SEW EURODRIVE

Catalog



Industrial Gear Units

P-X2.e series bevel planetary gear unit

Torque Classes from 100 kNm to 500 kNm

Edition 12/2025

31548873/EN



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1 Introduction

1.1 The SEW-EURODRIVE group of companies

1.1.1 What do we stand for?

For a reliable partnership!

Humanity and partnership, solutions and services, responsibility and quality, tradition and innovation: SEW-EURODRIVE, the owner-managed family business, has stood for all this and much more for more than 90 years.

As a market leader in drive and automation technology, we don't just power countless applications in virtually every industry. With over 22000 employees, we are also playing a key role in shaping the future of drive technology. For you. Ensuring you, your systems and machines are always at the cutting edge. Not just now, but in the future as well. We want you to succeed together with us.

1.1.2 Where can you find us?

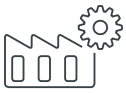
We are always nearby!

Our 17 production plants and 92 Drive Technology Centers in 57 countries mean we are at your service on every continent and in every corner of the world, always working with you as an equal partner and ensuring everything runs smoothly.

What makes us truly stand out from other manufacturers? With our broad customer support and service network worldwide, you never have to wait long for spare parts, repairs or professional advice.



57
countries



17
production plants



92
Drive Technology Centers



> 22000
employees



Global service



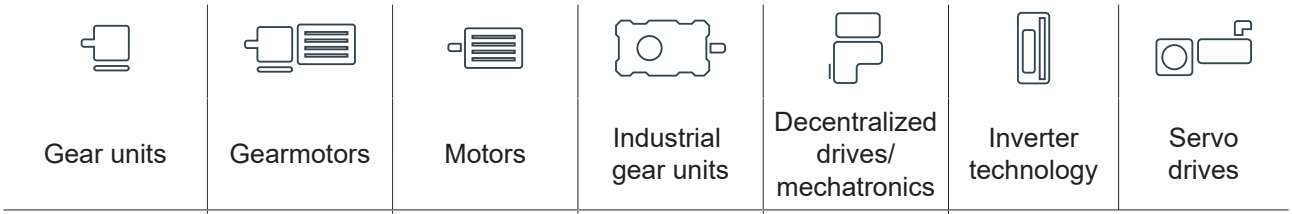
Countless industries

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1.1.3 What do we offer?

State-of-the-art drive technology and automation solutions from a single source!

Looking to modernize your processes or to construct a new system? We offer you one of the most extensive ranges of drive technology products, solutions, and services on the market. A single contact person for everything: that sounds good, doesn't it?



From the very outset, our customers have been able to rely on our high quality, committed advice and support, and fast delivery times. We offer a portfolio of modular solutions that are comprehensive and unique and meet every possible need.

- Perfect combination options and solutions for every application
- Energy efficiency up to IE5
- Quick and easy selection process and project planning
- Comprehensive portfolio – from drives and motors for continuous operation to high-precision servo drives
- Special designs in stainless steel, with explosion protection, or for electrified monorail systems
- Ideal solutions for every application
- Complete automation solutions for your machine or factory and many other areas

Independent of the project scope and the complexity of your requirements: We rise to the challenge, working with you to develop the perfect solution for you – including an all-round service package throughout your entire system life cycle on request.

Predictive maintenance is just one of the service trend topics no. 1. Early diagnosis and end-to-end condition monitoring have been an essential part of our offering for many years. That's because one thing in particular matters to us – the satisfaction and trust of our customers. from planning and the operation phase all the way to modernization. Where necessary, we also take care of drives from other manufacturers.

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1.1.4 What are the goals we want to reach with you?

We want to take you to the top!

Nothing excites us more than the future of production. We are already using Industry 4.0 principles to transform our manufacturing operations. As far as we are concerned, Industry 4.0 ceased to be a distant vision long ago – it is already a successful reality thanks to our smart factory. As a result, we have become one of the world's pioneers in this field.

Yet we do not just focus on increasing our performance to ever greater levels. We also pass on to you the expertise, experience and technical solutions we have gathered in implementing Industry 4.0 in our production halls. Why not find out more?

No matter how large or small your project may be, no matter how high or complex your requirements may be: We rise to the challenge, working with you to develop the perfect solution for you – including an all-round service package throughout your entire system life cycle on request.
Predictive maintenance is one of the currently trending service topics. Early diagnosis and end-to-end condition monitoring have been an essential part of our offering for many years. The only thing that counts is your satisfaction and driving forward your processes – from planning and the operation phase all the way to modernization. Where necessary, we also take care of drives from other manufacturers.

1.1.5 Why should you choose SEW-EURODRIVE?

Because these ten reasons speak for themselves:



1. **You will be more flexible**

   However much the requirements for your processes and production systems increase, we're there for you every step of the way. With rapid conversions, short delivery times, enhanced capacity and faster format changeovers, we're at your side – from evaluating your needs and implementing an appropriate solution all the way to Life Cycle Services.



2. **You will be more satisfied**

   Our name stands for the best quality. But we do not rest on our laurels. Quite the contrary, in fact. To ensure we meet all standards – both ours and yours – we undergo annual testing, including certification processes. That's because only one thing matters to us – the satisfaction and trust of our customers.



3. **You will know more**

   We're happy to share with you the industry and application expertise we have gained over decades and extending far beyond drive technology areas. We work with you to plan and put into practice your tailored solutions in a process where you constantly evolve in tandem with us.



4. **You will be more sustainable**

   We take responsibility for our employees, customers and business partners but also the environment in which we live and work. As a family business, we think in generations and always look beyond today and tomorrow. With us, you too can drive the future.

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5. **You will be more successful**

   Like you, we cannot afford to stand still. We provide continuous training for our employees and customers. We constantly expand our horizons and enhance our products, solutions and services, and thus your processes. You can only continue to be successful in the future with optimized workflows.



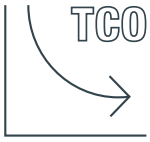
6. **You will be more energy efficient**

   We go out of our way to find new approaches and make our drives more efficient while always staying well ahead of international regulations. And, if you wish, we work with you to plan your systems and machines so that you can make the best possible use of energy recovery.



7. **You will be more innovative**

   What's the point of innovations if they remain out of your reach? We listen to you, which makes us fully aware of your future challenges, and we respond accordingly. With our approximately 800 researchers, we drive forward innovative technologies and help bring your processes up to date.



8. **You will save more money**

   With us, you can lower your overall operating costs. After all, it isn't just a matter of procurement expenses. Your TCO is significantly determined by the subsequent utilization and service life of your drive technology. We provide you with comprehensive advice on how to reduce your costs through sustainable operations.



9. **You will be close to us**

   Wherever in the world your system is running, our comprehensive service network and experts mean we're always ready to provide advice and practical assistance when you need it. All-in-one, on-site service that knows no bounds and significantly reduces or even eliminates downtimes.



10. **You will be faster**

    Throughout the world, our service staff ensure spare parts get to you fast, and faulty drives – including third-party products – are collected and repaired quickly. Software tools make engineering and startup easier for you. Services covering your entire system life cycle help make you faster and more efficient.

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1.2 Documentation

1.2.1 Contents of this publication

This catalog provides a detailed description of the following product group from SEW-EURODRIVE:

- Industrial gear units of the P-X..e series

1.2.2 Additional documentation

The following catalogs are available from SEW-EURODRIVE in addition to this catalog "Industrial Gear Units P-X..e series":

- "DRN63 – 315 AC Motors" catalog

1.3 Product names and trademarks

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

1.4 Copyright notice

© 2025 SEW-EURODRIVE. All rights reserved. Copyright law prohibits the unauthorized reproduction, modification, distribution and use of this document – in whole or in part.

1.5 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

1.6 Recycling, reprocessing, reuse

When manufacturing products, SEW-EURODRIVE makes sure to keep the use of new natural resources to a minimum in the interests of the circular economy. Key aspects here are the recycling of materials as well as the inspection and/or processing of returned components and their reuse in new products. These processes are only used at SEW-EURODRIVE if the resulting materials and components correspond to the quality of new products.

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2 Product description

2.1 P-X2.e gear unit series

The P-X2.e gear unit is a combination of:

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

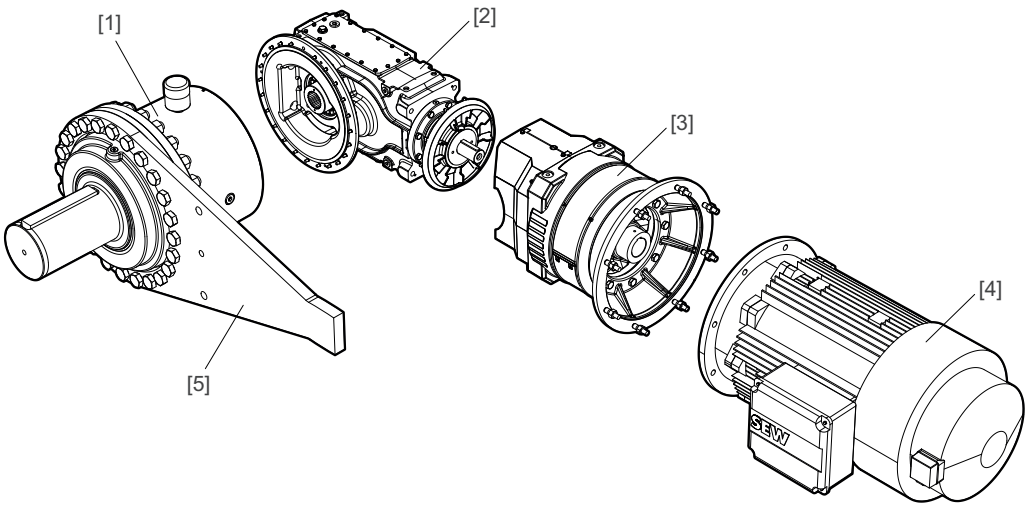
The P-X2.e series consists of 7 sizes with nominal torques of 100 170 Nm to 500 000 Nm.

The gear units have a **shared oil chamber**.

2.1.1 Standard housing /HP

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

The standard housing of the primary gear unit is connected to the planetary gear unit via a flange connection. The torque support is carried out via a torque arm on the planetary gear unit.



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

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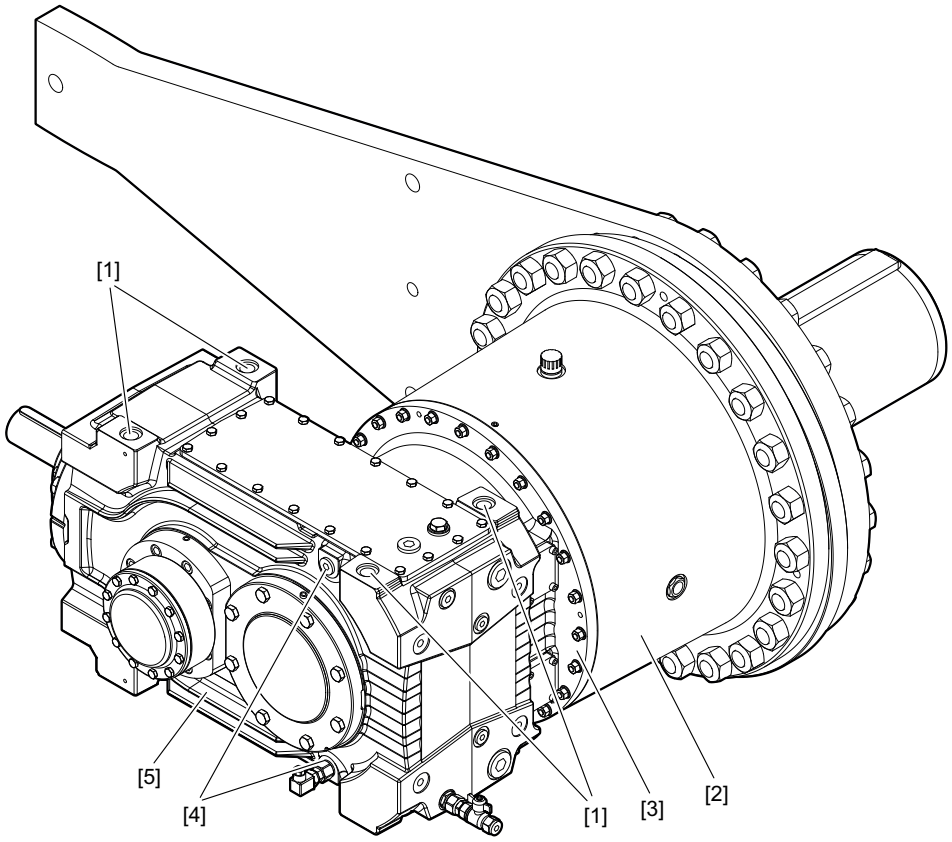
2.1.2 Housing with additional foot connection /HPB

The following figure shows an example of the structure of the gear unit combination with additional foot connection.

The housing of the primary gear unit with additional foot connection is connected to the planetary gear unit via a flange connection. The foot connection enables the combination of the gear unit with a swing base.

The torque support is carried out via a torque arm on the planetary gear unit.

The options for instrumentation and sensor technology are limited due to the foot connection.



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[1] Mounting bores on top and bottom
[2] Planetary gear unit
[3] Intermediate flange
[4] Mounting bores for sensor technology
[5] Primary gear unit

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2.2 Product characteristics

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

2.3 Overview of advantages

- Units optimally coordinated to each other
- Wide range of options thanks to the modular design by SEW-EURODRIVE.
- Standardized units, which means excellent price/performance ratio and short delivery times.

2.4 Application areas

Gear units of the P-X..e series are mainly used in applications that require high performance and high torques.

For example:

- Bucket wheel drives
- Shredders
- Wooden board systems
- Conveyor belts, e.g. apron conveyors

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2.5 Added values of planetary gear units by SEW-EURODRIVE

2.5.1 GearOil by SEW-EURODRIVE



GearOil by SEW-EURODRIVE increases the performance of the gear unit with high-quality base oils and the latest additive technologies. The oil reduces friction in rolling and sliding contact, resulting in increased efficiency and wear resistance.

2.5.2 Delivery times

The coordinated process chain from order receipt to shipping ensures short delivery times even for customer-specific adjustments.



This way, even replacement parts that are required during servicing can be delivered quickly.

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2.5.3 Global availability

With 4 production plants and 13 assembly plants across the globe, standardized industrial gear units can be made available worldwide in the shortest possible time. Additional service centers can also provide short-term service of any kind.



