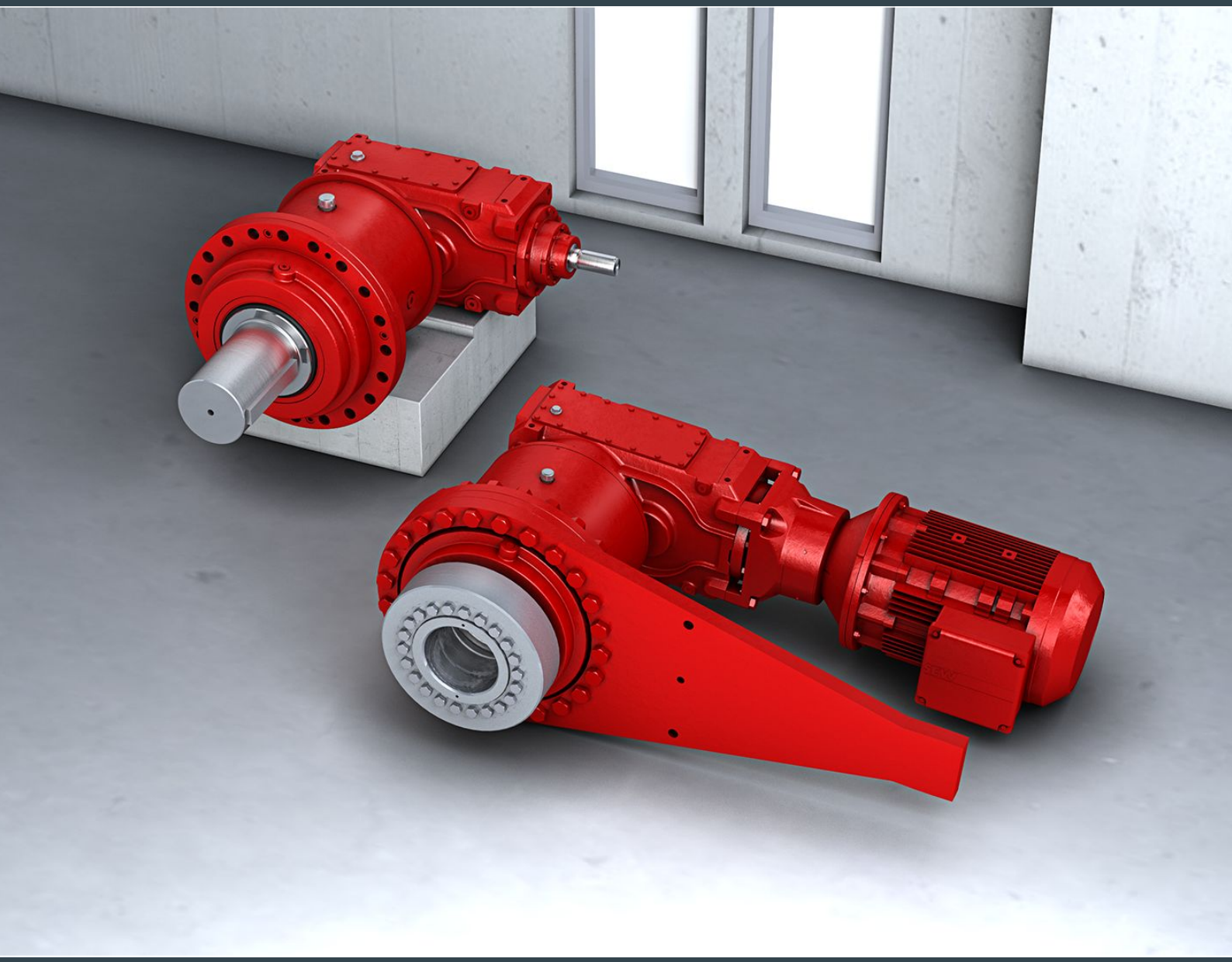
SEW EURODRIVE

Catalog



Industrial Gear Units
P-X Series
Torque Classes from 100 kNm to 500 kNm

Edition 11/2016

23087714/EN

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1 Introduction

1.1 The SEW-EURODRIVE group of companies

1.1.1 Global presence

Driving the world – with innovative drive solutions for all industries and for every application. Products and systems from SEW-EURODRIVE are used all over the world. Be it in the automotive, building materials, food and beverage or metal-processing industry – the decision to use drive technology "made by SEW-EURODRIVE" stands for reliability for both functionality and investment.

We are represented in the most important branches of industry all over the world: with 15 manufacturing plants and 77 Drive Technology Centers worldwide as well as our customer support, which we consider an integrative service that continues our commitment to outstanding quality.

1.1.2 Always the right drive

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, available space, and ambient conditions. Gear units and gearmotors offering a unique and finely tuned performance range and the best economic prerequisites to meet your drive requirements.

The modular DR.. motor series includes the energy-efficient motor types IE1 to IE4 and was designed and constructed with all worldwide requirements for energy efficiency classes in mind. The DR.. motor easily meets the requirements for approval and certification in all relevant countries. The energy-efficient drives achieve the highest efficiency in combination with SEW-EURODRIVE gear units.

The gearmotors are electronically enhanced by MOVITRAC® frequency inverters, MOVIDRIVE® drive inverters, and MOVIAXIS® multi-axis servo inverters – a combination that blends perfectly with the existing SEW-EURODRIVE program. As is the case with the mechanical systems, all development, production, and assembly is carried out entirely by SEW-EURODRIVE. In combination with our drive electronics, these drives provide the utmost in flexibility.

Products of the servo drive system, such as low backlash servo gear units, compact servomotors, or MOVIAXIS® multi-axis servo inverters ensure precision and dynamics. From single-axis or multi-axis applications to synchronized process sequences, servo drive systems from SEW-EURODRIVE enable flexible and customized implementation of your applications.

For economical, decentralized installations, SEW-EURODRIVE offers components from its decentralized drive system, such as MOVIMOT®, the gearmotor with integrated frequency inverter, or MOVI-SWITCH®, the gearmotor with integrated switching and protection function. SEW-EURODRIVE has developed hybrid cables to provide cost-effective functional solutions, irrespective of the system philosophy or scope. The latest developments from SEW-EURODRIVE: DRC.. electronic motor, MOVIGEAR® mechatronic drive system, MOVIFIT® decentralized drive controller, MOVIPRO® decentralized drive, positioning, and application controller, as well as MOVITRANS® system components for contactless energy transfer.

Power, quality, and robustness combined in a single standard product: with SEW-EURODRIVE, powerful movements are delivered by industrial gear units with high torques. The modular concept once again ensures optimum adaptation of industrial gear units to meet a wide range of different applications.

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1.1.3 Your ideal partner

Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding drive tasks in all industries and applications.

1.2 Products and systems from SEW-EURODRIVE

The products and systems by SEW-EURODRIVE are divided into the following product groups:

- Industrial gear units
- Gearmotors and frequency inverters
- Servo drive systems
- Decentralized drive systems
- MAXOLUTION®

Products and systems used in applications of several groups are listed in a separate group entitled "products and systems covering several product groups". The following tables indicate the products and systems included in the respective product group:

Industrial gear units
• X, MC, ML series helical and bevel-helical gear units • P002 – 102 series planetary gear units • XP130 – 250 series planetary gear units • P-X series planetary bevel-helical gear units • Application solutions with connections – Girth gears – Swing base – Gearmotor – Motor – Coupling – Brake – Lubrication system For conveyor drives, bucket conveyors, agitators, cooling towers, crane systems, and much more

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Gearmotors and frequency inverters		
Gear units / gearmotors	**Motors**	**Frequency inverters**
• Helical gear units / helical gearmotors • Parallel-shaft helical gear units / parallel-shaft helical gearmotors • Helical-bevel gear units / gearmotors • Helical-worm gear units / helical-worm gearmotors • SPIROPLAN® right-angle gearmotors • EMS drives • Geared torque motors • Pole-changing gearmotors • Variable-speed gear units / variable-speed gearmotors • Aseptic gearmotors • Explosion-proof gear units/ gearmotors • Explosion-proof variable-speed gear units / variable-speed gearmotors	• Asynchronous AC motors / AC brakemotors • Pole-changing AC motors / AC brakemotors • Energy-efficient motors • Explosion-proof AC motors / AC brakemotors • Torque motors • Single-phase motors / single-phase brakemotors • Asynchronous linear motors	• MOVITRAC® frequency inverters • MOVI4R-U® frequency inverters • MOVIDRIVE® drive inverters • Control, technology and communication options for inverters

Servo drive systems		
Servo gear units / gearmotors	**Servomotors**	**Servo drive inverters / servo inverters**
• Low backlash planetary servo gear units / planetary gearmotors • Low backlash helical-bevel servo gear units / helical-bevel gear units • R, F, K, S, W gear units / gearmotors • Explosion-proof servo gear units / servo gearmotors	• Asynchronous servomotors / servo brakemotors • Synchronous servomotors / servo brakemotors • Explosion-proof servomotors / servo brakemotors • Synchronous linear motors	• MOVIDRIVE® servo drive inverters • MOVIAXIS® multi-axis servo inverter • Control, technology and communication options for servo drive inverters and servo inverters

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Decentralized drive systems		
Decentralized drives	**Communication and installation**	**Contactless energy transfer system**
• DRC.. electronic motor / MOVIGEAR® mechatronic drive systems – DBC – Direct Binary Communication – DAC – Direct AS-Interface Communication – DSC – Direct SBus Communication – SNI – Single Line Network Installation • MOVIMOT® gearmotors with integrated frequency inverter • MOVIMOT® motors / brakemotors with integrated frequency inverter • MOVI-SWITCH® gearmotors with integrated switching and protection functions • MOVI-SWITCH® motors / brakemotors with integrated switching and protection function • Explosion-proof MOVIMOT® and MOVI-SWITCH® gearmotors	• Fieldbus interfaces • Field distributors for decentralized installation • MOVIFIT® product range – MOVIFIT® FDC for controlling MOVIGEAR® and DRC.. drive units – MOVIFIT® MC for controlling MOVIMOT® drives – MOVIFIT® SC with integrated electronic motor switch – MOVIFIT® FC with integrated frequency inverter • MOVIPRO® product range – MOVIPRO® SDC decentralized drive and positioning control	• MOVITRANS® system – Stationary components for energy supply – Mobile components for energy consumption – Line cables and installation material

MAXOLUTION®
• MAXOLUTION® packages for predefined application solutions • MAXOLUTION® systems for customer-specific system solutions and plants

Products and systems covering several product groups
• Operator panels • MOVI-PLC® drive-based control system • Components of the type "functional safety" • Diagnostic units

In addition to its products and systems, SEW-EURODRIVE offers a comprehensive range of services. These include:

- Technical consulting
- User software
- Seminars and training
- Extensive technical documentation
- Worldwide customer service

Visit our website at

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→ **www.sew-eurodrive.com**

The website provides comprehensive information and services.

1.3 Product names and trademarks

All product names included in this documentation are trademarks or registered trademarks of the respective titleholders.

1.4 Copyright notice

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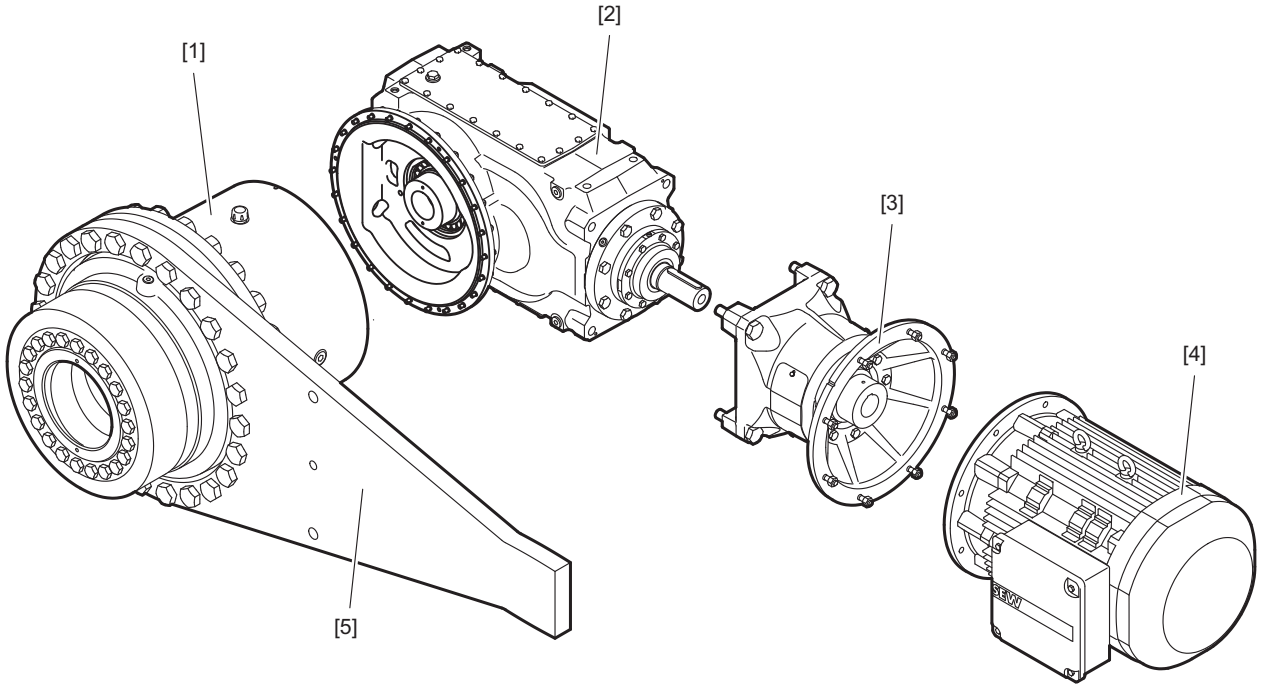
2 Product description

The P-X gear unit is a combination of:

- P.. series planetary gear unit output stage
- X.. series primary gear unit bevel-helical gear unit
- Mount-on components: Motor, coupling and motor adapter

There are 7 sizes of P-X series gear units with rated torques from 10070 Nm to 50000 Nm.

The following figure shows a sample combination of a planetary gear unit with torque arm, a primary gear unit, motor adapter, and a motor.



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[1] Planetary gear unit
[2] X.. series bevel-helical gear unit
[3] Motor adapter
[4] Motor
[5] Torque arm design

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2.1 Design features

Planetary gear units

- Can transmit high torques
- Are very compact
- Offer a high degree of torsional rigidity

Primary gear units

- Offer a large variance on the input side
- Are variable in the gear reduction range

2.2 Overview of advantages

- Optimally matched units
- Large range of options thanks to the SEW-EURODRIVE modular concept.
- Standardized units, which means excellent price/performance ratio and short delivery times.

2.3 Application areas

P-X gear units are mainly used in applications that require high performance and high torques.

For example:

- For industrial systems such as bucket wheel drives, shredders, wooden board systems
- For conveyor belts, e.g. apron conveyors

2.4 General information

2.4.1 Important information

Note the following points:

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- The illustrations in the catalog are examples. Final dimensions are available from SEW-EURODRIVE on request.
- The specified lubricant quantities are guide values only. Use the marks on the oil dipstick or oil level glass to determine the oil level.
- On delivery, the P-X gear units are ready for operation, but not filled with oil.
- Oil viscosity and grade must comply with those specified on the nameplate.
- The specified weight data are guide values. The exact gear unit weight is given in the order-specific dimension sheet. The nameplate shows the weight of the basic gear unit including all mounted gear unit options.
- The buyer must provide protection against unintentional contact with moving parts. The applicable safety regulations of the country in which the unit will be used are to be followed.

2.4.2 Power and torque

The power and torque values listed in the catalogs apply to standard design and standard lubrication of the gear units under normal ambient conditions.

Please note that the motor power shown in the selection tables for gear units is subject to selection. However, the output torque and the desired output speed are essential for the application and need to be checked.

2.4.3 Speeds

The quoted output speeds of the gear units are recommended values. You can calculate the rated output speed based on the rated motor speed and the gear unit ratio. Please note that the actual output speed depends on the motor load and the supply system conditions.

2.4.4 Noise

The noise levels of all gear units and motors (brakemotors) are well within the maximum permitted noise levels set forth in ISO 8579-1 for gear units and EN 60034 for motors.

2.4.5 Painting

Gear units and motors are painted in "blue gray"/RAL 7031 as per DIN 1843 as standard. Special paint coatings are available on request.

2.4.6 Weight information

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Please note that all weights shown in the catalog exclude the oil fill because the lubricant fill quantity depends on the mounting position.

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2.4.7 Air admission and accessibility

The gear units must be mounted on the driven machine in such a way that both axially and radially there is enough space left for unimpeded air admission and for the purposes of maintenance of the brake. Please also refer to the notes in the motor dimension sheets.

2.4.8 Brakemotors

On request, motors and gearmotors can be supplied with an integrated mechanical brake. The SEW-EURODRIVE brake is an electromagnetic disk brake with a DC coil that releases electrically and brakes using spring force. Due to its operating principle, the brake is applied if the power fails. It meets the basic safety requirements. The brake can also be released mechanically if equipped with manual brake release. For this purpose, the brake is supplied with either a hand lever with automatic reset or an adjustable set screw. The brake is controlled by a brake controller that is either installed in the motor wiring space or in the control cabinet.

A characteristic feature of the brakes is their extremely short design. The brake endshield is a part of both the motor and the brake. The integrated construction of the SEW-EURODRIVE brakemotor permits particularly compact and sturdy solutions.

2.4.9 International markets

Upon request, we deliver motors with connection requirements according to CSA and NEMA guidelines (UL listed).

For the Japanese market, we offer motors conforming to JIS standard. Contact your sales representative to assist you in such cases.

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2.5 Sizes and torques

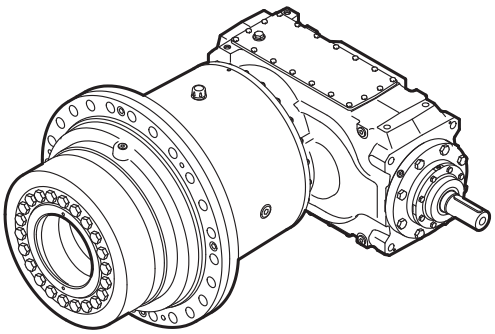
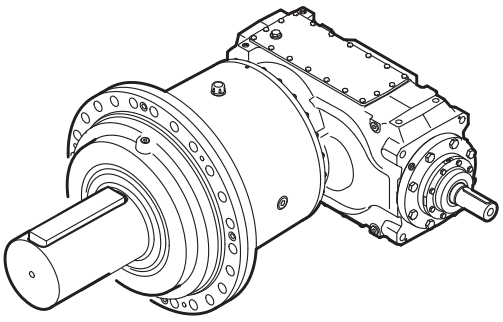
The nominal output torque ratings are listed in the table below.

Size	M_{n2} Nm
P.042	100170
P.052	124060
P.062	185660
P.072	245660
P.082	359400
P.092	423000
P.102	500000

2.6 Basic designs

The following designs of P-X gear units are available as standard:

Other designs are available on request.

	**PHF..X..** Planetary bevel-helical gear unit in flange-mounted design with hollow shaft and shrink disk
	**PF..X..** Planetary bevel-helical gear unit in flange-mounted design with solid shaft and key

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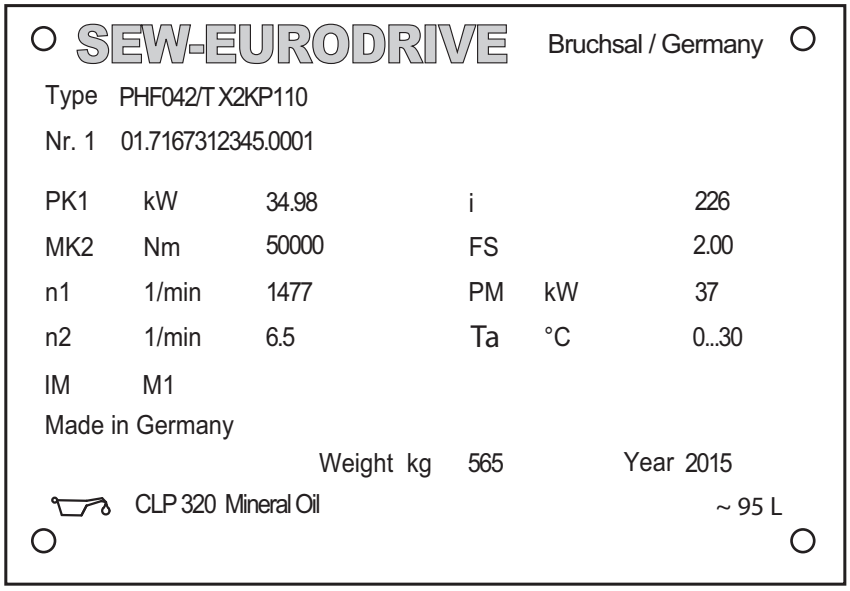
2.7 Nameplate

2.7.1 P-X gear unit series

The following example shows the structure of the nameplate.



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Type		Type designation
No. 1		Production number
P_{K1}	kW	Operating power on the input shaft (HSS)
M_{K2}	Nm	Gear unit output torque
n_1	1/min	Input speed (HSS)
n_2	1/min	Output speed (LSS)
i		Exact gear unit ratio
F_S		Service factor
P_M	kW	Nominal motor power
T_a	°C	Approved temperature range
IM		Mounting position
Weight	kg	Weight of the gear unit
Year		Year of manufacture
		Oil grade and viscosity class/oil quantity

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2.8 Type designation

The type designation is set up as follows:

PHF042 /T X2KP110/HP/F	
P..	P.. series planetary gear unit
PH..	Foot-mounted design, hollow shaft with shrink disk
PF..	Flange-mounted design, solid shaft
PHF..	Flange-mounted design, hollow shaft with shrink disk
042	Size
/T	Torque arm
X2KP	X series bevel-helical gear unit
110	Size
/HP	Housing for planetary gear unit
/F	Flange-mounted design

2.9 Abbreviations for output shaft designs

Gear unit design	Abbreviation	Meaning
Foot-mounted design (solid shaft)	P	• Solid shaft with key • Solid shaft with 2 keys (optional)
	PR	Solid shaft with key
	PL	Splined solid shaft
Flange-mounted design (solid shaft)	PF	• Solid shaft with key • Solid shaft with 2 keys (optional)
	PRF	Solid shaft with key
	PLF	Splined solid shaft
Foot-mounted design (hollow shaft)	PH	Hollow shaft with shrink disk
	PV	Splined hollow shaft
Flange-mounted design (hollow shaft)	PHF	Hollow shaft with shrink disk
	PVF	Splined hollow shaft

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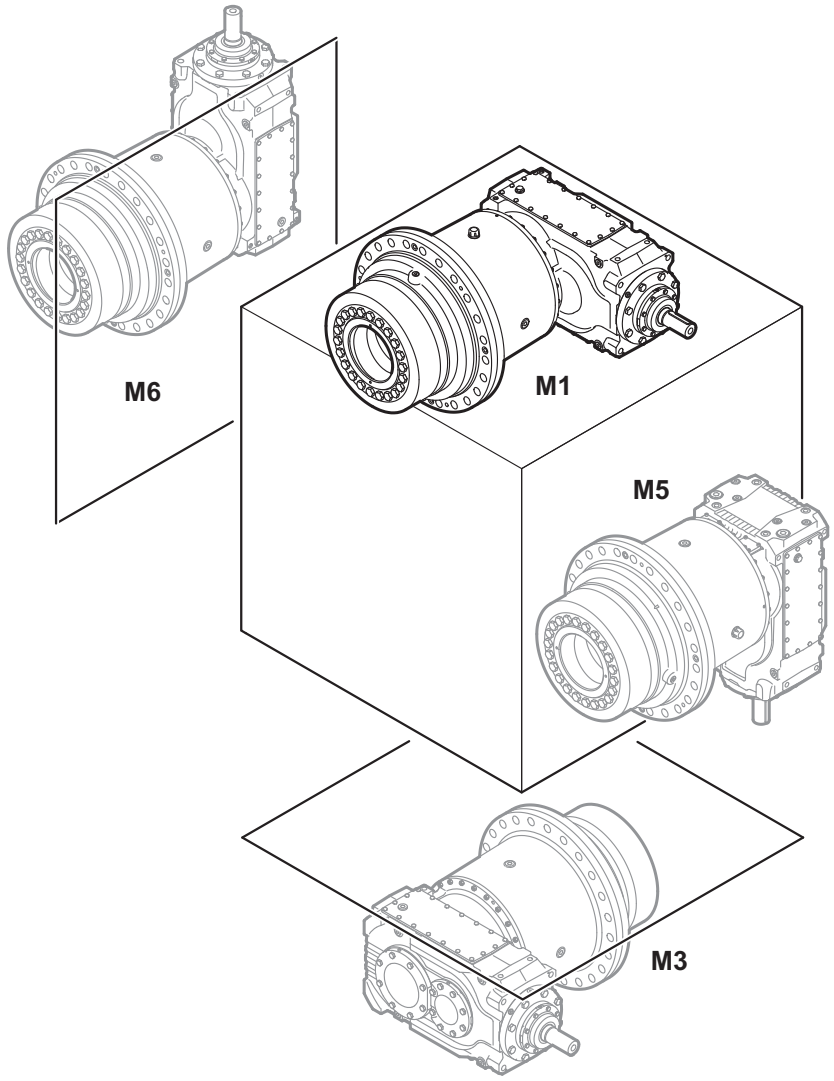
2.10 Mounting positions

2.10.1 Standard mounting position

The mounting position defines the spatial orientation of the gear unit housing and is designated **M1...M6**. The standard mounting position is **M1**.



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INFORMATION

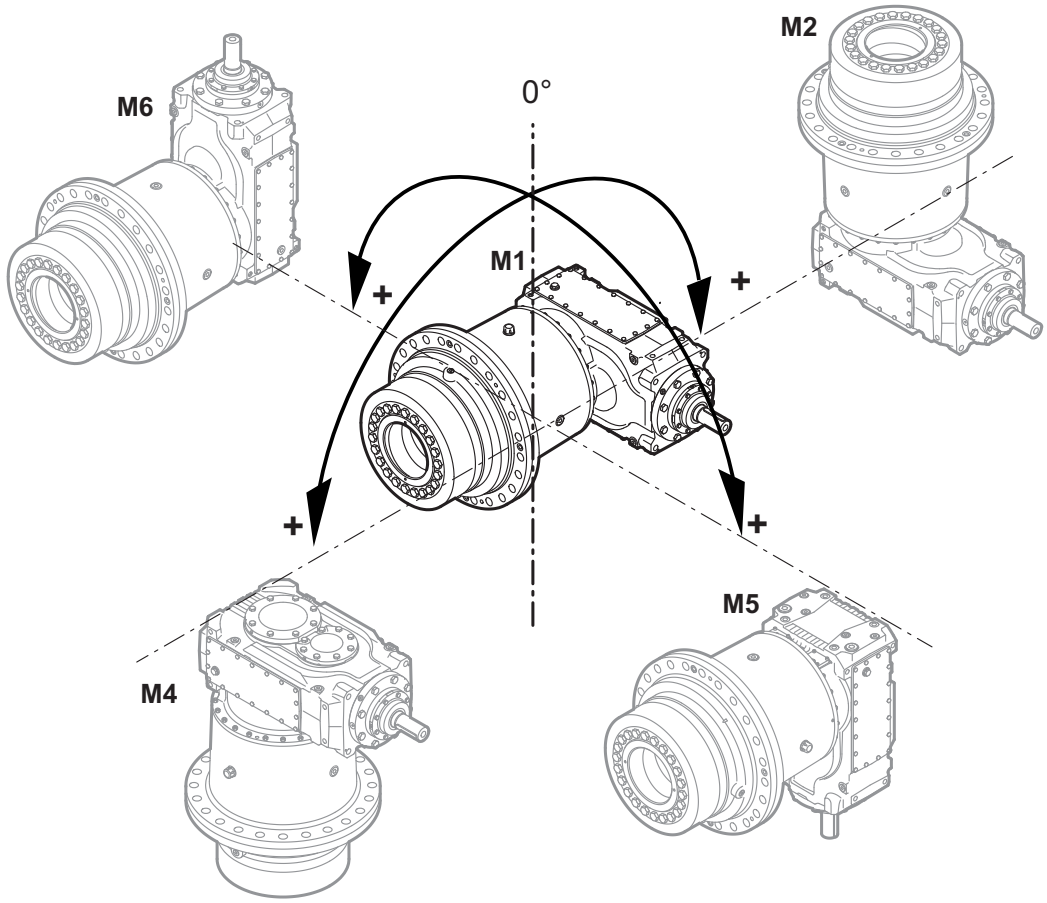
Contact SEW-EURODRIVE in case of a mounting position deviating from M1.

2.10.2 Fixed and variable pivoted mounting positions

Mounting positions deviating from the standard are differentiated between **fixed** and **variable** pivoted mounting positions.

INFORMATION

- Fixed and variable pivoted mounting positions are only possible after consultation with SEW-EURODRIVE. Observe the order documents, such as the dimension sheet.
- Fixed and variable pivoted mounting positions might involve restrictions concerning accessories and technical data. Also, delivery times might be longer. Contact SEW-EURODRIVE.



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Fixed pivoted mounting position

Definition:

Gear units with fixed pivoted mounting position have a fixed mounting position that differs from the standard.

This means the gear unit does not change its mounting position during operation.

Example:

The type designation is set up as follows:

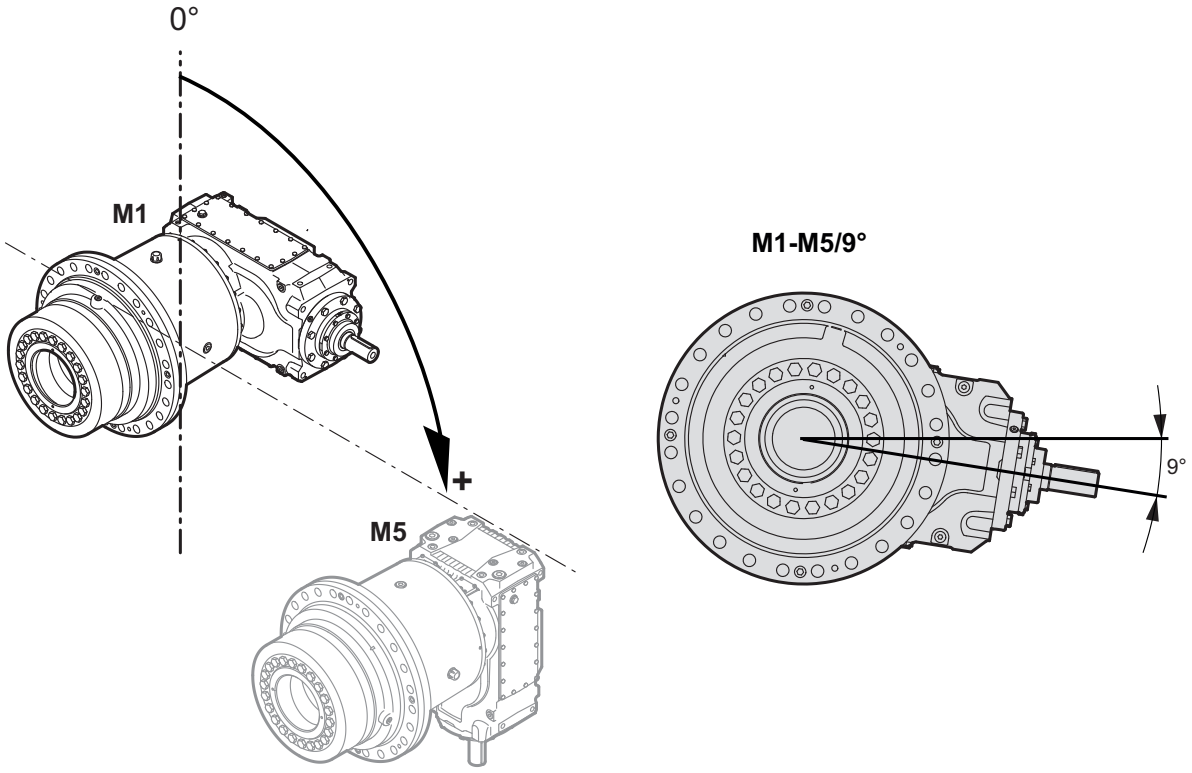
M1 = Initial mounting position

M5 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M5 by 9°

This results in the following fixed pivoted mounting position:



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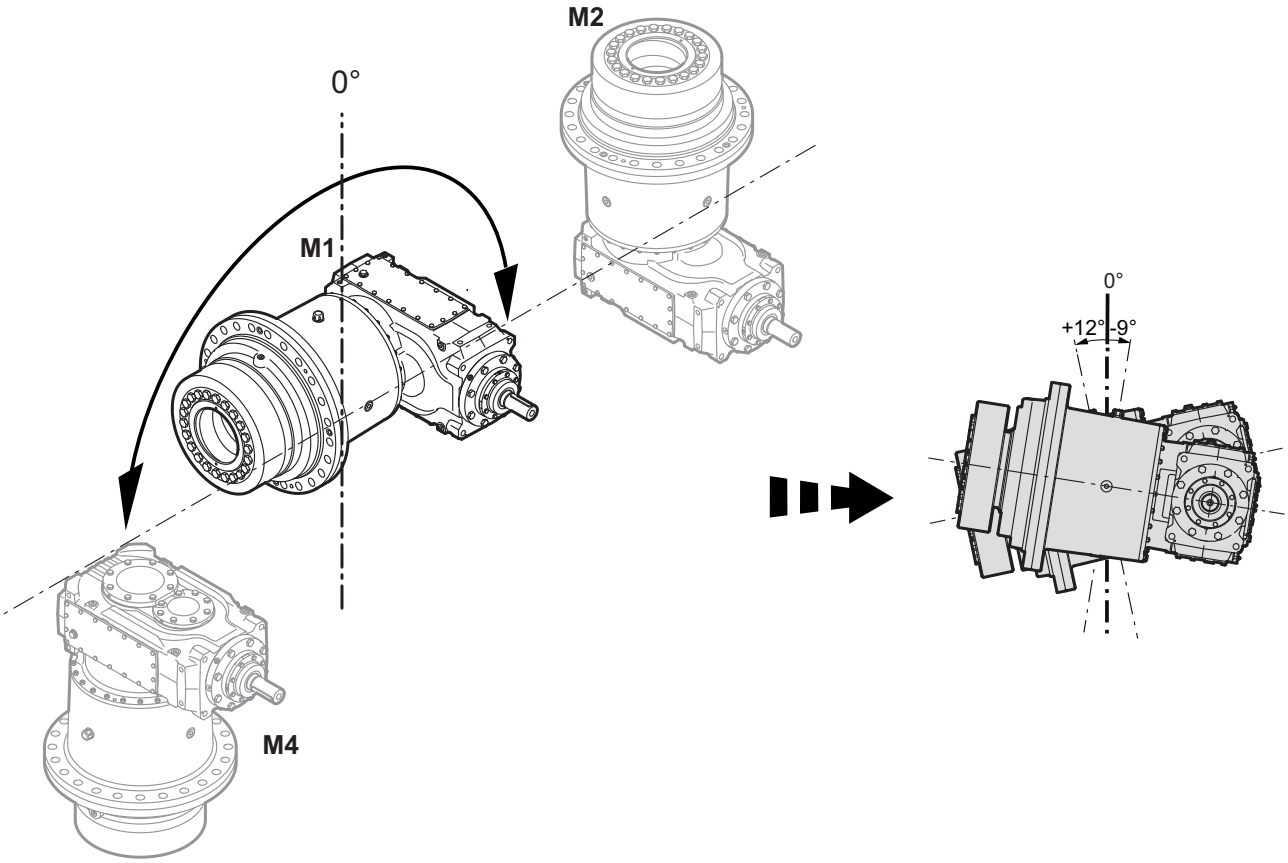
Variable pivoted mounting position

Definition:

Gear units with variable pivoted mounting position can change the specified pivoting angle during operation **variably** within the specified max./min. range.

Example:

The gear unit is operated in variable pivoted mounting position M1 to M2 = 9° and M1 to M4 = 12°.



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The largest pivoting angle determines the positive pivoting direction (12° > 9°). In this example, this is 12° towards M4.

