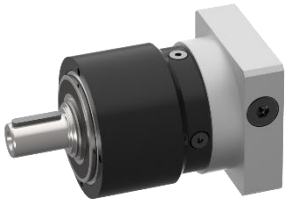
EPPINGER

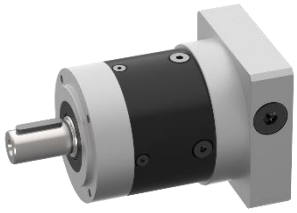
Assembly instructions

PA / PE / PF / PBA / PBE / PBF / PT / PR Gearboxes



PA

PBA



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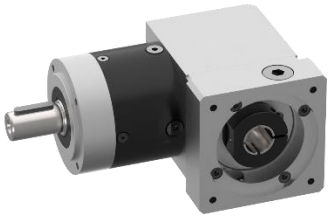

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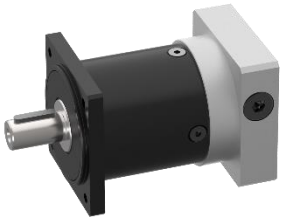

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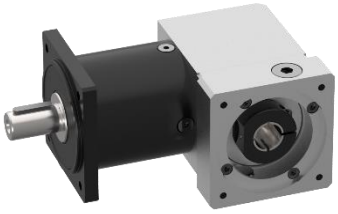

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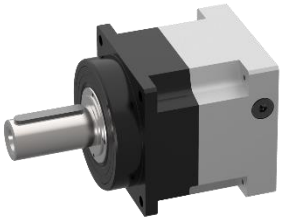

PT

PR

Table of contents

1 Safety instructions

A distinction is made between different levels of safety instructions. Table 1 below shows the definitions of symbols and signal words.

Symbol	Signal word	Definition
	**DANGER!**	Immediately imminent danger. Death or extremely serious injury, crippling.
	WARNING!	Possibly dangerous situation. Death or extremely serious injuries may result.
	CAUTION!	Less dangerous situation. Minor or moderate injuries may result.
	NOTICE	Potentially damaging situation. Possible damage to product and/or machine.
	INFO	Tips and other useful or important information and advice. No dangerous or harmful consequences for persons or property.

Table 1: Classification of notices

Symbol	Signal word	Definition
	**Environmental hazard**	Pollution risk for the environment

Table 2: Other symbols

2 General

2.1 Information on the documentation

These assembly instructions have to be read carefully before assembling, commissioning and maintaining the product. The document must be kept in a suitable place for future reference and must be available for any assembly, maintenance or dismantling work.

2.2 Target group

This documentation is intended for qualified trained personnel who are familiar with mechanical assembly work. Assembly, commissioning and maintenance may only be carried out by accordingly qualified personnel. Technical training or safety instruction is required.

2.3 Scope

The scope of these instructions covers the following products of the company ESA Eppinger GmbH:

- PA Planetary gearboxes
- PE Planetary gearboxes
- PF Planetary gearboxes
- PT Planetary gearboxes
- PR Planetary gearboxes
- PBA Bevel planetary gearboxes
- PBE Bevel planetary gearboxes
- PBF Bevel planetary gearboxes

All mounting parts necessary for the assembly, installation, operation and maintenance, which are included in the scope of supply of these gearboxes, are also within the scope of this document.

2.4 Intended use

Eppinger gearboxes are machine elements for converting or diverting torques and rotational speeds within the respectively specified performance range. Any operation outside the specified performance characteristics or other than the specified use is not permitted. The permissible torques and rotational speeds of the gearboxes must not be exceeded. The forces affecting on the gearbox shafts have to be limited to the maximum permissible values.

Unauthorised modifications or alterations to the product are not permitted.

According to the EC Machinery Directive 2006/42/EC, gearboxes are referred to as machine components and are therefore assemblies that do not fall within the scope of the Machinery Directive 2006/42/EC. Therefore, gearboxes are components to be installed in machines. The commissioning is forbidden until by or after the integration into the end product, the requirements of the machinery directives are met.

