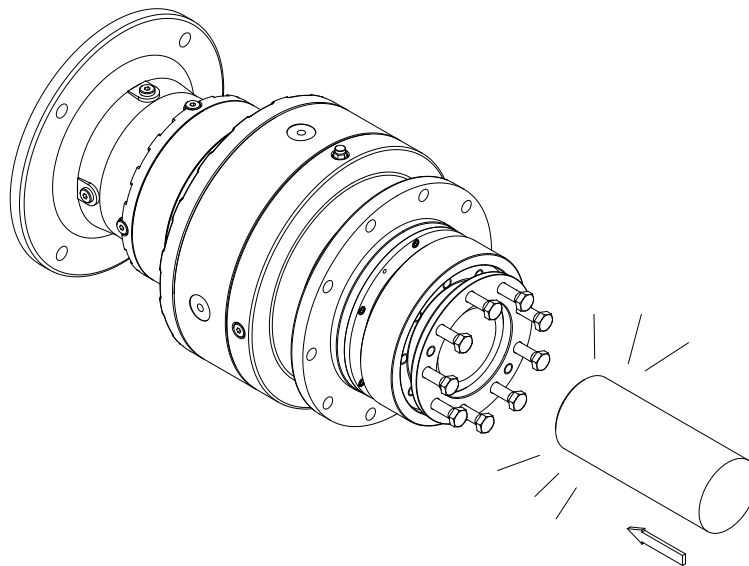


**7.1- Assembling customer shaft with shrink disc**

**7.1.1- Loosen the bolts of the shrink disc**

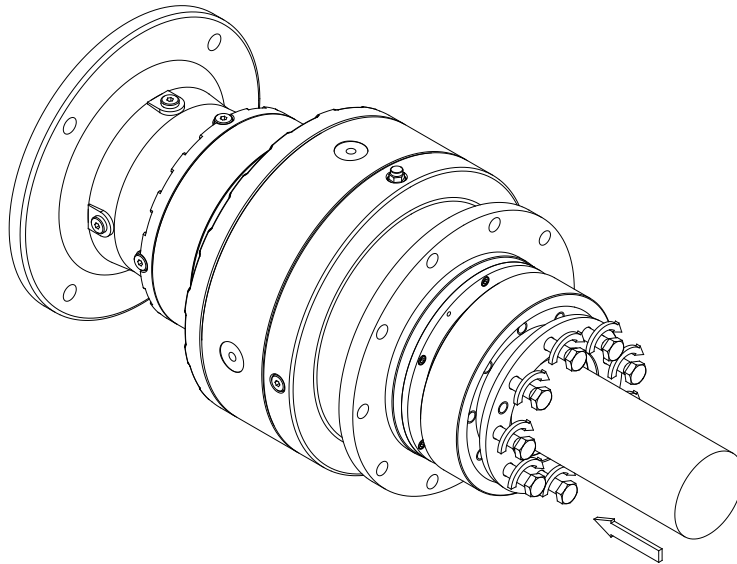


**7.1.2-** Use a commercially available solvent to remove all the dirt and oil from the shaft and shrink disc hollow. The surfaces must be free from oil or any dirt. The solvent must be removed from the surfaces as well.





**7.1.3-** Insert the shaft and tighten the bolts as shown. Please ensure that there is a clearance gap between the shrink disc shoulder and the hollow shaft shoulder of the gearbox.

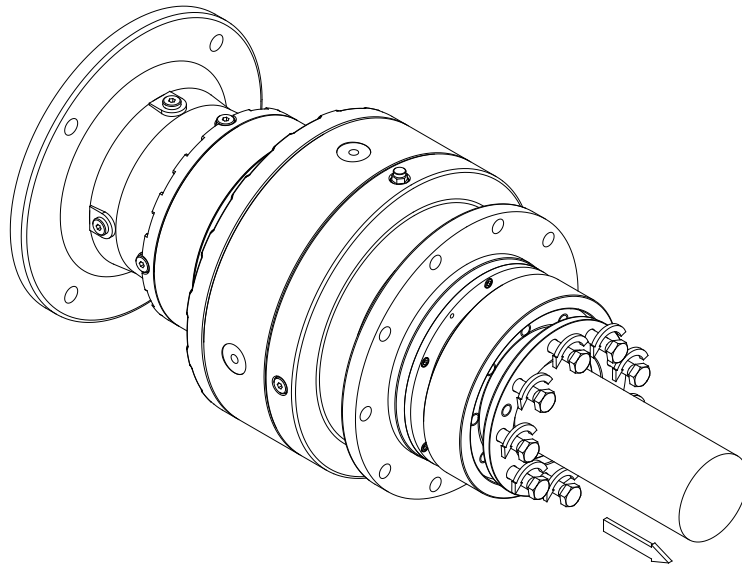


Type	Bolt	Tightening Torque [Nm]
P/R11..0S	M8	30
P/R12..0S	M8	30
P/R15..0S	M10	59
P/R16..0S	M10	59
P/R19..0S	M12	100
P/R23..0S	M14	160
P/R24..0S	M14	160
P/R27..0S	M16	250
P/R29..0S	M16	250
P/R35..0S	M16	250



**7.2- Disassembling customer shaft with shrink disc**

7.2.1- Loosen the bolts of the shrink disc and take out the shaft.



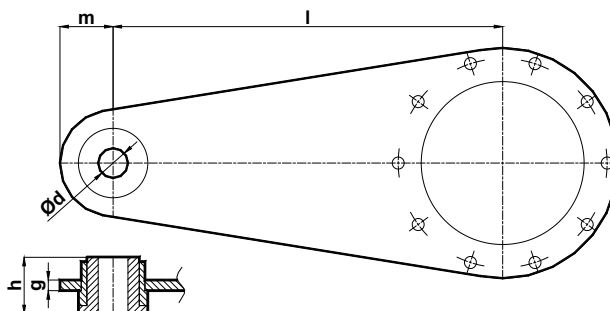


## 7.3 Assembling Gear Unit with Torque Arm

### 7.3.1- Dimensions

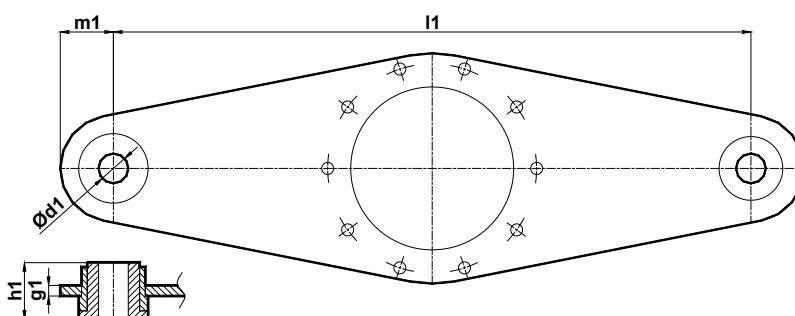
The torque arm dimension shown below is according to the size of the planetary gearbox.

#### One Sided Torque Arm



Type	l	m	d	h	g
P11/P12	300	60	21	60	12
P15/P16	350	60	32	60	15
P19	400	60	32	70	20
P23/P24	450	75	42	80	25
P27	700	90	52	100	25
P29	800	90	52	100	25
P35	900	120	72	120	30

#### Two Sided Torque Arm

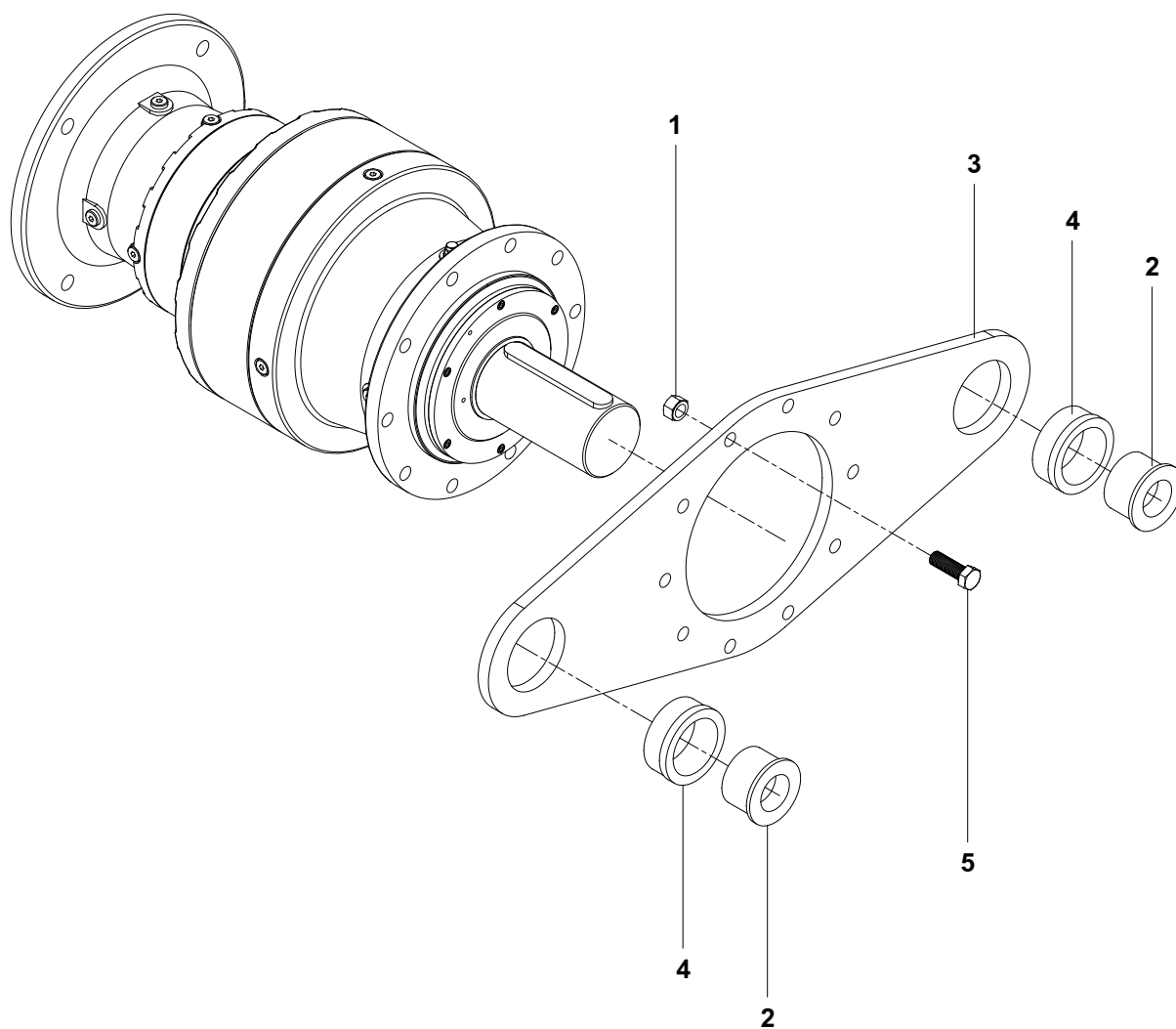


Type	l1	m1	d1	h1	g1
P11/P12	450	60	21	60	12
P15/P16	500	60	32	60	15
P19	600	60	32	70	20
P23/P24	700	75	42	80	25
P27	1000	90	52	100	25
P29	1100	90	52	100	25
P35	1200	120	72	120	30





