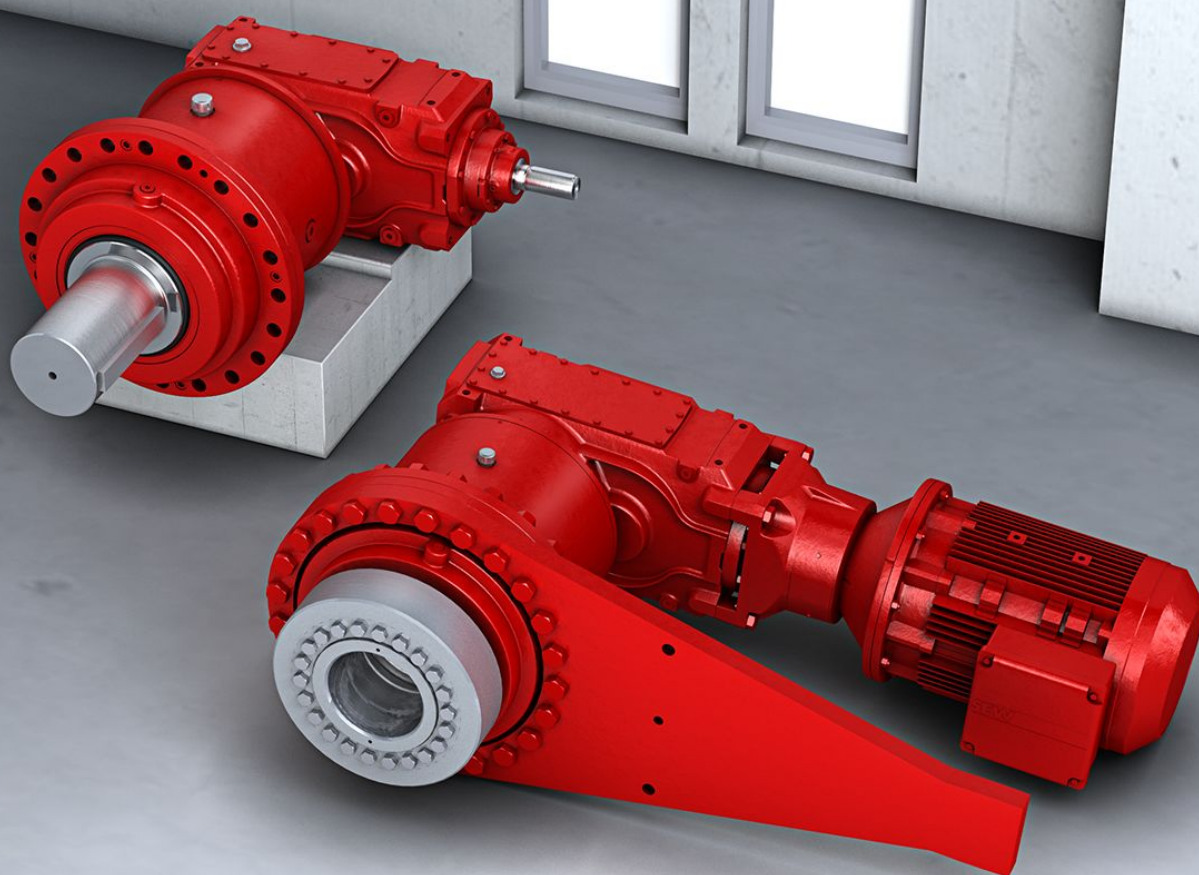




**SEW**  
**EURODRIVE**

# Catalog



Industrial Gear Units

**P-X Series**

Torque Classes from 100 kNm to 500 kNm



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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 14 manufacturing plants and 79 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.

### 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". Consult the following tables to locate the products and systems included in the respective product group:

| Industrial gear units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• X, MC, ML series helical and bevel-helical gear units</li> <li>• P002 – 102 series planetary gear units</li> <li>• XP130 – 250 series planetary gear units</li> <li>• P.X.. series planetary bevel-helical gear units</li> <li>• Application solutions with connections <ul style="list-style-type: none"> <li>– Girth gears</li> <li>– Swing base</li> <li>– Gearmotor</li> <li>– Motor</li> <li>– Coupling</li> <li>– Brake</li> <li>– Lubrication system</li> </ul> </li> </ul> <p>For conveyor drives, bucket conveyors, agitators, cooling towers, crane systems, and much more</p> |

| Gearmotors and frequency inverters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gear units / gearmotors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Motors                                                                                                                                                                                                                                                                                                                                                | Frequency inverters                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>• Helical gear units / gearmotors</li> <li>• Parallel-shaft helical gear units / parallel-shaft helical gearmotors</li> <li>• Helical-bevel gear units / gearmotors</li> <li>• Helical-worm gear units / helical-worm gearmotors</li> <li>• SPIROPLAN® right-angle gearmotors</li> <li>• Drives for electrified monorail systems</li> <li>• Geared torque motors</li> <li>• Pole-changing gearmotors</li> <li>• Variable-speed gear units / variable-speed gearmotors</li> <li>• Aseptic gearmotors</li> <li>• Explosion-proof gear units/ gearmotors</li> <li>• Explosion-proof variable-speed gear units / variable-speed gearmotors</li> </ul> | <ul style="list-style-type: none"> <li>• Asynchronous AC motors / AC brakemotors</li> <li>• Pole-changing AC motors / AC brakemotors</li> <li>• Energy-efficient motors</li> <li>• Explosion-proof AC motors / AC brakemotors</li> <li>• Torque motors</li> <li>• Single-phase motors / brake-motors</li> <li>• Asynchronous linear motors</li> </ul> | <ul style="list-style-type: none"> <li>• MOVITRAC® frequency inverters</li> <li>• MOVI4R-U® frequency inverters</li> <li>• MOVIDRIVE® drive inverters</li> <li>• Control, technology and communication options for inverters</li> </ul> |

| Servo drive systems                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Servo gear units / gearmotors                                                                                                                                                                                                                                                                                        | Servomotors                                                                                                                                                                                                                           | Servo drive inverters / servo inverters                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>• Low backlash planetary servo gear units / planetary gearmotors</li> <li>• Low backlash helical-bevel servo gear units / helical-bevel gear units</li> <li>• R, F, K, S, W gear units / gearmotors</li> <li>• Explosion-proof servo gear units / servo gearmotors</li> </ul> | <ul style="list-style-type: none"> <li>• Asynchronous servomotors / servo brakemotors</li> <li>• Synchronous servomotors /</li> <li>• Explosion-proof servomotors / servo brakemotors</li> <li>• Synchronous linear motors</li> </ul> | <ul style="list-style-type: none"> <li>• MOVIDRIVE® servo drive inverters</li> <li>• MOVIAXIS® multi-axis servo inverter</li> <li>• Control, technology and communication options for servo drive inverters and servo inverters</li> </ul> |

| Decentralized drive systems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Decentralized drives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Communication and installation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Contactless energy transfer                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• DRC.. electronic motors / MOVIGEAR® mechatronic drive systems               <ul style="list-style-type: none"> <li>– DBC – Direct Binary Communication</li> <li>– DAC – Direct AS-Interface Communication</li> <li>– DSC – Direct SBus Communication</li> <li>– SNI – Single Line Network Installation</li> </ul> </li> <li>• MOVIMOT® gearmotors with integrated frequency inverter</li> <li>• MOVIMOT® motors / brakemotors with integrated frequency inverter</li> <li>• MOVI-SWITCH® gearmotors with integrated switching and protection functions</li> <li>• MOVI-SWITCH® motors / brakemotors with integrated switching and protection function</li> <li>• Explosion-proof MOVIMOT® and MOVI-SWITCH® gearmotors</li> </ul> | <ul style="list-style-type: none"> <li>• Fieldbus interfaces</li> <li>• Field distributors for decentralized installation</li> <li>• MOVIFIT® product range               <ul style="list-style-type: none"> <li>– MOVIFIT® FDC for controlling MOVIGEAR® and DRC.. drive units</li> <li>– MOVIFIT® MC for controlling MOVIMOT® drives</li> <li>– MOVIFIT® SC with integrated electronic motor switch</li> <li>– MOVIFIT® FC with integrated frequency inverter</li> </ul> </li> <li>• MOVIPRO® product range               <ul style="list-style-type: none"> <li>– MOVIPRO® SDC decentralized drive and positioning control</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• MOVITRANS® system               <ul style="list-style-type: none"> <li>– Stationary components for energy supply</li> <li>– Mobile components for energy consumption</li> <li>– Line cables and installation material</li> </ul> </li> </ul> |

| MAXOLUTION®                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• MAXOLUTION® packages for predefined application solutions</li> <li>• MAXOLUTION® systems for customer-specific system solutions and plants</li> </ul> |

| Products and systems covering several product groups                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Operator panels</li> <li>• MOVI-PLC® drive-based control system</li> <li>• Components of the type "functional safety"</li> <li>• Diagnostic units</li> </ul> |

In addition to 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

→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)

The website provides comprehensive information and services.

1

### 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

Copyright © 2015 – All rights reserved.

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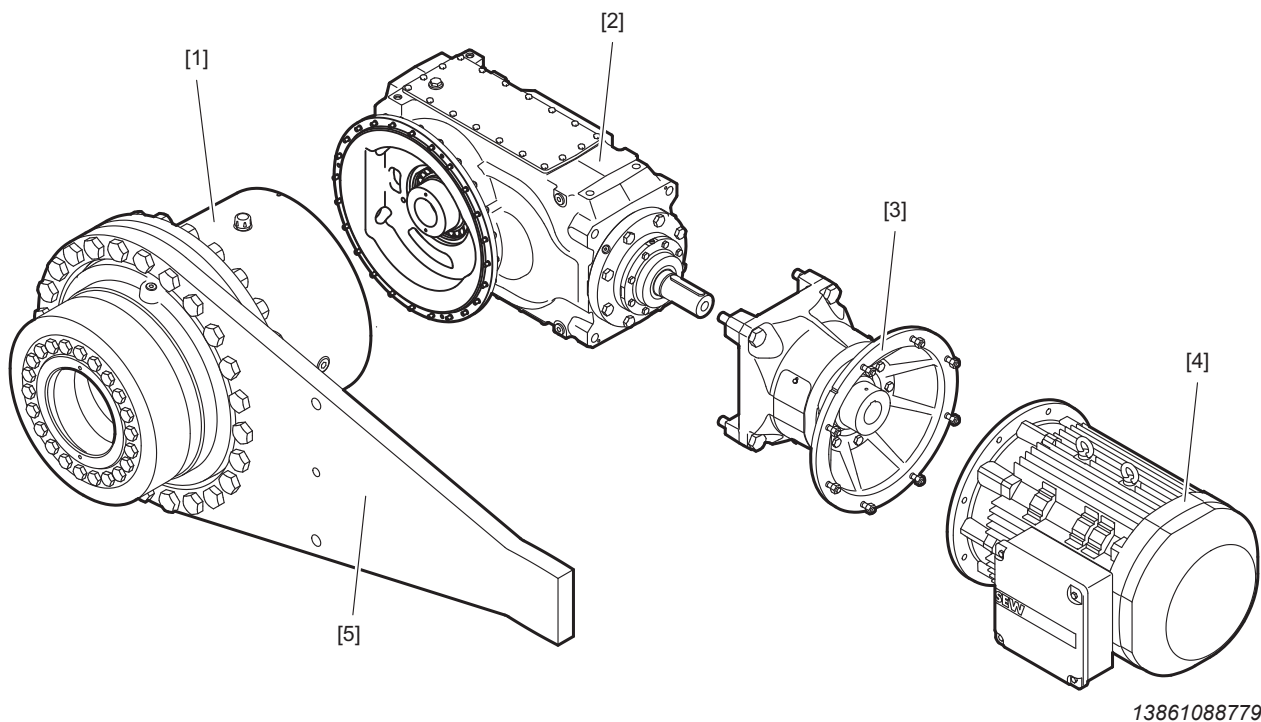
## 2 Product description

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 100,170 Nm to 500,000 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.



- [1] Planetary gear unit
- [2] X.. series bevel-helical gear unit
- [3] Motor adapter

- [4] Motor
- [5] Torque arm design

13861088779

## 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:

### INFORMATION



- 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****INFORMATION**

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

**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 end-shield 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.

### 2.5 Sizes and torques

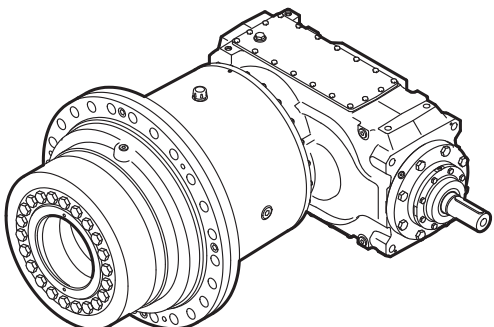
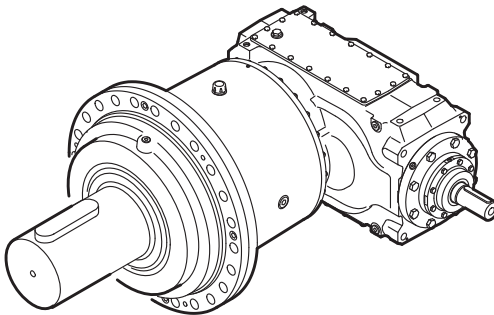
The nominal output torque ratings are listed in the table below.

| Size         | $M_{n2}$ [Nm] |
|--------------|---------------|
| <b>P.042</b> | 100 170       |
| <b>P.052</b> | 124 060       |
| <b>P.062</b> | 185 660       |
| <b>P.072</b> | 245 660       |
| <b>P.082</b> | 359 400       |
| <b>P.092</b> | 423 000       |
| <b>P.102</b> | 500 000       |

### 2.6 Basic designs

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

Other designs are available on request.

|                                                                                                        |                                                                                                                            |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|  <p>13861111947</p>  | <p><b>PHF..X..</b></p> <p>Planetary bevel-helical gear unit in flange-mounted design with hollow shaft and shrink disk</p> |
|  <p>13861146763</p> | <p><b>PF..X..</b></p> <p>Planetary bevel-helical gear unit in flange-mounted design with solid shaft and key</p>           |

## 2.7 Type designation

The type designation is set up as follows:

2

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

### 2.8 Nameplate

#### 2.8.1 P-X gear unit series

The following example shows the structure of the nameplate.

○
**SEW-EURODRIVE**
Bruchsal / Germany ○

Type PHF042/TX2KP110

Nr. 1 01.7167312345.0001

|     |       |       |    |    |        |
|-----|-------|-------|----|----|--------|
| PK1 | kW    | 34.98 | i  |    | 226    |
| MK2 | Nm    | 50000 | FS |    | 2.00   |
| n1  | 1/min | 1477  | PM | kW | 37     |
| n2  | 1/min | 6.5   | Ta | °C | 0...30 |
| IM  | M1    |       |    |    |        |

Made in Germany

Weight kg 565
Year 2015

CLP 320 Mineral Oil
~ 95 L

○

○

9007212064450315

| Type     |         | Type designation                             |
|----------|---------|----------------------------------------------|
| No. 1    |         | Serial 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 |

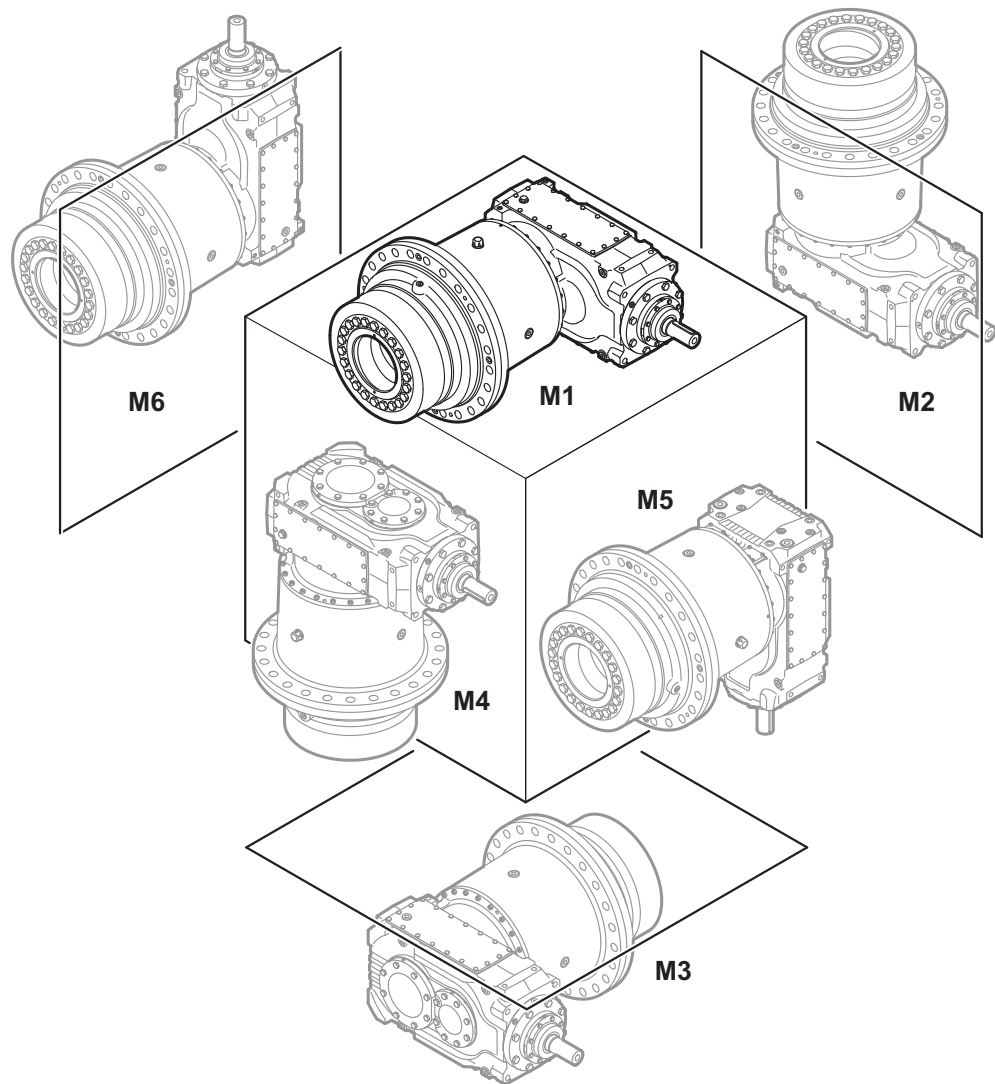


## 2.9 Mounting positions

### 2.9.1 Standard mounting position

2

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



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## INFORMATION



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

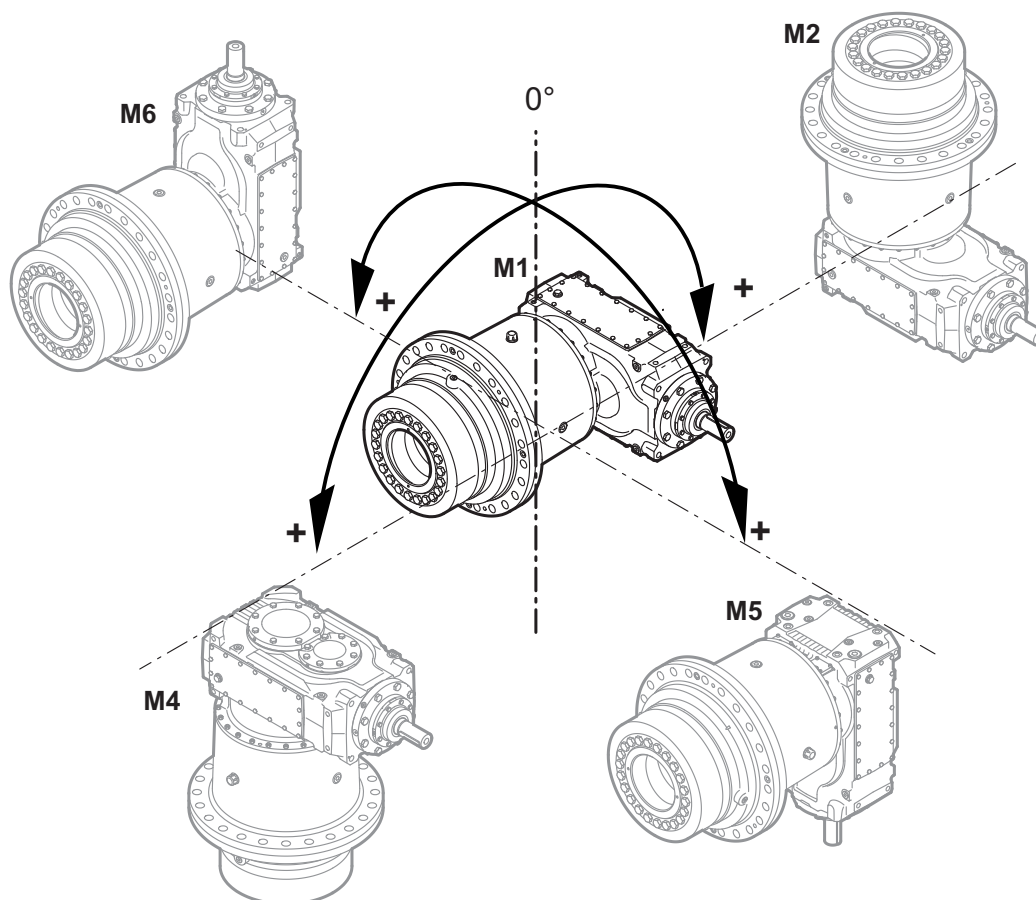
### 2.9.2 Fixed and variable pivoted mounting positions

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.



14442483979

## 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:

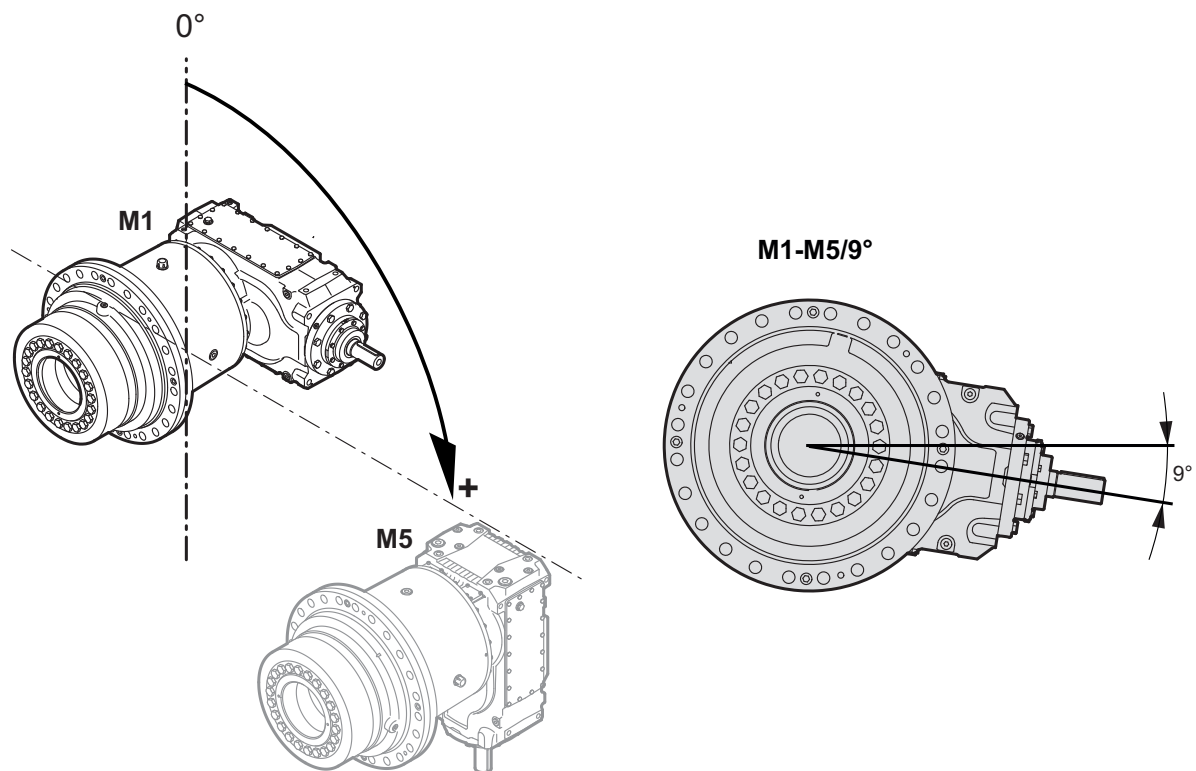
**M1** = Initial mounting position

**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:



9007213705011339

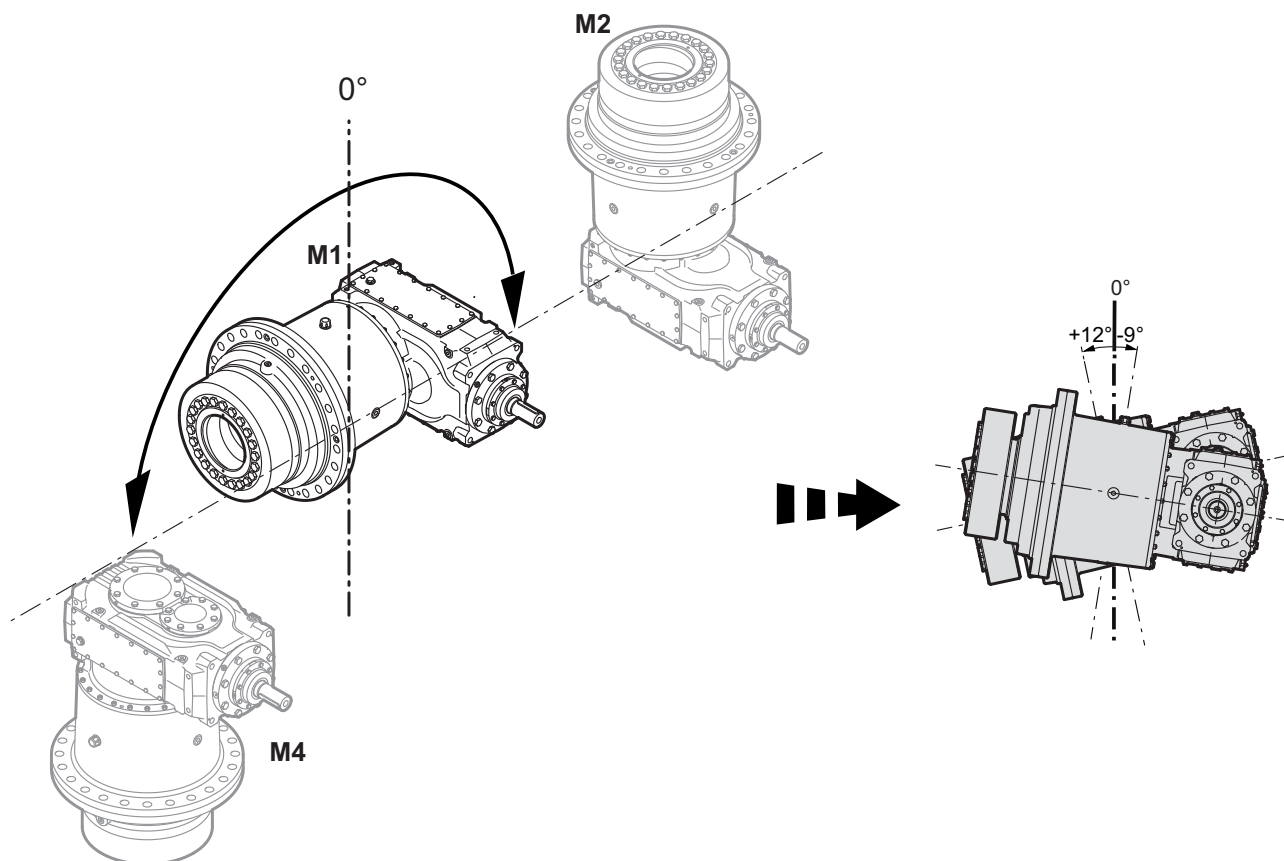
### Variable pivoted mounting position

#### Definition:

Gear units with variable pivoted mounting position can change the mounting position **variably** during operation 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°.

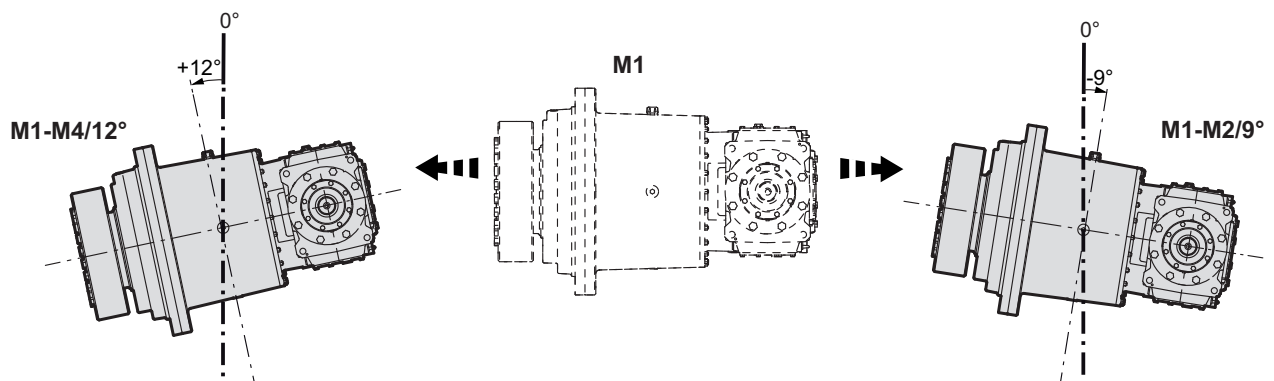
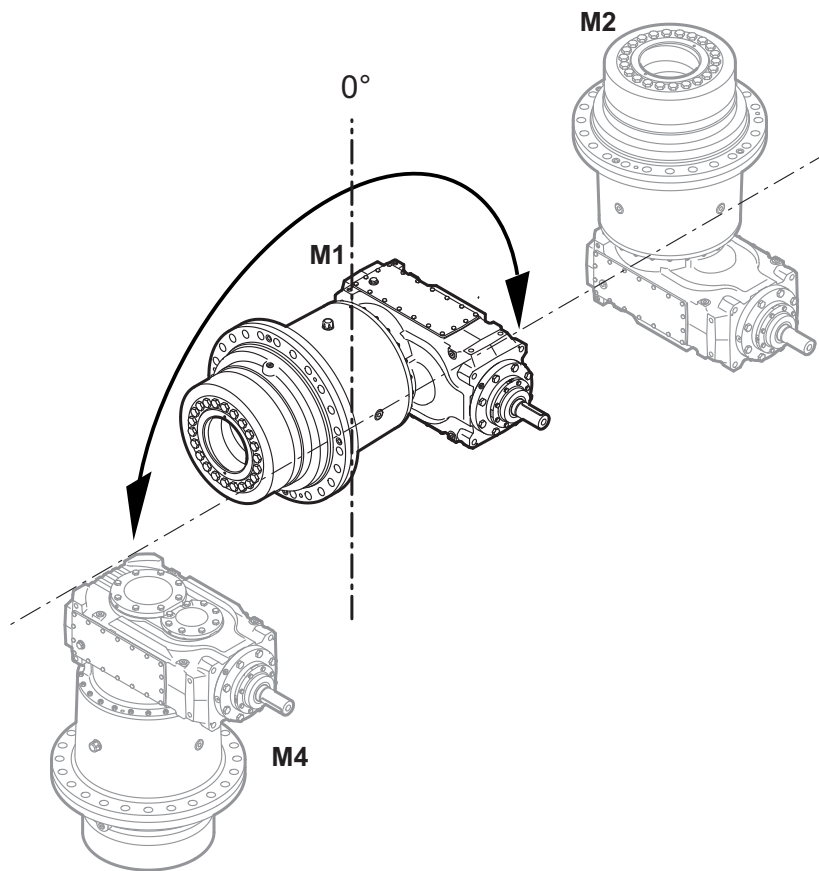


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The largest pivoting angle determines the positive pivoting direction (12° > 9°). In this example, this is 12° towards M4.