2.5 Contact

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Breitwiesenweg 2-8
73770 Denkendorf/Germany
+49 (0) 711 / 934 934-626
vertrieb@eppinger-gears.com
https://www.eppinger.de

3 Handling and transport

During handling and transport, suitable lifting equipment must be used depending on the weight of the gearbox. The permissible lifting capacities and other specifications of the hoist manufacturer must be observed.

DANGER!

Death or extremely serious injury / crippling caused by falling loads. During transport, never stay under suspended loads.

The weights given in Table 3 apply to gearboxes without motor flange.

Type	Weight about in kg		
PA	**1-stage**	**2-stage**	
50	0,7	0,9 kg	
70	1,5	1,9	
90	3,4	3,9	
120	9,2	10,9	
155	19,9	23,8	
PE	**1-stage**	**2-stage**	**3-stage**
40	0,5	0,8	0,9
60	0,9	1,2	1,5
80	2,3	2,8	3,2
120	7,5	9,2	10,7
160	17,5	23,6	-
PF	**1-stage**	**2-stage**	**3-stage**
40	0,6	0,8	1,0
60	1,2	1,4	1,7
80	3,2	3,6	4,2
120	8,6	10,3	12,0
PT	**1-stage**	**2-stage**	
62	2,2	2,6	
76	3,2	4,0	
101	6,5	8,6	
141	13,5	17,6	
182	34,0	41,6	
242	78	-	

Type	Weight about in kg		
PBA	**2-stage**	**3-stage**	
50	1,7	1,9	
70	2,4	2,8	
90	5,0	5,6	
120	14,9	16,7	
PBE	**2-stage**	**3-stage**	**4-stage**
40	1,0	1,3	1,5
60	2,0	2,3	2,6
80	3,8	4,2	4,7
120	12,9	14,6	16,2
PBF	**2-stage**	**3-stage**	**4-stage**
40	1,1	1,3	1,6
60	2,2	2,5	2,8
80	4,6	5,0	5,6
120	14,0	15,8	17,4
PR	**1-stage**	**2-stage**	
64	2,1	2,6	
90	4,4	5,1	
110	9,0	11,5	
140	16,0	18,2	
200	36,5	52,0	
255	81,0	95,0	

Table 3: Weights

4 Storage

The gearboxes have to be stored protected from dust, dirt and moisture. The temperature has to be between -5°C and +40°C and the humidity should not exceed 60%. The maximum storage period is 24 months and the corrosion protection has to be checked regularly to ensure that it is intact.

5 Assembly

CAUTION!

Assembly work may only be carried out by accordingly qualified trained personnel. First of all, check the gearbox for external damage.

CAUTION!

A damaged gearbox must not be operated.

Before installing the gearbox, always switch off the machine and secure it against a restart. In addition is has to be ensured that the machine cannot move.

DANGER!

Death or extremely serious injury / crippling caused by moving machine elements when accidentally switched on or by accidentally releasing stressed components during assembly.

Before installation, check the direction of rotation of the gearbox. The direction of rotation of the gearbox can be taken from the data sheet.

5.1 Mounting of the gearbox

The gearbox has to be securely screwed to the application. Special attention has to be paid to a flat support.

The centring collar on the output end of the gearbox housing can be used for the exact centring of the gearbox. The dimensions as well as the tolerances can be taken from the data sheet.

All existing mounting holes must always be used. At this, the screw tightening torque depends on the strength class of the screw as well as the material of the bearing face respectively the internal thread. The thread reach has to be

chosen according to the strength class of the screw as well as the material of the internal thread.

5.2 Assembly of the output shaft

The torque transmission takes place via a key or bolted flanges (PR series only).

5.2.1 Assembly of gearboxes with key

The shaft is suitable for mounting couplings or for a direct mounting of transmission elements such as gear wheels or belt wheels onto the shaft.

The gear shaft must be clean and free of grease or oil.

For the chosen transmission principle, the existing specification of the manufacturer of the coupling or the clamping device must be observed.

NOTICE
Damages of the gearbox caused by large axial loads during the assembly.
When pressing components onto the shaft, do not support the force via the gearbox housing.

The supporting length of the key must be suitable for the torque to be transmitted.

5.2.2 Assembly of gearboxes with flanged shaft

The flanged shaft of the PR series is suitable for mounting transmission elements such as gear wheels or belt wheels.