Pivoted from M1 to M4 by +12°

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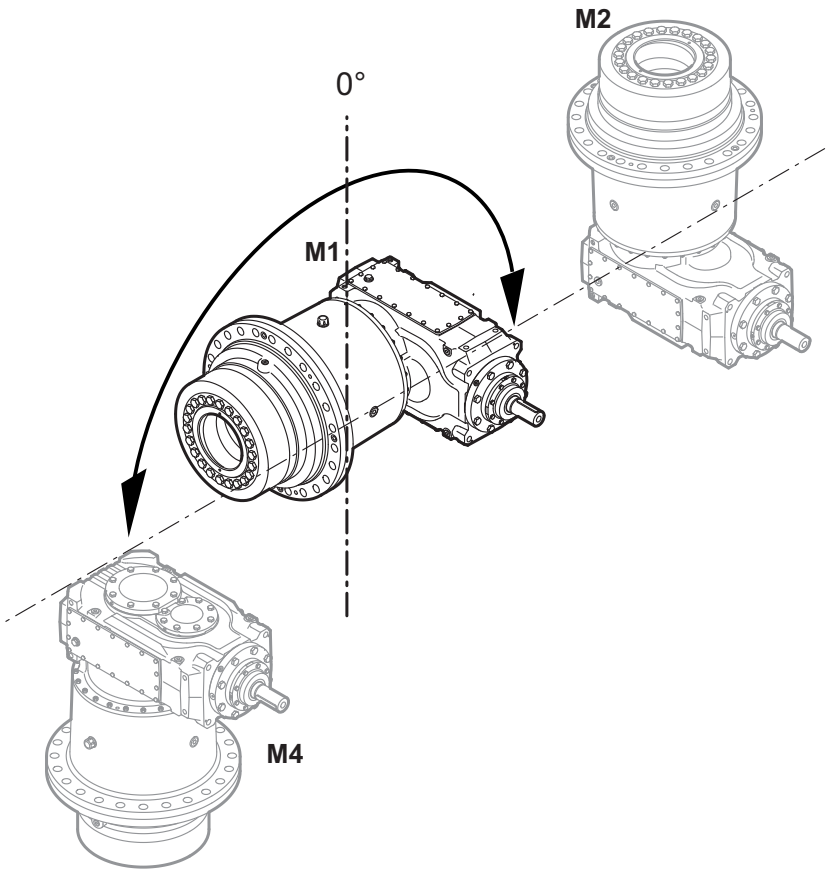
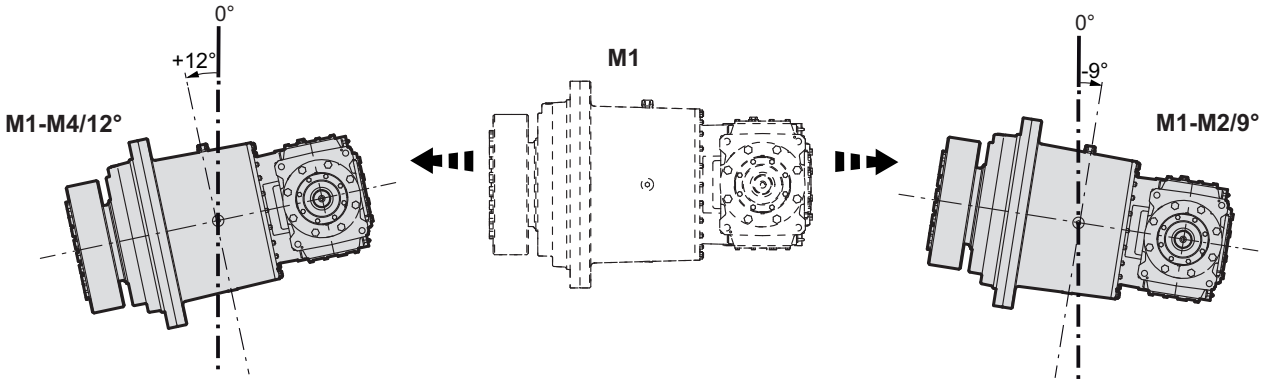
Pivoted from M1 to M2 by -9°





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The type designation for this example is:

M1-M4/–9°...12°

M1 = Initial mounting position

M4 = Pivoting direction

12° = pivoted from M1 to M4 by 12°

-9° = pivoted from M1 to M2 by 9° (= pivoted from M1 to M4 by -9°)

Combination of fixed and variable pivoted mounting positions

Fixed and variable pivoted mounting positions can be combined.

Example:

The following example shows a combination of fixed and variable pivoted mounting position.

M1-M4/9° (fixed pivoted mounting position)

M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

M1-M6/–9°...12° (variable pivoted mounting position)

M1 = Initial mounting position

M6 = Pivoting direction

12° = 12° from M1 to M6

-9° = 9° from M1 to M5 (= -9° from M1 to M6)

All final positions have to be specified if the mounting position of the gear unit deviates from standard mounting positions in several directions. Fixed and variable final positions can be combined.

Example of a gear unit based on mounting position M1 that is tilted by ±10 ° around the transverse axis during operation and is mounted in a fixed angle of 15 ° around the longitudinal axis:

M1 - M2/10°/V - M4/10°/V - M5/15°/F

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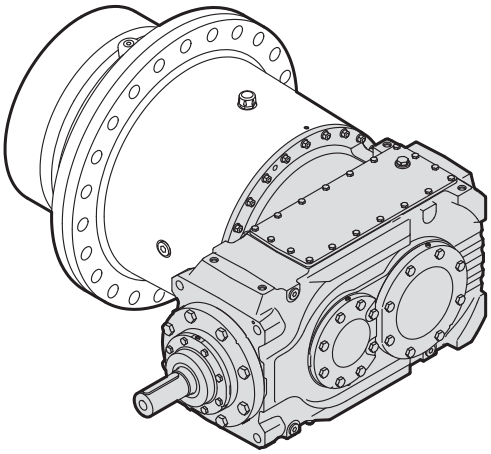
2.11 Mounting position of the primary gear unit

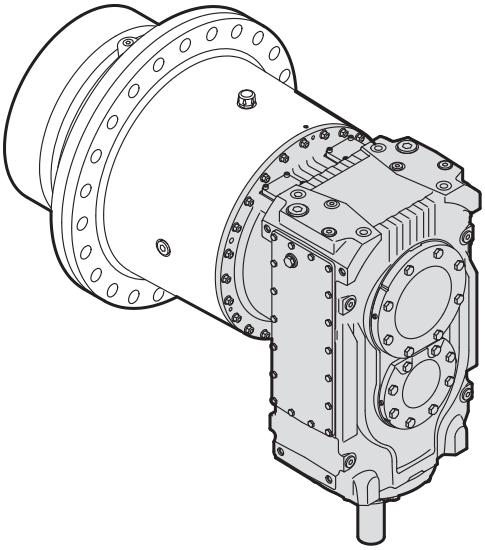
As standard, the primary gear unit can be mounted in the mounting positions **0°, 90°, 180° and 270°**.

The following figure shows the planetary gear unit in mounting position M1. For additional information on the mounting position, refer to chapter "Mounting position" (→ 17).

Primary gear unit mounting position 0°



Primary gear unit mounting position 90 °



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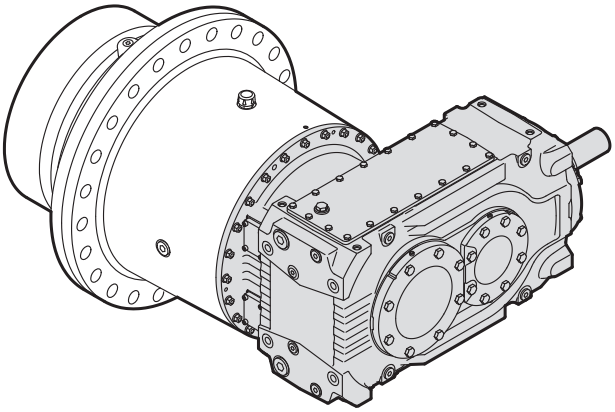
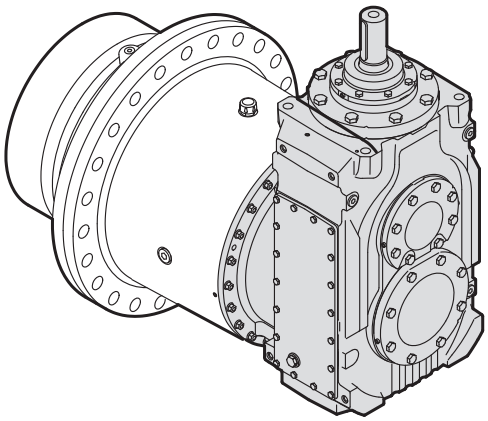
Primary gear unit mounting position 180 °


Primary gear unit mounting position 270 °


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In case of deviating mounting positions of the primary gear unit of 90° (lower input shaft) and 270° (upper input shaft) contact SEW-EURODRIVE. In this case different accessories are available.

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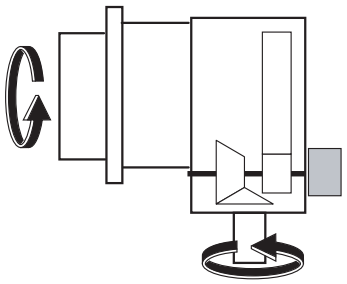
2.12 Directions of rotation dependencies

The following figure shows the direction of rotation dependency between input and output shaft. The gear units as well as the position of the backstop are schematically shown.

Shaft position 03 Pos. of end gear 4	
P.X2K..	

▯ = Position of the backstop

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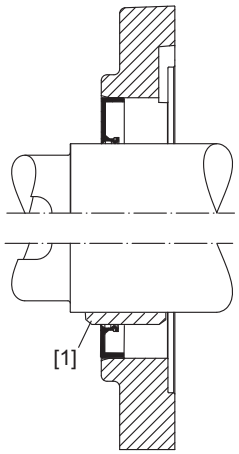
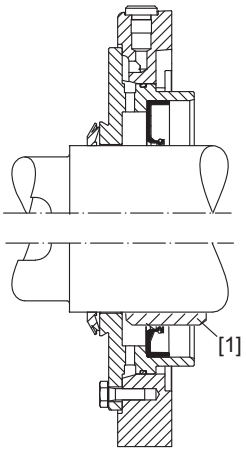
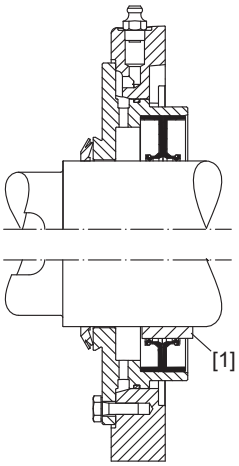
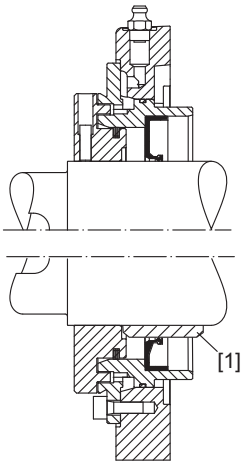
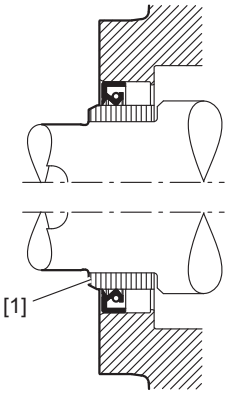
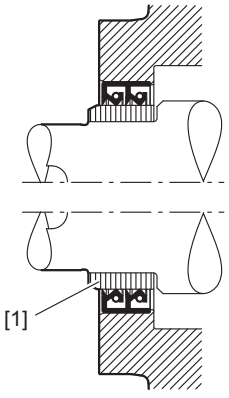
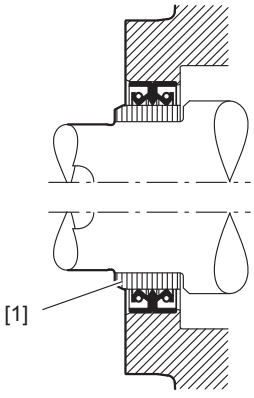
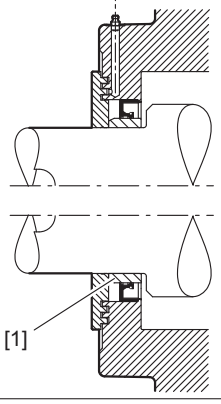
2.13 Sealing system

2.13.1 Input shaft

Standard	Dust-proof	Dust-proof Regreasable	Radial labyrinth seal (Taconite) Regreasable
Single oil seal with dust protection lip	Single oil seal with dust protection cover	Double oil seal with dust protection cover	Single oil seal with radial labyrinth seal
Normal environment	**Medium** dust load with abrasive particles	**High** dust load with abrasive particles	**Very high** dust load with abrasive particles
			
[1] Optional with oil seal sleeve			

2.13.2 Output shaft

Standard for mounting positions M1/M3/M5/M6	Standard for mounting positions M1/M3/M5/M6	Standard for mounting positions M1/M3/M5/M6	Radial labyrinth seal Regreasable for mounting positions M1/M3/M5/M6
Single oil seal, inside sealing with dust protection lip on a hardened sleeve [1]	2 oil seals, inside sealing on a hardened sleeve [1]	1 oil seal, inside sealing, and 1 oil seal, outside sealing, on a hardened sleeve [1]	Single oil seal with radial labyrinth seal on a hardened sleeve [1]
• Normal environment	• **Medium** dust load with abrasive particles	• **High** dust load with abrasive particles and splash water load	• **Very high** dust load with abrasive particles
			

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2.14 Storage and transport conditions

The gear units can be provided with the following protection and packaging types depending on the storage and transport conditions.

2.14.1 Internal conservation

Standard corrosion protection

After the test run, the test oil fill is drained out of the gear unit. The remaining oil film protects the gear unit against corrosion for a limited period of time.

Long-term corrosion protection

After the test run, the test oil fill is drained out of the gear unit and the interior space is filled with a vapor phase inhibitor. The breather filter is replaced by a screw plug and enclosed with the gear unit.

2.14.2 Exterior corrosion protection

The following measures are taken for exterior corrosion protection:

- Anti-corrosion agent is applied to bare, non-painted functional surfaces of shafts, flanges, mounting and foot surfaces of the housing. Remove it only using an appropriate solvent which is not harmful to the oil seal.
- Small spare parts and loose pieces, such as bolts, nuts, etc., are packed in corrosion protection plastic bags (VCI corrosion protection bags).
- Threaded holes and blind holes are covered by plastic plugs.

INFORMATION

- If the gear unit is stored longer than six months, regularly check the protective coating of unpainted areas as well as the paint coating. Areas in which the protective coating and/or painting has been damaged may have to be repainted.

2.14.3 Packaging

Standard packaging

The gear unit is delivered on a pallet, securely attached and without cover.

Use: Transportation by land

Long-term packaging

The gear unit is delivered in a wooden box that is also appropriate for sea transport.

Use: Sea transport and/or for extended storage

2.14.4 Storage conditions

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INFORMATION

- During storage up to startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing races!
- The output shaft must be rotated at least one full rotation every 6 months so that the position of the rolling elements in the bearings of the input and output shafts changes.
- The gear units are delivered without oil; different protection systems are required depending on the storage period and storage conditions as shown in the table below.

Corrosion protection + packaging	Storage location	Storage duration
Standard corrosion protection + Standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks.	Max. 6 months with intact surface protection.
Long-term corrosion protection + Standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks.	Max. 3 years with regular inspection and checking for intactness.
Long-term corrosion protection + Long-term packaging	With roof, protected against rain and shocks.	Max. 3 years with regular inspection and checking for intactness.

INFORMATION

If stored in tropical zones, provide for sufficient protection against insect damage. Contact SEW-EURODRIVE for differing requirements.

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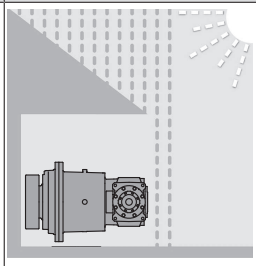
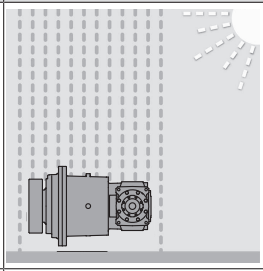
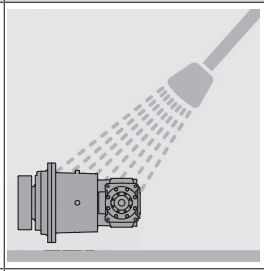
2.15 Corrosion and surface protection

2.15.1 OS surface protection

Gear units are available with surface protection OS1, OS2, and OS3.

The following table gives an overview of coating and surface protection systems.

SEW-EURODRIVE design	OS1 Low environmental impact	OS2 Medium environmental impact	OS3 High environmental impact
Used as surface protection with typical ambient conditions Corrosivity categories DIN EN ISO 12944-2			
	Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)	Suitable for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high)
Sample applications	• Systems in saw mills • Agitators and mixers	• Applications in gravel plants • Cableways	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	120 h	120 h	240 h
Salt spray test ISO 7253	–	240 h	480 h
Top coat color[1)]	RAL 7031	RAL 7031	RAL 7031
Color according to RAL	Yes	Yes	Yes
Uncoated parts shaft end/ flanges	Water and hand perspiration repelling anticorrosion agent applied at the factory for external preservation		

1) Standard color

INFORMATION

Sheet metal parts (e.g. protection covers) are painted in RAL 1003.

Special surface protection is also available, please contact SEW-EURODRIVE.

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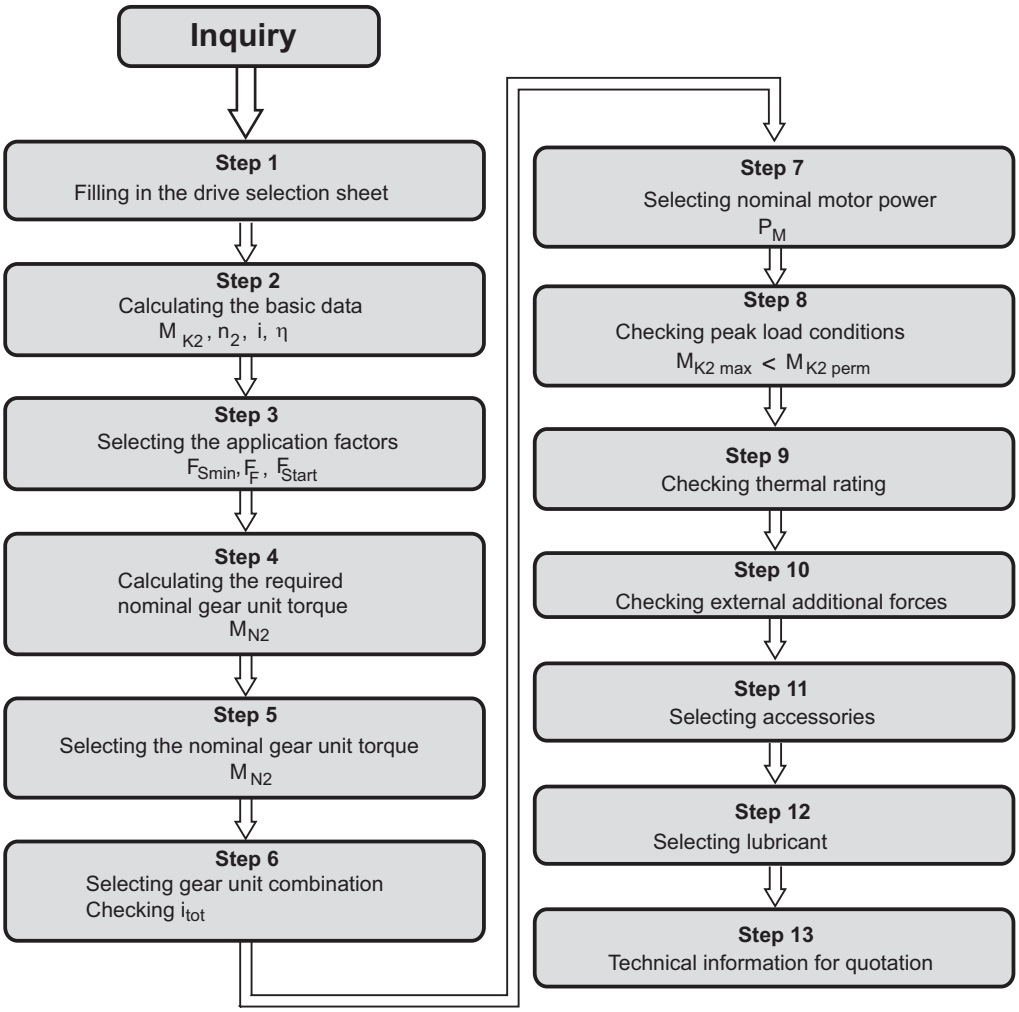
3 Project planning for gear units

3.1 Project planning procedure



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3.1.1 Step 1: Drive selection data:

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1. Machine on LSS (normally a driven machine)

Key: [...] = Values to be filled in
[X] = Mark your selection with ☒

1.1 Area of application/industry [...]

1.2 Application [...]

1.3 Ambient temperature [°C] [...]

normal | min. | max.

1.4 Installation altitude [m] [...]

1.5 Gear unit installation [X]

- ☐ Small space ($v_a \geq 0{,}5$ m/s)
- ☐ Large spaces and halls ($v_a > 1{,}4$ m/s)
- ☐ Outdoors with sun protection ($v_a > 3$ m/s)

1.6 Ambient conditions [X]

- ☐ Normal
- ☐ Dusty
- ☐ Damp
- ☐ Corrosive
- ☐ Dry

2. Load characteristics

2.1 Required speed n_2 [1/min] [...]

normal | min. | max.

2.2 Operating power on HSS P_{K1} [kW] [...]

normal | min. | max.

2.3 Operating torque on LSS M_{K2} [kNm] [...]

normal | min. | max.

2.4 Frequency of load peaks ($M_{K2\ max.}$ oder $P_{K1\ max.}$)

per hour

2.5 Number of startups per hour [...]

Startups

2.6 Service life [X]

- ☐ Infinite fatigue strength (Gearing acc. to DIN 3990)
- ☐ Defined service life [h]

2.7 Direction of rotation under load (LSS) [X]

- ☐ CW rotation
- ☐ CCW rotation
- ☐ Both directions of rotation
- ☐ Reversible

2.8 Operating time/day [X]

- ☐ < 3 hours
- ☐ 3 – 10 hours
- ☐ > 10 hours

2.9 Backstop required [X]

- ☐ No
- ☐ Yes

2.10 Exact load cycle attached [X]

- ☐ No
- ☐ Yes

3. Machine on HSS (normally a drive machine)

3.1 Type: [X]

- ☐ AC motor
- ☐ AC motor/inverter
- ☐ DC motor
- ☐ Hydraulic motor
- ☐ Servomotor

3.2 Motor power P_M [kW] [...]

normal | min. | max.

3.3 Motor speed n_M [kW] [...]

normal | min. | max.

3.4 Nominal motor torque M_M [Nm] [...]

normal | min. | max.

3.5 Input speed n_1 [1/min] [...]

normal | min. | max.

3.6 If electric motor: [X] [...]

- ☐ IEC
- ☐ NEMA

Motor size (IEC or NEMA code):

3.7 Motor mounting position [X] [...]

- ☐ B3
- ☐ B5
- ☐ V1
- ☐ Other:

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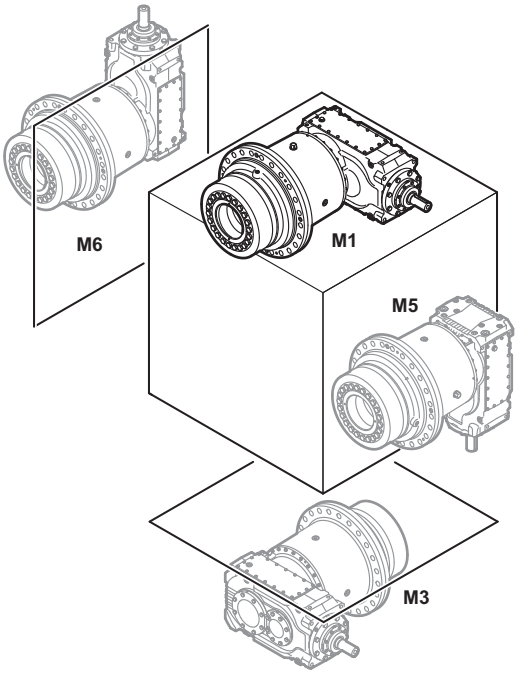
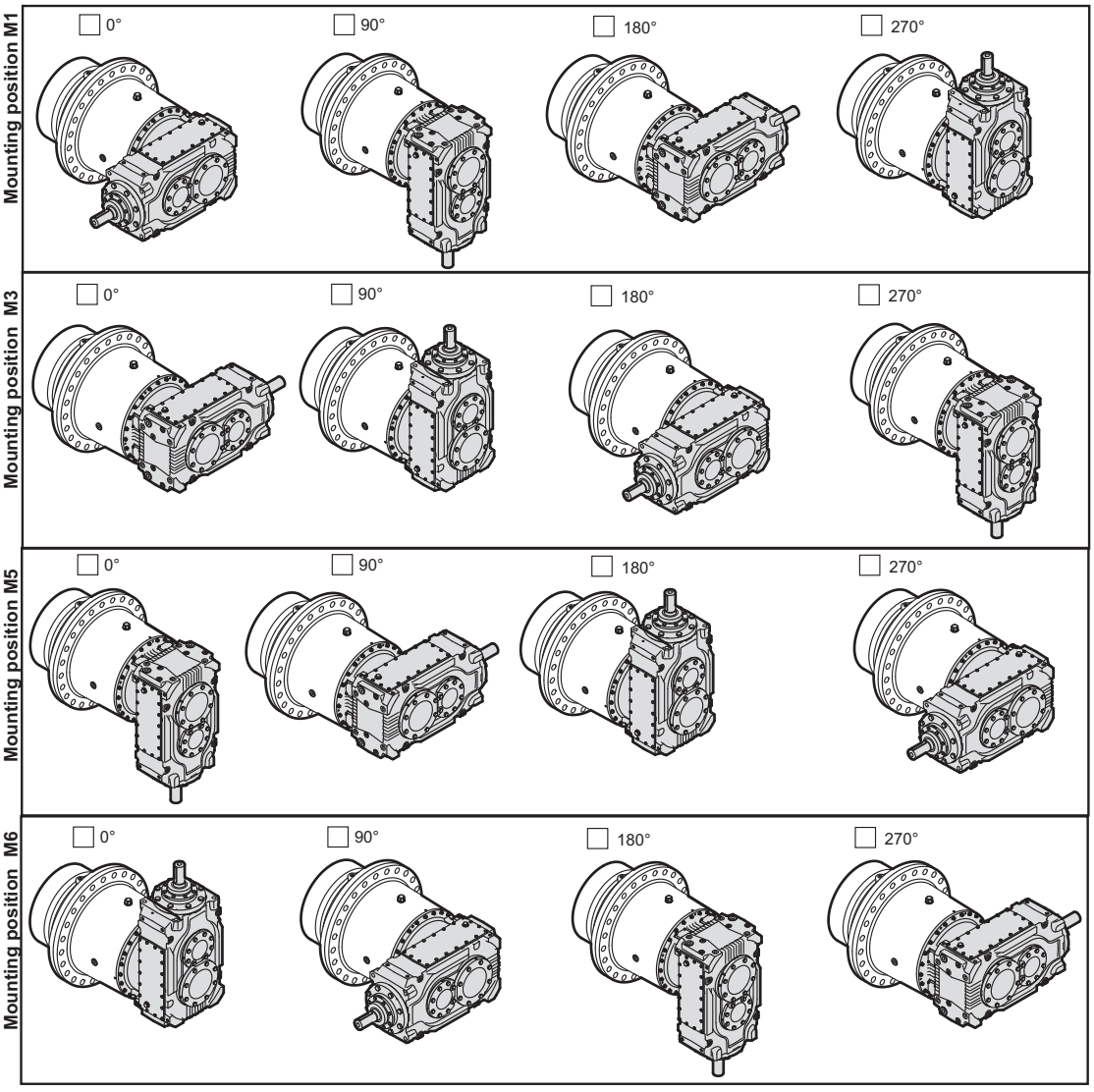
4.0 Gear unit requirements

4.1 Mounting position [X]

- ☐ M1
- ☐ M3
- ☐ M5
- ☐ M6



4.2 Mounting position of the primary gear unit [X]



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4.3 Application-specific operating factor $F_{S\ min.}$ [X] [...]

☐ In relation to motor power P_M / motor torque M_M

☐ Operating power at LSS P_{K2} / operating torque at LSS M_{K2}

4.4 Assembly of gear unit housing [X]

☐ Foot
☐ Flange
☐ Torque

4.5 LSS connection to customer machine shaft [X] [...]

☐ Elastic clutch (claw or bolt coupling)
☐ Flexible coupling
☐ Rigid flange coupling
☐ Barrel coupling
☐ Sprocket
☐ Pinion
☐ Hollow shaft – torque arm
☐ Hollow shaft – foot mounting
☐ Hollow shaft – flange mounting
☐ Other

4.6 LSS gear unit design [X] [...]

LSS design (if with solid shaft)

☐ Solid shaft with key
☐ Solid shaft with 2 keys
☐ Solid shaft without keyway
☐ Smooth shaft
☐ Solid shaft with splined hollow shaft DIN 5480
☐ Other

LSS design (if with hollow shaft)

☐ Hollow shaft for shrink disk connection, including shrink disk
☐ Splined hollow shaft DIN 5480
☐ Other

4.7 HSS connection to motor [X]

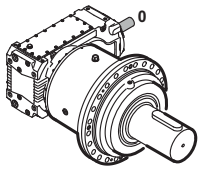
☐ Customer installation (base frame)
☐ Motor adapter with elastic coupling
☐ Motor bracket with V-belt drive
☐ Motor scoop
☐ Other, see sketch

4.8 Machine shaft bearings

☐ 2 bearings, gear unit transmits only the torque
☐ 1 bearing opposite the gear unit, gear unit acts as a point of support
☐ 1 bearing right at the gear unit, gear unit acts as a point of support

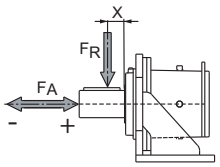
4.9 Forces acting on the input shaft HSS [X] [...]

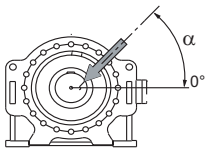
	Shaft 0
Axial force F_A [kN]	
Radial force F_R [kN]	
Distance from shaft shoulder X [mm]	
Application angle of the radial force α [°]	



or variable ☐

4.10 Forces at the LSS [X] [...]





	normal	min.	max.
Axial force F_{A2} [N]			
Radial force F_{R2} [N]			
Distance from shaft shoulder X [mm]			

Application angle of radial force α [°]

or rotating ☐

4.11 Electric power supply [X] [...]

	AC 3-phase	AC 1-phase	DC		
Line voltage V_{line}	☐	☐	☐	V	HZ
Auxiliary voltage V_{aux}	☐	☐	☐	V	HZ

Degree of protection: IP

Explosion protection required: ☐ Yes ☐ No

4.12 Permitted cooling (if required) [X]

	Permitted	Not permitted
Fan	☐	☐
Cooling cartridge	☐	☐
External oil-air cooler	☐	☐
External oil-water cooler	☐	☐

Cooling water available: ☐ Yes ☐ No

Cooling water temperature: °C

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3.1.2 Step 2: Calculation of basic data – M_{K2}, n_2, i, η

Constant torque	$M_{K2} = \frac{P_{K1} \times 9550 \times \eta}{n_2} Nm$ Note: If P_{K1} unknown → $P_{K1} = P_M$ M_{K2} = Operating torque on LSS in Nm P_{K1} = Required operating power at HSS in kW n_2 = Output speed (LSS) in min^{-1}
Gear ratio	$i = \frac{n_1}{n_2}$ n_1 = Input speed (HSS) in min^{-1} n_2 = Output speed (LSS) in min^{-1}
Efficiency – η	η = f (i; gear unit type) The efficiency of the gear unit is mainly determined by the gearing and bearing friction as well by churning losses. For the calculation, a guide value of 96% is used.

3.1.3 Step 3: Selecting application factors

Application-specific service factor	$F_{S\,min}$
Peak load factor	F_F
Startup factor	F_{Start}

$F_{S\,min}$ - application-specific service factor

The application-specific service factor F_s considers the typical load behavior with regard to the driven machine.

Recommended values with reference to

- Area of application
- Type of driven machine
- Operating hours/day

are given in the following table.

INFORMATION

These tables apply only to gear units driven by electric motors. For other types of drive motors, the following correction values apply:

- $F_{S\,min}$ (selection table) + 0.25 for combustion engines with 4 or more cylinders:
- $F_{S\,min}$ (selection table) + 0.5 for combustion engines with 1 to 3 cylinders:

INFORMATION

In the event of deviations from the typical load behavior, please contact SEW-EURODRIVE.

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Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\ min}$ Operating period / day		
		Gearing with infinite fatigue strength (referring to DIN 3990)		
		< 3 h	3-10 h	> 10 h
Waste water treatment	Impeller aerator	-	1.80	2.00
	Thickeners	1.15	1.25	1.50
	Vacuum filters	1.15	1.30	1.50
	Collector	1.15	1.25	1.50
	Screw pump	-	1.30	1.50
	Brush aerators	-	-	2.00
Mining	Crushers	1.55	1.75	2.00
	Screens and shakers	1.55	1.75	2.00
	Slewing drives	-	1.55	1.80
	Bucket-wheel excavator - mining	1)	2.00*	2.30*
	Bucket-wheel excavator - bulk material	1)	1.70	1.70
Energy	Frequency inverters	-	1.80	2.00
	Water wheels (low speed)	-	-	1.70
	Water turbines	-	-	1)
Conveyors	Bucket elevators	-	1.40	1.50
	Vertical conveyors – other	-	1.50	1.80
	Belt conveyors ≤ 100 kW	1.15	1.25	1.40
	Belt conveyors > 100 kW	1.15	1.30	1.50
	Apron feeders	-	1.25	1.50
	Screw feeders	1.15	1.25	1.50
	Shakers, screens	1.55	1.75	2.00
	Escalators	1.25	1.25	1.50
	Passenger elevators	1)	1)	1)
Rubber and plastic industry	Extruders (plastic)	-	1.40	1.60
	Extruders (rubber)	-	1.50	1.80
	Rubber rollers (2 in a row)	1.55	1.75	2.00
	Rubber rollers (3 in a row)	-	1.50	1.75
	Heating rollers	1.35	1.50	1.75
	Calender	-	1.65	1.65
	Mills	1.55	1.75	2.00
	Mixing rollers	1)	1)	1)
	Slab rollers	1.55	1.75	2.00
	Refiners	1.55	1.75	2.00
	Tire machines	1)	1)	1)
Timber industry	Timber industry	1)	1)	1)
Cranes	Cranes and hoists	2)	2)	2)
Food industry	Crushers and mills	-	-	1.75
	Beet slicers	-	1.25	1.50
	Drying drums	-	1.25	1.50

1) Contact SEW-EURODRIVE

2) Please contact SEW-EURODRIVE; dimensioning according to FEM1001

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* only after customer consultation

Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\,min}$ Operating period / day		
		Gearing with infinite fatigue strength (referring to DIN 3990)		
		< 3 h	3-10 h	> 10 h
Metal production and processing	Winder	-	1.60	1.75
	Cutting rollers	1.55	1.75	2.00
	Table conveyors, single drives	1)	1)	1)
	Table conveyors, group drives	1)	1)	1)
	Table conveyors, reciprocating	1)	1)	1)
	Wire drawing machines	1.35	1.50	1.75
	Rollers	1)	1)	1)
Mills and drums	Cooling and drying drums	-	1.50	1.60
	Rotary kilns	-	-	2.00
	Ball mills	-	-	2.00
	Coal mills	-	1.50	1.75
Pulp and paper industry	Debarking drums and machines	1.55	1.80	-
	Rolls (pick-up, wire drive, wire suction)	-	1.80	2.00
	Drying cylinders (rolling bearings)	-	1.80	2.00
	Calenders (rolling bearings)	-	1.80	2.00
	Filters (pressure and vacuum)	-	1.80	2.00
	Beaters and chippers	1.55	1.75	2.00
	Jordan mills	-	1.50	1.75
	Presses (bark, felt, glue, suction)	-	-	1.75
	Reels	-	-	1.75
	Pulpers	1)	1)	1)
	Washer filters	-	-	1.50
	Yankee cylinders (dryers)	1)	1)	1)
Pumps	Centrifugal pumps	1.15	1.35	1.45
	Reciprocating pumps (single-cylinder)	1.35	1.50	1.80
	Reciprocating pumps (multi-cylinder)	1.20	1.40	1.50
	Screw pumps	-	1.25	1.50
	Rotary pumps (gear pump, vane pump)	-	-	1.25
Agitators and mixers	Agitators for liquids	1.00	1.25	1.50
	Agitators for liquids (variable density)	1.20	1.50	1.65
	Agitators for solids (non-uniform material)	1.40	1.60	1.70
	Agitators for solids (uniform material)	-	1.35	1.40
	Concrete mixers	-	1.50	1.50
Cableways	Material ropeways	-	1.40	1.50
	Aerial tramways	-	1)	1)
	Surface lifts	1)	1)	1)
	Continuous aerial tramways	1)	1)	1)
	Funicular railways	1)	1)	1)
Fans	Heat exchangers	1.50	1.50	1.50
	Dry cooling tower	-	-	2.00
	Wet cooling towers	2.00	2.00	2.00
	Blowers (axial and radial)	1.50	1.50	1.50
Compressors	Reciprocating compressors	-	1.80	1.90
	Radial compressors	-	1.40	1.50
	Screw-type compressors	-	1.50	1.75

1) Contact SEW-EURODRIVE

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Peak load factor – F_F

The peak load factor F_F takes account of the overload capacity of the gearing and the rotating parts.