Pivoted from M1 to M4 by +12°

Pivoted from M1 to M2 by  $-9^\circ$



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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  $12^\circ$

**-9°** = pivoted from M1 to M2 by  $9^\circ$  (= pivoted from M1 to M4 by  $-9^\circ$ )

**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.

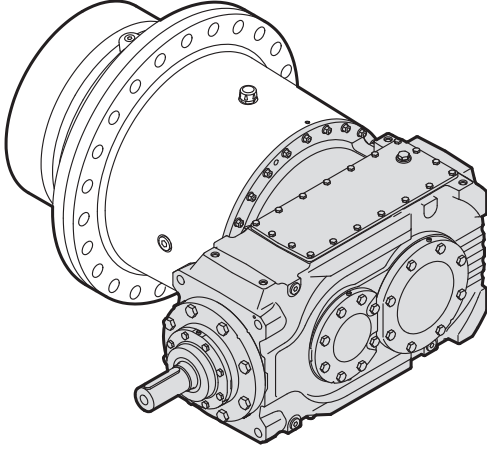
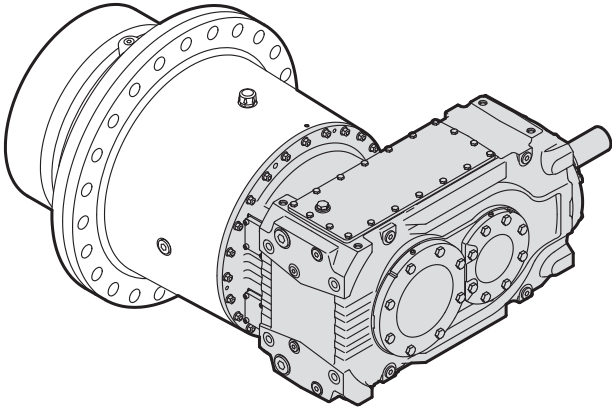
Example of a gear unit based on mounting position M1 that is tilted by  $\pm 10^\circ$  around the transverse axis during operation and is mounted in a fixed angle of  $15^\circ$  around the longitudinal axis:

**M1 - M2/10°/V - M4/10°/V - M5/15°/F**

## 2.10 Mounting position of the primary gear unit

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

The mounting positions are shown in the following table.

| Primary gear unit mounting position 0°                                                                  |
|---------------------------------------------------------------------------------------------------------|
|  <p>13900311947</p>   |
| Primary gear unit mounting position 180 °                                                               |
|  <p>13900315275</p> |

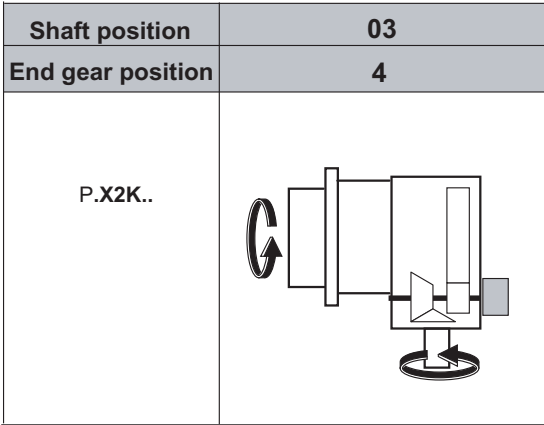
### INFORMATION



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.

2.11    Directions of rotation dependencies

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



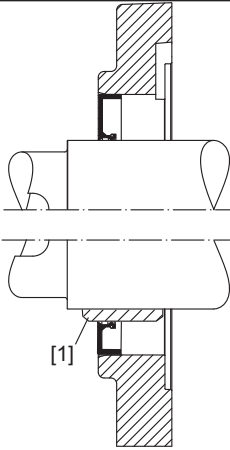
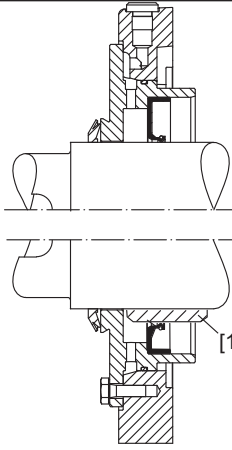
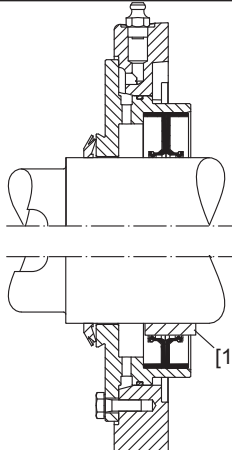
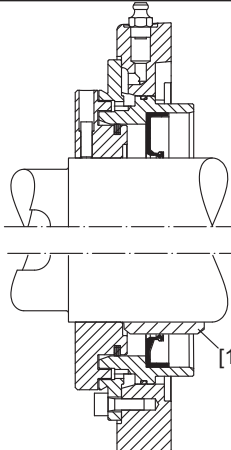
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 = Position of the backstop



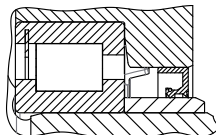
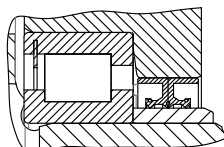
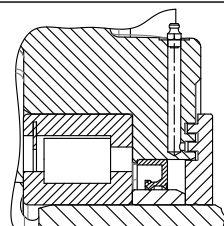
## 2.12 Sealing system

### 2.12.1 Input shaft

| Standard                                                                          | Dust-proof                                                                        | Dust-proof<br>Regreasable                                                          | Radial labyrinth seal<br>(Taconite)<br>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                                                              | • <b>Medium</b> dust load with abrasive particles                                 | • <b>High</b> dust load with abrasive particles                                    | • <b>Very high</b> dust load with abrasive particles                                |
|  |  |  |  |

[1] Optional with oil seal sleeve

### 2.12.2 Output shaft

| Seal                                                                                                                                                                       | Design                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <br> | <p>Sealing with 1 oil seal<br/>Optional 2 oil seals on a hardened sleeve</p>                     |
|                                                                                         | <p>Sealing with lubricated labyrinth seal plus 1 oil seal (regreasable) on a hardened sleeve</p> |

## 2.13 Storage and transport conditions

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

### 2.13.1 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.

### 2.13.2 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.
- 

### 2.13.3 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 long-term storage

#### 2.13.4 Storage conditions

### 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<br>+ packaging                        | Storage location                                                                                                                                                                                                                                                                             | Storage duration                                                  |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Standard corrosion protection<br>+<br>Standard packaging   | Under roof and enclosed at constant temperature and atmospheric humidity ( $5\text{ °C} < \vartheta < 60\text{ °C}$ , $< 50\%$ relative humidity).<br><br>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<br>+<br>Standard packaging  | Under roof and enclosed at constant temperature and atmospheric humidity ( $5\text{ °C} < \vartheta < 60\text{ °C}$ , $< 50\%$ relative humidity).<br><br>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<br>+<br>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.

## **2.14 Corrosion and surface protection**

### **2.14.1 General**

SEW-EURODRIVE offers various optional protective measures for operation of motors and gear units under special environmental conditions.

These preventive measures comprise two groups:

- Corrosion protection KS for motors
- Surface protection OS for motors and gear units

For motors, optimum protection is offered by a combination of corrosion protection KS and surface protection OS.

### **2.14.2 KS corrosion protection**

KS corrosion protection for motors comprises the following measures:

- All retaining screws that are loosened during operation are made of stainless steel.
- The nameplates are made of stainless steel.
- Various motor parts are coated with a finishing varnish.
- The flange contact surfaces and shaft ends are treated with a temporary anti-corrosion agent.
- Additional measures for brakemotors.

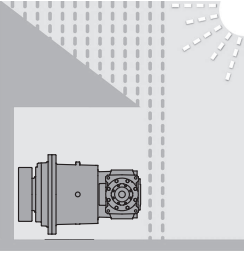
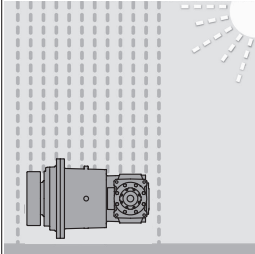
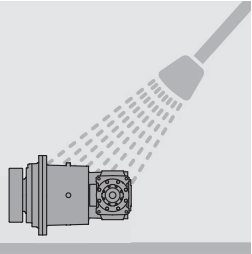
A sticker labeled "KORROSIONSSCHUTZ" (corrosion protection) on the fan guard indicates that special treatment has been applied.

Motors with a forced cooling fan and motors with a spread-shaft encoder (ES..) cannot be supplied with corrosion protection KS.

### 2.14.3 OS surface protection

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

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

| SEW design                                                                                               | OS1<br>Low environmental impact                                                                                                                                                                                                                                  | OS2<br>Medium environmental impact                                                                                                                                                                | OS3<br>High environmental impact                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Used as surface protection with typical ambient conditions<br>Corrosion categories<br>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.<br>According to corrosivity category: C2 (low) | Suited for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering.<br>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.<br>According to corrosivity category: C4 (high) |
| Sample applications                                                                                      | <ul style="list-style-type: none"> <li>• Systems in saw mills</li> <li>• Agitators and mixers</li> </ul>                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Applications in gravel plants</li> <li>• Cable cars</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>• Port cranes</li> <li>• Sewage treatment plants</li> <li>• Mining applications</li> </ul>                                                                                                                                         |
| Condensation test ISO 6270                                                                               | 120 h                                                                                                                                                                                                                                                            | 120 h                                                                                                                                                                                             | 240 h                                                                                                                                                                                                                                                                     |
| Salt spray test ISO 7253                                                                                 | –                                                                                                                                                                                                                                                                | 240 h                                                                                                                                                                                             | 480 h                                                                                                                                                                                                                                                                     |
| Top coat color <sup>1)</sup>                                                                             | RAL 7031                                                                                                                                                                                                                                                         | RAL 7031                                                                                                                                                                                          | RAL 7031                                                                                                                                                                                                                                                                  |
| Color according to RAL                                                                                   | Yes                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                       |
| Uncoated parts: shaft end/ flanges                                                                       | Water and hand perspiration repelling rust preventive applied at the factory for external preservation                                                                                                                                                           |                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                           |

1) Standard color

## INFORMATION

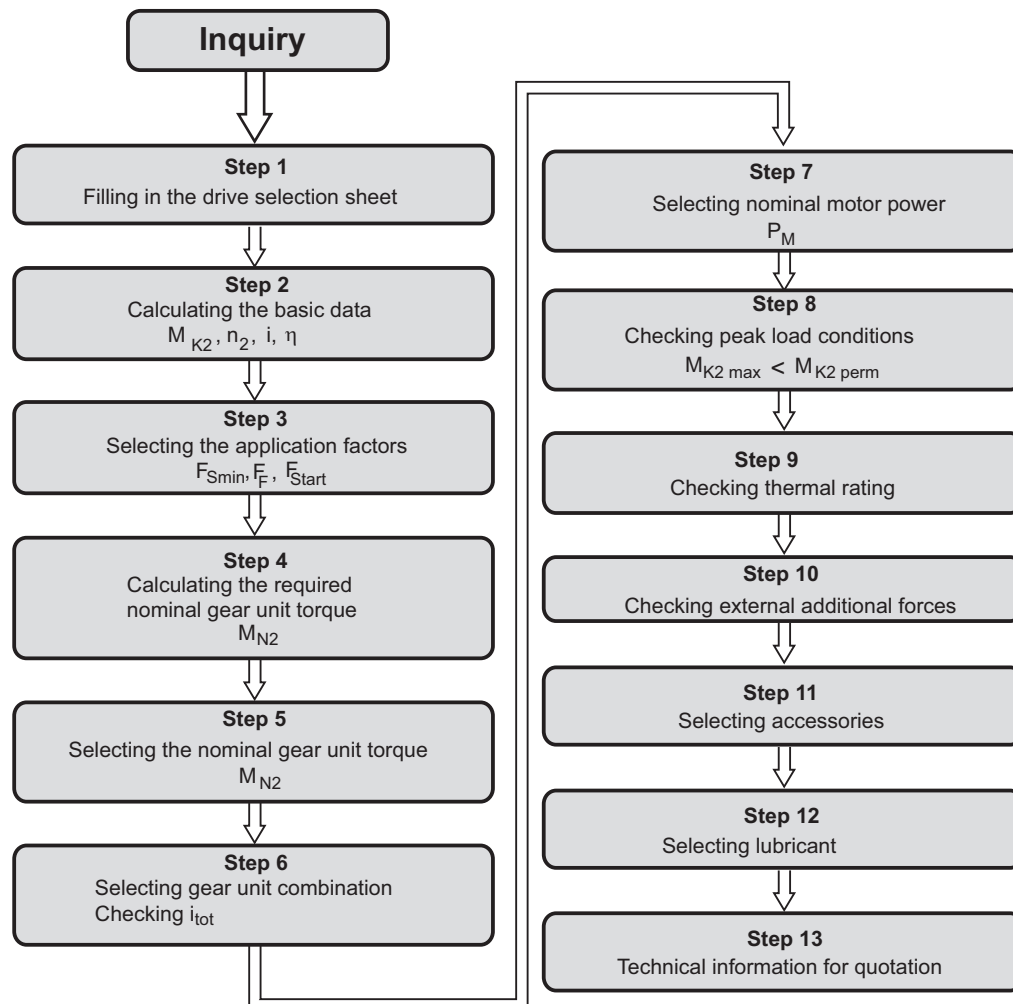


Sheet metal parts (e.g. protection covers) are painted in RAL 1003.

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

### 3 Project planning for gear units

#### 3.1 Project planning procedure



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## 3.1.1 Step 1: Drive selection data:

## 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.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

## 1.4 Installation altitude [m] [...]

## 1.5 Gear unit installation [X]

- ☐ Small space ( $v_a \geq 0.5$  m/s)  
☐ Large spaces and halls ( $v_a \geq 1.4$  m/s)  
☐ Outdoors with sun protection ( $v_a \geq 3$  m/s)

## 1.6 Ambient conditions [X]

- ☐ Normal ☐ Damp  
☐ Dusty ☐ Dry  
☐ Corrosive

## 2. Load characteristics

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

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

2.4 Frequency of load peaks ( $M_{K2 \max.}$  or  $P_{K1 \max.}$ ) [...]
 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.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

3.3 Motor speed  $n_M$  [1/min] [...]

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

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

- ☐ IEC  
☐ NEMA

Motor size (IEC or NEMA code):

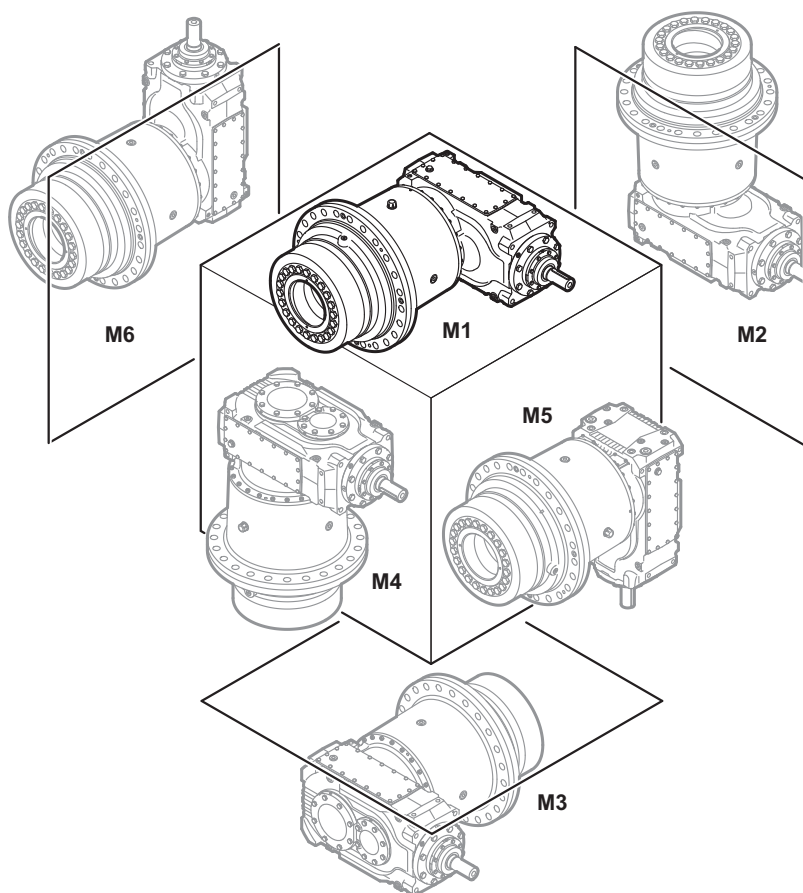
## 3.7 Motor mounting position [X] [...]

- ☐ B3  
☐ B5  
☐ V1  
☐ Other:

### 4.0 Gear unit requirements

#### 4.1 Mounting position [X]

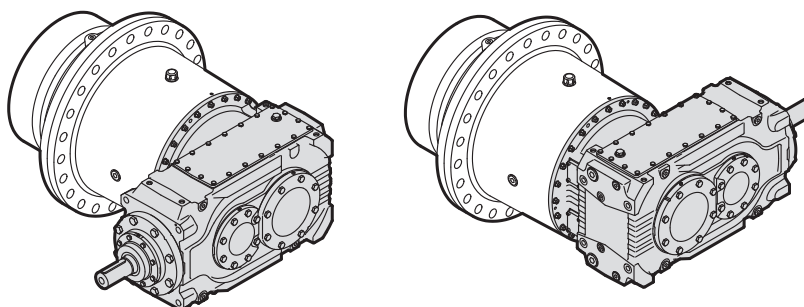
- ☐ M1
- ☐ M2
- ☐ M3
- ☐ M4
- ☐ M5
- ☐ M6



#### 4.2 Mounting positions for primary gear unit [X]

☐ 0°

☐ 180°



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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)

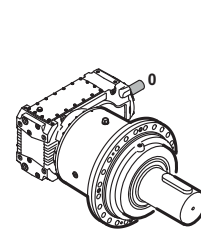
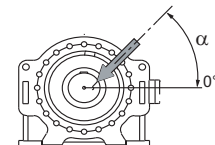
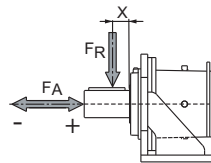
- ☐ Hollow shaft for shrink disk connection,  
including shrink disk  
☐ Splined hollow shaft DIN 5480  
☐ Other

**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] [...]**Axial force  $F_A$  [kN] Radial force  $F_R$  [kN] Distance from shaft  
shoulder X [mm] Application angle of  
the radial force  $\alpha$  [°] or variable ☐**4.10 Forces at the LSS [X] [...]**Axial force  $F_{A2}$  [N] 

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

Radial force  $F_{R2}$  [N] 

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

Distance from  
shaft shoulder X [mm] 

| normal               | min.                 | max.                 |
|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

Application angle of  
radial force  $\alpha$  [°] or rotating ☐**4.11 Electric power supply [X] [...]**Line voltage  $V_{line}$ 

| AC                       | DC                       |
|--------------------------|--------------------------|
| 3-phase                  | 1-phase                  |
| <input type="checkbox"/> | <input type="checkbox"/> |

 V  HZAuxiliary voltage  $V_{aux}$ 

| AC                       | DC                       |
|--------------------------|--------------------------|
| 3-phase                  | 1-phase                  |
| <input type="checkbox"/> | <input type="checkbox"/> |

 V  HZDegree of  
protection Explosion pro-  
tection required ☐ Yes  
☐ No**4.12 Permitted cooling (if required) [X]**

|                           | Permitted                | Not permitted            |
|---------------------------|--------------------------|--------------------------|
| Fan                       | <input type="checkbox"/> | <input type="checkbox"/> |
| Cooling cartridge         | <input type="checkbox"/> | <input type="checkbox"/> |
| External oil-air cooler   | <input type="checkbox"/> | <input type="checkbox"/> |
| External oil-water cooler | <input type="checkbox"/> | <input type="checkbox"/> |

Cooling water ☐ Yes  
available ☐ No Cooling water temperature  °C

3.1.2 Step 2: Calculating the basic data –  $M_{K2}$ ,  $n_2$ ,  $i$ ,  $\eta$ 

|                     |                                                                                                                                                                                                                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Constant torque     | $M_{K2} = \frac{P_{K1} \times 9550 \times \eta}{n_2} \text{ [Nm]}$ <p>Note: if <math>P_{K1}</math> is not known <math>\rightarrow P_{K1} = P_M</math></p> <p><math>M_{K2}</math> = Operating torque at LSS<br/> <math>P_{K1}</math> = Required operating power at HSS [kW]<br/> <math>n_2</math> = Output speed (LSS) 1/min</p> |
| Gear ratio          | $i = \frac{n_1}{n_2}$ <p><math>n_1</math> = Input speed (HSS) <math>\text{min}^{-1}</math><br/> <math>n_2</math> = Output speed (LSS) <math>\text{min}^{-1}</math></p>                                                                                                                                                          |
| Efficiency – $\eta$ | <p><math>\eta = f(i; \text{gear unit type})</math></p> <p>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.</p>                                                                                           |

## 3.1.3 Step 3: Selecting application factors

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

 $F_{S \min}$  – 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 time / 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:

- Combustion engines with four or more cylinders:  $F_{S \min}$  (selection table) + 0.25
- Combustion engines with one to three cylinders:  $F_{S \min}$  (selection table) + 0.5

## INFORMATION



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

| Area of Application         | Type of application<br>(driven machine) | Application-specific service factor $F_{S \min}$<br>Operating period / day |        |        |
|-----------------------------|-----------------------------------------|----------------------------------------------------------------------------|--------|--------|
|                             |                                         | Gearing with infinite fatigue strength (referring to<br>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   |
| Timber industry             | Tire machines                           | 1)                                                                         | 1)     | 1)     |
|                             | 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

\* only after customer consultation

| Area of Application             | Type of application<br>(driven machine)     | Application-specific service factor $F_{S \min}$<br>Operating period / day |        |        |
|---------------------------------|---------------------------------------------|----------------------------------------------------------------------------|--------|--------|
|                                 |                                             | Gearing with infinite fatigue strength (referring to<br>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   |
| Cable cars                      | 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

**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<br>P042...P102              | 1                               | 1.2    | 1.3     | 1.5     | 1.75     | 2.0   |
| Hollow shaft with shrink disk connection<br>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 <sup>1)</sup>     |
| 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: Calculating 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 [Nm]  
 $M_{K2}$  = Operating torque at LSS [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 [Nm]  
 $M_{K2}$  = Operating torque at LSS [Nm]  
 $F_{S \min}$  = Application-specific service factor

**3.1.5 Step 5: Selecting the nominal gear unit torque  $M_{N2}$** 

| Size  | $M_{N2}$ [Nm] | $M_{N2 \text{ Lim}}$ [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                 |

### 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  $n_1 < 1000 \text{ min}^{-1}$ , the value for  $1000 \text{ min}^{-1}$  can be used for  $M_{N2}$ .

For input speeds  $n_1 > 1800 \text{ min}^{-1}$ , 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.    | $n_1 = 1000 \text{ min}^{-1}$ |                         |                      |                      |                                                                                    |                                                                                     |                      | 100 kNm |      |
| Designation   | $i_{\text{tot}}$              | $n_2 [\text{min}^{-1}]$ | $P_{N1} [\text{kW}]$ |                      | 20 °C                                                                              | $P_{\text{TH}} [\text{kW}] \text{ M1}$                                              | 40 °C                |         |      |
|               |                               |                         |                      |                      |  |  |                      |         |      |
| P.042 X2KP110 | 159<br>178<br>202*<br>226*    | 6,3<br>5,6<br>5<br>4,4  | 69<br>61<br>54<br>48 | 55<br>55<br>53<br>52 | 76<br>76<br>72<br>71                                                               | )<br>37<br>37<br>37                                                                 | 53<br>54<br>52<br>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 $P_M$

$$P_M \geq P_{K1} = \frac{P_{K2}}{\eta} [\text{kW}]$$

$P_M$  = Nominal motor power [kW]

$P_{K1}$  = Operating power at HSS [kW]

$P_{K2}$  = Operating power at LSS [kW]

$\eta$  = Efficiency

3.1.8 Step 8: Checking the peak load conditions  $M_{K2\ per}$ ;  $M_{K2\ max}$ Permitted peak output torque  $M_{K2\ per}$ :

$$M_{K2\ per} = \frac{M_{N2\ Lim}}{F_F} [Nm]$$

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

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

$$M_{K2\ max} = \frac{P_M \times 9550 \times \eta}{n_2} \times F_{start}^* [Nm]$$

$M_{K2\ max}$  = Peak output torque [Nm]  
 $P_M$  = Nominal motor power [kW]  
 $F_{start}$  = Startup factor  
 $n_2$  = Output speed [ $\text{min}^{-1}$ ]  
 $\eta$  = Efficiency

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

Checking the gear unit selection:

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

### 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  $\geq 1.4$  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 [kW/m<sup>2</sup>] into account.

Thermal rating  $P_{TH}$  of the gear unit [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.

$$P_T = P_{TH} \times f_1 \times f_T \quad [kW]$$

$P_T$  = thermal rating of the gear unit [kW]

$P_{TH}$  = Nominal thermal rating of the gear unit [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 [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        |



### 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 $f_T$ |                                                                                                            |    |      |     |      |
|--------------------------|------------------------------------------------------------------------------------------------------------|----|------|-----|------|
| Lubrication type         | <ul style="list-style-type: none"> <li>without additional cooling</li> <li>or</li> <li>with fan</li> </ul> |    |      |     |      |
|                          | Ambient temperature [°C]                                                                                   |    |      |     |      |
|                          | 10                                                                                                         | 20 | 30   | 40  | 50   |
| Splash lubrication       | 1.15                                                                                                       | 1  | 0.85 | 0.7 | 0.55 |

When  $P_T < 1/3 \times P_{N1}$ , contact SEW-EURODRIVE

$P_T$  = Thermal rating of the gear unit [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 [kW]

$P_{K1}$  = Operating power at HSS [kW]

### 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. An important factor for determining the resulting overhung load is the type of transmission element mounted to the shaft end. 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:

$$F_R = \frac{M_d \times 2000}{d_0} \times f_z \quad [\text{N}]$$

$F_R$  = Overhung load [N]

$M_d$  = Torque [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  $F_{R\text{ per}}$  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.

## INFORMATION

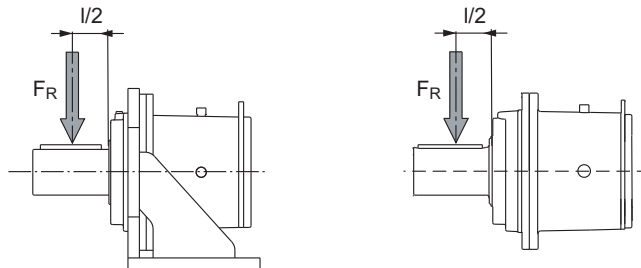


For permitted overhung and axial loads on the input shaft (HSS), please consult SEW-EURODRIVE.