7.3.2- Assemble the parts as shown below

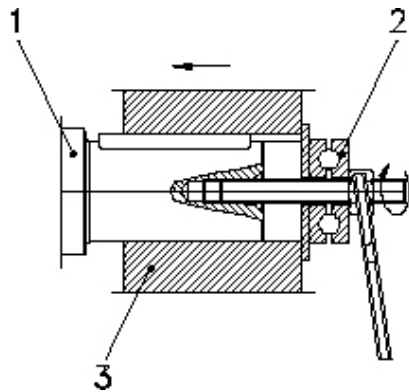


1- Nut	4- Torque arm
2- Rubber buffer	5- Bolt
3- Spacer	



### 7.4 Fitting output shaft elements

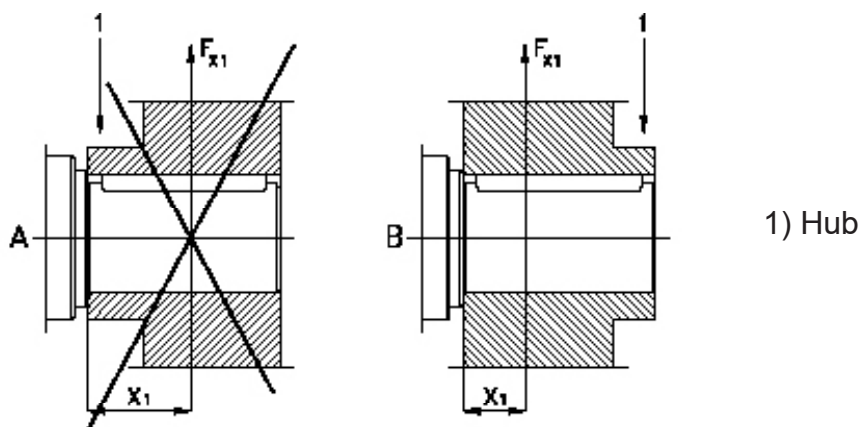
Use the following illustration to assemble output shaft units



- 1) Gear shaft end
- 2) Thrust bearing
- 3) Coupling hub

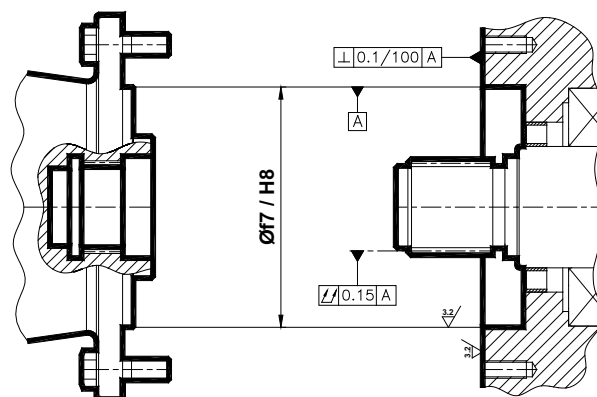
### 7.5- Correct position of output shaft elements

The output shaft unit (transmission elements) must be in proximity to the gear unit so that the radial load is positioned as closely as possible to the gear unit.



### 7.6- Correct position of splined shaft output mounting positions

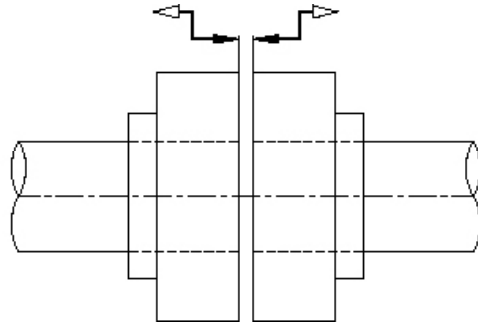
Please refer to the following mounting tolerances for splined output. Please ensure that there is no eccentricity between axes.



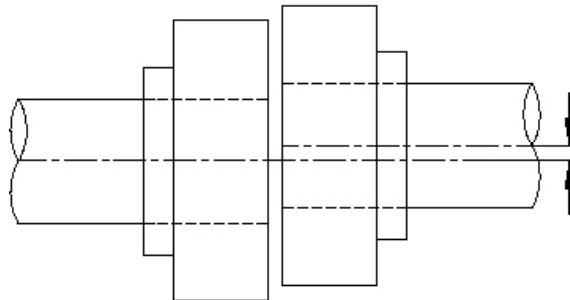


### 7.7- Fitting Couplings

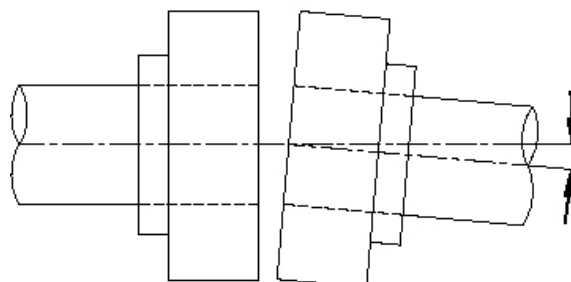
7.7.1- When installing the coupling, please ensure that there is an air gap between the two elements.



7.7.2- When installing the coupling, please observe the maximum permissible axial misalignment.



7.7.3- When installing the coupling, please observe the maximum permissible angular displacement.

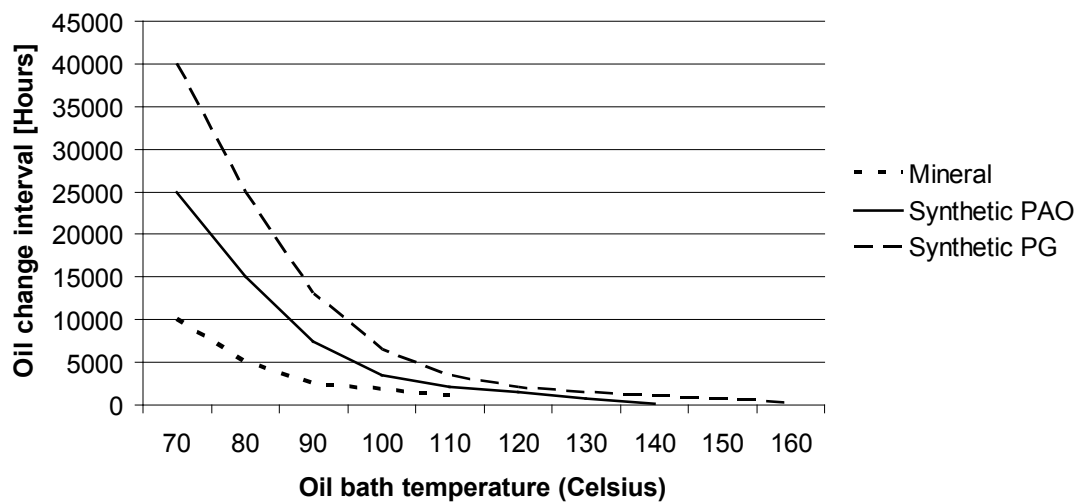




### 8- Maintenance and Inspections

Under normal ambient and working conditions the gear unit should be checked according to the following intervals:

Item to check / replace	Every 3.000 operating hours or every 6 months	Every 10.000 operating Hours or every 3 years
Check for oil leakage	<b>x</b>	
Check for oil level	<b>x</b>	
Check oil leakage from seal	<b>x</b>	
Check Bearings Noise	<b>x</b>	
Change Mineral Oil		<b>x</b>
Change Sealing		<b>x(Change if necessary)</b>



For normal ambient conditions 70°C oil bath temperature should be taken as reference.

\* For P/R series mineral oil is used unless it is differently ordered. For oil type and quantities refer to the gear unit's label.

# Operating Instructions






## P/R Series

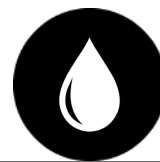
### Lubrication



#### 9- Lubrication

##### 9-1 Oil Types

Lubricant	DIN 51517-3	Ambient Temperature [°C]		ISO VG	Beyond Petroleum	Castrol	Klüber Lubrication	Mobil	Shell
		Dip Lubrication	Forced Lubrication						
Mineral Oil	CLP	0 ... +50	–	680	Energol GR-XP 680	Alpha SP 680	Klüberoil GEM 1-680 N	Mobilgear XMP 680	Omala 680
		-5 ... +45	–	460	Energol GR-XP 460	Alpha SP 460	Klüberoil GEM 1-460 N	Mobilgear XMP 460	Omala F460
		-10 ... +40	+15 ... +40	320	Energol GR-XP 320	Alpha SP 320	Klüberoil GEM 1-320 N	Mobilgear XMP 320	Omala F320
		-15 ... +30	+10 ... +30	220	Energol GR-XP 220	Alpha SP 220	Klüberoil GEM 1-220 N	Mobilgear XMP 220	Omala F220
		-20 ... +20	+5 ... +20	150	Energol GR-XP-150	Alpha SP 150	Klüberoil GEM1-150 N	Mobilgear XMP150	Omala 150
		-25... +10	+3 ... +10	100	Energol GR-XP 100	Alpha SP 100	Klüberoil GEM 1-100 N	–	Omala 100
Synthetic Oil	CLP PG	-10 ... +60	–	680	Energysyn SG-XP 680	–	Klübersynth GH 6 -680	Mobil Glygoyle 680	Tivela S 680
		-20 ... +50	–	460	Energysyn SG-XP460	Aphasyn PG460	Klübersynth GH 6-460	Mobil Glygoyle 460	Tivela S 460
		-25 ... +40	+5 ... +40	320	Energysyn SG-XP320	Aphasyn PG320	Klübersynth GH 6-320	Mobil Glygoyle 320	Tivela S 320
		-30 ... +30	0 ... +30	220	Energysyn SG-XP 220	Aphasyn PG 220	Klübersynth GH 6-220	–	Tivela S 220
		-35 ... +20	-5 ... +20	150	Energysyn SG-XP 150	Aphasyn PG 150	Klübersynth GH 6 -150	–	Tivela S 150
		-40 ... +10	-8 ... +10	100	–	–	Klübersynth GH 6 -100	–	–
	CLP HC	-10 ... +60	–	680	–	–	Klübersynth GEM4-680 N	Mobilgear SHCXMP680	–
		-20 ... +50	–	460	Energysyn EP-XF 460	Alphasyn T 460	Klübersynth GEM4-460 N	Mobilgear SHC XMP460	Omala HD 460
		-25 ... +40	+5 ... +40	320	Energysyn EP-XF 320	Alphasyn T 320	Klübersynth GEM4-320 N	Mobilgear SHC XMP 320	Omala HD 320
		-30 ... +30	0 ... +30	220	Energysyn EP-XF 220	Alphasyn T 220	Klübersynth GEM4-220 N	Mobilgear SHC XMP 220	Omala HD 220
		-35 ... +20	-5 ... +20	150	Energysyn EP-XF 150	Alphasyn T 150	Klübersynth GEM4-150 N	Mobilgear SHC XMP 150	Omala HD 150
		-40 ... +10	-8 ... +10	100	–	–	Klübersynth GEM4-100 N	–	–
Food Grade Oil	CLP NSF H1	-15 ... +25	+5 ... +25	320	–	Optileb GT 320	Klüberoil 4 UH1-320 N	Mobil SHC Cibus 320	Cassida Flu- id GL-320
Biodegrad- able Oil	CLP E	-25 ... +40	+5 ... +40	320	–	Tribol BioTop 1418-320	Klübersynth GEM 2-320	–	–
Mineral Grease [ -20 .... +120 Working Temperature °C ]					Energrease LS 3	Spheerol AP3	Centoplex 2 EP	Mobilux EP 3	Alvania RL3
Synthetic Grease [ -30 .... +100 Working Temperature °C ]					Energrease SY 2202	–	Petamo GHY 133 N	Mobiltemp SHC100	Cassida RLS 2



#### 9.2- Changing the oil



Refer to the nameplate to find out the correct oil filling level inside the gearbox.