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2.5.4 Detailed calculation

Thanks to the networked calculation landscape, each drive is simulated and calculated with the individually required drive data. Collaboration with research institutes enable us to already use the latest calculation models for series products. The individually tailored product can be created in this way.



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2.5.5 Extended warranty



If the gear unit starts up after the statutory warranty has expired or if you want to pass on your customer's warranty claim to the supplier, for example, SEW-EURODRIVE offers a new warranty package "**+24**" for an additional 24 months warranty on the industrial gear unit.

The following packages are available for the gear units.

Packages	Scope	Advantages
+24	24 months of warranty on the gear unit.	The correct installation of the gear unit is checked by an SEW service technician.
+24 advanced	Gear unit filled with premium lubricant GearOil by SEW-EURODRIVE, giving you an additional 24 months warranty for your industrial gear unit free of charge.	The correct installation of the gear unit is checked by an SEW service technician.

The prerequisite for claiming extended warranty is an acceptance test of the customer-installed gear unit performed by a service technician from SEW-EURODRIVE. In the interest of both parties, the inspection ensures correct installation, alignment, and proper preparation of the drive system for operation. For this reason, inspection by SEW-EURODRIVE must be performed after installation and before startup.

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2.6 General information

2.6.1 Important information

Observe the following information.

- Figures in the catalog are examples. Final dimensions are available from SEW-EURODRIVE on request.
- Lubricant fill quantities are non-binding guide values. The oil level marking on the oil level glass or oil dipstick is decisive.
- As standard, the gear units are delivered ready for operation but without oil filling.
- The oil viscosity and oil type must correspond to the specifications on the nameplate.
- The specified weights 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.
- Rotating parts must be protected by the buyer against unintentional contact. Observe the valid safety regulations of the respective country of use.

2.6.2 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.

2.6.3 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.

2.6.4 Sound power level

The sound power levels of the gear units, gearmotors, and motors correspond to ISO 8579-1 for gear units and gearmotors and comply with the limit values of EN 60034 for motors.

2.6.5 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.

2.6.6 Weight information

Note that all weight specifications listed in this catalog do not include lubricant, as the lubricant filling depends on the mounting position.

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2.6.7 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.

2.6.8 Brakemotors

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

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

2.6.9 International markets

Market access is contingent to local approvals in many countries. Additional laws, regulations, and market conventions must be adhered to. Experience has shown that an identification of the product is required together with certification. This is realized at SEW-EURODRIVE with one or several logos on the main nameplate, with additional labels on the product, or by providing the relevant certificates.

Some countries, such as the states of the European Union, impose certain requirements regarding explosion-protected gear units. The following markings are attached to the gear unit if these requirements are met.

CE	CE marking to state compliance with European directives, (see EU declaration of conformity or EU declaration of incorporation).
Ex	ATEX mark to state compliance with the European Directive 2014/34/EU.

Refer to the operating instructions of the respective motor for information on the motor markings.

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2.7 Sizes and torques

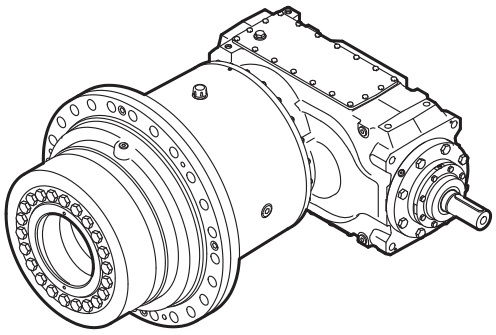
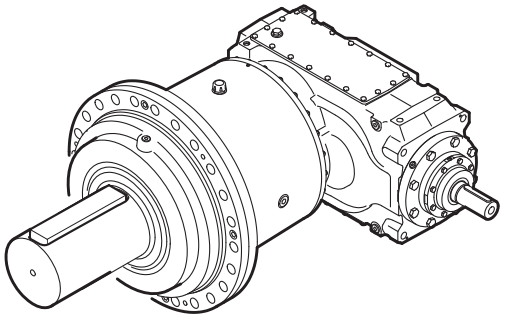
The nominal output torques are listed in the table below.

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

2.8 Basic designs

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

Other designs are available on request.

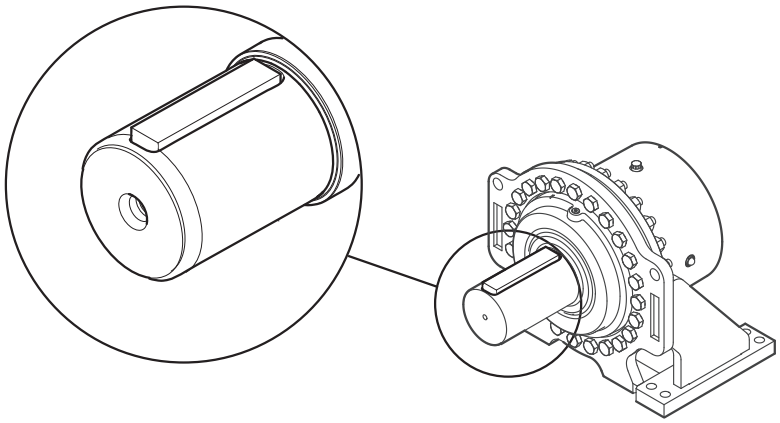
	**PHF..X..e** Bevel-helical planetary gear unit in flange-mounted design with hollow shaft and shrink disk
	**PF..X..e** Bevel-helical planetary gear unit in flange-mounted design with solid shaft and key

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2.8.1 Output shaft designs

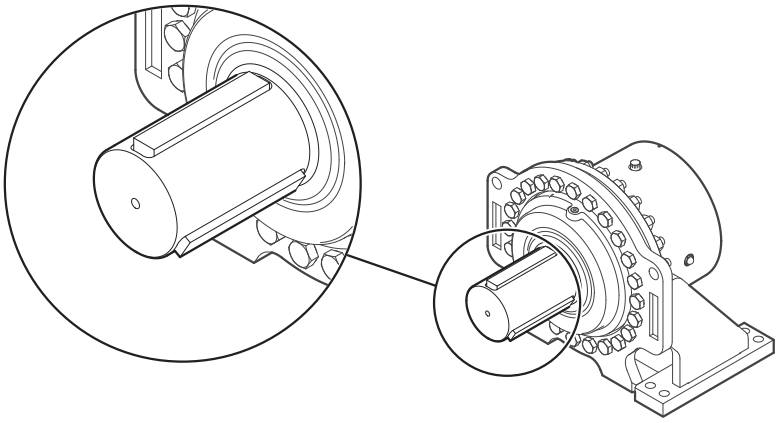
The output shaft [LSS] of the planetary gear unit is available in the following designs:

Output shaft as a solid shaft with key /..S



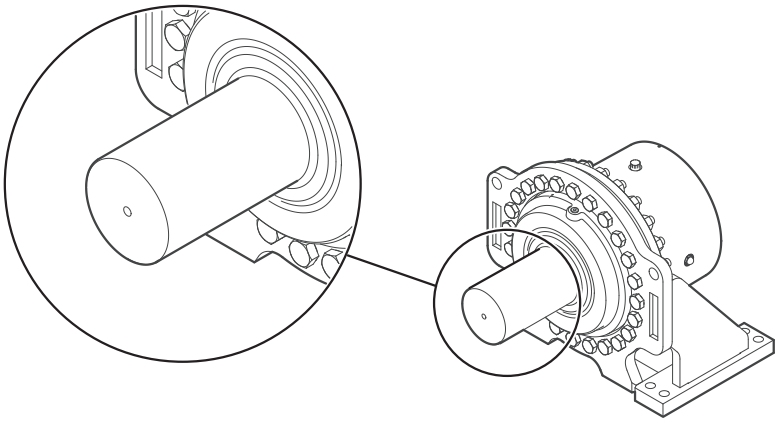
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Output shaft as a solid shaft with 2 keys /..S



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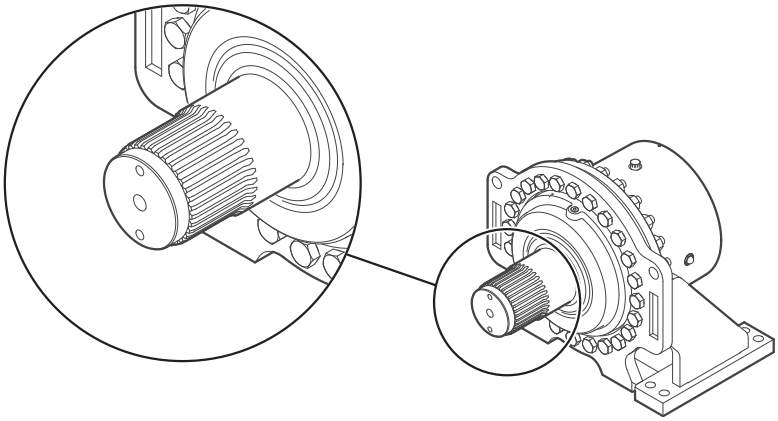
Output shaft as a smooth solid shaft /..R



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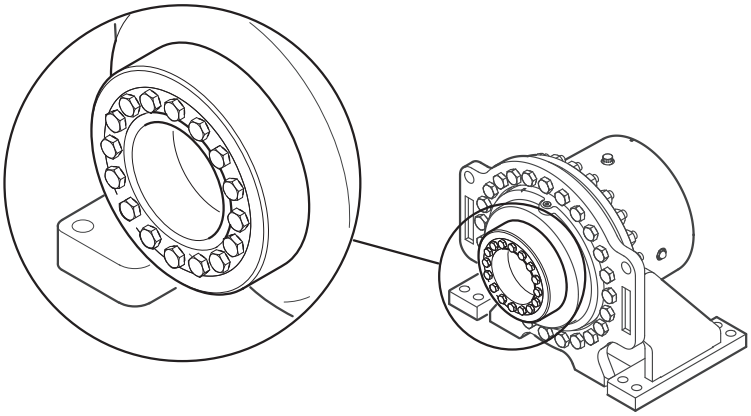
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Output shaft as a splined solid shaft /..L



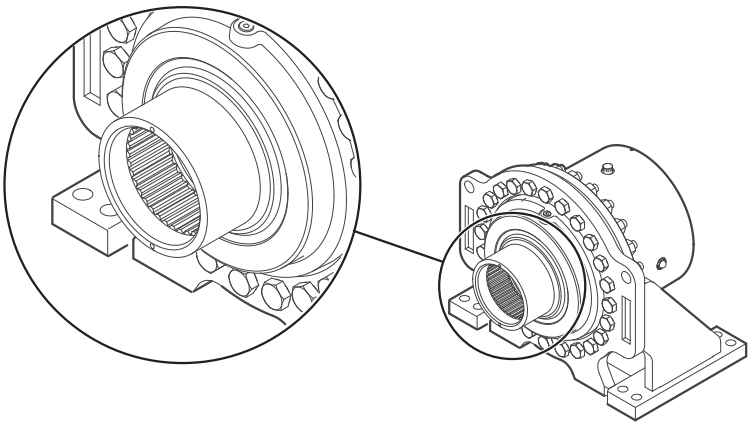
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Output shaft as a hollow shaft with shrink disk /..H



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Output shaft as a splined hollow shaft /..V



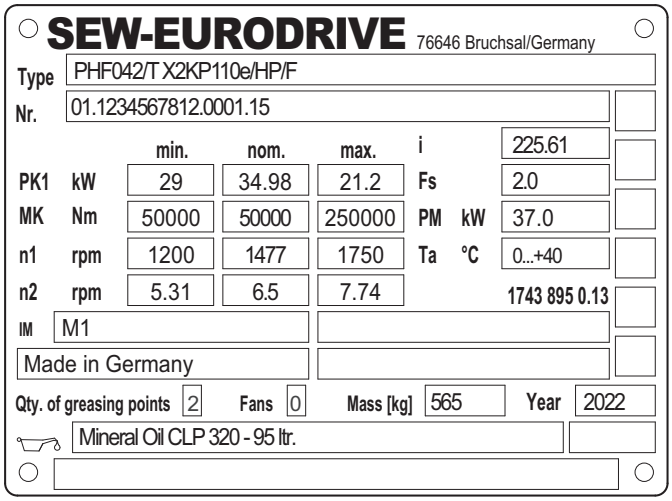
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2.9 Nameplate

2.9.1 P-X..e gear unit series

The following example shows the structure of the nameplate.



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Type		Type designation
Nr.		Production number
P_{K1}	kW	Operating power on the input shaft (HSS)
M_{K2}	Nm	Gear unit output torque
n_1	min^{-1}	Input speed (HSS)
n_2	min^{-1}	Output speed (LSS)
i		Exact gear unit ratio
F_S		Service factor
P_M	kW	Nominal motor power
T_a	°C	Permitted temperature range
IM		Mounting position and mounting surface
Qty. of greasing points		Number of regreasing points
Fans		Number of installed fans
Mass	kg	Gear unit weight
Year		Year of manufacture
		Oil grade and viscosity class/oil quantity

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Nameplate 2

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents, and further services.