3

### 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  $F_{R\text{ per}} \geq F_R$ .



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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  $n = 10 \text{ min}^{-1}$ .

| P.. series         | 042 | 052 | 062 | 072 | 082 | 092 | 102 |
|--------------------|-----|-----|-----|-----|-----|-----|-----|
| $F_{R\text{ per}}$ | 249 | 280 | 364 | 403 | 526 | 580 | 680 |

### Calculation of $F_{R\text{ perl}}$ [N] for different output speeds $n^*$ (1/min)

$$F_{R\text{ per}}^* = F_{R\text{ per}} \times \left( \frac{10}{n^*} \right)^{\left( \frac{1}{3.33} \right)} \leq F_{R\text{ max}} \text{ [N]}$$

$F_{R\text{ per}}^*$  = Permitted overhung load [N] for different output speed

$F_{R\text{ per}}$  = Permitted overhung load [N]

$F_{R\text{ max}}$  = Maximum overhung load [n] (see table in chapter 1.9.7)

$n^*$  = Differing output speed [1/min]

| P.. series              | 042 | 052 | 062 | 072 | 082 | 092 | 102 |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|
| $F_{R\text{ max}}$ [kN] | 323 | 364 | 473 | 523 | 683 | 720 | 850 |

# 3 Project planning for gear units

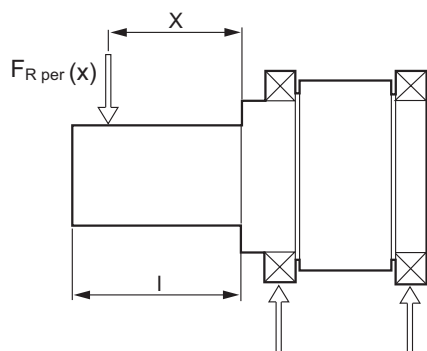
## Project planning procedure

### Comment

$$F_R \leq F_{R \text{ per}}^* \leq F_{R \text{ max}}$$

However, if  $F_{R \text{ per}}^* > F_{R \text{ max}}$ , you will have to check:  $F_R \leq F_{R \text{ max}}$

### 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:

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

$$b^* = (b - l/2) + x \text{ [mm]}$$

$F_{R \text{ per}}(x)$  = Permitted overhung load [N] of the off-center force application

$F_{R \text{ per}}$  = Permitted overhung load [N]

$F_{R \text{ max}}$  = Maximum overhung load [N]

### Comment

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

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

### 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  $n_2 < 1.0 \text{ min}^{-1}$ :

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

### 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  $n_2 = 4.0 \text{ min}^{-1}$
- Required operating power at LSS  $P_{k2} = 75 \text{ kW}$
- 4 pole motor, frequency inverter operation
- Input speed  $n_1 = 1500 \text{ min}^{-1}$
- Operating period: 12 hours per day
- Cyclic duration factor: 100% cdf, 10 starts per hour
- Outdoors, dusty environment
- Ambient temperature =  $0 \text{ }^{\circ}\text{C} \dots 40 \text{ }^{\circ}\text{C}$
- Installation altitude  $H = 800 \text{ m}$
- No axial or radial forces acting on the output shaft
- Motor mounting with IEC motor adapter

**3.2.2 Step 2: Calculating the basic data  $M_{K2}$ ,  $i$ ,  $\eta$** **Operating torque on LSS:**

$$M_{K2} = \frac{P_{K2} \times 9\,550}{n_2} \text{ [Nm]}$$

 $M_{K2}$  = Operating torque at LSS [Nm] $P_{K2}$  = Operating power at LSS [kW] $n_2$  = Output speed (LSS) [ $\text{min}^{-1}$ ]

$$M_{K2} = \frac{75 \text{ kW} \times 9\,550}{4 \text{ min}^{-1}} = 179\,063 \text{ Nm}$$

**Required gear ratio:**

$$i = \frac{n_1}{n_2} = \frac{1\,500 \text{ min}^{-1}}{4 \text{ min}^{-1}} = 375$$

 $n_1$  = Input speed (HSS) [ $\text{min}^{-1}$ ] $n_2$  = Output speed (LSS) [ $\text{min}^{-1}$ ]

Efficiency:

$$\eta = 0.96$$

**3.2.3 Step 3: Selecting the application factors  $F_{S \min}$ ,  $F_F$ ,  $F_{\text{Start}}$** **Application-specific service factor  $F_{S \min}$** Application: Apron feeder  $t > 10 \text{ h} \rightarrow F_{S \min} = 1.5$ **Peak load factor  $F_F$** 

Hollow shaft with shrink disk

Load per hour  $\rightarrow F_F = 1.2$ **Startup factor  $F_{\text{Start}}$** Motor in frequency inverter operation  $\rightarrow F_{\text{Start}} = 1.7$  $t$  = Daily operating period**3.2.4 Step 4: Calculating the required nominal output torque  $M_{N2}$** 

Constant direction of the load – constant torque:

$$M_{N2} \geq M_{K2} \times F_{S \min} = 179\,062.5 \text{ Nm} \times 1.5 = 268\,594 \text{ Nm}$$

 $M_{N2}$  = Nominal torque [Nm] $M_{K2}$  = Operating torque at LSS [Nm] $F_{S \min}$  = application-specific service factor

### 3.2.5 Step 5: Selecting the nominal gear unit torque $M_{N2}$

$$M_{N2} > 268\,594\text{ Nm}$$

| Size  | $M_{N2}$ [Nm]  | $M_{N2\text{ Lim}}$ [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 | <b>359 400</b> | 718 800                  |
| P.092 | 423 000        | 846 000                  |
| P.102 | 500 000        | 1 000 000                |

- Select the gear unit size: P.082

### 3.2.6 Step 6: Selecting the gear unit combination

| P.082 X2K.    |                  | $n_1 = 1500\text{ min}^{-1}$ |               | 359 400 Nm       |            |           |            |
|---------------|------------------|------------------------------|---------------|------------------|------------|-----------|------------|
| Designation   | $i_{\text{tot}}$ | $n_2$ [min <sup>-1</sup> ]   | $P_{N1}$ [kW] | $P_{TH}$ [kW] M1 |            |           |            |
|               |                  |                              |               | 20 °C            | 40 °C      | 40 °C     | 40 °C      |
| 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        |
|               | <b>385*</b>      | <b>3,9</b>                   | <b>153</b>    | <b>112</b>       | <b>171</b> | <b>71</b> | <b>118</b> |
|               | 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  $i_{\text{tot}} = 385$  (required = 375 → ok)

### 3.2.7 Step 7: Selecting the motor power $P_M$

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

$P_M$  = Nominal motor power [kW]  
 $P_{K2}$  = Operating power at LSS [kW]  
 $P_M$  = Nominal motor power [kW]

Motor selection → PM = 90 [kW]



**3.2.8 Step 8: Checking the peak load conditions  $M_{K2 \max} < M_{K2 \text{ per}}$** **Permitted peak output torque  $M_{K2 \text{ per}}$ :**

$$M_{K2 \text{ per}} = \frac{M_{N2 \text{ Lim}}}{F_F} = \frac{718\,800 \text{ Nm}}{1.2} = 599\,000 \text{ Nm}$$

$M_{K2 \text{ per}}$  = Permitted peak output torque [Nm]  
 $M_{N2 \text{ Lim}}$  = limited nominal gear unit torque [Nm]  
 $F_F$  = Peak load factor

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

$$M_{K2 \max} = \frac{P_M \times 9\,550 \times \eta \times F_{\text{start}}}{n_2} = \frac{90 \text{ kW} \times 9\,550 \times 0.96 \times 1.7}{4 \text{ min}^{-1}} = 350\,676 \text{ Nm}$$

$M_{K2 \max}$  = Peak output torque [Nm]  
 $P_M$  = Motor power [kW]  
 $F_{\text{start}}$  = Startup factor

**Checking the gear unit selection:**

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

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

### 3.2.9 Step 9: Checking the thermal rating

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

$f_1 = 1.0$  see installation altitude 800 m (Altitude factor  $f_1$ )

$f_T = 0.7$  see ambient temperature with splash lubrication without additional cooling (Temperature factors  $f_T$ )

$P_T$  = Thermal rating [kW]

$P_{TH}$  = Nominal thermal rating [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  $P_{K1} > P_T$

$$50 \text{ kW} < 78 \text{ kW}$$

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

**Check the thermal rating with cooling.**

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

$$P_{K1} > P_T$$

$$78 \text{ kW} < 87 \text{ kW}$$

→ 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  $n_2 = 4.0 \text{ min}^{-1}$  ( $n_2 > 1.0^{-1}$ ), 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                                |

## 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

### 4.1 Torque arm

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.

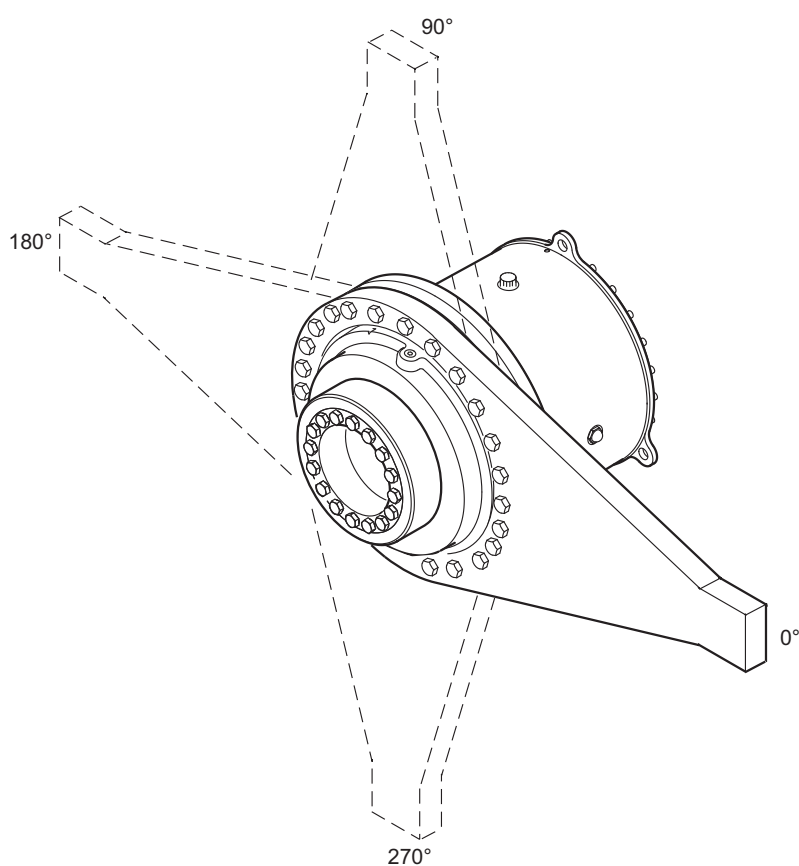
The position of the torque arm is determined as looking onto the output shaft (mounting position **0°**, **90°**, **180°**, **270°**).

#### 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.

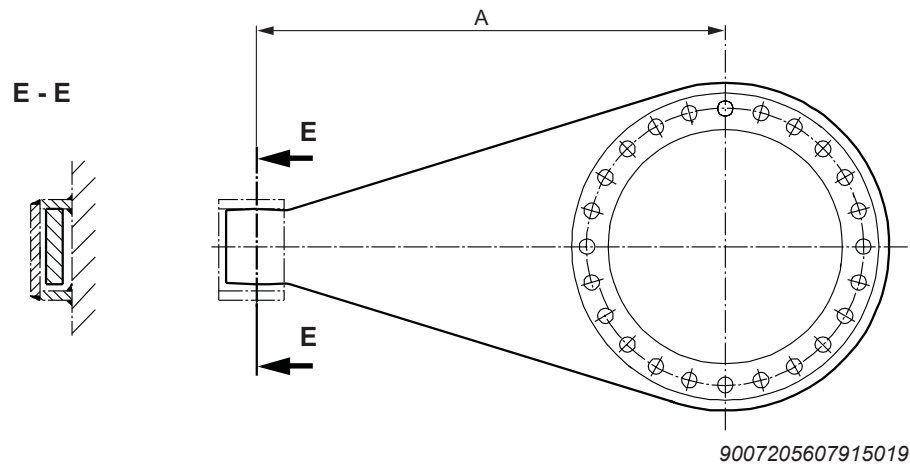


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#### 4.1.1 Single-sided torque arm

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 two 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.



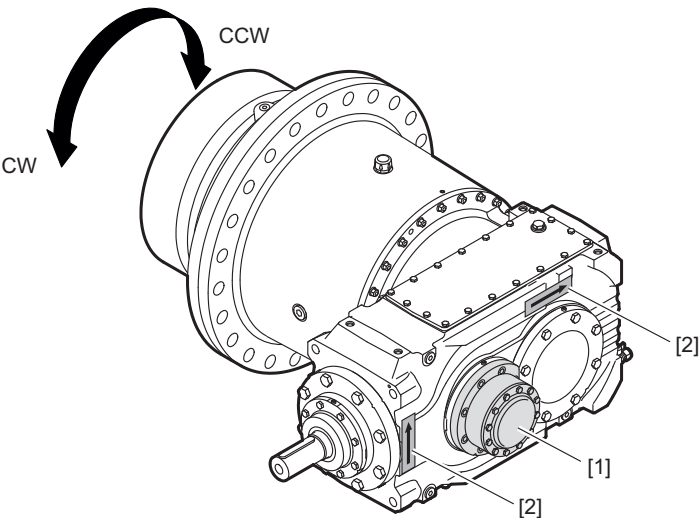
#### Weights

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

4.2 Backstop

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.

The backstop might wear off when operated below lift-off speed.

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

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

| $n_1 \text{ [min}^{-1}\text{]}$ | 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".

### 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

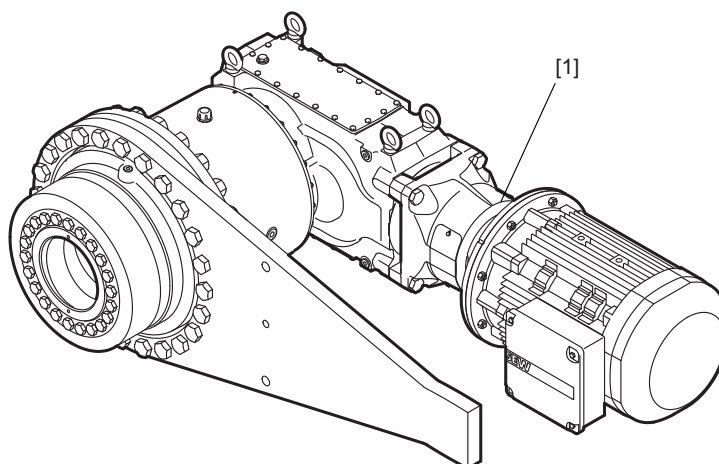
Observe the following information:



#### 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 of the motor adapter.
- All motor adapters can have a fan installed.
- For additional information, refer to the motor adapter dimension sheets.

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.

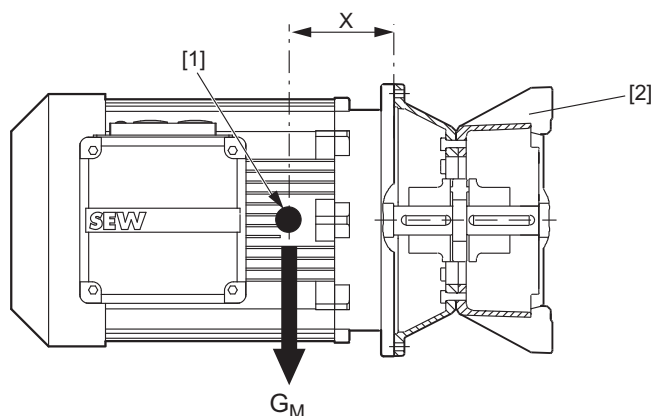
## INFORMATION



- 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), consult 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.



## 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).

## 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 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](http://www.sew-eurodrive.de/lubricants)
-

## 5.2.1 Structure of the tables and abbreviations

|        |     | DIN (ISO)<br>API     | ISO,SAE<br>NLGI    |  |                 |     |  |  |
|--------|-----|----------------------|--------------------|------------------------------------------------------------------------------------|-----------------|-----|--|--|
| [1]    | CLP | VG 150 <sup>1)</sup> | -20                | +65                                                                                | -20             | +65 |  |  |
|        |     |                      | -5                 |                                                                                    | -5              |     |  |  |
|        |     |                      | +5                 |                                                                                    | +5              |     |  |  |
|        |     |                      | Optigear<br>BM 150 |                                                                                    | Alpha<br>SP 150 |     |  |  |
| S0     |     | S0                   |                    |                                                                                    |                 |     |  |  |
| VG 220 |     | -15                  | +75                | -15                                                                                | +75             |     |  |  |
|        |     | 0                    |                    | 0                                                                                  |                 |     |  |  |
|        |     | +10                  |                    | +10                                                                                |                 |     |  |  |
|        |     | Optigear<br>BM 220   |                    | Alpha<br>SP 220                                                                    |                 |     |  |  |
| S0     |     | S0                   |                    |                                                                                    |                 |     |  |  |
| VG 320 |     | -10                  | +85                | -10                                                                                | +80             |     |  |  |
|        |     | +5                   |                    | +5                                                                                 |                 |     |  |  |
|        |     | +15                  |                    | +15                                                                                |                 |     |  |  |
|        |     | Optigear<br>BM 320   |                    | Alpha<br>SP 320                                                                    |                 |     |  |  |
| S0     |     | S0                   |                    |                                                                                    |                 |     |  |  |

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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 ( <b>NSF H1</b> -compliant)                   |
|  | = Biodegradable oil (lubricant for agriculture, forestry, and water management) |
| 1)                                                                                  | = Lubricants may only be used if service factor $F_s \geq 1.3$                  |

### 5.2.2 Explanation of the various lubricants

|     |              |     |     |
|-----|--------------|-----|-----|
|     |              |     | [5] |
| [1] | -20          |     |     |
| [2] | -5           | +65 | [6] |
| [3] | +5           |     |     |
| [4] | xyz          |     |     |
|     | SEW070040013 |     | [7] |

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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.

### 5.2.3 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.

## 5.2.4 Lubricant tables

The lubricant table is valid when this document is printed. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

| DIN (ISO)<br>API | ISO SAE<br>NLGI      |  |  |  |  |  |  |  |               |
|------------------|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------|
| CLP              | VG 150 <sup>1)</sup> | -20                                                                                 | -20                                                                                  | -20                                                                                   | -20                                                                                   | -20                                                                                   | -20                                                                                   | -20                                                                                   |               |
|                  |                      | -5                                                                                  | -5                                                                                   | -5                                                                                    | -5                                                                                    | -5                                                                                    | -5                                                                                    | -5                                                                                    |               |
|                  |                      | +5                                                                                  | +5                                                                                   | +5                                                                                    | +5                                                                                    | +5                                                                                    | +5                                                                                    | +5                                                                                    |               |
|                  |                      | Optigear<br>BM 150                                                                  | Alpha<br>SP 150                                                                      | Renolin<br>CLP 150 Plus                                                               | Renolin<br>HighGear 150                                                               | Mobilgear 600<br>XP 150                                                               | Kilberoil<br>GEM 1-150 N                                                              | Meropa 150                                                                            |               |
|                  | VG 220               | -15                                                                                 | -15                                                                                  | -15                                                                                   | -15                                                                                   | -15                                                                                   | -15                                                                                   | -15                                                                                   | -15           |
|                  |                      | 0                                                                                   | 0                                                                                    | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0             |
|                  |                      | +10                                                                                 | +10                                                                                  | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10           |
|                  |                      | Optigear<br>BM 220                                                                  | Alpha<br>SP 220                                                                      | Renolin<br>CLP 220 Plus                                                               | Renolin<br>HighGear 220                                                               | Mobilgear 600<br>XP 220                                                               | Kilberoil<br>GEM 1-220 N                                                              | Meropa 220                                                                            | Carter EP 220 |
|                  | VG 320               | -10                                                                                 | -10                                                                                  | -10                                                                                   | -10                                                                                   | -10                                                                                   | -10                                                                                   | -10                                                                                   | -10           |
|                  |                      | +5                                                                                  | +5                                                                                   | +5                                                                                    | +5                                                                                    | +5                                                                                    | +5                                                                                    | +5                                                                                    | +5            |
|                  |                      | +15                                                                                 | +15                                                                                  | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15           |
|                  |                      | Optigear<br>BM 320                                                                  | Alpha<br>SP 320                                                                      | Renolin<br>CLP 320 Plus                                                               | Renolin<br>HighGear 320                                                               | Mobilgear 600<br>XP 320                                                               | Kilberoil<br>GEM 1-320 N                                                              | Meropa 320                                                                            | Carter EP 320 |
|                  | VG 460               | -5                                                                                  | -5                                                                                   | -5                                                                                    | -5                                                                                    | -5                                                                                    | -5                                                                                    | -5                                                                                    | -5            |
|                  |                      | +10                                                                                 | +10                                                                                  | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10                                                                                   | +10           |
|                  |                      | +20                                                                                 | +20                                                                                  | +20                                                                                   | +20                                                                                   | +20                                                                                   | +20                                                                                   | +20                                                                                   | +20           |
|                  |                      | Optigear<br>BM 460                                                                  | Alpha<br>SP 460                                                                      | Renolin<br>CLP 460 Plus                                                               | Renolin<br>HighGear 460                                                               | Mobilgear 600<br>XP 460                                                               | Kilberoil<br>GEM 1-460 N                                                              | Meropa 460                                                                            | Carter EP 460 |
|                  | VG 680               | 0                                                                                   | 0                                                                                    | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0                                                                                     | 0             |
|                  |                      | +15                                                                                 | +15                                                                                  | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15                                                                                   | +15           |
|                  |                      | +25                                                                                 | +25                                                                                  | +25                                                                                   | +25                                                                                   | +25                                                                                   | +25                                                                                   | +25                                                                                   | +25           |
|                  |                      | Optigear<br>BM 680                                                                  | Alpha<br>SP 680                                                                      | Renolin<br>CLP 680 Plus                                                               | Renolin<br>HighGear 680                                                               | Mobilgear 600<br>XP 680                                                               | Kilberoil<br>GEM 1-680 N                                                              | Meropa 680                                                                            | Carter EP 680 |
|                  | VG 1000              | +5                                                                                  |                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |               |
|                  |                      | +20                                                                                 |                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |               |
|                  |                      | +30                                                                                 |                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |               |
|                  |                      | Optigear<br>BM 1000                                                                 |                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |               |
|                  | SO                   |                                                                                     | SO                                                                                   |                                                                                       | SO                                                                                    |                                                                                       | SO                                                                                    |                                                                                       |               |

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The lubricant table is valid when this document is printed. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

| DIN (ISO)<br>API | ISO,SAE<br>NLGI      |                                         |                                       |                        |                                        |                                          |                                       |                                  |                                                                                                                 |  |  |  |
|------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--|--|--|
| CLP HC           | VG 32 <sup>1)</sup>  |                                                                                                                            |                                                                                                                          | <div><div>-40</div><div>-30</div><div>+30</div><div>-25</div></div> <div>SHC 624</div> <div>S0</div>     |                                                                                                                         |                                                                                                                           |                                                                                                                        |                                                                                                                   |                                                                                                                 |  |  |  |
|                  | VG 68 <sup>1)</sup>  |                                                                                                                            | <div><div>-35</div><div>-20</div><div>+50</div><div>-10</div></div> <div>Renolin<br/>Unisyn CLP 68</div> <div>S0</div>   | <div><div>-40</div><div>-25</div><div>+50</div><div>-15</div></div> <div>SHC 626</div> <div>S0</div>     | <div><div>-35</div><div>-20</div><div>+50</div><div>-10</div></div> <div>Klubersynth<br/>GEM 4-68 N</div> <div>S0</div> | <div><div>-40</div><div>-20</div><div>+50</div><div>-10</div></div> <div>Omala<br/>S4 GX 68</div> <div>S0</div>           |                                                                                                                        |                                                                                                                   |                                                                                                                 |  |  |  |
|                  | VG 150 <sup>1)</sup> | <div><div>-25</div><div>-10</div><div>+70</div><div>0</div></div> <div>Alphasyn<br/>EP 150</div> <div>S0</div>             | <div><div>-30</div><div>-10</div><div>+70</div><div>+0</div></div> <div>Renolin<br/>Unisyn CLP 150</div> <div>S0</div>   | <div><div>-35</div><div>-15</div><div>+75</div><div>-5</div></div> <div>SHC Gear 150</div> <div>S0</div> | <div><div>-25</div><div>-10</div><div>70</div><div>0</div></div> <div>Klubersynth<br/>GEM 4-150 N</div> <div>S0</div>   | <div><div>-30</div><div>-10</div><div>+75</div><div>0</div></div> <div>Omala<br/>S4 GX 150</div> <div>S0</div>            | <div><div>-25</div><div>-10</div><div>+70</div><div>0</div></div> <div>Pinnacle<br/>EP 150</div> <div>S0</div>         | <div><div>-35</div><div>-15</div><div>+75</div><div>-5</div></div> <div>Carter<br/>SH 150</div> <div>S0</div>     |                                                                                                                 |  |  |  |
|                  | VG 220               | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Alphasyn<br/>EP 220</div> <div>S0</div>             | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Renolin<br/>Unisyn CLP 220</div> <div>S0</div>    | <div><div>-25</div><div>-5</div><div>+85</div><div>0</div></div> <div>SHC 630</div> <div>S0</div>        | <div><div>-30</div><div>-10</div><div>+85</div><div>+5</div></div> <div>SHC Gear 220</div> <div>S0</div>                | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Klubersynth<br/>GEM 4-220 N</div> <div>S0</div>    | <div><div>-25</div><div>-5</div><div>+85</div><div>+5</div></div> <div>Omala<br/>S4 GX 220</div> <div>S0</div>         | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Pinnacle<br/>EP 220</div> <div>S0</div>    | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Carter<br/>SH 220</div> <div>S0</div>    |  |  |  |
|                  | VG 320               | <div><div>-20</div><div>0</div><div>+90</div><div>+10</div></div> <div>Alphasyn<br/>EP 320</div> <div>S0</div>             | <div><div>-20</div><div>0</div><div>+90</div><div>+10</div></div> <div>Renolin<br/>Unisyn CLP 320</div> <div>S0</div>    | <div><div>-25</div><div>-5</div><div>+95</div><div>+10</div></div> <div>SHC 632</div> <div>S0</div>      | <div><div>-20</div><div>0</div><div>+95</div><div>+10</div></div> <div>SHC Gear 320</div> <div>S0</div>                 | <div><div>-20</div><div>0</div><div>+95</div><div>+10</div></div> <div>Klubersynth<br/>GEM 4-320 N</div> <div>S0</div>    | <div><div>-20</div><div>0</div><div>+95</div><div>+10</div></div> <div>Omala<br/>S4 GX 320</div> <div>S0</div>         | <div><div>-20</div><div>0</div><div>+90</div><div>+10</div></div> <div>Pinnacle<br/>EP 320</div> <div>S0</div>    | <div><div>-20</div><div>0</div><div>+90</div><div>+10</div></div> <div>Carter<br/>SH 320</div> <div>S0</div>    |  |  |  |
|                  | VG 460               | <div><div>-15</div><div>+5</div><div>+100</div><div>+15</div></div> <div>Alphasyn<br/>EP 460</div> <div>S0</div>           | <div><div>-15</div><div>+5</div><div>+100</div><div>+15</div></div> <div>Renolin<br/>Unisyn CLP 460</div> <div>S0</div>  | <div><div>-15</div><div>+5</div><div>+105</div><div>+15</div></div> <div>SHC 634</div> <div>S0</div>     | <div><div>-20</div><div>0</div><div>+110</div><div>+15</div></div> <div>SHC Gear 460</div> <div>S0</div>                | <div><div>-15</div><div>+5</div><div>+105</div><div>+20</div></div> <div>Klubersynth<br/>GEM 4-460 N</div> <div>S0</div>  | <div><div>-15</div><div>+5</div><div>+105</div><div>+15</div></div> <div>Omala<br/>S4 GX 460</div> <div>S0</div>       | <div><div>-15</div><div>+5</div><div>+100</div><div>+15</div></div> <div>Pinnacle<br/>EP 460</div> <div>S0</div>  | <div><div>-15</div><div>+5</div><div>+100</div><div>+15</div></div> <div>Carter<br/>SH 460</div> <div>S0</div>  |  |  |  |
|                  | VG 680               | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Optigear<br/>Synthetic X 680</div> <div>S0</div> | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Renolin<br/>Unisyn CLP 680</div> <div>S0</div> | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>SHC 636</div> <div>S0</div>    | <div><div>-15</div><div>+10</div><div>+110</div><div>+25</div></div> <div>SHC Gear 680</div> <div>S0</div>              | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Klubersynth<br/>GEM 4-680 N</div> <div>S0</div> | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Omala<br/>S4 GX 680</div> <div>S0</div>      | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Pinnacle<br/>EP 680</div> <div>S0</div> | <div><div>-10</div><div>+10</div><div>+110</div><div>+25</div></div> <div>Carter<br/>SH 680</div> <div>S0</div> |  |  |  |
|                  | VG 1000              |                                                                                                                            |                                                                                                                          |                                                                                                          | <div><div>-10</div><div>+15</div><div>+110</div><div>+30</div></div> <div>SHC 639</div> <div>S0</div>                   | <div><div>-10</div><div>+20</div><div>+110</div><div>+30</div></div> <div>SHC Gear 1000</div> <div>S0</div>               | <div><div>-10</div><div>+20</div><div>+110</div><div>+30</div></div> <div>Klubersynth<br/>EG4-1000</div> <div>S0</div> |                                                                                                                   |                                                                                                                 |  |  |  |

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| DIN (ISO)<br>API     | ISO SAE<br>NLGI         |  |  |  |  |
|----------------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| CLP HC<br>NSF H1     | VG 68 <sup>1)</sup>     | -35                                                                                 | -40                                                                                 |                                                                                       | -35                                                                                   |
|                      |                         | -20                                                                                 | -25                                                                                 |                                                                                       | -20                                                                                   |
|                      |                         | -10                                                                                 | -15                                                                                 |                                                                                       | -10                                                                                   |
|                      |                         | Cassida<br>Fluid HF 68                                                              | Optileb<br>HY 68                                                                    |                                                                                       | Küberoil<br>4UH1-68 N                                                                 |
|                      | VG 220 <sup>1)</sup>    | S0                                                                                  | S0                                                                                  |                                                                                       | S0                                                                                    |
|                      |                         | -20                                                                                 | -25                                                                                 |                                                                                       | -25                                                                                   |
|                      |                         | -5                                                                                  | -5                                                                                  |                                                                                       | -5                                                                                    |
|                      |                         | +5                                                                                  | +5                                                                                  |                                                                                       | +5                                                                                    |
|                      |                         | Cassida<br>Fluid GL 220                                                             | Optileb<br>GT 220                                                                   |                                                                                       | Küberoil<br>4UH1-220 N                                                                |
|                      |                         | S0                                                                                  | S0                                                                                  |                                                                                       | S0                                                                                    |
| VG 460 <sup>1)</sup> |                         | -15                                                                                 | -15                                                                                 |                                                                                       | -15                                                                                   |
|                      |                         | +5                                                                                  | +5                                                                                  |                                                                                       | +5                                                                                    |
|                      |                         | +20                                                                                 | +20                                                                                 |                                                                                       | +15                                                                                   |
|                      |                         | +90                                                                                 | +95                                                                                 |                                                                                       | +95                                                                                   |
|                      | Cassida<br>Fluid GL 460 |                                                                                     |                                                                                     |                                                                                       | Küberoil<br>4UH1-460 N                                                                |
|                      |                         |                                                                                     | Optileb<br>GT 460                                                                   |                                                                                       |                                                                                       |
|                      |                         | S0                                                                                  | S0                                                                                  |                                                                                       | S0                                                                                    |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         | -15                                                                                 | -15                                                                                 |                                                                                       | -15                                                                                   |
|                      |                         | +5                                                                                  | +5                                                                                  |                                                                                       | +5                                                                                    |
|                      |                         | +20                                                                                 | +20                                                                                 |                                                                                       | +15                                                                                   |
|                      |                         | +90                                                                                 | +95                                                                                 |                                                                                       | +95                                                                                   |
| E                    | VG 460                  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      | VG 460                  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      | VG 460                  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                      |                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |

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### 5.3 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!
- For pivoted mounting positions adhere to the lubricant fill quantity on the nameplates.
- For variable pivoted mounting positions adhere to the control mounting position on the additional nameplate "Oil control angle".
- The required oil quantity depends on the mark on the oil dipstick.

The following table shows the lubricant quantities for splash lubrication.

| X2K..            | P042    |          | P052    |          | P062    |          | P072    |          | P082    |          | P092    |          | P102    |          |
|------------------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| i <sub>tot</sub> | 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     | -        |



## 5.4 Sealing greases / rolling bearing greases

The table shows the greases recommended by SEW-EURODRIVE for an operating temperature of –40 °C to 100 °C.

| Manufacturer | Grease                                    | Group   |
|--------------|-------------------------------------------|---------|
| Fuchs        | <b>Renolit CX TOM 15 OEM<sup>1)</sup></b> | Group 1 |
| BP           | Energrease LS-EP 2                        |         |
| Castrol      | Longtime PD 2                             |         |
| Castrol      | Spheerol EP 2                             |         |
| Klüber       | Centoplex EP2                             |         |
| Klüber       | Petamo GHY 133 N                          |         |
| Kuwait       | Q8 Rembrandt EP2                          |         |
| Mobil        | Mobilux EP 2                              |         |
| Shell        | Gadus S2 V220 2                           |         |
| Texaco       | Mulifak EP2                               |         |
| Total        | Multis EP 2                               |         |
| Castrol      | <b>Obeen FS<sup>1)</sup></b>              | Group 2 |
| Fuchs        | <b>Plantogel 2<sup>1)</sup></b>           | Group 3 |

1) Grease used by the factory should be preferred.

## INFORMATION



- The greases may only be replaced 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.

## 5.5 Lubrication type

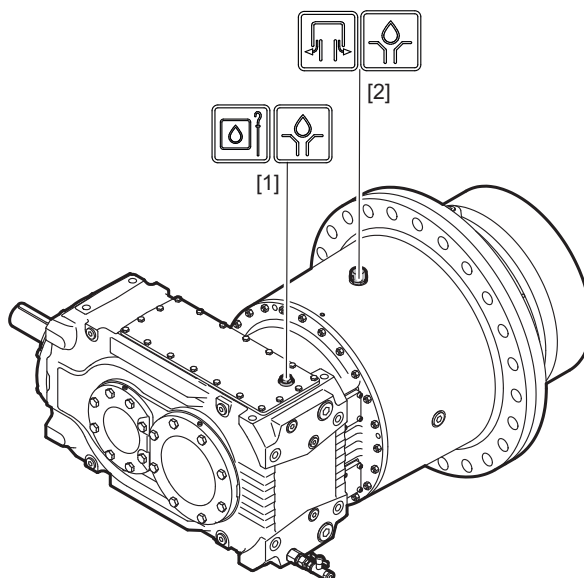
Splash lubrication is the standard lubrication type.

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.