-Do not mix synthetic oils with mineral oils as this will cause serious damage to the gear unit.

The oil change must be done by using the filling, draining and level plugs according to the mounting position illustrated in section 9.3.

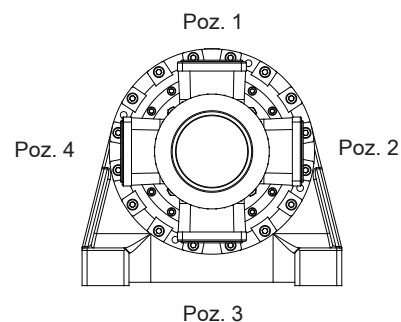
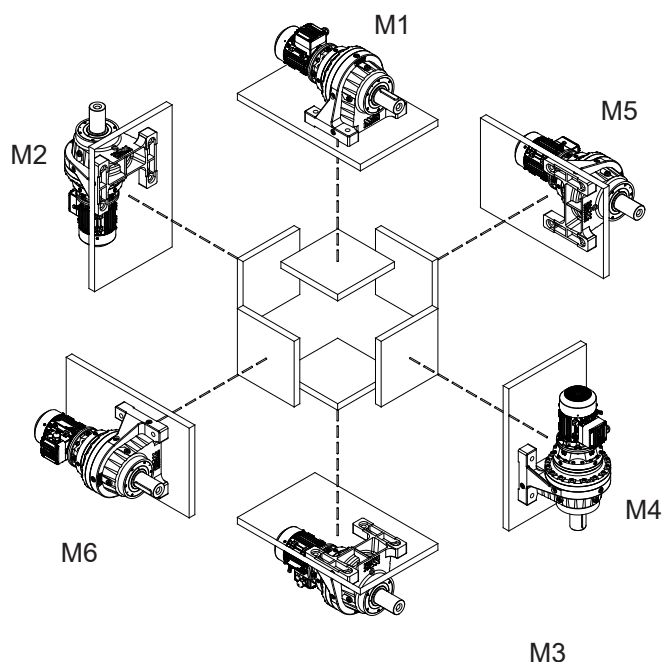
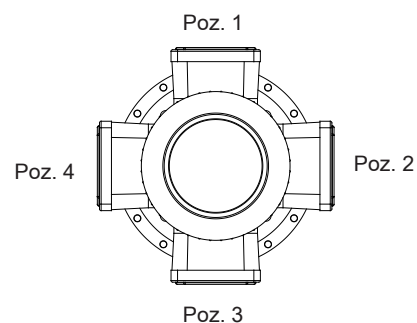
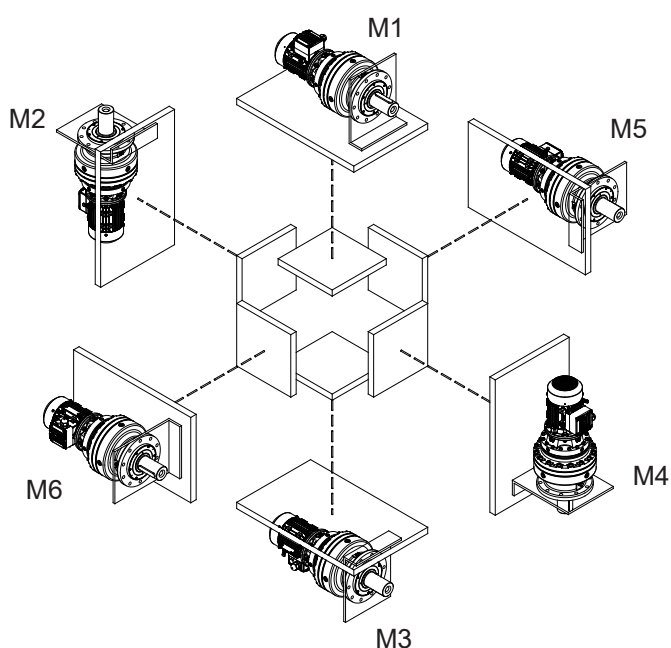


-Extended, intensive contact with oils can lead to skin irritations.

Avoid extended contact with oil, and clean oil off skin thoroughly.

-Hot oil can cause scalding. When changing oil, protect yourself against contacting hot oil.

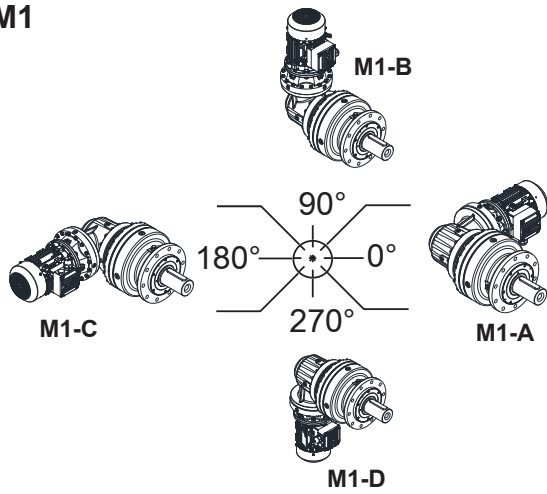
#### 9.3 Mounting Positions



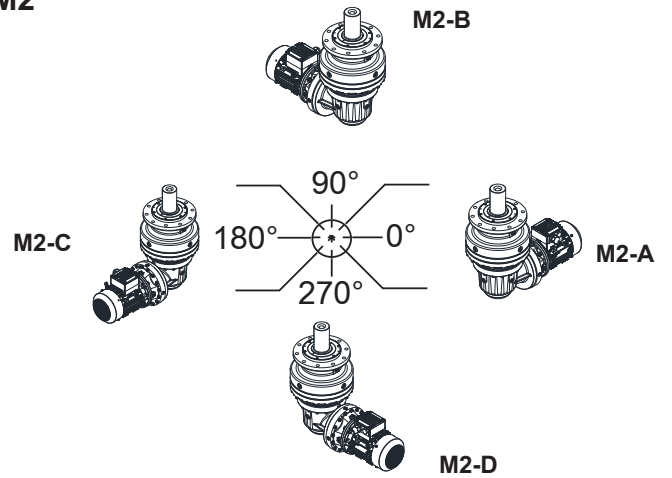


#### 9.3.1 Mounting Position P Series with K Form

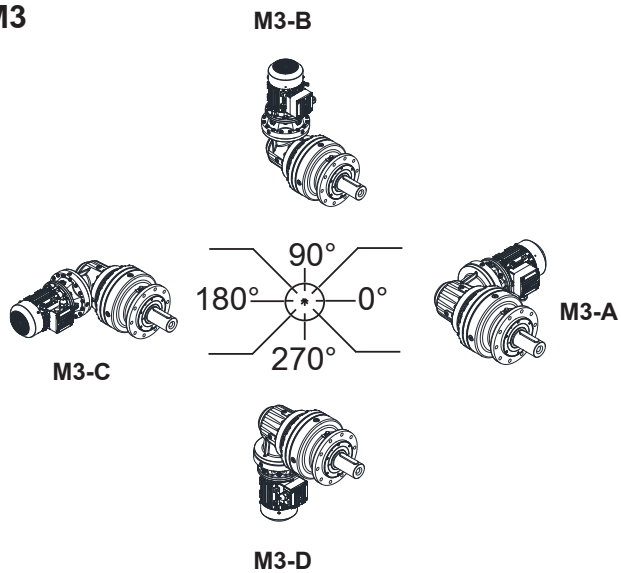
**M1**



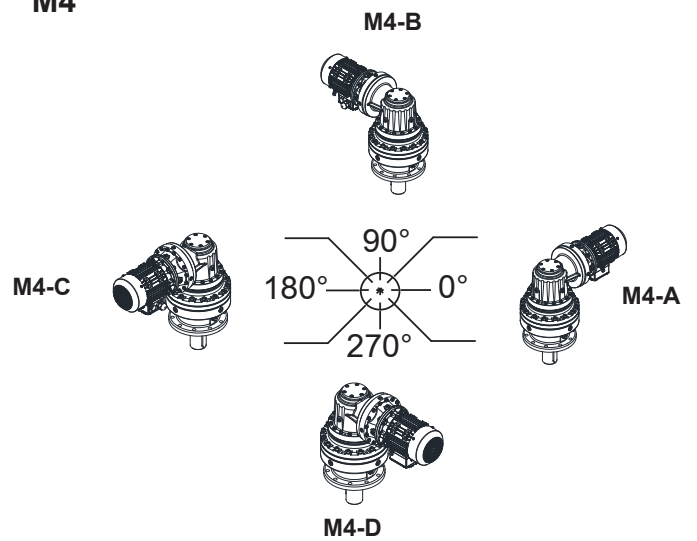
**M2**



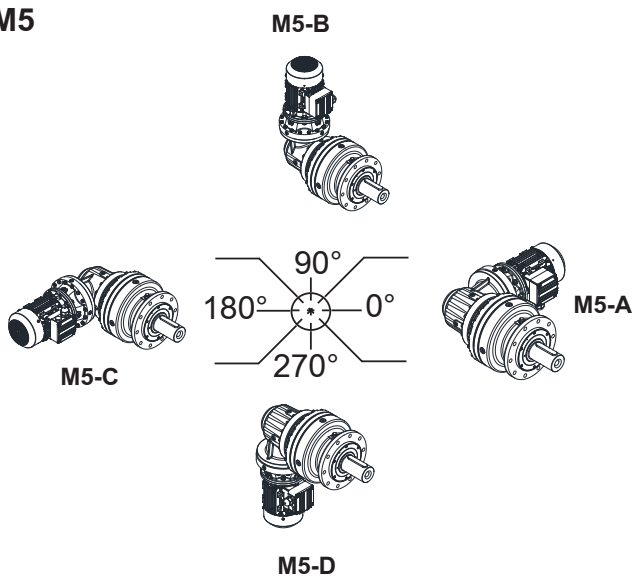
**M3**



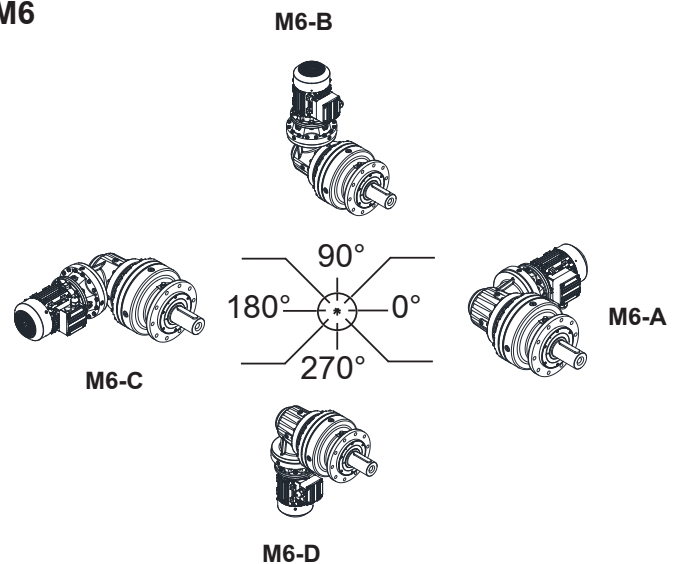
**M4**



**M5**



**M6**

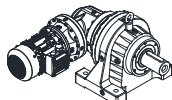
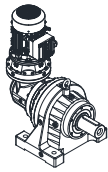