The following figure shows an example of a product label:



27021632785813515

2.10 Type designation

The type designation is set up as follows:

PHF042/T X2KP110e/HP/F	
P..	P.. series planetary gear unit
PH..	Foot-mounted design, hollow shaft with shrink disk
PF..	Flange-mounted design, solid shaft
PHF..	Flange-mounted design, hollow shaft with shrink disk
042	Size
/T	Torque arm
X2KP	X series bevel-helical gear unit
110	Size
e	Generation P-X.e
/HP	Housing for planetary gear unit
/HPB	Housing for planetary gear unit with additional foot connection
/F	Flange-mounted design

2.11 Abbreviations for output shaft designs

..PHF042e/T	
P	• Gear unit design
H	Output shaft type: • - = Solid shaft with key(s) (1 or 2) • R = Smooth solid shaft • L = Splining on the outside • H = Shrink disk
F	Gear unit mounting: • - = Foot-mounted design • F = Flange-mounted design
042	• Size
/T	• Torque arm

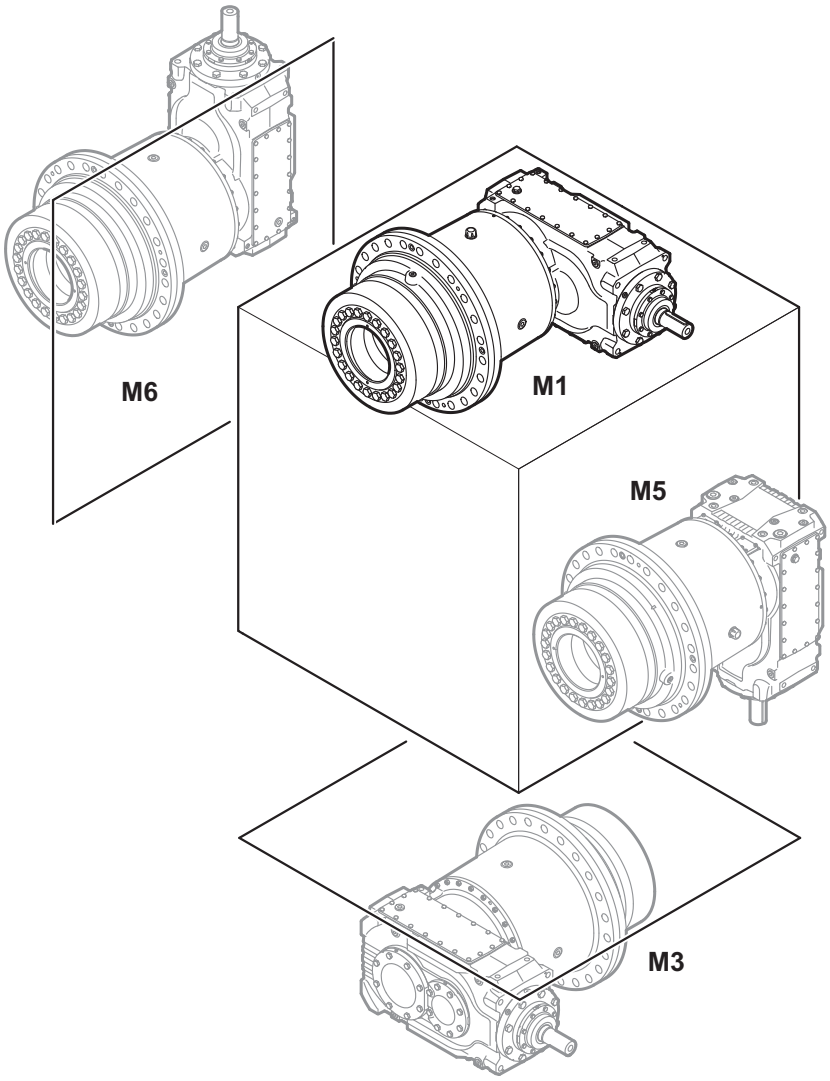
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2.12 Mounting positions

2.12.1 Standard mounting position

The mounting position defines the spatial position of the gear unit housing and is designated with M1 – M6.

The standard mounting position is **M1**.



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INFORMATION

In the event of mounting positions deviating from M1, contact SEW-EURODRIVE.

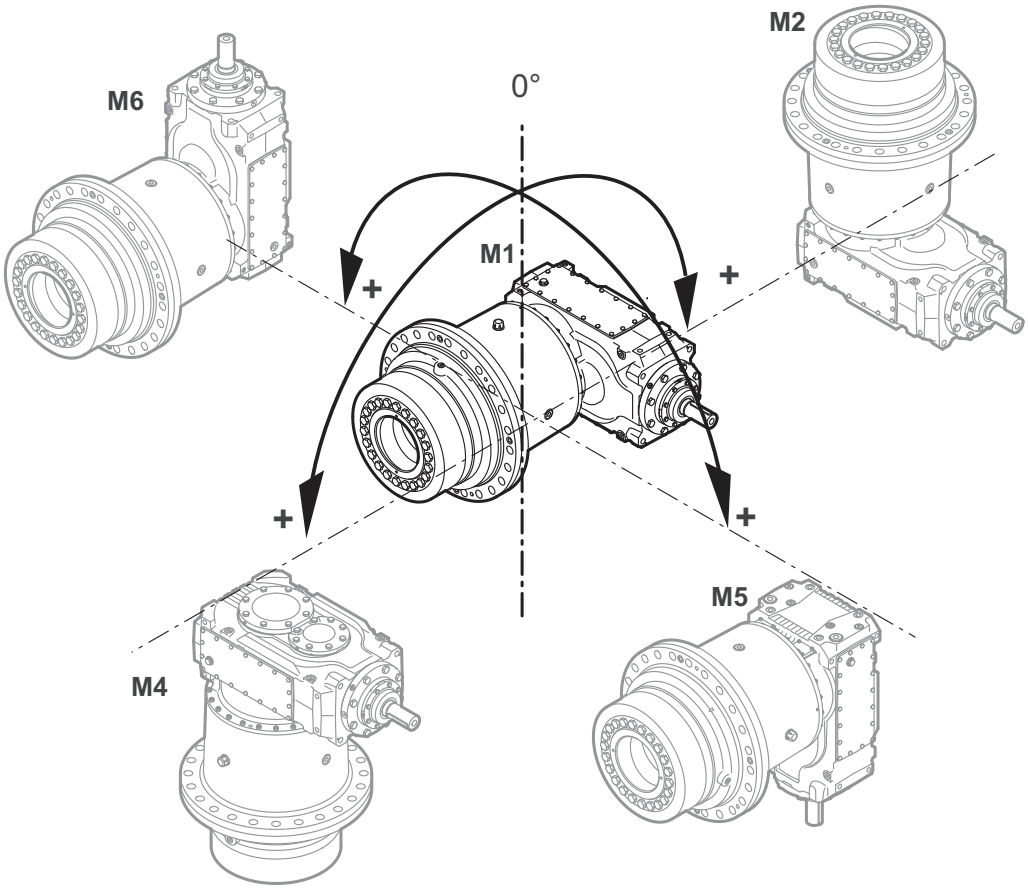
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2.12.2 Fixed and variable pivoted mounting positions

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

INFORMATION

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



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Fixed pivoted mounting position

Definition:

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

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

Example:

The type designation is set up as follows:

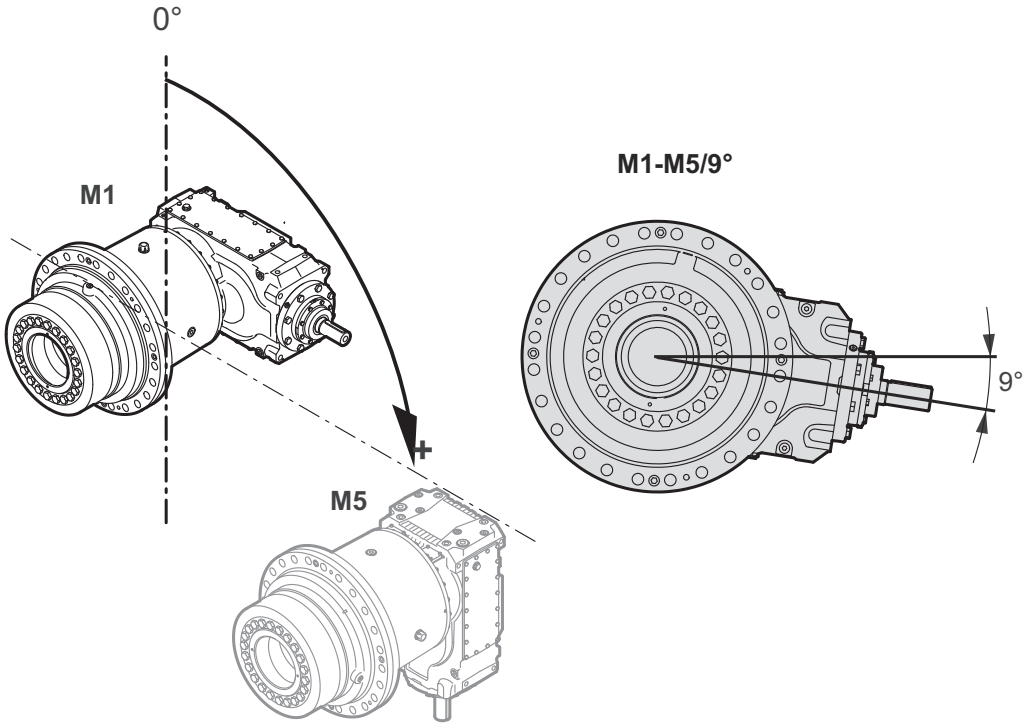
M1 = Initial mounting position

M5 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M5 by 9°

This results in the following fixed pivoted mounting position:



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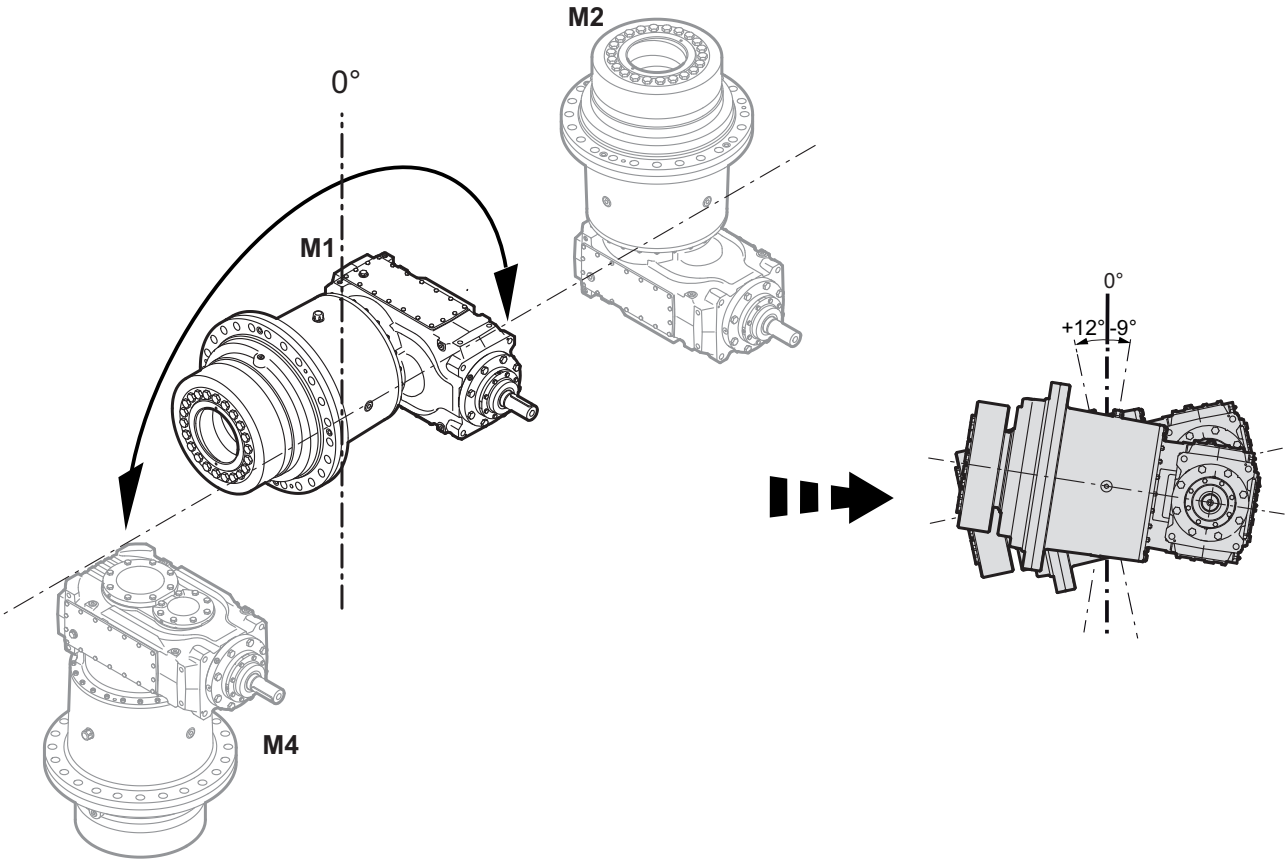
Variable pivoted mounting position

Definition:

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

Example:

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



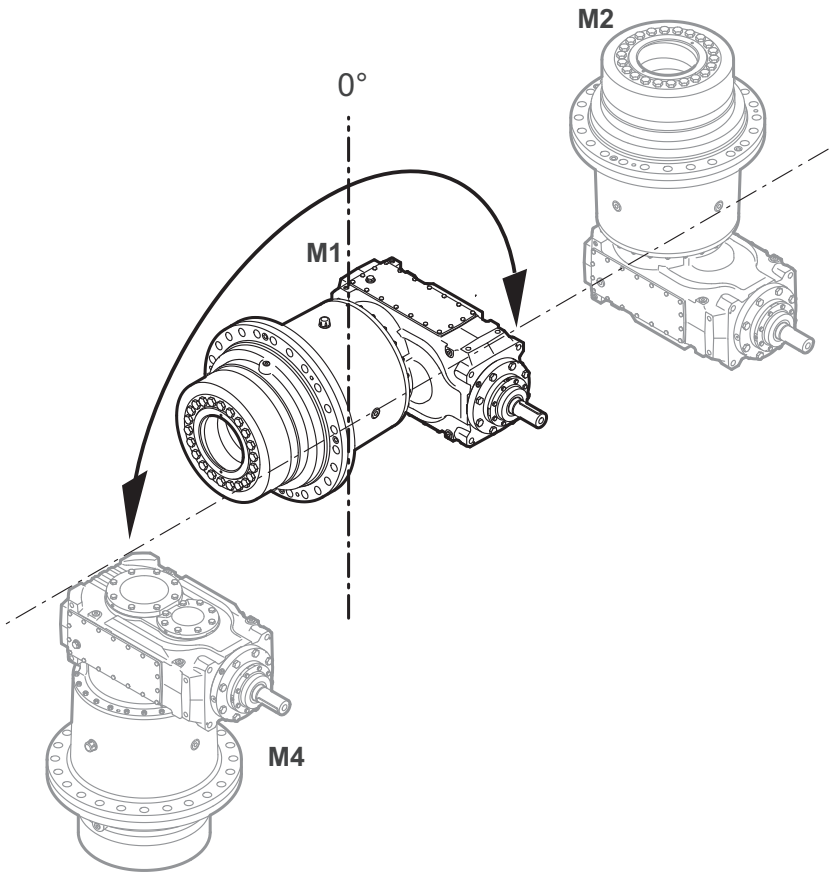
14457396107

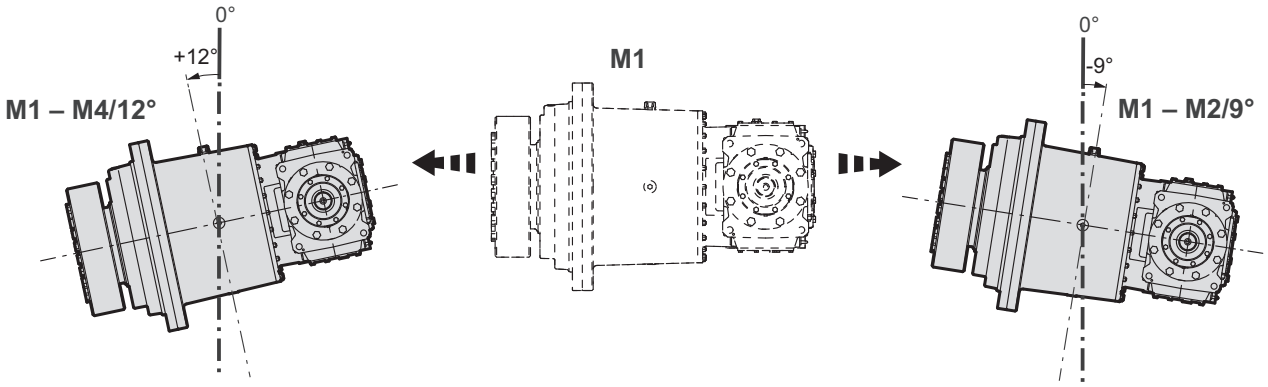
The largest pivoting angle determines the positive pivoting direction (12° > 9°). In this example, this is 12° towards M4.