### 5.6 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.

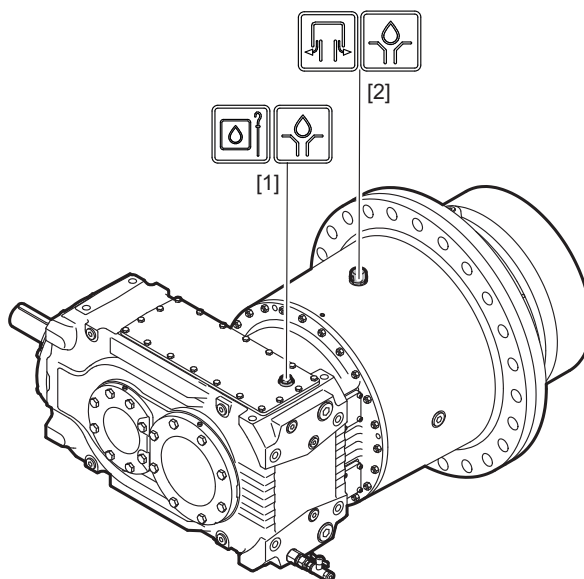


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### 5.7 Oil level check and gear unit venting

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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## 5.8 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 also available in magnetic design as an option.

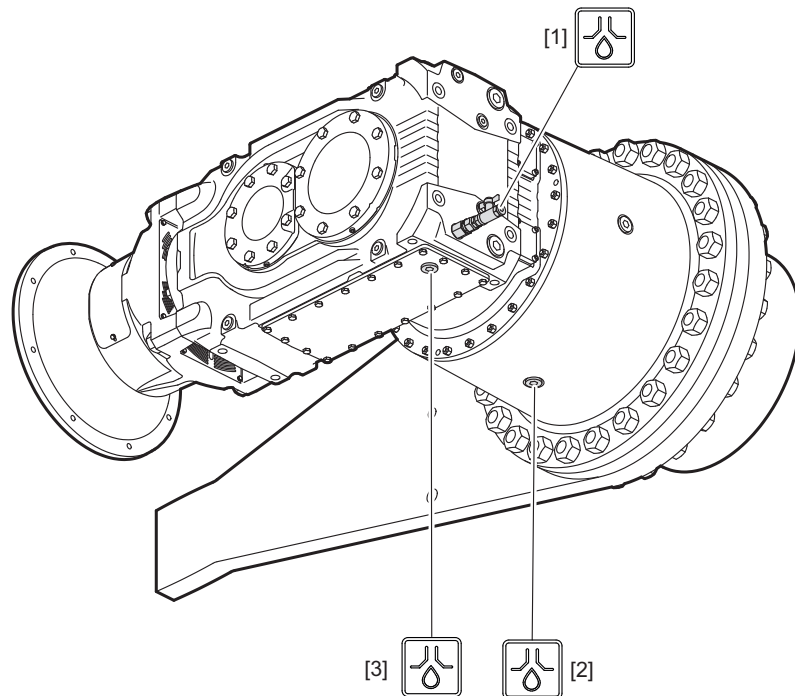
As an alternative, an additional oil drain valve can be attached to the planetary gear unit instead of the screw plug [2].

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### INFORMATION



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



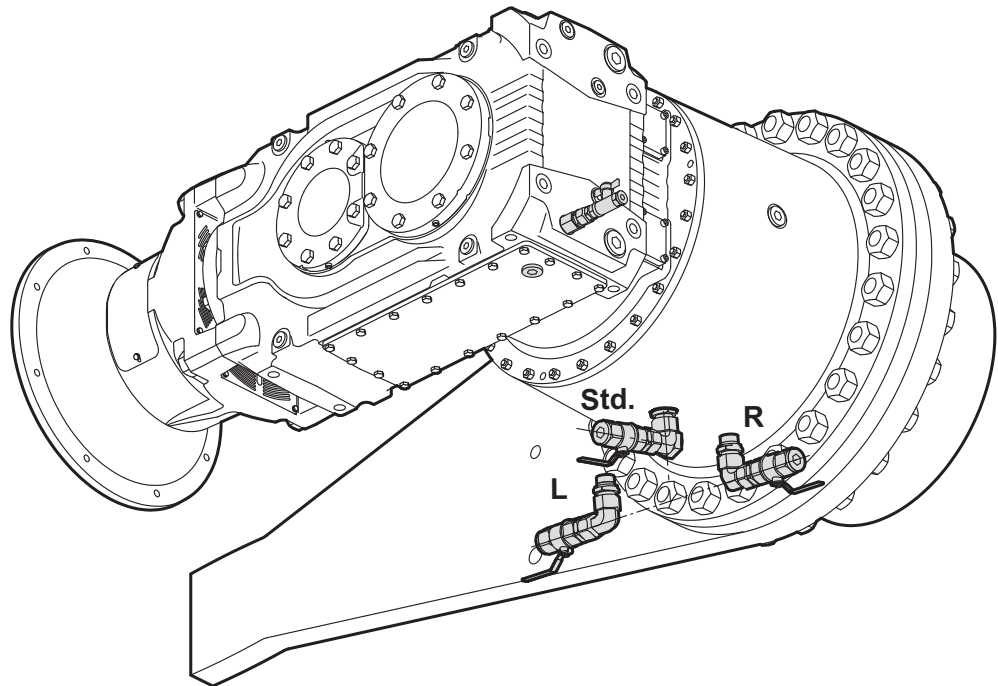
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## 5.9 Oil drain valve

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

### 5.9.1 Position of the oil drain valve

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

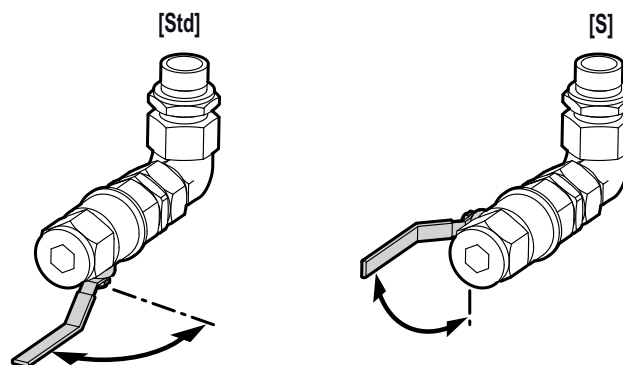


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Std = Standard  
R = Right  
L = Left

### 5.9.2 Position of the lever

The following figure shows the possible positions of the lever.



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Std = Standard  
S = On the side

## 5.10 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.

### 5.10.1 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

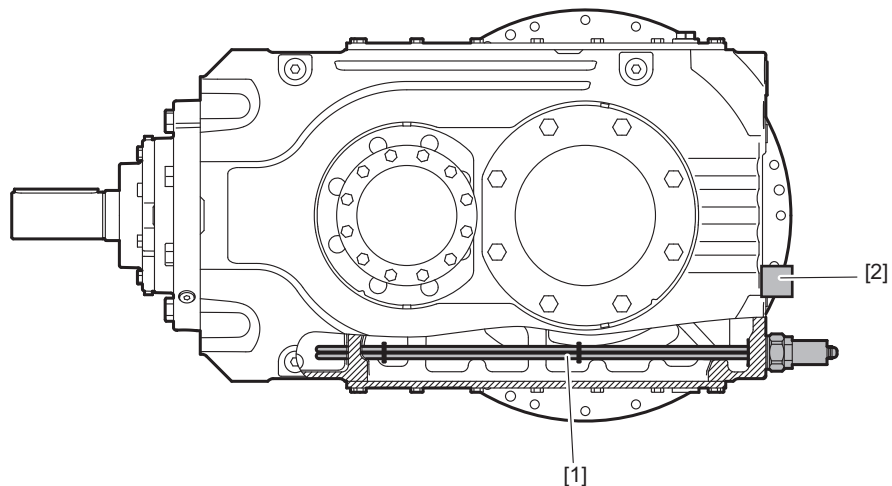


- Before startup, it might be necessary to heat up the oil with an oil heater to the temperature specified under "Initial temperature". Observe the lubricant table in chapter "Permitted lubricants" (→ 58). For the design and dimensioning of the required oil heater, contact SEW-EURODRIVE.
- For the minimally permitted initial temperature for mineral and synthetic oil, refer to the chapter "Permitted lubricants" (→ 58).

### 5.10.2 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" (→ 71).
- For dimensions of the heating elements, see chapter "Oil heater /OH [mm]" (→ 107).

### 5.10.3 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 initial temperature for gear unit startup, see chapter Limit temperature for gear unit start.

At this temperature, see table "Minimum permitted initial temperature for gear unit start" in chapter Limit temperature for gear unit start, the thermostat disables the oil heater. Only then can the gear unit be started. The thermostat activates the oil heater again once the temperature is about 5 K below the trip point.

- In order 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, type, mounting position, oil quantity, and ambient temperature.
- Thermostat and oil heater are installed 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.

## 5.10.4 Connection power

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

| Peripheral Conditions: $T_{amb} = -20\text{ °C}$ ; Mounting position M1 (Splash lubrication) |                 |           |                   |                        |                     |
|----------------------------------------------------------------------------------------------|-----------------|-----------|-------------------|------------------------|---------------------|
| Size                                                                                         | Heating element |           | $P_{inst}$<br>[W] | Heating over 4h<br>[K] | Max. heating<br>[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

**5.10.5 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" (→  58). 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" (→  58).
-



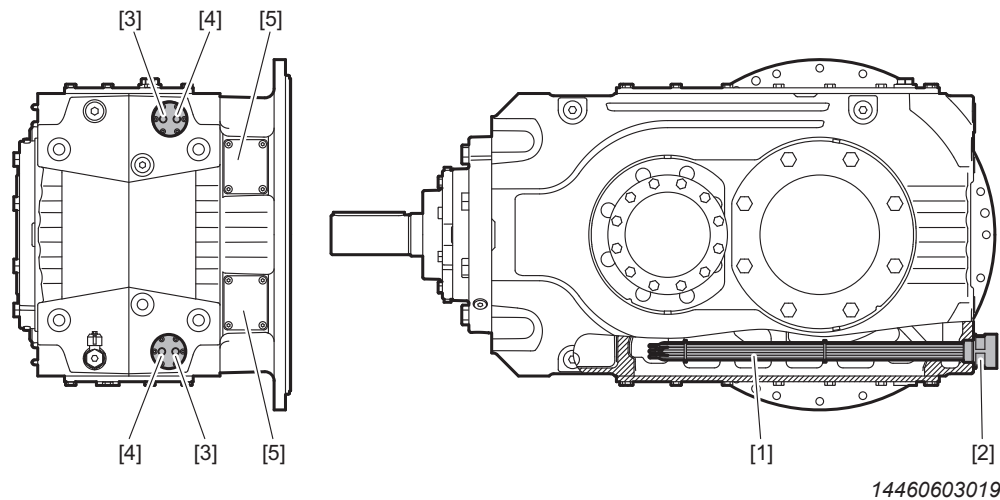
## 5.11 Water cooling cartridge

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.

### 5.11.1 Structure



- [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.

### 5.11.2 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<br>[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.

## 5.11.3 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 <sup>1)</sup> | 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     |

## 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<br>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                                                             |

**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

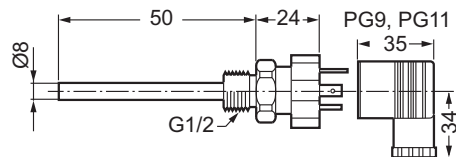
## 6 Condition monitoring

### 6.1 Temperature sensor PT100

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

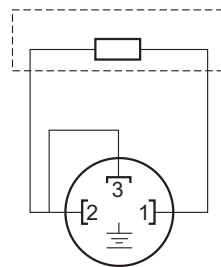
The temperature sensor is located in the oil sump of the gear unit. The exact position depends on the gear unit design.

#### 6.1.1 Dimensions



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#### 6.1.2 Electrical connection



[1] / [2] Resistor element connection

#### 6.1.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance [K]  $\pm (0.3 + 0.005 \times T)$ , (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.

## 6.2 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.

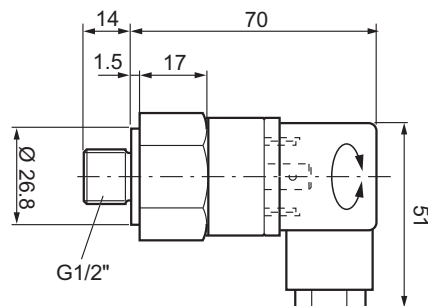
For various functions, the temperature switch is also used as limit value switch, for example

- a pre-warning
- or
- 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 type and shaft position.

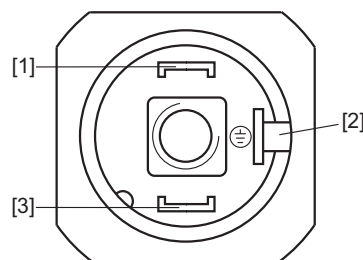
### 6.2.1 Dimensions



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### 6.2.2 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 (without vacuum)  
 [2] Grounding terminal 6.3 x 0.8



### 6.2.3 Technical data

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

### 6.3 Temperature switch /TSK

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

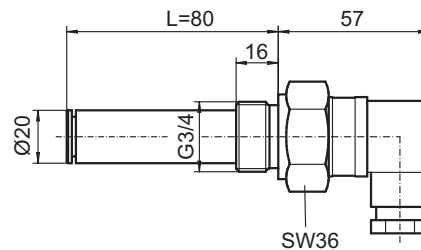
The temperature switch is integrated into the circuit of the oil supply system as follows:

- Activation of the cooling system once 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, using a relay in the power circuit is recommended 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 type and shaft position.

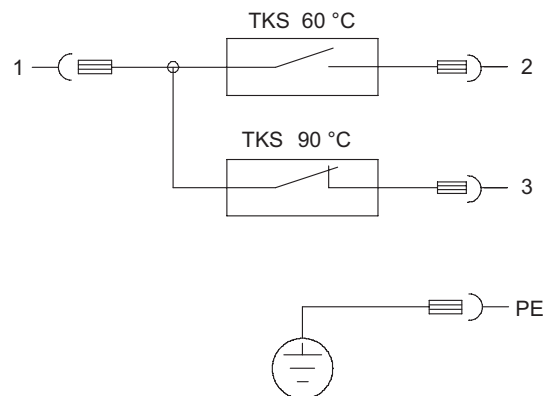
#### 6.3.1 Dimensions



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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 Diagnostic unit DUO10A (Oil aging)

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 temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit calculates the estimated remaining service life for the gear unit oil based on the measured oil temperature. This calculated value is continuously shown on the display of the evaluation unit; when needed, the display can be changed to 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/CLP-PAO | 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

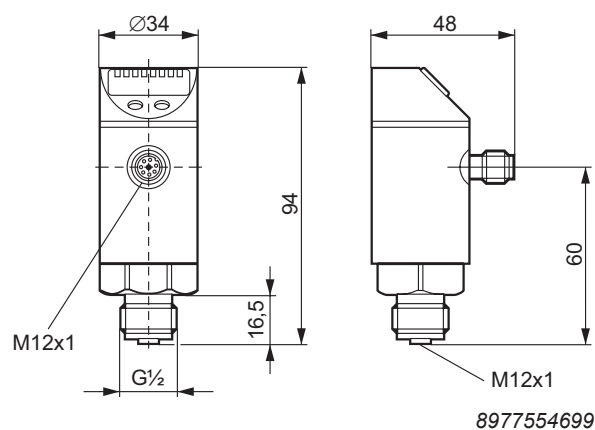


Further information about the evaluation unit and accessories is found in the "DUO10A Diagnostic Unit" manual, part no. 11473428.

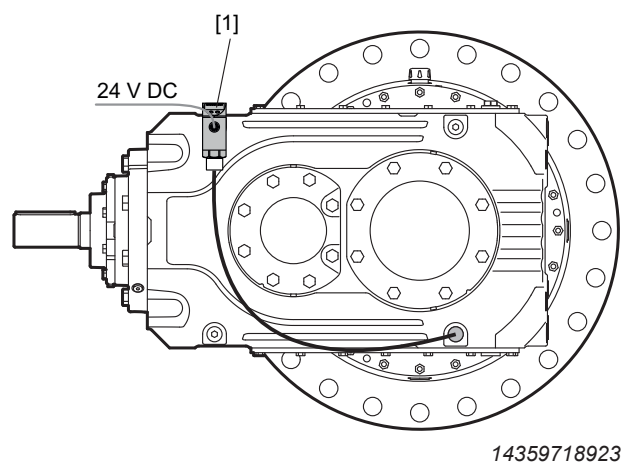
# 6 Condition monitoring

## Diagnostic unit DUO10A (Oil aging)

### 6.4.1 Dimensions



### 6.4.2 Mounting examples



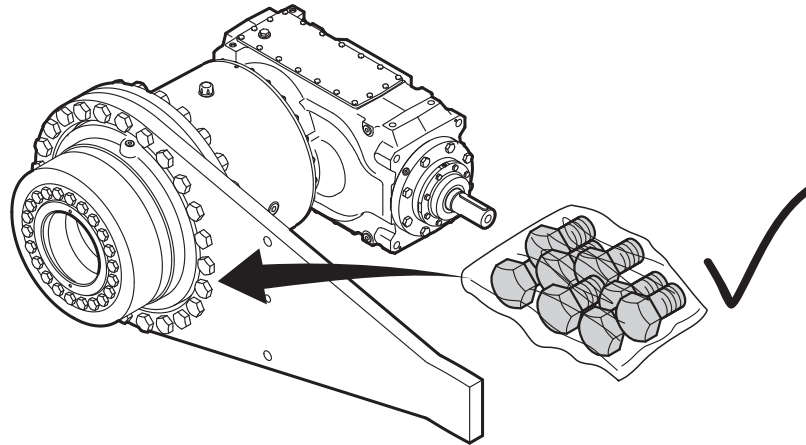
[1] DUO10A diagnostic unit

## 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**:

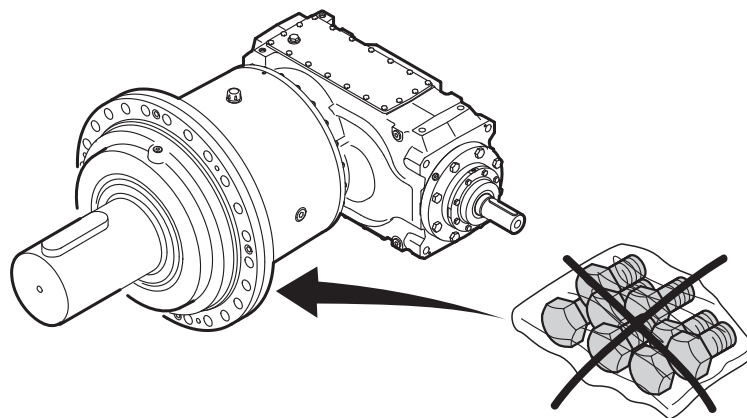
- Gear unit with torque arm



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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

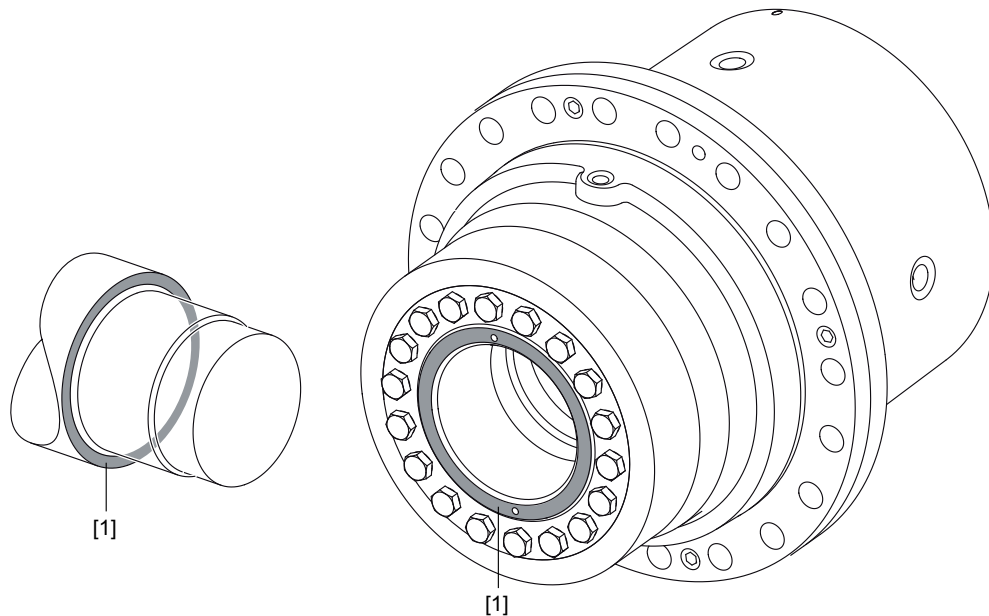


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**7.2 Output shaft as hollow shaft with shrink disk**

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.    | $n_1 = 1000 \text{ min}^{-1}$ |                         |                      |                      |                                                                                      |                                                                                       |                      | 100 kNm |      |
| Designation   | $i_{\text{tot}}$              | $n_2 [\text{min}^{-1}]$ | $P_{N1} [\text{kW}]$ |                      | 20 °C                                                                                | $P_{\text{TH}} [\text{kW}] \text{ M1}$                                                | 40 °C                |         |      |
|               |                               |                         |                      |                      |  |  |                      |         |      |
| P.042 X2KP110 | 159<br>178<br>202*<br>226*    | 6,3<br>5,6<br>5<br>4,4  | 69<br>61<br>54<br>48 | 55<br>55<br>53<br>52 | 76<br>76<br>72<br>71                                                                 | )<br>37<br>37<br>37                                                                   | 53<br>54<br>52<br>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  $i_N \geq 10$

## 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.

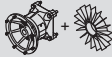
#### EN 50347

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.

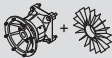
The new dimension designations given in EN 50347 / IEC 72-1 are used for the dimensions in question in the dimension tables of the dimensions sheets.

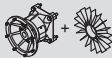


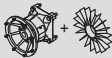
## 9 Selection tables

| P.042 X2K. $n_1 = 1000 \text{ min}^{-1}$ 100170 Nm |                  |                         |                    |                                        |                                                                                                                                                                          |       |                                                                                                                                                                           |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                                                                                                          |       |                                                                                                                                                                           |
|                                                    |                  |                         |                    | 20 °C                                  |  +  | 40 °C |  +  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                                                                                                        |

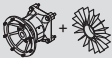
| P.052 X2K. $n_1 = 1000 \text{ min}^{-1}$ 124060 Nm |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                         |                    | 20 °C                                  |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                  |

| P.062 X2K. $n_1 = 1000 \text{ min}^{-1}$ 185660 Nm |                  |                                 |                     |                                         |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|---------------------------------|---------------------|-----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 \text{ [min}^{-1}\text{]}$ | $PN_1 \text{ [kW]}$ | $P_{\text{TH}} \text{ [kW]} \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                                 |                     | 20 °C                                   |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                  |
|                                                    |                  |                                 |                     |                                         |                                                                                    |       |                                                                                     |

| P.072 X2K. $n_1 = 1000 \text{ min}^{-1}$ 245660 Nm |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                         |                    | 20 °C                                  |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                  |
|                                                    |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |

| P.082 X2K. $n_1 = 1000 \text{ min}^{-1}$ 359400 Nm |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                         |                    | 20 °C                                  |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                 |

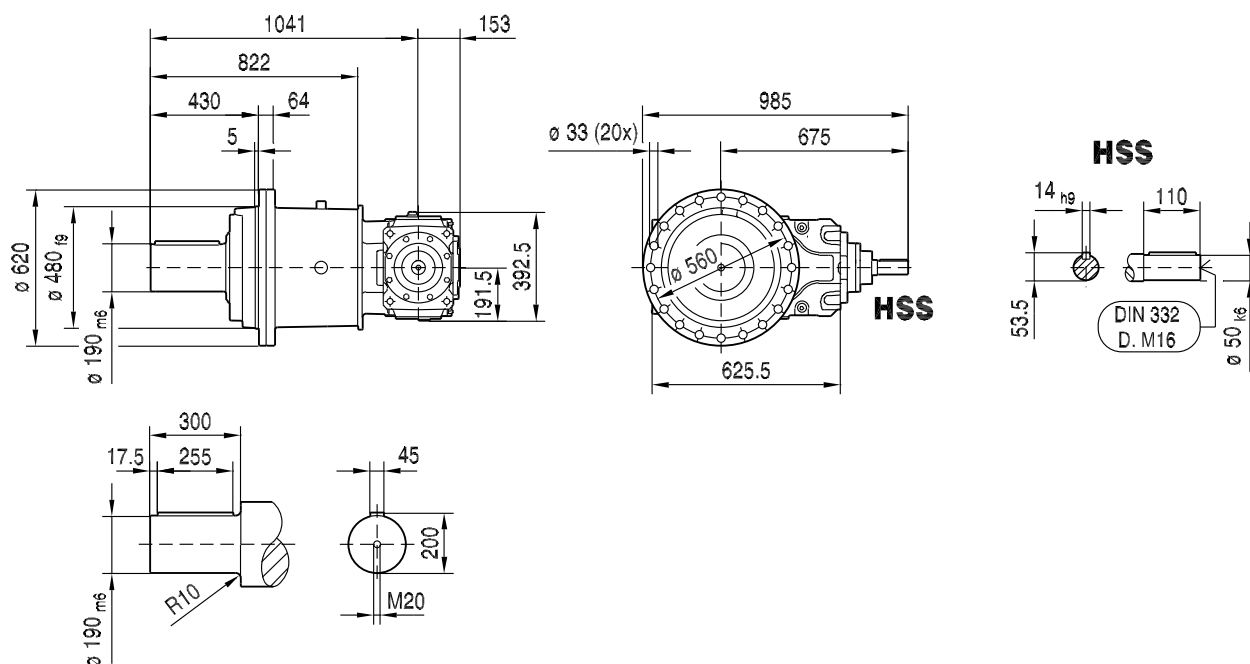
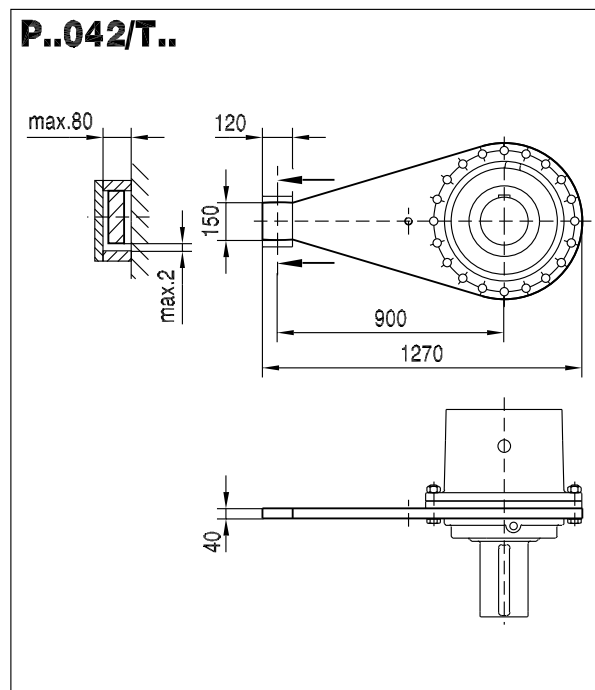
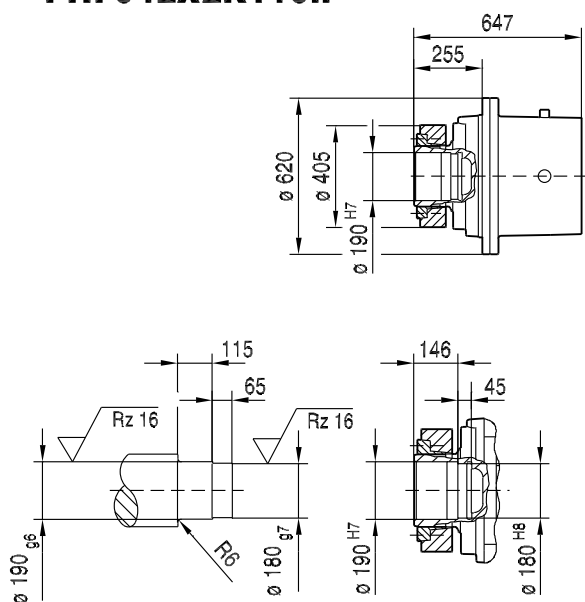
| P.092 X2K. $n_1 = 1000 \text{ min}^{-1}$ 423000 Nm |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                         |                    | 20 °C                                  |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                 |
|                                                    |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |

| P.102 X2K. $n_1 = 1000 \text{ min}^{-1}$ 500000 Nm |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |
|----------------------------------------------------|------------------|-------------------------|--------------------|----------------------------------------|------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|
| Designation                                        | $i_{\text{tot}}$ | $n_2 [\text{min}^{-1}]$ | $PN_1 [\text{kW}]$ | $P_{\text{TH}} [\text{kW}] \text{ M1}$ |                                                                                    |       |                                                                                     |
|                                                    |                  |                         |                    | 20 °C                                  |  | 40 °C |  |
| 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. $n_1 = 1200 \text{ min}^{-1}$ 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. $n_1 = 1500 \text{ min}^{-1}$ 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. $n_1 = 1800 \text{ min}^{-1}$ 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                                                                                 |
|                                                    |                  |                         |                    |                                        |                                                                                    |       |                                                                                     |