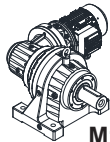
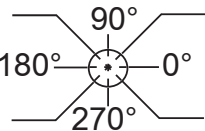
#### 9.3.2 Mounting Positions R Series with K Form

**M1**

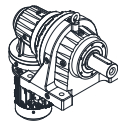
**M1-B**



**M1-C**



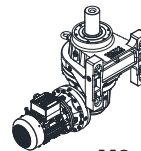
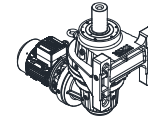
**M1-A**



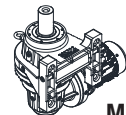
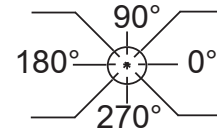
**M1-D**

**M2**

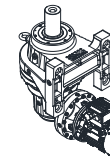
**M2-B**



**M2-C**



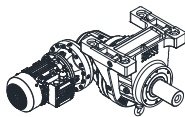
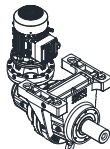
**M2-A**



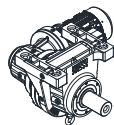
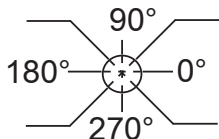
**M2-D**

**M3**

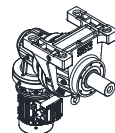
**M3-B**



**M3-C**



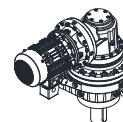
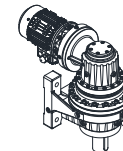
**M3-A**



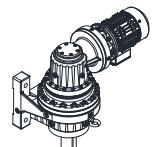
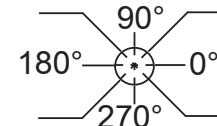
**M3-D**

**M4**

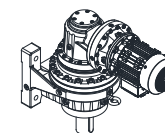
**M4-B**



**M4-C**



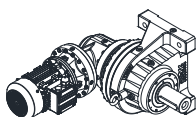
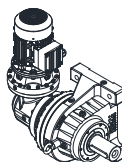
**M4-A**



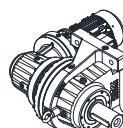
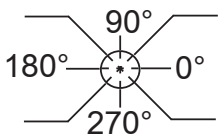
**M4-D**

**M5**

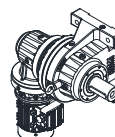
**M5-B**



**M5-C**



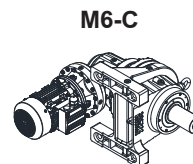
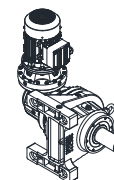
**M5-A**



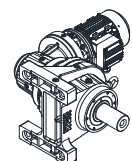
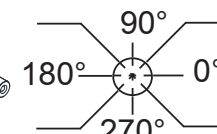
**M5-D**

**M6**

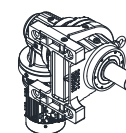
**M6-B**



**M6-C**

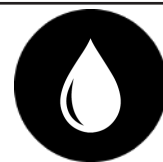


**M6-A**

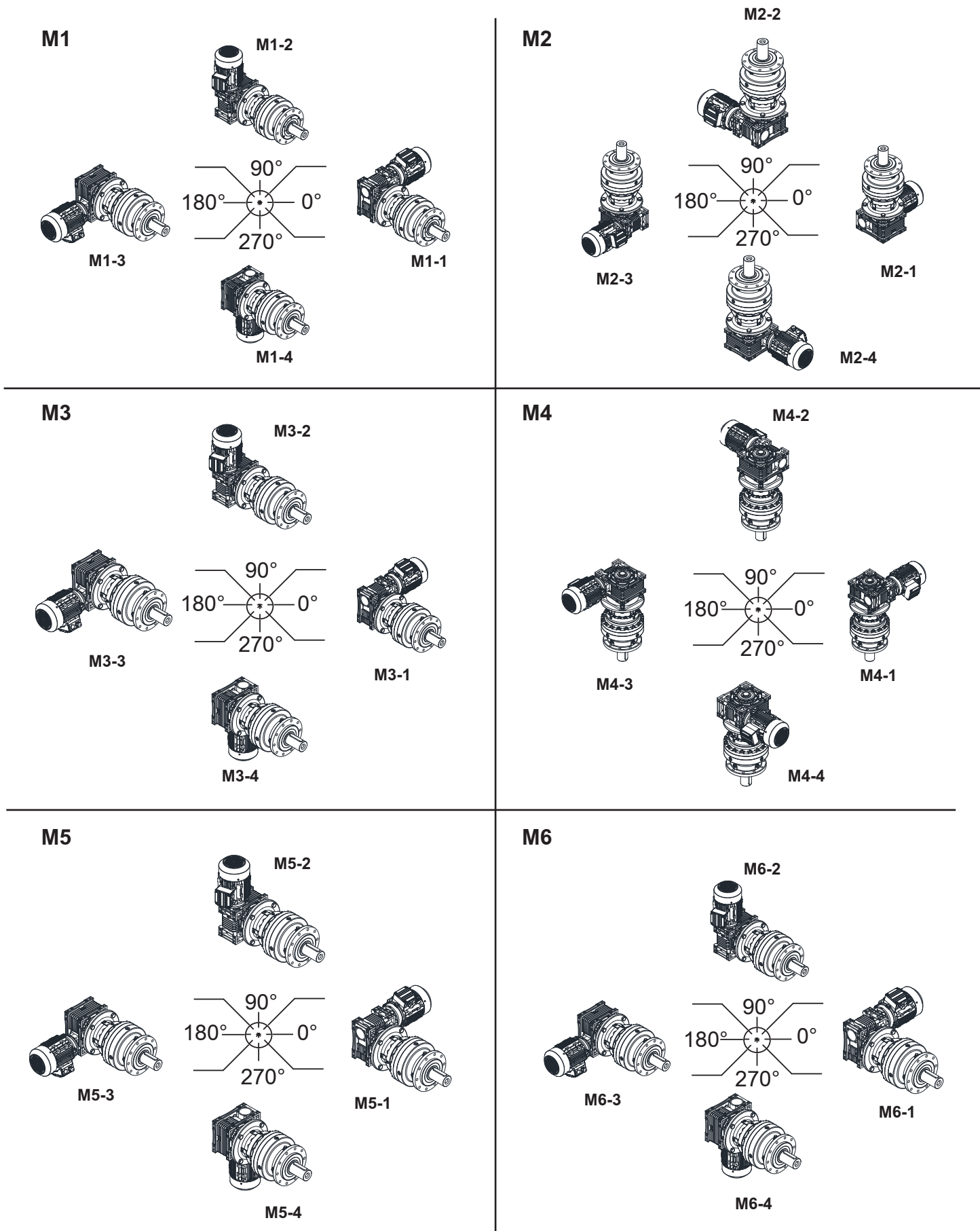


**M6-D**



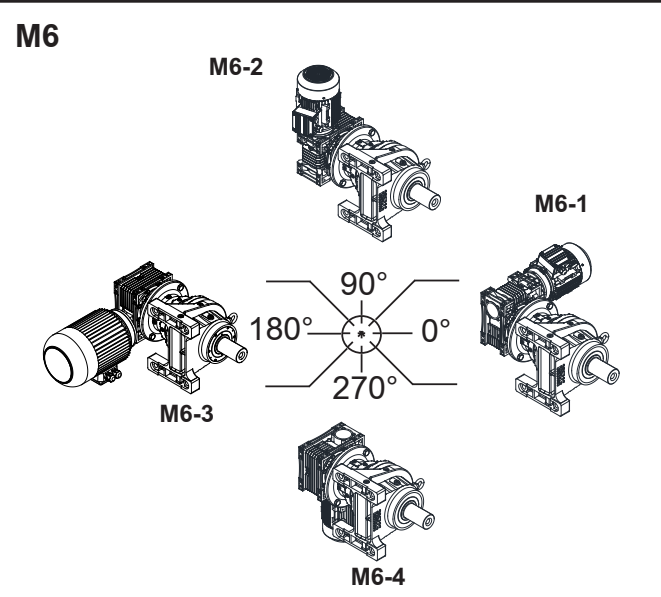
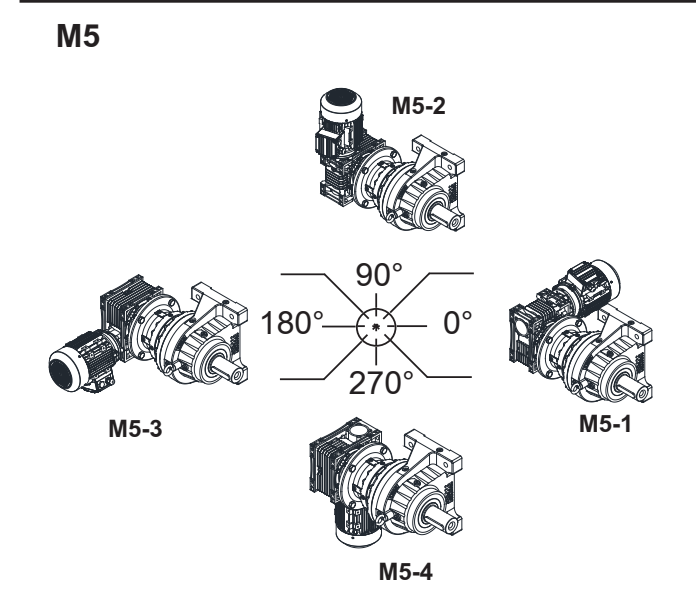
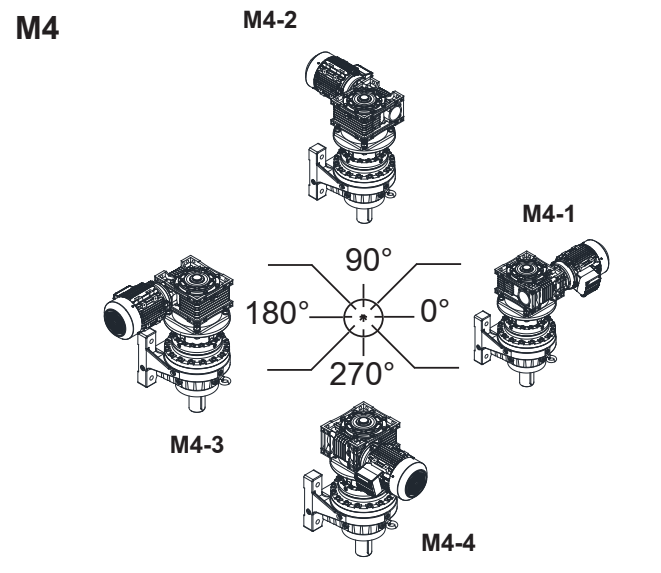
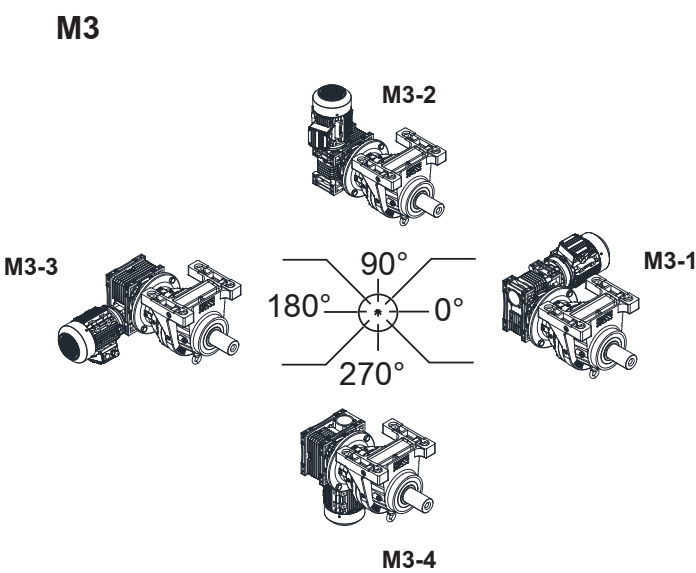
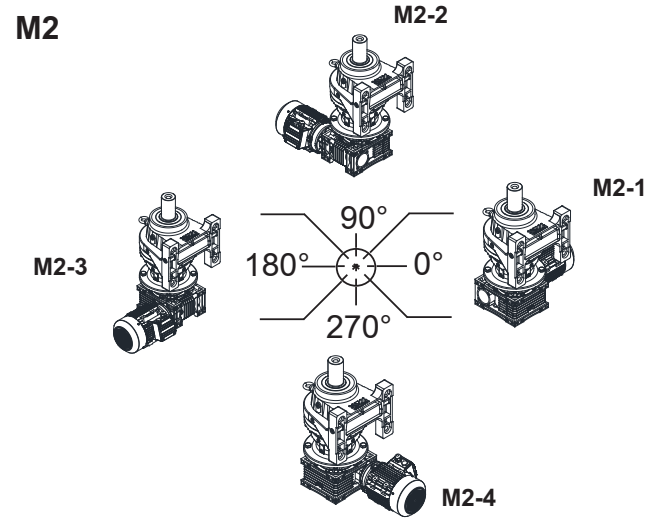
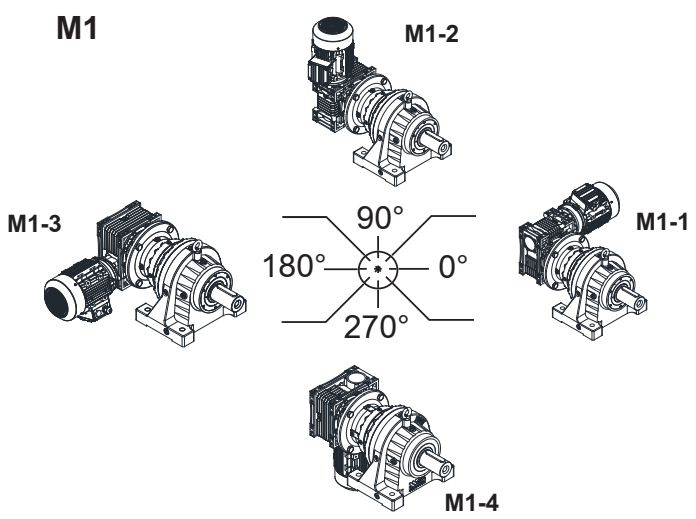