Planetary gear unit type/size	Peak load factor – F_F					
	Frequency of peak load per hour					
	1...5	6...20	21...40	41...80	81...160	> 160
Output shaft as solid shaft P042...P102	1	1.2	1.3	1.5	1.75	2.0
Hollow shaft with shrink disk connection P042...P102	1.1	1.2	1.3	1.5	1.75	2.0

Startup factor – F_{Start}

The startup factor F_{start} takes account of the overload caused by startup.

Startup mode	Startup factor – F_{Start}
Direct	3.0
Soft start	1.8
Frequency inverter	1.5 to 2.0[1)]
Star/delta	1.3
Hydraulic coupling without delay chamber	2.0
Hydraulic coupling with delay chamber	1.6

1) Depending on settings

3.1.4 Step 4: Calculation of the required nominal gear unit torque M_{N2}

Constant load direction – constant torque:

$$M_{N2} \geq M_{K2} \times F_{S\min} Nm$$

M_{N2} = Nominal gear unit torque in Nm
M_{K2} = Operating torque at LSS in Nm
$F_{S\ min}$ = Application-specific service factor

Reversing load direction – constant torque:

$$M_{N2} \geq M_{K2} \times F_{S\min} \times 1.43 Nm$$

M_{N2} = Nominal gear unit torque in Nm
M_{K2} = Operating torque at LSS in Nm
$F_{S\ min}$ = Application-specific service factor

3.1.5 Step 5: Selection of nominal gear unit torque M_{N2}

Size	M_{N2} Nm	$M_{N2\ Lim}$ Nm
P.042	100 170	200 340
P.052	124 060	248 120
P.062	185 660	371 320
P.072	245 660	491 320
P.082	359 400	718 800
P.092	423 000	846 000
P.102	500 000	1 000 000

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3.1.6 Step 6: Selecting the gear unit combination

The selection of the gear unit combination is based on the nominal gear unit torque M_{N2} according to the speed/power overview tables in chapter "Selection tables".

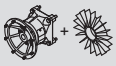
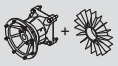
The selection table guide on the foldout page of the catalog can be used to quickly locate the speed/power overview table and to make a preliminary selection of the gear unit size.

If the input speed n_1 **<** 1000 min^{-1}, the value for 1000 min^{-1} can be used for M_{N2}.

For input speeds n_1 **>** 1800 min^{-1}, contact SEW-EURODRIVE.

The following figure shows the structure of the selection tables.

[1] [2] [3] [4] [6] [7] [8] [9] [5] [10]

P.042 X2K.	n_1 = 1000 min^{-1}						100 kNm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.042 X2KP110	159	6,3	69	55	76	)	53
	178	5,6	61	55	76	37	54
	202*	5	54	53	72	37	52
	226*	4,4	48	52	71	37	51

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[1] Gear unit designation
[2] Input speed (HSS)
[3] Total gear unit ratio (rounded)
[4] Output speed (LSS)
[5] Nominal gear unit torque
[6] Nominal gear unit power

Thermal rating at 20 °C ambient temperature, mounting position M1

[7] without fan
[8] With fan in motor adapter

Thermal rating at 40 °C ambient temperature, mounting position M1

[9] without fan
[10] With fan in motor adapter
) Contact SEW-EURODRIVE
* X2K. primary gear units have a gear ratio $i_N \geq 10$

3.1.7 Step 7: Selecting the nominal motor power P_M

$$P_M \geq P_{K1} = \frac{P_{K2}}{\eta}\, kW$$

P_M = Nominal motor power in kW
P_{K1} = Operating power at HSS in kW
P_{K2} = Operating power at LSS in kW
η = Efficiency

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3.1.8 Step 8: Checking the peak load conditions – $M_{K2\ per}$; M_{K2max}

Constant load direction:

$$M_{K2per} = \frac{M_{N2Lim}}{F_F} Nm$$

M_{K2per} = Permitted peak output torque in Nm
M_{N2Lim} = Limited nominal gear unit torque in Nm
F_F = Peak load factor

Reversing load direction:

$$M_{K2per} = \frac{M_{N2Lim}}{F_F} \times 0.7 Nm$$

M_{K2per} = Permitted peak output torque in Nm
M_{N2Lim} = Limited nominal gear unit torque in Nm
F_F = Peak load factor

Calculating the peak load $M_{K2\ max}$:

$$M_{K2max} = M_a \times F_{start}^{*} Nm$$

M_{K2max} = Peak output torque in Nm
M_a = Output torque in relation to nominal motor power in Nm
F_{start} = Startup factor

* If F_{start} is not specified, take the startup factors from the table on "Startup factor – F_{start}".

Checking the gear unit selection:

$$M_{K2max} \leq M_{K2per}$$

M_{K2per} = Permitted peak output torque in Nm
M_{K2max} = Peak output torque in Nm

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3.1.9 Step 9: Checking the thermal rating – P_T

The thermal rating P_T of a gear unit is the power that a gear unit can transmit without exceeding a certain oil temperature.

The thermal rating P_T depends on the following factors:

- Ambient temperature
- Air circulation and sunlight exposure at the installation site
- Installation altitude
- Heat conduction to the foundation at the installation site
- Gear unit type, size and gear ratio
- Type of gear unit external cooling
- Type of gear unit lubrication
- Lubricant type
- Cyclic duration factor

For the following ambient conditions, the thermal rating can be directly read from the selection tables:

- Ambient temperature 20 °C to 40 °C
- Installation in a large hall (air velocity ≥ 1.4 m/s)
- Self-cooling or cooling with fan in motor adapter
- Foundation as steel support structure
- Installation altitude < 1000 m above sea level

INFORMATION

- For other ambient temperatures and types of lubricants, you can calculate the thermal rating P_T using the temperature factor f_T and the lubrication factor f_L. The resulting calculation results are approximate values. Please contact SEW-EURODRIVE to determine the exact values.
- Sufficient protection from direct sunlight is absolutely necessary when installed outdoors. If the gear unit cannot be protected from direct sunlight, the thermal calculation must take the sunlight in kW/m² into account.

Thermal rating P_{TH} of the gear unit in kW for the following lubrication types and mounting position M1 is given in the chapter "Selection tables". The thermal rating for other combinations can be determined using factors.

$$P_T = P_{TH} \times f_1 \times f_T$$

P_T = Thermal rating of the gear unit in kW

P_{TH} = Nominal thermal rating of the gear unit in kW. The values in the chapter "Selection tables" depend on type of cooling, mounting position and lubrication type.

f_1 = Altitude factor

f_T = Temperature factor

Altitude factor f_1

The following table lists the altitude factor f_1.

Altitude factor	Altitude H in m above sea level				
	up to 999	1000 - 2000	2000 - 3000	3000 - 4000	4000 - 5000
f_1	1.00	0.95	0.91	0.87	0.83

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Temperature factors f_T

The following table shows the temperature factor f_T depending on the lubrication type, ambient temperature, and cooling option.

Temperature factor f_T					
	Without additional cooling or with fan				
Lubrication type	Ambient temperature in °C				
	10	20	30	40	50
Splash lubrication	1.15	1	0.85	0.7	0.55

$$P_T < \frac{1}{3} \times P_{N1}$$

→ Contact SEW-EURODRIVE

P_T = Thermal rating of the gear unit in kW

P_{N1} = Nominal gear unit power

The gear unit's thermal rating must be at least as large as the operating power on the input shaft HSS.

$$P_T \geq P_{K1}$$

P_T = Thermal rating of the gear unit in kW

P_{K1} = Operating power at HSS in kW

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3.1.10 Step 10: Checking the external additional forces

Influences and dependencies:

The permitted additional forces depend on the following factors:

- Existing service factor of the gear unit with respect to the selection data
- Required bearing service life
- Direction of the axial force (from or towards gear unit)
- Application angle of the radial load (rotating or at a specific position)
- Point of force application
- Ratio between radial and axial load
- Gear unit mounting

Determining the overhung load

If no overhung loads are specified, they can be determined by approximation as follows. When determining the resulting overhung load, the type of transmission element mounted on the shaft end must be considered. The following transmission element factors f_Z must be considered for various transmission elements.

Transmission element	Transmission element factor f_Z	Comments
Gears	1.15	< 17 teeth
Sprockets	1.40	< 13 teeth
Sprockets	1.25	< 20 teeth
Narrow V-belt pulleys	1.75	Influence of pre-tensioning
Flat belt pulleys	2.50	Influence of pre-tensioning
Toothed belt pulleys	1.50	Influence of pre-tensioning

The overhung load exerted on the motor or gear shaft is calculated as follows:

$$F_R = \frac{M_d \times 2000}{d_0} \times f_z N$$

F_R = Overhung load in N
M_d = Torque in Nm
d_0 = Mean diameter of the installed transmission element in [mm]
f_Z = Transmission element factor

Permitted overhung load

The basis for determining the permitted overhung loads in the roller bearing calculation is the nominal bearing service life L_{10h} (according to ISO 281).

For special operating conditions, the permitted overhung loads can be determined on the basis of the modified service life L_{nmh} on request.

For applications with defined service life, the permitted overhung loads have been calculated based on an adapted shaft safety. The values can thus be reduced.

Overhung load on output

The permitted overhung loads F_{Rper} for solid shaft gear units can be calculated exactly. The force values relate to the force application in the center of the shaft end for solid shafts and to the gear unit flange contact point for hollow shafts. In planetary gear units, the force application angle and direction of rotation do not influence the permitted values as there are no inner forces from the gear unit acting on the output bearing.

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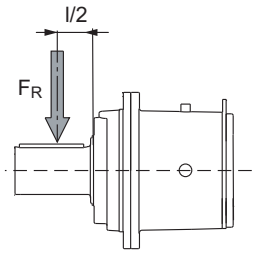
INFORMATION

For permitted overhung and axial loads on the input shaft (HSS), please contact SEW-EURODRIVE.

Checking the permitted overhung load on the output

The permitted overhung load F_R on the center of the shaft end is checked according to the following table. The load is permitted if $F_{R\,per} \geq F_R$.



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Permitted overhung loads for solid shafts:

The values apply to force application to the center of the shaft end and an output speed of n = 10 min^{-1}.

P.. series	042	052	062	072	082	092	102
F_{Rper}	249	280	364	403	526	580	680

Calculation of F_{Rperl} in N for different output speeds n* in 1/min

$$F_{Rper}{}^{*} = F_{Rper} \times (\frac{10}{n^{*}})^{(\frac{1}{3.33})} \leq F_{R\max} N$$

F_{Rper} = Permitted overhung load in N for different output speed
F_{Rper} = Permitted overhung load in N
F_{Rmax} = Maximum overhung load in N
n* = Differing output speed in 1/min

P.. series	042	052	062	072	082	092	102
F_{Rmax} kN	323	364	473	523	683	720	850

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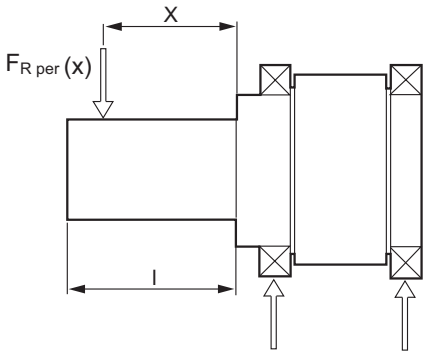
Comment

$$F_R \leq F_{Rper}{}^* \leq F_{R\max}$$

However, if $F_{Rper}{}^* > F_{Rmax}$, you will have to check: $F_R \leq F_{Rmax}$

Conversion of permitted overhung load on the output for force application away from the center of the shaft end



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Size	a	b	l
P.042	268	229	300
P.052	283	260	350
P.062	308	287	400
P.072	334	291	400
P.082	377	321	450
P.092	445	343	450
P.102	473	375	550

Calculation of off-center force application:

$$F_{Rper}(x) = F_{Rper} \times \frac{(a+b)}{(a+b^*)} \leq F_{R\max} N$$

b* = (b - l/2) + x in mm
$F_{Rper}(x)$ = Permitted overhung load in N of the off-center force application
F_{Rper} = Permitted overhung load in N
F_{Rmax} = Maximum overhung load in N

Comment

$$F_R \leq F_{Rper}(x) \leq F_{R\max}$$

However, if $F_{R\,perm}(x) > F_{R\,max}$, you will have to check: $F_R \leq F_{R\,max}$

Permitted axial force

For applications with axial loads, consult SEW-EURODRIVE.

INFORMATION

- Please consult SEW-EURODRIVE if you use the PH.. design in combination with overhung forces, or the PHF.. variant with flange mounting.
- If only an axial load but no additional overhung load act on the output shaft, it is necessary that you contact SEW-EURODRIVE.

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3.1.11 Step 11: Selecting the optional equipment/accessories

P..
- Oil drain valve
- Breather valve
- Torque arm
- Flange-mounted design

X2K..
- Motor adapter
- Fan
- Backstop
- PT100 temperature sensor
- Shaft end pump

3.1.12 Step 12: Selecting the lubricant

Lubricants can be chosen according to the lubricant table.

Output speeds $n_2 < 1.0\ min^{-1}$:

We recommend using MOBIL SHC XMP 460 synthetic lubricant in conjunction with fluorocarbon rubber oil seals to ensure lubricating properties at low output speeds.

3.1.13 Step 13: Technical specifications

PHF042 /T X2KP110/HP/F	
PHF..	Flange-mounted design, hollow shaft with shrink disk
042	Size
/T	Torque arm
X2KP	X series bevel-helical gear unit
110	Size
/HP	Housing for planetary gear unit
/F	Flange-mounted design

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3.2 Selection example

3.2.1 Step 1: Drive selection data

- Application: Apron feeders
- Bevel-helical planetary gear unit (mounting position M1)
- Output shaft: Hollow shaft with shrink disk and torque arm
- Required output speed n_2 = 4.0 min^{-1}
- Required operating power at LSS P_{k2} = 75 kW
- 4 pole motor, frequency inverter operation
- Input speed n_1 = 1500 min^{-1}
- Operating time: 12 hours per day
- Cyclic duration factor: 100 % cdf, 10 starts per hour
- Direction of rotation under load: CW rotation
- Outdoors, dusty environment
- Ambient temperature = 0 °C...40 °C
- Installation altitude H = 800 m
- No axial or radial forces acting on the output shaft
- Motor mounting with IEC motor adapter

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3.2.2 Step 2: Calculation of basic data M_{K2}, i, η

Operating torque on LSS:

$$M_{K2} = \frac{P_{K2} \times 9550}{n_2} Nm$$

M_{K2} = Operating torque at LSS in Nm
P_{K2} = Operating power at LSS in kW
n_2 = Output speed (LSS) in min^{-1}

$$M_{K2} = \frac{75kW \times 9550}{4\,min^{-1}} = 179063Nm$$

Required gear ratio:

$$i = \frac{n_1}{n_2} = \frac{1500\,min^{-1}}{4\,min^{-1}} = 375$$

n_1 = Input speed (HSS) in min^{-1}
n_2 = Output speed (LSS) in min^{-1}

Efficiency:

η = 0.96

3.2.3 Step 3: Selecting the application factors $F_{S\,min}$, F_F, F_{Start}

Application-specific service factor $F_{S\,min}$

Application: Apron feeder t > 10 h → $F_{S\,min}$ = 1.5

Peak load factor F_F

Hollow shaft with shrink disk

Load per hour → F_F = 1.2

Startup factor F_{start}

Motor in frequency inverter operation → F_{Start} = 1.7

t = Daily operating period

3.2.4 Step 4: Calculating the required nominal output torque M_{N2}

Constant direction of the load – constant torque:

$$M_{N2} \geq M_{K2} \times F_{Smin} = 179062.5Nm \times 1.5 = 268594Nm$$

M_{N2} = Nominal torque in Nm
M_{K2} = Operating torque at LSS in Nm
F_{Smin} = Application-specific service factor

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3.2.5 Step 5: Selection of nominal gear unit torque M_{N2}

M_{N2} > 268594 Nm

Size	M_{N2} Nm	$M_{N2\ Lim}$ Nm
P.042	100170	200340
P.052	124060	248120
P.062	185660	371320
P.072	245660	491320
P.082	**359400**	718800
P.092	423000	846000
P.102	500000	1000000

- Selecting the gear unit size: P.082

3.2.6 Step 6: Selecting the gear unit combination

P.082 X2K.	n_1 = 1500 min^{-1}						359 400 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.082 X2KP150	164	9,1	359	116	194	61	124
	176	8,5	335	118	194	64	126
	208*	7,2	283	120	187	74	127
	222*	6,8	265	120	186	75	127
	254*	5,9	234	119	179	78	126
	272*	5,5	219	119	178	79	126
	304	4,9	194	110	178	63	118
	326	4,6	181	111	178	65	118
	385*	3,9	153	112	171	71	118
	413*	3,6	143	112	170	72	118
	471*	3,2	126	110	164	74	116
	504*	3,0	118	110	163	74	116

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- Select the gear unit combination: PHF082 X2KP150
- Total gear ratio i_{tot} = 385 (required = 375 → ok)

3.2.7 Step 7: Selecting the motor power P_M

$$P_M \geq P_{K1} = \frac{P_{K2}}{\eta} = \frac{75kW}{0.96} = 78kW$$

P_M = Nominal motor power in kW
P_{K1} = Operating power at HSS in kW
P_{K2} = Operating power at LSS in kW
P_M = Nominal motor power in kW

Motor selection → P_M = 90 kW

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3.2.8 Step 8: Checking the peak load conditions $M_{K2\ max} < M_{K2\ per}$

Constant direction of the load – constant torque:

$$M_{K2per} = \frac{M_{N2Lim}}{F_F} = \frac{718800}{1.2} = 599000Nm$$

$M_{K2\ per}$ = Permitted peak output torque in Nm
$M_{N2\ Lim}$ = Limited nominal gear unit torque in Nm
F_F = Peak load factor

Calculating the peak load $M_{K2\ max}$:

$$M_{K2max} = \frac{P_M \times 9550 \times \eta \times F_{start}}{n_2} = \frac{90kW \times 9550 \times 0.96 \times 1.7}{4\,min^{-1}} = 350676Nm$$

$M_{K2\ max}$ = Peak output torque in Nm
P_M = Motor power in kW
F_{Start} = Startup factor

Checking the gear unit selection:

$M_{K2\ max} \leq M_{K2\ per} \rightarrow$ OK

$M_{K2\ max}$ = Peak output torque
$M_{K2\ per}$ = Permitted peak output torque

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3.2.9 Step 9: Checking the thermal rating

$$P_T = P_{TH} \times f_1 \times f_T = 71kW \times 1.00 \times 0.7 = 50kW$$

f_1 = 1.0 see installation altitude 800 m

f_T = 0.7 see ambient temperature with splash lubrication without additional cooling

P_T = Thermal rating in kW
P_{TH} = Nominal thermal rating in kW
f_1 = Altitude factor
f_T = Temperature factor

The operating power P_{K1} must not exceed the thermal rating P_T – ($P_{K1} \leq P_T$). Additional cooling is required if $P_{K1} > P_T$

50 kW < 78 kW

→ Thermal rating not sufficient at 40 °C without additional cooling

Check the thermal rating with cooling.

$$P_T = P_{TH} \times f_1 \times f_T = 118kW \times 1.00 \times 0.7 = 87kW$$

$P_{K1} > P_T$

78 kW < 87 kW

→ Thermal rating sufficient at 40 °C with a fan in motor adapter.

3.2.10 Step 10: Checking the external additional forces

There are no external additional forces → OK.

3.2.11 Step 11: Selecting the lubricant

As n_2 = 4.0 min^{-1} ($n_2 > 1.0^{-1}$), you can choose the lubricants according to the lubricant table (see chapter 5.3.2).

3.2.12 Step 12: Technical specifications

PHF082 /T X2K150/HP/F	
PHF..	Flange-mounted design, hollow shaft with shrink disk
082	Size
/T	Torque arm
X2KP	X series bevel-helical gear unit
150	Size
/HP	Housing for planetary gear unit
/F	Flange-mounted design

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4 Options and accessories

The following additional options are available. Contact SEW-EURODRIVE if you require options.

- ATEX design
- Double-sided torque arm
- Output shaft types
  - Splined hollow shaft according to DIN 5480
- Output shaft (LSS) sealing system
  - Labyrinth seal
- External oil-water cooler and oil-air cooler
- Shaft end pump
- Water cooling cartridge
- Axial and radial fan

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4.1 Torque arm /T

The torque arm can be enclosed in the delivery or can be mounted according to customer requirements.

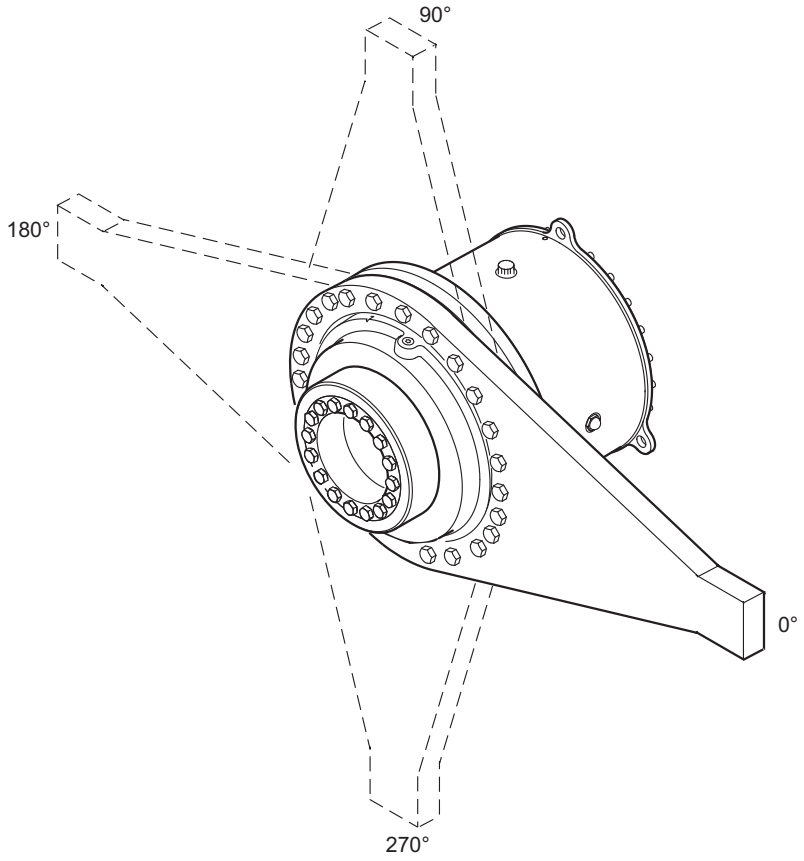
The retaining screws are included in the delivery.

The position of the torque arm is determined as looking onto the output shaft (mounting position **0°, 90°, 180°, 270°**).

INFORMATION

Different mounting positions are possible depending on the angle division (number of retaining screws).

The following figure shows an example of the mounting position of the torque arm.



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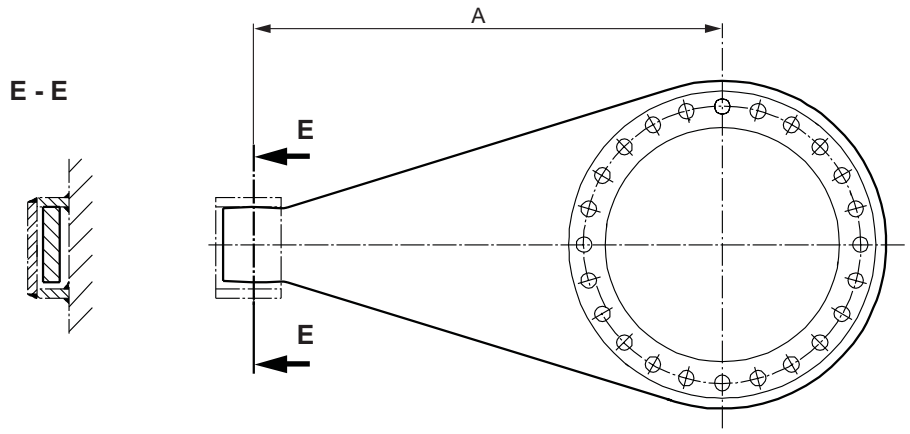
4.1.1 Single-sided torque arm

The reaction torque to the gear unit output torque is absorbed by the torque arm fixture via lever arm A. The illustration shows an example of absorption in a welded construction with design dimensions. Two supporting plates with the suggested dimensions are welded onto the customer's structure. Once the gear unit has been mounted, a connecting cover plate is welded onto the 2 supporting plates. The force acting on the support is the gear unit torque divided by the length of the lever arm A. The reaction force acts on the gear unit and customer bearings.

The following figure shows a sample torque arm.



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Weights

Size	Weight kg
P.042	93
P.052	102
P.062	183
P.072	317
P.082	420
P.092	440
P.102	510

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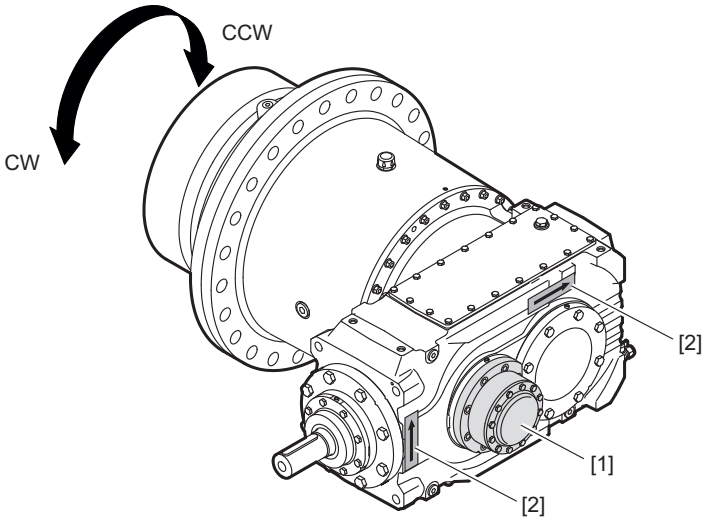
4.2 Backstop /BS

The purpose of a backstop [1] is to prevent unwanted directions of rotation. During operation, the backstop permits rotation in only one specified direction of rotation.

The backstop functions by using centrifugal lift-off sprags. Once the lift-off speed is reached, the sprags completely lift off from the contact surface of the outer ring. The backstop is lubricated with gear oil.



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The direction of rotation is specified as viewed onto the output shaft (LSS).

- CW = Clockwise rotation
- CCW = Counterclockwise rotation

The permitted direction of rotation [2] is indicated on the housing.

Contact SEW-EURODRIVE for differing requirements.

Wear can occur on the backstop when operated below lift-off speed.

In the following cases **always** contact SEW-EURODRIVE for specifying the maintenance intervals:

- Input shaft speed rates $n_1 < 950\ min^{-1}$
- or any of the following gear unit designs:

n_1 min^{-1}	Size
950...1150	X2K100..170 $i_N \geq 10$

n_1 = Input speed (HSS) i_N = Nominal gear unit ratio

INFORMATION

X2K primary gear units with a gear unit ratio $i_N \geq 10$ are marked with * in the chapter "Selection tables".

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4.3 Foot-mounted design

The gear unit is also available in foot-mounted design.

Please contact SEW-EURODRIVE.

4.4 Fan

A fan may be installed in the motor adapter to raise the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

4.5 Motor adapter

Motor adapters are available for mounting

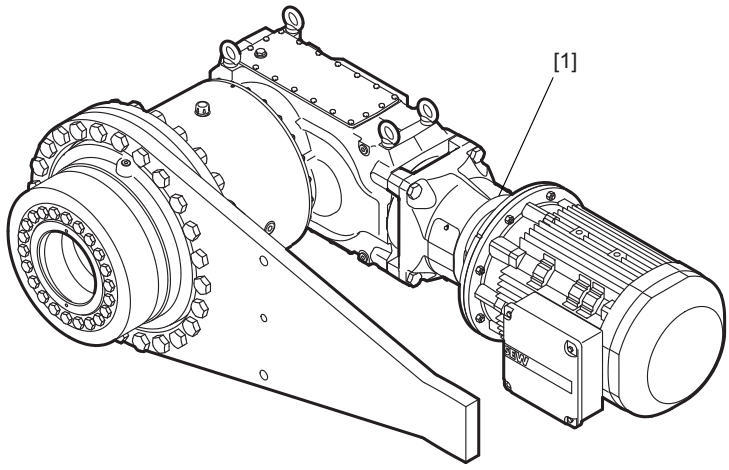
- **IEC (B5) motors** of sizes 200 to 355
- **NEMA ("C" face) motors** of sizes 324 to 449

Observe the following information:

INFORMATION

- The gear unit must be mounted in such a way that liquids cannot enter the motor adapter (HSS end) and accumulate there. Otherwise, the oil seal can be damaged, and subsequent damage can create a possible ignition source.
- An elastic claw coupling is included in the delivery.
- All motor adapters can have a fan installed.
- Further information can be found in the chapter "Motor adapter dimension sheets" (→ 🗎 112).

The following figure shows an example of the motor adapter [1] connected to the gear unit:



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4.5.1 Max. permitted motor weight

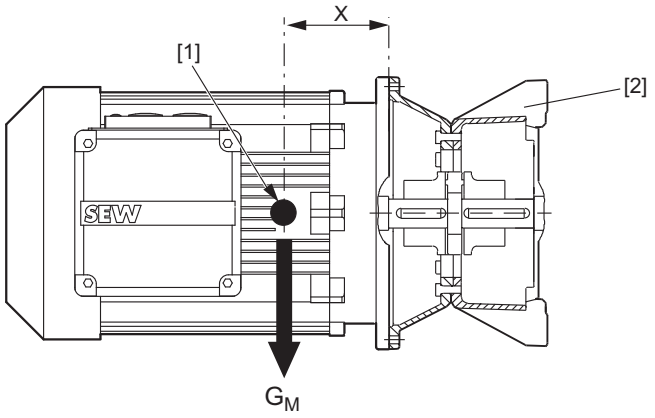
When mounting a motor at the gear unit the approved maximum motor weight in regard to the motor adapter size must be verified.

INFORMATION

- The maximally permitted motor weight may not be exceeded.
- In case of a deviating mounting position, contact SEW-EURODRIVE.

2. Maximum motor weight depending on motor adapter size

The following maximum loads on the motor adapter must not be exceeded.



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[1] Center of gravity of the motor
[2] Motor adapter
X = Distance from the center of gravity
G_M = Weight of the mounted motor

INFORMATION

The table only applies to stationary applications. For mobile applications (e.g. travel drives), contact SEW-EURODRIVE.

Motor adapter		G_M	X
IEC	NEMA	kg	mm
100/112	182/184	60	190
132	213/215	110	230
160/180	254/286	220	310
200	324	280	340
225	326	400	420
250 / 280	364 - 405	820	480
315S-L	444 - 449	1450	680
315		2000	740
355		2500	740

The maximum permitted weight G_M must be linearly reduced if the centroidal distance **X** is increased. G_M cannot be increased if the centroidal distance is reduced.

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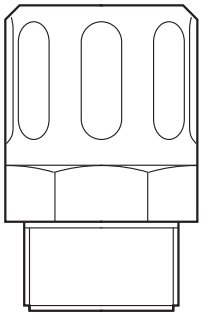
4.6 Breather

The following breathers can be used.

4.6.1 Breather (standard)

Structure



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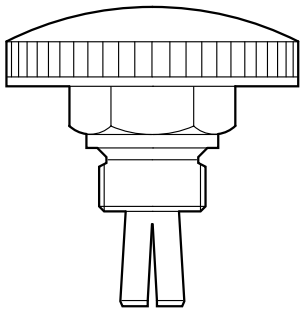
Housing material	Steel
Filter inserts	Wire mesh
Design	Pipe taper thread according to DIN 3858

4.6.2 Breather for harsh operating conditions

Structure



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Housing material	Stainless steel
Filter inserts	Steel and aluminum wire mesh
Design	Cylindrical pipe thread according to DIN EN ISO 228-1 Dimensioned for operating conditions with special protection against drip and splash water

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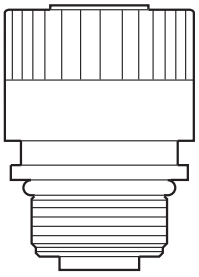
4.6.3 Plastic breather



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Structure

Housing material	Plastic
Filter inserts	Polyester filter, not exchangeable
Filter size	2 µm
Threads	3/4" or 1"

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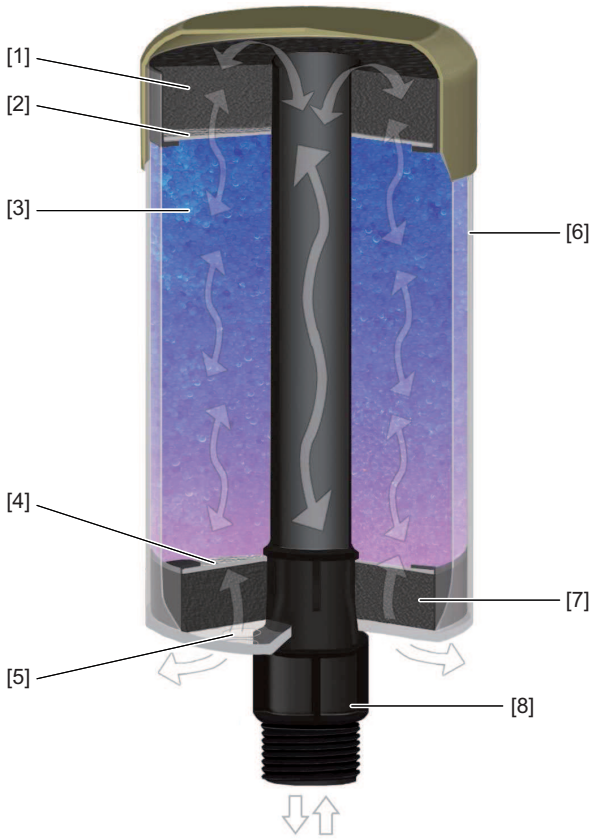
4.6.4 Desiccant breather filter (manufacturer: Des Case)

Structure



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[1]	Foam inlay	Reduces oil mist that comes in contact with silica gel when air escapes and ensures that the escaping air is distributed equally to the filter and the desiccant.
[2]	Filter element	Second polyester filter element that prevents the spreading of desiccant dust. Maximum efficiency due to backwashing.
[3]	Steam absorbent	Silica gel absorbs water of the flowing in air. The desiccant changes its color from blue to pink to indicate the state.
[4]	Filter element	Patented polyester filter element that filters contamination of up to 3 µm (absolute) from the air (74% efficiency at 0.5 µm). Special openings release particles if air escapes extending the service life of the filter.
[5]	Ventilation openings	Individual openings are opened depending on the required air volume in the system. Dimensioned for 20 cfm (0.566438 m). (Unit is inactive due to plug until it is used).
[6]	Loadable polycarbonate housing	Shock-absorbing, transparent casing for reliable operation and easy maintenance.
[7]	Foam inlay	Absorbs oil mist and distributes the flowing in air equally to the filter and desiccant.
[8]	Fastening via thread	Simple replacement of standard filter/breather caps with one or two adapters.

Standard one-way breather filter

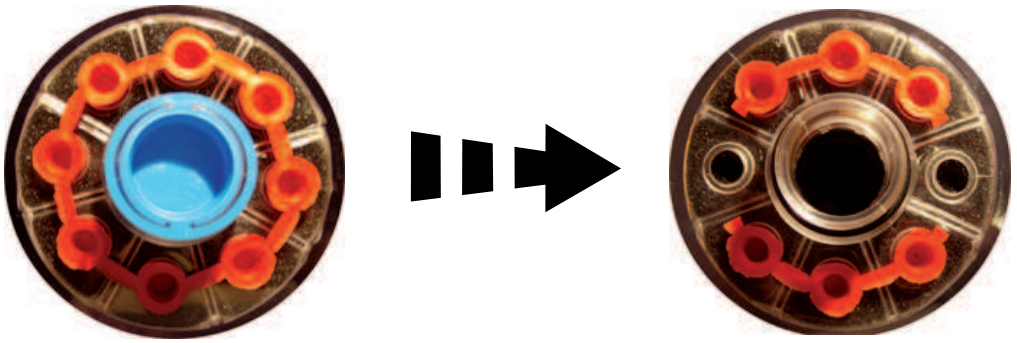
Type #	DC-2	DC-3	DC-4
Size (height × diameter in cm)	11.4 × 10.2	16.5 × 10.2	21.6 × 10.2
Filter area (cm^2 per filter)	25.4	25.4	25.4
Amount of silica gel (kg)	0.45	0.68	0.91
Amount of remaining water (l)	0.18	0.27	0.36
Amount of retained water (l)	0.65	1.15	1.6
Operating temperature range (°C)	-50 to +100	+50 to +100	+50 to +100
Max. flow rate (l/mn at 70 mb)	600	600	600
Desiccant	Silica gel	Silica gel	Silica gel
Filtering (µ absolute)	3	3	3
Connection dimension	1'' NPT	1'' NPT	1'' NPT

DES-CASE breather filters comply with the European REACH requirements (valid as of 2007).