## 10 Dimension sheets

**PF042X2K110..**

45 004 00 14

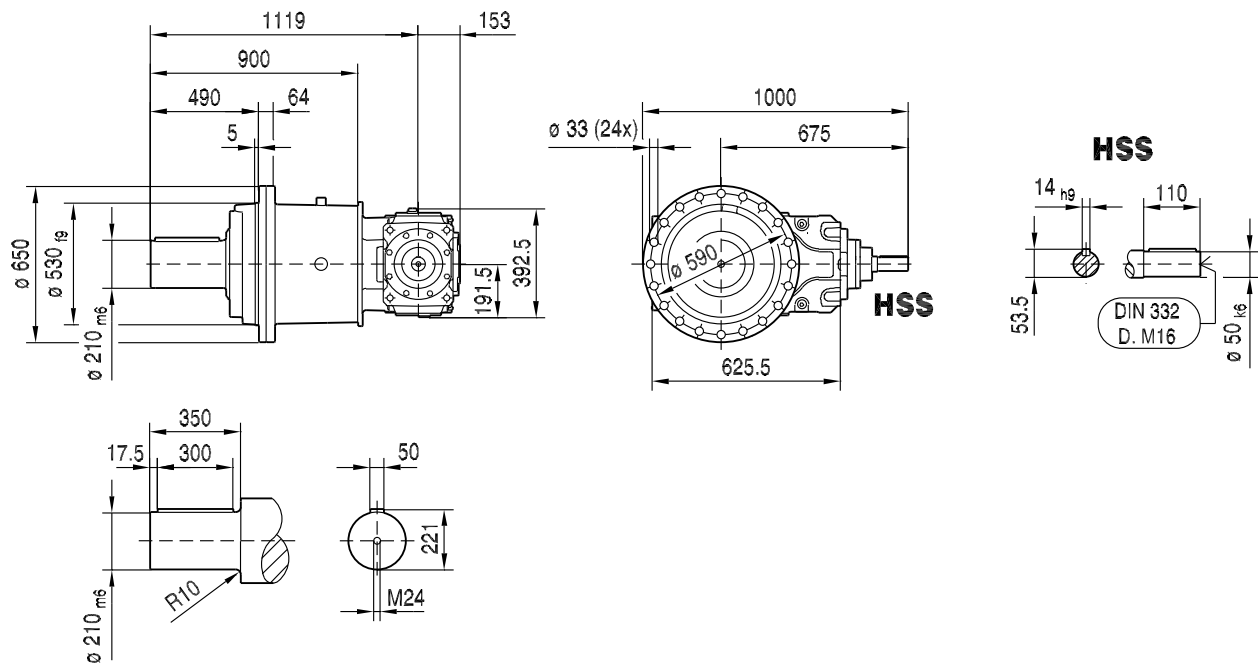
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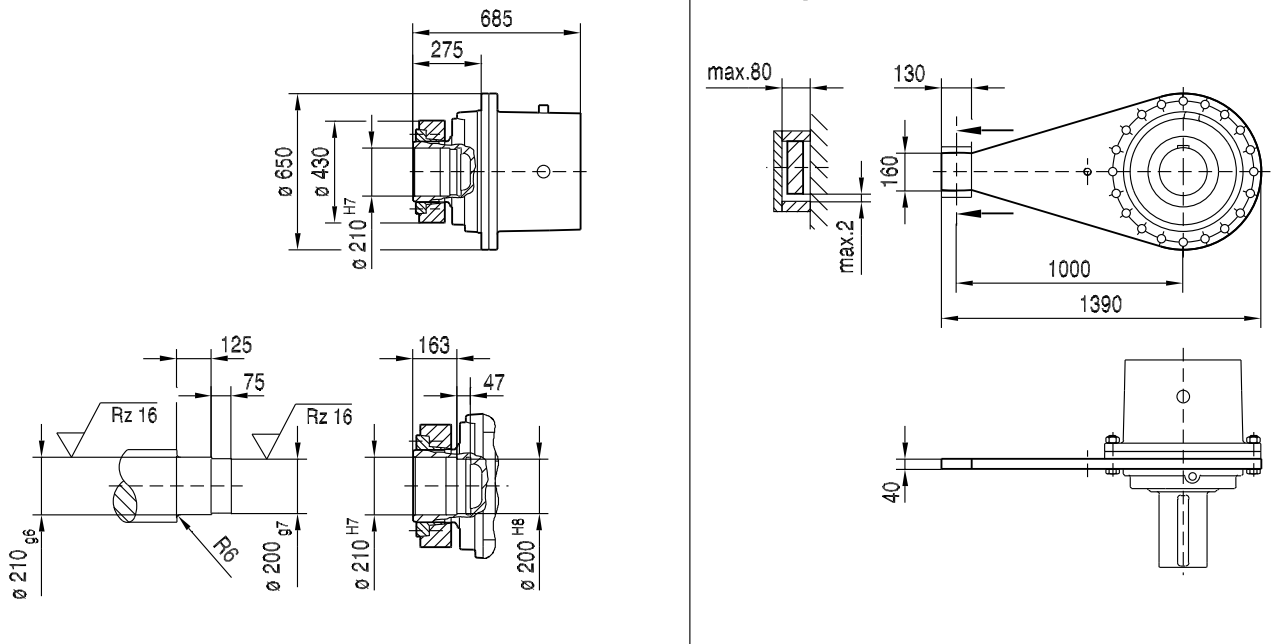
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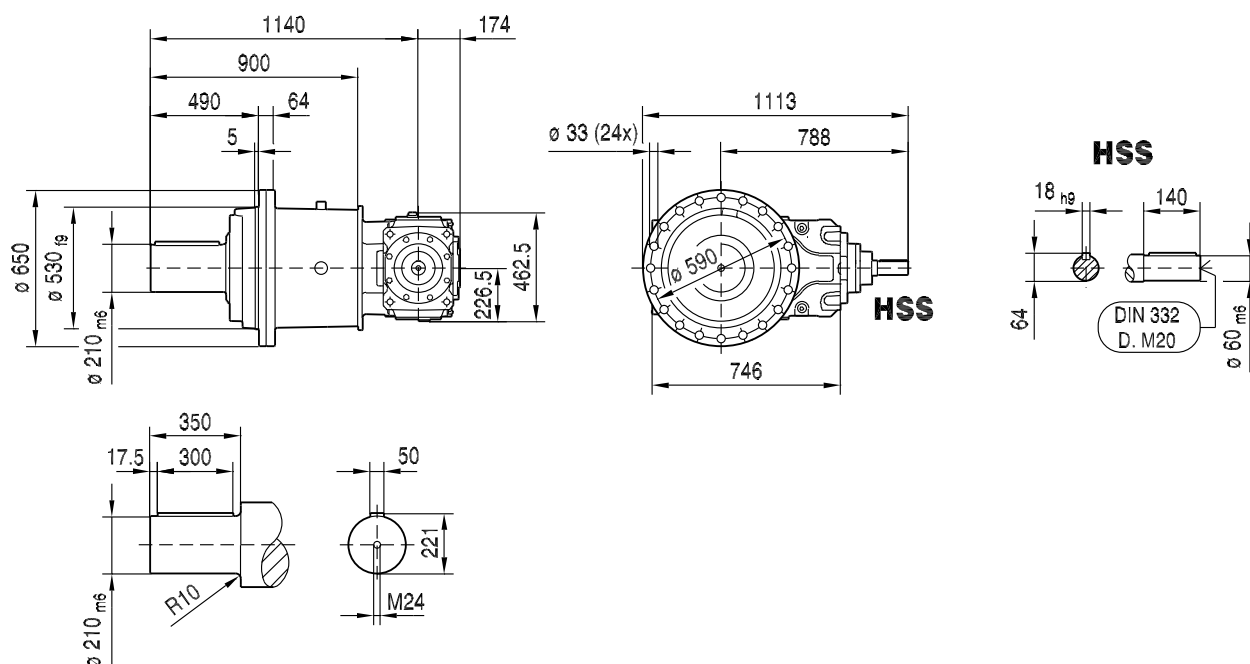
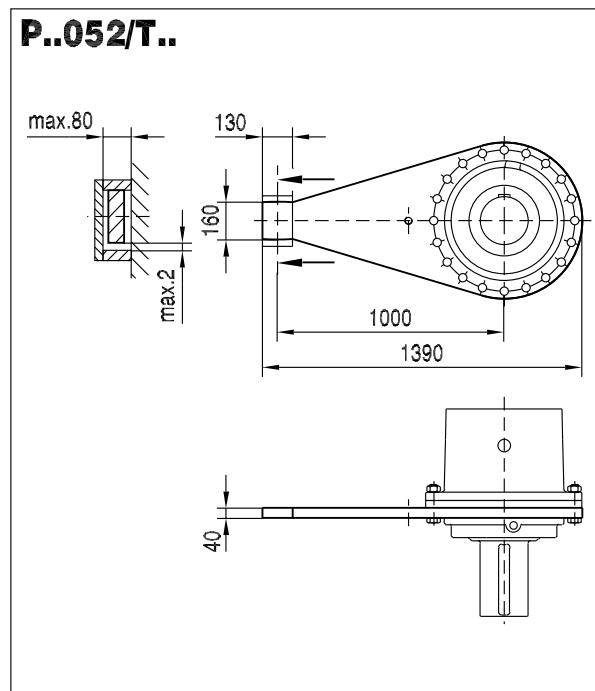
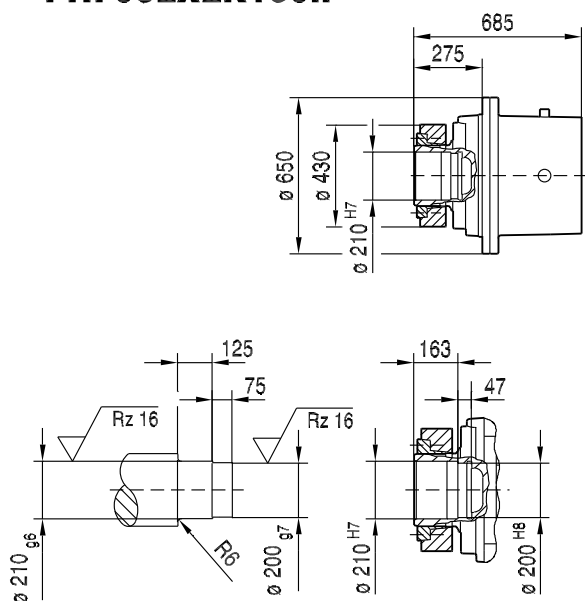
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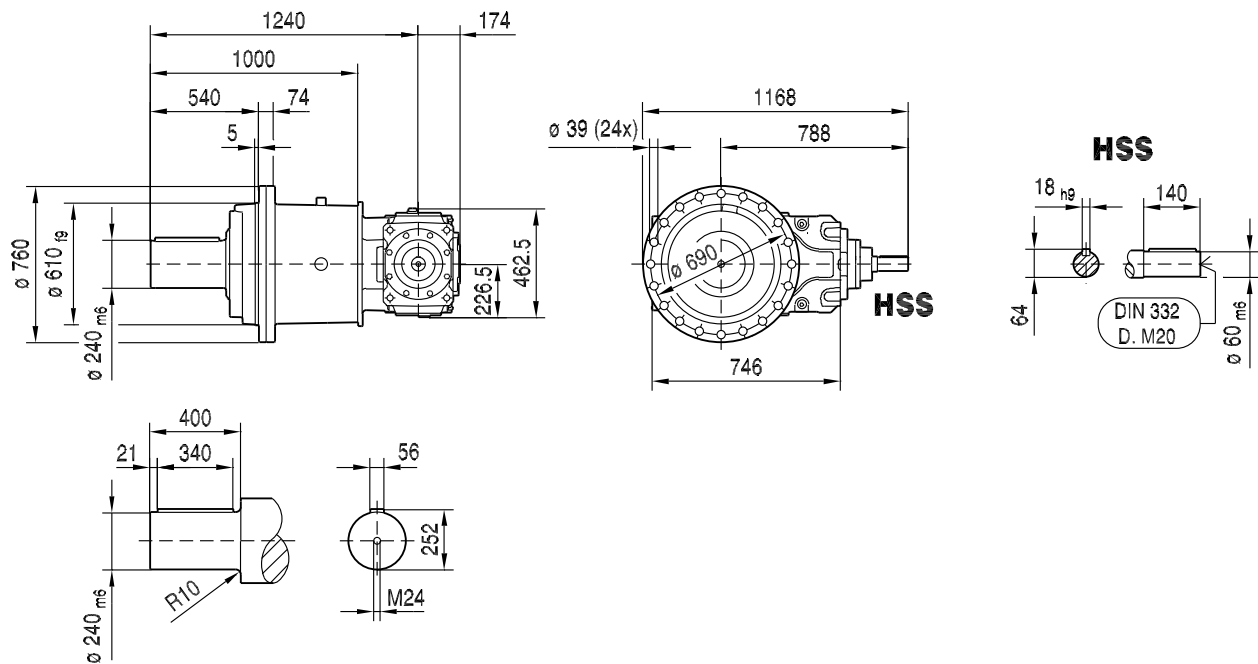
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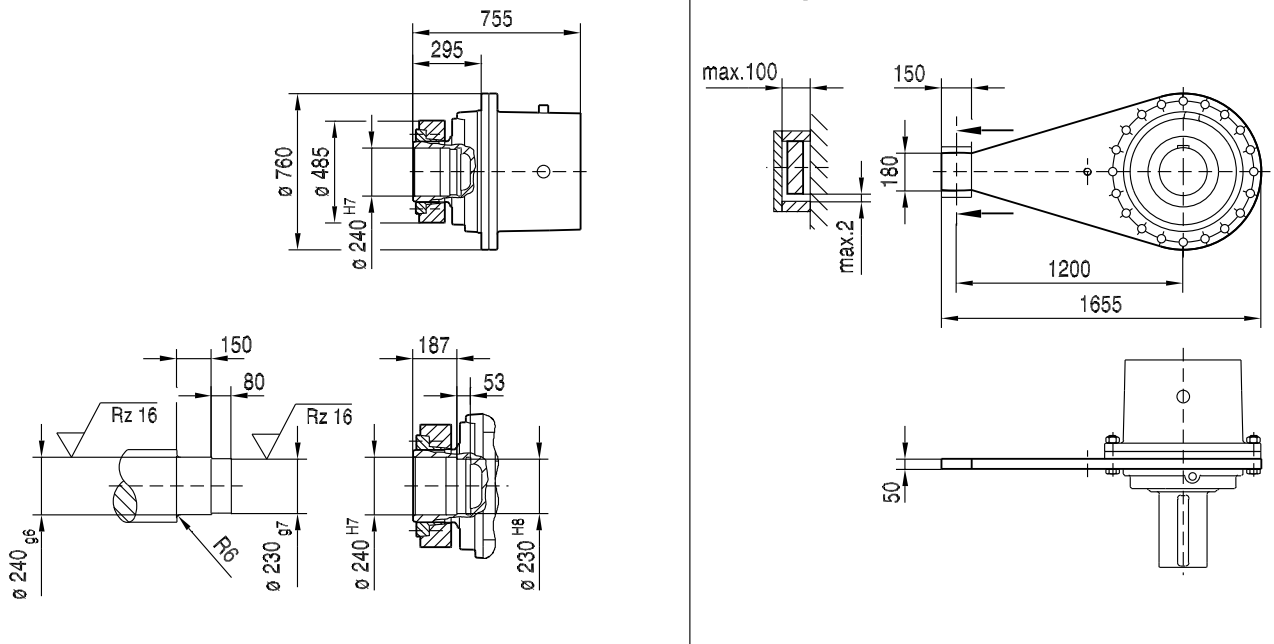
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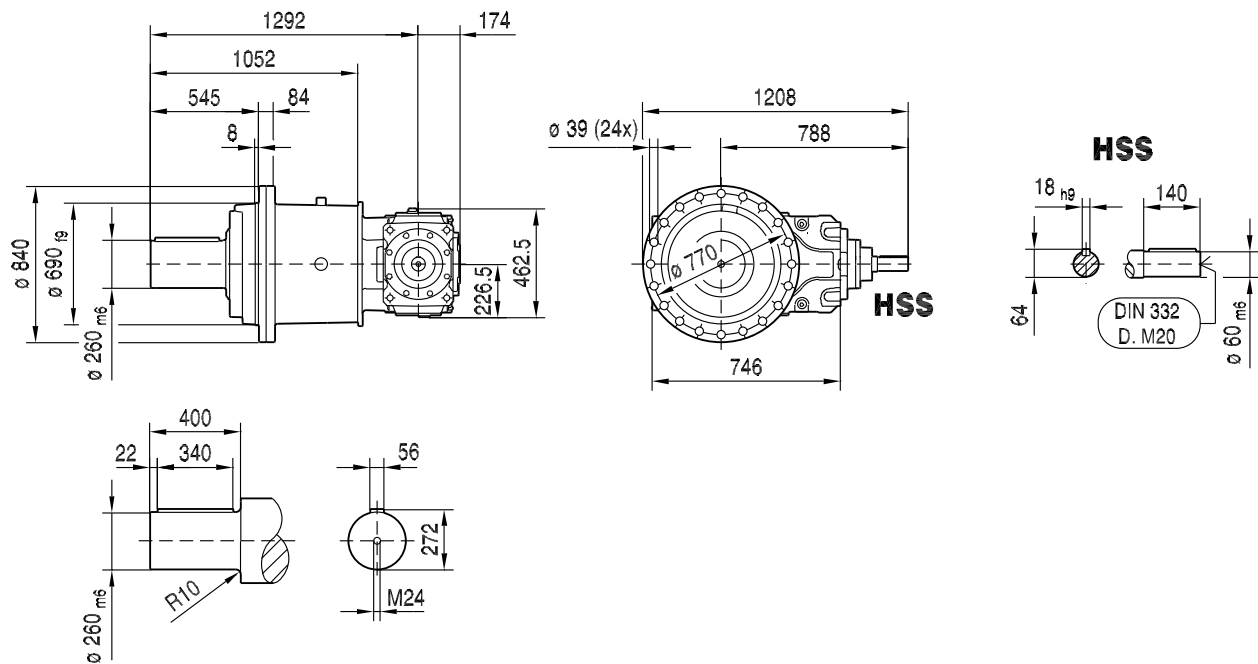
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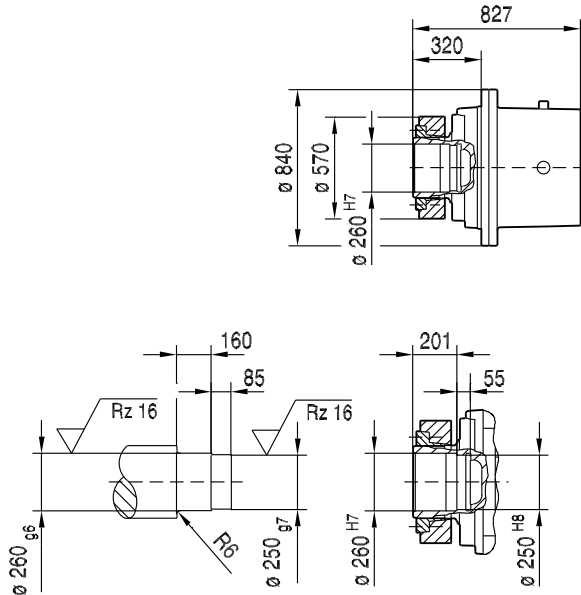
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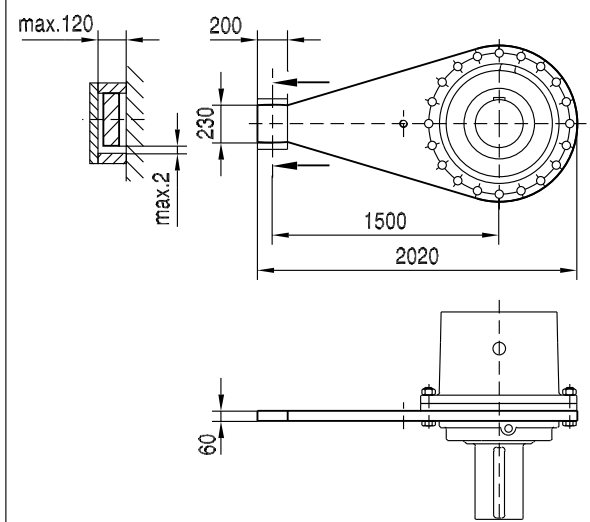
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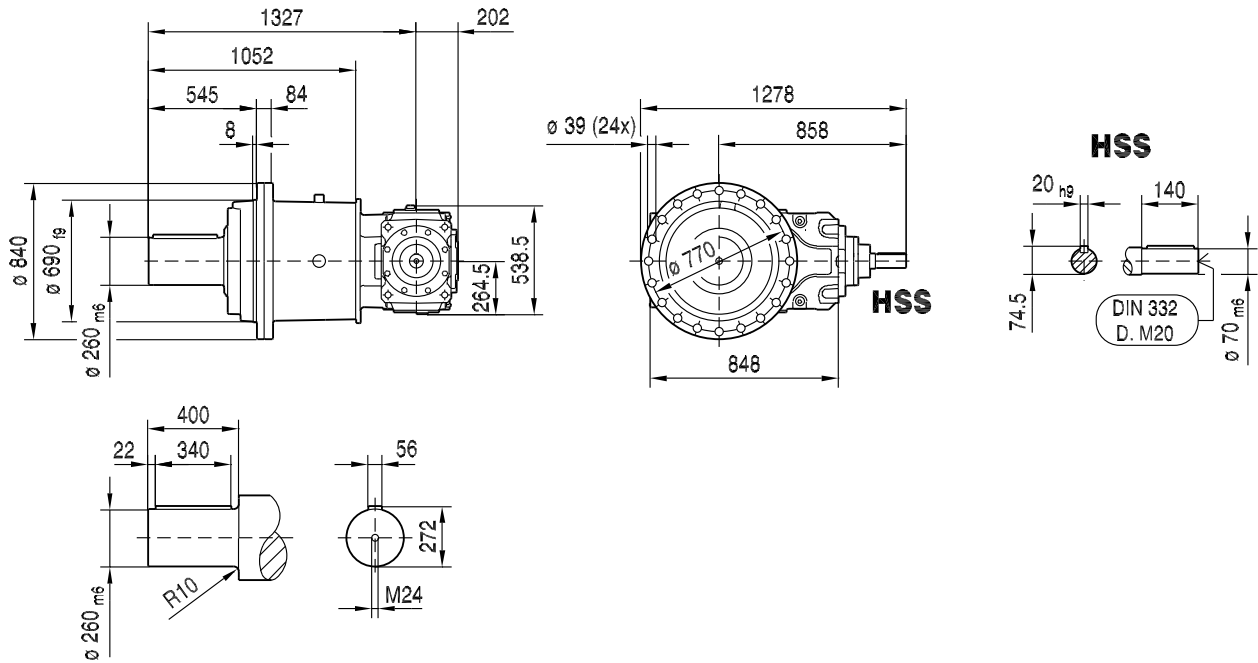
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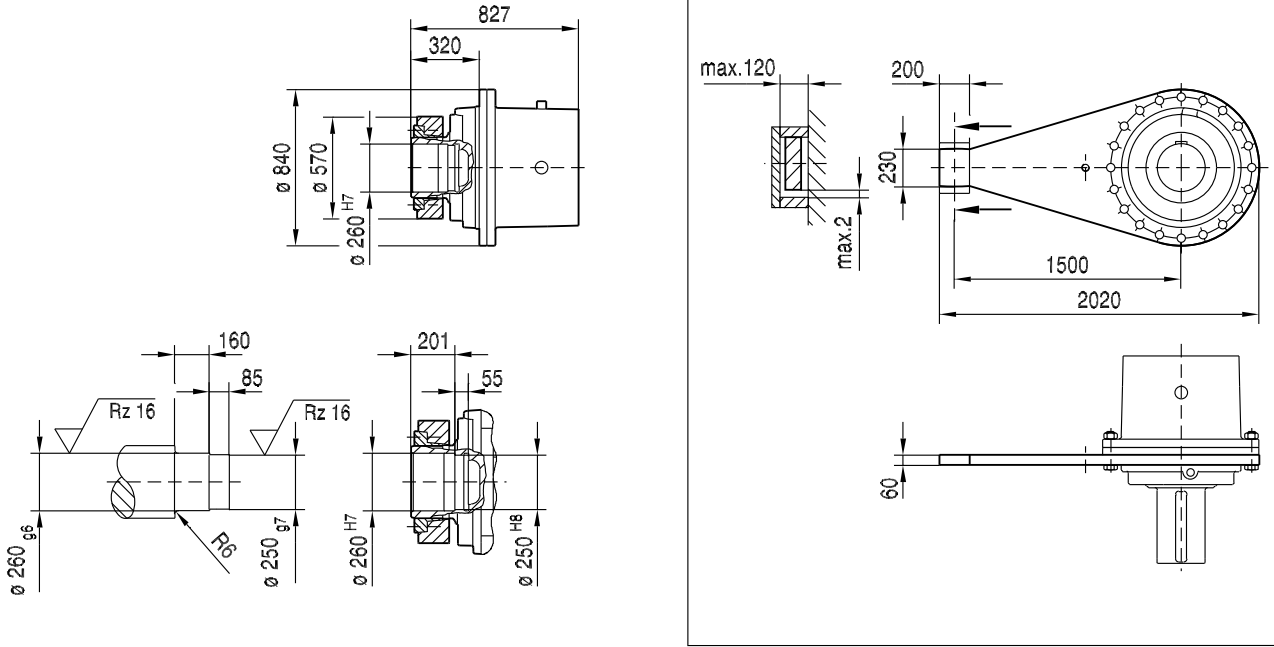
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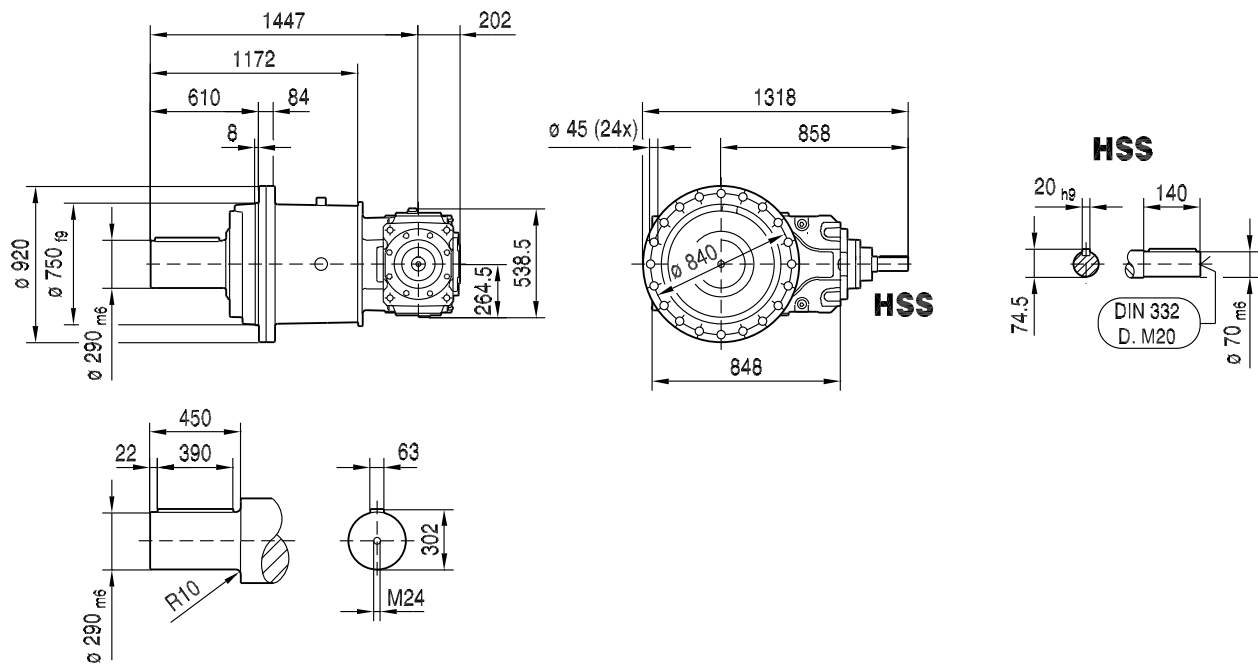
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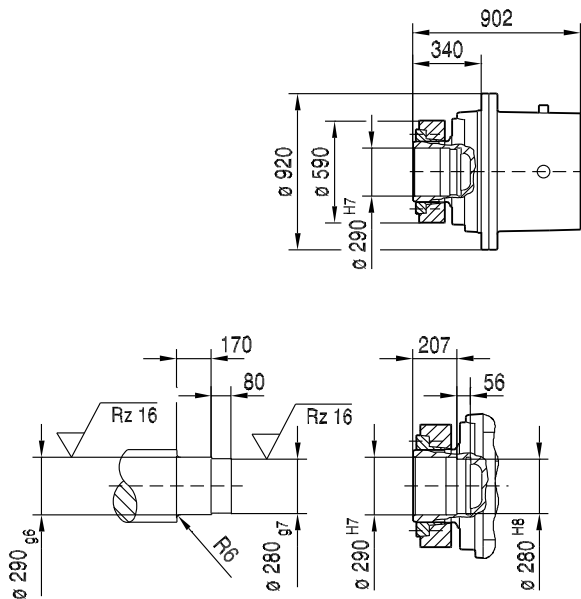
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| 1 985     | 2 040       |

**PF082X2K150..**

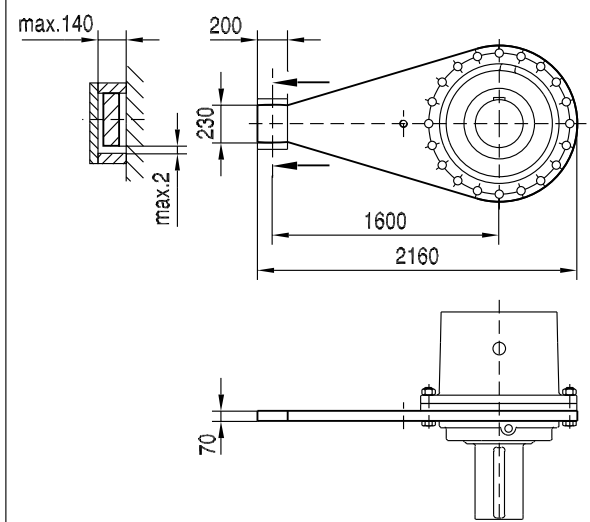
45 010 00 14



**PHF082X2K150..**



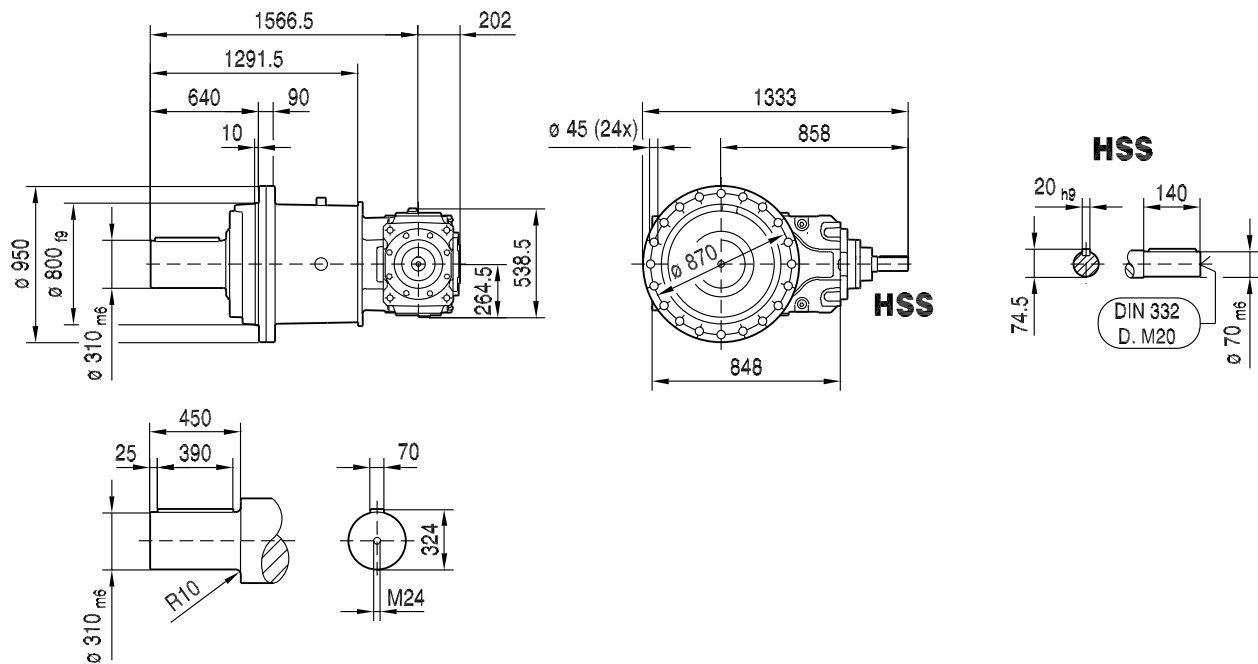
**P..082/T..**



| PF.. [Kg] | PHF... [Kg] |
|-----------|-------------|
| 2 510     | 2 505       |

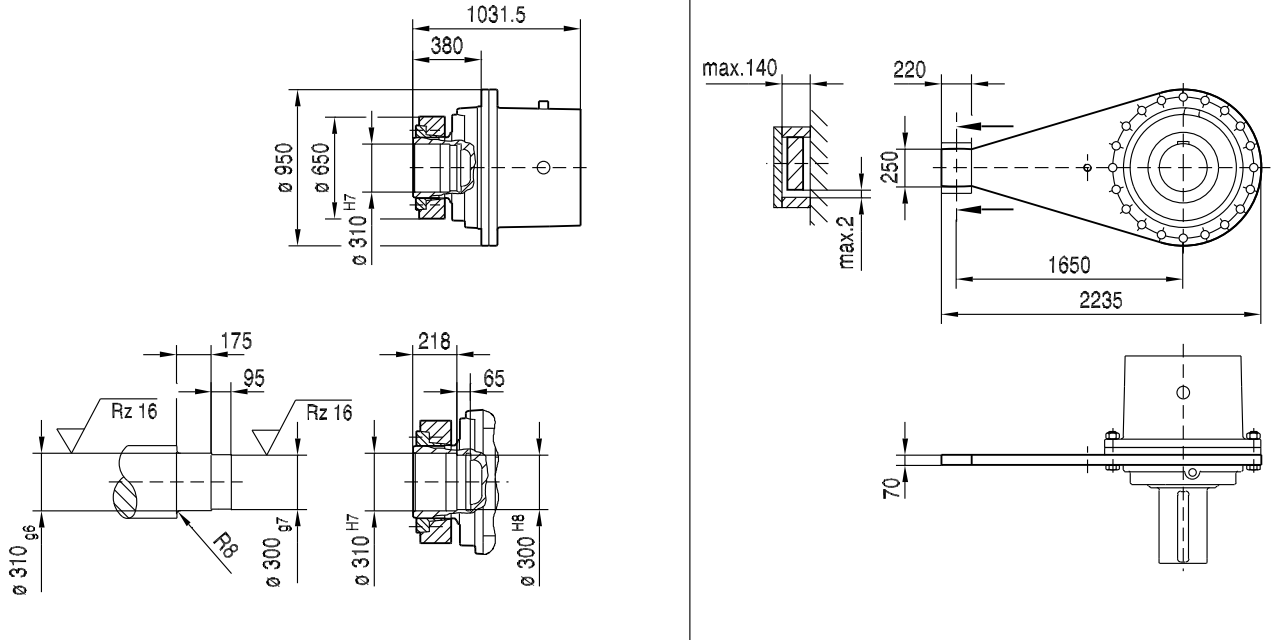
# PF092X2K150..