#### 9.3.3 Mounting Position for P Series Combined with Helical Worm Gear





**9.3.4 Mounting Position for P Series Combined with Helical Worm Gear**





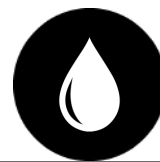
**9.4 Oil Quantities [litres]**

Gearbox Type	Mounting position					
	M1	M2	M3	M4	M5	M6
P.1101L / R.1101L	0,6	0,6	0,6	0,8	0,6	0,6
P.1102L / R.1102L	1,0	1,2	0,7	1,3	0,7	0,7
P.1103L / R.1103L	1,1	1,8	1,1	1,6	1,1	1,1
P.1104L / R.1104L	1,6	2,1	1,4	2,2	1,4	1,4
P.1201L / R.1201L	0,7	0,7	0,7	0,9	0,7	0,7
P.1202L / R.1202L	0,8	1,3	0,8	0,9	0,8	0,8
P.1203L / R.1203L	1,5	2,0	1,5	1,8	1,5	1,5
P.1204L / R.1204L	1,5	2,3	1,5	2,4	1,5	1,5
P.1501L / R.1501L	1,4	2,8	1,4	1,7	1,4	1,4
P.1502L / R.1502L	1,3	1,9	1,3	2,1	1,3	1,3
P.1503L / R.1503L	1,5	2,4	1,5	2,6	1,5	1,5
P.1504L / R.1504L	1,8	3,0	1,8	3,1	1,8	1,8
P.1601L / R.1601L	1,5	3,0	1,5	1,9	1,5	1,5
P.1602L / R.1602L	1,5	2,1	1,5	2,2	1,5	1,5
P.1603L / R.1603L	1,8	2,6	1,8	2,8	1,8	1,8
P.1604L / R.1604L	2,0	3,0	2,0	3,2	2,0	2,0
P.1901L / R.1901L	2,2	2,4	2,2	2,2	2,2	2,2
P.1902L / R.1902L	2,0	2,9	2,0	3,3	2,0	2,0
P.1903L / R.1903L	3,4	2,1	1,8	3,1	1,8	1,8
P.1904L / R.1904L	2,0	2,5	2,0	3,5	2,0	2,0
P.2301L / R.2301L	3,6	4,2	3,6	4,2	3,6	3,6
P.2302L / R.2302L	4,3	4,2	4,3	7,2	4,3	4,3
P.2303L / R.2303L	4,1	3,7	3,4	6,4	3,4	3,4
P.2304L / R.2304L	3,6	4,2	3,6	6,8	3,6	3,6
P.2401L / R.2401L	4,0	4,9	4,0	4,5	4,0	4,0
P.2402L / R.2402L	4,5	4,4	4,5	7,4	4,5	4,5
P.2403L / R.2403L	3,5	4,0	3,5	6,5	3,5	3,5
P.2404L / R.2404L	5,5	4,4	4,0	7,0	4,0	4,0
P.2701L / R.2701L	4,3	9,0	4,3	8,6	4,3	4,3
P.2702L / R.2702L	4,7	8,3	4,7	7,1	4,7	4,7
P.2703L / R.2703L	4,8	10,75	7,3	6,7	7,3	7,3
P.2704L / R.2704L	4,9	8,5	4,7	8,5	4,7	4,7
P.2901L / R.2901L	5,75	8,3	5,75	9,65	5,75	5,75
P.2902L / R.2902L	6,05	11,15	6,05	7,55	6,05	6,05
P.2903L / R.2903L	6,1	8,8	6,1	10,35	6,1	6,1
P.2904L / R.2904L	6,2	8,7	6,2	11,75	6,2	6,2
P.3501L / R.3501L	6,5	7,6	6,5	10,7	6,5	6,5
P.3502L / R.3502L	7,4	14,0	7,4	8,0	7,4	7,4
P.3503L / R.3503L	9	8,6	9	24	9	9
P.3504L / R.3504L	12,3	8,9	12,3	15,0	12,3	12,3

# Operating Instructions

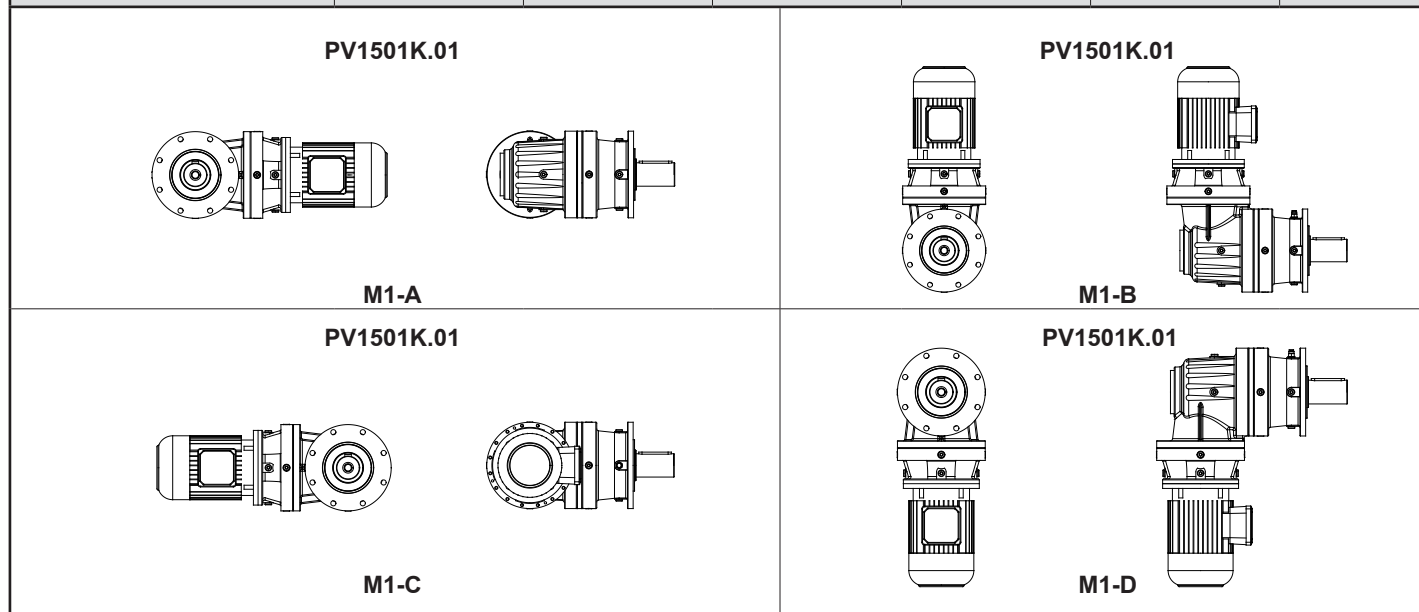
## P/R Series

### Lubrication



#### 9.4 Oil Quantities [litres]

Gearbox Types	Mounting position					
	M1-A	M2-A	M3-A	M4-A	M5-A	M6-A
P.1102K / R.1102K	1,3	2,3	1,3	1,7	1,3	1,3
P.1103K / R.1103K	1,6	3	1,6	2,2	1,6	1,6
P.1104K / R.1104K	2,4	4,5	2,4	3,1	2,4	2,4
P.1202K / R.1202K	1,4	2,5	1,4	1,8	1,4	1,4
P.1203K / R.1203K	1,7	3,2	1,7	2,3	1,7	1,7
P.1204K / R.1204K	2,5	4,7	2,5	1,8	2,5	2,5
P.1502K / R.1502K	2,1	4,8	2,1	2,4	2,1	2,1
P.1503K / R.1503K	2	3,1	2	3	2	2
P.1504K / R.1504K	2	2,6	2	3,9	2	2
P.1602K / R.1602K	2,2	4,9	2,2	2,5	2,2	2,2
P.1603K / R.1603K	2,1	2,5	2,1	3,1	2,1	2,1
P.1604K / R.1604K	2,1	2,7	2,1	4	2,1	2,1
P.1902K / R.1902K	5	8,2	5	6,1	5	5
P.1903K / R.1903K	3,1	4,7	3,1	5	3,1	3,1
P.1904K / R.1904K	2,8	3	2,8	4,8	2,8	2,8
P.2302K / R.2302K	7,1	10,6	7,1	9,6	7,1	7,1
P.2303K / R.2303K	4,2	5,2	4,2	7,2	4,2	4,2
P.2304K / R.2304K	4,1	4,0	4,1	7,3	4,1	4,1
P.2402K / R.2402K	7,2	10,7	7,2	9,7	7,2	7,2
P.2403K / R.2403K	4,3	5,3	4,3	7,3	4,3	4,3
P.2404K / R.2404K	4,2	4,1	4,2	7,4	4,2	4,2
P.2702K / R.2702K	11	14,4	11	12,2	11	11
P.2703K / R.2703K	3,1	7,6	3,1	9	3,1	3,1
P.2704K / R.2704K	5,3	6,4	5,3	9,5	5,3	5,3
P.2902K / R.2902K	11,6	15,8	11,6	13,4	11,6	11,6
P.2903K / R.2903K	6,6	10,4	6,6	11,8	6,6	6,6
P.2904K / R.2904K	6,7	7,8	6,7	8,8	6,7	6,7
P.3502K / R.3502K	12,1	17,2	12,1	14,5	12,1	12,1
P.3503K / R.3503K	10,2	13,1	10,2	14,5	10,2	10,2
P.3504K / R.3504K	8,1	9,2	8,1	8,2	8,1	8,1