Usage

Before startup

Open only 2 of the air openings (180° opposite) at the bottom of the breather filter. Remove the blue cap that protects the rising pipe. If required install a suitable adapter to the filter before installing the filter at the gear unit.



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5 Lubrication, oil heater and cooling

5.1 General information on selecting the oil

Unless a special arrangement is made, SEW-EURODRIVE supplies drives without oil fill.

INFORMATION

This means the gear unit must be filled with the correct oil grade and quantity before startup. You find the corresponding information on the nameplate of the gear unit.

The following tables provide an overview of mineral and synthetic oils.

5.1.1 Mineral oil

Standards

Lubrication oils are divided into ISO VG viscosity classes according to ISO 3448 and DIN 51519.

ISO class	ISO 6743-6 designation	DIN 51517-3 designation	AGMA 9005-D94 designation
150	ISO-L-CKC 150	DIN 51517-CLP 150	AGMA 4 EP
220	ISO-L-CKC 220	DIN 51517-CLP 220	AGMA 5 EP
320	ISO-L-CKC 320	DIN 51517-CLP 320	AGMA 6 EP
460	ISO-L-CKC 460	DIN 51517-CLP 460	AGMA 7 EP
680	ISO-L-CKC 680	DIN 51517-CLP 680	AGMA 8 EP

5.1.2 Synthetic oil

Standards

Lubrication oils are divided into ISO VG viscosity classes according to ISO 3448 and DIN 51519.

ISO class	ISO 6743-6 designation	DIN 51519 designation	AGMA 9005-D94 designation
150	ISO-L-CKT 150	CLP HC 150	AGMA 4 EP
220	ISO-L-CKT 220	CLP HC 220	AGMA 5 EP
320	ISO-L-CKT 320	CLP HC 320	AGMA 6 EP
460	ISO-L-CKT 460	CLP HC 460	AGMA 7 EP
680	ISO-L-CKT 680	CLP HC 680	AGMA 8 EP

In addition to having the required viscosity, the oil must fulfill the following criteria:

- CLP oils according to DIN 51517-3
- Micro-pitting test according to FVA, FV no. 54/ I-IV, GFT class high, damage force level >10

If synthetic oil is used, SEW-EURODRIVE recommends polyalphaolefin-based oil (CLP HC).

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INFORMATION

If required, a cooling system must be used or the oil change interval must be shortened (see chapter "Lubricant change intervals" in the "Helical and Bevel-Helical X.. Series Gear Units" operating instructions).

Observe the operating temperature of the gear unit when specifying the oil change intervals.

5.2 Guidelines for lubricant selection

As standard, the gear units are delivered without oil fill.

Generally it is possible to have the gear unit delivered with oil.

INFORMATION

- The oil viscosity and type (mineral/synthetic) to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate. You must contact SEW-EURODRIVE in case of a deviation from this specification. This lubricant recommendation in chapter "Lubricant table" in no way represents a guarantee as to the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of its product.
- Ensure that the gear unit is filled with the correct oil grade and quantity before startup. You can obtain the corresponding information from the gear unit nameplate and the lubricant table on the following pages.
- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Check the compatibility of the used greases and oils.

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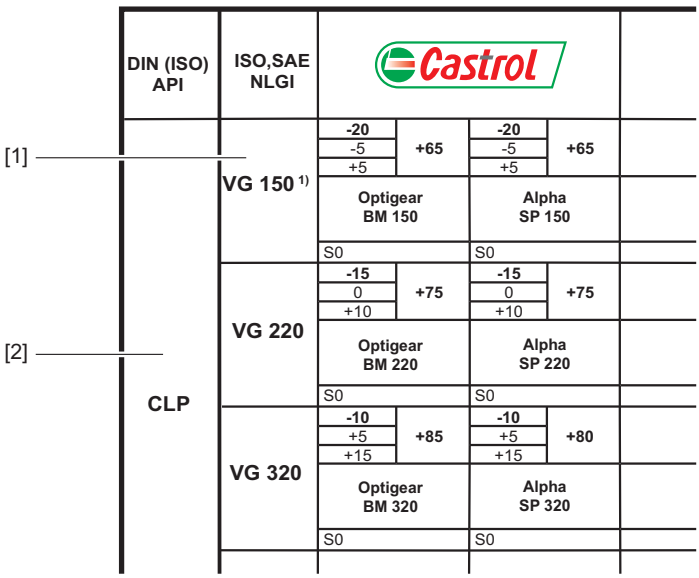
5.3 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

INFORMATION

- The standard for viscosity and oil grade is the type of oil that is specified by SEW-EURODRIVE in the order (see order confirmation and nameplate).
- Contact SEW-EURODRIVE if you use bio and food grade lubricants or polyglycol oils.
- Check the compatibility of the greases and oils used.
- The tables contain the lubricants approved by SEW-EURODRIVE.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For the latest information about the lubricants, visit: www.sew-eurodrive.de/lubricants

5.3.1 Structure of the tables and abbreviations



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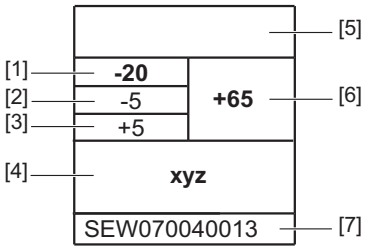
[1] Viscosity class
[2] Lubricant type

Abbreviations

Icons	Designation
CLP	= Mineral oil
CLP HC	= Synthetic polyalphaolefin (PAO)
E	= Ester-based oil
	= Mineral lubricant
	= Synthetic lubricant
	= Lubricant for the food industry (**NSF H1**-compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$

5.3.2 Explanation of the various lubricants



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[1] Lowest cold start temperature in °C for splash lubrication*
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt*
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt*
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C. MUST NOT BE EXCEEDED.
[7] Approvals

*In case of low temperatures, the oil must be heated to the specified minimum temperature, for example by using an oil heater. The maximally permitted oil viscosity per pump type is specified in the following chapter.

5.3.3 Explanation of the oil supply systems and the oil viscosity

The following pressure lubrications are designed for an oil viscosity of 2000 cSt:

- Motor pump for pressure lubrication /ONP
- Motor pump incl. air cooler for pressure lubrication /OAP
- Motor pump incl. water cooler for pressure lubrication /OWP

The shaft end pumps are designed for an oil viscosity of 5000 cSt.

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5.3.4 Lubricant tables

This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

DIN (ISO) API	ISO,SAE NLGI	Castrol				FUCHS				Mobil®				KLÜBER LUBRICATION				Shell				TEXACO				TOTAL			
CLP	VG 150 [1]	-20 / -5 / +5	+65	Optigear BM 150		-20 / -5 / +5	+65	Renolin CLP 150 Plus		-20 / -5 / +5	+65	Mobilgear 600 XP 150		-20 / -5 / +5	+65	Klüberoil GEM 1-150 N						-20 / -5 / +5	+65	Meropa 150					
		S0				S0				SEW070030013				S0								S0							
	VG 220	-15 / 0 / +10	+75	Optigear BM 220		-15 / 0 / +10	+75	Renolin CLP 220 Plus		-15 / 0 / +10	+75	Mobilgear 600 XP 220		-15 / 0 / +10	+75	Klüberoil GEM 1-220 N		-15 / 0 / +10	+75	Shell Omala Oil F 220		-15 / 0 / +10	+75	Meropa 220		-15 / 0 / +10	+75	Carter EP 220	
		S0				S0				SEW070030013				S0				S0				S0				S0			
	VG 320	-10 / +5 / +15	+85	Optigear BM 320		-10 / +5 / +15	+80	Renolin CLP 320 Plus		-10 / +5 / +15	+80	Mobilgear 600 XP 320		-10 / +5 / +15	+80	Klüberoil GEM 1-320 N		-10 / +5 / +15	+80	Shell Omala Oil F 320		-10 / +5 / +15	+80	Meropa 320		-10 / +5 / +15	+80	Carter EP 320	
		S0				S0				SEW070030013				S0				S0				S0				S0			
	VG 460	-5 / +10 / +20	+90	Optigear BM 460		-5 / +10 / +20	+90	Renolin CLP 460 Plus		-5 / +10 / +20	+90	Mobilgear 600 XP 460		-5 / +10 / +20	+90	Klüberoil GEM 1-460 N		-5 / +10 / +20	+90	Shell Omala Oil F 460		-5 / +10 / +20	+90	Meropa 460		-5 / +10 / +20	+90	Carter EP 460	
		S0				S0				SEW070030013				S0				S0				S0				S0			
	VG 680	0 / +15 / +25	+90	Optigear BM 680		0 / +15 / +25	+90	Renolin CLP 680 Plus		0 / +15 / +25	+90	Mobilgear 600 XP 680		0 / +15 / +25	+90	Klüberoil GEM 1-680 N						0 / +15 / +25	+90	Meropa 680		0 / +15 / +25	+90	Carter EP 680	
		S0				S0				SEW070030013				S0								S0				S0			
	VG 1000	+5 / +20 / +30	+90	Optigear BM 1000																									
		S0																											

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DIN (ISO) API	ISO,SAE NLGI	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL
CLP HC	VG 32 [1]			-40 -30 -25 +30 SHC 624				
	VG 68 [1]		-35 -20 -10 +50 Renolin Unisyn CLP 68	-40 -25 -15 +50 SHC 626	-35 -20 -10 +50 Klübersynth GEM 4-68 N	-40 -20 -10 +50 Omala S4 GX 68		
	VG 150 [1]	-25 -10 0 +70 Alphasyn EP 150	-30 -10 +0 +70 Renolin Unisyn CLP 150	-30 -10 0 +75 SHC 629	-25 -10 0 70 Klübersynth GEM 4-150 N	-30 -10 0 +75 Omala S4 GX 150	-25 -10 0 +70 Pinnacle EP 150	-35 -15 -5 +75 Carter SH 150
	VG 220	-25 -5 +5 +80 Alphasyn EP 220	-25 -5 +5 +80 Renolin Unisyn CLP 220	-20 0 +10 +75 HighGear Synth 220	-25 -5 +5 +80 Klübersynth GEM 4-220 N	-25 -5 +5 +85 Omala S4 GX 220	-25 -5 +5 +80 Pinnacle EP 220	-25 -5 +5 +80 Carter SH 220
	VG 320	-20 0 +10 +90 Alphasyn EP 320	-20 0 +10 +90 Renolin Unisyn CLP 320	-15 0 +15 +85 HighGear Synth 320	-20 -5 +10 +95 Klübersynth GEM 4-320 N	-20 0 +10 +95 Omala S4 GX 320	-20 0 +10 +90 Pinnacle EP 320	-20 0 +10 +90 Carter SH 320
	VG 460	-15 +5 +15 +100 Alphasyn EP 460	-15 +5 +15 +100 Renolin Unisyn CLP 460	-10 +5 +20 +95 HighGear Synth 460	-15 +5 +20 +105 Klübersynth GEM 4-460 N	-15 +5 +15 +105 Omala S4 GX 460	-15 +5 +15 +100 Pinnacle EP 460	-15 +5 +15 +100 Carter SH 460
	VG 680	-10 +10 +25 +110 Optigear Synthetic X 680	-10 +10 +25 +110 Renolin Unisyn CLP 680	-5 +10 +25 +110 HighGear Synth 680	-10 +10 +25 +110 Klübersynth GEM 4-680 N	-10 +10 +25 +110 Omala S4 GX 680		-10 +10 +25 +110 Carter SH 680
	VG 1000			-10 +15 +30 +110 SHC 639	0 +20 +30 +110 Klübersynth EG4-1000			
				-10 +15 +30 +110 SHC Gear 1000				

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DIN (ISO) API	ISO,SAE NLGI	bremer & leguil					Castrol					FUCHS		KLÜBER LUBRICATION		
CLP HC NSF H1	VG 68 [1]	-35 -20 -10	+45	Cassida Fluid HF 68	S0		-40 -25 -15	+45	Optileb HY 68	S0				-35 -20 -10	+45	Klüberoil 4UH1-68 N	S0
	VG 220 [1]	-20 -5 +5	+75	Cassida Fluid GL 220	S0		-25 -5 +5	+75	Optileb GT 220	S0				-25 -5 +5	+75	Klüberoil 4UH1-220 N	S0
	VG 460 [1]	-15 +5 +20	+90	Cassida Fluid GL 460	S0		-15 +5 +20	+95	Optileb GT 460	S0				-15 +5 +15	+95	Klüberoil 4UH1-460 N	S0
E	VG 460											-15 +5 +15	+95	-15 +5 +15	+95	Klüberbio CA2-460	S0
													Plantogear 460 S	S0			

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5.4 Lubricant fill quantities

The specified lubricant fill quantities are **guide values** and apply only to the gear unit without mount-on components such as the oil supply system. The precise value varies depending on the gear ratio and the number of stages.

INFORMATION

- P-X gear units are supplied without lubricant!
- The required oil quantity depends on the mark on the oil dipstick.
- In case of pivoted mounting positions, the lubricant fill quantity on the nameplate may vary from the standard. The fill quantity specified on the nameplate is a guide value. The required oil quantity depends on the respective marks on the oil dipstick.
- For variable pivoted mounting positions adhere to the control mounting position on the additional nameplate "Oil control angle".

The following table shows the lubricant quantities for splash lubrication.

X2K..	P042		P052		P062		P072		P082		P092		P102	
i_{tot}	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550
110	27	27	-	29	-	-	-	-	-	-	-	-	-	-
130	-	-	36	-	43	43	-	47	-	-	-	-	-	-
150	-	-	-	-	-	-	63	-	74	74	-	84		93
170	-	-	-	-	-	-		-	-	-	111	-	119	-

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5.5 Sealing greases/rolling bearing greases

The table shows the grease types recommended by SEW-EURODRIVE for operating temperatures from -40 °C to 100 °C.

	Manufacturer	Grease
Default	Fuchs	**Renolit CX TOM 15 OEM**[1)]
	Castrol	Spheerol EPL 2
	Klüber	Petamo GHY 133 N
	Shell	Gadus S2 V220 2
	Texaco	Mulifak EP2
	Total	Multis EP 2
	Bremer & Leguil	Cassida Grease GTS2[1)]
	Fuchs	**Plantogel 2**[1)]

1) Grease used by the factory should be preferred.

INFORMATION

- The greases may only be interchanged within the same group. It is not permitted to mix different groups.
- If a customer wants to use a grease that is not listed in the table, the customer has to make sure that it is suitable for the intended application.

5.6 Lubrication type

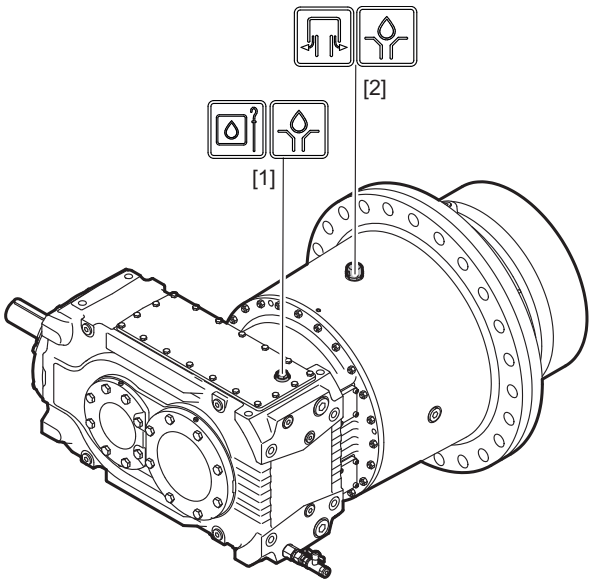
Splash lubrication is the standard lubrication type.

The mark on the oil dipstick is decisive for filling of the gear unit. Gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil.

For other mounting positions than the mounting position M1 oil bath lubrication might be necessary. Please contact SEW-EURODRIVE in such cases.

5.7 Oil filling

Oil filling can be performed either via the oil dipstick bores [1] on the primary gear unit or via the breather [2] on the planetary gear unit.



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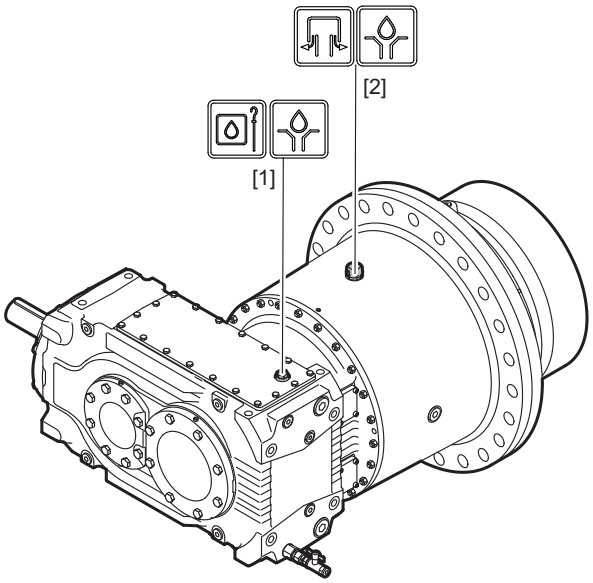
5.8 Oil level check and gear unit venting

Due to the shared oil chamber, the oil level check is performed via oil dipstick [1] at the upper inspection cover of the primary gear unit depending on the mounting position. The gear unit venting [2] is performed at the planetary gear unit.

As standard, oil dipstick [1] and breather [2] are made of steel. They are available made of plastic or stainless steel as an option.



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5.9 Oil drain

As standard the oil drain is performed via the oil drain valve [1] at the primary gear unit.

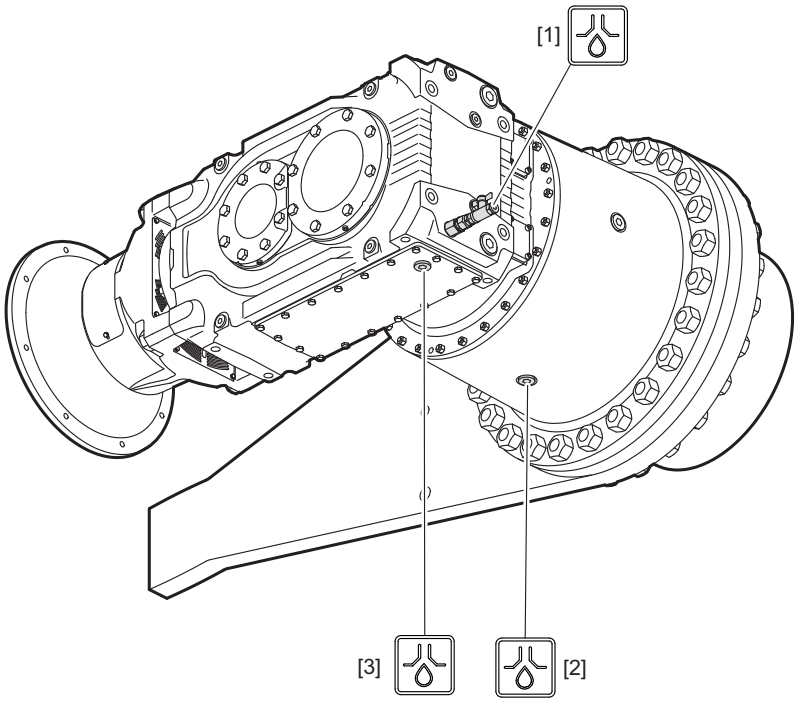
In case a complete oil drain is required, additional screw plugs [2] at the planetary gear unit or the primary gear unit [3] can be used.

These screw plugs are optionally also available in magnetic design.

As an alternative, an additional oil drain valve can be attached to the planetary gear unit instead of the screw plug [2].

INFORMATION

The position of the oil drain can change at pivoted mounting positions. Please contact SEW-EURODRIVE in this case.



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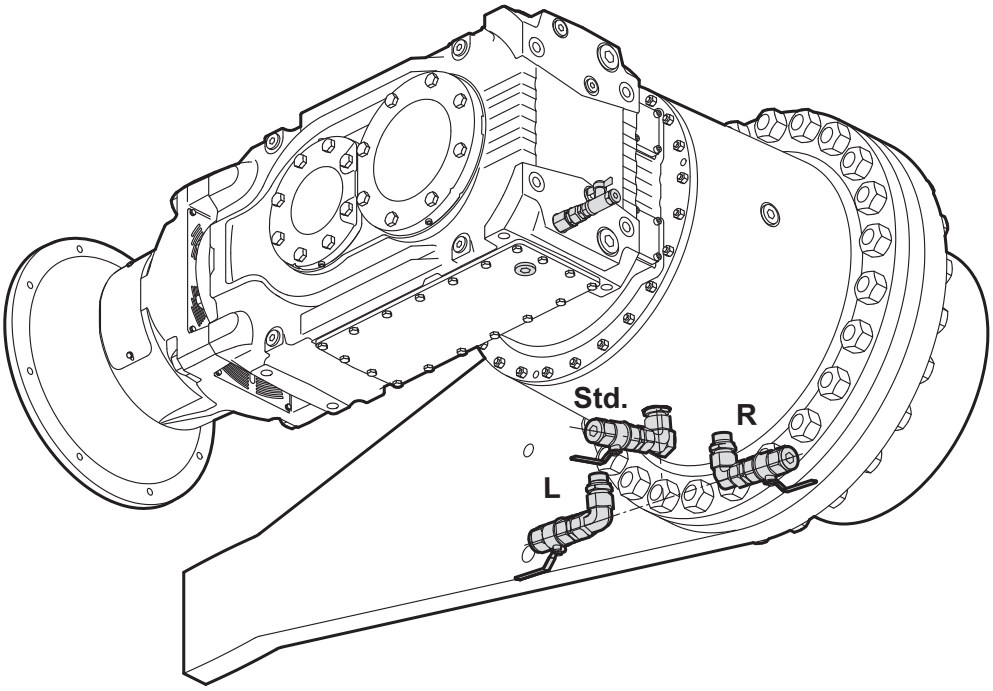
5.10 Oil drain valve

In addition to the standard oil drain plug, SEW-EURODRIVE offers the oil drain valve option. Observe the variants that are described below.

5.10.1 Position of the oil drain valve

The following figure shows the installation options of the oil drain valve at the planetary gear unit.



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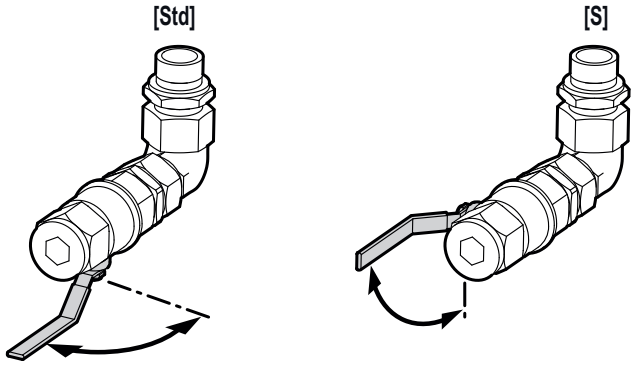
Std = Standard
R = Right
L = Left

5.10.2 Position of the lever

The following figure shows the possible positions of the lever.



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Std = Standard
S = On the side

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5.11 Oil heater

An oil heater is required to ensure lubrication during a cold gear unit startup when the ambient temperature is low.

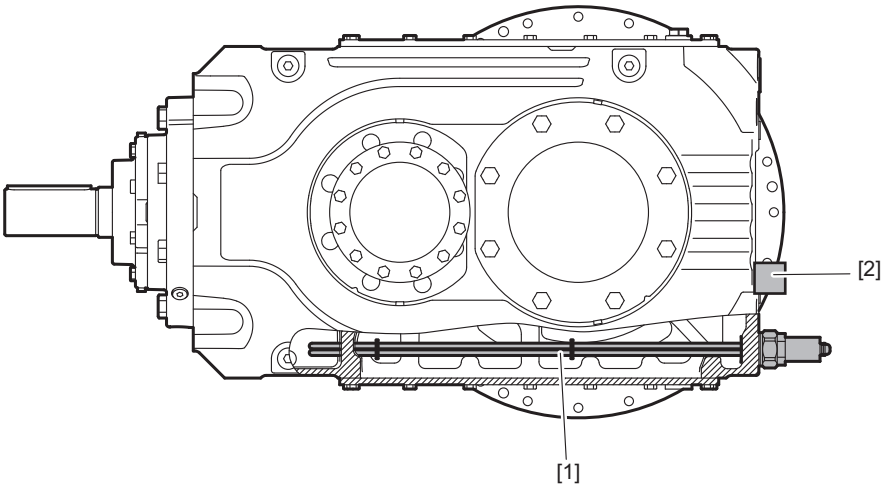
In the event of a cold start of the gear unit, take the oil viscosity outside the gear unit (e.g. in oil pipes) into account.

The heater is screwed into the gear unit housing ex works and is controlled by a thermostat. The trip temperature of the thermostat is set at the factory depending on the lubricant used.

5.11.1 Structure

The oil heater consists of 2 basic parts:

1. Heating element in the oil sump ("oil heater") with terminal box
2. Thermostat with integrated temperature sensor



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[1] Oil heater [2] Thermostat with integrated temperature sensor

INFORMATION

- To prevent damage, it is essential that the heating elements are fully immersed in the oil sump.
- The position of the thermostat varies with design and mounting position of the gear unit.
- Not all combinations of accessory options might be possible depending on the mounting position, gear unit size, and lubrication type. Contact SEW-EURODRIVE.
- To keep the gear unit startup temperature, the thermostat can be energized continuously. The heating process can take several hours.
- To reduce heating times, an additional heating element (OH-F) can be installed at the mounting flange. The connected load is specified in chapter "Connection power" (→ 🗎 75).
- For dimensions of the heating elements, see chapter "Oil heater/OH [mm]" (→ 🗎 109).

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5.11.2 Information on the function of the oil heater

- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature "initial temperature for gear unit startup", see chapter "Limit temperature for gear unit startup" (→ 🗎 75).

  At this temperature, the thermostat disables the oil heater see chapter "Minimum temperature for gear unit start" (→ 🗎 75). Only then, the gear unit can be started. The thermostat activates the oil heater again once the temperature is about 5 K below the trip point.
- To prevent the oil from burning, the heating elements of the heater have a maximum surface load. This is why the heating process for cold gear unit oil can take between one and several hours. The exact duration of the heating process before the start varies depending on the gear unit size, design, mounting position, oil quantity, and ambient temperature.
- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire them properly and connect them to the current supply.
- Contact SEW-EURODRIVE if another oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.

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5.11.3 Connection power

The table shows the power of the heating that may be installed.

Peripheral Conditions: T_{Amb} = -20 °C; Mounting position M1 (Splash lubrication)					
Size	Heating element		P_{Inst} W	Heating after 4h K	Max. heating K
P042 X2K110	1	OH	550	15.3	18.5
	2	OH-F + OH	250 + 550	22.2	26.9
P052 X2K110	1	OH	550	14.1	17.6
	2	OH-F + OH	250 + 550	20.6	25.6
P052 X2K130	1	OH	680	15	18.6
	2	OH-F + OH	250 + 680	20.5	25.4
P062 X2K130	1	OH	680	12.5	16.1
	2	OH-F + OH	250 + 680	17.6	22
P072 X2K130	1	OH	680	10.8	14.5
	2	OH-F + OH	250 + 680	14.7	19.8
P072 X2K150	1	OH	800	11.3	15.6
	2	OH-F + OH	700 + 800	21.2	29.3
P082 X2K150	1	OH	800	9.7	14
	2	OH-F + OH	700 + 800	18.2	16.3
P092 X2K150	1	OH	800	8.5	12.9
	2	OH-F + OH	700 + 800	16	24.3
P102 X2K150	1	OH	800	7.4	11.7
	2	OH-F + OH	700 + 800	13.8	21.9
P092 X2K170	1	OH	940	8.6	12.7
	2	OH-F + OH	780 + 940	15.6	23.2
P102 X2K170	1	OH	940	7.5	11.6
	2	OH-F + OH	780 + 940	13.8	21.3

P_{inst} = Power of the installed heater

OH = Oil heater in the gear unit

OH-F = Oil heater in the flange

5.11.4 Limit temperature for gear unit start

The minimum permitted ambient temperature/oil temperature for gear unit startup depends on the viscosity of the oil used and the lubrication type of the gear unit.

INFORMATION

- Before startup, it might be necessary to heat up the oil with an oil heater to the temperature specified under "Initial temperature". Observe the lubricant table in chapter "Permitted lubricants" (→ 🗎 63). For the design and dimensioning of the required oil heater, contact SEW-EURODRIVE.
- For the minimally permitted initial temperature for mineral and synthetic oil, refer to the chapter "Permitted lubricants" (→ 🗎 63).

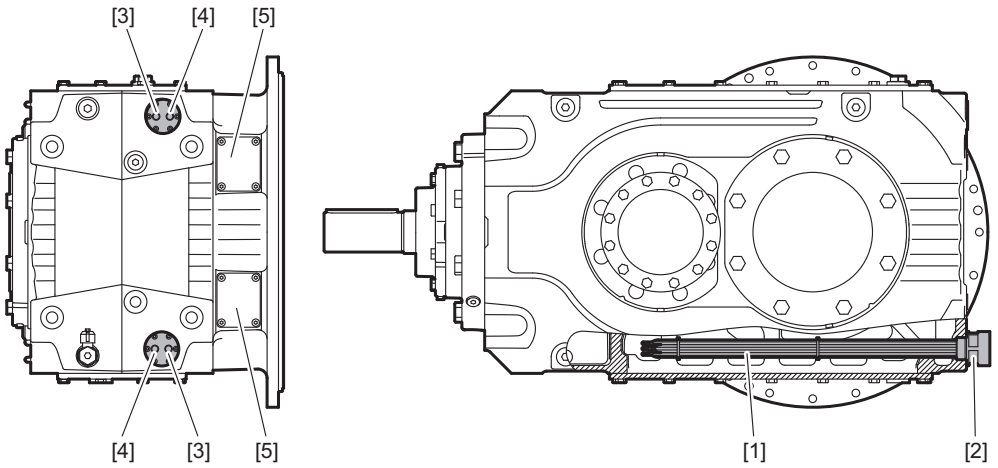
5.12 Water cooling cartridge

The water cooling cartridge can be installed above or beneath the oil level. The water connection must be installed by the user.

The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit.

The data given in the technical specifications must be observed.

5.12.1 Structure



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[1] Cooling pipes
[2] Tube plate with adapter piece
[3] Return
[4] Supply
[5] Assembly opening for optional water cooling cartridge

The water cooling cartridge consists of 3 main parts:

- Cooling pipes (CuNi alloy)
- Tube plate (brass)
- Connection piece (brass; gray cast iron; steel)

For connection to the cooling circuit, the following 2 bores with

- pipe thread G1/4" for sizes X110 – X170

are available. The piping is not included in the delivery.

Gear units with water cooling cartridge are delivered completely assembled.

Water cooling cartridges can be retrofitted to a certain extent. Contact SEW-EURODRIVE.

INFORMATION

The possible use as well as the maximum number of water cooling cartridges depends among others from the gear unit size, mounting position, end gear position, and lubrication type. Not all combinations of accessory options might be possible depending on the mounting position and mounting surface. Contact SEW-EURODRIVE.

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5.12.2 Notes on connection and operation

The required cooling water flow rate depends on the following characteristics:

- Gear unit size
- Mounting position
- Lubrication type

The cooling water quantity has to be dimensioned individually for each cooling cartridge.

Size/Connection	Max. cooling water flow rate l/min
X2K110/X2K130 – G1''	12
X2K150/X2K170 – G1 1/4''	15

INFORMATION

The cooling circuit must be connected in parallel for gear units with several water cooling cartridges.

INFORMATION

Contact SEW-EURODRIVE in the following cases:

- When selecting the water cooling cartridges
- When special cooling media are used (then the cooling capacity of the water cooling cartridge changes).
- When aggressive cooling media are used, such as brackish water or salt water.

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5.12.3 Requirements on the water quality

INFORMATION

Special measures have to be taken when using sea water or brackish water. Contact SEW-EURODRIVE.

The following requirements on the water quality are recommendations. In exceptional cases, certain concentrations of substances of content might cause unforeseen reactions.

The quality of the water as well as its substances are important factors for assessing the cooling water available for water cooling cartridges. The water quality is determined by the water hardness and the pH value of the water.

Water hardness

Water hardness is defined by the amount of hardeners (carbonates and bicarbonates) in the water. Hardeners accumulate on the surface of the water cooling cartridge in particular at high temperatures and in this way impair the performance. Take these deposits into account when selecting the water cooling cartridge for extremely hard water.

The following table shows the classification of German degrees of hardness to water quality °dH:

Degree of hardness[1)]	Water quality
0 – 5 °dH	Very soft water
5 – 10 °dH	Soft water
10 – 20 °dH	Medium hard water
20 – 30 °dH	Hard water
> 30 °dH	Very hard water

1) 10 mg/l of hardener corresponds to 1 °dH

pH value

- The water cooling cartridge partially consists of a copper and nickel alloy, to which the following applies:

  → Corrosion problems when **pH value < 6**
- With alkaline water:

  → Corrosion problems when **water hardness < 6°dH**.

  Smaller values can cause corrosion due to free carbonic acid.

  The following table describes the classification of the water quality based on the pH value:

pH value	Water quality
4.5	Very acidic
4.5 – 6.0	Acidic
6.0 – 6.8	Slightly acidic
7.0	Neutral
7.2 – 7.7	Slightly alkaline
7.7 – 8.2	Alkaline
8.2	Very alkaline

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Cooling water assessment based on water substances

The following table provides an overview of the resistance of copper pipes against substances in non-potable water.

Assessment criterion	Approximate concentration mg/l	Evaluation CuNi10Fe1Mn
pH value	< 6	0
	6 to 9	+
	> 9	0
Chloride	up to 1000	+
	> 1000	+ (< 25000 mg/l)
Sulfate	up to 70	+
	70 to 300	+
	> 300	+ (< 25000 mg/l)
Nitrate	up to 100	+
	> 100	0
Free (aggressive) carbonic acid	up to 20	+
	20 to 50	0
	> 50	–
Oxygen	up to 2	+
	> 2	+
Ammonium	up to 2	+
	2 to 20	+
	> 20	–
Iron (dissolved)	up to 10	0
	> 10	–
Manganese (dissolved)	up to 1	0
	> 1	–
Free chlorine	up to 5	permanently < 0.5 mg/l
	> 5	intermittently < 3.0 mg/l
Sulfide		0
Ammonia		+ (< 15 mg/l)

Key

+	= usually good resistivity
0	= corrosion problems can occur in particular if several factors are assessed with 0
–	= we advise against use

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Types of cooling water/characteristics

Note the following conditions:

Industrial water

- Usually untreated water (no drinking water)
- Often very contaminated
- A water analysis is necessary for assessment
- Copper, brass and steel are very resistant against industrial water

Stream water and river water

- We recommend using copper brass pipes
- Cast iron parts must be protected against corrosion by suitable coating
- Usually untreated water (no drinking water)
- Often very contaminated
- A water analysis is necessary for assessment

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6 Condition monitoring

6.1 Temperature switch /NTB

A temperature switch with preset switching temperatures of 70, 80, 90 or 100 °C is used for monitoring the gear unit oil temperature.

For various functions, the temperature switch is also used as limit value switch, for example

- for a pre-alarm

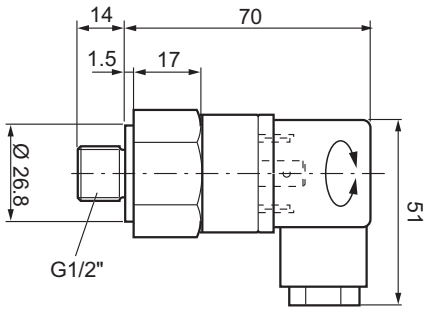
  or

- for a main alarm for switching off the main motor.

To guarantee a long service life and functioning under all conditions, it is recommended to use a relay in the power circuit instead of a direct connection through the temperature switch.

The temperature switch is located in the oil sump of the gear unit. The exact position depends on the gear unit design and shaft position.

6.1.1 Dimensions



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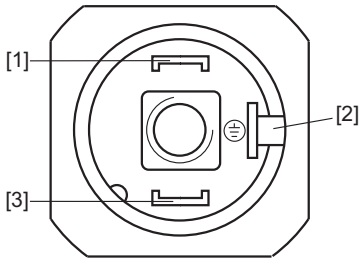
6.1.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



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[1] [3] NC contact
[2] Grounding terminal 6.3 x 0.8

6.1.3 Technical data

- Trip temperature: 70 °C, 80 °C, 90 °C, 100 °C ± 5 °C
- Contact capacity: 10 A - AC 240 V

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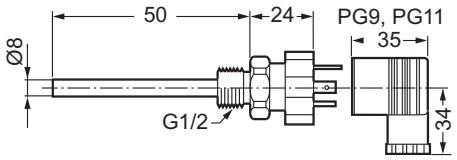
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

6.2 Temperature sensor PT100

The PT100 temperature sensor can be used to measure the temperature of the gear unit oil.