Always use all available threaded holes for the screw connection of the transmission elements.

The tightening torque to be used can be taken from Table 4. Use only screws with a strength class of at least 10.9.

Screw size	M5	M6	M8	M10	M16
Tightening torque in Nm	9.5	16	39	77	330

Table 4: Tightening torques output flange

5.3 Motor assembly

Prior to the assembly, degrease the coupling and the motor shaft.

DANGER!

Risk of injuries due to a slipping of the shaft. The torque cannot be reliably transmitted if the shaft is not assembled according to the indicated requirements.

Prior to the assembly of the motor, the coupling has to be aligned in such a manner that the clamping screw of the coupling can be tightened via the through hole of the locking screw in the motor flange (Figure 1 and Figure 2).

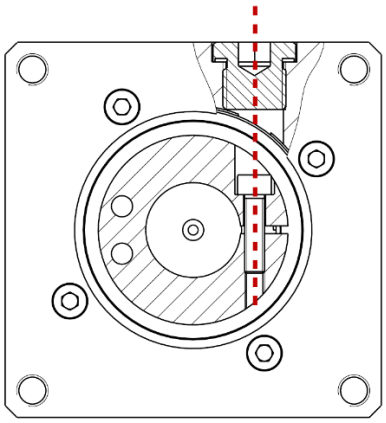

Figure 1: Clamping coupling PA, PE, PF, PBA, PBE, PBF gearboxes

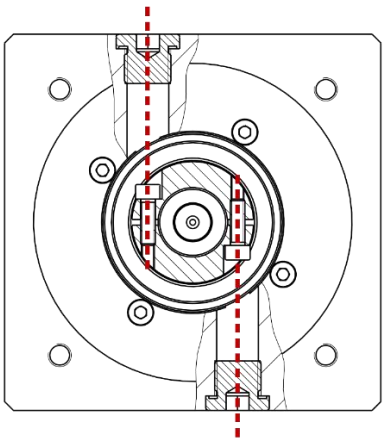

Figure 2: Clamping coupling PT and PR gearboxes

For motors with a key, this has to be removed prior to the assembling. The keyway must be aligned in such a manner that it matches the notch of the coupling hub.

Carefully introduce the motor shaft into the coupling bore. The motor shaft has to be introduced steadily at a right angle and concentrically to the bore. An angular or lateral misalignment during movement of the motor shaft can damage the coupling. An axial load of the coupling, e.g. by a canting of the motor shaft during the introduction into the coupling is not permissible.

NOTICE
Damaging of the coupling by a lateral, axial or angular displacement by the motor shaft during the assembling.

After the motor has been inserted until the motor plate is in contact with the gearbox flange, screw the motor to the gearbox flange. Take care of the thread reach of the screws. The thread reach of the motor flange shall be twice the length of the nominal diameter of the screw. (Figure 3)

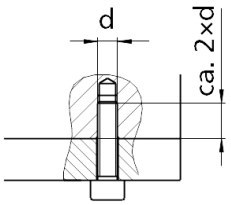

Figure 3: Length of the screw

After that, clamp the motor shaft in the coupling. The clamping screw of the coupling can be reached through the through hole of the locking screw in the motor flange.

For gearboxes of the PT and PR series with two opposing clamping screws (Figure 2), tighten these in turns, step by step, as steadily as possible.

The tightening torque to be used as well as the width across flats can be taken from Table 5.

Type	Gearbox size					
PA / PBA	**50**	**70** **90**		**120**	**155**	
PE	**40**	**60** **80**		**120** **160**		
PBE	**40**	**60** **80**		**120**	**160**	
PF / PBF	**40**	**60** **80**		**120**		
PT		**62** **76**	**101**	**141** **182** **(2-stage)**	**182** **(1-stage)**	**242**
PR		**64** **90**	**110**	**140**	**200** **255** **(2-stage)**	**255** **(1-stage)**
Tightening torque in Nm	4,6	9,5	16	39	77	330
Width across flats	AF3	AF4	AF5	AF6	AF8	AF14

Table 5: Tightening torques / Width across flats coupling clamping screw

NOTICE
Damaging of the coupling
The coupling has to be screwed together free from axial loads.