Pivoted from M1 to M4 by +12°

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Pivoted from M1 to M2 by -9°





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The type designation for this example is:

M1 – M4/-9° – 12°

M1 = Initial mounting position

M4 = Pivoting direction

12° = pivoted from M1 to M4 by 12°

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

Combination of fixed and variable pivoted mounting positions

Fixed and variable pivoted mounting positions can be combined.

Example:

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

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

M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

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

M1 = Initial mounting position

M6 = Pivoting direction

12° = 12° from M1 to M6

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

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

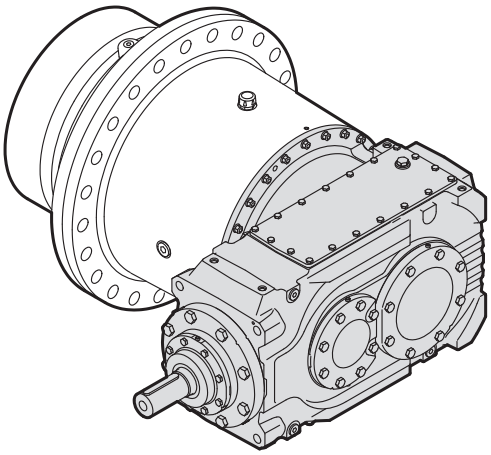
Example of a gear unit based on mounting position M1 that is tilted by ±10° around the transverse axis during operation and is mounted in a fixed angle of 15° around the longitudinal axis:

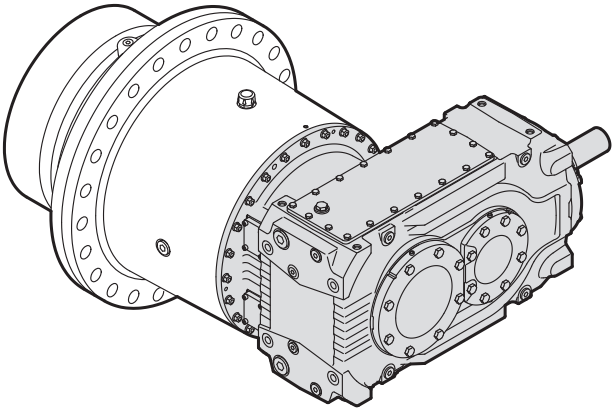
M1 - M2/10°/V - M4/10°/V - M5/15°/F

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2.13 Mounting position of the primary gear unit

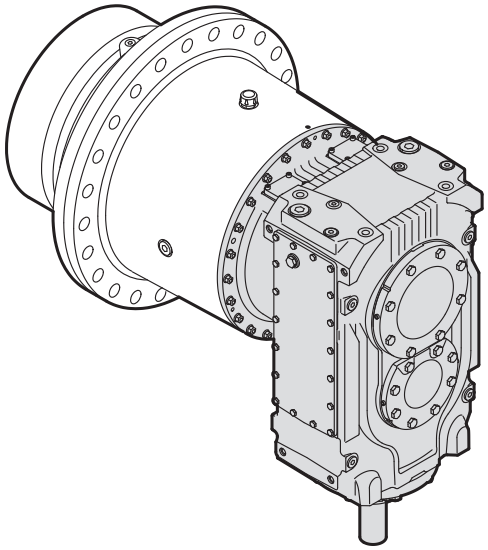
As standard, the primary gear unit can be mounted in the mounting positions **0° or 180°**.

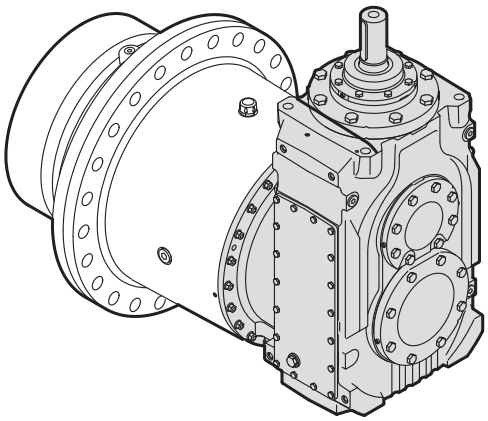
Primary gear unit mounting position 0°


Primary gear unit mounting position 180°


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The mounting positions **90° and 270°** must be considered according to the specific order; contact SEW-EURODRIVE in such cases.

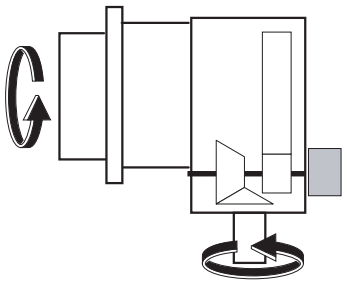
Primary gear unit mounting position 90°


Primary gear unit mounting position 270°


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2.14 Directions of rotation dependencies

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

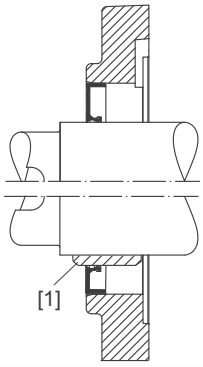
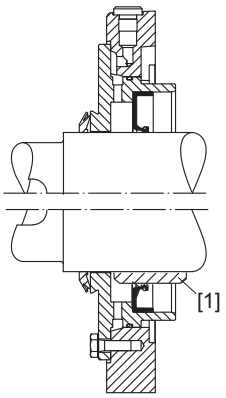
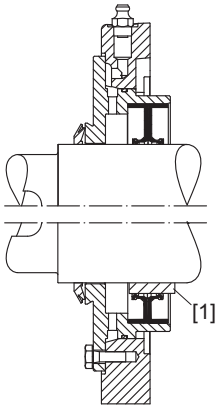
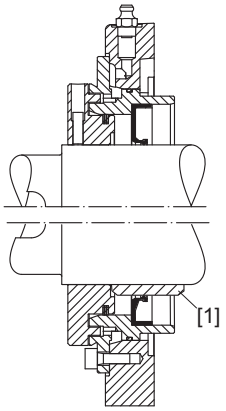
Shaft position 03 Pos. of end gear 4	
P.X2K..	

= Position of the backstop

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2.15 Sealing system

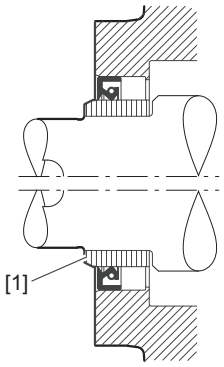
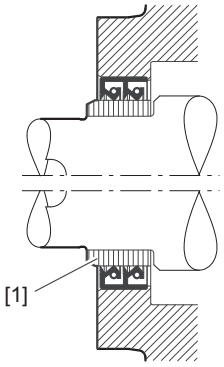
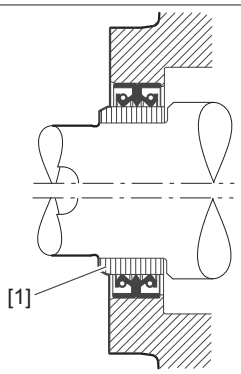
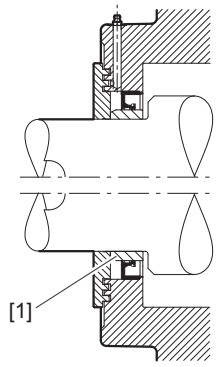
2.15.1 Input shaft

Designation	Property	Environment	Figure
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	**Medium** dust load with abrasive particles	
Dust-protected regreasable	Double oil seal with dust protection cover	**High** dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	**Very high** dust load with abrasive particles	

[1] Optional with oil seal sleeve

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2.15.2 Output shaft

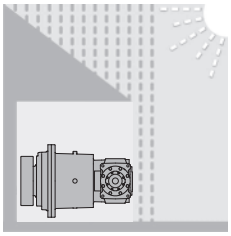
Designation	Property	Environment	Illustration
Standard for mounting position M1/M3/M5/M6	Individual radial oil seal with internal sealing with dust protection lip on a hardened sleeve [1]	Normal environment	
Optional for mounting positions M1/M3/M5/M6	2 oil seals, inside sealing, on a hardened sleeve [1]	**Medium** dust load with abrasive particles	
Optional for mounting positions M1/M3/M5/M6	1 oil seal, inside sealing, and 1 oil seal, outside sealing, on a hardened sleeve [1]	**High** dust load with abrasive particles and splashing water	
Radial labyrinth seal Regreasable for mounting position M1/M3/M5/M6	Individual radial oil seal with radial labyrinth seal on a hardened sleeve [1]	**Very high** dust load with abrasive particles	

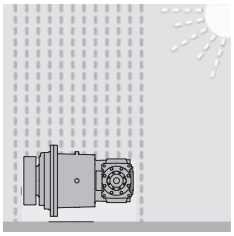
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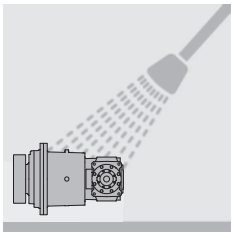
2.16 Coating and surface protection systems

The gear units are available with surface protection OS 1, OS 2, OS 3, and OS 4.

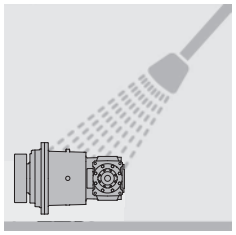
The following descriptions provide an overview of the coating and surface protection systems.

OS 1 low environmental pollution	
	Suitable 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. Based on corrosivity category: C2 (low)
Sample applications	• Systems in saw mills • Agitators and mixers
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	–

OS 2 medium environmental pollution	
	Suitable for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. Based on corrosivity category: C3 (moderate)
Sample applications	• Applications in gravel plants • Cable cars
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h

OS 3 high environmental pollution	
	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 exposure. Based on corrosivity category: C4 (high)
Sample applications	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h
Salt spray test ISO 7253	480 h

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OS 4 high environmental pollution	
	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. Based on corrosivity category: C5 (very high)
Sample applications	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry
Condensation test ISO 6270	360 h
Salt spray test ISO 7253	600 h

INFORMATION

- Standard top coat color RAL 7031, can deviate depending on the order.
- Colors according to RAL – Yes
- Water and hand perspiration repelling rust preventive for external preservation applied to uncoated parts, shaft ends/flanges.
- Sheet metal parts (such as protection covers) are painted in RAL 1003 as standard.
- Higher quality surface protection systems are available on request.

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2.17 Lubricant selection

2.17.1 General information on selecting the oil

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

INFORMATION

You must fill the gear unit 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.

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

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 (see chapter "Lubricant change intervals" in the "P-X..e series" operating instructions).

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

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2.17.2 Permitted lubricants

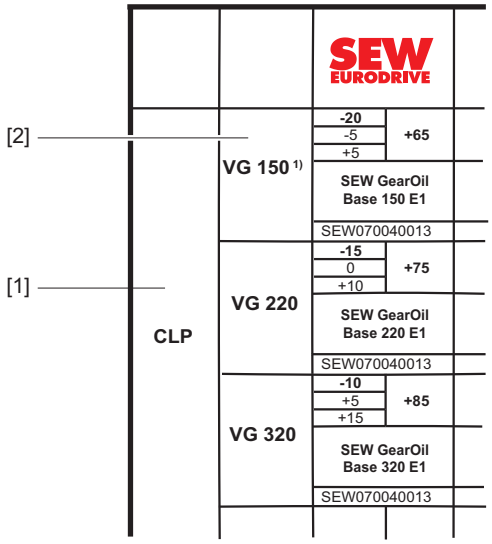
This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

Observe the following information.

- The oil type and viscosity are selected by SEW-EURODRIVE specifically to the order. The information in the order confirmation and on the nameplate are decisive.
- Contact **SEW-EURODRIVE** in advance when using biological lubricants, food grade lubricants, or polyglycol oils.
- Check the compatibility of the used grease and oil.
- The tables contain only the lubricants approved by **SEW-EURODRIVE**.
- Note that oils of the same viscosity class may have different properties depending on the manufacturer. In particular, the minimum permitted oil bath temperatures are manufacturer-specific and listed in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the used method of lubrication. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
- The values specified in the tables correspond to the state at the time of printing. The data of the lubricants is subject to dynamic change by the lubricant manufacturers. For the latest information on lubricants, refer to https://www.sew-eurodrive.de/lubricants/

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Structure of the tables and abbreviations



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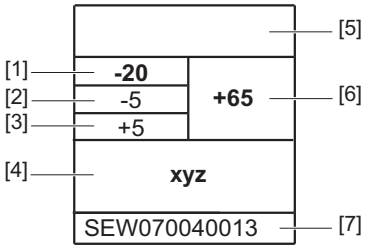
[1] Lubricant type
[2] Viscosity class

Abbreviations

Icons	Designation
CLP	= mineral oil
CLP HC	= synthetic polyalphaolefin (PAO)
E	= ester-based oil
	= mineral lubricant
	= synthetic lubricant
	= lubricant for the food industry (**NSF H1**-compliant)
	= biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= lubricants may only be used if service factor $F_s \geq 1.3$

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Explanation of the various lubricants



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[1] Lowest cold start temperature in °C for splash lubrication
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt[1)]
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt[1)]
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C[1)]
[7] Approvals

1) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

Lubricant compatibility with oil seals

Approval	Explanation
SEW07004_ _13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

Permitted application temperature range of the oil seals

In the low temperature range, oil seals can withstand shaft deflections (e.g. through overhung load) only to a limited extent. Take special care to avoid or limit pulsating and changing radial displacements of the shaft. Contact SEW-EURODRIVE if necessary.