The temperature sensor is located in the oil sump of the gear unit. The exact position depends on the gear unit design.

6.2.1 Dimensions



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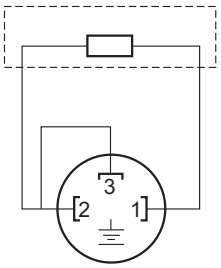
6.2.2 Electrical connection



[1] / [2] Resistor element connection

6.2.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance [K] ± (0.3 + 0.005 x T), (corresponds to DIN IEC 751 class B),

  T = Oil temperature °C
- Plug connector DIN 43650 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

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6.3 Temperature switch /TSK

The TSK temperature switch is used with oil supply systems for circulation cooling. It is provided with 2 fixed trip points (60 °C and 90 °C) for controlling and monitoring the system.

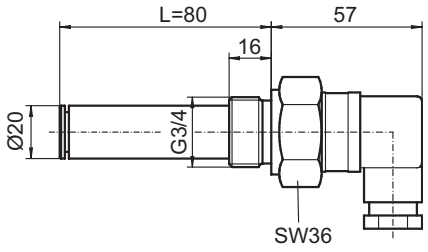
The temperature switch is integrated into the circuit of the oil supply system as follows:

- The cooling system is activated when the oil temperature reaches 60 °C
- Warning signal or disconnection of the gear unit when the oil temperature exceeds 90 °C (usually a sign of malfunction in the oil supply system)

To guarantee a long service life and functioning under all conditions, it is recommended to use a relay in the power circuit instead of a direct connection through the temperature switch.

The temperature switch is located in the oil sump of the gear unit. The exact position depends on the gear unit design and shaft position.

6.3.1 Dimensions



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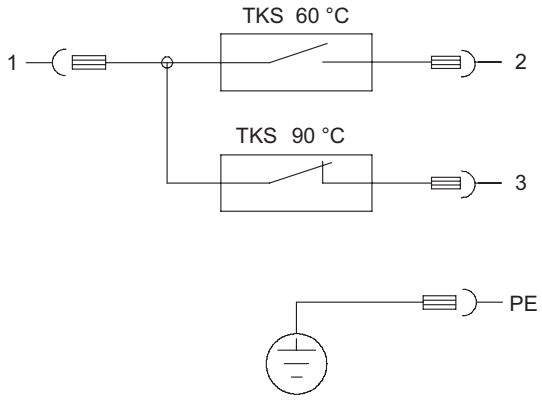
6.3.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



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[1][2] Switch 60 °C NO contact
[1][3] Switch 90 °C NC contact
PE Grounding terminal

6.3.3 Technical data

- Switching temperatures: 60 °C and 90 °C
- Contact capacity: 2 A - AC 240 V
- Plug connector: DIN EN 175301-803 PG11 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

6.4 DUO10A diagnostic unit (oil ageing)

The DUO10A diagnostic unit was developed for timely planning of oil changes.

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The PT100 temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit uses the oil temperature values to calculate the predicted remaining service life of the oil. This calculated value is continuously displayed on the evaluation unit display. If required, the display can display the current gear unit oil temperature.

The oil types used by SEW are recorded in the evaluation unit, wherein a type of oil approved by SEW-EURODRIVE can be customized.

Oil grades:

Oil type	Designation	Limit temperature
Mineral oil CLP/ Bio oil	OIL1	100 °C
Synthetic oil CLPHC/CLPPAO	OIL2	130 °C
Polyglycol oil CLPPG	OIL3	130 °C
Food grade oil	OIL4	100 °C
Customer-specific	OIL5	Default setting = OIL1

4 switching outputs (NC/NO contact) with the following functions are available to connect the evaluation unit:

- Early warning:

  Is set to a few days before expiration of the remaining service life. The number of days can be set directly on the evaluation unit.

- Main alarm:

  Is set when the estimated remaining service life reaches zero.

- Limit temperature:

  Shows when the permitted oil temperature has been exceeded.

- Ready for operation:

  Displays errors in the wiring and recognizable faults in the evaluation unit.

INFORMATION

Further information about the evaluation unit and accessories is found the "DUO10A Diagnostic Unit" manual, part no. 11473428.

6.4.1 Dimensions

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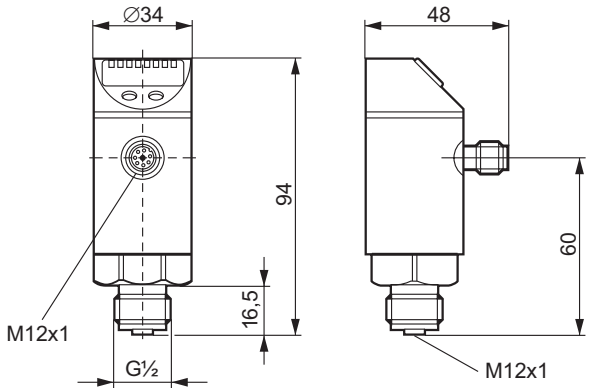
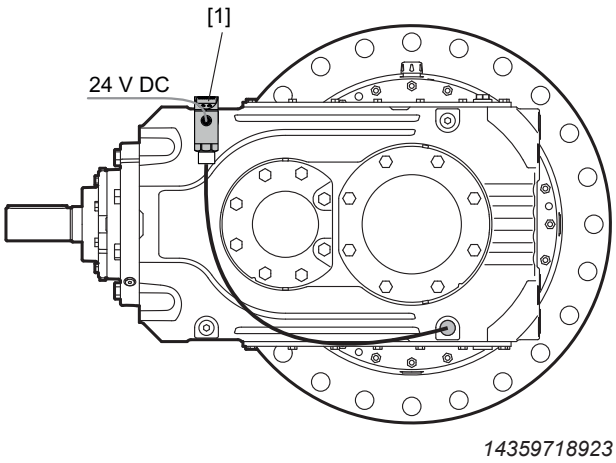


6.4.2 Mounting examples



[1] DUO10A diagnostic unit

6.5 Vibration SmartCheck

Vibration SmartCheck vibration monitoring is used to detect damage of gear units and gearmotors early (e.g. bearing damage or imbalances). For this, permanent frequency-selective monitoring of the gearmotor is used. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference value for signal analysis e.g. to trigger time or event-based measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

Vibration SmartCheck is configured using the FAG software SmartWeb. If you use several Vibration SmartCheck systems, you can control them via the FAG software SmartUtility Light centrally from one PC.

The full version of the SmartUtility software allows you to open sensors directly via the FAG software SmartWeb, to analyze measurement data in the SmartUtility Viewer and to download configurations or uploading configurations on other devices.

INFORMATION

Further information about the evaluation unit and accessories is found the "Vibration SmartCheck" operating instructions, part no. 23085312.

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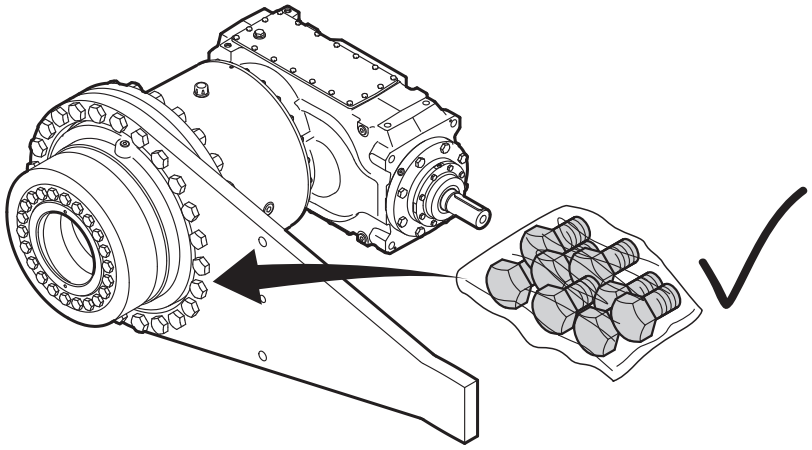
7 Design and operating notes

7.1 Screws included in the delivery

For the following gear unit designs, the screws are **included in the delivery**:

- Gear unit with torque arm



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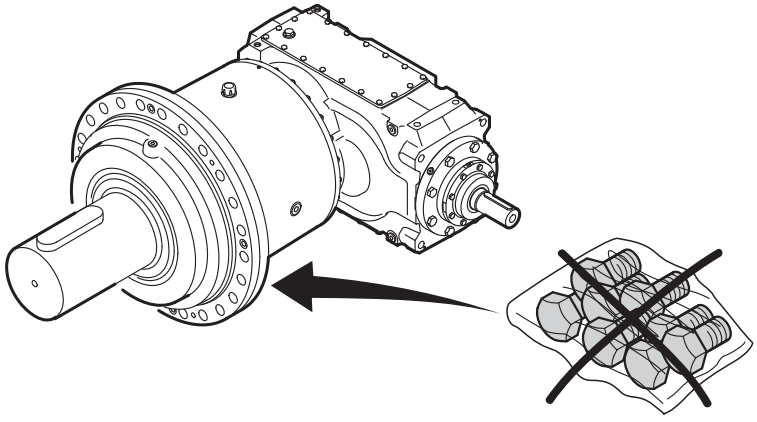
Not included in the delivery:

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (shims, spacer rings), if necessary
- Fasteners for input and output elements
- Lubricant e.g. NOCO® fluid from SEW-EURODRIVE
- Aids for assembly/disassembly onto the machine shaft
- Fasteners for the gear unit base
- Connection screws for flange-mounted gear units



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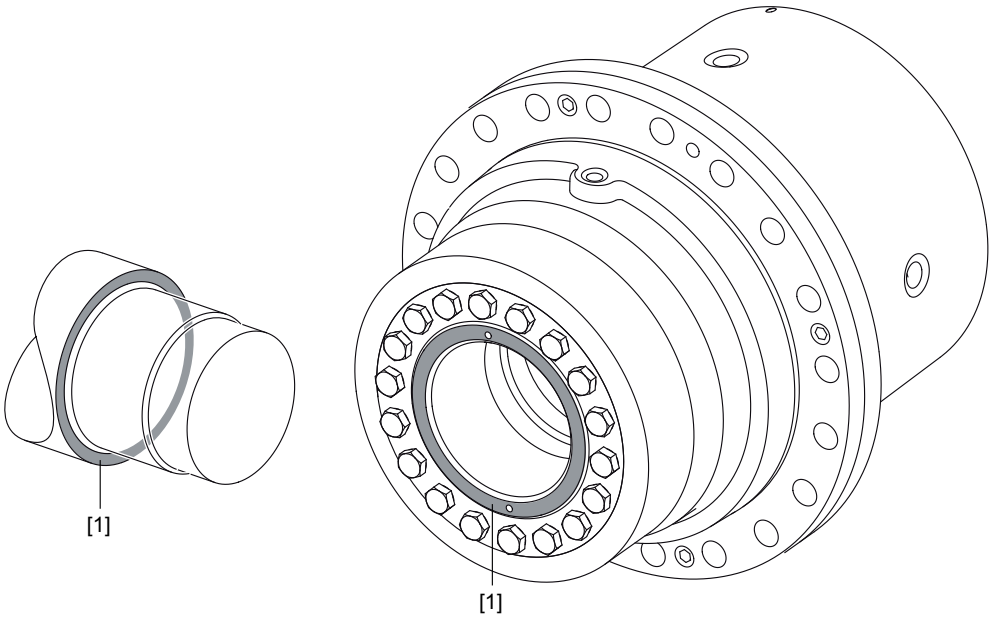
7.2 Output shaft as hollow shaft with shrink disk

To guarantee a complete torque transmission from the gear unit to the machine shaft, observe the following procedure during construction and assembly.

Push the gear unit onto the machine shaft until the contact surfaces [1] touch.



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8 Important information on selection tables and dimension drawings

The following pages contain important information for chapters 10 and 11.

INFORMATION

Unless specified otherwise, all dimensions are given in **mm**.

8.1 Selection tables

INFORMATION

The selection tables show possible gear unit combinations. Different gear ratio ranges and options are possible. X.. series gear units are used as primary gear unit in this case. Please contact SEW-EURODRIVE.

The following figure shows the structure of the selection tables.

[1]	[2]	[3]	[4]	[6]	[7]	[8]	[9]	[5]	[10]
P.042 X2K.	**n_1 = 1000 min^{-1}**								**100 kNm**
						P_{TH} [kW] M1			
					20 °C			**40 °C**	
Designation	**i_{tot}**	**n_2 [min^{-1}]**	**PN_1 [kW]**						
P.042 X2KP110	159	6,3	69	55	76	)		53	
	178	5,6	61	55	76	37		54	
	202*	5	54	53	72	37		52	
	226*	4,4	48	52	71	37		51	

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[1] Gear unit designation

[2] Input speed (HSS)

[3] Total gear unit ratio (rounded)

[4] Output speed (LSS)

[5] Nominal gear unit torque

[6] Nominal gear unit power

Thermal rating at 20 °C ambient temperature, mounting position M1

[7] without fan

[8] With fan in motor adapter

Thermal rating at 40 °C ambient temperature, mounting position M1

[9] without fan

[10] With fan in motor adapter

) Contact SEW-EURODRIVE

* X2K. primary gear units have a gear ratio i_N ≥10

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8.2 Dimension sheets

8.2.1 Scope of delivery

= Standard parts supplied by SEW-EURODRIVE.

= Standard parts not supplied by SEW-EURODRIVE.

8.2.2 Tolerances

Keys

Keys: according to DIN 6885 (domed type A)

Spline

Splined shaft according to DIN 5480

8.2.3 Dimensions of motors and planetary gear units

Motor options

The motor dimensions can change when installing motor options. Refer to the dimension drawings of the motor options.

Special designs

The dimensions of the terminal box on special designs such as KS, CSA, VIK, low voltage or voltage changeover may deviate from the standard dimensions.

EN 50347

European standard EN 50347 became effective in August 2001. This standard adopts the dimension designations for three-phase AC motors for sizes 56 to 315M and flange sizes 65 to 740 from the IEC 72-1 standard.

The new dimension designations given in EN 50347 / IEC 72-1 are used for the dimensions in question in the dimension tables of the dimensions sheets.

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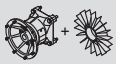
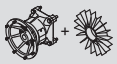
9 Selection tables

P.042 X2K.	n_1 = 1000 min^{-1}						100170 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.042 X2KP110	159	6.3	69	55	76	35	53
	178	5.6	61	55	76	37	54
	202*	5.0	54	53	72	37	52
	226*	4.4	48	52	71	37	51
	246*	4.1	45	49	67	35	48
	276*	3.6	40	50	67	35	48
	310	3.2	35	49	67	32	48
	348	2.9	31	49	68	33	48
	393*	2.5	28	48	64	33	46
	440*	2.3	25	47	63	33	46
	480*	2.1	23	44	60	32	43
	538*	1.9	21	45	60	32	44

P.042X2K.	n_1 = 1200 min^{-1}						100170 Nm
P.042 X2KP110	159	7.5	83	52	78	30	53
	178	6.7	74	54	79	32	54
	202*	5.9	65	53	76	34	53
	226*	5.3	58	52	75	35	53
	246*	4.9	54	50	71	34	50
	276*	4.3	48	50	71	35	51
	310	3.9	42	47	70	28	47
	348	3.4	38	48	70	29	48
	393*	3.1	33	48	68	31	48
	440*	2.7	30	47	67	31	47
	480*	2.5	28	45	63	30	45
	538*	2.2	25	45	63	31	46

P.042 X2K.	n_1 = 1500 min^{-1}						100170 Nm
P.042 X2KP110	159	9.4	103	44	80	18	48
	178	8.4	92	47	81	21	51
	202*	7.4	81	50	80	28	54
	226*	6.6	73	51	79	29	54
	246*	6.1	67	50	75	30	52
	276*	5.4	60	50	76	31	53
	310	4.8	53	40	72	18	44
	348	4.3	47	42	72	20	45
	393*	3.8	42	45	72	26	48
	440*	3.4	37	45	71	27	48
	480*	3.1	35	45	68	27	47
	538*	2.8	31	45	68	28	48

P.042 X2K.	n_1 = 1800 min^{-1}						100170 Nm
P.042 X2KP110	159	11.3	124	31	77	)	40
	178	10.1	111	35	80	)	43
	202*	8.9	98	44	82	19	51
	226*	8.0	87	45	82	21	52
	246*	7.3	81	46	79	24	52
	276*	6.5	72	47	79	25	53
	310	5.8	64	30	69	)	37
	348	5.2	57	32	71	)	39
	393*	4.6	50	41	74	18	46
	440*	4.1	45	41	73	20	47
	480*	3.8	41	42	71	22	47
	538*	3.3	37	43	71	23	48

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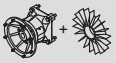
P.052 X2K.	n_1 = 1000 min^{-1}						124060 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.052 X2KP130	160	6.3	85	62	92	34	60
	182	5.5	74	62	91	36	60
	200	5.0	68	62	89	38	61
	227*	4.4	60	64	89	40	62
	248*	4.0	55	60	83	39	59
	281*	3.6	49	60	82	39	58
P.052 X2KP110	310	3.2	44	53	73	35	52
	348	2.9	39	53	73	36	52
	393*	2.5	35	51	69	36	50
	440*	2.3	31	50	68	36	49
	480*	2.1	29	48	64	34	47
	538*	1.9	25	48	64	34	47

P.052 X2K.	n_1 = 1200 min^{-1}						124060 Nm
P.052 X2KP130	160	7.5	102	53	91	20	53
	182	6.6	89	54	92	24	55
	200	6.0	81	58	91	30	58
	227*	5.3	72	60	92	33	61
	248*	4.8	66	58	87	34	59
	281*	4.3	59	58	86	35	59
P.052 X2KP110	310	3.9	52	51	76	31	52
	348	3.4	47	53	76	32	53
	393*	3.1	41	52	73	34	52
	440*	2.7	37	51	72	34	51
	480*	2.5	34	49	68	33	49
	538*	2.2	31	49	68	34	49

P.052 X2K.	n_1 = 1500 min^{-1}						124060 Nm
P.052 X2KP130	160	9.4	127	30	83	)	36
	182	8.2	112	34	85	)	40
	200	7.5	102	46	91	)	51
	227*	6.6	90	50	94	17	54
	248*	6.0	83	51	91	23	56
	281*	5.3	73	52	90	25	57
P.052 X2KP110	310	4.8	66	45	78	21	49
	348	4.3	58	47	79	23	50
	393*	3.8	52	50	77	29	53
	440*	3.4	46	50	76	30	53
	480*	3.1	43	49	73	30	51
	538*	2.8	38	49	73	31	51

P.052 X2K.	n_1 = 1800 min^{-1}						124060 Nm
P.052 X2KP130	160	11.3	152	)	66	)	)
	182	9.9	134	)	70	)	)
	200	9.0	122	28	85	)	38
	227*	7.9	107	33	89	)	43
	248*	7.3	99	40	90	)	49
	281*	6.4	88	43	91	)	51
P.052 X2KP110	310	5.8	79	35	77	)	42
	348	5.2	70	37	79	)	45
	393*	4.6	62	45	80	22	51
	440*	4.1	55	46	79	23	52
	480*	3.8	51	46	77	25	52
	538*	3.3	46	47	77	26	52

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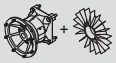
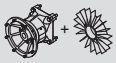
P.062 X2K.	n_1 = 1000 min^{-1}						185660 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.062 X2KP130	160	6.3	127	78	112	46	76
	182	5.5	111	78	111	48	76
	200	5.0	101	77	106	49	75
	227*	4.4	89	78	107	51	76
	248*	4.0	83	72	99	49	71
	281*	3.6	73	72	97	49	70
	312	3.2	65	70	100	43	68
	354	2.8	57	70	99	43	68
	390	2.6	52	69	95	45	67
	443*	2.3	46	70	96	46	68
	483*	2.1	42	66	89	44	64
	548*	1.8	37	65	88	44	63

P.062 X2K.	n_1 = 1200 min^{-1}						185660 Nm
P.062 X2KP130	160	7.5	152	70	113	34	71
	182	6.6	134	71	112	37	72
	200	6.0	122	74	110	43	74
	227*	5.3	107	76	111	45	77
	248*	4.8	99	73	104	45	73
	281*	4.3	88	72	103	46	72
	312	3.8	78	63	102	32	64
	354	3.4	69	64	101	34	65
	390	3.1	62	66	99	39	67
	443*	2.7	55	68	100	41	69
	483*	2.5	51	65	94	41	66
	548*	2.2	45	65	93	42	66

P.062 X2K.	n_1 = 1500 min^{-1}						185660 Nm
P.062 X2KP130	160	9.4	190	49	109	)	56
	182	8.2	167	53	110	)	59
	200	7.5	152	63	114	26	69
	227*	6.6	134	67	115	31	73
	248*	6.0	124	67	110	35	72
	281*	5.3	109	68	109	37	73
	312	4.8	98	47	98	)	53
	354	4.2	86	50	99	)	55
	390	3.8	78	58	103	26	63
	443*	3.4	69	61	104	29	65
	483*	3.1	64	61	100	33	65
	548*	2.7	56	61	98	34	65

P.062 X2K.	n_1 = 1800 min^{-1}						185660 Nm
P.062 X2KP130	160	11.3	228	13	95	)	30
	182	9.9	201	22	99	)	37
	200	9.0	182	47	112	)	58
	227*	7.9	161	52	116	)	63
	248*	7.3	149	58	113	20	68
	281*	6.4	131	60	113	23	69
	312	5.8	117	19	87	)	32
	354	5.1	103	25	90	)	37
	390	4.6	94	45	101	)	55
	443*	4.1	82	48	103	)	58
	483*	3.7	76	53	103	20	62
	548*	3.3	67	55	102	23	63

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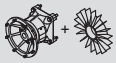
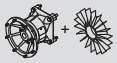
P.072 X2K.	n_1 = 1000 min^{-1}						245660 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.072 X2KP150	162	6.2	166	112	157	74	109
	174	5.7	154	112	155	75	109
	206*	4.9	130	106	144	73	104
	220*	4.5	122	106	143	73	103
	251*	4.0	108	102	136	71	99
	269*	3.7	101	101	135	71	99
P.072 X2KP130	303	3.3	89	85	118	54	83
	344	2.9	78	84	117	54	82
	378	2.6	71	82	112	55	80
	430*	2.3	62	82	112	56	80
	469*	2.1	58	77	104	54	75
	532*	1.9	51	76	102	54	74

P.072 X2K.	n_1 = 1200 min^{-1}						245660 Nm
P.072 X2KP150	162	7.4	199	109	163	67	110
	174	6.9	185	109	162	68	110
	206*	5.8	156	106	154	70	107
	220*	5.5	146	106	152	71	107
	251*	4.8	130	103	145	71	104
	269*	4.5	121	103	144	71	104
P.072 X2KP130	303	4.0	106	79	122	44	80
	344	3.5	94	80	120	46	80
	378	3.2	85	81	117	50	81
	430*	2.8	75	82	118	52	83
	469*	2.6	69	78	110	51	78
	532*	2.3	61	77	108	51	77

P.072 X2K.	n_1 = 1500 min^{-1}						245660 Nm
P.072 X2KP150	162	9.3	248	98	167	50	106
	174	8.6	231	100	167	52	107
	206*	7.3	195	103	163	62	109
	220*	6.8	183	104	162	63	110
	251*	6.0	162	103	157	66	109
	269*	5.6	151	103	156	67	109
P.072 X2KP130	303	5.0	133	63	121	20	70
	344	4.4	117	66	121	24	72
	378	4.0	106	74	122	37	79
	430*	3.5	94	76	123	41	82
	469*	3.2	87	75	117	43	80
	532*	2.8	76	75	116	44	80

P.072 X2K.	n_1 = 1800 min^{-1}						245600 Nm
P.072 X2KP150	162	11.1	298	80	166	21	95
	174	10.3	278	83	168	26	98
	206*	8.7	234	95	168	49	108
	220*	8.2	220	97	168	51	109
	251*	7.2	194	100	166	59	111
	269*	6.7	181	100	165	60	112
P.072 X2KP130	303	5.9	159	37	113	)	51
	344	5.2	140	43	114	)	56
	378	4.8	128	61	124	17	72
	430*	4.2	112	65	126	23	76
	469*	3.8	104	68	122	32	78
	532*	3.4	92	69	121	32	78

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P.082 X2K.	n_1 = 1000 min^{-1}						359400 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.082 X2KP150	164	6.1	239	129	178	86	126
	176	5.7	223	129	177	87	126
	208*	4.8	189	122	164	84	119
	222*	4.5	177	121	163	85	119
	254*	3.9	156	116	154	82	113
	272*	3.7	146	115	152	82	112
	304	3.3	129	118	162	81	115
	326	3.1	120	118	161	81	115
	385*	2.6	102	112	150	78	109
	413*	2.4	95	111	148	78	108
	471*	2.1	84	106	141	76	104
	504*	2.0	79	105	139	75	103

P.082 X2K.	n_1 = 1200 min^{-1}						359400 Nm
P.082 X2KP150	164	7.3	287	126	187	79	127
	176	6.8	268	127	186	80	128
	208*	5.8	226	123	174	82	123
	222*	5.4	212	123	173	82	123
	254*	4.7	187	119	165	82	119
	272*	4.4	175	118	163	82	119
	304	3.9	155	117	171	76	118
	326	3.7	145	117	170	77	118
	385*	3.1	122	113	160	77	114
	413*	2.9	114	113	158	77	113
	471*	2.5	101	109	151	76	109
	504*	2.4	94	108	149	76	109

P.082 X2K.	n_1 = 1500 min^{-1}						359400 Nm
P.082 X2KP150	164	9.1	359	116	194	61	124
	176	8.5	335	118	194	64	126
	208*	7.2	283	120	187	74	127
	222*	6.8	265	120	186	75	127
	254*	5.9	234	119	179	78	126
	272*	5.5	219	119	178	79	126
	304	4.9	194	110	178	63	118
	326	4.6	181	111	178	65	118
	385*	3.9	153	112	171	71	118
	413*	3.6	143	112	170	72	118
	471*	3.2	126	110	164	74	116
	504*	3.0	118	110	163	74	116

P.082 X2K.	n_1 = 1800 min^{-1}						359400 Nm
P.082 X2KP150	164	11.0	431	97	194	32	114
	176	10.2	401	101	196	38	117
	208*	8.7	340	112	195	60	127
	222*	8.1	318	114	195	63	128
	254*	7.1	281	117	191	71	129
	272*	6.6	262	117	190	72	130
	304	5.9	232	98	181	43	112
	326	5.5	217	100	182	46	114
	385*	4.7	184	107	180	62	120
	413*	4.4	171	108	179	63	120
	471*	3.8	152	109	175	69	120
	504*	3.6	142	109	174	69	120

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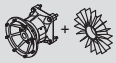
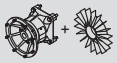
P.092 X2K.	n_1 = 1000 min^{-1}						423000 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.092 X2KP170	160	6.3	289	165	236	104	160
	179	5.6	258	165	234	106	161
	198	5.1	233	165	230	110	161
	223*	4.5	207	165	226	111	161
	242*	4.1	193	157	212	108	153
	272*	3.7	172	155	209	108	152
P.092 X2KP150	318	3.1	145	131	177	90	127
	340	2.9	136	130	176	90	127
	403*	2.5	115	122	163	86	120
	431*	2.3	107	122	161	86	119
	492*	2.0	95	116	153	83	113
	527*	1.9	89	115	151	83	112

P.092 X2K.	n_1 = 1200 min^{-1}						423000 Nm
P.092 X2KP170	160	7.5	346	155	241	87	156
	179	6.7	310	157	241	91	158
	198	6.1	280	161	241	100	162
	223*	5.4	249	162	238	102	163
	242*	5.0	231	157	226	103	158
	272*	4.4	206	156	222	104	157
P.092 X2KP150	318	3.8	174	130	188	86	131
	340	3.5	163	130	186	86	131
	403*	3.0	138	125	174	86	125
	431*	2.8	129	124	173	86	125
	492*	2.4	114	120	164	84	120
	527*	2.3	106	119	163	84	119

P.092 X2K.	n_1 = 1500 min^{-1}						423000 Nm
P.092 X2KP170	160	9.4	433	128	239	45	139
	179	8.4	387	133	242	55	145
	198	7.6	350	147	248	76	158
	223*	6.7	311	150	248	81	160
	242*	6.2	289	152	240	91	161
	272*	5.5	257	153	239	94	162
P.092 X2KP150	318	4.7	218	125	198	74	132
	340	4.4	204	125	197	75	133
	403*	3.7	172	124	189	81	131
	431*	3.5	161	124	187	81	131
	492*	3.0	142	122	179	83	128
	527*	2.8	133	122	178	83	128

P.092 X2K.	n_1 = 1800 min^{-1}						423000 Nm
P.092 X2KP170	160	11.3	520	83	227	)	110
	179	10.1	464	95	232	)	120
	198	9.1	420	122	248	37	144
	223*	8.1	373	128	250	47	149
	242*	7.4	347	140	249	71	159
	272*	6.6	309	143	248	76	161
P.092 X2KP150	318	5.7	261	113	203	55	129
	340	5.3	245	115	203	58	130
	403*	4.5	206	121	199	72	134
	431*	4.2	193	121	198	73	134
	492*	3.7	171	122	193	78	134
	527*	3.4	159	122	191	79	134

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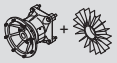
P.102 X2K.	n_1 = 1000 min^{-1}						500000 Nm
				P_{TH} [kW] M1			
				20 °C		40 °C	
Designation	i_{tot}	n_2 [min^{-1}]	PN_1 [kW]				
P.102 X2KP170	157	6.4	348	191	269	122	185
	177	5.6	308	191	266	125	186
	196	5.1	279	191	260	128	186
	220*	4.5	248	190	257	129	185
	239*	4.2	231	179	240	124	175
	269*	3.7	205	176	236	124	172
P.102 X2KP150	314	3.2	174	152	203	106	148
	336	3.0	163	151	201	106	147
	398*	2.5	137	140	186	101	137
	426*	2.3	128	139	184	100	136
	486*	2.1	114	132	174	96	129
	520*	1.9	106	131	172	96	128

P.102 X2K.	n_1 = 1200 min^{-1}						500000 Nm
P.102 X2KP170	157	7.6	417	181	278	105	182
	177	6.8	370	183	278	110	185
	196	6.1	334	187	274	118	189
	220*	5.5	298	188	271	121	189
	239*	5.0	277	180	255	120	181
	269*	4.5	246	180	252	121	181
P.102 X2KP150	314	3.8	209	153	216	102	153
	336	3.6	195	152	214	103	153
	398*	3.0	165	145	199	100	145
	426*	2.8	154	144	197	100	145
	486*	2.5	136	137	187	98	138
	520*	2.3	127	136	186	97	137

P.102 X2K.	n_1 = 1500 min^{-1}						500000 Nm
P.102 X2KP170	157	9.6	522	153	279	62	167
	177	8.5	463	160	281	73	173
	196	7.7	418	174	287	94	185
	220*	6.8	372	177	287	100	188
	239*	6.3	346	176	275	109	187
	269*	5.6	308	177	271	111	187
P.102 X2KP150	314	4.8	261	148	231	91	157
	336	4.5	244	149	230	93	157
	398*	3.8	206	146	217	97	153
	426*	3.5	192	146	215	97	153
	486*	3.1	170	142	205	97	149
	520*	2.9	159	141	203	97	148

P.102 X2K.	n_1 = 1800 min^{-1}						500000 Nm
P.102 X2KP170	157	11.5	626	108	268	)	137
	177	10.2	555	121	274	)	148
	196	9.2	501	148	290	55	173
	220*	8.2	447	155	292	66	179
	239*	7.5	416	165	287	89	186
	269*	6.7	369	168	286	94	188
P.102 X2KP150	314	5.7	313	138	239	73	155
	336	5.4	293	139	239	76	157
	398*	4.5	247	143	231	89	158
	426*	4.2	231	144	230	90	158
	486*	3.7	204	143	221	94	156
	520*	3.5	191	142	219	94	156

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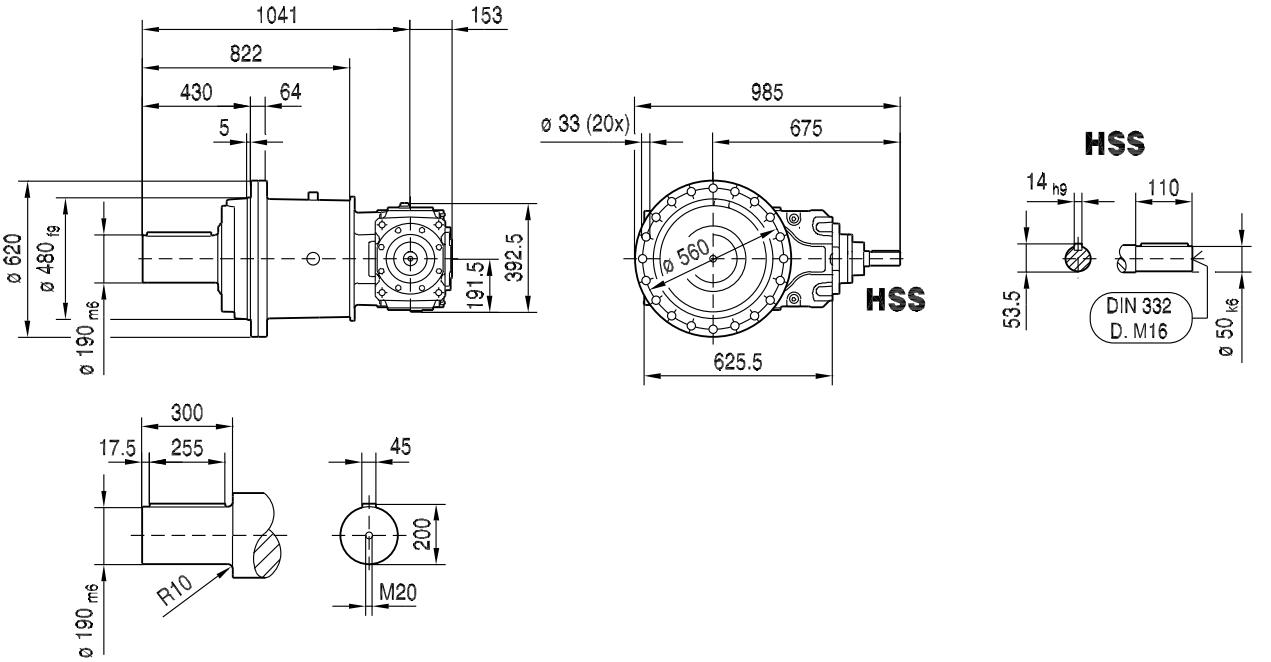
10 Dimension sheets

45 004 00 14

PF042X2K110..