# Operating Instructions

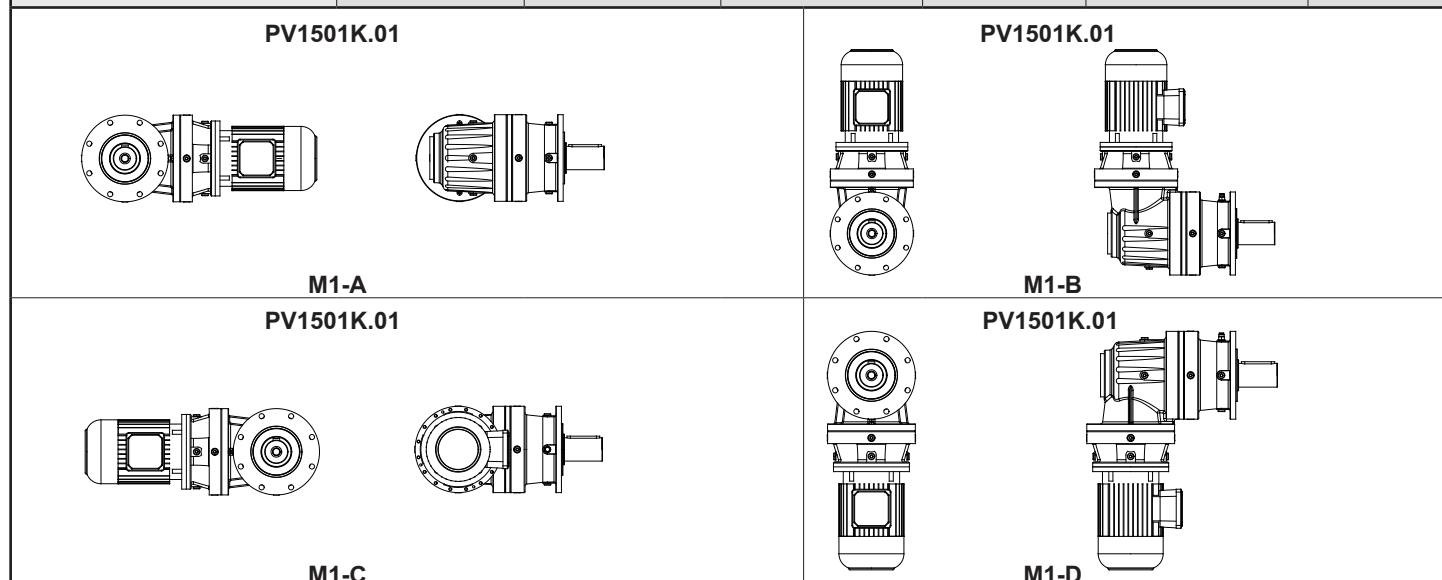
## P/R Series

### Lubrication



#### 9.4 Oil Quantities [litres]

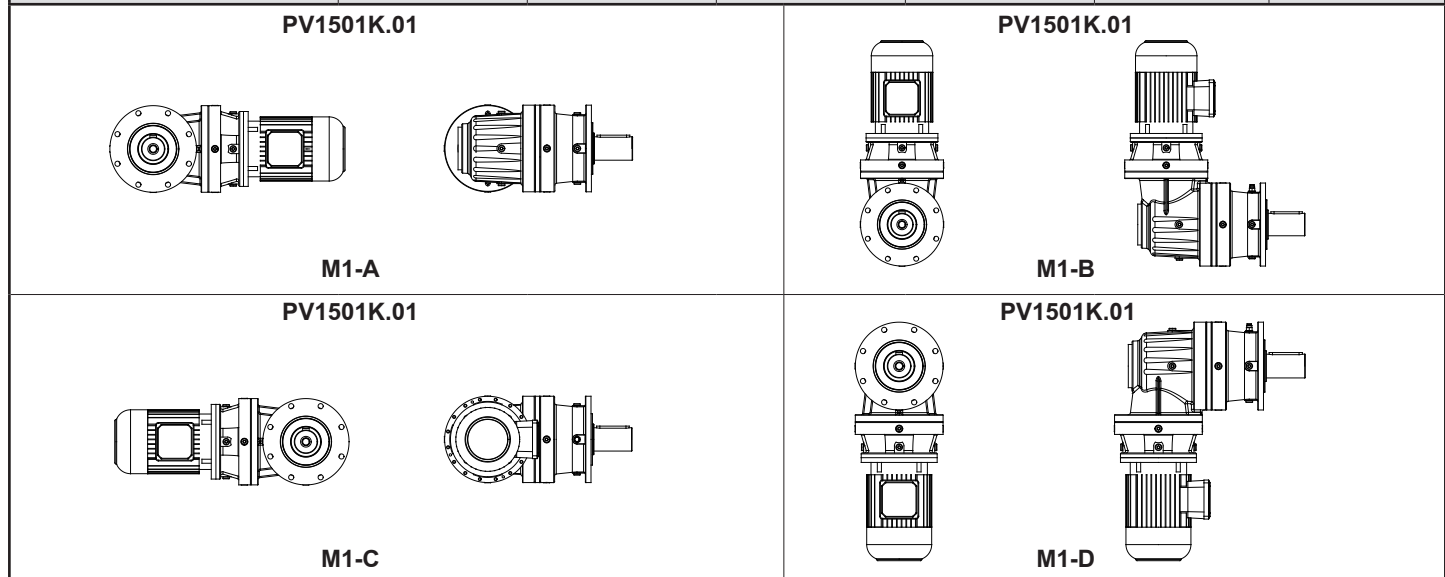
Gearbox	Mounting position					
	M1-B	M2-B	M3-B	M4-B	M5-B	M6-B
P...1102K / R...1102K	1	2,3	1,25	1,7	1	1
P...1103K / R...1103K	1,2	3	1,6	2,2	1,2	1,2
P...1104K / R...1104K	3,6	4,5	2,4	3,0	3,6	3,6
P...1202K / R...1202K	1,1	2,4	1,4	1,8	1,1	1,1
P...1203K / R...1203K	1,3	3,1	1,7	2,3	1,3	1,3
P...1204K / R...1204K	3,7	4,6	2,6	3,1	3,7	3,7
P...1502K / R...1502K	1,8	4,8	2,1	2,4	1,8	1,8
P...1503K / R...1503K	1,7	3,1	2	3	1,7	1,7
P...1504K / R...1504K	1,7	2,6	1,7	3,9	1,7	1,7
P...1602K / R...1602K	1,9	4,9	2,2	2,5	1,9	1,9
P...1603K / R...1603K	1,8	3,2	2,1	3,1	1,8	1,8
P...1604K / R...1604K	1,8	2,7	1,77	4,0	1,8	1,8
P...1902K / R...1902K	3,9	8,2	3,9	6,1	3,9	3,9
P...1903K / R...1903K	5,2	4,7	5,22	5	5,2	5,2
P...1904K / R...1904K	2,5	3	2,5	4,8	2,5	2,5
P...2302K / R...2302K	7,1	10,6	6,1	9,1	6,1	6,1
P...2303K / R...2303K	4	5,2	4,4	7,2	4	4
P...2304K / R...2304K	3,8	4,0	4,1	7,3	3,8	3,8
P...2402K / R...2402K	7,2	10,7	6,2	9,2	6,2	6,2
P...2403K / R...2403K	4,1	5,3	4,5	7,3	4,1	4,1
P...2404K / R...2404K	3,9	4,1	4,9	7,4	3,9	3,9
P...2702K / R...2702K	9,3	14,4	9,3	12,2	9,3	9,3
P...2703K / R...2703K	4,9	7,6	4,9	9,2	4,9	4,9
P...2704K / R...2704K	5	6,4	5,3	9,51	5	5
P...2902K / R...2902K	8	15,8	8	13,4	8	8
P...2903K / R...2903K	7,1	10,3	7,1	11,8	7,1	7,1
P...2904K / R...2904K	6,5	7,8	6,6	8,8	6,5	6,5
P...3502K / R...3502K	6,8	17,2	6,7	14,5	6,8	6,8
P...3503K / R...3503K	9,2	13,1	9,2	14,5	9,2	9,2
P...3504K / R...3504K	7,9	9,2	7,9	8,2	7,9	7,9





#### 9.4 Oil Quantities [litres]

Gearbox	Mounting position					
	M1-C	M2-C	M3-C	M4-C	M5-C	M6-C
P...1102K / R...1102K	1,3	2,3	1,25	1,7	1,3	1,3
P...1103K / R...1103K	1,6	3	1,6	2,2	1,6	1,6
P...1104K / R...1104K	2,4	4,5	2,4	3,0	2,4	2,4
P...1202K / R...1202K	1,4	2,4	1,4	1,8	1,4	1,4
P...1203K / R...1203K	1,7	3,1	1,7	2,3	1,7	1,7
P...1204K / R...1204K	2,5	4,6	2,5	3,1	2,5	2,5
P...1502K / R...1502K	2,1	4,8	2,1	2,4	2,1	2,1
P...1503K / R...1503K	2	3,1	2	3	2	2
P...1504K / R...1504K	2	2,6	1,7	3,9	2	2
P...1602K / R...1602K	2,21	4,9	2,2	2,5	2,2	2,2
P...1603K / R...1603K	2,1	3,2	2,1	3,1	2,1	2,1
P...1604K / R...1604K	2,1	2,7	1,77	4,0	2,1	2,1
P...1902K / R...1902K	5	8,2	3,9	6,1	5	5
P...1903K / R...1903K	3,1	4,7	5,2	5	3,1	3,1
P...1904K / R...1904K	2,8	3	2,5	4,8	2,8	2,8
P...2302K / R...2302K	7,1	10,6	6,1	9,6	7,1	7,1
P...2303K / R...2303K	4	5,2	4,4	7,2	4	4
P...2304K / R...2304K	4,1	4,0	4,1	7,3	4,1	4,1
P...2402K / R...2402K	7,2	10,7	6,2	9,7	7,2	7,2
P...2403K / R...2403K	4,1	5,3	4,5	7,3	4,1	4,1
P...2404K / R...2404K	4,2	4,1	4,2	7,4	4,2	4,2
P...2702K / R...2702K	11	14,4	9,3	12,2	11	11
P...2703K / R...2703K	3,1	7,6	4,9	9,2	3,1	3,1
P...2704K / R...2704K	5,3	6,4	5,3	9,5	5,3	5,3
P...2902K / R...2902K	12,6	15,8	11,8	13,4	12,6	12,6
P...2903K / R...2903K	6,6	10,3	7,04	11,8	6,6	6,6
P...2904K / R...2904K	6,4	7,8	6,6	8,8	6,4	6,4
P...3502K / R...3502K	14,2	17,2	14,2	14,5	14,2	14,2
P...3503K / R...3503K	10,2	13,1	9,2	14,5	10,2	10,2
P...3504K / R...3504K	7,5	9,2	7,9	8,16	7,5	7,5