Oil seal material class	Permitted oil sump temperature
NBR	-40°C to +80°C
FKM	-25°C to +115°C
FKM-PSS	-25°C to +115°C

Limitations of use of oil seals with the specific lubricant are described in the following table:

Material class			Manufacturer		Material	
S	1	NBR	1	Freudenberg		72 NBR 902
			2	Trelleborg		4NV11
	2	FKM	1	Freudenberg	1	75 FKM 585
					2	75 FKM 170055
			2	Trelleborg	1	VCBVR

Examples:

S11: Only the elastomer 72NBR902 from Freudenberg meets the approval requirements in conjunction with the specific lubricant.

S2: Only the elastomer FKM meets the approval requirements in conjunction with the specific lubricant.

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GearOil by SEW-EURODRIVE – lubricant for gear units



With decades of experience in gear unit development and construction, as well as numerous customer applications, SEW-EURODRIVE has extensive tribological knowledge. On this basis and in accordance with long-term test runs, SEW-EURODRIVE has developed a special formulation for its own premium gear oil: GearOil by SEW-EURODRIVE – the optimum protection for SEW-EURODRIVE gear units.

By using high-quality base materials and additives as well as the appropriate logistics, SEW-EURODRIVE ensures the highest level of quality.

GearOil by SEW-EURODRIVE increases the performance of the gear unit, regardless of whether it is a standard, servo, or industrial gear unit. The premium gear oil reduces the friction between gear wheels by creating a very good lubrication film. This increases the service life of lubricant and wear parts, such as sealing rings and bearings. The high scuffing load capacity of the GearOil Base mineral lubricant (scuffing load capacity 14) improves protection from fretting on the gearing. At the same time, GearOil increases the efficiency of the gear unit and protects against corrosion and harmful foaming of the oil. The "self-cleaning" properties of the lubricants prevent deposits as they bind water and dirt particles.

Optionally, you can select GearOil by SEW-EURODRIVE as the initial filling for the gear units and gearmotors. The premium gear oil can be ordered in can or barrel containers for service and maintenance purposes. GearOil by SEW-EURODRIVE can be stored for up to 6 years in unopened containers.

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Lubricant tables

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

[1]	[2]	SEW EURODRIVE	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	SINOPEC	TotalEnergies
CLP	VG 150	-20 … +65	-20 … +65	-20 … +65	-20 … +65	-20 … +65	-20 … +65	
		SEW GearOil Base 150 E1 / US1 / CN1 / BR1	Optigear BM 150	Alpha SP 150	Renolin CLP 150 Plus	Renolin HighGear 150	Mobilgear 600 XP 150	Klüberoil GEM 1-150 N	AP-SGO 150	
		SEW07004001 3			SEW07003001 3				SEW07003001 3	
	VG 220	-15 … +75	-15 … +75	-15 … +75	-15 … +75	-15 … +75	-15 … +75	-15 … +75	
		SEW GearOil Base 220 E1 / US1 / CN1 / BR1	Optigear BM 220	Alpha SP 220	Renolin CLP 220 Plus	Renolin HighGear 220	Mobilgear 600 XP 220	Klüberoil GEM 1-220 N	AP-SGO 220	Carter EP 220
		SEW07004001 3			SEW07003001 3				SEW07003001 3	
	VG 320	-10 … +85	-10 … +85	-10 … +80	-10 … +80	-10 … +80	-10 … +80	-10 … +80	
		SEW GearOil Base 320 E1 / US1 / CN1 / BR1	Optigear BM 320	Alpha SP 320	Renolin CLP 320 Plus	Renolin HighGear 320	Mobilgear 600 XP 320	Klüberoil GEM 1-320 N	AP-SGO 320	Carter EP 320
		SEW07004001 3			SEW07003001 3				SEW07003001 3	
	VG 460	-5 … +90	-5 … +90	-5 … +90	-5 … +90	-5 … +90	-5 … +90	-5 … +90	
		SEW GearOil Base 460 E1 / US1 / CN1 / BR1	Optigear BM 460	Alpha SP 460	Renolin CLP 460 Plus	Renolin HighGear 460	Mobilgear 600 XP 460	Klüberoil GEM 1-460 N	AP-SGO 460	Carter EP 460
		SEW07004001 3			SEW07003001 3				SEW07003001 3	
	VG 680	0 … +90	0 … +90	0 … +90	0 … +90	0 … +90	0 … +90	-5 … +90	
		SEW GearOil Base 680 E1 / US1 / CN1 / BR1	Optigear BM 680	Alpha SP 680	Renolin CLP 680 Plus	Renolin HighGear 680	Mobilgear 600 XP 680	Klüberoil GEM 1-680 N	AP-SGO 460	Carter EP 680
		SEW07004001 3			SEW07003001 3				SEW07003001 3	
	VG 1000	+5 … +90	+5 … +90							
		Optigear BM 1000								

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

[1]	[2]	SEW EURODRIVE	Castrol		FUCHS		Mobil		KLÜBER LUBRICATION	TotalEnergies
CLP HC	VG 32 [1]						-40 -30 -25 / +30			
							SHC 624			
	VG 68 [1]				-35 -20 -10 / +50		-40 -25 -15 / +50		-35 -20 -10 / +50	
					Renolin Unisyn CLP 68		SHC 626		Klübersynth GEM 4-68 N	
	VG 150 [1]	-35 -15 -5 / +75	-25 -10 0 / +70	-30 -10 0 / +70	-30 -10 +0 / +70		-30 -10 0 / +75	-35 -15 -5 / +75	-25 -10 0 / 70	-35 -15 -5 / +75
		GearOil Synth 150 E1	Alphasyn EP 150	Optigear Synthetic X 150	Renolin Unisyn CLP 150		SHC 629	SHC Gear 150	Klübersynth GEM 4-150 N	Carter SH 150
		SEW 070040313								
	VG 220	-30 -10 0 / +85	-25 -5 +5 / +80	-25 -5 +5 / +80	-25 -5 +5 / +80		-25 -5 0 / +85	-30 -10 +5 / +85	-25 -5 +5 / +80	-25 -5 +5 / +80
		GearOil Synth 220 E1	Alphasyn EP 220	Optigear Synthetic X 220	Renolin Unisyn CLP 220		SHC 630	SHC Gear 220	Klübersynth GEM 4-220 N	Carter SH 220
		SEW 070040313								
	VG 320	-25 -5 +5 / +100	-20 0 +10 / +90	-20 0 +10 / +90	-20 0 +10 / +90		-20 0 +10 / +95	-25 -5 +10 / +95	-20 0 +10 / +95	-20 0 +10 / +90
		GearOil Synth 320 E1	Alphasyn EP 320	Optigear Synthetic X 320	Renolin Unisyn CLP 320		SHC 632	SHC Gear 320	Klübersynth GEM 4-320 N	Carter SH 320
		SEW 070040313								
	VG 460	-20 0 +15 / +110	-15 +5 +15 / +100	-15 +5 +15 / +100	-15 +5 +15 / +100		-15 +5 +15 / +105	-20 0 +15 / +110	-15 +5 +20 / +105	-15 +5 +15 / +100
		GearOil Synth 460 E1	Alphasyn EP 460	Optigear Synthetic X 460	Renolin Unisyn CLP 460		SHC 634	SHC Gear 460	Klübersynth GEM 4-460 N	Carter SH 460
		SEW 070040313								
	VG 680	-15 +5 +20 / +110		-10 +10 +25 / +110	-10 +10 +25 / +110		-10 +10 +25 / +110	-15 +10 +25 / +110	-10 +10 +25 / +110	-10 +10 +25 / +110
		GearOil Synth 680 E1		Optigear Synthetic X 680	Renolin Unisyn CLP 680		SHC 636	SHC Gear 680	Klübersynth GEM 4-680 N	Carter SH 680
		SEW 070040313								
	VG 1000						-10 +15 +30 / +110	-10 +15 +30 / +110	0 +20 +30 / +110	
							SHC 639	SHC Gear 1000	Klübersynth EG4-1000	

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

| [1] | | |

2.17.3 Lubricant fill quantities

The specified lubricant fill quantities are **approximate 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

- The gear units of the P-X..e series are delivered without lubricant.
- The oil quantity to be filled depends on the mark on the oil dipstick.
- For pivoted mounting positions, the lubricant fill quantity on the nameplate may deviate from the standard. The fill quantity specified on the nameplate is an approximate value. The markings on the oil dipstick are the decisive indicators for the correct fill level.
- For variable pivoted mounting positions, adhere to the control mounting position on the additional nameplate "Oil control angle".

The following table shows the lubricant fill quantities for splash lubrication.

X2K..	P.042		P.052		P.062		P.072		P.082		P.092		P.102	
i_{tot}	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550	155-285	≥285-550
110e	27	27	–	29	–	–	–	–	–	–	–	–	–	–
130e	–	–	36	–	43	43	–	47	–	–	–	–	–	–
150e	–	–	–	–	–	–	63	–	74	74	–	84	–	93
170e	–	–	–	–	–	–	–	–	–	–	111	–	119	–

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2.17.4 Sealing greases/bearing greases

Bearing greases

The table shows the greases recommended by SEW-EURODRIVE with the "lower operating temperature".

The permitted operating temperature of the lubricant used must be taken into account for the lower and upper operating temperature. For further information, refer to chapter "Lubricant table" (→ 🗎 42).

Area of operation	Manufacturer	Greases	Lower temperature limit
Standard	SEW-EURODRIVE	**SEW Grease HL 2 E1**[1)]	-40 °C
	Fuchs	Renolit CX TOM 15 OEM	-40 °C
	BP	Energrease LS EP-2	-30 °C
	Castrol	Longtime PD 2	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-25 °C
		Petamo GHY 133 N	-40 °C
	Mobil	Mobilux EP 2	-20 °C
	Shell	Gadus S2 V220 2	-20 °C
	Total	Multis EP 2	-20 °C
	SEW-EURODRIVE	**SEW Grease HL 2 H1 E1**[1)]	-40 °C
	Bremer & Leguil	Cassida Grease GTS2	-40 °C
	Fuchs	**Plantogel 2**[1)]	-40 °C

1) Use the greases used at the factory if possible.

Premium bearing grease HL 2 E1 Grease by SEW-EURODRIVE

HL 2 E1 Grease by SEW-EURODRIVE consists of optimally matched product components. The calcium sulfonate complex saponified lubricating grease is based on a semi-synthetic base oil. In combination with an optimized additive package, the HL 2 E1 Grease by SEW-EURODRIVE has extraordinary mechanical characteristics. The powerful lubricant provides high thermal and mechanical stability for all friction points (bearings and seals) which are subjected to high levels of stress in the gear unit and the seals in the motor. This minimizes sealing ring wear and reduces the risk of premature roller bearing failure.

The corresponding premium bearing grease HL 2 E1 Grease by SEW-EURODRIVE is available for use in the food processing industry.

Key advantages:

- Good corrosion and wear protection
- Wide service temperature range
- Optimum water resistance
- Resistant to aging
- High thermal and mechanical stability

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2.17.5 Lubrication type

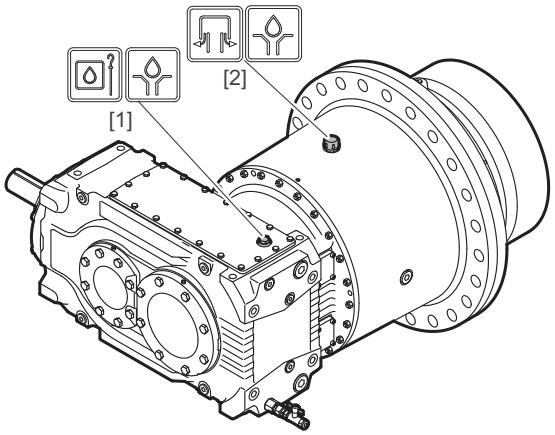
The splash lubrication is the standard lubrication type. Gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil.

Oil bath lubrication may be necessary for mounting positions other than the standard mounting position M1. Contact SEW-EURODRIVE in this case.

2.17.6 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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2.17.7 Oil drain

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

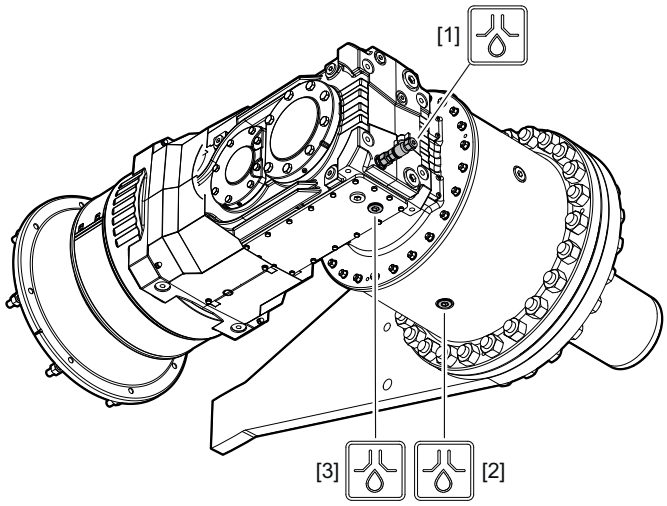
In case a complete oil drain is required, additional screw plugs [2] at the planetary gear unit or the primary gear unit [3] can be used.

These screw plugs are optionally also available in magnetic design.