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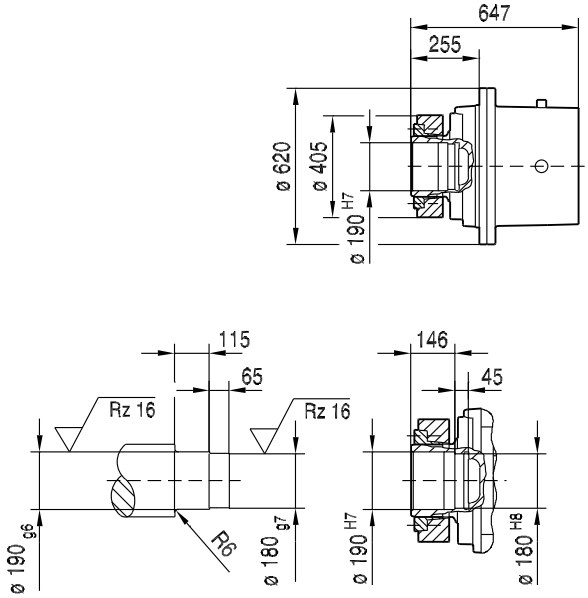

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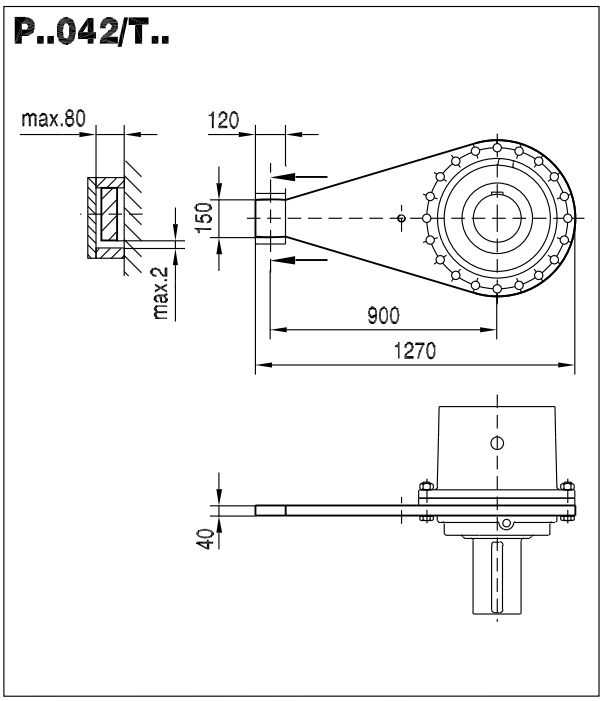

PF.. kg	PHF... kg
860	865

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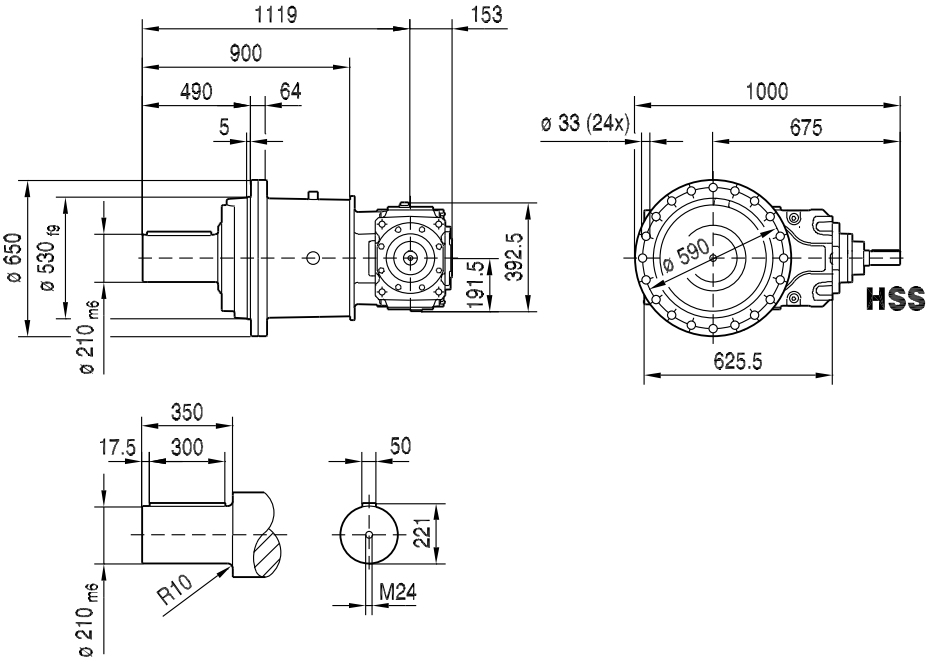
45 005 00 14

PF052X2K110..



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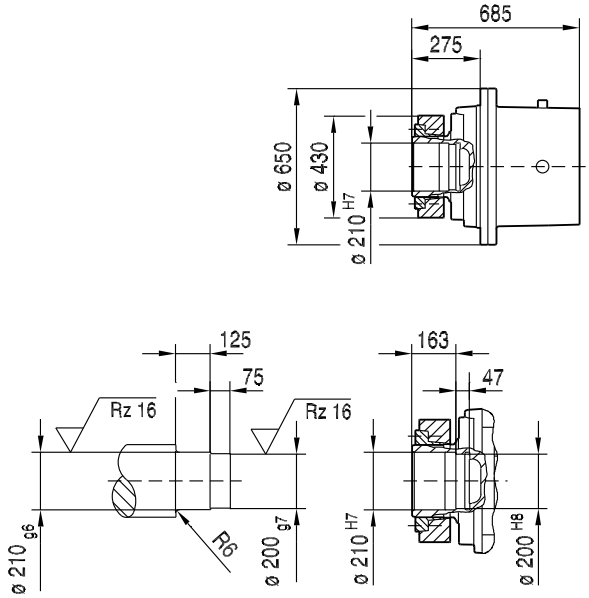

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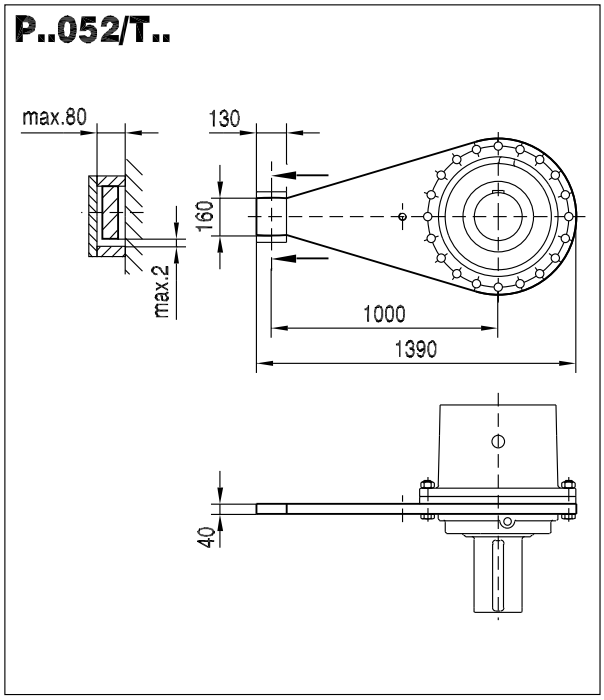

PF.. kg	PHF... kg
1 000	990

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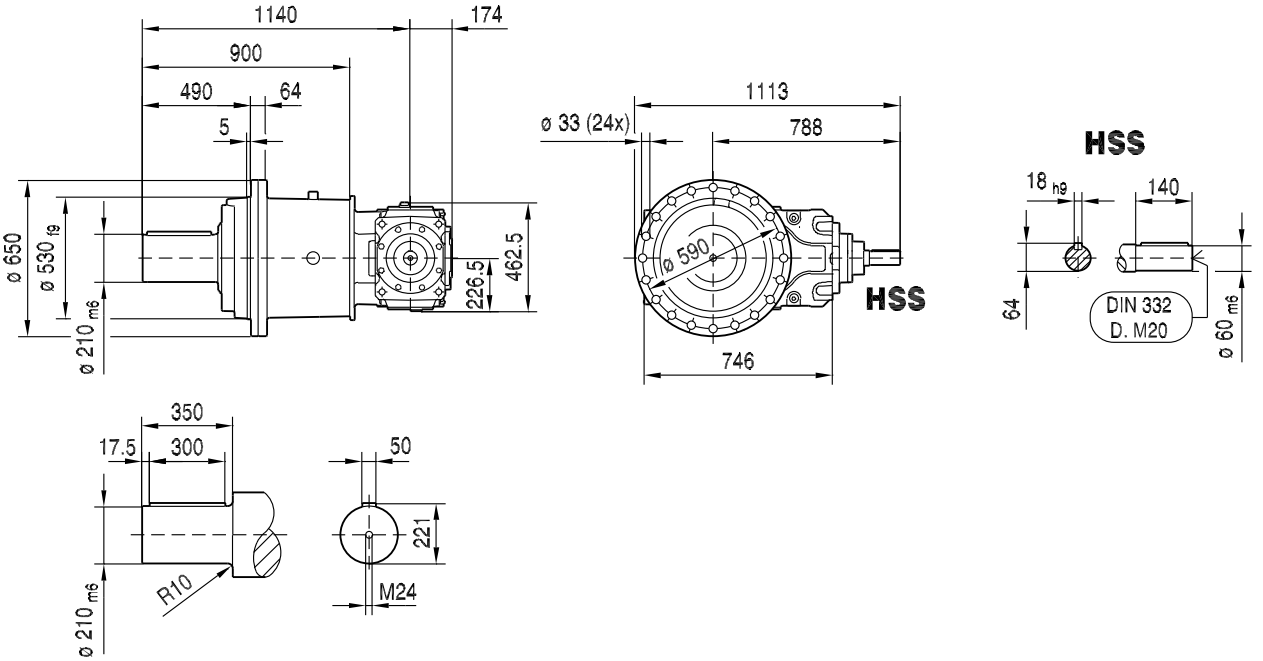
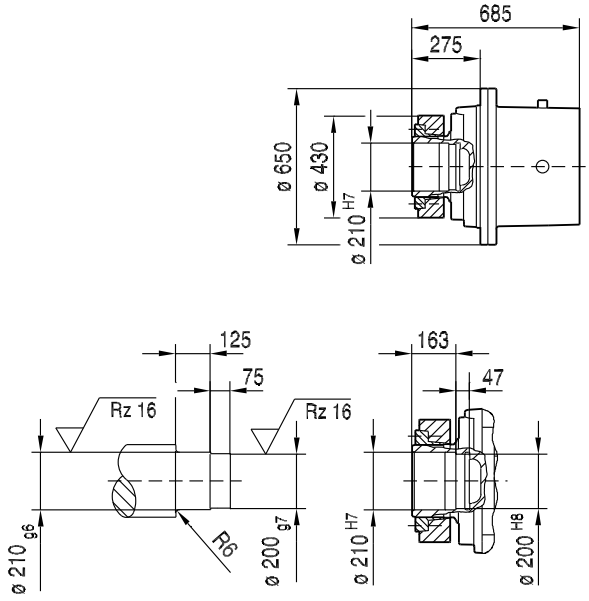
45 006 00 14

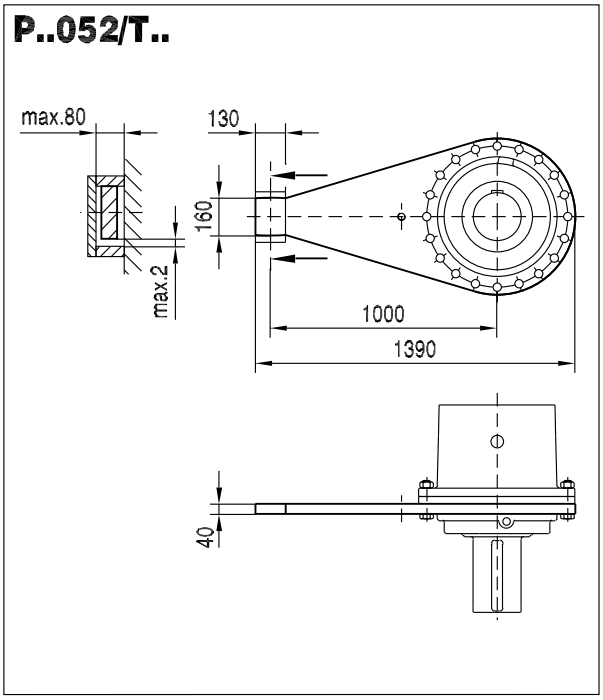
PF052X2K130..



PHF052X2K130..



P..052/T..



PF.. kg	PHF... kg
1 130	1 125

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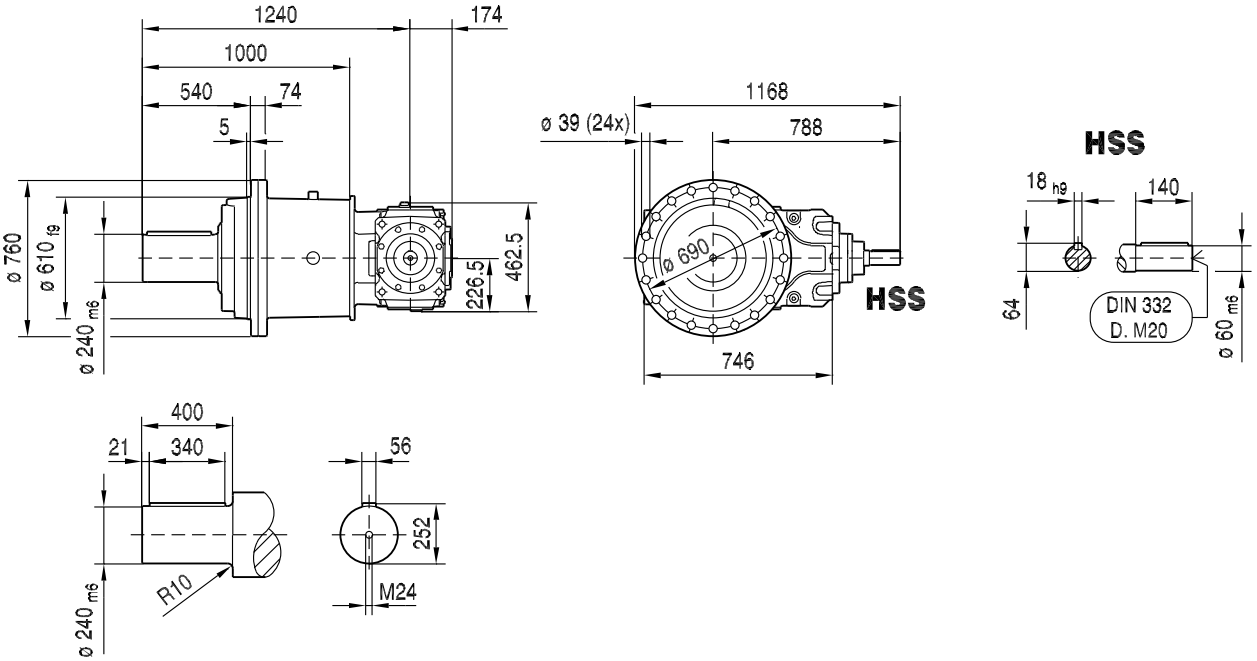
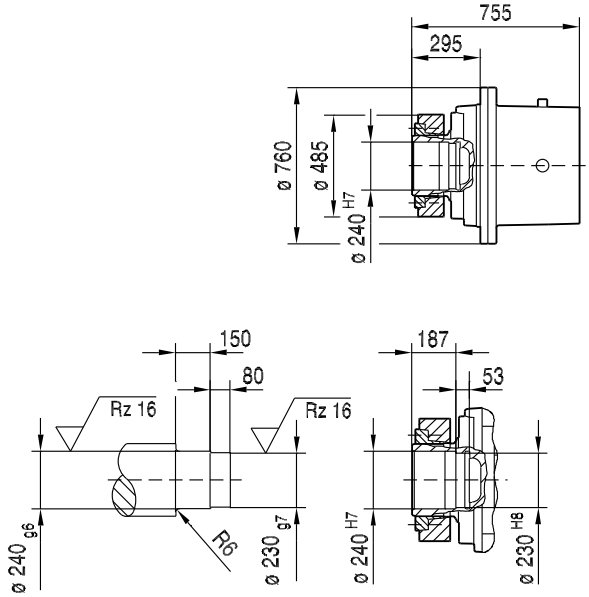
45 007 00 14

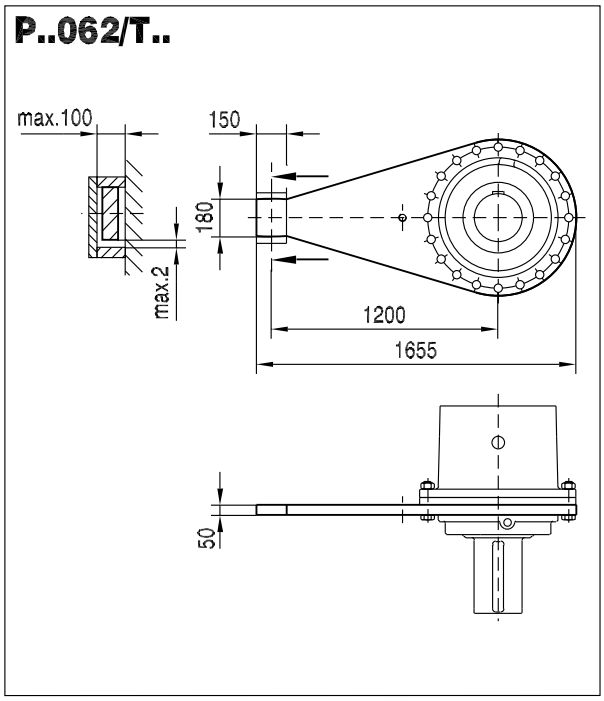
PF062X2K130..



PHF062X2K130..



P..062/T..



PF.. kg	PHF... kg
1 475	1 465

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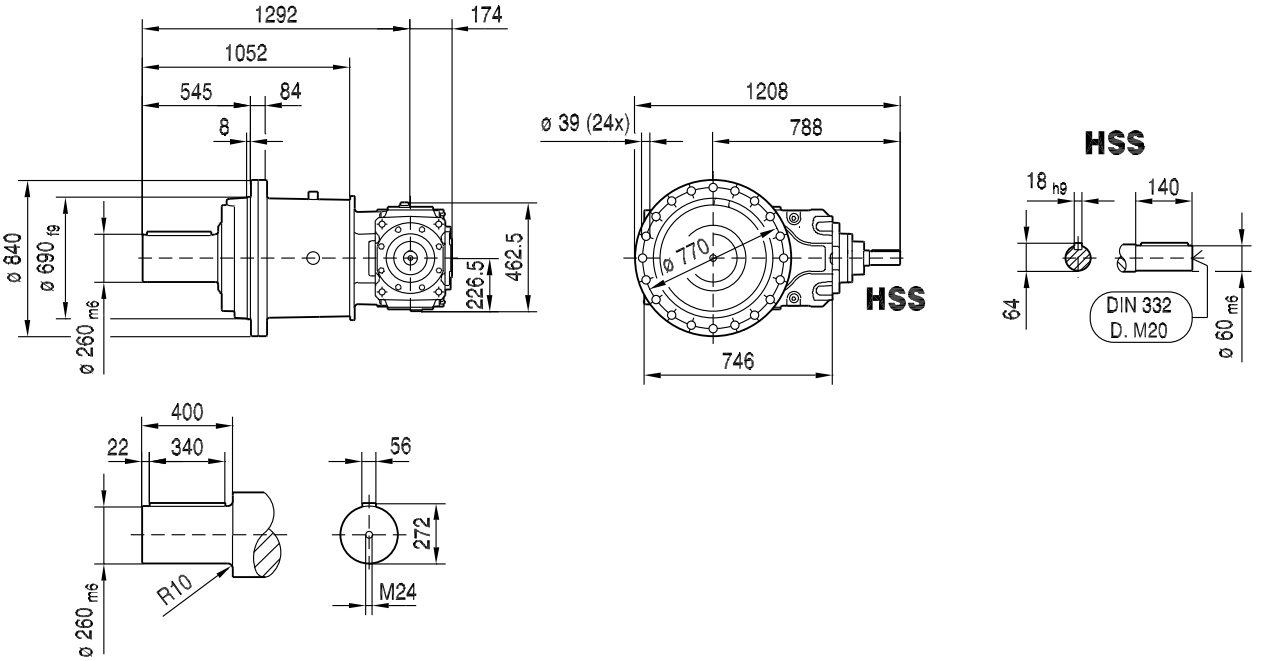
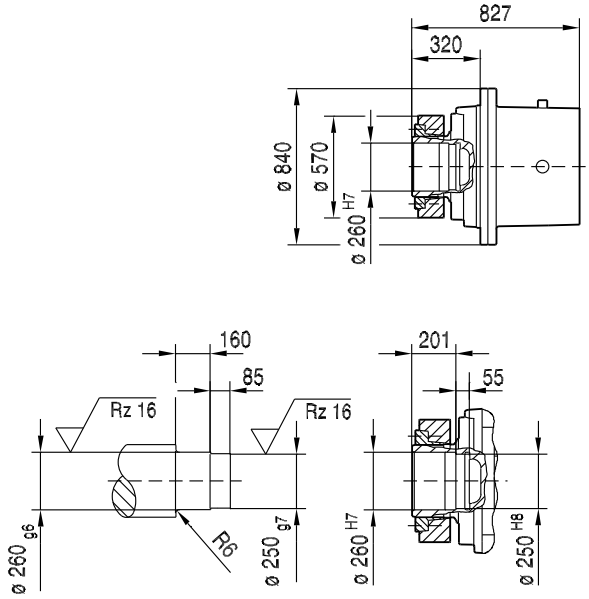
45 008 00 14

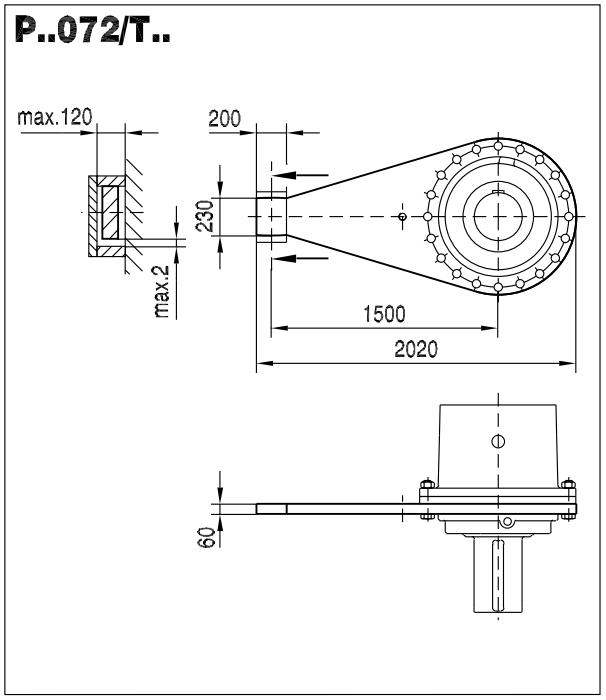
PF072X2K130..



PHF072X2K130..



P..072/T..



PF.. kg	PHF... kg
1 775	1 825

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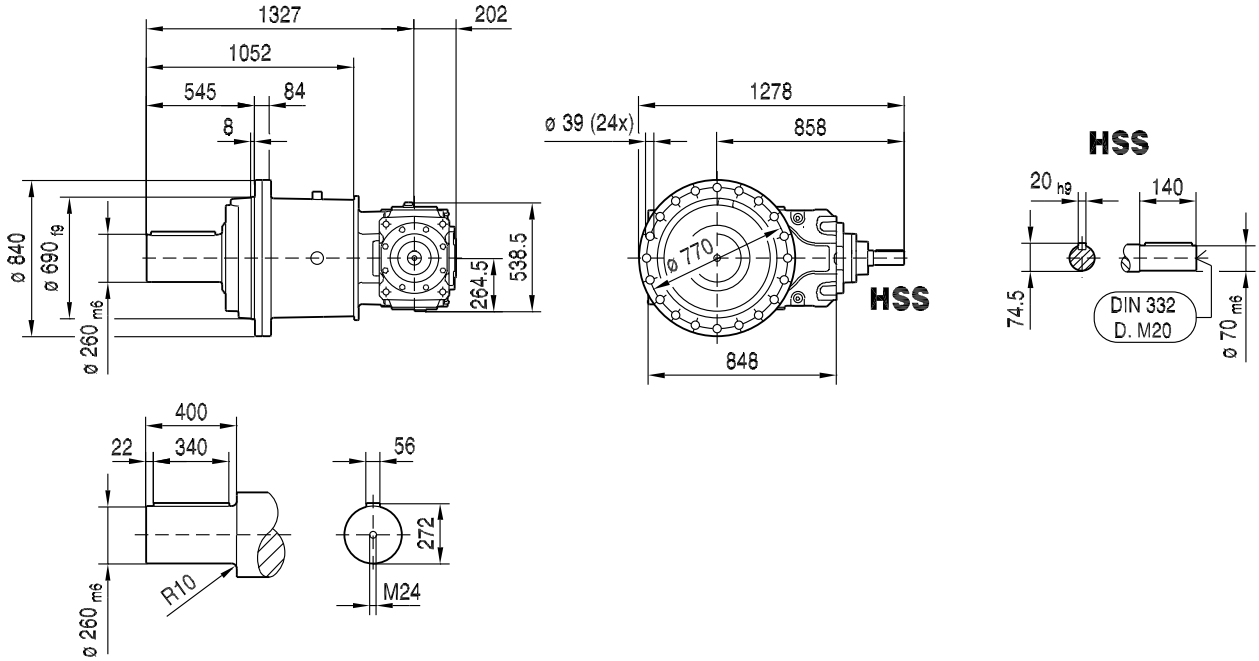
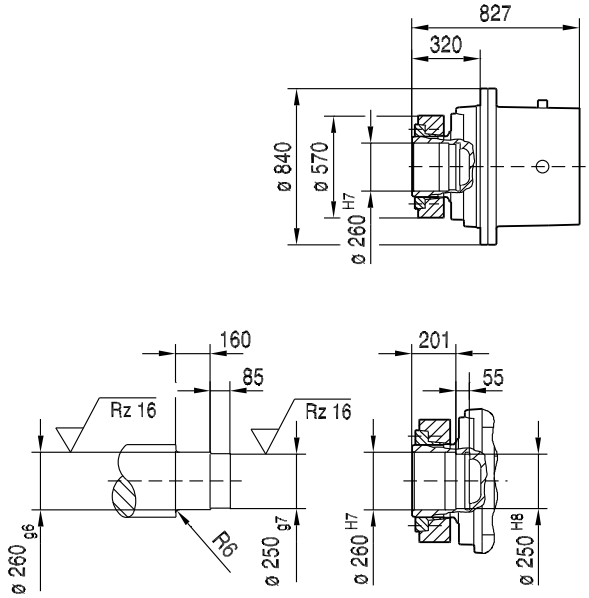
45 009 00 14

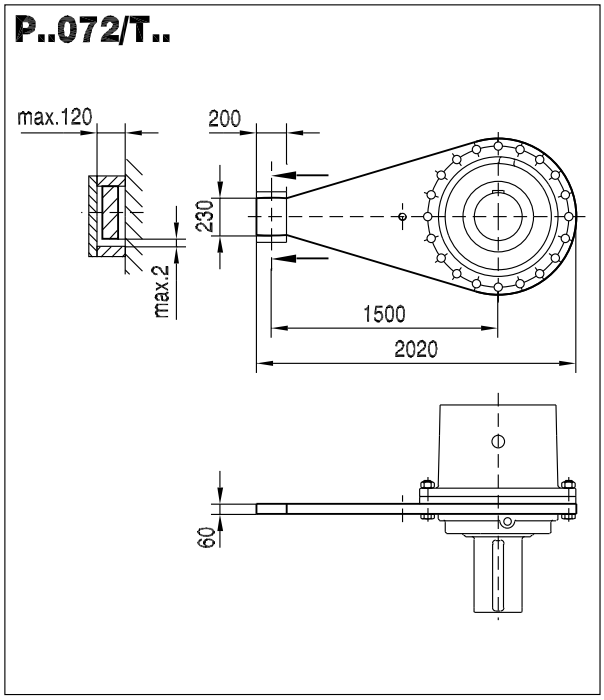
PF072X2K150..



PHF072X2K150..



P..072/T..



PF.. kg	PHF... kg
1 985	2 040

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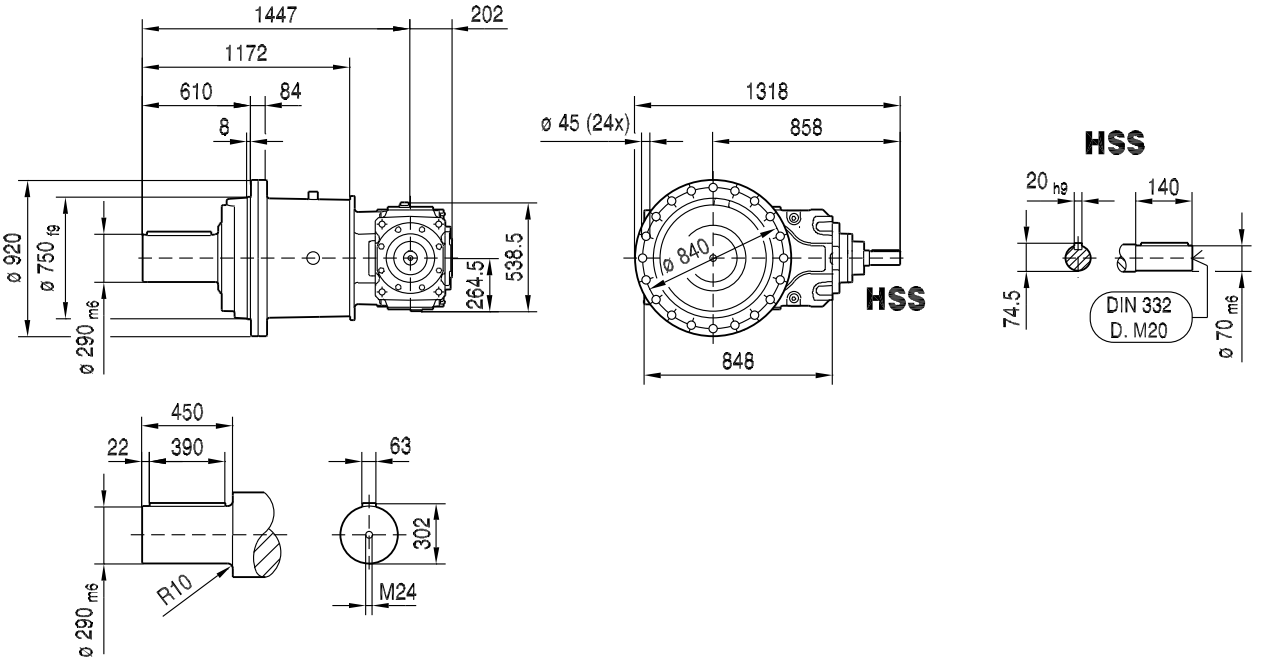
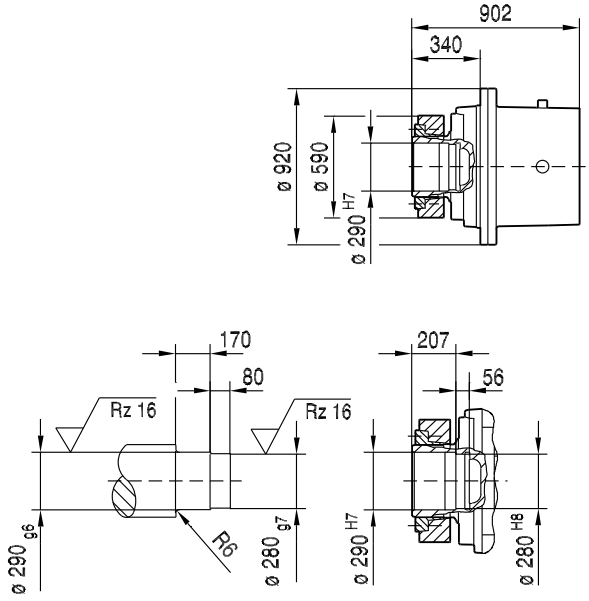
45 010 00 14

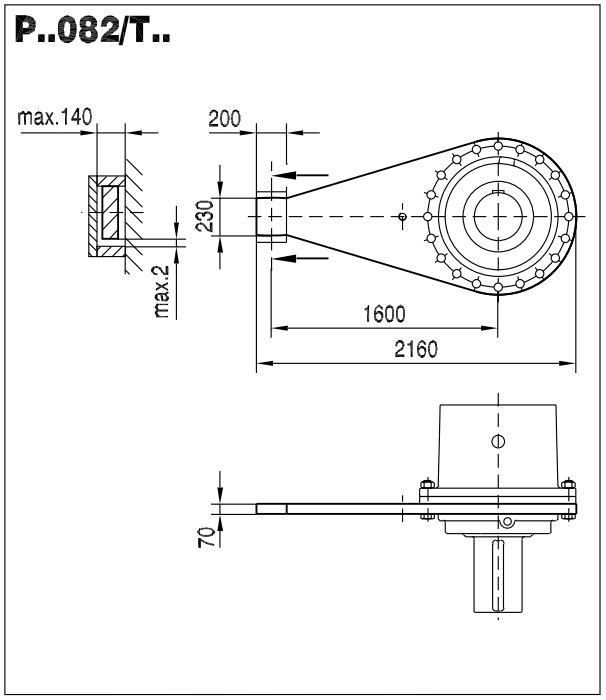
PF082X2K150..



PHF082X2K150..



P..082/T..



PF.. kg	PHF... kg
2 510	2 505

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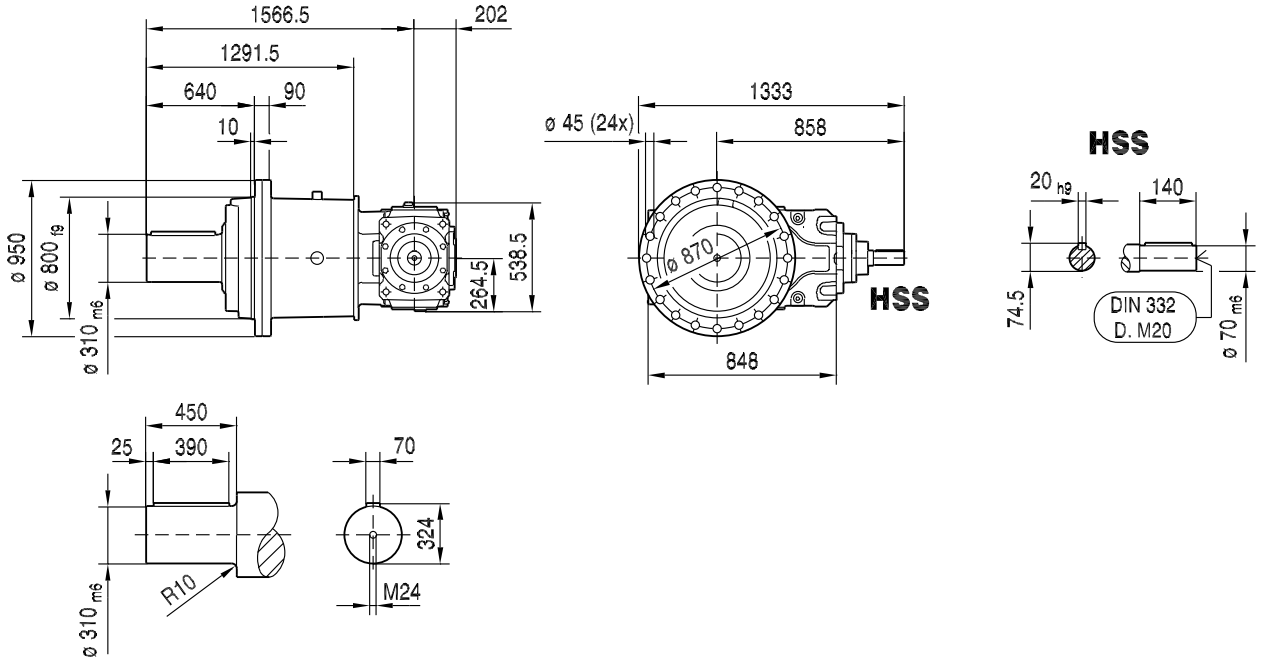
45 011 00 14

PF092X2K150..



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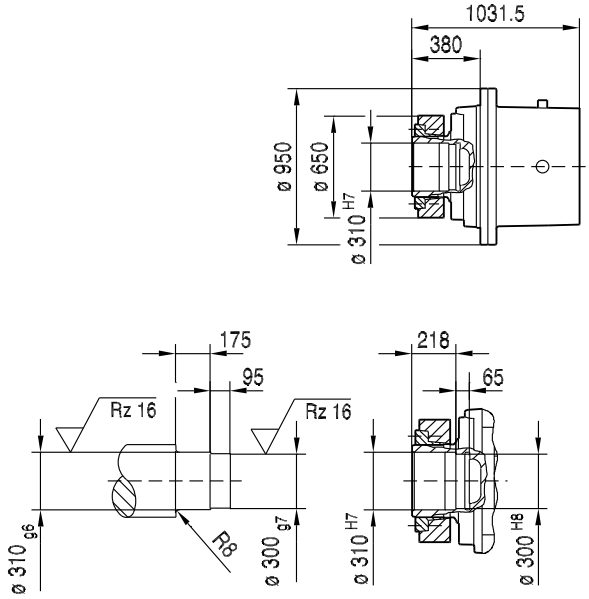
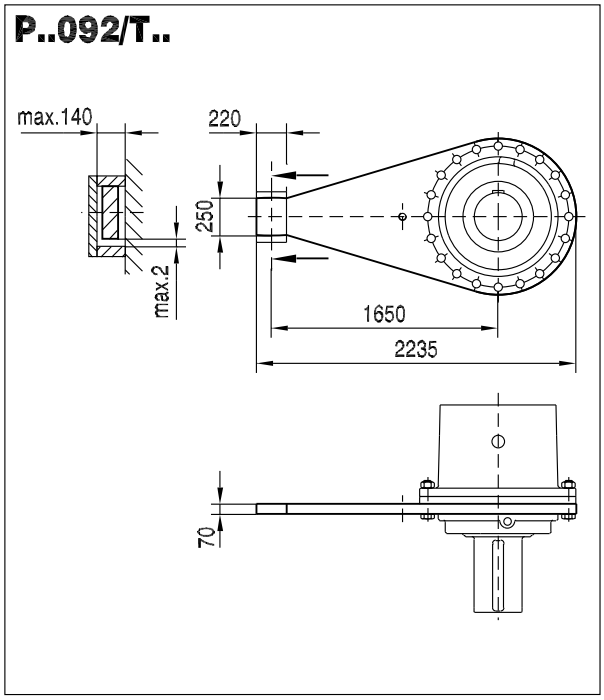


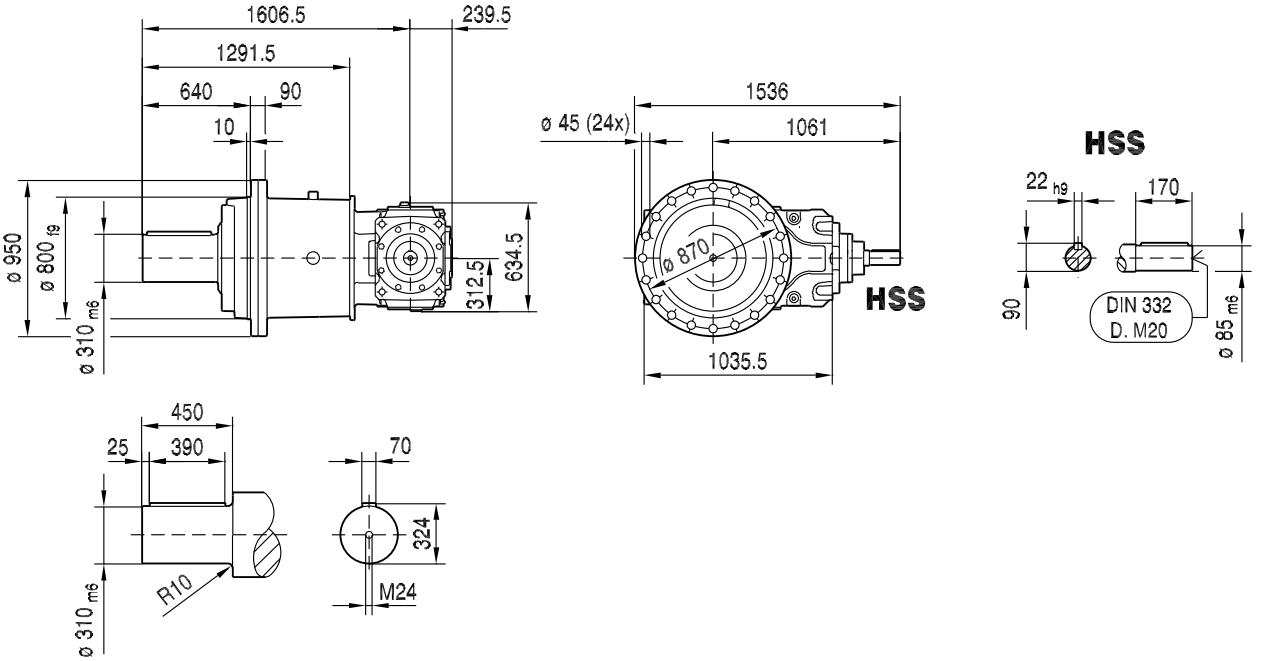
P..092/T..