6 Commissioning

CAUTION!

The commissioning may only be carried out by accordingly qualified trained personnel.

Before commissioning, all mechanical mounting parts and their fastening must be checked. Check the screw tightening torques. Commissioning may only take place if the machine complies with the provisions of the EC Machinery Directive. The monitoring and protective devices of the machine must not be put out of operation. In addition to EMERGENCY STOP buttons, EMERGENCY STOP command devices, covers and hoods, this also includes other protective devices such as sensors, light barriers and acoustic or optical emergency signals. The security of the gearbox can only be assured by the end product. Therefore, any commissioning with overridden protection equipment of the machine is not permitted.

DANGER!

Death or extremely serious injury / crippling caused by equipment in operation without suitable safety or protective devices by the surrounding end product.

7 Operation

CAUTION!

The gearbox may only be operated by accordingly qualified trained personnel.

The gearbox may only be operated with active protective and monitoring equipment of the machine.

DANGER!

Death or extremely serious injury / crippling caused by equipment in operation without suitable safety or protective devices by the surrounding end product.

WARNING!

Burns at hot surfaces.
During operation, the surface of the gearbox can reach high temperatures. It must be ensured that there is no unintentional contact with the surface of the gearbox.

During the operation, the gearbox should be observed.

Leakage, unusual temperature rises or an increase in the noise respectively vibration indicate a fault which has to be repaired. If one of these criteria should occur, the plant has to be shut down immediately. If the fault cannot be eliminated, contact ESA Eppinger (chapter 2.5).

8 Maintenance

CAUTION!

Maintenance may only be carried out by accordingly qualified trained personnel.

As a matter of principle, the PA, PE, PF, PBA, PBE, PBF, PT and PR gearboxes of the company ESA Eppinger are maintenance-free and lubricated for life.

For special gearboxes and gearboxes with operating conditions outside the specification, any separately communicated maintenance intervals and specifications apply.

NOTICE

Damages to the gearbox by a reduced lubricity.
Different lubricants must not be mixed. This may result in a reduced lubrication effect and a damaging of the gearbox.

DANGER!

Risk of burns during the oil change by hot gearbox oil.

CAUTION!

Skin irritation by intensive contact with lubricants.

9 Decommissioning

CAUTION!

Dismantling and disposal may only be carried out by accordingly qualified trained personnel.

9.1 Dismantling

Before dismantling the gearbox, always switch off the machine and secure it against a restart. In addition is has to be ensured that the machine cannot move.

DANGER!

Death or extremely serious injury / crippling caused by moving machine elements when accidentally switched on or by accidentally releasing stressed components during dismantling.

Where applicable, loosen the mounted coupling or clamping hub according to the manufacturer's instructions.

9.1.1 Motor disassembly

To loosen the clamping hub of the coupling, rotate it so that the clamping screw of the coupling can be reached via the bore in the motor flange. (Figure 1 and Figure 2, page 9)

This can be carried out, for example, by manually rotating the output shaft of the gearbox.

Depending on the gearbox, loosen the clamping screw (Figure 1) respectively the clamping screws (Figure 2) of the coupling. The width across flats can be taken from Table 5 (page 11).

After the loosening of the clamping coupling, the motor screw joint can be unscrewed.

WARNING!

Risk of injury.
The motor is only attached with the motor screw joint. After the loosening of the motor screw joint, the motor can suddenly draw loose.

Pull out the motor steadily and as concentrically as possible from the coupling.

NOTICE

Damaging of the coupling by a lateral, axial or angular displacement of the coupling by the motor shaft during the dismantling.

9.2 Disposal

ENVIRONMENTAL HAZARD!

Environmental compatibility, health risks, disposal regulations and the local possibilities of proper disposal must be observed.
Any and all operating materials, in particular oils, fats and lubricants are to be disposed of according to the national and regional applicable regulations.

CAUTION!

Skin irritation by intensive contact with lubricants.

10 Changes to these assembly instructions

Changes in version 2

- Adaption to the corporate design
- Added PA- and PBA series
- Changes to weights and tightening torques