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

INFORMATION

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



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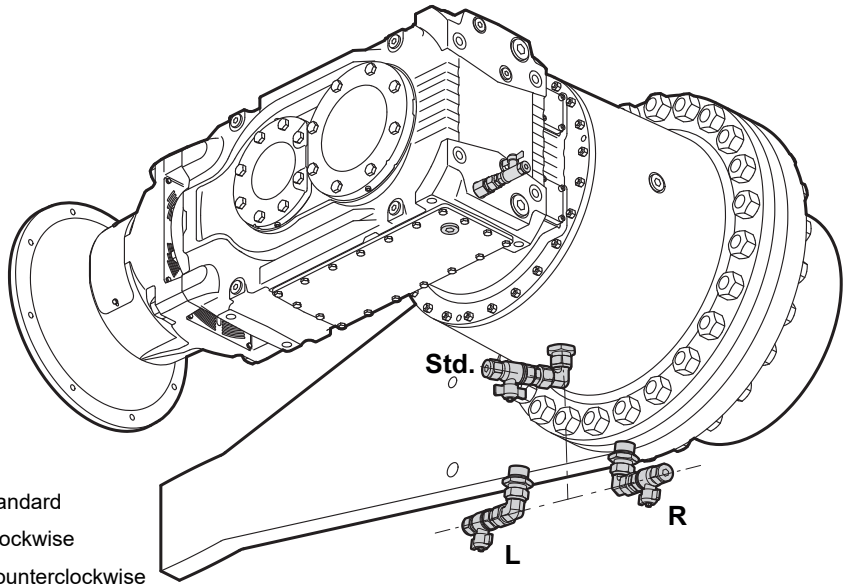
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2.17.8 Oil drain valve

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

Position of the oil drain valve size P.042 – P.052

For planetary gear units of sizes P.042 – P.052, an oil drain valve with wing handle is used as standard. The following figure shows the installation options of the oil drain valve.

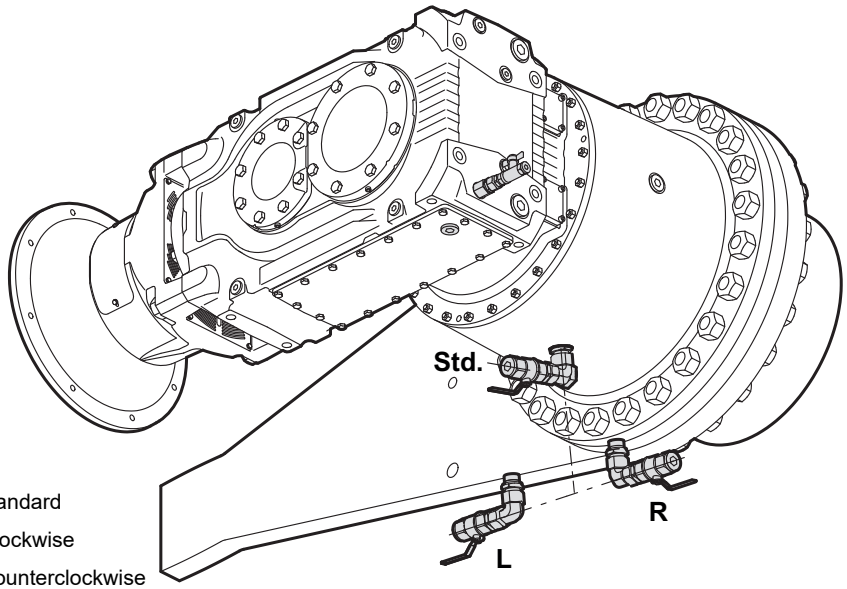


Std. = standard
R = Clockwise
L = Counterclockwise

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Position of the oil drain valve size P.062 – P.102

For planetary gear units of sizes P.062 – P.102, an oil drain valve with lever grip is used as standard. The following figure shows the installation options of the oil drain valve.



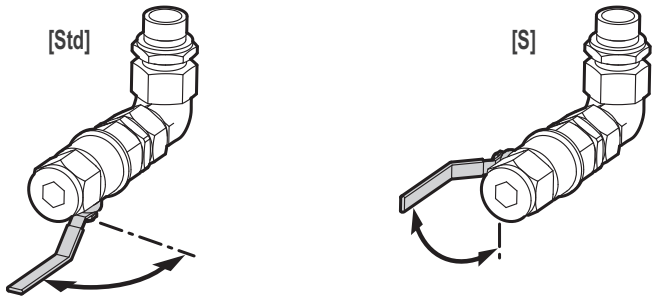
Std. = standard
R = Clockwise
L = Counterclockwise

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Position of the lever

The following figure shows the possible positions of the lever.



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Std = Standard
S = On the side

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2.18 Storage and transport conditions

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

2.18.1 Internal preservation

Standard preservation

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. If specified in the order, the gear unit can be delivered with oil. Refer to the order documents for more information.

Long-term preservation

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 is replaced by a screw plug and included in the gear unit delivery.

Preservation with VCI anti-corrosion agent is not permitted for gear units that are operated with food grade lubricants. Contact SEW-EURODRIVE in such cases.

2.18.2 Exterior preservation

The following measures are taken for exterior preservation:

- Anti-corrosion agent is applied to bare, non-painted functional surfaces of shafts, flanges, mounting and foot surfaces of the housing. The anti-corrosion agent must be removed only with a suitable solvent that does not damage 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 with plastic plugs.
- If the gear unit is stored longer than 6 months, you must regularly check the protective coating of unpainted areas as well as the paint coating. Renew areas with damaged protective coating/paint.

2.18.3 Packaging

Standard packaging

The gear unit is delivered on a pallet without cover.

Use: transport by truck or rail

Long-term packaging

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

Use: transport by ship and/or extended storage

2.18.4 Storage conditions

Improper storage may result in damage to the gear unit. Observe the following information to prevent damage to the gear unit:

- While in storage until startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing races.

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- Only fill gear units with oil up to the uppermost rolling element. This ensures a remaining air volume for the oil to expand in case of higher temperatures. Add VCI Anticorit to the oil and tightly seal the gear unit (replace the breather with a screw plug).
- The permissible storage temperature is -30 °C to +50 °C.
- When storing in tropical areas, ensure adequate protection against insect damage. Contact SEW-EURODRIVE in case of deviating requirements.

The gear unit is delivered without any oil filling as standard; different protection systems are required depending on the storage period and storage conditions as shown in the following table:

Preservation + packaging	Storage location	Storage duration
Standard preservation + Standard packaging	• Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity) • No sudden temperature variations and controlled ventilation with filter (free of dirt and dust) • No aggressive vapors or shocks	Maximum 6 months with intact surface protection
Long-term preservation + Standard packaging	• Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity) • No sudden temperature variations and controlled ventilation of the storage room with filter (free of dirt and dust) • No aggressive vapors or shocks	Maximum 3 years with regular inspection and checking for intactness
Long-term preservation + Long-term packaging	• Covered, protection against rain, vibration-free	Maximum 3 years with regular inspection and checking for intactness

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3 Options and accessories

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

- ATEX design
- Double-sided torque arm
- Hollow shaft with shrink disk optional with forcing thread
- External oil-water cooler and oil-air cooler
- Shaft end pump
- Water cooling cartridge
- Axial and radial fan

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3.1 Torque arm

3.1.1 Single-sided torque arm

The reaction torque to the 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 from the gear unit torque divided by the length of the lever arm A acts on the support. The reaction force acts on the gear unit and customer bearings.

NOTICE

Mounting elements may be damaged by excessively high impacts.

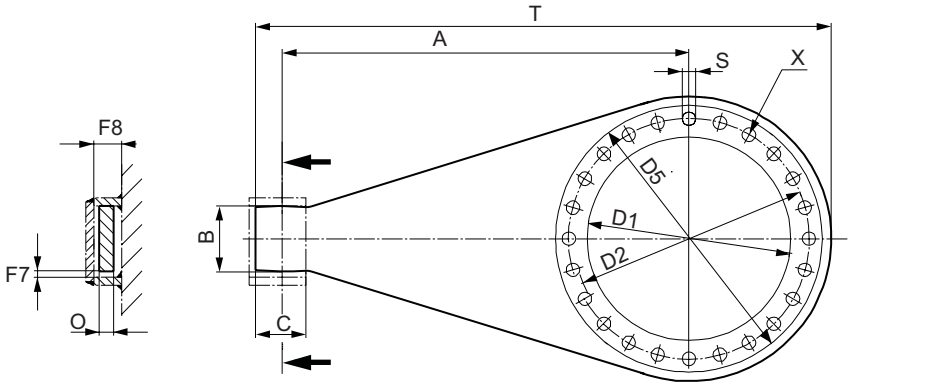
Possible damage to property.

- Limit the maximum clearance for the torque arm bearing according to F7 and F8 in the following table.

INFORMATION

The torque arm bearing must be sufficiently dimensioned by the user.

The following figure shows a sample torque arm with dimensions.



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Dimensions

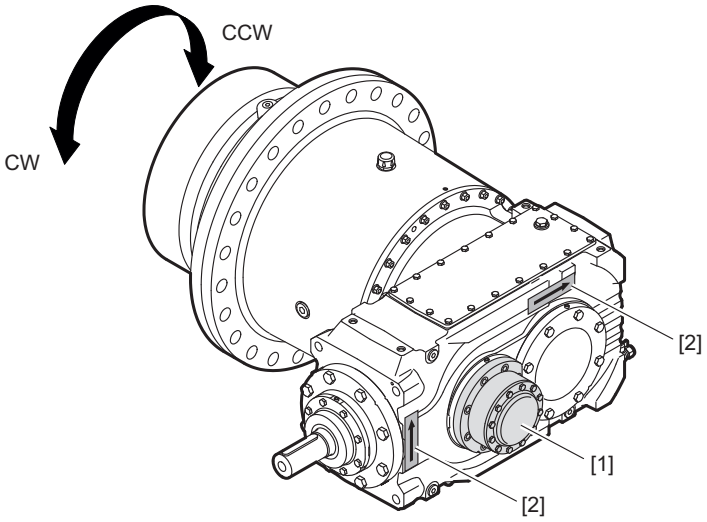
Size	Dimensions in mm										Quantity	Mass
	A	B	C	D1	D2	O	F7	F8	S	T	X	kg
P.042	900	150	120	484	560	40	2	80	33	1270	20	93
P.052	1000	160	130	534	590	40	2	80	33	1390	24	102
P.062	1200	180	150	614	690	50	2	100	39	1655	24	183
P.072	1500	230	200	694	770	60	2	120	39	2020	24	317
P.082	1600	230	200	754	840	70	2	140	45	2160	24	420
P.092	1650	250	220	804	870	70	2	140	45	2235	24	440
P.102	1700	250	220	854	960	70	2	140	45	2335	24	510

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3.2 Backstop /BS

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

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.

In the event of deviating requirements, contact SEW-EURODRIVE.

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

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

- Speeds at the input shaft n_1 < 950 min^{-1}
- or when using any of the following gear unit designs:

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

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

INFORMATION

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

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3.3 Motor adapters /MA

The motor adapters [1] are available for the mounting of:

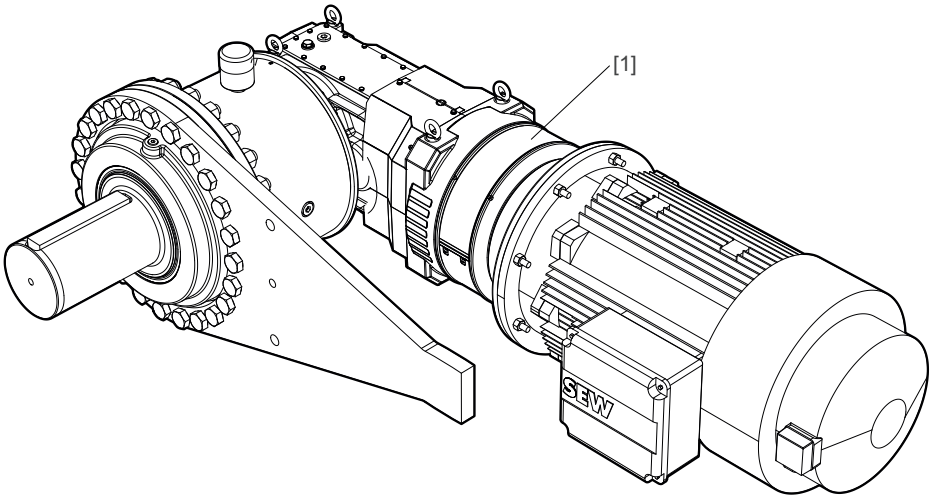
- **IEC (B5) motors** of sizes 200 to 355
- **NEMA ("C" face) motors** of sizes 324 to 449

INFORMATION

- The gear unit must be installed in such a way that liquids cannot enter the motor adapter (HSS end) and accumulate there. Otherwise there is the danger that the respective oil seal can be damaged and subsequent damage can thereby create a potential ignition source.
- An elastic claw coupling is included in the scope of delivery.
- All motor adapters can have a fan installed.

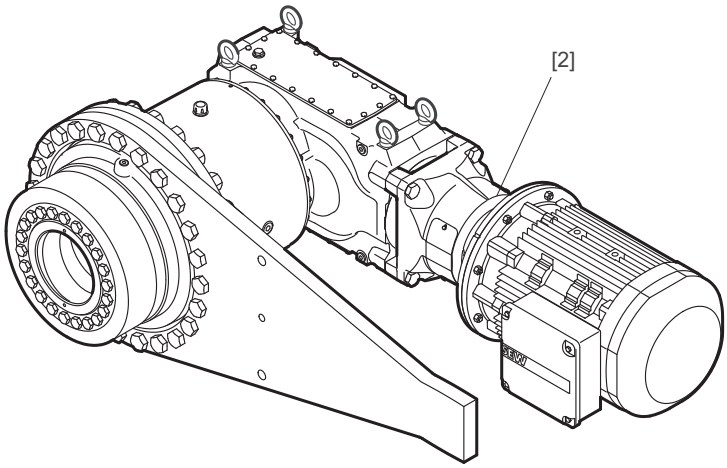
The motor adapter is available in 2 designs.

The following figure shows an example of the mounting of an MA2 motor adapter [1] with optional fan.



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The following figure shows an example of the mounting of an MA1 motor adapter [2] without optional fan.



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3.3.1 Max. permitted motor weight

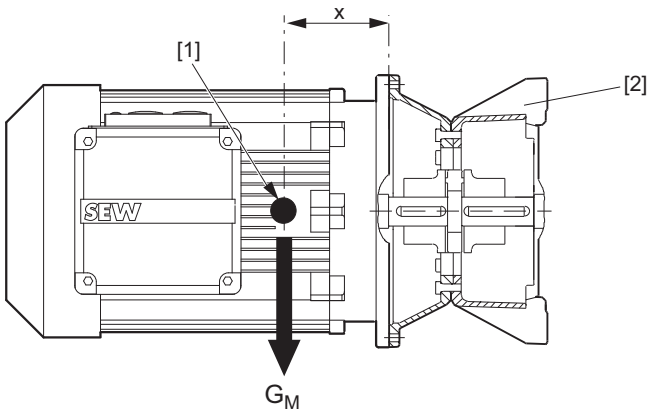
When mounting a motor at the gear unit the approved maximum motor weight in regard to the motor adapter size must be verified.