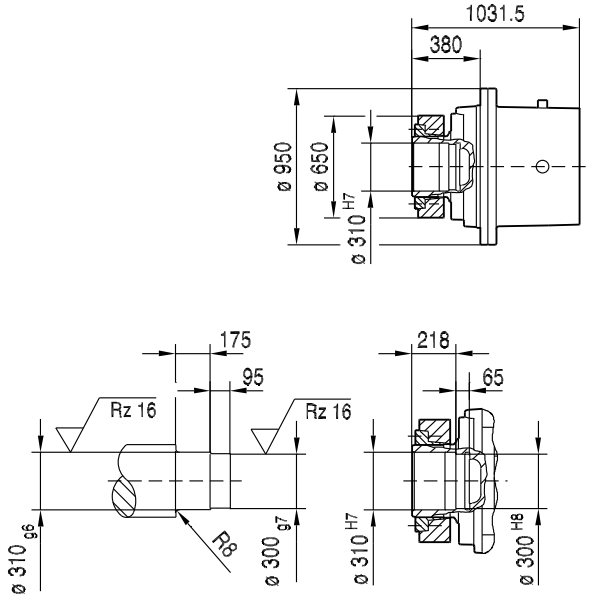
PF.. kg	PHF... kg
2 985	3 000

45 012 00 14

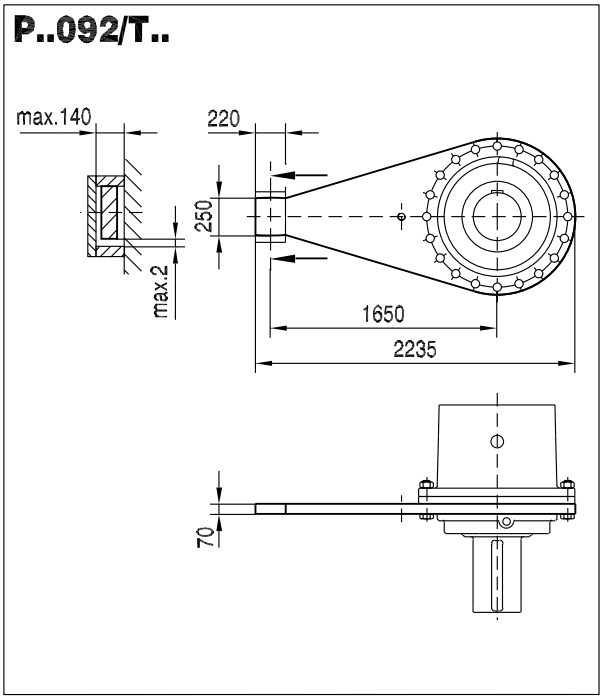
PF092X2K170..



PHF092X2K170..



P..092/T..



PF.. kg	PHF... kg
3 305	3 320

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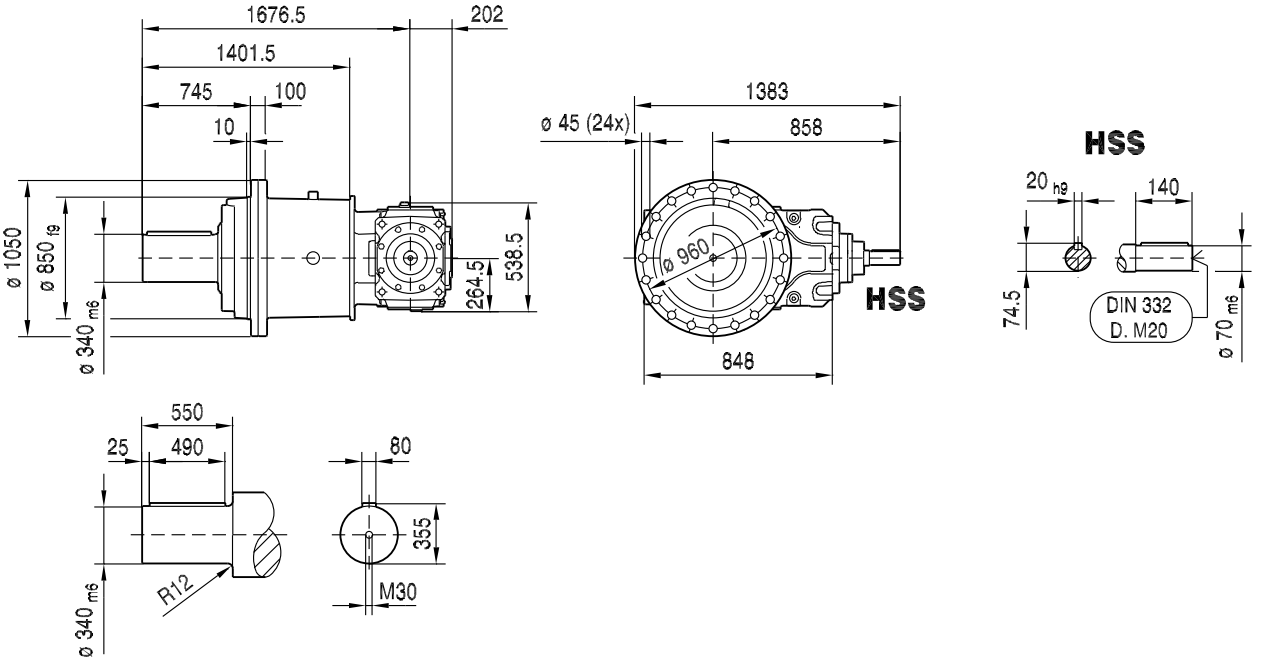
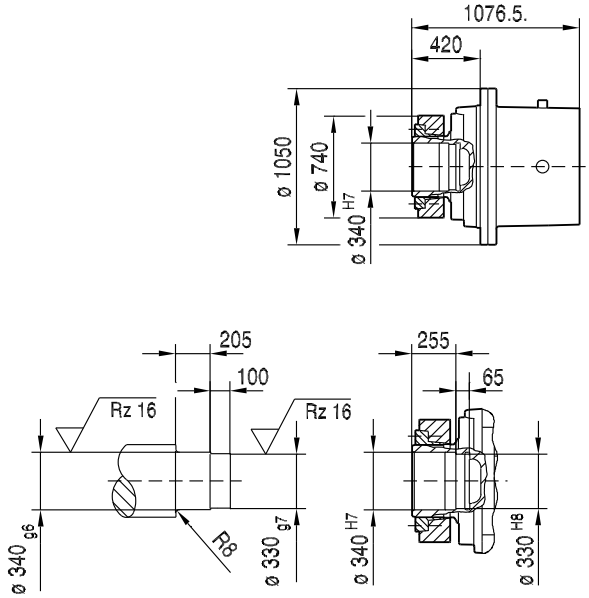
45 013 00 14

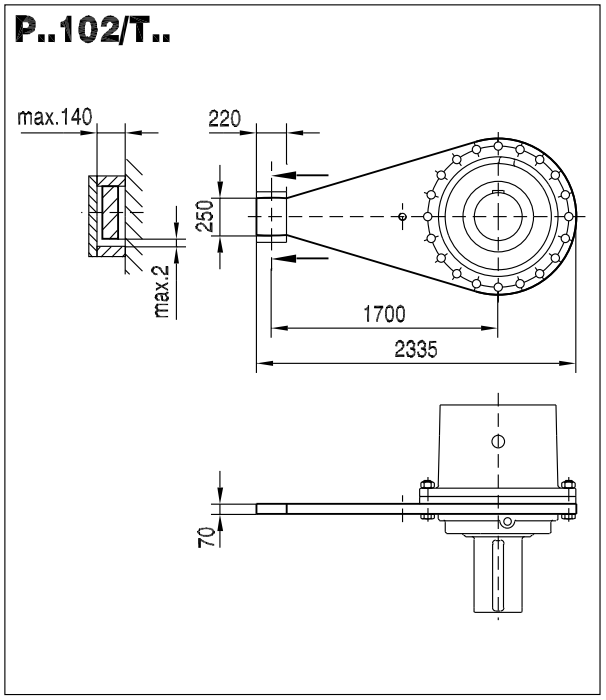
PF102X2K150..



PHF102X2K150..



P..102/T..



PF.. kg	PHF... kg
3 580	3 645

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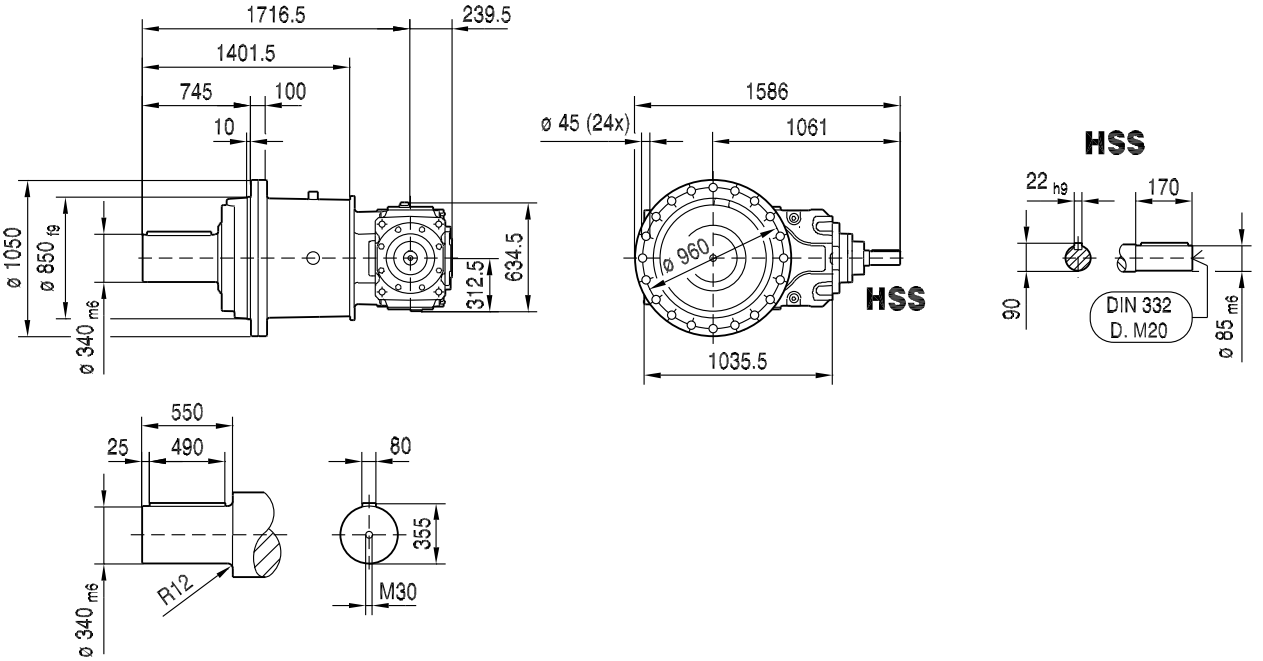
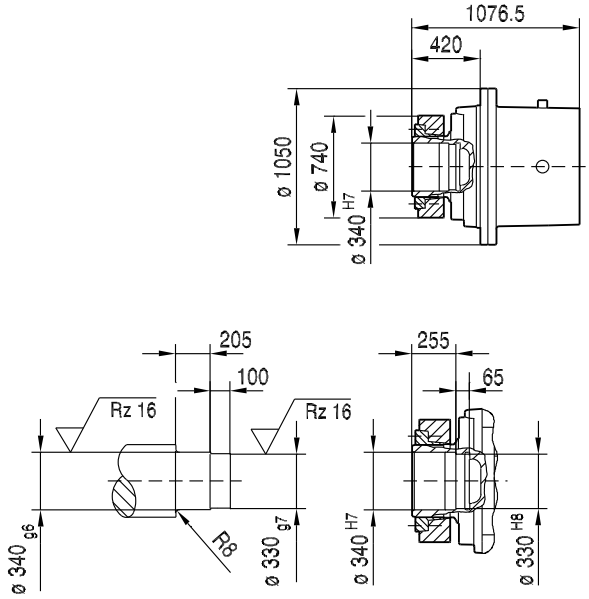
45 014 00 14

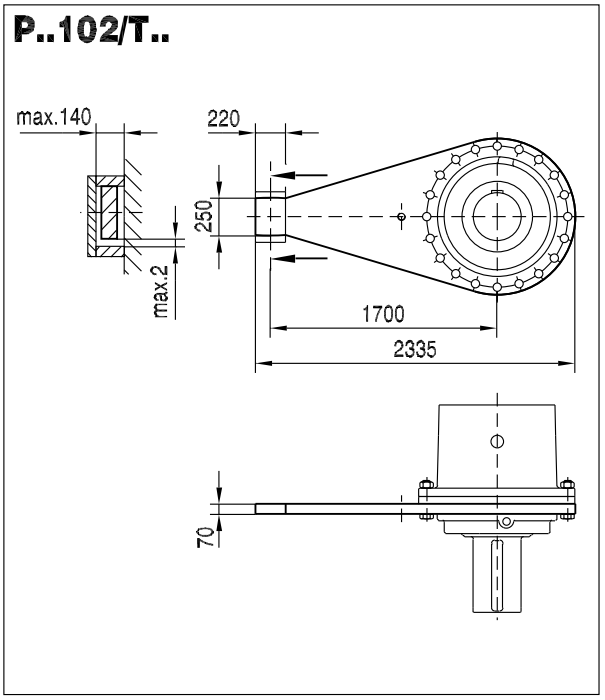
PF102X2K170..



PHF102X2K170..



P..102/T..



PF.. kg	PHF... kg
3 900	3 965

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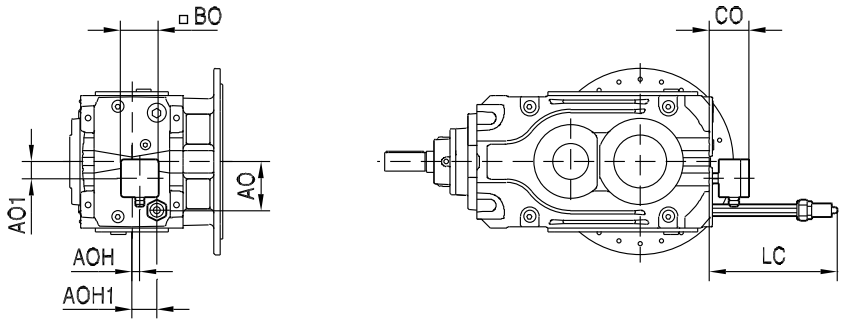
11 Options dimension sheets

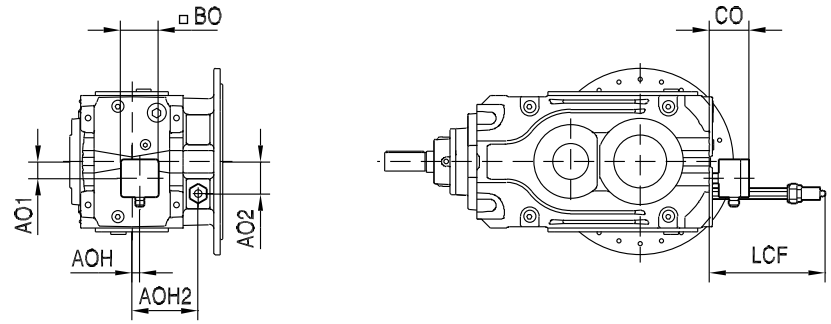
11.1 Oil heater/OH [mm]

45 001 00 15

OH



OH-F



	AO	AO1	AO2	AOH	AOH1	AOH2	□BO	CO	LC	LCF
X2K110	129	44.5	85	20	50	158.5	100	100	580	340
X2K130	170	85	103	22	60	178.5	100	100	680	340
X2K150	205	122.5	115	24	70	205	100	100	780	510
X2K170	250	162.5	151	35	80	238	100	100	890	560

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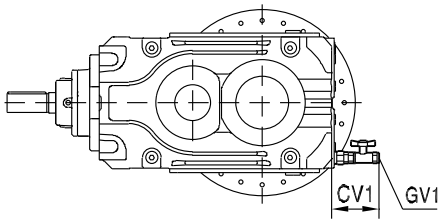
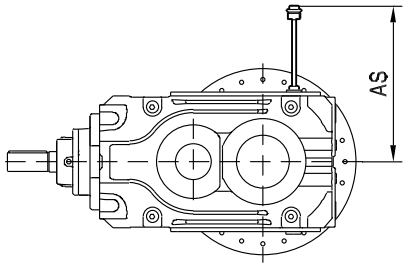
11.2 Oil drain valve ODV/Oil dipstick OD [mm]

45 002 00 15

ODV



OD



	ODV		OD
	CV1	**GV1**	AS
X2K110	155	G1/2"	465
X2K130	121.5	G1/2"	550
X2K150	121.5	G1/2"	630
X2K170	121.5	G1/2"	735

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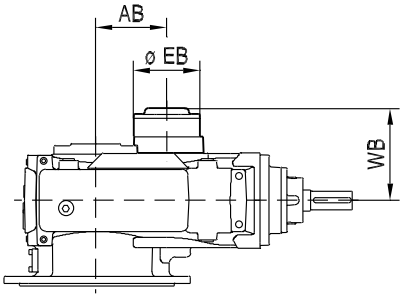
11.3 Backstop/BS [mm]

45 003 00 15

BS



	AB	Ø EB	WC
X2K110	184	175	244
X2K130	226	190	268
X2K150	267	210	295
X2K170	325	245	343

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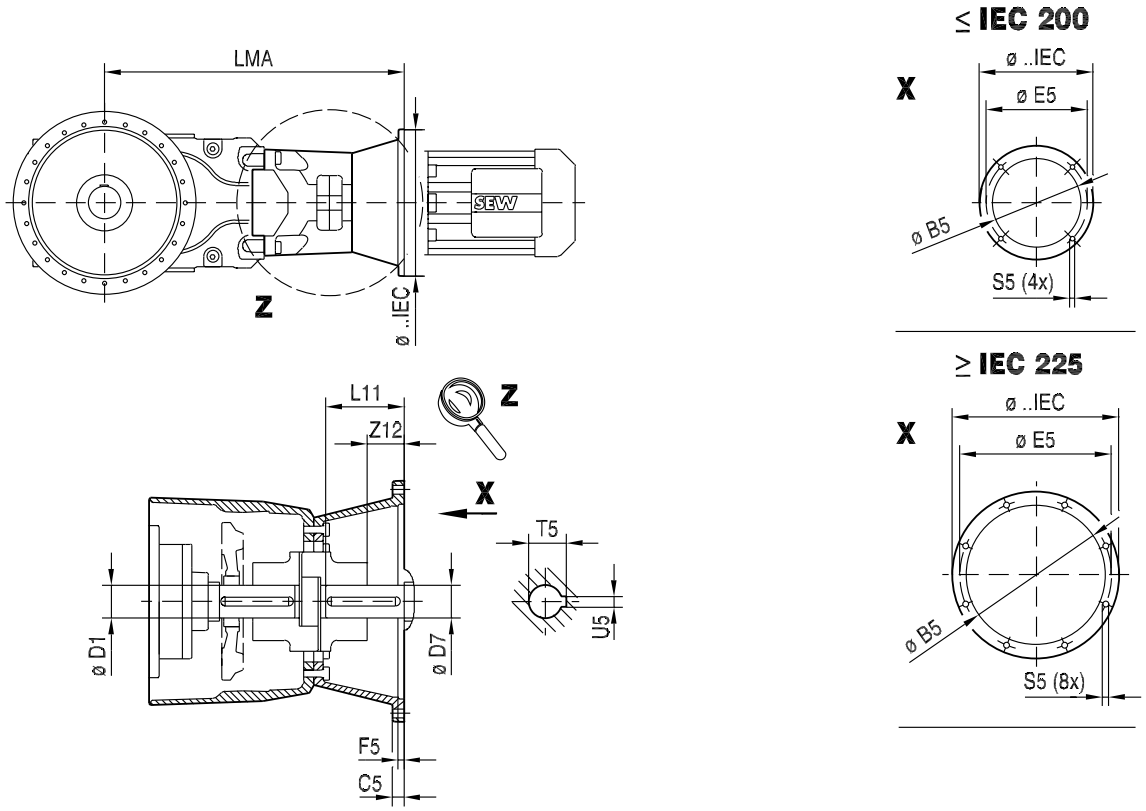
11.4 IEC motor adapter [mm]

For further information, refer to chapter "Motor adapter" (→ 🗎 55).

11.4.1 IEC motor adapter X2K110 - 170

45 005 00 15

MA



X2K..	IEC	Ø IEC	Ø B5	C5	Ø D7	Ø E5	F5	L11	S5	T5	U5	Ø D1	LMA	Z12	Kg
110	200	400	300^{H7}	20	55^{H7}	350	7	110	M16 (4x)	59.3	16^{JS9}	50	788	38	50
	225	450	350^{H7}	20	60^{H7}	400	7	140	M16 (8x)	64.4	18^{JS9}	50	818	66	55
	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8x)	69.4	18^{JS9}	50	848	73	70
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8x)	79.9	20^{JS9}	50	848	73	75
130[1)]	225	450	350^{H7}	20	60^{H7}	400	7	140	M16 (8x)	64.4	18^{JS9}	60	931	36	70
	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8x)	69.4	18^{JS9}	60	961	48	85
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8x)	79.9	20^{JS9}	60	961	47	85
	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8x)	85.4	22^{JS9}	60	981	81	110
150	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8x)	69.4	18^{JS9}	70	1031	54	100
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8x)	79.9	20^{JS9}	70	1031	49	100
	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8x)	85.4	22^{JS9}	70	1031	32.5	130
170	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8x)	85.4	22^{JS9}	85	1234	43	150
	315	800	680^{H7}	25	85^{H7}	740	7	170	M20 (8x)	90.4	22^{JS9}	85	1270	46	190
	355	800	680^{H7}	25	100^{H7}	740	7	210	M20 (8x)	106.4	28^{JS9}	85	1310	84	220

1) Observe the chapter concerning the maximum motor weight depending on the motor adapter size

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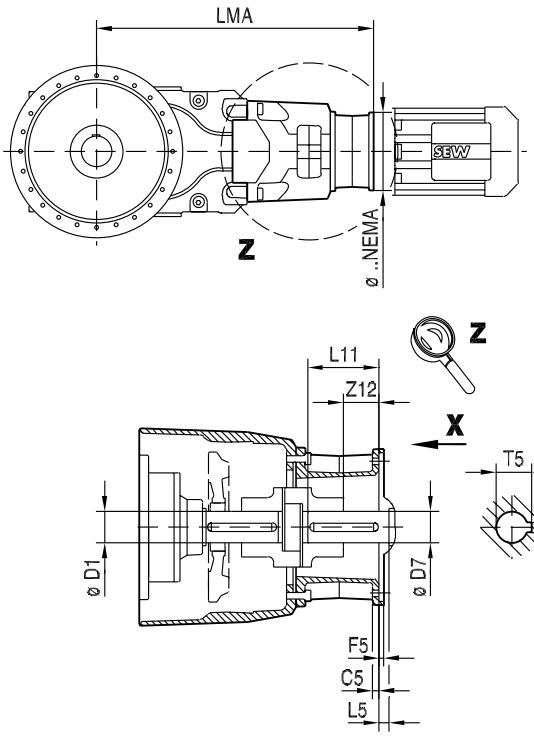
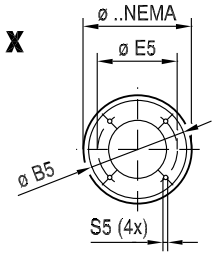
11.5 NEMA motor adapter [inch]

45 004 00 15

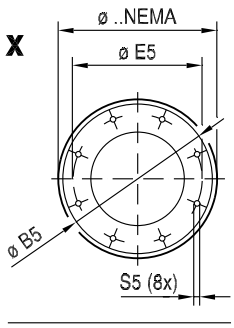
NEMA-MA



≤ NEMA 326



≥ NEMA 364



X2K..	NEMA	Ø NEMA	Ø B5	C5	Ø D7	Ø E5	F5	L5	L11
110	324TC-326TC	13	12 1/2^{H7}	0.71	2.12^{M7}	11	0.2	1/4	5
	364TC-365TC	13	12 1/2^{H7}	0.71	2.38^{M7}	11	0.2	1/4	5 5/8
	404TC-405TC	13	12 1/2^{H7}	0.79	2.88^{M7}	11	0.2	1/4	7
130	364TC-365TC	13	12 1/2^{H7}	0.71	2.38^{M7}	11	0.2	1/4	5 5/8
	404TC-405TC	13	12 1/2^{H7}	0.79	2.88^{M7}	11	0.2	1/4	7
	444TC-445TC	16.6	16^{H7}	0.79	3.38^{M7}	14	0.2	1/4	8 1/4
150	404TC-405TC	13	12 1/2^{H7}	0.79	2.88^{M7}	11	0.2	1/4	8 1/4
	444TC-445TC	16.6	16^{H7}	0.79	3.38^{M7}	14	0.2	1/4	8 1/4
170	444TC-445TC	16.6	16^{H7}	0.79	3.38^{M7}	14	0.2	1/4	8 1/4
	447TC-449TC	16.6	16^{H7}	0.79	3.38^{M7}	14	0.2	1/4	8 1/4

X2K..	NEMA	S5	T5	U5	Ø D1	LMA	Z12	Kg
110	324TC-326TC	0.69 (4x)	2,362	1/2 $^{+0.00197}$	1.97	32.01	2.36	45
	364TC-365TC	0.69 (8x)	2,661	5/8 $^{+0.00197}$	1.97	32.87	1.37	60
	404TC-405TC	0.69 (8x)	3,213	3/4 $^{+0.00197}$	1.97	38.19	3.65	70
130	364TC-365TC	0.69 (8x)	2,661	5/8$^{+0.00197}$	2.36	37.32	2.56	60
	404TC-405TC	0.69 (8x)	3,213	3/4$^{+0.00197}$	2.36	39.61	3.65	70
	444TC-445TC	0.69 (8x)	3,772	7/8$^{+0.00197}$	2.36	43.54	4.16	90
150	404TC-405TC	0.69 (8x)	3,213	3/4$^{+0.00197}$	2.76	42.36	3.77	90
	444TC-445TC	0.69 (8x)	3,772	7/8$^{+0.00197}$	2.76	43.54	4.16	110
170	444TC-445TC	0.69 (8x)	3,772	7/8$^{+0.00197}$	3.35	51.57	4.32	145
	447TC-449TC	0.69 (8x)	3,772	7/8$^{+0.00197}$	3.35	51.57	3.68	155

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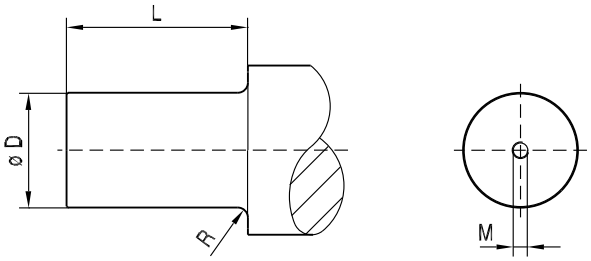
11.6 PR.. Smooth solid shaft

45 003 00 14



	Ø D	L	M	R
P.042	190_{v6}	300	M20	10
P.052	210_{v6}	350	M24	10
P.062	240_{v6}	400	M24	10
P.072	260_{v6}	400	M24	10
P.082	290_{v6}	450	M24	10
P.092	310_{v6}	450	M24	10
P.102	340_{v6}	550	M30	12

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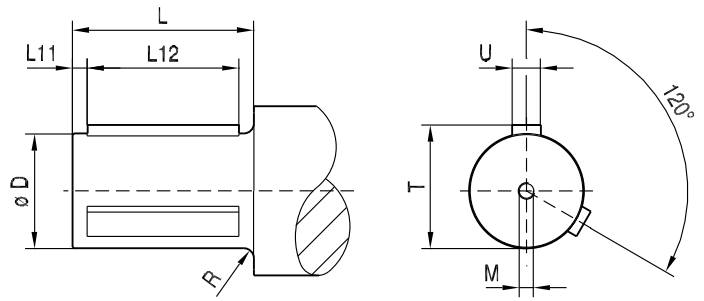
11.7 P.. Solid shaft with 2 keys

45 002 00 14



	Ø D	L11	L12	L	T	V	M	R
P.042	190_{m6}	17.5	255	300	200	45	M20	10
P.052	210_{m6}	17.5	300	350	221	50	M24	10
P.062	240_{m6}	21	340	400	252	56	M24	10
P.072	260_{m6}	22	340	400	272	56	M24	10
P.082	290_{m6}	22	390	450	302	63	M24	10
P.092	310_{m6}	25	390	450	324	70	M24	10
P.102	340_{m6}	25	490	550	355	80	M30	12

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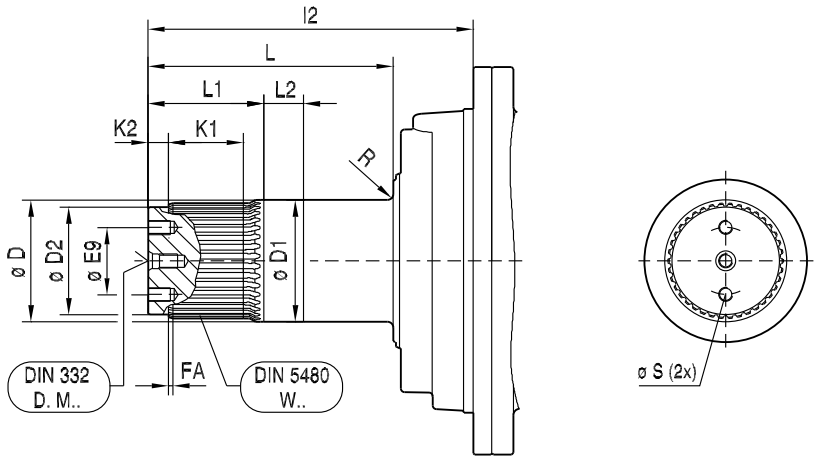
11.8 PL.. Splined solid shaft

45 002 00 16



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DIN 5480 - Solid shaft														
	Ø D1	**Ø D2**	**L2**	**K2**	**L**	**l2**	**L1**	**K1**	**R**	**Ø E9**	**DIN 332 D.M..**	**Ø S (2x)**	**FA**	**DIN 5480-W..**
PLF.042	190_{m6}	165_{m6}	30	30	300	430	175	110	10	125	M20	M20	8	180x5x30x34x8f
PLF.052	210_{m6}	185_{m6}	35	35	350	490	180	110	10	140	M24	M24	8	200x5x30x38x8f
PLF.062	240_{m6}	205_{m6}	35	35	400	540	210	130	10	160	M24	M24	8	220x5x30x42x8f
PLF.072	260_{m6}	235_{m6}	40	40	400	545	215	135	10	160	M24	M24	8	250x5x30x48x8f
PLF.082	290_{m6}	265_{m6}	40	40	450	610	235	155	10	190	M24	M24	8	280x5x30x54x8f
PLF.092	310_{m6}	280_{m6}	45	45	450	640	245	160	10	220	M24	M24	8	300x5x30x58x8f
PLF.102	340_{m6}	300_{m6}	50	50	550	745	265	167	12	235	M30	M30	8	320x5x30x62x8f

INFORMATION

For applications with overhung loads, contact SEW-EURODRIVE.

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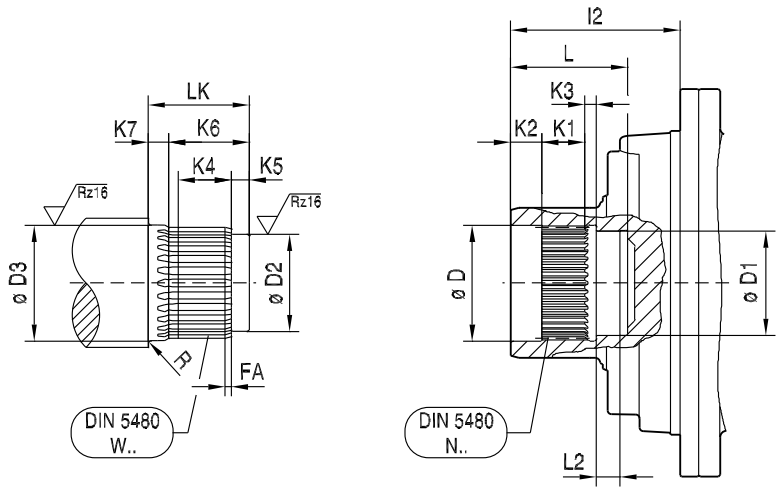
11.9 PV.. Splined hollow shaft

45 001 00 16



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DIN 5480 - Hollow shaft									
	Ø D	Ø D1	K2	L2	L	l2	K1	K3	DIN 5480 N..
PVF.042	202^{H7}	180^{H7}	45	30	191	255	80	21	200x5x30x38x9H
PVF.052	222^{H7}	200^{H7}	55	35	210	275	82	23	220x5x30x42x9H
PVF.062	252^{H7}	230^{H7}	60	35	240	295	95	32	250x5x30x48x9H
PVF.072	282^{H7}	250^{H7}	60	37	256	320	98	43	280x5x30x54x9H
PVF.082	302^{H7}	280^{H7}	60	38	263	340	125	22	300x5x30x58x9H
PVF.092	322^{H7}	300^{H7}	70	40	283	380	130	23	320x5x30x62x9H
PVF.102	362^{H7}	330^{H7}	90	45	320	420	125	40	360x8x30x44x9H

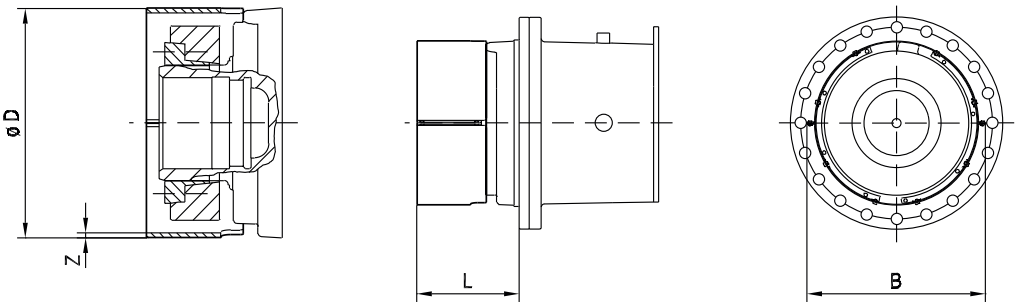
Recommendations for customer shaft										
	Ø D3	Ø D2	K7	K5	LK	K6	K4	R	FA	DIN 5480 W..
PVF.042	202_{m6}	180_{m6}	34	43	178	144	92	5	8x30°	200x5x30x38x8f
PVF.052	222_{m6}	200_{m6}	44	50	197	153	94	5	8x30°	220x5x30x42x8f
PVF.062	252_{m6}	230_{m6}	49	59	224	175	107	5	8x30°	250x5x30x48x8f
PVF.072	282_{m6}	250_{m6}	49	72	240	191	110	6	8x30°	280x5x30x54x8f
PVF.082	302_{m6}	280_{m6}	49	52	247	198	137	6	8x30°	300x5x30x58x8f
PVF.092	322_{m6}	300_{m6}	59.5	55	265	205.5	142	8	8x30°	320x5x30x62x8f
PVF.102	362_{m6}	330_{m6}	77	75	302	225	139	8	10x30°	360x8x30x44x8f

INFORMATION

For applications with overhung loads, contact SEW-EURODRIVE.