# Operating Instructions

## P/R Series

### Lubrication



#### 9.5 Oil Plugs

##### 9.5.1 Oil Plugs for P Series L Type

Mounting position	Single Stage	2 Stages	3 Stages	4 Stages
M1				
M2				
M3				
M4				
M5				
M6				

Symbol : : Drain Plug : Oil Filling : Oil Level : Breather

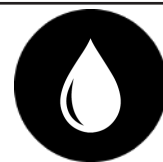


9.5.2 Oil Plugs for R Series L Type

Mounting position	Single Stage	2 Stages	3 Stages	4 Stages
M1				
M2				
M3				
M4				
M5				
M6				

Symbol : : Drain Plug      : Oil Filling      : Oil Level      : Breather





9.5.3 Oil Plugs for P Series K Type

Mounting position	A	B	C	D
M1				
M2				
M3				
M4				
M5				
M6				

Symbol : : Drain Plug      : Oil Filling      : Oil Level      : Breather



9.5.4 Oil Plugs for R Series K Type

Mounting position	A	B	C	D
M1				
M2				
M3				
M4				
M5				
M6				

Symbol :      ■ : Drain Plug      ▽ : Oil Filling      ▼ : Oil Level      ● : Breather

# Operating Instructions

## P/R Series

### Lubrication



#### 9.5.5 Oil Plugs for P Series Gearboxes Combined with E Series

Mounting position	1	2	3	4
M1				
M2				
M3				
M4				
M5				
M6				

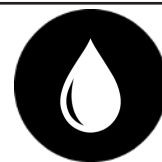
Symbol : : Drain Plug      : Oil Filling      : Oil Level      : Breather



#### 9.5.6 Oil Plugs for R Series Gearboxes Combined with E Series

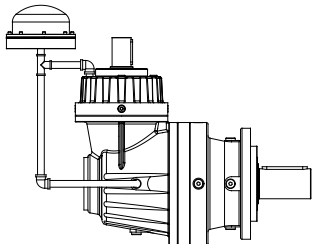
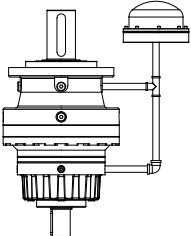
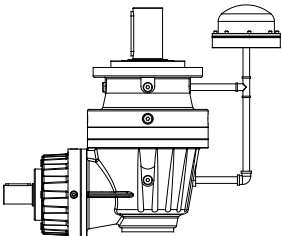
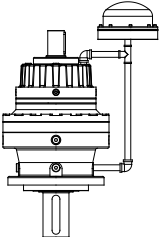
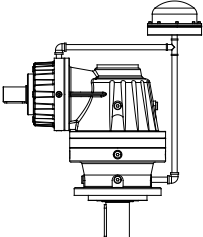
Mounting position	1	2	3	4
M1				
M2				
M3				
M4				
M5				
M6				

Symbol :      ■ : Drain Plug      ▽ : Oil Filling      ▼ : Oil Level      ● : Breather



### 9.6 Oil Expansion Tank

Expansion tanks can be used with planetary gearboxes according to the mounting positions shown below.

Mounting Pos.	Expansion Tank (L Type)	Expansion Tank (K Type)
M1	<b>Not Applicable</b>	
M2		
M3	<b>Not Applicable</b>	<b>Not Applicable</b>
M4		



## 10. Hydraulic Motors

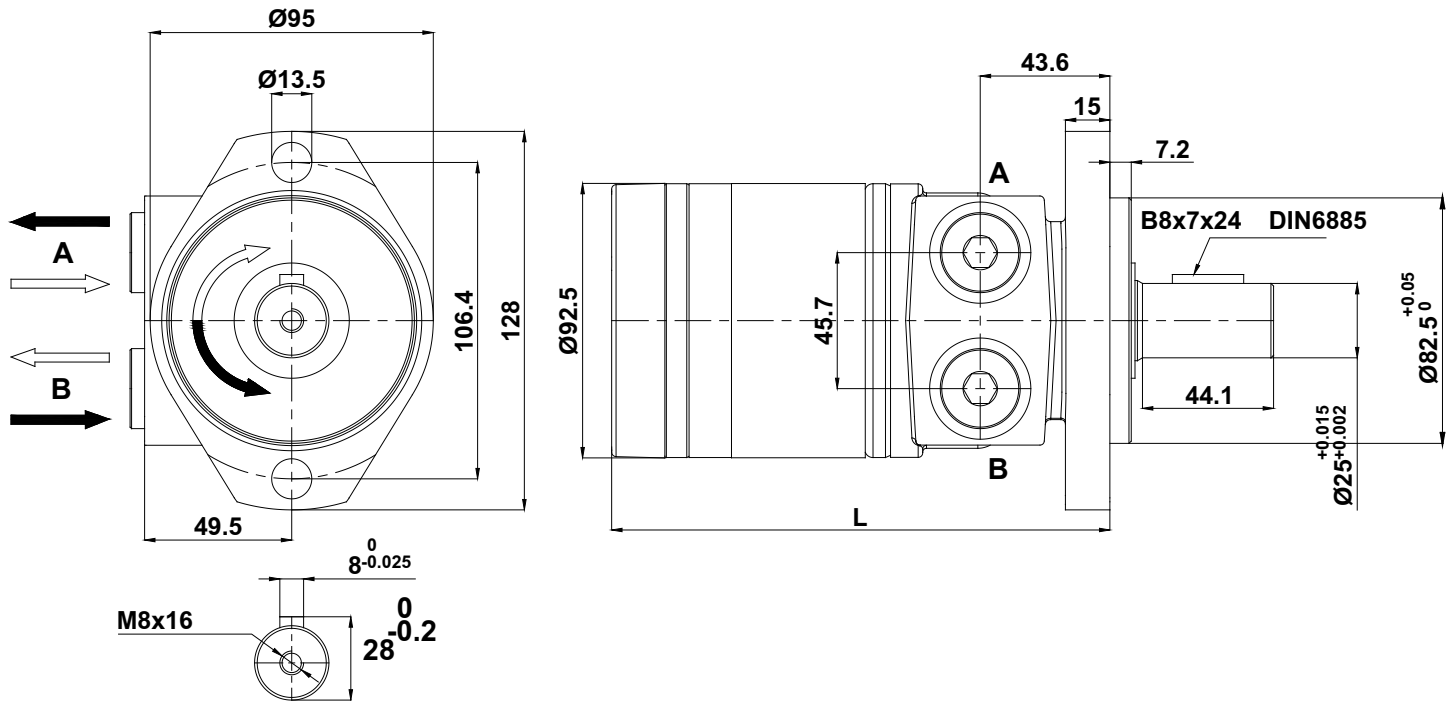
All motors must be charged with hydraulic fluid before being operated and during installation. You can find the technical information and picture below. For performance diagrams or other detailed information please see the P/R series product catalogue or contact JS-Technik.

Type	Geometric Displacement V [cm <sup>3</sup> /rev]	Maximum Speed [rpm]	Max. Oil Flow Q [l/min]	Max. Pressure Difference [Bar]	Max Supply Pressure [bar]	Maximum Torque [Nm] (cont / int)	Maximum Power [kW]	Min. Starting Torque [Nm]	
<b>HE</b>	<b>HE 36</b>	36	930 / 1160	35 / 42	140 / 190	200	55 / 70	8,5	44 / 52
	<b>HE 45</b>	41	810 / 990	35 / 42	140 / 190	200	70 / 100	10	44 / 64
	<b>HE 50</b>	50	725 / 935	35 / 45	140 / 175	200	90 / 115	11	72 / 92
	<b>HE 65</b>	66	705 / 940	45 / 60	140 / 175	200	125 / 160	15	100 / 128
	<b>HE 80</b>	82	560 / 750	45 / 60	140 / 175	200	160 / 200	15	128 / 160
	<b>HE 100</b>	98	470 / 630	45 / 60	140 / 175	200	190 / 240	15	152 / 192
	<b>HE 130</b>	130	350 / 470	45 / 60	140 / 175	200	255 / 320	15	204 / 256
	<b>HE 165</b>	163	280 / 375	45 / 60	140 / 175	200	310 / 395	15	248 / 316
	<b>HE 195</b>	196	235 / 315	45 / 60	140 / 175	200	390 / 480	15	312 / 384
	<b>HE 230</b>	228	265 / 330	60 / 75	120 / 150	200	380 / 480	15	304 / 384
	<b>HE 260</b>	261	230 / 290	60 / 75	110 / 140	200	400 / 525	15	320 / 420
	<b>HE 295</b>	293	200 / 255	60 / 75	100 / 130	200	410 / 520	13	328 / 416
	<b>HE 330</b>	326	185 / 235	60 / 75	100 / 120	200	430 / 530	13	344 / 424
	<b>HE 365</b>	370	150 / 200	60 / 75	95 / 110	200	467 / 558	11	373 / 446
	<b>HE 390</b>	392	152 / 190	60 / 75	85 / 100	200	435 / 540	10	348 / 432
<b>HG</b>	<b>HG 140</b>	140	530 / 710	75 / 100	200 / 280	300	400 / 545	33	320 / 436
	<b>HG 170</b>	169	440 / 575	75 / 100	200 / 280	300	485 / 670	33	388 / 536
	<b>HG 195</b>	195	380 / 510	75 / 100	200 / 280	300	560 / 770	33	448 / 616
	<b>HG 240</b>	237	320 / 420	75 / 100	200 / 280	300	685 / 945	32	548 / 756
	<b>HG 280</b>	280	270 / 350	75 / 100	200 / 280	300	800 / 1100	31	640 / 880
	<b>HG 335</b>	337	225 / 290	75 / 100	200 / 280	300	980 / 1350	30	784 / 1080
	<b>HG 405</b>	405	185 / 245	75 / 100	170 / 240	300	960 / 1350	27	768 / 1080
	<b>HG 475</b>	476	160 / 240	75 / 115	140 / 200	300	960 / 1400	28	768 / 1120
	<b>HG 530</b>	529	140 / 215	75 / 115	140 / 170	300	1050 / 1280	23	840 / 1024
	<b>HG 625</b>	624	120 / 185	75 / 115	120 / 160	300	1040 / 1360	20	832 / 1088
	<b>HG 785</b>	786	95 / 145	75 / 115	100 / 140	300	1150 / 1490	17	920 / 1192
<b>HG 960</b>	958	78 / 119	75 / 115	70 / 100	300	925 / 1390	12	740 / 1112	