INFORMATION

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

2. Maximum motor weight depending on motor adapter size

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



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

INFORMATION

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

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

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

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3.4 Foot-mounted design

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

Please contact SEW-EURODRIVE.

3.5 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.

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3.6 Oil heater

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

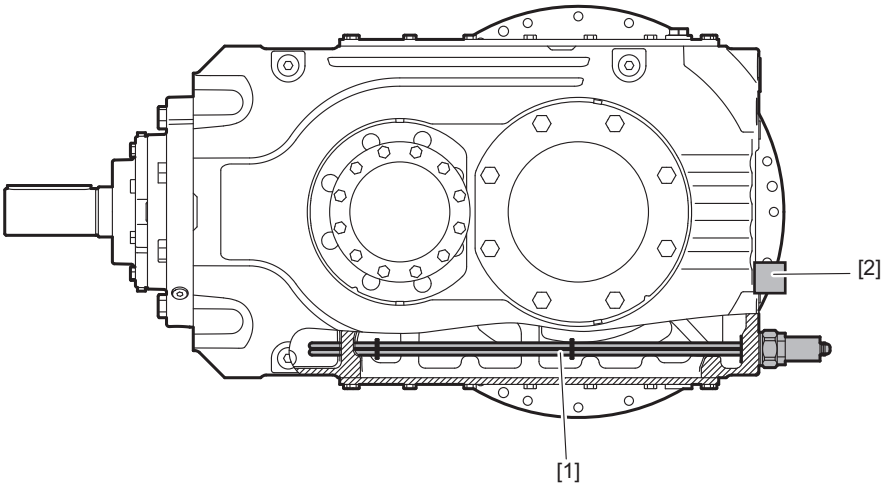
Note the oil viscosity outside of the gear unit (e.g. in the oil pipes) when performing a cold gear unit startup.

The heater is screwed into the gear unit housing at the factory and is controlled by a thermostat. The set limit temperature on the thermostat below which the oil must be heated is set at the factory depending on the used lubricant.

3.6.1 Structure

The oil heater consists of 2 main parts:

1. Heating element in the oil sump 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 depending on the design and mounting position of the gear unit.
- Depending on the mounting position, gear unit size, and lubrication type, there may be limitations of the possible combinations of accessory options. Contact SEW-EURODRIVE.
- To keep the gear unit startup temperature, the thermostat can be continuously supplied with current. 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" (→ 🗎 60).
- For dimensions of the heating elements, refer to chapter "Oil heater / OH" (→ 🗎 118).

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3.6.2 Information on the function of the oil heater

- The switching point of the oil heater thermostat is factory-set to a temperature of approximately 5 K above the respective initial temperature for gear unit startup. The thermostat turns off the oil heater at this temperature. Only then may the gear unit be started up. The thermostat activates the oil heater again once the temperature is approximately 5 K below the switching point.

  The lowest cold start temperature depends on the used lubricant and the lubrication type of the gear unit. For more information, refer to chapter "Permitted lubricants" (→ 🗎 37).
- To prevent the oil from burning, the heating elements of the heater have a maximum surface load. This is why the heating process for cold gear unit oil can take between one and several hours. The exact duration of the heating process before the start varies depending on the gear unit size, design, mounting position, oil quantity, and ambient temperature.
- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, cable them properly and connect them to the current supply.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.

3.6.3 Connection power

The table shows the power of the installable heating elements.

Peripheral conditions: T_{amb} = -25 °C; mounting position M1 (splash lubrication)					
Size	**Heating element**		**P_{Inst} W**	**Heating after 4 h K**	**Max. heating K**
P042 X2K110e	1	OH	340	10	12
	2	OH-F + OH	170 + 340	14	17
P052 X2K110e	1	OH	340	8	11
	2	OH-F + OH	170 + 340	13	16
P052 X2K130e	1	OH	410	9	11
	2	OH-F + OH	200 + 410	13	17
P062 X2K130e	1	OH	410	7	10
	2	OH-F + OH	200 + 410	12	14
P072 X2K130e	1	OH	410	7	9
	2	OH-F + OH	200 + 410	10	13
P072 X2K150e	1	OH	490	7	10
	2	OH-F + OH	200 + 490	10	13
P082 X2K150e	1	OH	490	6	9
	2	OH-F + OH	200 + 490	8	12
P092 X2K150e	1	OH	490	5	8
	2	OH-F + OH	200 + 490	8	11
P102 X2K150e	1	OH	490	4	7
	2	OH-F + OH	200 + 490	7	10
P092 X2K170e	1	OH	570	5	8
	2	OH-F + OH	340 + 570	8	12
P102 X2K170e	1	OH	570	5	7
	2	OH-F + OH	340 + 570	7	11

P_{inst} = Power of the installed heater

OH = Oil heater in the gear unit

OH-F = Oil heater in the flange

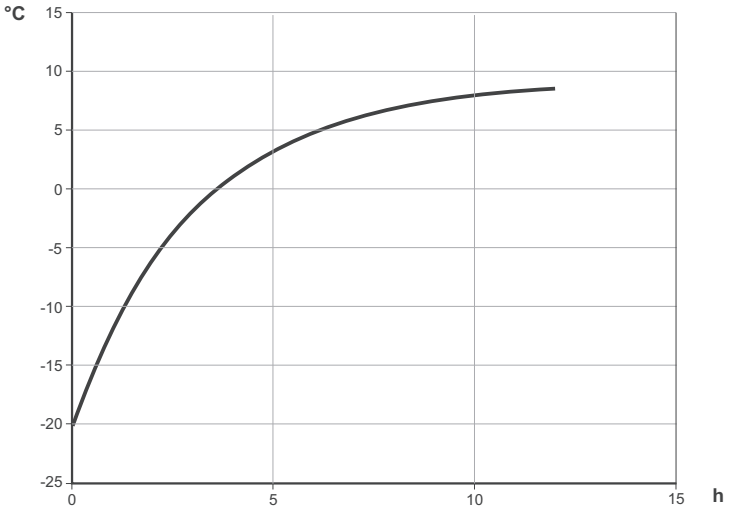
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3.6.4 Example of heating

Example of heating with the gear unit combination P072 X2K150

With the following basic conditions:

2 heating elements Peripheral conditions: T_{amb} = -20 °C; mounting position M1 (splash lubrication)		
Duration h	**Heating K**	**Temperature °C**
0	0	-20
1	8.0	-12.0
2	13.9	-6.1
3	18.1	-1.9
4	21.2	1.2
5	23.4	3.4
6	25.0	5.0
7	26.2	6.2
8	27.1	7.1
9	27.7	7.7
10	28.1	8.1
11	28.5	8.5
12	28.7	8.7



°C = Temperature h = Heating duration

3.6.5 Limit temperature for gear unit startup

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.

Before startup, the oil may have to be heated to the specified "starting temperature" by an oil heater. Observe the lubricant table in chapter "Permitted lubricants".

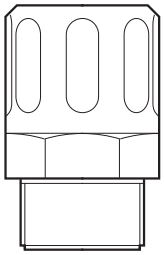
3.7 Breather /BPG

The breather prevents non-permitted pressure increases generated by heating or cooling during operation.

Observe the following information.

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3.7.1 Breather (standard)



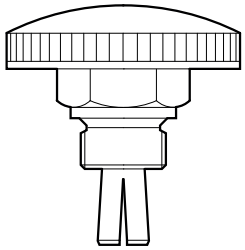
9007218373427339

Structure

Features	
Housing material	Steel
Filter inserts	Wire mesh
Design	3/4" or 1"

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3.7.2 Steel breather for harsh operating conditions

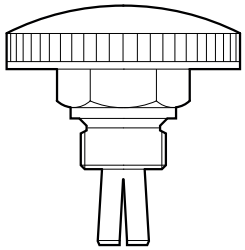


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Structure

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

3.7.3 Stainless steel breather for harsh operating conditions



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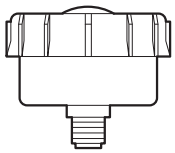
Structure

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

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3.7.4 Breather with filter insert /PI

The breather has a corrosion-proof housing with air intake opening at the top. The cover with protection lip keeps splashing water off.

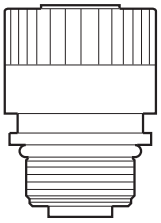


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Structure

Characteristics	
Housing material	Polyamide
Filter inserts	Wire mesh, galvanized
Filter size	10 µm
Thread	3/4" or 1"

3.7.5 Plastic breather



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Structure

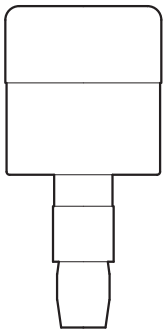
Features	
Housing material	Plastic
Filter inserts	Polyester filter, not exchangeable
Filter size	2 µm
Threads	3/4" or 1"

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3.7.6 Desiccant breather filter /DC

The filter contains a desiccant that absorbs water vapor from the inflowing air.

The filter can also retain oil mist from the outflowing air, which reduces the environmental impact and increases the efficiency of the system



9007222800055435

Structure

Features	
Housing material	Polycarbonate
Filter inserts	• Polyester filter: Removes air particles > 3 µm • Silica gel: Absorbs water and humidity. Saturation is indicated by the color changing from blue to pink. • Foam pad: Absorbs oil mist
Thread	3/8" or 1"

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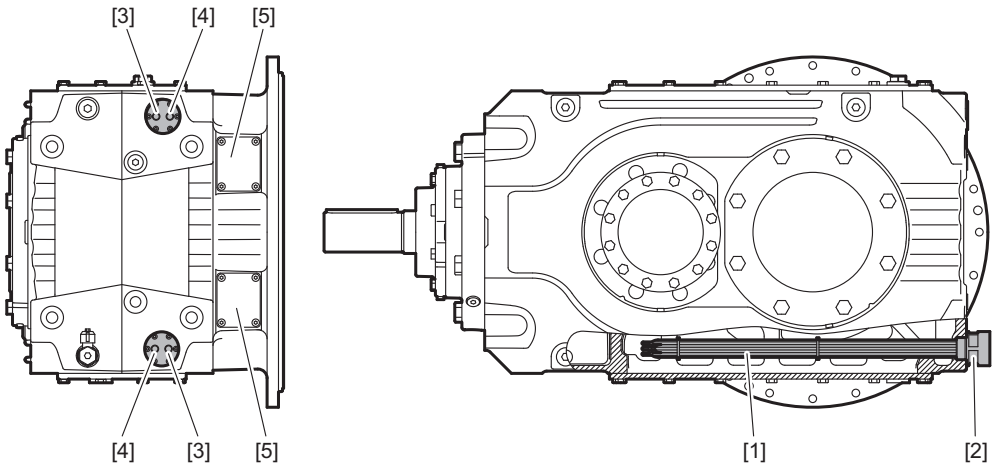
3.8 Water cooling cartridge /CCT

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.

3.8.1 Structure



[1] Cooling pipes
[2] Tube plate with connection 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), stainless steel optional
- Tube plate (brass)
- Connection piece (brass; gray cast iron; steel)

Two bores with the following pipe thread are available to connect to the cooling circuit:

Size	Pipe thread
X100e – 130e	1″
X140e – 170e	1¼″

The piping is not included in the scope of delivery.

The gear unit with water cooling cartridge is delivered completely assembled.

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

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3.8.2 Notes on connection and operation

Thermal ratings are specified in chapter "Selection tables". To reach these, different cooling water flow rates are required for different gear unit designs. The required cooling water flow rate depends on the following characteristics:

- Gear unit size
- Mounting position
- Lubrication type

The cooling water quantity must be dimensioned individually for each cooling cartridge.

Size/connection	Max. cooling water flow rate l/min
X2K110e/X2K130e – G1″	12
X2K150e/X2K170e – G1 ¼″	15

INFORMATION

The specified cooling water flow rate refers to one cooling cartridge. The cooling circuit must be connected in parallel for gear units with several water cooling cartridges. A series connection of multiple cooling cartridges is not permitted.

3.8.3 Requirements on the water quality

INFORMATION

Note that special measures are required when using sea water and 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 the use of water cooling cartridges. The water quality is determined by the water hardness and the pH value of the water.

Water hardness

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

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

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

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

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pH value

The water cooling cartridge partially consists of a copper and nickel alloy, whereby corrosion problems can occur at a **pH value < 6**.

With alkaline water, corrosion problems can occur at a **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 CuNi10Fe1Mn
pH value	< 6	0
	6 to 9	+
	> 9	0
Chloride	Up to 1000	+
	> 1000	+ (< 25 000 mg/l)
Sulfate	Up to 70	+
	70 to 300	+
	> 300	+ (< 25 000 mg/l)
Nitrate	Up to 100	+
	> 100	0
Free (aggressive) carbonic acid	Up to 20	+
	20 to 50	0
	> 50	–
Oxygen	Up to 2)	+
	> 2	+
Ammonium	Up to 2	+
	2 to 20	+
	> 20	–
Iron (dissolved)	Up to 10	0
	> 10	–
Manganese (dissolved)	Up to 1	0
	> 1	–
Free chlorine	Up to 5	Permanently < 0.5 mg/l
	> 5	Intermittently < 3.0 mg/l
Sulfide		0
Ammonia		+ (< 15 mg/l)

Key

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

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Types of cooling water/characteristics

	Note the following conditions:
Industrial water	• Usually untreated water (no drinking water) • Often very contaminated • A water analysis is necessary for assessment • Copper, brass and steel are very resistant against industrial water
Stream water and river water	• We recommend using copper brass pipes • Cast iron parts must be protected against corrosion by suitable coating • Usually untreated water (no drinking water) • Often very contaminated • A water analysis is necessary for assessment
Salt water	• As standard, water cooling cartridges are made of copper nickel pipes. Stainless steel or titanium pipes are available on request.
Brackish water	• As standard, water cooling cartridges are made of copper nickel pipes. Stainless steel or titanium pipes are available on request. • A mixture of sea water and river water

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4 Condition monitoring

4.1 Temperature switch /NTB

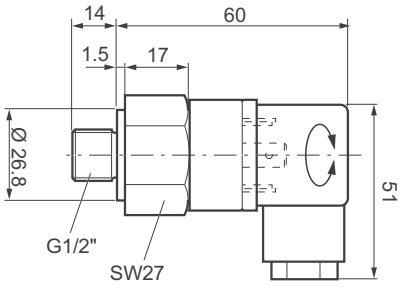
A temperature switch with preset switching temperatures of 70, 80, 90, or 100 °C is optionally available for monitoring the gear unit's oil temperature.