11.10 Protection cover for shrink disk

45 133 00 08



	B	ø D	L	Z
P.042	522	479	269	2
P.052	566	523	293	2
P.062	636	593	312	2
P.072	712	669	335.5	2
P.082	776	733	360	2
P.092	734	684	399.5	2
P.102	824	774	435.5	2

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12 Address Directory

Germany			
Headquarters Production plant Sales	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany P.O. box address Postfach 3023 • D-76642 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.seweurodrive.com sew@sew-eurodrive.de
Production Plant / Industrial Gear Units	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 76646 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production plant	**Graben**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany P.O. box address Postfach 1220 • 76671 Graben-Neudorf, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Oestringen Plant Franz-Gurk-Strasse 2 76684 Oestringen, Germany	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
Service Competence Centers	**Mechanical/ Mechatronic Components**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Strasse 40-42 30823 Garbsen (near Hanover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Daenkritzer Weg 1 08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstrasse 5 85551 Kirchheim (near Munich)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline/24-hour availability		+49 800 SEWHELP +49 800 7394357
Technical offices	**Augsburg**	SEW-EURODRIVE GmbH & Co KG August-Wessels-Strasse 27 86156 Augsburg, Germany	Tel. +49 821 22779-10 Fax +49 821 22779-50 tb-augsburg@sew-eurodrive.de
	Berlin	SEW-EURODRIVE GmbH & Co KG Lilienthalstrasse 3a 12529 Schoenefeld, Germany	Tel. +49 306331131-30 Fax +49 306331131-36 tb-berlin@sew-eurodrive.de
	Lake Constance	SEW-EURODRIVE GmbH & Co KG Dornierstraße 4 88677 Markdorf, Germany	Tel. +49 7544 96590-90 Fax +49 7544 96590-99 tb-bodensee@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Bornstr.19 ... 22 28195 Bremen, Germany	Tel. +49 421 33918-10 Fax +49 421 33918-22 tb-bremen@sew-eurodrive.de
	Dortmund	SEW-EURODRIVE GmbH & Co KG Hildastraße 8 44145 Dortmund, Germany	Tel. +49 231 229028-10 Fax +49 231 229028-20 tb-dortmund@sew-eurodrive.de
	Dresden	SEW-EURODRIVE GmbH & Co KG Hauptstrasse 32 01445 Radebeul, Germany	Tel. +49 351 26338-0 Fax +49 351 26338-38 tb-dresden@sew-eurodrive.de
	Erfurt	SEW-EURODRIVE GmbH & Co KG Dubliner Strasse 12 99091 Erfurt, Germany	Tel. +49 361 21709-70 Fax +49 361 21709-79 tb-erfurt@sew-eurodrive.de
	Guestrow	SEW-EURODRIVE GmbH & Co KG Glasewitzer Chaussee 33 B 18273 Guestrow, Germany P.O. box address Postfach 1216 • 18262 Güstrow, Germany	Tel. +49 3843 8557-80 Fax +49 3843 8557-88 tb-guestrow@sew-eurodrive.de

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Germany			
	Hamburg	SEW-EURODRIVE GmbH & Co KG Bramfelder Strasse 119 22305 Hamburg, Germany	Tel. +49 40 298109-60 Fax +49 40 298109-70 tb-hamburg@sew-eurodrive.de
	Hanover/Garbsen	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Str.40-42 30823 Garbsen, Germany P.O. box address Postfach 1104 53 • 30804 Garbsen, Germany	Tel. +49 5137 8798-10 Fax +49 5137 8798-50 tb-hannover@sew-eurodrive.de
	Heilbronn	SEW-EURODRIVE GmbH & Co KG Zeppelinstrasse 7 74357 Boennigheim, Germany	Tel. +49 7143 8738-0 Fax +49 7143 8738-25 tb-heilbronn@sew-eurodrive.de
	Herford	SEW-EURODRIVE GmbH & Co KG Göbenstraße 3 – 7 32052 Herford	Tel. +49 5221 9141-0 Fax +49 5221 9141-20 tb-herford@sew-eurodrive.de
	Karlsruhe	SEW-EURODRIVE GmbH & Co KG Ettlinger Weg 2 76467 Bietigheim, Germany P.O. box address Postfach 43 • 76463 Bietigheim, Germany	Tel. +49 7245 9190-10 Fax +49 7245 9190-20 tb-karlsruhe@sew-eurodrive.de
	Kassel	SEW-EURODRIVE GmbH & Co KG Lange Strasse 14 34253 Lohfelden, Germany	Tel. +49 561 95144-80 Fax +49 561 95144-90 tb-kassel@sew-eurodrive.de
	Koblenz	SEW-EURODRIVE GmbH & Co KG Bahnstrasse 17a 56743 Mendig, Germany	Tel. +49 2652 9713-30 Fax +49 2652 9713-40 tb-koblenz@sew-eurodrive.de
	Lahr	SEWEURODRIVE GmbH & Co KG Europastrasse 3/1 77933 Lahr/Schwarzwald, Germany	Tel. +49 7821 90999-60 Fax +49 7821 90999-79 tb-lahr@sew-eurodrive.de
	Langenfeld	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld, Germany	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 tb-langenfeld@sew-eurodrive.de
	Magdeburg	SEW-EURODRIVE GmbH & Co KG Breiteweg 53 39179 Barleben, Germany	Tel. +49 39203 7577-1 Fax +49 39203 7577-9 tb-magdeburg@sew-eurodrive.de
	Mannheim	SEW-EURODRIVE GmbH & Co KG Besselstrasse 26 68219 Mannheim, Germany	Tel. +49 621 71683-10 Fax +49 621 71683-22 tb-mannheim@sew-eurodrive.de
	Munich	SEW-EURODRIVE GmbH & Co KG Domagkstrasse 5 85551 Kirchheim, Germany	Tel. +49 89 90955-110 Fax +49 89 90955-150 tb-muenchen@sew-eurodrive.de
	Muenster	SEW-EURODRIVE GmbH & Co KG Hafenplatz 4 48155 Muenster, Germany	Tel. +49 251 41475-11 Fax +49 251 41475-50 tb-muenster@sew-eurodrive.de
	Nuremberg	SEW-EURODRIVE GmbH & Co KG Plattenaeckerweg 6 90455 Nuremberg, Germany	Tel. +49 911 98884-50 Fax +49 911 98884-60 tb-nuernberg@sew-eurodrive.de
	Regensburg	SEW-EURODRIVE GmbH & Co KG Im Gewerbepark A15 93059 Regensburg, Germany	Tel. +49 941 46668-68 Fax +49 941 46668-66 tb-regensburg@sew-eurodrive.de
	Rhine-Main	SEW-EURODRIVE GmbH & Co KG Niederstedter Weg 5 61348 Bad Homburg, Germany	Tel. +49 6172 9617-0 Fax +49 6172 9617-50 tb-rheinmain@sew-eurodrive.de
	Stuttgart	SEW-EURODRIVE GmbH & Co KG Friedrich-List-Strasse 46 70771 Leinfelden-Echterdingen, Germany	Tel. +49 711 16072-0 Fax +49 711 16072-72 tb-stuttgart@sew-eurodrive.de
	Ulm	SEWEURODRIVE GmbH & Co KG Dieselstrasse 14 89160 Dornstadt, Germany	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 tb-ulm@sew-eurodrive.de
	Drive Center Wuerzburg	SEW-EURODRIVE GmbH & Co KG Nuernbergerstrasse 118 97076 Wuerzburg-Lengfeld, Germany	Tel. +49 931 27886-60 Fax +49 931 27886-66 tb-wuerzburg@sew-eurodrive.de
	Zwickau / Meerane	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane, Germany	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 tb-zwickau@sew-eurodrive.de

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France			
Production plant **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex, France	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production plant	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex, France	Tel. +33 3 87 29 38 00
Assembly plant **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Etang, France	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Technical offices	**Alsace**	SEW-USOCOME 1 rue Auguste Gasser 68360 Soultz, France	Tel. +33 3 89 74 51 62 Fax +33 3 89 76 58 71
	Aquitaine/Charente	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B.P.182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 08 Fax +33 5 57 26 39 09
	Auvergne/Limousin	SEW-USOCOME Farges 19600 Chasteaux, France	Tel. +33 5 55 20 12 10 Fax +33 5 55 20 12 11
	Lower Normandy	SEW-USOCOME 5 rue de la Limare 14250 Brouay, France	Tel. +33 2 31 37 92 86 Fax +33 2 31 74 68 15
	Burgundy	SEW-USOCOME 10 rue de la poste 71350 Saint Loup Géanges, France	Tel. +33 3 85 49 92 18 Fax +33 3 85 49 92 19
	Brittany	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 04 Fax +33 2 40 78 42 20
	Centre/Poitou	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 11 Fax +33 2 40 78 42 20
	Champagne-Ardenne	SEW-USOCOME 25 bis rue Victor Hugo Appartement 7 10120 Saint André les Vergers, France	Tel. +33 3 25 79 63 24 Fax +33 3 25 79 63 25
	Franche-Comté	SEW-USOCOME 24 avenue Charles Boby 70000 Quincey, France	Tel. +33 3 81 60 20 47 Fax +33 3 81 87 75 93
	Île-de-France East/Aisne	SEW-USOCOME 20 rue Félix Faure 02100 Saint Quentin, France	Tel. +33 3 23 62 81 24 Fax +33 3 23 62 81 44
	Île-de-France North/Picardy	SEW-USOCOME 25bis rue Kléber 92300 Levallois Perret, France	Tel. +33 1 41 05 92 74 Fax +33 1 41 05 92 75
	Île-de-France South	SEW-USOCOME 6 chemin des bergers Lieu-dit Marchais 91410 Roinville sous Dourdan, France	Tel. +33 1 60 81 10 56 Fax +33 1 60 81 10 57

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France			
	Lothringen/Northern Alsace	SEW-USOCOME 1 rue de la forêt 54250 Champigneulles, France	Tel. +33 3 83 96 28 04 Fax +33 3 83 96 28 07
	Midi-Pyrénées/ Roussillon	SEW-USOCOME 179 route de Grazac 31190 Caujac, France	Tel. +33 5 61 08 15 85 Fax +33 5 61 08 16 44
	Nord-Pas-de-Calais	SEW-USOCOME 209, route d'Hesdigneul 62360 Hesdin l'Abbé, France	Tel. +33 3 21 10 86 86 Fax +33 3 21 10 86 87
	Paris/Île-de-France West	SEW-USOCOME 42 avenue Jean Jaurès 78580 Maule, France	Tel. +33 1 30 90 89 86 Fax +33 1 30 90 93 15
	Pays de la Loire	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 03 Fax +33 2 40 78 42 20
	Provence-Alpes-Côte d'Azur	SEW-USOCOME Le Clos Montolivet 9 impasse Bounin – Bât. A 13012 Marseille, France	Tel. +33 4 91 18 00 11 Fax +33 4 91 18 00 12
	Rhône-Alpes East	SEW-USOCOME Montée de la Garenne 26750 Génissieux, France	Tel. +33 4 75 05 65 95 Fax +33 4 75 05 65 96
	Rhône-Alpes North	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 03 Fax +33 4 72 15 37 15
	Rhône-Alpes West	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 04 Fax +33 4 72 15 37 15

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly plant Sales	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Córdoba	SEW EURODRIVE ARGENTINA S.A. Ruta Nacional 19, Manzana 97, Lote 5 (X5125) Malvinas Argentinas Prov. de Córdoba	Tel. +54 351-490-0010 sewcor@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Santa Fe	SEW EURODRIVE ARGENTINA S.A. Ruta Prov. 21 Km 7, Lote 41 Parque Industrial Alvear (2126) Gral. Alvear Prov. de Santa Fe	Tel. +54 341-317-7277 sewsfe@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Service	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 sewmen@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Technical offices	**Tucumán**	SEW EURODRIVE ARGENTINA S.A. Balcarce 609 (T4000IAM) S.M. de Tucumán Prov. de Tucumán	Tel. +54 381-400-4569 sewtuc@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Bahía Blanca	SEW EURODRIVE ARGENTINA S.A. O'Higgins 95, 1er Piso A (B8000IVA) Bahía Blanca Prov. de Buenos Aires	Tel. +54 291-451-7345 sewbb@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Comahue	SEW EURODRIVE ARGENTINA S.A. Puerto Rico 1885 (R8324IOE) Cipolletti Prov. de Río Negro	Tel. +54 299-478-1290 sewcomahue@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

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Argentina			
Mining	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 mineria@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly plants **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043, Australia	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164, Australia	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Sales **Service**	**Adelaide**	SEW-EURODRIVE PTY. LTD. 9C Park Way Mawson Lakes, SA 5095, Australia	Tel. +61 8 8161 4000 Fax +61 8 8161 4002 enquires@sew-eurodrive.com.au
	Brisbane	SEW-EURODRIVE PTY.LTD. 1 /34 Collinsvale St Rocklea, Queensland, 4106, Australia	Tel. +61 7 3276 5100 Fax +61 7 3276 5102 enquires@sew-eurodrive.com.au
	Perth	SEW-EURODRIVE PTY. LTD. 10 Colin Jamieson Drive Welshpool, WA 6106, Australia	Tel. +61 8 9251-4900 Fax +61 8 9251-4903 enquires@sew-eurodrive.com.au
Sales	**Townsville**	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814, Australia	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly plant **Sales** **Service**	**Vienna**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 1230 Wien, Austria	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Technical offices	**Linz**	SEW-EURODRIVE Ges.m.b.H. Reuchlinstr. 6/3 4020 Linz, Austria	Tel. +43 732 655 109-0 Fax +43 732 655 109-20 tb-linz@sew-eurodrive.at
	Graz	SEW-EURODRIVE Ges.m.b.H. Grabenstraße 231 8045 Graz, Austria	Tel. +43 316 685 756-0 Fax +43 316 685 755 tb-graz@sew-eurodrive.at
	Dornbirn	SEW-EURODRIVE Ges.m.b.H. Lustenauerstraße 27/1 6850 Dornbirn, Austria	Tel. +43 5572 3725 99-0 Fax +43 5572 3725 99-20 tb-dornbirn@sew-eurodrive.at

Bangladesh			
Sales	**Bangladesh**	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive-bangladesh.com

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 220033 Minsk, Belarus	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

Belgium			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Centers	**Industrial gear units**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 6900 Marche-en-Famenne, Belgium	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
Production plant **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP, Brazil SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

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Brazil			
Assembly plants **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 – Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br
Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia, Bulgaria	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg
Cameroon			
Sales	**Douala, Cameroon**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala, Cameroon	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr
Canada			
Assembly plants **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Please contact us for more addresses of service centers in Canada.		
Chile			
Assembly plant **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. box address Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production plant **Assembly plant** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly plant **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 51262581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530, China	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141, China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn

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China			
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan, China	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn

Colombia			
Assembly plant **Sales** **Service**	**Bogota**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá, Colombia	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co

Côte d'Ivoire			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb, Croatia	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales **Assembly plant** **Service**	**Hostivice**	SEW-EURODRIVE CZ S.R.O. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline/24-hour availability	HOTLINE: +420 800 739 739 (800 SEW SEW)	**Service:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Assembly plant **Service**	**Plzeň**	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 326 00 Plzeň	Tel. +420 378 775 320 Fax +420 377 970 710 sew@sew-eurodrive.cz
Technical offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 60200 Brno	Tel. +420 543 254 174 Fax +420 543 256 845 radek.chmela@sew-eurodrive.cz
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313 miroslav.moravec@sew-eurodrive.cz
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studentská 6202/17 708 00 Ostrava-Poruba	Tel. +420 597 329 044 david.kenkus@sew-eurodrive.cz
	Klatovy	SEW-EURODRIVE CZ S.R.O. Vídeňská 841 33901 Klatovy	Tel. +420 376 331 634 Fax +420 376 331 634 viktor.kubernat@sew-eurodrive.cz
Service	**Horní Moštěnice**	SEW-EURODRIVE CZ S.R.O. Nám.Dr.M.Tyrše 14/64 751 17 Horní Moštěnice	Tel. +420 581 224 374 Fax +420 581 224 374 servis@sew-eurodrive.cz

Denmark			
Assembly plant **Sales** **Service**	**Copenhagen**	SEW-EURODRIVE A/S Geminivej 28-30 2670 Greve, Denmark	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo, Egypt	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

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Estonia			
Sales	**Tallinn**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa, Estonia	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly plant **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola 2, Finland	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Technical offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 00410 Helsinki, Finland	Tel. +358 201 589-300 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Asemakatu 7 65100 Vaasa, Finland	Tel. +358 201 589-300 sew@sew.fi
	Kuopio	SEW-EURODRIVE OY Viestikatu 3 70600 Kuopio, Finland	Tel. +358 201 589-300 sew@sew.fi
Production plant **Assembly plant**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville, Gabon**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabon	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical office	**Thessaloniki**	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki, Greece	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr

Great Britain			
Assembly plant **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline/24-hour availability		Tel. +44 1924 896911
Service Competence Centers	**Southern England**	SEW-EURODRIVE Ltd. Unit 41 Easter Park Benyon Road Silchester Reading Berkshire RG7 2PQ	Tel. +44 1189 701-699 Fax +44 1189 701-021
Technical offices	**Midlands**	SEW-EURODRIVE Ltd. 5 Sugar Brook Court Aston Road Bromsgrove Worcs. B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245

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Great Britain			
	Scotland	SEW-EURODRIVE Ltd. No 37 Enterprise House Springkerse Business Park Stirling FK7 7UF	Tel. +44 17 8647-8730 Fax +44 17 8645-0223

Hong Kong			
Assembly plant **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. 1037 Budapest, Hungary Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu

India			
Company office **Assembly plant** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243, India Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly plant **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
Technical offices	**Ahmedabad**	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat, India	Tel. +91 79 40072067/68 Fax +91 79 40072069 salesahmedabad@seweurodrivein-dia.com
	Aurangabad	SEW-EURODRIVE INDIA PRIVATE LIMITED	Tel. +91 86000 12333 salesaurangabad@seweurodrivein-dia.com
	Bangalore	SEW-EURODRIVE India Private Limited Sy.no:41-P3, Peenya1, Phase 1A, Peenya Village, Yeswanthapura Hobli, Bangalore North Taluk, Bangalore Dist, Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbangalore@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited # C-104, 3rd Block, KSSIDC Complex, Electronic City. Bangalore – 560100, Karnataka	Tel. +91 80 28522662 / 28522663 salesbangalore@seweurodriveindia.com
	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED Genetic Udayanchal, House-96 (6th Floor), Road-23/A, Block-B, Banani, Dhaka-1213, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive-bangladesh.com
	Bellary	SEW-EURODRIVE India Private Limited Door no-56/279 Ward No-16, Sindhigi compound, Near Raghavendra talkies, Bellary-583101 Karnataka	Tel. +91 77609 88668 salesbellary@seweurodriveindia.com
	Chandigarh	SEW-EURODRIVE India Private Limited # 72, Type- 4, Power Colony, Chandigarh - Rupnagar Highway Rupnagar- 140001, Punjab	Tel. +91 81462 67606 saleschandigarh@seweurodrivein-dia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu, India	Tel. +91 44 42849813 Fax +91 44 42849816 saleschennai@seweurodriveindia.com
	Kochi	SEW-EURODRIVE India Private Limited CF7-(2), Block No 1, Vasanth Nagar, Opposite Jawahar Lal Nehru Stadium, Palarivattom – Cochin 682025	Tel. +91 98951 30375 salescochin@seweurodriveindia.com

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India			
	Coimbatore	SEW-EURODRIVE INDIA PRIVATE LIMITED 687/2, SRI SAKTHIVEL TOWERS (NEAR DEEPAM HOSPITAL) TRICHY ROAD, RAMANATHAPURAM COIMBATORE - 641 045.Tamilnadu, India	Tel. +91 422 2322420 Fax +91 422 2323988 salescoimbatore@seweurodrivein-dia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No. 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 salescuttack@seweurodriveindia.com
	Gandhidham	SEW-EURODRIVE India Private Limited TCX-S-28, FF, Ward 12/A, Gandhidham - Kutch - 370201	Tel. +91 81282 36850 salesgandhidham@seweurodrivein-dia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh, India	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyderabad@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat no.: S1 " Kashi Kunj",h. No. 60, New Rani Kudar Road No - 3 P.o. + P.s. - Kadma Jamshedpur - Pin - 831005 Jharkhand	Tel. +91 9934123671 salesjamshedpur@seweurodrivein-dia.com
	Kolhapur	SEW EURODRIVE India Private Limited	Tel. +91 86000 20846 saleskolhapur@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal, India	Tel. +91 33 22827457 Fax +91 33 22894204 saleskolkata@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 saleslucknow@seweurodriveindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra, India	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com
	Nagpur	SEW-EURODRIVE India Private Limited Plot No 49, New Kailash Nager, Samta colony, Nagpur-440027	Tel. +91 95610 89525 salesnagpur@seweurodriveindia.com
	Nashik	SEW-EURODRIVE India Private Limited 107, "YOG" Bunglow, Mahatama Nagar, Trimbak Road, Nashik, Maharashtra – 422 007	Tel. +91 9665752978 salesnashik@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 1008, 10th Floor, 12th Level "Westend Mall" Tower Plot, District Centre Adjacent Hotel Hilton Janak Puri, New Delhi – 110058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Jai Tulajabhavani Complex. Office No: 15 First Floor, Opp. Century Enka Company, MIDC Bhosari, Pune 411 026	Tel. +91 20-65118890 / 91 Fax +91 20 25380721 salespune@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited LUNAWAT PRISM 4th Floor, S.No. 148 Opposite Wanaz Company, Besides Mega Mart At Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra, India	Tel. +91 20 25380730/735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh, India	Tel. +91 771 4090765 Fax +91 771 4090765 salesraipur@seweurodriveindia.com

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India			
	Ranchi	SEW-EURODRIVE India Private Limited Flat No.: A - 101, Krishna Shree Apartment, Anantpur, P.O. Doranda – Ranchi 834002	Tel. +91 8294630772 salesranchi@seweurodriveindia.com
	Tiruchirappalli	SEW-EURODRIVE India Private Limited A-106,Trichy Towers, Chandrasekarapuram, Salai Road, Trichy – 620018.	Mobile +91 95009 88081 salestrichy@seweurodriveindia.com
	Vadodara	SEW-EURODRIVE India Private Limited Unit No. 301, Savorite Bldg, Plot No. 143, Vinayak Society, off old Padra Road, Vadodara - 390 007. Gujarat	Tel. +91 265 2325258 Fax +91 265 2325259 salesvadodara@seweurodriveindia.com
	Vijayawada	SEW-EURODRIVE India Private Limited Door No:40-5/3-10A, Syam Nagar, NGO's Colony, Tikkle Road, Vijayawada-520010	Tel. +91 99895 01748 Fax +91 8662475157 Mobile +91 9989501748 salesvijayawada@seweurodrivein-dia.com

Indonesia			
Sales	**Jakarta**	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350, Indonesia	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
		PT. Agrindo Putra Lestari Jl.Prof.DR.Latumenten no27/A Jakarta 11330	Tel. +62 21 63855588 Fax +62 21 63853789 aplindo@indosat.net.id
	Medan	PT. Serumpun Indah Lestari Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60122	Tel. +62 31 5990128 Fax +62 31 5962666 triagri@indosat.net.id
		CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 / +62 31 5317224 Fax +62 31 5317220 / +62 31 5994629 sianhwa@sby.centrin.net.id

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11, Ireland	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Iceland			
Sales	**Reykjavik**	VARMA & VELAVERK EHF Dalshrauni 5 IS-220 Hafnarjördur	Tel. +354 585 1070 Fax +354 585 1071 varmaverk@varmaverk.is http://www.varmaverk.is

Israel			
Sales	**Tel Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon, Israel	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly plant **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 40064 Ozzano dell'Emilia (Bo), Italy	Tel. +39 051 65-23-801 Fax +39 02 96 980 499

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Italy			
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 81020 S. Nicola la Strada (Caserta), Italy	Tel. +39 0823 219011 Fax +39 02 96 980 599
	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 980229 Fax +39 02 96 980 999
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 02 96 980 699
	Turin	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C 10135 Torino, Italy	Tel. +39 011 3473780 Fax +39 02 96 980 799
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Antonio Meucci 5, I-37042 - Caldiero (VR)	Tel. +39 045 89-239-11 Fax +39 02 96 980 814

Japan			
Assembly plant **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022, Japan	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th floor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001, Japan	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003, Japan	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C 1073 Riga, Latvia	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut, Lebanon	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

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Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg

Malaysia			
Assembly plant **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical offices	**Kuala Lumpur**	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 51229633 Fax +60 3 51229622 sewsa@sew-eurodrive.com.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 sewpg@sew-eurodrive.com.my

Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Mauritania			
Sales	**Zouérat**	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 45 44 50 19 Fax +222 45 44 03 14 contact@africom-sarl.com

Macedonia			
Sales	**Skopje**	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk

Mexico			
Assembly plant **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

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Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

New Zealand			
Assembly plants **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount Drive East Tamaki Auckland, New Zealand	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch, New Zealand	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch, New Zealand	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical offices	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz

Netherlands			
Assembly plant **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam, Netherlands Postbus 10085 3004 AB Rotterdam, Netherlands	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 1 217 4332 team.sew@eisnl.com http://www.eisnl.com

Norway			
Assembly plant **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss, Norway	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karatschi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py

Peru			
Assembly plant **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima, Peru	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Philippines			
Sales	**Luzon**	Totaltech Corporation 5081-B C&L Mansion Filmore Ave. Cor. Fahrenheit St. 1235 Makati City	Tel. +63 2 551-9265 / +63 2 551-9271 / +63 2 551-9378 Fax +63 2 551-9273 totaltech89@gmail.com
	All Areas	P.T. Cerna Corporation 4137 Ponte St., Brgy. Santa Cruz, Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com

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Poland			
Assembly plant **Sales** **Service**	**Łódź**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź, Poland	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa 24 hour hotline Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical office	**Tychy**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Strzelecka 66 PL-43-109 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 648
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Gdansk	SEW-EURODRIVE Polska Sp.z.o.o. ul. Galaktyczna 30A PL-80-299 Gdańsk	Tel. +48 58 762 70 00 Fax +48 58 762 70 09
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 61-371 Poznań, Poland	Tel. +48 61 6465500 Fax +48 61 6465519
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 26-600 Radom, Poland	Tel. +48 48 365 40 50 Fax +48 48 365 40 52

Portugal			
Assembly plant **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 3050-901 Mealhada, Portugal	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Service Competence Centers	**Lisbon**	SEW-EURODRIVE, LDA. Núcleo Empresarial I de São Julião do Tojal Rua de Entremuros, 54 Fracção I 2660-533 São Julião do Tojal, Portugal	Tel. +351 21 958-0198 Fax +351 21 958-0245 esc.lisboa@sew-eurodrive.pt
Technical office	**Porto**	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo, Portugal	Tel. +351 229 350 383 Fax +351 229 350 384 Tel. +351 9 32559110 esc.porto@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti, Romania	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly plant **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical office	**Ekaterinburg**	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 620078 Ekaterinburg, Russia	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 664011 Irkutsk, Russia	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moscow	ZAO SEW-EURODRIVE Malaja Semjonowskaja Str. д. 9, корпус 2 107023 Moscow	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa 30 630087 Novosibirsk, Russia	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Perm	ZAO SEW-EURODRIVE Stakhanovskaya str., 45 Office 512 RUS-614066 Perm	Tel. +7 342 2219494 Fax +7 342 2219444 pso@sew-eurodrive.ru

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Russia			
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. 445057 Togliatti, Russia	Tel. +7 8482 710529 Fax +7 8482 810590
Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com
Serbia			
Sales	**Belgrade**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd, Serbia	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly plant **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	**Bratislava**	SEW-EURODRIVE SK s.r.o. Rybničná 40 831 06 Bratislava, Slovakia	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-EURODRIVE SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 010 01 Žilina, Slovakia	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banska Bystrica	SEW-EURODRIVE SK s.r.o. Rudlovská cesta 85 974 11 Banská Bystrica, Slovakia	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-EURODRIVE SK s.r.o. Slovenská ulica 26 040 01 Košice, Slovakia	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk
Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 3000 Celje, Slovenia	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
Spain			
Assembly plant **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya), Spain	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Technical offices	**Barcelona**	Delegación Barcelona Avda. Francesc Macià, 60 – Planta 16, porta 1 Eix Macià – "Torre Milenium" 08208 Sabadell (Barcelona), Spain	Tel. +34 93 7162200 Fax +34 93 7233007
	Madrid	Delegación Madrid Gran Via. 48-2° A-D 28220 Majadahonda (Madrid), Spain	Tel. +34 91 6342250 Fax +34 91 6340899
	Sevilla	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla, Spain	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com
Sri Lanka			
Sales	**Colombo**	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981

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South Africa			
Assembly plants **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013, South Africa P.O.Box 90004 Bertsham 2013, South Africa	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town, South Africa P.O. Box 36556 Chempet 7442 Cape Town, South Africa	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban, South Africa	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban, South Africa P.O. Box 10433, Ashwood 3605, South Africa	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O. Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
Technical offices	**Port Elizabeth**	SEW-EURODRIVE PTY LTD. 8 Ruan Access Park Old Cape Road Greenbushes 6000 Port Elizabeth	Tel. +27 41 3722246 Fax +27 41 3722247 dtait@sew.co.za

South Korea			
Assembly plant **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270, Korea	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical offices	**Daegu**	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	Daejeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Gwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054, Korea	Tel. +82 2 862-8051 Fax +82 2 862-8199

Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz

Sweden			
Assembly plant **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 55303 Jönköping, Sweden Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

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Sweden			
Sales	**Göteborg**	SEW-EURODRIVE AB Gustaf Werners gata 8 42132 Västra Frölunda, Sweden	Tel. +46 31 70968 80 Fax +46 31 70968 93 goteborg@sew.se
	Stockholm	SEW-EURODRIVE AB Björkholmsvägen 10 14146 Huddinge, Sweden	Tel. +46 8 44986 80 Fax +46 8 44986 93 stockholm@sew.se
	Malmö	SEW-EURODRIVE AB Borrgatan 5 21124 Malmö, Sweden	Tel. +46 40 68064 80 Fax +46 40 68064 93 malmo@sew.se
	Skellefteå	SEW-EURODRIVE AB Trädgårdsgatan 8 93131 Skellefteå, Sweden	Tel. +46 910 7153 80 Fax +46 910 7153 93 skelleftea@sew.se

Switzerland			
Assembly plant **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Technical offices	**Romandy**	André Gerber Es Perreyres 1436 Chamblon, Switzerland	Tel. +41 24 445 3850 Fax +41 24 445 4887
	Bern / Solothurn	Rudolf Bühler Muntersweg 5 2540 Grenchen, Switzerland	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzer-land, Aargau	Armin Pfister Stierenweid 4950 Huttwill, BE, Switzerland	Tel. +41 62 962 54 55 Fax +41 62 962 54 56
	Zurich, Tessin	Gian-Michele Muletta Fischerstrasse 61 8132 Egg bei Zürich, Switzerland	Tel. +41 44 994 81 15 Fax +41 44 994 81 16
	Lake Constance and Eastern Switzerland	Markus Künzle Eichweg 4 9403 Goldach, Switzerland	Tel. +41 71 845 2808 Fax +41 71 845 2809

Taiwan (R.O.C.)			
Sales	**Nan Tou**	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878
	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei, Taiwan	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net

Tanzania			
Sales	**Dar es Salaam**	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 uroos@sew.co.tz

Thailand			
Assembly plant **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000, Thailand	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Technical offices	**Bangkok**	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok,10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hat Yai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi.17/1 Rachas-Utid Road. Hadyai, Songkhla 90110, Thailand	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com

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Thailand			
	Khon Kaen	SEW-EURODRIVE (Thailand) Ltd. 4th Floor, Kaow-U-HA MOTOR Bldg, 359/2, Mitraphab Road. Muang District Khonkaen 40000, Thailand	Tel. +66 43 225745 Fax +66 43 324871 sew-thailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

Turkey			
Assembly plant **Sales** **Service**	**Kocaeli-Gebze**	SEW-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Technical offices	**Adana**	SEW-EURODRİVE Cevat Yurdakul Cad.No:52 Akdoğan İş Merkezi K:5 D.18 Seyhan / Adana	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
	Ankara	SEW-EURODRİVE 1368.Cadde Eminel İşmerkezi No: 18/68 İvogsan / Ankara	Tel. +90 312 385 33 90 Fax +90 312 385 32 58
	Bursa	SEW-EURODRİVE Üçevler Mah. Bayraktepe Sok. Akay İş Merkezi Kat:3 No: 7/6 Nilüfer / Bursa	Tel. +90 224 443 45 60 Fax +90 224 443 45 58
	Istanbul	SEW-EURODRİVE Tekstilkent Ticaret Merkezi B-13 Blok No:70 Esenler / İstanbul	Tel. +90-262-9991000-04 Fax +90-262-9991009
	Izmir	SEW-EURODRİVE 1203/11 Sok. No. 4/614 Kara Hasan Atlı İş Merkezi Kat :6 Yenişehir / İzmir	Tel. +90 232 469 62 64 Fax +90 232 433 61 05

Ukraine			
Assembly plant **Sales** **Service**	**Dnipropetrowsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Sales	**Kiev**	ООО «СЕВ-Евродрайв» ул.С.Олейника, 21 02068 Киев	Тел. +380 44 503 95 77 Факс. +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	ООО «СЕВ-Евродрайв» ул.25-летия РККА, 1-В, оф. 805 83000 Донецк	Тел. +380 62 38 80 545 Факс. +380 62 38 80 533 dso@sew-eurodrive.ua
	Ivano-Frankivsk	ООО «СЕВ-Евродрайв» ул.Независимости, 4, оф.303 83000 Ивано-Франковск	Тел. +380 342 725 190 Факс. +380 342 725 191 ifso@sew-eurodrive.ua

Uruguay			
Assembly plant **Sales**	**Montevideo**	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-89 sewuy@sew-eurodrive.com.uy

USA			
Production plant **Assembly plant** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com

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USA			
Assembly plants **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014, USA	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373, USA	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237, USA	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544, USA	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Please contact us for other service center addresses in the USA.		
Venezuela			
Assembly plant **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo, Venezuela	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net
United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
Vietnam			
Sales	**Ho-Chi-Minh-Stadt**	**All sectors except for ports and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Ports and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn
Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com

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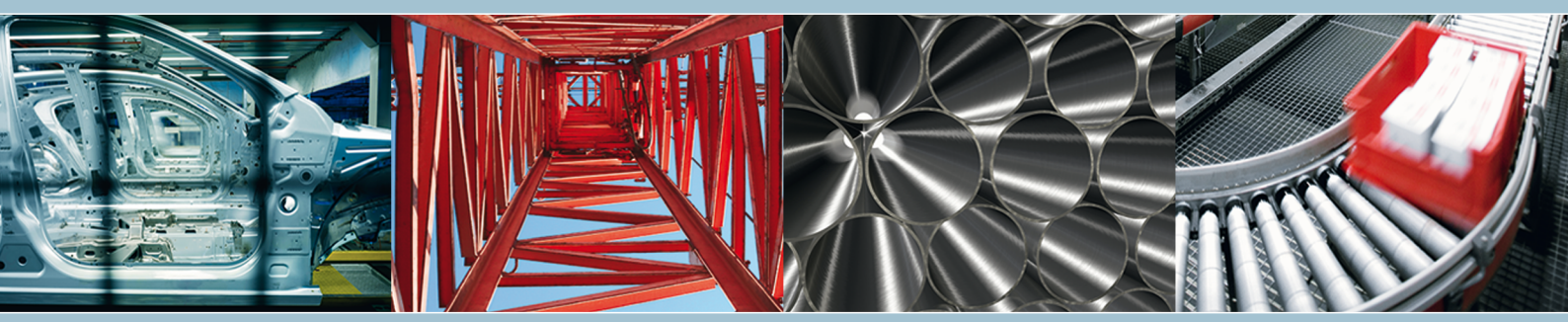

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SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
76642 BRUCHSAL
GERMANY
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com
→ www.sew-eurodrive.com