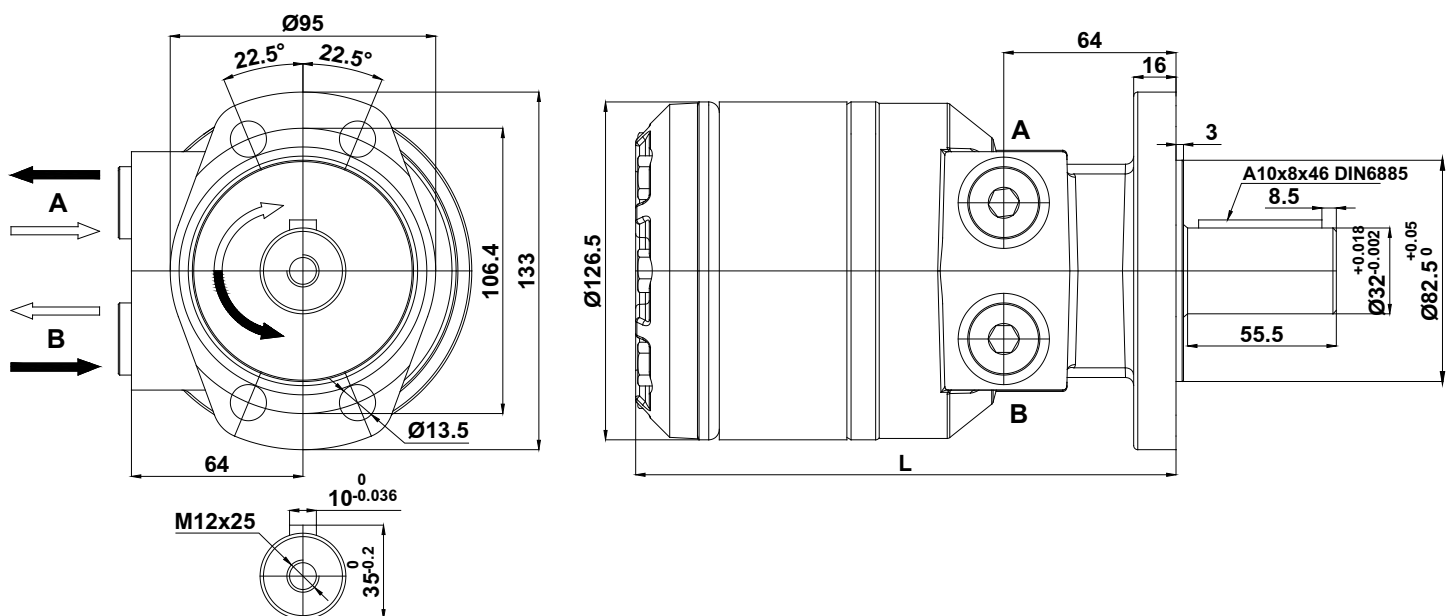
Intermittent operation rating applies to %10 of every minute.



10.1 HE Series flange and Shaft dimensions:



10.2 HG Series flange and Shaft dimensions:





## 11- Troubleshooting Guide



All instructions recommended below must be carried out by professionally trained mechanics or electricians. JS-Technik must be informed before any modification is made to the gear unit. An oil change can be carried out without consultation. All modifications or executions without the knowledge of JS-Technik are at the user's own risk.

ID	Problem	Observation	Remedy
001	Gearbox Does Not Start Up	You hear no noise and shaft is not rotating. You are not using any driver or frequency inverter.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. If you are still having issues, go to ID001.
002	Gearbox Does Not Start Up	You hear no noise and shaft is not rotating. You are using a frequency inverter or driver.	Please observe the frequency inverter/driver manual. Check the motor by connecting the motor directly to the supply voltage to determine if the problem is with the inverter. If you are still having issues, go to ID001.
003	Gearbox Does Not Start Up	You hear some noise, but the motor and the gear shaft are not rotating. You are not using any driver/frequency inverter or brake motor.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. If the same problem persists, the load may be too great for the chosen motor. Loosen the gearbox from the load/torque. If this works, the starting torque is insufficient and higher motor power is needed. For monophase motors, check the starting up condensator and running condensator as well. If you are still having issues, refer to ID100.
004	Gearbox Does Not Start Up	You hear some noise, but the motor and the gear shaft are not rotating. You are using a driver or frequency inverter.	Please observe the frequency inverters or drivers manual. To determine the source of the fault, disconnect the motor from the converter. Connect the motor directly to the mains including safety devices. If you are still having issues, go to ID 100.
005	Gearbox Does Not Start Up	You hear some noise, but the motor and the gear shaft are not rotating. You are using a brake motor.	Please check the supply voltage and frequency of the mains connection. These values should be according to the nameplate of the gear motor. Check the operating instructions of the motor manufacturer. Make sure that the brake is in order. Examine the operating instructions of the motor brake. If no solution is found, supply power to the brake individually, for example 198V DC. If a clicking sound is heard, the brake will open. If you do not hear this sound, the brake or the rectifier is damaged. When the brake is active, the motor is supplied with voltage. If the problem persists, the motor may be oversized for the load. Go to ID 003.



# Operating Instructions

## P/R Series

### Troubleshooting Guide



ID	Problem	Observation	Remedy
006	Gearbox Does Not Work in Low Speeds/frequencies.	You are using a frequency inverter.	At low speeds, the motors frequency is too low. The parameters of the motor and the inverter must be optimised. The efficiency of the gearbox may be too low at low speed, especially for helical worm gear units. The recommended frequency range is 20-70Hz for helical worm gear units, 10-70 Hz for helical gear units. Use a stronger motor power or change the gear ratio of the gearbox to operate in the recommended frequency range.
007	Transmission does not start in the morning or after a long break	Ambient temperature is below +5° Celsius.	The oil is not in accordance with your working conditions. Change to lower viscosity oils. Refer to the owner's manual for the correct oil selection. Control the engine ambient temperature with a heater. If the problem persists, select an engine with higher power.
008	Gearbox is Heating Up too Much	The gearbox is used below 40 °C ambient temperature.	Measure the surface temperature of the gearbox under full load. If the temperature is below 80°C, it is OK. All ATEX certified gearboxes are designed to operate below 120°C. If the ambient temperature of ATEX gearboxes is above 120°C, be sure to shut down the operation and contact JS-Technik. If a gearbox without ATEX certification is operated above 80°C ambient temperature, check the lubrication type and oil quantity according to the mounting position. Check the mounting position on the gearbox nameplate. If it does not match the current mounting position, go to ID 100.
009	Gearbox is Heating Up too Much	You are using a helical gear unit. Ambient temperature is lower than +40°C	Measure the surface temperature of the gearbox under full load. If the temperature is below 80°C, it is OK. All ATEX certified gearboxes are designed to operate below 120°C. If the ambient temperature of ATEX gearboxes is above 120°C, be sure to shut down the operation and contact JS-Technik. If a gearbox without ATEX certification is operated above 80°C ambient temperature, check the lubrication type and oil quantity according to the mounting position. Check the mounting position on the gearbox nameplate. If it does not match the current mounting position, go to ID 100.
010	Gearbox is Heating Up too Much	Ambient temperature is over +40° Celsius	Standard gearboxes are designed for ambient temperatures below 40°C. If the ambient temperature is above 40°C, a special solution must be used. Please contact JS-Technik GmbH.
011	Gearbox is noisy	Noise is regular and continuous	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise motor bearings or gearbox bearings are defect. Change bearings. Go to ID 100
012	Gearbox is noisy	Noise is random	Check Your moving parts for noise. Disassemble the gearbox and run without load. If the noise is still audible in this case, there may be particles in the oil of the gearbox. Change the oil and check it. If there are metal particles in the oil, the gearbox is damaged. Go to ID100.

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### Troubleshooting Guide



ID	Problem	Observation	Remedy
013	Gearbox is noisy	Regular knocking noise	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise one of the gears inside is defect. Go to ID 100
014	Gearbox is noisy	Regular noise increase and decrease	Check the output shaft for concentricity. Disconnect the gearbox from the machine. If you continue to hear the noise, one of the gears probably has a runout. Follow ID 100.
015	Gearbox is noisy	Gear motor with brake makes irregular noises.	Low random clicking noise may come from the brake disk, which is fine. If the noise level is too high, the brake may be defective or the air gap of the brake disk needs adjustment.
016	Gearbox is noisy	An inverter is used and the volume changes according to the speed.	The parameters of the frequency inverter are not optimised for the frequency range of the motor used. Read the operating instructions of the converter. If the problem persists, possibly change the transmission ratio of the gearbox. Follow ID 100.
017	Oil is Leaking	Oil Leakage from Seal	If the ambient temperature is over 40°C or the operating time without a break is over 16 hours, please fit a breather screw. To do this, read the gearbox bleeding instructions. If it does not help either, a seal may be damaged. Follow ID 100.
018	Oil is Leaking	Oil Leakage from Plug	Check the position of the vent screw. In every assembly position, the vent screw should be in the uppermost position. The screw is sometimes not tight enough. There are some particles sitting under the rubber surface of the screw. Clean and reassemble the screw. If the problem continues, go to ID 100.
019	Oil is Leaking	Oil Leakage from Housing	Find the place where the oil is leaking. It may be that the oil is coming out of the seal or the vent but is flowing over the housing. If this is the case, go to ID018/019. If you are sure that the oil is coming out of the housing, the housing may have a micro-crack. Go to ID 100.
020	Oil is Leaking	Oil Leakage from Cover	The seal under the lid is damaged. Remove the lid and replace the seal. Fit the cover and tighten the cover screws. If the problem is not solved, go to ID 100.
021	Gearbox has regular runout	A torque arm is used	The concentricity error of the gearbox is caused by the connection point. The air gap between the shaft and the hub does not have a proper fit. It has negative influences on the gearbox, especially when using a torque arm.
022	Gearbox has random runout	A torque arm is used.	The concentricity error of the gearbox is caused by the connection point. The air gap between the shaft and the hub does not have a proper fit. It has negative influences on the gearbox, especially when using a torque arm.
023	Motor is heating up	Motor is running over its nominal current	The motor power is not enough or some overload to the motor is possible. The motor may be defect. Go to ID 100
024	Motor is heating up	Ambient is dusty	Check the self-cooling via the motor ribs. If a frequency inverter is used, a forced cooling fan may be necessary at low speed. Go to ID 100.



ID	Problem	Observation	Remedy
025	Motor is running but gearbox shaft is not rotating	Friction noise occurs	Some elements (gears, shafts) may be defective. Go to ID 10.
026	Gearbox Housing is Defect	You are using a chain drive or pinion gear	The radial load or polygon effect of the chain may have caused the damage. Check if mounting screws are loose or if the mounting base is loose. Check if you are using the correct diameter of chain drive and you are not exceeding max. allowed radial load. Check the position of your output element, re-calculate your radial load and check if this suits the maximum allowed radial load. Go to ID 100
027	Output Shaft is Defect	You are using a chain drive or pinion gear	The radial load or polygon effect of the chain may have caused the damage. Check the position of your output element, re-calculate your radial load and check if this suits the maximum allowed radial load. Go to ID 100.
028	Gearbox is stopping too late	A brake motor is used	Check the brake rectifier, the brake disk, and the wiring of the motor brake.
029	Gearbox is starting too late	A brake motor is used	Check the brake rectifier, the brake disk, and the wiring of the motor brake.
100	Service Required	No solution is found	Please contact JS-Technik. The contact details can be found on each page of these operating instructions. Changes to mechanical parts can only be carried out by JS-Technik or with its consent. The warranty will be invalidated if changes are made without consent.

## 11- Disposal

If your product is no longer of use and you wish to dispose of it, refer to the instructions here. If you have any questions regarding ecological disposal methods, please consult our service points given on the backside of this manual.

### 11.1- Disposal of Oil

-Lubricants (oil and greases) are hazardous substances, which can contaminate soil and water. Collect drained lubricant into suitable receptacles and dispose of it according to the valid national guidelines.

### 11.2-Disposal of the Seals

Remove the seal rings from the gear unit and remove oil and grease residues. Dispose the seals as composite material (metal/plastic).

### 11.3-Disposal of Metal

If possible, separate the gear material into iron, aluminium and other materials. Dispose of it according to the valid national guidelines.