45 011 00 14



# PHF092X2K150..

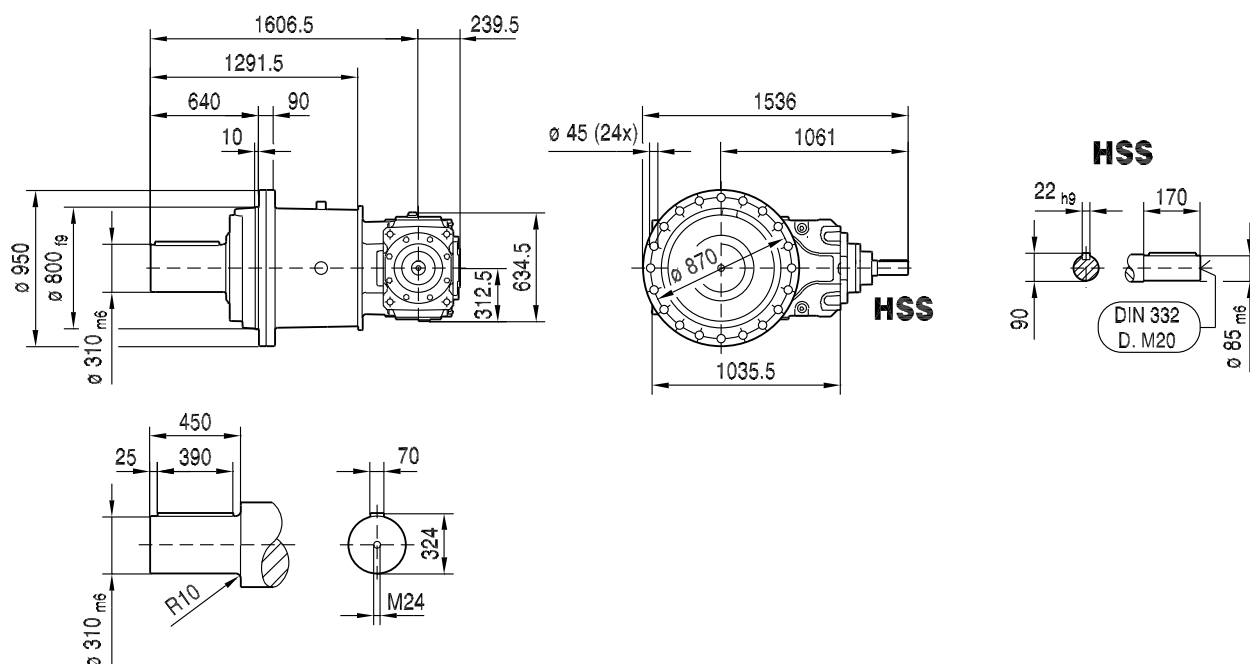
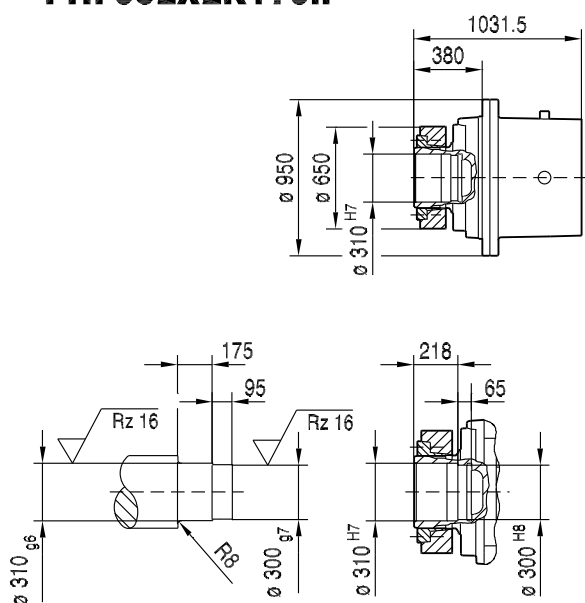
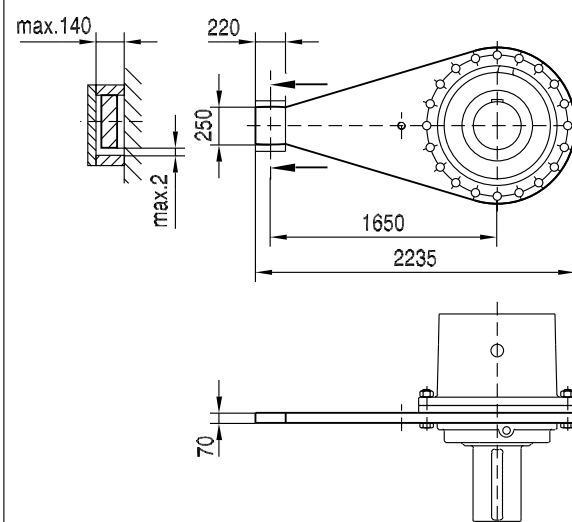
## P..092/T..



| PF.. [Kg] | PHF... [Kg] |
|-----------|-------------|
| 2 985     | 3 000       |

**PF092X2K170..**

45 012 00 14

**PHF092X2K170..****P..092/T..**

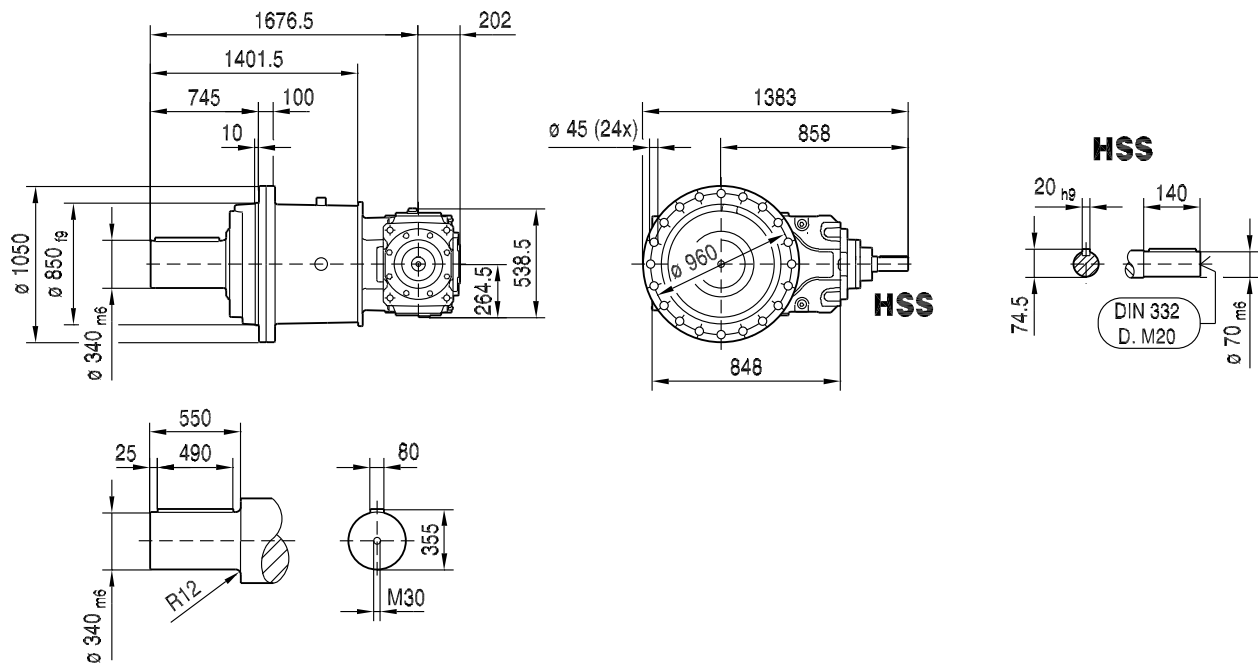
| PF.. [Kg] | PHF... [Kg] |
|-----------|-------------|
| 3 305     | 3 320       |

21915989/EN – 05/2015

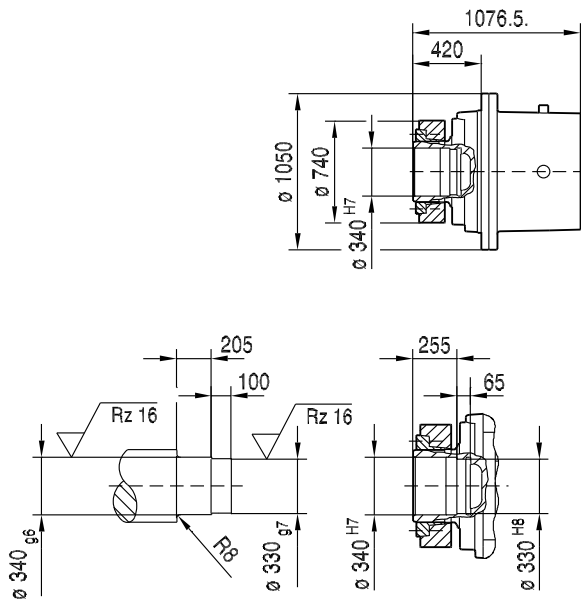


# PF102X2K150..

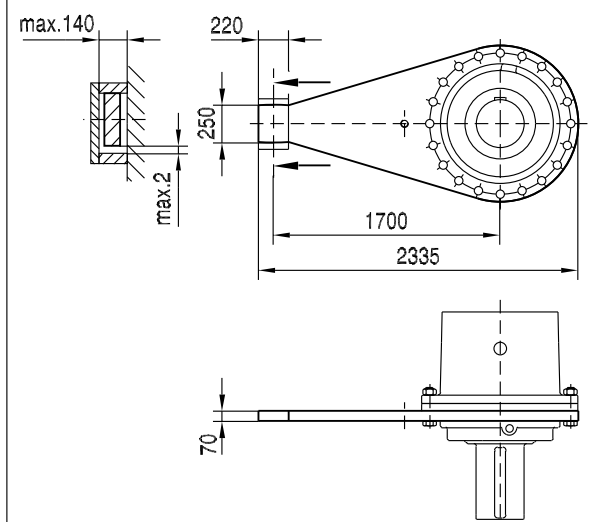
45 013 00 14



# PHF102X2K150..



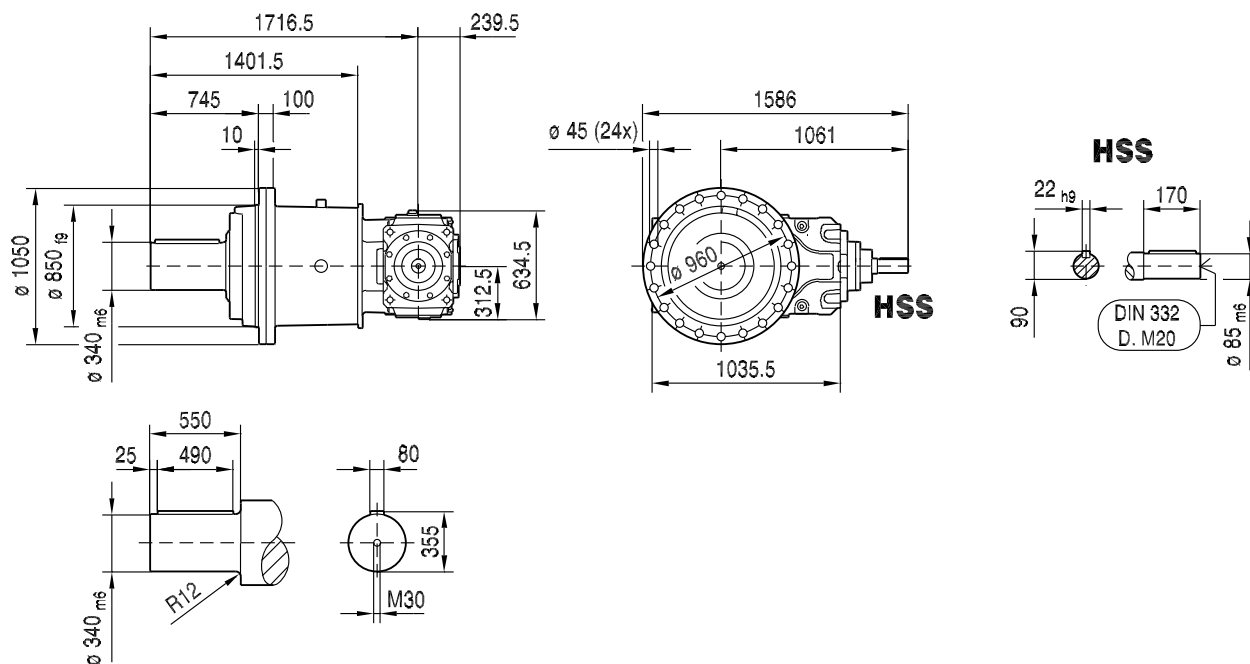
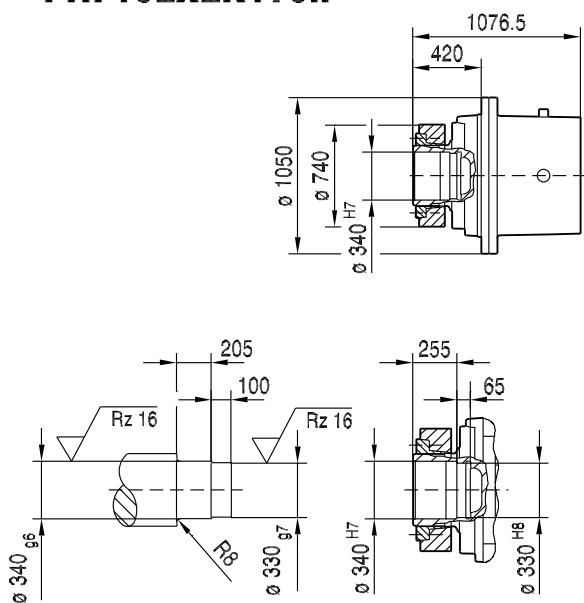
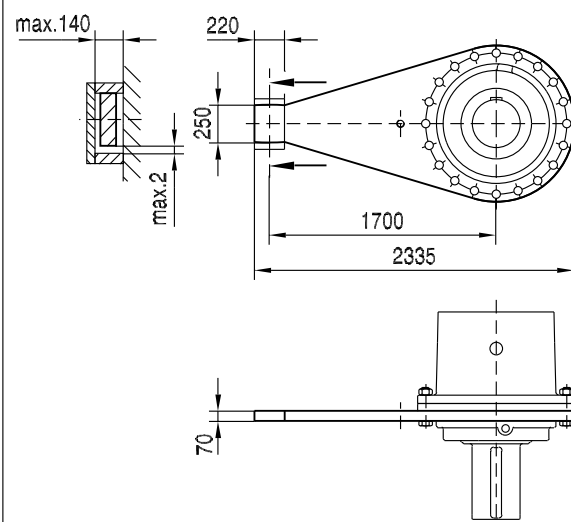
# P..102/T..



| PF.. [Kg] | PHF... [Kg] |
|-----------|-------------|
| 3 580     | 3 645       |

**PF102X2K170..**

45 014 00 14

**PHF102X2K170..****P..102/T..**

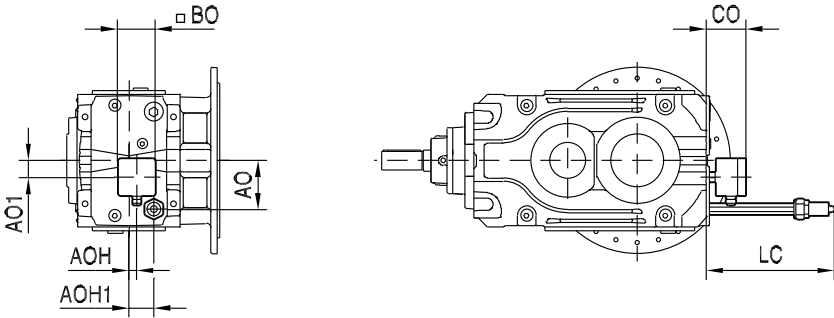
| PF.. [Kg] | PHF... [Kg] |
|-----------|-------------|
| 3 900     | 3 965       |

11 Options dimension sheets

11.1 Oil heater /OH [mm]

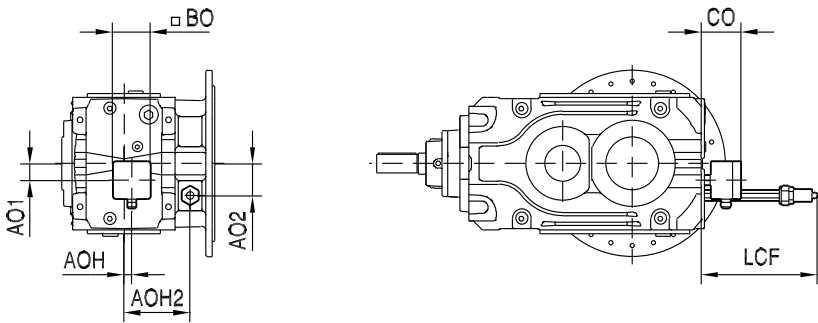
45 001 00 15

OH



11

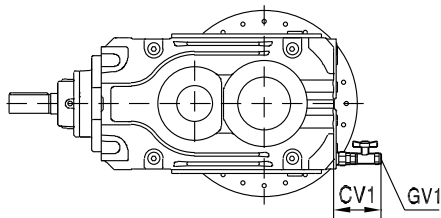
OH-F



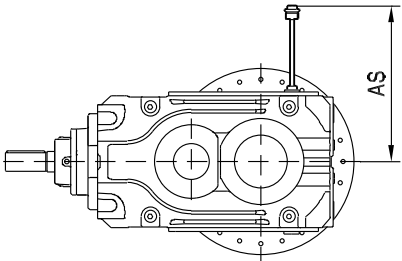
|        | AO  | AO1   | AO2 | AOH | AOH1 | AOH2  | BO  | CO  | LC  | LCF |
|--------|-----|-------|-----|-----|------|-------|-----|-----|-----|-----|
| X2K110 | 129 | 44.5  | 85  | 20  | 50   | 158.5 | 100 | 100 | 580 | 340 |
| X2K130 | 170 | 85    | 103 | 22  | 60   | 178.5 | 100 | 100 | 680 | 340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

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

ODV



OD

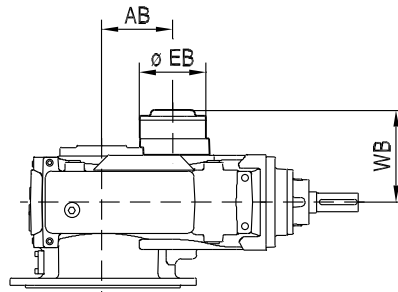


45 002 00 15

|        | 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 |

## 11.3 Backstop /BS [mm]

45 003 00 15

**BS**

11

|               | AB  | Ø EB | WB  |
|---------------|-----|------|-----|
| <b>X2K110</b> | 184 | 175  | 244 |
| <b>X2K130</b> | 226 | 190  | 268 |
| <b>X2K150</b> | 267 | 210  | 295 |
| <b>X2K170</b> | 325 | 245  | 343 |

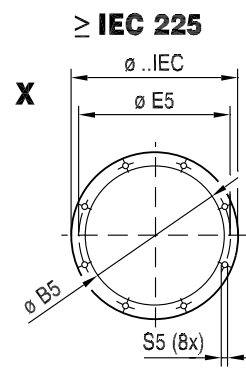
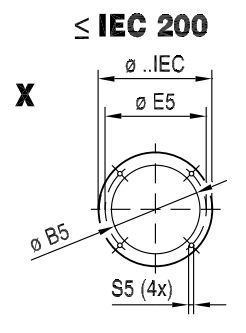
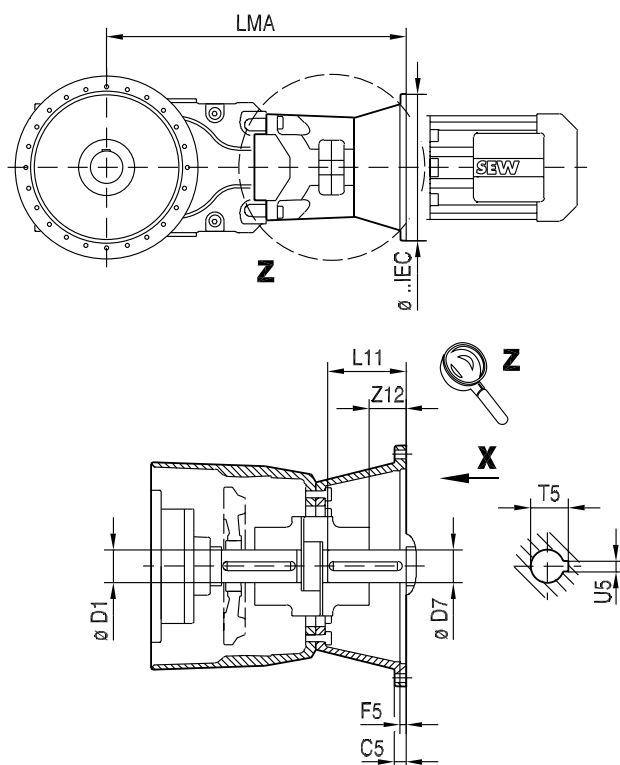
## 11.4 IEC motor adapter [mm]

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

## 11.4.1 IEC motor adapter X2K110 - 170

45 005 00 15

MA

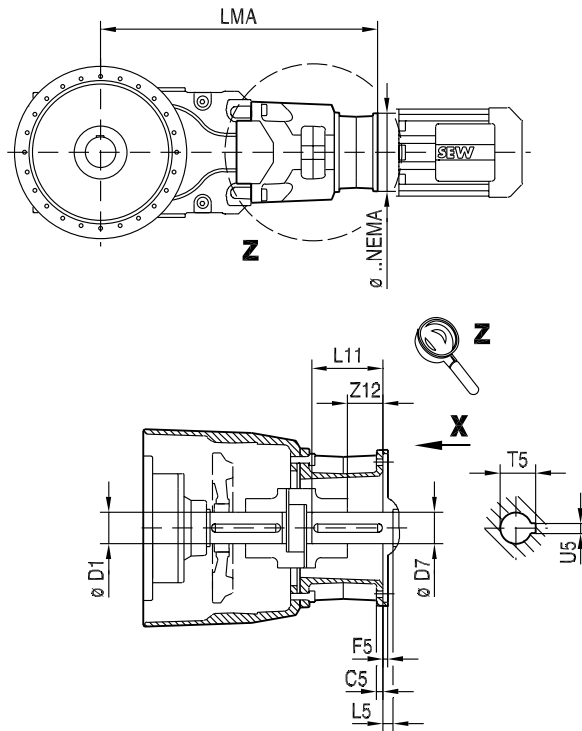


| X2K..             | IEC    | Ø IEC | Ø B5              | C5 | Ø D7              | Ø E5 | F5 | L11 | S5       | T5    | U5                | Ø D1 | LMA  | Z12  | Kg  |
|-------------------|--------|-------|-------------------|----|-------------------|------|----|-----|----------|-------|-------------------|------|------|------|-----|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

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

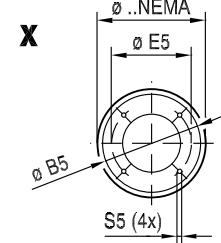
## 11.5 NEMA motor adapter [inch]

## NEMA-MA

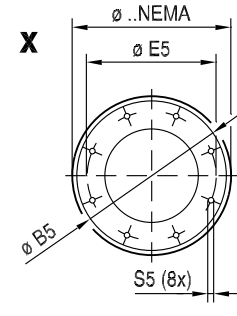


45 004 00 15

≤ NEMA 326



≥ NEMA 364



11

| X2K.. | NEMA        | Ø NEMA | Ø B5                 | C5   | Ø D7               | Ø E5 | F5  | L5  | L11   |
|-------|-------------|--------|----------------------|------|--------------------|------|-----|-----|-------|
| 110   | 324TC-326TC | 13     | 12 1/2 <sup>H7</sup> | 0.71 | 2.12 <sup>M7</sup> | 11   | 0.2 | 1/4 | 5     |
|       | 364TC-365TC | 13     | 12 1/2 <sup>H7</sup> | 0.71 | 2.38 <sup>M7</sup> | 11   | 0.2 | 1/4 | 5 5/8 |
|       | 404TC-405TC | 13     | 12 1/2 <sup>H7</sup> | 0.79 | 2.88 <sup>M7</sup> | 11   | 0.2 | 1/4 | 7     |
| 130   | 364TC-365TC | 13     | 12 1/2 <sup>H7</sup> | 0.71 | 2.38 <sup>M7</sup> | 11   | 0.2 | 1/4 | 5 5/8 |
|       | 404TC-405TC | 13     | 12 1/2 <sup>H7</sup> | 0.79 | 2.88 <sup>M7</sup> | 11   | 0.2 | 1/4 | 7     |
|       | 444TC-445TC | 16.6   | 16 <sup>H7</sup>     | 0.79 | 3.38 <sup>M7</sup> | 14   | 0.2 | 1/4 | 8 1/4 |
| 150   | 404TC-405TC | 13     | 12 1/2 <sup>H7</sup> | 0.79 | 2.88 <sup>M7</sup> | 11   | 0.2 | 1/4 | 8 1/4 |
|       | 444TC-445TC | 16.6   | 16 <sup>H7</sup>     | 0.79 | 3.38 <sup>M7</sup> | 14   | 0.2 | 1/4 | 8 1/4 |
| 170   | 444TC-445TC | 16.6   | 16 <sup>H7</sup>     | 0.79 | 3.38 <sup>M7</sup> | 14   | 0.2 | 1/4 | 8 1/4 |
|       | 447TC-449TC | 16.6   | 16 <sup>H7</sup>     | 0.79 | 3.38 <sup>M7</sup> | 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 <sup>+0.00197</sup> | 1.97 | 32.01 | 2.36 | 45  |
|       | 364TC-365TC | 0.69 (8x) | 2,661 | 5/8 <sup>+0.00197</sup> | 1.97 | 32.87 | 1.37 | 60  |
|       | 404TC-405TC | 0.69 (8x) | 3,213 | 3/4 <sup>+0.00197</sup> | 1.97 | 38.19 | 3.65 | 70  |
| 130   | 364TC-365TC | 0.69 (8x) | 2,661 | 5/8 <sup>+0.00197</sup> | 2.36 | 37.32 | 2.56 | 60  |
|       | 404TC-405TC | 0.69 (8x) | 3,213 | 3/4 <sup>+0.00197</sup> | 2.36 | 39.61 | 3.65 | 70  |
|       | 444TC-445TC | 0.69 (8x) | 3,772 | 7/8 <sup>+0.00197</sup> | 2.36 | 43.54 | 4.16 | 90  |
| 150   | 404TC-405TC | 0.69 (8x) | 3,213 | 3/4 <sup>+0.00197</sup> | 2.76 | 42.36 | 3.77 | 90  |
|       | 444TC-445TC | 0.69 (8x) | 3,772 | 7/8 <sup>+0.00197</sup> | 2.76 | 43.54 | 4.16 | 110 |
| 170   | 444TC-445TC | 0.69 (8x) | 3,772 | 7/8 <sup>+0.00197</sup> | 3.35 | 51.57 | 4.32 | 145 |
|       | 447TC-449TC | 0.69 (8x) | 3,772 | 7/8 <sup>+0.00197</sup> | 3.35 | 51.57 | 3.68 | 155 |

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## 12 Address Directory

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

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

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

| France                      |                                    |                                                                                                                                     |                                                                                                                |
|-----------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|                             | <b>Lothringen/North-ern Alsace</b> | SEW-USOCOME<br>1 rue de la forêt<br>54250 Champigneulle, France                                                                     | Tel. +33 3 83 96 28 04<br>Fax +33 3 83 96 28 07                                                                |
|                             | <b>Midi-Pyrénées/Roussillon</b>    | SEW-USOCOME<br>179 route de Grazac<br>31190 Caujac, France                                                                          | Tel. +33 5 61 08 15 85<br>Fax +33 5 61 08 16 44                                                                |
|                             | <b>Nord-Pas-de-Cal-ais</b>         | SEW-USOCOME<br>209, route d'Hesdigneul<br>62360 Hesdin l'Abbé, France                                                               | Tel. +33 3 21 10 86 86<br>Fax +33 3 21 10 86 87                                                                |
|                             | <b>Paris/Île-de-France West</b>    | SEW-USOCOME<br>42 avenue Jean Jaurès<br>78580 Maule, France                                                                         | Tel. +33 1 30 90 89 86<br>Fax +33 1 30 90 93 15                                                                |
|                             | <b>Pays de la Loire</b>            | SEW-USOCOME<br>Parc d'activités de la forêt<br>4 rue des Fontenelles<br>44140 Le Bignon, France                                     | Tel. +33 2 40 78 42 03<br>Fax +33 2 40 78 42 20                                                                |
|                             | <b>Provence-Alpes-Côte d'Azur</b>  | SEW-USOCOME<br>Le Clos Montolivet<br>9 impasse Bounin – Bât. A<br>13012 Marseille, France                                           | Tel. +33 4 91 18 00 11<br>Fax +33 4 91 18 00 12                                                                |
|                             | <b>Rhône-Alpes East</b>            | SEW-USOCOME<br>Montée de la Garenne<br>26750 Génissieux, France                                                                     | Tel. +33 4 75 05 65 95<br>Fax +33 4 75 05 65 96                                                                |
|                             | <b>Rhône-Alpes North</b>           | SEW-USOCOME<br>Parc d'affaires Roosevelt<br>Rue Jacques Tati<br>69120 Vaulx en Velin, France                                        | Tel. +33 4 72 15 37 03<br>Fax +33 4 72 15 37 15                                                                |
|                             | <b>Rhône-Alpes West</b>            | SEW-USOCOME<br>Parc d'affaires Roosevelt<br>Rue Jacques Tati<br>69120 Vaulx en Velin, France                                        | Tel. +33 4 72 15 37 04<br>Fax +33 4 72 15 37 15                                                                |
| Algeria                     |                                    |                                                                                                                                     |                                                                                                                |
| <b>Sales</b>                | <b>Algiers</b>                     | REDUCOM Sarl<br>16, rue des Frères Zaghroune<br>Bellevue<br>16200 El Harrach Alger                                                  | Tel. +213 21 8214-91<br>Fax +213 21 8222-84<br>info@reducom-dz.com<br>http://www.reducom-dz.com                |
| Argentina                   |                                    |                                                                                                                                     |                                                                                                                |
| <b>Assembly plant Sales</b> | <b>Buenos Aires</b>                | SEW EURODRIVE ARGENTINA S.A.<br>Ruta Panamericana Km 37.5, Lote 35<br>(B1619IEA) Centro Industrial Garín<br>Prov. de Buenos Aires   | Tel. +54 3327 4572-84<br>Fax +54 3327 4572-21<br>sewar@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar |
|                             | <b>Córdoba</b>                     | SEW EURODRIVE ARGENTINA S.A.<br>Ruta Nacional 19, Manzana 97, Lote 5<br>(X5125) Malvinas Argentinas<br>Prov. de Córdoba             | Tel. +54 351-490-0010<br>sewcor@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                        |
|                             | <b>Santa Fe</b>                    | SEW EURODRIVE ARGENTINA S.A.<br>Ruta Prov. 21 Km 7, Lote 41<br>Parque Industrial Alvear<br>(2126) Gral. Alvear<br>Prov. de Santa Fe | Tel. +54 341-317-7277<br>sewsfe@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                        |
| <b>Service</b>              | <b>Mendoza</b>                     | SEW EURODRIVE ARGENTINA S.A.                                                                                                        | Tel. +54 261-430-0060<br>sewmen@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                        |
| <b>Technical offices</b>    | <b>Tucumán</b>                     | SEW EURODRIVE ARGENTINA S.A.<br>Balcarce 609<br>(T4000IAM) S.M. de Tucumán<br>Prov. de Tucumán                                      | Tel. +54 381-400-4569<br>sewtuc@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                        |
|                             | <b>Bahía Blanca</b>                | SEW EURODRIVE ARGENTINA S.A.<br>O'Higgins 95, 1er Piso A<br>(B8000IVA) Bahía Blanca<br>Prov. de Buenos Aires                        | Tel. +54 291-451-7345<br>sewbb@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                         |
|                             | <b>Comahue</b>                     | SEW EURODRIVE ARGENTINA S.A.<br>Puerto Rico 1885<br>(R8324IOE) Cipolletti<br>Prov. de Río Negro                                     | Tel. +54 299-478-1290<br>sewcomahue@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                    |

| Argentina                            |                          |                                                                                                                                                                            |                                                                                                                 |
|--------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Mining                               | Mendoza                  | SEW EURODRIVE ARGENTINA S.A.                                                                                                                                               | Tel. +54 261-430-0060<br>mineria@sew-eurodrive.com.ar<br>http://www.sew-eurodrive.com.ar                        |
| Australia                            |                          |                                                                                                                                                                            |                                                                                                                 |
| Assembly plants<br>Sales<br>Service  | Melbourne                | SEW-EURODRIVE PTY. LTD.<br>27 Beverage Drive<br>Tullamarine, Victoria 3043, Australia                                                                                      | Tel. +61 3 9933-1000<br>Fax +61 3 9933-1003<br>http://www.sew-eurodrive.com.au<br>enquires@sew-eurodrive.com.au |
|                                      | Sydney                   | SEW-EURODRIVE PTY. LTD.<br>9, Sleigh Place, Wetherill Park<br>New South Wales, 2164, Australia                                                                             | Tel. +61 2 9725-9900<br>Fax +61 2 9725-9905<br>enquires@sew-eurodrive.com.au                                    |
| Sales<br>Service                     | Adelaide                 | SEW-EURODRIVE PTY. LTD.<br>9C Park Way<br>Mawson Lakes, SA 5095, Australia                                                                                                 | Tel. +61 8 8161 4000<br>Fax +61 8 8161 4002<br>enquires@sew-eurodrive.com.au                                    |
|                                      | Brisbane                 | SEW-EURODRIVE PTY. LTD.<br>1 /34 Collinsvale St<br>Rocklea, Queensland, 4106, Australia                                                                                    | Tel. +61 7 3276 5100<br>Fax +61 7 3276 5102<br>enquires@sew-eurodrive.com.au                                    |
|                                      | Perth                    | SEW-EURODRIVE PTY. LTD.<br>10 Colin Jamieson Drive<br>Welshpool, WA 6106, Australia                                                                                        | Tel. +61 8 9251-4900<br>Fax +61 8 9251-4903<br>enquires@sew-eurodrive.com.au                                    |
| Sales                                | Townsville               | SEW-EURODRIVE PTY. LTD.<br>12 Leyland Street<br>Garbutt, QLD 4814, Australia                                                                                               | Tel. +61 7 4779 4333<br>Fax +61 7 4779 5333<br>enquires@sew-eurodrive.com.au                                    |
| Austria                              |                          |                                                                                                                                                                            |                                                                                                                 |
| Assembly plant<br>Sales<br>Service   | Vienna                   | SEW-EURODRIVE Ges.m.b.H.<br>Richard-Strauss-Strasse 24<br>1230 Wien, Austria                                                                                               | Tel. +43 1 617 55 00-0<br>Fax +43 1 617 55 00-30<br>http://www.sew-eurodrive.at<br>sew@sew-eurodrive.at         |
| Technical offices                    | Linz                     | SEW-EURODRIVE Ges.m.b.H.<br>Reuchlinstr. 6/3<br>4020 Linz, Austria                                                                                                         | Tel. +43 732 655 109-0<br>Fax +43 732 655 109-20<br>tb-linz@sew-eurodrive.at                                    |
|                                      | Graz                     | SEW-EURODRIVE Ges.m.b.H.<br>Grabenstraße 231<br>8045 Graz, Austria                                                                                                         | Tel. +43 316 685 756-0<br>Fax +43 316 685 755<br>tb-graz@sew-eurodrive.at                                       |
|                                      | Dornbirn                 | SEW-EURODRIVE Ges.m.b.H.<br>Lustenauerstraße 27/1<br>6850 Dornbirn, Austria                                                                                                | Tel. +43 5572 3725 99-0<br>Fax +43 5572 3725 99-20<br>tb-dornbirn@sew-eurodrive.at                              |
| Bangladesh                           |                          |                                                                                                                                                                            |                                                                                                                 |
| Sales                                | Bangladesh               | SEW-EURODRIVE INDIA PRIVATE LIMITED<br>345 DIT Road<br>East Rampura<br>Dhaka-1219, Bangladesh                                                                              | Mobile +88 01729 097309<br>salesdhaka@seweurodrive-bangladesh.com                                               |
| Belarus                              |                          |                                                                                                                                                                            |                                                                                                                 |
| Sales                                | Minsk                    | SEW-EURODRIVE BY<br>RybalkoStr. 26<br>220033 Minsk, Belarus                                                                                                                | Tel. +375 17 298 47 56 / 298 47 58<br>Fax +375 17 298 47 54<br>http://www.sew.by<br>sales@sew.by                |
| Belgium                              |                          |                                                                                                                                                                            |                                                                                                                 |
| Assembly plant<br>Sales<br>Service   | Brussels                 | SEW-EURODRIVE n.v./s.a.<br>Researchpark Haasrode 1060<br>Evenementenlaan 7<br>BE-3001 Leuven                                                                               | Tel. +32 16 386-311<br>Fax +32 16 386-336<br>http://www.sew-eurodrive.be<br>info@sew-eurodrive.be               |
| Service Competence<br>Centers        | Industrial gear<br>units | SEW-EURODRIVE n.v./s.a.<br>Rue de Parc Industriel, 31<br>6900 Marche-en-Famenne, Belgium                                                                                   | Tel. +32 84 219-878<br>Fax +32 84 219-879<br>http://www.sew-eurodrive.be<br>service-wallonie@sew-eurodrive.be   |
| Brazil                               |                          |                                                                                                                                                                            |                                                                                                                 |
| Production plant<br>Sales<br>Service | São Paulo                | SEW-EURODRIVE Brasil Ltda.<br>Avenida Amâncio Gaiolli, 152 - Rodovia Presid-<br>ente Dutra Km 208<br>Guarulhos - 07251-250 - SP, Brazil<br>SAT - SEW ATENDE - 0800 7700496 | Tel. +55 11 2489-9133<br>Fax +55 11 2480-3328<br>http://www.sew-eurodrive.com.br<br>sew@sew.com.br              |



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

| China                                       |                                                               |                                                                                                                                  |                                                                                                              |
|---------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                             | <b>Wuhan</b>                                                  | SEW-EURODRIVE (Wuhan) Co., Ltd.<br>10A-2, 6th Road<br>No. 59, the 4th Quanli Road, WEDA<br>430056 Wuhan, China                   | Tel. +86 27 84478388<br>Fax +86 27 84478389<br>wuhan@sew-eurodrive.cn                                        |
|                                             | <b>Xi'An</b>                                                  | SEW-EURODRIVE (Xi'An) Co., Ltd.<br>No. 12 Jinye 2nd Road<br>Xi'An High-Technology Industrial Development<br>Zone<br>Xi'An 710065 | Tel. +86 29 68686262<br>Fax +86 29 68686311<br>xian@sew-eurodrive.cn                                         |
| Colombia                                    |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Bogota</b>                                                 | SEW-EURODRIVE COLOMBIA LTDA.<br>Calle 22 No. 132-60<br>Bodega 6, Manzana B<br>Santafé de Bogotá, Colombia                        | Tel. +57 1 54750-50<br>Fax +57 1 54750-44<br>http://www.sew-eurodrive.com.co<br>sew@sew-eurodrive.com.co     |
| Côte d'Ivoire                               |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Sales</b>                                | <b>Abidjan</b>                                                | SICA<br>Société Industrielle & Commerciale pour l'Afrique<br>165, Boulevard de Marseille<br>26 BP 1173 Abidjan 26                | Tel. +225 21 25 79 44<br>Fax +225 21 25 88 28<br>sicamot@aviso.ci                                            |
| Croatia                                     |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Sales<br/>Service</b>                    | <b>Zagreb</b>                                                 | KOMPEKS d. o. o.<br>Zeleni dol 10<br>10 000 Zagreb, Croatia                                                                      | Tel. +385 1 4613-158<br>Fax +385 1 4613-158<br>kompeks@inet.hr                                               |
| Czech Republic                              |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Sales<br/>Assembly plant<br/>Service</b> | <b>Hostivice</b>                                              | SEW-EURODRIVE CZ S.R.O.<br>Floriánova 2459<br>253 01 Hostivice                                                                   | Tel. +420 255 709 601<br>Fax +420 235 350 613<br>http://www.sew-eurodrive.cz<br>sew@sew-eurodrive.cz         |
|                                             | <b>Drive Service Hot-<br/>line/24-hour avail-<br/>ability</b> | <b>HOTLINE: +420 800 739 739 (800 SEW SEW)</b>                                                                                   | <b>Service:</b><br>Tel. +420 255 709 632<br>Fax +420 235 358 218<br>servis@sew-eurodrive.cz                  |
| <b>Assembly plant<br/>Service</b>           | <b>Plzeň</b>                                                  | SEW-EURODRIVE CZ S.R.O.<br>Areal KRPA a.s.<br>Zahradní 173/2<br>326 00 Plzeň                                                     | Tel. +420 378 775 320<br>Fax +420 377 970 710<br>sew@sew-eurodrive.cz                                        |
| <b>Technical offices</b>                    | <b>Brno</b>                                                   | SEW-EURODRIVE CZ S.R.O.<br>Křenová 52<br>60200 Brno                                                                              | Tel. +420 543 254 174<br>Fax +420 543 256 845<br>radek.chmela@sew-eurodrive.cz                               |
|                                             | <b>Hradec Králové</b>                                         | SEW-EURODRIVE CZ S.R.O.<br>Čechova 498<br>50202 Hradec Králové                                                                   | Tel. +420 495 510 141<br>Fax +420 495 521 313<br>miroslav.moravec@sew-eurodrive.cz                           |
|                                             | <b>Ostrava</b>                                                | SEW-EURODRIVE CZ S.R.O.<br>Studentská 6202/17<br>708 00 Ostrava-Poruba                                                           | Tel. +420 597 329 044<br>david.kenkus@sew-eurodrive.cz                                                       |
|                                             | <b>Klatovy</b>                                                | SEW-EURODRIVE CZ S.R.O.<br>Videňská 841<br>33901 Klatovy                                                                         | Tel. +420 376 331 634<br>Fax +420 376 331 634<br>viktor.kubernat@sew-eurodrive.cz                            |
| <b>Service</b>                              | <b>Horní Moštěnice</b>                                        | SEW-EURODRIVE CZ S.R.O.<br>Nám.Dr.M.Tyrše 14/64<br>751 17 Horní Moštěnice                                                        | Tel. +420 581 224 374<br>Fax +420 581 224 374<br>servis@sew-eurodrive.cz                                     |
| Denmark                                     |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Copenhagen</b>                                             | SEW-EURODRIVE A/S<br>Geminivej 28-30<br>2670 Greve, Denmark                                                                      | Tel. +45 43 9585-00<br>Fax +45 43 9585-09<br>http://www.sew-eurodrive.dk<br>sew@sew-eurodrive.dk             |
| Egypt                                       |                                                               |                                                                                                                                  |                                                                                                              |
| <b>Sales<br/>Service</b>                    | <b>Cairo</b>                                                  | Copam Egypt<br>for Engineering & Agencies<br>33 El Hegaz ST, Heliopolis, Cairo, Egypt                                            | Tel. +20 2 22566-299 +1 23143088<br>Fax +20 2 22594-757<br>http://www.copam-egypt.com/<br>copam@datum.com.eg |



| Estonia                                     |                                                   |                                                                                                              |                                                                                                                                                          |
|---------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sales</b>                                | <b>Tallinn</b>                                    | ALAS-KUUL AS<br>Reti tee 4<br>EE-75301 Peetri küla, Rae vald, Harjumaa, Estonia                              | Tel. +372 6593230<br>Fax +372 6593231<br>veiko.soots@alas-kuul.ee                                                                                        |
| Finland                                     |                                                   |                                                                                                              |                                                                                                                                                          |
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Hollola</b>                                    | SEW-EURODRIVE OY<br>Vesimäentie 4<br>15860 Hollola 2, Finland                                                | Tel. +358 201 589-300<br>Fax +358 3 780-6211<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a><br>sew@sew.fi                      |
| <b>Service</b>                              | <b>Hollola</b>                                    | SEW-EURODRIVE OY<br>Keskikankaantie 21<br>FIN-15860 Hollola                                                  | Tel. +358 201 589-300<br>Fax +358 3 780-6211<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a><br>sew@sew.fi                      |
| <b>Technical offices</b>                    | <b>Helsinki</b>                                   | SEW-EURODRIVE OY<br>Luutnantintie 5<br>00410 Helsinki, Finland                                               | Tel. +358 201 589-300<br>sew@sew.fi                                                                                                                      |
|                                             | <b>Vaasa</b>                                      | SEW-EURODRIVE OY<br>Asemakatu 7<br>65100 Vaasa, Finland                                                      | Tel. +358 201 589-300<br>sew@sew.fi                                                                                                                      |
|                                             | <b>Kuopio</b>                                     | SEW-EURODRIVE OY<br>Viestikatu 3<br>70600 Kuopio, Finland                                                    | Tel. +358 201 589-300<br>sew@sew.fi                                                                                                                      |
| <b>Production plant<br/>Assembly plant</b>  | <b>Karkkila</b>                                   | SEW Industrial Gears Oy<br>Valurinkatu 6, PL 8<br>FI-03600 Karkkila, 03601 Karkkila                          | Tel. +358 201 589-300<br>Fax +358 201 589-310<br>sew@sew.fi<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a>                     |
| Gabon                                       |                                                   |                                                                                                              |                                                                                                                                                          |
| <b>Sales</b>                                | <b>Libreville, Gabon</b>                          | ESG Electro Services Gabun<br>Feu Rouge Lalala<br>1889 Libreville<br>Gabon                                   | Tel. +241 741059<br>Fax +241 741059<br>esg_services@yahoo.fr                                                                                             |
| Greece                                      |                                                   |                                                                                                              |                                                                                                                                                          |
| <b>Sales</b>                                | <b>Athens</b>                                     | Christ. Boznos & Son S.A.<br>12, K. Mavromichali Street<br>P.O. Box 80136<br>GR-18545 Piraeus                | Tel. +30 2 1042 251-34<br>Fax +30 2 1042 251-59<br><a href="http://www.boznos.gr">http://www.boznos.gr</a><br>info@boznos.gr                             |
| <b>Technical office</b>                     | <b>Thessaloniki</b>                               | Christ. Boznos & Son S.A.<br>Asklipiou 26<br>562 24 Evosmos, Thessaloniki, Greece                            | Tel. +30 2 310 7054-00<br>Fax +30 2 310 7055-15<br>info@boznos.gr                                                                                        |
| Great Britain                               |                                                   |                                                                                                              |                                                                                                                                                          |
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Normanton</b>                                  | SEW-EURODRIVE Ltd.<br>DeVilliers Way<br>Trident Park<br>Normanton<br>West Yorkshire<br>WF6 1GX               | Tel. +44 1924 893-855<br>Fax +44 1924 893-702<br><a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a><br>info@sew-eurodrive.co.uk |
|                                             | <b>Drive Service Hotline/24-hour availability</b> |                                                                                                              | Tel. +44 1924 896911                                                                                                                                     |
| <b>Service Competence<br/>Centers</b>       | <b>Southern England</b>                           | SEW-EURODRIVE Ltd.<br>Unit 41<br>Easter Park<br>Benyon Road<br>Silchester<br>Reading<br>Berkshire<br>RG7 2PQ | Tel. +44 1189 701-699<br>Fax +44 1189 701-021                                                                                                            |
| <b>Technical offices</b>                    | <b>Midlands</b>                                   | SEW-EURODRIVE Ltd.<br>5 Sugar Brook Court<br>Aston Road<br>Bromsgrove<br>Worcs.<br>B60 3EX                   | Tel. +44 1527 877-319<br>Fax +44 1527 575-245                                                                                                            |

| Great Britain                                                  |                   |                                                                                                                                                                         |                                                                                                                                                          |
|----------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                | <b>Scotland</b>   | SEW-EURODRIVE Ltd.<br>No 37 Enterprise House<br>Springkerse Business Park<br>Stirling<br>FK7 7UF                                                                        | Tel. +44 17 8647-8730<br>Fax +44 17 8645-0223                                                                                                            |
| Hong Kong                                                      |                   |                                                                                                                                                                         |                                                                                                                                                          |
| <b>Assembly plant<br/>Sales<br/>Service</b>                    | <b>Hong Kong</b>  | SEW-EURODRIVE LTD.<br>Unit No. 801-806, 8th Floor<br>Hong Leong Industrial Complex<br>No. 4, Wang Kwong Road<br>Kowloon, Hong Kong                                      | Tel. +852 36902200<br>Fax +852 36902211<br>contact@sew-eurodrive.hk                                                                                      |
| Hungary                                                        |                   |                                                                                                                                                                         |                                                                                                                                                          |
| <b>Sales<br/>Service</b>                                       | <b>Budapest</b>   | SEW-EURODRIVE Kft.<br>1037 Budapest, Hungary<br>Kunigunda u. 18                                                                                                         | Tel. +36 1 437 06-58<br>Fax +36 1 437 06-50<br>http://www.sew-eurodrive.hu<br>office@sew-eurodrive.hu                                                    |
| India                                                          |                   |                                                                                                                                                                         |                                                                                                                                                          |
| <b>Company office<br/>Assembly plant<br/>Sales<br/>Service</b> | <b>Vadodara</b>   | SEW-EURODRIVE India Private Limited<br>Plot No. 4, GIDC<br>POR Ramangamdi • Vadodara - 391 243, India<br>Gujarat                                                        | Tel. +91 265 3045200, +91 265 2831086<br>Fax +91 265 3045300, +91 265 2831087<br>http://www.seweurodriveindia.com<br>salesvadodara@seweurodriveindia.com |
| <b>Assembly plant<br/>Sales<br/>Service</b>                    | <b>Chennai</b>    | SEW-EURODRIVE India Private Limited<br>Plot No. K3/1, Sipcot Industrial Park Phase II<br>Mambakkam Village<br>Sriperumbudur - 602105<br>Kancheepuram Dist, Tamil Nadu   | Tel. +91 44 37188888<br>Fax +91 44 37188811<br>saleschennai@seweurodriveindia.com                                                                        |
| <b>Technical offices</b>                                       | <b>Ahmedabad</b>  | SEW-EURODRIVE India Private Limited<br>306, Shaan office complex, Behind Sakar-IV,<br>Ellisebridge, Ashram Road<br>Ahmedabad – Gujarat, India                           | Tel. +91 79 40072067/68<br>Fax +91 79 40072069<br>salesahmedabad@seweurodrivein-<br>dia.com                                                              |
|                                                                | <b>Aurangabad</b> | SEW-EURODRIVE INDIA PRIVATE LIMITED                                                                                                                                     | Tel. +91 86000 12333<br>salesaurangabad@seweurodrivein-<br>dia.com                                                                                       |
|                                                                | <b>Bangalore</b>  | SEW-EURODRIVE India Private Limited<br>Sy.no:41-P3, Peenya1, Phase 1A, Peenya Vil-<br>lage, Yeswanthapura Hobli, Bangalore North<br>Taluk,<br>Bangalore Dist, Karnataka | Tel. +91 80 22266565<br>Fax +91 80 22266569<br>salesbangalore@seweurodriveindia.com                                                                      |
|                                                                |                   | SEW-EURODRIVE India Private Limited<br># C-104, 3rd Block, KSSIDC Complex, Electronic<br>City.<br>Bangalore – 560100, Karnataka                                         | Tel. +91 80 28522662 / 28522663<br>salesbangalore@seweurodriveindia.com                                                                                  |
|                                                                | <b>Bangladesh</b> | SEW-EURODRIVE INDIA PRIVATE LIMITED<br>Genetic Udayanchal,<br>House-96 (6th Floor), Road-23/A,<br>Block-B, Banani, Dhaka-1213, Bangladesh                               | Mobile +88 01729 097309<br>salesdhaka@seweurodrive-<br>bangladesh.com                                                                                    |
|                                                                | <b>Bellary</b>    | SEW-EURODRIVE India Private Limited<br>Door no-56/279 Ward No-16, Sindhigi com-<br>pound, Near Raghavendra talkies,<br>Bellary-583101<br>Karnataka                      | Tel. +91 77609 88668<br>salesbellary@seweurodriveindia.com                                                                                               |
|                                                                | <b>Chandigarh</b> | SEW-EURODRIVE India Private Limited<br># 72, Type- 4, Power Colony,<br>Chandigarh - Rupnagar Highway<br>Rupnagar- 140001, Punjab                                        | Tel. +91 81462 67606<br>saleschandigarh@seweurodrivein-<br>dia.com                                                                                       |
|                                                                | <b>Chennai</b>    | SEW-EURODRIVE India Private Limited<br>2nd Floor, Josmans Complex,<br>No. 5, McNichols Road,<br>Chetpet<br>Chennai - 600031 - Tamil Nadu, India                         | Tel. +91 44 42849813<br>Fax +91 44 42849816<br>saleschennai@seweurodriveindia.com                                                                        |
|                                                                | <b>Kochi</b>      | SEW-EURODRIVE India Private Limited<br>CF7-(2), Block No 1, Vasanth Nagar,<br>Opposite Jawahar Lal Nehru Stadium,<br>Palarivattom – Cochin 682025                       | Tel. +91 98951 30375<br>salescochin@seweurodriveindia.com                                                                                                |

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

| India                                       |                        |                                                                                                                                                             |                                                                                                                                      |
|---------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                             | <b>Ranchi</b>          | SEW-EURODRIVE India Private Limited<br>Flat No.: A - 101,<br>Krishna Shree Apartment,<br>Anantpur, P.O. Doranda – Ranchi 834002                             | Tel. +91 8294630772<br>salesranchi@seweurodriveindia.com                                                                             |
|                                             | <b>Tiruchirappalli</b> | SEW-EURODRIVE India Private Limited<br>A-106, Trichy Towers,<br>Chandrasekarapuram,<br>Salai Road,<br>Trichy – 620018.                                      | Mobile +91 95009 88081<br>salestrichy@seweurodriveindia.com                                                                          |
|                                             | <b>Vadodara</b>        | SEW-EURODRIVE India Private Limited<br>Unit No. 301, Savorite Bldg,<br>Plot No. 143, Vinayak Society,<br>off old Padra Road,<br>Vadodara - 390 007. Gujarat | Tel. +91 265 2325258<br>Fax +91 265 2325259<br>salesvadodara@seweurodriveindia.com                                                   |
|                                             | <b>Vijayawada</b>      | SEW-EURODRIVE India Private Limited<br>Door No:40-5/3-10A, Syam Nagar, NGO's<br>Colony,<br>Tikkle Road, Vijayawada-520010                                   | Tel. +91 99895 01748<br>Fax +91 8662475157<br>Mobile +91 9989501748<br>salesvijayawada@seweurodriveindia.com                         |
| Indonesia                                   |                        |                                                                                                                                                             |                                                                                                                                      |
| <b>Sales</b>                                | <b>Jakarta</b>         | PT. Cahaya Sukses Abadi<br>Komplek Rukan Puri Mutiara Blok A no 99,<br>Sunter<br>Jakarta 14350, Indonesia                                                   | Tel. +62 21 65310599<br>Fax +62 21 65310600<br>csajkt@cbn.net.id                                                                     |
|                                             |                        | PT. Agrindo Putra Lestari<br>Jl.Prof.DR.Latumenten no27/A<br>Jakarta 11330                                                                                  | Tel. +62 21 63855588<br>Fax +62 21 63853789<br>aplindo@indosat.net.id                                                                |
|                                             | <b>Medan</b>           | PT. Serumpun Indah Lestari<br>Pulau Solor no. 8, Kawasan Industri Medan II<br>Medan 20252                                                                   | Tel. +62 61 687 1221<br>Fax +62 61 6871429 / +62 61 6871458 /<br>+62 61 30008041<br>sil@serumpunindah.com<br>serumpunindah@yahoo.com |
|                                             | <b>Surabaya</b>        | PT. TRIAGRI JAYA ABADI<br>Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6<br>No. 11<br>Surabaya 60122                                                          | Tel. +62 31 5990128<br>Fax +62 31 5962666<br>triagri@indosat.net.id                                                                  |
|                                             |                        | CV. Multi Mas<br>Jl. Raden Saleh 43A Kav. 18<br>Surabaya 60174                                                                                              | Tel. +62 31 5458589 / +62 31 5317224<br>Fax +62 31 5317220 / +62 31 5994629<br>sianhwa@sby.centrin.net.id                            |
| Ireland                                     |                        |                                                                                                                                                             |                                                                                                                                      |
| <b>Sales<br/>Service</b>                    | <b>Dublin</b>          | Alpertor Engineering Ltd.<br>48 Moyle Road<br>Dublin Industrial Estate<br>Glasnevin, Dublin 11, Ireland                                                     | Tel. +353 1 830-6277<br>Fax +353 1 830-6458<br>info@alperton.ie<br>http://www.alperton.ie                                            |
| Iceland                                     |                        |                                                                                                                                                             |                                                                                                                                      |
| <b>Sales</b>                                | <b>Reykjavik</b>       | VARMA & VELAVERK EHF<br>Dalshrauni 5<br>IS-220 Hafnarjördur                                                                                                 | Tel. +354 585 1070<br>Fax +354 585 1071<br>varmaverk@varmaverk.is<br>http://www.varmaverk.is                                         |
| Israel                                      |                        |                                                                                                                                                             |                                                                                                                                      |
| <b>Sales</b>                                | <b>Tel Aviv</b>        | Liraz Handasa Ltd.<br>Ahofer Str 34B / 228<br>58858 Holon, Israel                                                                                           | Tel. +972 3 5599511<br>Fax +972 3 5599512<br>http://www.liraz-handasa.co.il<br>office@liraz-handasa.co.il                            |
| Italy                                       |                        |                                                                                                                                                             |                                                                                                                                      |
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Solaro</b>          | SEW-EURODRIVE di R. Blicke & Co.s.a.s.<br>Via Bernini,14<br>I-20020 Solaro (Milano), Italy                                                                  | Tel. +39 02 96 9801<br>Fax +39 02 96 980 999<br>http://www.sew-eurodrive.it<br>sewit@sew-eurodrive.it                                |
| <b>Technical offices</b>                    | <b>Bologna</b>         | SEW-EURODRIVE di R. Blicke & Co.s.a.s.<br>Via della Grafica, 47<br>40064 Ozzano dell'Emilia (Bo), Italy                                                     | Tel. +39 051 65-23-801<br>Fax +39 02 96 980 499                                                                                      |

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

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

| Kazakhstan   |               |                                                                                      |                                                                                                                                                                                             |
|--------------|---------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sales</b> | <b>Almaty</b> | TOO "СЕВ-ЕВРОДРАЙВ"<br>пр.Райымбека, 348<br>050061 г. Алматы<br>Республика Казахстан | Тел. +7 (727) 334 1880<br>Факс +7 (727) 334 1881<br><a href="http://www.sew-eurodrive.kz">http://www.sew-eurodrive.kz</a><br><a href="mailto:sew@sew-eurodrive.kz">sew@sew-eurodrive.kz</a> |

| Kenya        |                |                                                                                                                       |                                                                                                           |
|--------------|----------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Sales</b> | <b>Nairobi</b> | Barico Maintenances Ltd<br>Kamutaga Place<br>Commercial Street<br>Industrial Area<br>P.O.BOX 52217 - 00200<br>Nairobi | Tel. +254 20 6537094/5<br>Fax +254 20 6537096<br><a href="mailto:info@barico.co.ke">info@barico.co.ke</a> |

| Latvia       |             |                                                      |                                                                                                                                                                            |
|--------------|-------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sales</b> | <b>Riga</b> | SIA Alas-Kuul<br>Katlakalna 11C<br>1073 Riga, Latvia | Tel. +371 6 7139253<br>Fax +371 6 7139386<br><a href="http://www.alas-kuul.com">http://www.alas-kuul.com</a><br><a href="mailto:info@alas-kuul.com">info@alas-kuul.com</a> |

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

| Lithuania                          |              |                                                                                                                                                       |                                                                                                                                                                |
|------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sales                              | Alytus       | UAB Irseva<br>Statybininku 106C<br>LT-63431 Alytus                                                                                                    | Tel. +370 315 79204<br>Fax +370 315 56175<br>irmantas@irseva.lt<br><a href="http://www.sew-eurodrive.lt">http://www.sew-eurodrive.lt</a>                       |
| Luxembourg                         |              |                                                                                                                                                       |                                                                                                                                                                |
| Assembly plant<br>Sales<br>Service | Brussels     | SEW-EURODRIVE n.v./s.a.<br>Researchpark Haasrode 1060<br>Evenementenlaan 7<br>BE-3001 Leuven                                                          | Tel. +32 16 386-311<br>Fax +32 16 386-336<br><a href="http://www.sew-eurodrive.lu">http://www.sew-eurodrive.lu</a><br>info@sew-eurodrive.be                    |
| Madagascar                         |              |                                                                                                                                                       |                                                                                                                                                                |
| Sales                              | Antananarivo | Ocean Trade<br>BP21bis. Andraharo<br>Antananarivo.<br>101 Madagascar                                                                                  | Tel. +261 20 2330303<br>Fax +261 20 2330330<br>oceanrabp@moov.mg                                                                                               |
| Malaysia                           |              |                                                                                                                                                       |                                                                                                                                                                |
| Assembly plant<br>Sales<br>Service | Johor        | SEW-EURODRIVE SDN BHD<br>No. 95, Jalan Seroja 39, Taman Johor Jaya<br>81000 Johor Bahru, Johor<br>West Malaysia                                       | Tel. +60 7 3549409<br>Fax +60 7 3541404<br>sales@sew-eurodrive.com.my                                                                                          |
| Technical offices                  | Kuala Lumpur | SEW-EURODRIVE Sdn. Bhd.<br>No. 2, Jalan Anggerik Mokara 31/46<br>Kota Kemuning Seksyen 31<br>40460 Shah Alam<br>Selangor Darul Ehsan                  | Tel. +60 3 51229633<br>Fax +60 3 51229622<br>sewsa@sew-eurodrive.com.my                                                                                        |
|                                    | Kuching      | SEW-EURODRIVE Sdn. Bhd.<br>Lot 268, Section 9 KTL D<br>Lorong 9, Jalan Satok<br>93400 Kuching, Sarawak<br>East Malaysia                               | Tel. +60 82 232380<br>Fax +60 82 242380                                                                                                                        |
|                                    | Penang       | SEW-EURODRIVE Sdn. Bhd.<br>No. 38, Jalan Bawal<br>Kimsar Garden<br>13700 Prai, Penang                                                                 | Tel. +60 4 3999349<br>Fax +60 4 3999348<br>sewpg@sew-eurodrive.com.my                                                                                          |
| Morocco                            |              |                                                                                                                                                       |                                                                                                                                                                |
| Sales<br>Service                   | Mohammedia   | SEW-EURODRIVE SARL<br>2 bis, Rue Al Jahid<br>28810 Mohammedia                                                                                         | Tel. +212 523 32 27 80/81<br>Fax +212 523 32 27 89<br>sew@sew-eurodrive.ma<br><a href="http://www.sew-eurodrive.ma">http://www.sew-eurodrive.ma</a>            |
| Mauritania                         |              |                                                                                                                                                       |                                                                                                                                                                |
| Sales                              | Zouérat      | AFRICOM - SARL<br>En Face Marché Dumez<br>P.B. 88<br>Zouérate                                                                                         | Tel. +222 45 44 50 19<br>Fax +222 45 44 03 14<br>contact@africom-sarl.com                                                                                      |
| Macedonia                          |              |                                                                                                                                                       |                                                                                                                                                                |
| Sales                              | Skopje       | Boznos DOOEL<br>Dime Anicin 2A/7A<br>1000 Skopje                                                                                                      | Tel. +389 23256553<br>Fax +389 23256554<br><a href="http://www.boznos.mk">http://www.boznos.mk</a>                                                             |
| Mexico                             |              |                                                                                                                                                       |                                                                                                                                                                |
| Assembly plant<br>Sales<br>Service | Quéretaro    | SEW-EURODRIVE MEXICO SA DE CV<br>SEM-981118-M93<br>Tequisquiapan No. 102<br>Parque Industrial Quéretaro<br>C.P. 76220<br>Quéretaro, Mexico            | Tel. +52 442 1030-300<br>Fax +52 442 1030-301<br><a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a><br>scmexico@seweurodrive.com.mx |
| Mongolia                           |              |                                                                                                                                                       |                                                                                                                                                                |
| Sales                              | Ulan Bator   | SEW-EURODRIVE Representative Office Mon-<br>golia<br>Olympic street 8,<br>2nd floor Juulchin corp bldg.,<br>Sukhbaatar district,<br>Ulaanbaatar 14253 | Tel. +976-70009997<br>Fax +976-70009997<br><a href="http://www.sew-eurodrive.mn">http://www.sew-eurodrive.mn</a><br>sew@sew-eurodrive.mn                       |



| Namibia                                      |                                      |                                                                                                                                                                               |                                                                                                                              |
|----------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Sales</b>                                 | <b>Swakopmund</b>                    | DB Mining & Industrial Services<br>Einstein Street<br>Strauss Industrial Park<br>Unit1<br>Swakopmund                                                                          | Tel. +264 64 462 738<br>Fax +264 64 462 734<br>sales@dbmining.in.na                                                          |
| New Zealand                                  |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Assembly plants<br/>Sales<br/>Service</b> | <b>Auckland</b>                      | SEW-EURODRIVE NEW ZEALAND LTD.<br>P.O. Box 58-428<br>82 Greenmount Drive<br>East Tamaki Auckland, New Zealand                                                                 | Tel. +64 9 2745627<br>Fax +64 9 2740165<br>http://www.sew-eurodrive.co.nz<br>sales@sew-eurodrive.co.nz                       |
|                                              | <b>Christchurch,<br/>New Zealand</b> | SEW-EURODRIVE NEW ZEALAND LTD.<br>10 Settlers Crescent, Ferrymead<br>Christchurch, New Zealand                                                                                | Tel. +64 3 384-6251<br>Fax +64 3 384-6455<br>sales@sew-eurodrive.co.nz                                                       |
| <b>Technical offices</b>                     | <b>Palmerston North</b>              | SEW-EURODRIVE NEW ZEALAND LTD.<br>C/-Grant Shearman, RD 5, Aronui Road<br>Palmerston North                                                                                    | Tel. +64 6 355-2165<br>Fax +64 6 355-2316<br>sales@sew-eurodrive.co.nz                                                       |
| Netherlands                                  |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Assembly plant<br/>Sales<br/>Service</b>  | <b>Rotterdam</b>                     | SEW-EURODRIVE B.V.<br>Industrieweg 175<br>3044 AS Rotterdam, Netherlands<br>Postbus 10085<br>3004 AB Rotterdam, Netherlands                                                   | Tel. +31 10 4463-700<br>Fax +31 10 4155-552<br>Service: 0800-SEWHELP<br>http://www.sew-eurodrive.nl<br>info@sew-eurodrive.nl |
| Nigeria                                      |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Sales</b>                                 | <b>Lagos</b>                         | EISNL Engineering Solutions and Drives Ltd<br>Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme)<br>Adeniyi Jones St. End<br>Off ACME Road, Ogba, Ikeja, Lagos<br>Nigeria | Tel. +234 1 217 4332<br>team.sew@eisnl.com<br>http://www.eisnl.com                                                           |
| Norway                                       |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Assembly plant<br/>Sales<br/>Service</b>  | <b>Moss</b>                          | SEW-EURODRIVE A/S<br>Solgaard skog 71<br>1599 Moss, Norway                                                                                                                    | Tel. +47 69 24 10 20<br>Fax +47 69 24 10 40<br>http://www.sew-eurodrive.no<br>sew@sew-eurodrive.no                           |
| Pakistan                                     |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Sales</b>                                 | <b>Karatschi</b>                     | Industrial Power Drives<br>Al-Fatah Chamber A/3, 1st Floor Central Commercial Area,<br>Sultan Ahmed Shah Road, Block 7/8,<br>Karachi                                          | Tel. +92 21 452 9369<br>Fax +92-21-454 7365<br>seweurodrive@cyber.net.pk                                                     |
| Paraguay                                     |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Sales</b>                                 | <b>Fernando de la Mora</b>           | SEW-EURODRIVE PARAGUAY S.R.L<br>De la Victoria 112, Esquina nueva Asunción<br>Departamento Central<br>Fernando de la Mora, Barrio Bernardino                                  | Tel. +595 991 519695<br>Fax +595 21 3285539<br>sew-py@sew-eurodrive.com.py                                                   |
| Peru                                         |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Assembly plant<br/>Sales<br/>Service</b>  | <b>Lima</b>                          | SEW DEL PERU MOTORES REDUCTORES<br>S.A.C.<br>Los Calderos, 120-124<br>Urbanizacion Industrial Vulcano, ATE, Lima,<br>Peru                                                     | Tel. +51 1 3495280<br>Fax +51 1 3493002<br>http://www.sew-eurodrive.com.pe<br>sewperu@sew-eurodrive.com.pe                   |
| Philippines                                  |                                      |                                                                                                                                                                               |                                                                                                                              |
| <b>Sales</b>                                 | <b>Luzon</b>                         | Totaltech Corporation<br>5081-B C&L Mansion Filmore Ave. Cor. Fahrenheit St.<br>1235 Makati City                                                                              | Tel. +63 2 551-9265 / +63 2 551-9271 /<br>+63 2 551-9378<br>Fax +63 2 551-9273<br>totaltech89@gmail.com                      |
|                                              | <b>All Areas</b>                     | P.T. Cerna Corporation<br>4137 Ponte St., Brgy. Santa Cruz, Makati City<br>1205                                                                                               | Tel. +63 2 519 6214<br>Fax +63 2 890 2802<br>mech_drive_sys@ptcerna.com                                                      |

| Poland                             |                |                                                                                                                                                    |                                                                                                                                                                                                     |
|------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly plant<br>Sales<br>Service | Łódź           | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Techniczna 5<br>92-518 Łódź, Poland                                                                          | Tel. +48 42 676 53 00<br>Fax +48 42 676 53 49<br><a href="http://www.sew-eurodrive.pl">http://www.sew-eurodrive.pl</a><br><a href="mailto:sew@sew-eurodrive.pl">sew@sew-eurodrive.pl</a>            |
|                                    | Service        | Tel. +48 42 6765332 / 42 6765343<br>Fax +48 42 6765346                                                                                             | Linia serwisowa 24 hour hotline<br>Tel. +48 602 739 739<br>(+48 602 SEW SEW)<br><a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>                                                |
| Technical office                   | Tychy          | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Strzelecka 66<br>PL-43-109 Tychy                                                                             | Tel. +48 32 32 32 610<br>Fax +48 32 32 32 648                                                                                                                                                       |
|                                    | Bydgoszcz      | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Fordońska 246<br>PL-85-959 Bydgoszcz                                                                         | Tel. +48 52 3606590<br>Fax +48 52 3606591                                                                                                                                                           |
|                                    | Gdansk         | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Galaktyczna 30A<br>PL-80-299 Gdańsk                                                                          | Tel. +48 58 762 70 00<br>Fax +48 58 762 70 09                                                                                                                                                       |
|                                    | Poznan         | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Romana Maya 1<br>61-371 Poznań, Poland                                                                       | Tel. +48 61 6465500<br>Fax +48 61 6465519                                                                                                                                                           |
|                                    | Radom          | SEW-EURODRIVE Polska Sp.z.o.o.<br>ul. Słowackiego 84<br>26-600 Radom, Poland                                                                       | Tel. +48 48 365 40 50<br>Fax +48 48 365 40 52                                                                                                                                                       |
| Portugal                           |                |                                                                                                                                                    |                                                                                                                                                                                                     |
| Assembly plant<br>Sales<br>Service | Coimbra        | SEW-EURODRIVE, LDA.<br>Apartado 15<br>3050-901 Mealhada, Portugal                                                                                  | Tel. +351 231 20 9670<br>Fax +351 231 20 3685<br><a href="http://www.sew-eurodrive.pt">http://www.sew-eurodrive.pt</a><br><a href="mailto:infosew@sew-eurodrive.pt">infosew@sew-eurodrive.pt</a>    |
|                                    | Lisbon         | SEW-EURODRIVE, LDA.<br>Núcleo Empresarial I de São Julião do Tojal<br>Rua de Entremuros, 54<br>Fracção I<br>2660-533 São Julião do Tojal, Portugal | Tel. +351 21 958-0198<br>Fax +351 21 958-0245<br><a href="mailto:esc.lisboa@sew-eurodrive.pt">esc.lisboa@sew-eurodrive.pt</a>                                                                       |
| Technical office                   | Porto          | SEW-EURODRIVE, LDA.<br>Av. 25 de Abril, 68<br>4440-502 Valongo, Portugal                                                                           | Tel. +351 229 350 383<br>Fax +351 229 350 384<br>Tel. +351 9 32559110<br><a href="mailto:esc.porto@sew-eurodrive.pt">esc.porto@sew-eurodrive.pt</a>                                                 |
| Romania                            |                |                                                                                                                                                    |                                                                                                                                                                                                     |
| Sales<br>Service                   | Bucharest      | Sialco Trading SRL<br>str. Brazilia nr. 36<br>011783 Bucuresti, Romania                                                                            | Tel. +40 21 230-1328<br>Fax +40 21 230-7170<br><a href="mailto:sialco@sialco.ro">sialco@sialco.ro</a>                                                                                               |
| Russia                             |                |                                                                                                                                                    |                                                                                                                                                                                                     |
| Assembly plant<br>Sales<br>Service | St. Petersburg | ZAO SEW-EURODRIVE<br>P.O. Box 36<br>RUS-195220 St. Petersburg                                                                                      | Tel. +7 812 3332522 +7 812 5357142<br>Fax +7 812 3332523<br><a href="http://www.sew-eurodrive.ru">http://www.sew-eurodrive.ru</a><br><a href="mailto:sew@sew-eurodrive.ru">sew@sew-eurodrive.ru</a> |
|                                    | Ekaterinburg   | ZAO SEW-EURODRIVE<br>Kominerna Str. 16<br>Office 614<br>620078 Ekaterinburg, Russia                                                                | Tel. +7 343 310 3977<br>Fax +7 343 310 3978<br><a href="mailto:eso@sew-eurodrive.ru">eso@sew-eurodrive.ru</a>                                                                                       |
|                                    | Irkutsk        | ZAO SEW-EURODRIVE<br>5-Armii Str., 31<br>664011 Irkutsk, Russia                                                                                    | Tel. +7 3952 25 5880<br>Fax +7 3952 25 5881<br><a href="mailto:iso@sew-eurodrive.ru">iso@sew-eurodrive.ru</a>                                                                                       |
|                                    | Moscow         | ZAO SEW-EURODRIVE<br>Malaja Semjonovskaja Str.<br>д. 9, корпус 2<br>107023 Moscow                                                                  | Tel. +7 495 9337090<br>Fax +7 495 9337094<br><a href="mailto:mso@sew-eurodrive.ru">mso@sew-eurodrive.ru</a>                                                                                         |
|                                    | Novosibirsk    | ZAO SEW-EURODRIVE<br>pr. K Marksa 30<br>630087 Novosibirsk, Russia                                                                                 | Tel. +7 383 3350200<br>Fax +7 383 3462544<br><a href="mailto:nso@sew-eurodrive.ru">nso@sew-eurodrive.ru</a>                                                                                         |
|                                    | Perm           | ZAO SEW-EURODRIVE<br>Stakhanovskaya str., 45 Office 512<br>RUS-614066 Perm                                                                         | Tel. +7 342 2219494<br>Fax +7 342 2219444<br><a href="mailto:psa@sew-eurodrive.ru">psa@sew-eurodrive.ru</a>                                                                                         |



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

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

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

| Swaziland    |                |                                                          |                                                                                                                             |
|--------------|----------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Sales</b> | <b>Manzini</b> | C G Trading Co. (Pty) Ltd<br>PO Box 2960<br>Manzini M200 | Tel. +268 2 518 6343<br>Fax +268 2 518 5033<br><a href="mailto:engineering@cgtrading.co.sz">engineering@cgtrading.co.sz</a> |

| Sweden                                      |                  |                                                                                             |                                                                                                                                                                              |
|---------------------------------------------|------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assembly plant<br/>Sales<br/>Service</b> | <b>Jönköping</b> | SEW-EURODRIVE AB<br>Gnejsvägen 6-8<br>55303 Jönköping, Sweden<br>Box 3100 S-55003 Jönköping | Tel. +46 36 3442 00<br>Fax +46 36 3442 80<br><a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a><br><a href="mailto:jonkoping@sew.se">jonkoping@sew.se</a> |

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

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

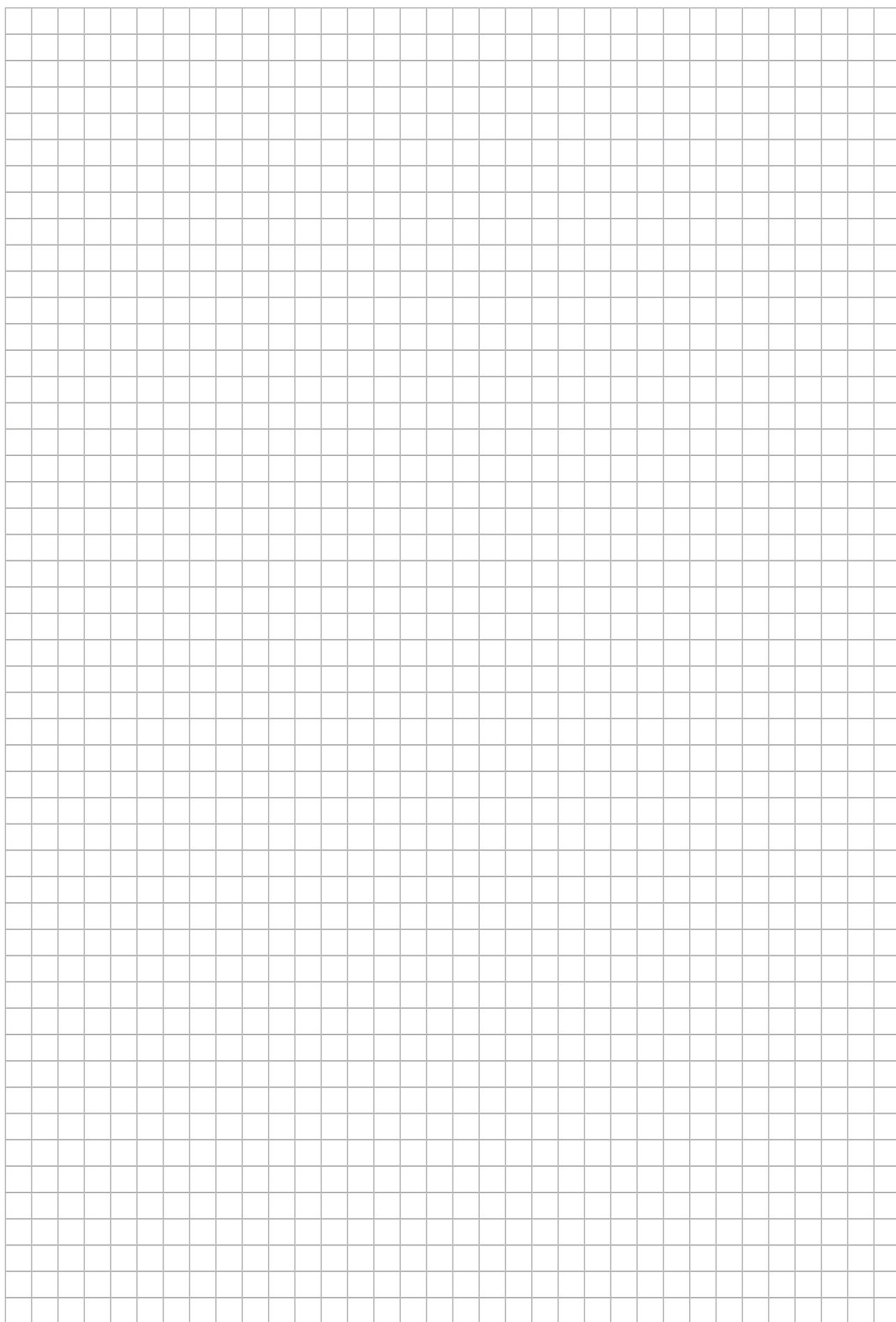
| Taiwan (R.O.C.) |                |                                                                                              |                                                                                      |
|-----------------|----------------|----------------------------------------------------------------------------------------------|--------------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

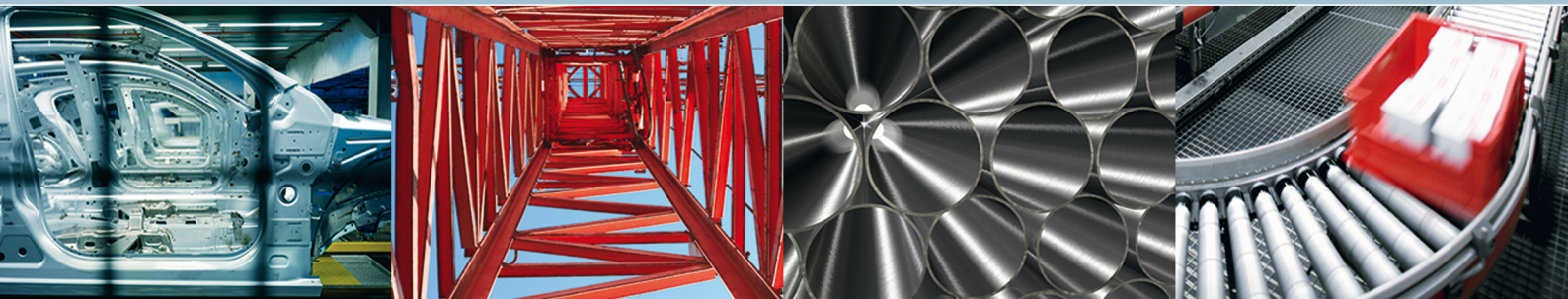
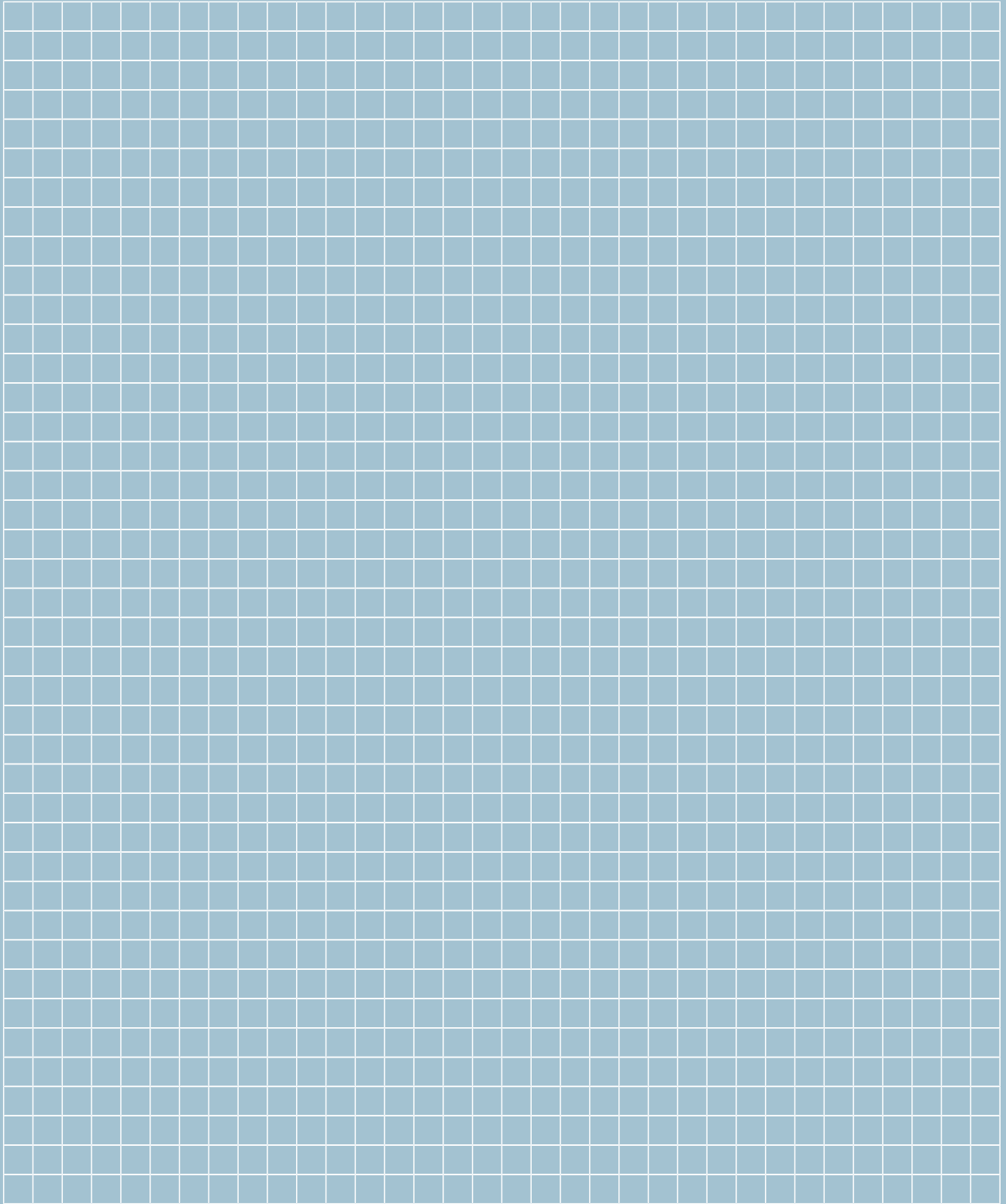
| Tanzania     |                      |                                                                                                |                                                                      |
|--------------|----------------------|------------------------------------------------------------------------------------------------|--------------------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

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

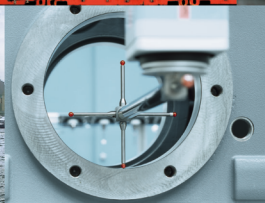
| Thailand                                                         |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
|------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | <b>Khon Kaen</b>        | SEW-EURODRIVE (Thailand) Ltd.<br>4th Floor, Kaow-U-HA MOTOR Bldg,<br>359/2, Mitraphab Road.<br>Muang District<br>Khonkaen 40000, Thailand | Tel. +66 43 225745<br>Fax +66 43 324871<br>sew-thailand@sew-eurodrive.com                                                                                                                                                |
| Tunisia                                                          |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
| <b>Sales</b>                                                     | <b>Tunis</b>            | T. M.S. Technic Marketing Service<br>Zone Industrielle Mghira 2<br>Lot No. 39<br>2082 Fouchana                                            | Tel. +216 79 40 88 77<br>Fax +216 79 40 88 66<br>http://www.tms.com.tn<br>tms@tms.com.tn                                                                                                                                 |
| Turkey                                                           |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
| <b>Assembly plant<br/>Sales<br/>Service</b>                      | <b>Kocaeli-Gebze</b>    | SEW-EURODRIVE<br>Sistemleri San. Ve TIC. Ltd. Sti<br>Gebze Organize Sanayi Böl. 400 Sok No. 401<br>41480 Gebze Kocaeli                    | Tel. +90-262-9991000-04<br>Fax +90-262-9991009<br>http://www.sew-eurodrive.com.tr<br>sew@sew-eurodrive.com.tr                                                                                                            |
| <b>Technical offices</b>                                         | <b>Adana</b>            | SEW-EURODRIVE<br>Cevat Yurdakul Cad.No:52<br>Akdoğan İş Merkezi K:5 D.18<br>Seyhan / Adana                                                | Tel. +90 322 359 94 15<br>Fax +90 322 359 94 16                                                                                                                                                                          |
|                                                                  | <b>Ankara</b>           | SEW-EURODRIVE<br>1368.Cadde Eminel İşmerkezi<br>No: 18/68<br>İvogsan / Ankara                                                             | Tel. +90 312 385 33 90<br>Fax +90 312 385 32 58                                                                                                                                                                          |
|                                                                  | <b>Bursa</b>            | SEW-EURODRIVE<br>Üçevler Mah. Bayraktepe Sok.<br>Akay İş Merkezi Kat:3 No: 7/6<br>Nilüfer / Bursa                                         | Tel. +90 224 443 45 60<br>Fax +90 224 443 45 58                                                                                                                                                                          |
|                                                                  | <b>Istanbul</b>         | SEW-EURODRIVE<br>Tekstilcent Ticaret Merkezi<br>B-13 Blok No:70<br>Esenler / İstanbul                                                     | Tel. +90-262-9991000-04<br>Fax +90-262-9991009                                                                                                                                                                           |
|                                                                  | <b>Izmir</b>            | SEW-EURODRIVE<br>1203/11 Sok. No. 4/614<br>Kara Hasan Atlı İş Merkezi Kat :6<br>Yenişehir / İzmir                                         | Tel. +90 232 469 62 64<br>Fax +90 232 433 61 05                                                                                                                                                                          |
| Ukraine                                                          |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
| <b>Assembly plant<br/>Sales<br/>Service</b>                      | <b>Dnipropetrowsk</b>   | ООО «СЕВ-Евродрайв»<br>ул.Рабочая, 23-В, офис 409<br>49008 Днепропетровск                                                                 | Тел. +380 56 370 3211<br>Факс. +380 56 372 2078<br>http://www.sew-eurodrive.ua<br>sew@sew-eurodrive.ua                                                                                                                   |
| <b>Sales</b>                                                     | <b>Kiev</b>             | ООО «СЕВ-Евродрайв»<br>ул.С.Олейника, 21<br>02068 Киев                                                                                    | Тел. +380 44 503 95 77<br>Факс. +380 44 503 95 78<br>kso@sew-eurodrive.ua                                                                                                                                                |
|                                                                  | <b>Donetsk</b>          | ООО «СЕВ-Евродрайв»<br>ул.25-летия РККА, 1-В, оф. 805<br>83000 Донецк                                                                     | Тел. +380 62 38 80 545<br>Факс. +380 62 38 80 533<br>dso@sew-eurodrive.ua                                                                                                                                                |
|                                                                  | <b>Ivano-Frankivsk</b>  | ООО «СЕВ-Евродрайв»<br>ул.Независимости, 4, оф.303<br>83000 Ивано-Франковск                                                               | Тел. +380 342 725 190<br>Факс. +380 342 725 191<br>ifso@sew-eurodrive.ua                                                                                                                                                 |
| Uruguay                                                          |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
| <b>Assembly plant<br/>Sales</b>                                  | <b>Montevideo</b>       | SEW-EURODRIVE Uruguay, S. A.<br>Jose Serrato 3569 Esquina Corumbe<br>CP 12000 Montevideo                                                  | Tel. +598 2 21181-89<br>Fax +598 2 21181-89<br>sewuy@sew-eurodrive.com.uy                                                                                                                                                |
| USA                                                              |                         |                                                                                                                                           |                                                                                                                                                                                                                          |
| <b>Production plant<br/>Assembly plant<br/>Sales<br/>Service</b> | <b>Southeast Region</b> | SEW-EURODRIVE INC.<br>1295 Old Spartanburg Highway<br>P.O. Box 518<br>Lyman, S.C. 29365                                                   | Tel. +1 864 439-7537<br>Fax Sales +1 864 439-7830<br>Fax Manufacturing +1 864 439-9948<br>Fax Assembly +1 864 439-0566<br>Fax Confidential/HR +1 864 949-5557<br>http://www.seweurodrive.com<br>cslyman@seweurodrive.com |

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









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