For various functions, the temperature switch is also used as a limit value switch, e.g. for:

- Tripping a pre-alarm
- Tripping a main alarm for switch-off of the main motor

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

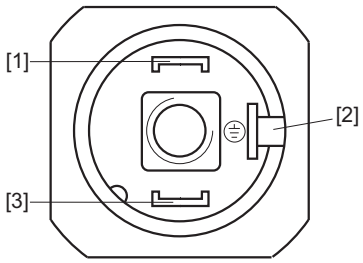
4.1.1 Dimensions



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4.1.2 Electrical connection

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



366532491

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

4.1.3 Technical data

- Trip temperature: 70 °C, 80 °C, 90 °C, 100 °C ± 5 °C
- Contact capacity: 10 A – AC 240 V
- Connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the connector for electrical connection is 0.25 Nm.

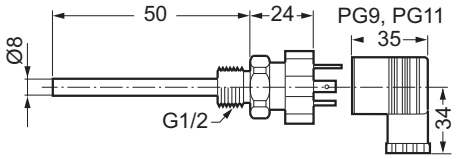
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4.2 Temperature sensor PT100

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

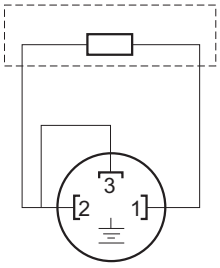
The temperature sensor is located in the oil sump of the gear unit. The exact position depends on the gear unit design.

4.2.1 Dimensions



13968000011

4.2.2 Electrical connection



9007205607947403

[1] / [2] Resistor element connection

4.2.3 Technical data

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

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

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4.3 Temperature switch /TSK

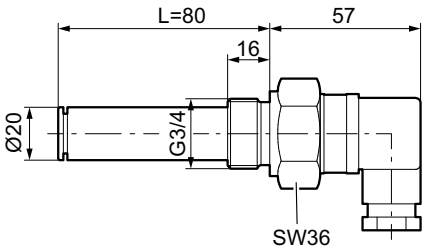
The TSK temperature switch is used with oil supply systems for circulation cooling. It is provided with 2 fixed switching points of 60 °C and 90 °C for controlling and monitoring the system.

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

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

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

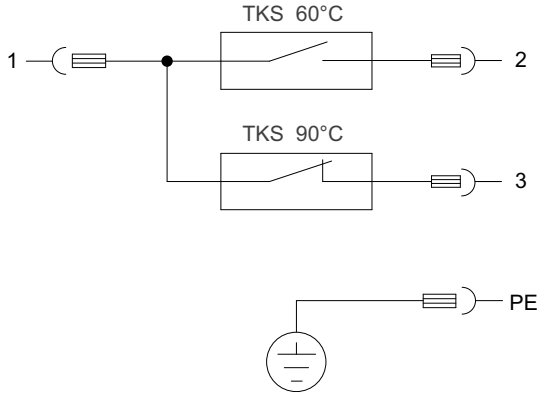
4.3.1 Dimensions



56786717195

4.3.2 Electrical connection

To ensure a long service life and proper function, it is recommended to use a relay in the 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

4.3.3 Technical data

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

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4.4 Diagnostic unit DUO10A (oil ageing)

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

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

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

Oil grades:

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

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

- Early warning:

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

- Main alarm:

  Is set when the estimated remaining service life reaches zero.

- Limit temperature:

  Shows when the permitted oil temperature has been exceeded.

- Ready for operation:

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

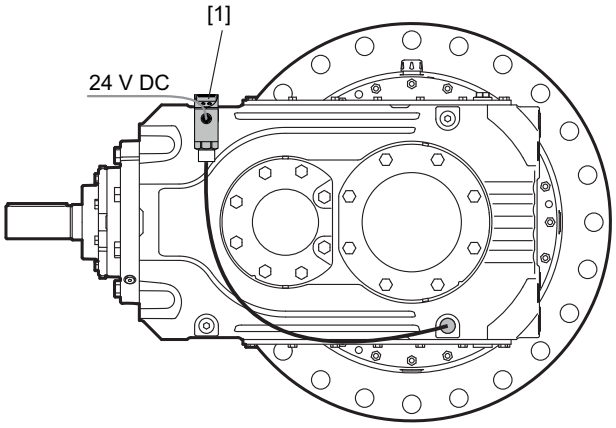
INFORMATION

For further information on the evaluation unit and accessories, refer to the "DUO10A Diagnostic Unit" manual, part no. 11473428.

4.4.1 Dimensions

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4.4.2 Mounting examples



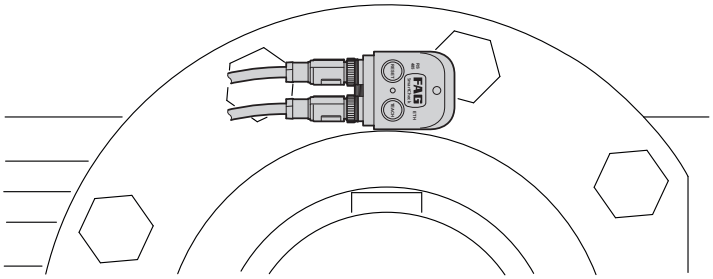
[1] Diagnostic unit DUO10A

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4.5 DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded, and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-controlled measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

DUV40A is configured using the SmartWeb software. If you use several Vibration SmartCheck systems, you can control them centrally from one computer using the SmartUtility Light software.

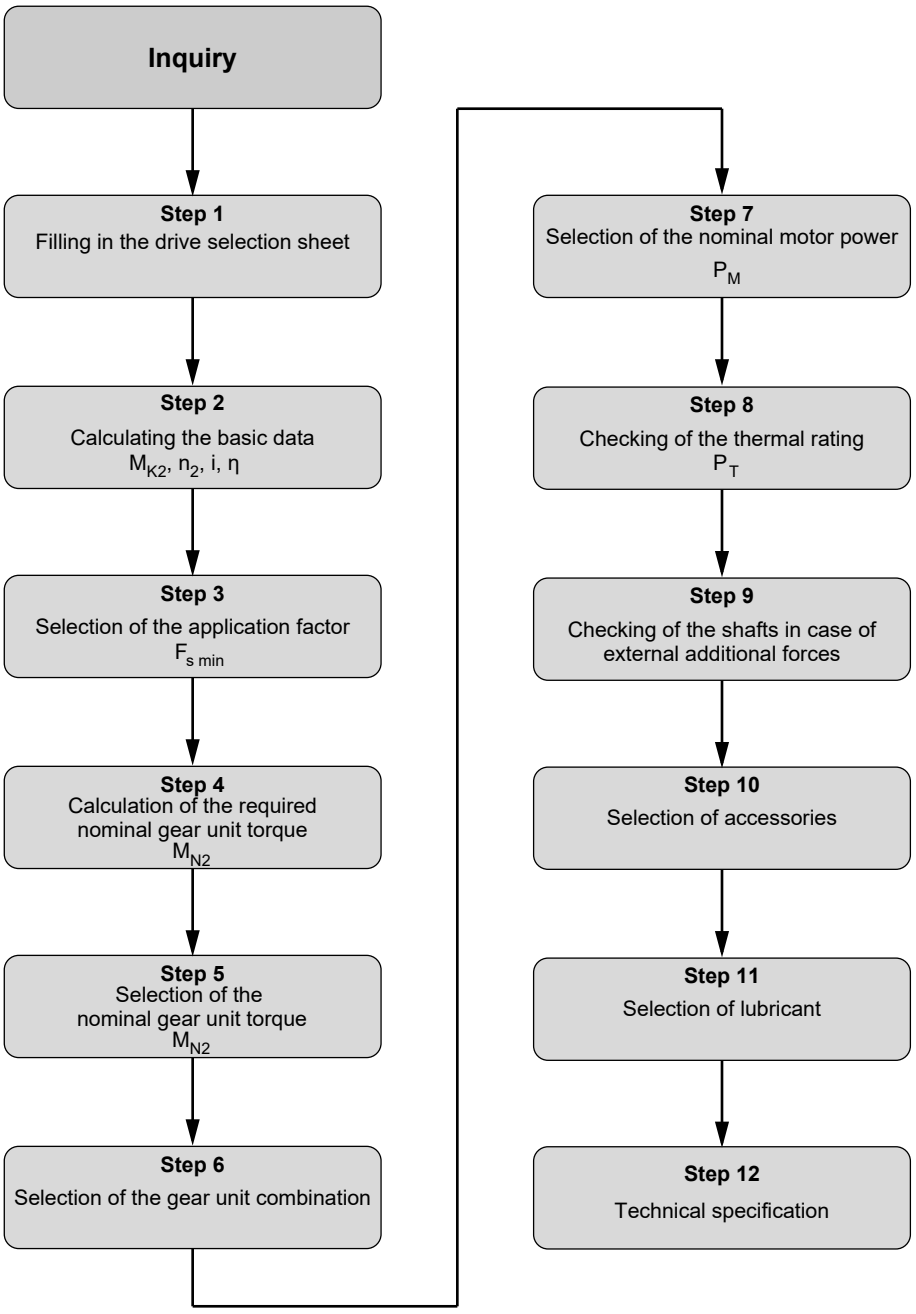


For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part number: 31969828/EN.

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5 Project planning for gear units

5.1 Project planning procedure



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5.1.1 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.

1.4 Installation altitude [m] [...]

1.5 Gear unit installation [X]

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

1.6 Ambient conditions [X]

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

2. Load characteristics

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

normal | min. | max.

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

normal | min. | max.

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

normal | min. | max.

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.

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

normal | min. | max.

3.4 Motor torque M [Nm] [$_M$]

normal | min. | max.

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

normal | min. | max.

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

- ☐ IEC
- ☐ NEMA

Motor size (IEC or NEMA code):

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

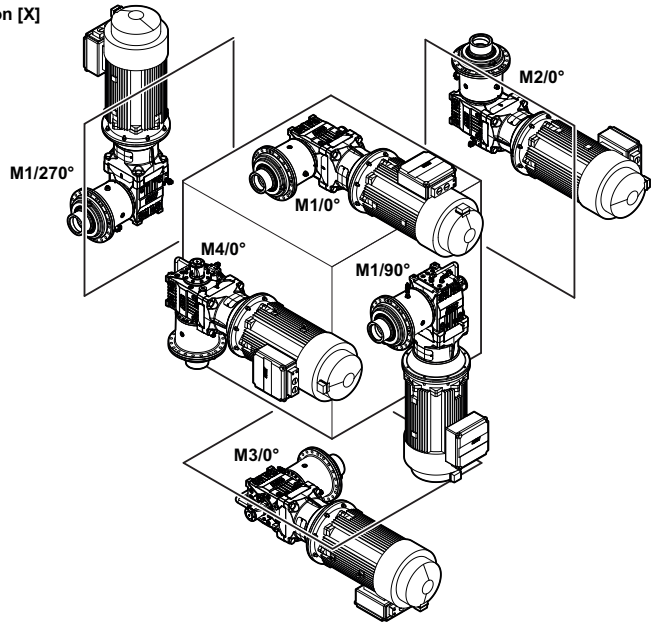
- ☐ B3
- ☐ B5
- ☐ V1
- ☐ Other:

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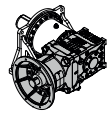
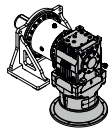
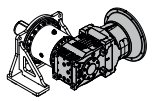
4.0 Gear unit requirements

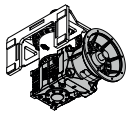
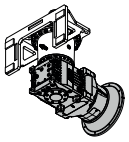
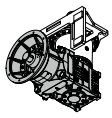
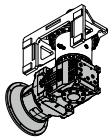
4.1 Mounting position [X]

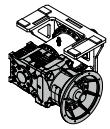
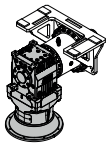
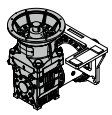
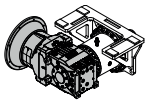
- ☐ M1
- ☐ M2
- ☐ M3
- ☐ M4

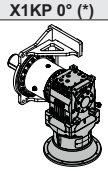
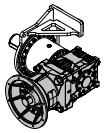
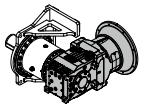


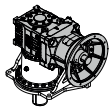
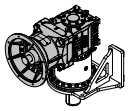
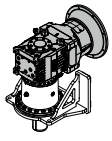
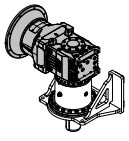
4.2 Mounting position of primary gear unit [X]

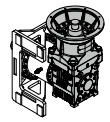
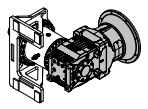
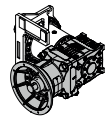
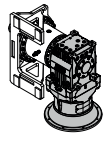
P2.e M1	
X1KP 0° (M1)	X1KP 270° (M4)
	
X1KP 90° (*)	X1KP 180° (M3)
	

P2.e M2	
X1KP 0° (*)	X1KP 270° (*)
	
X1KP 90° (*)	X1KP 180° (*)
	

P2.e M3	
X1KP 0° (M3)	X1KP 270° (*)
	
X1KP 90° (M4)	X1KP 180° (M1)
	

P2.e M5	
X1KP 0° (*)	X1KP 270° (M1)
	
X1KP 90° (M3)	X1KP 180° (M4)
	

P2.e M4	
X1KP 0° (M5)	X1KP 270° (M5)
	
X1KP 90° (M5)	X1KP 180° (M5)
	

P2.e M6	
X1KP 0° (M4)	X1KP 270° (M3)
	
X1KP 90° (M1)	X1KP 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 arm

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

☐ Elastic coupling (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]

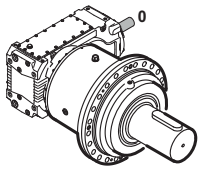
☐ Customer installation (base frame)
☐ Motor adapter with elastic coupling
☐ Motor bracket with V-belt drive
☐ Motor scoop
☐ Other, see sketch

4.8 Machine shaft bearings

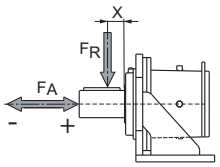
☐ 2 bearings, gear unit transmits only the torque
☐ 1 bearing opposite the gear unit, gear unit acts as a point of support
☐ 1 bearing right at the gear unit, gear unit acts as a point of support

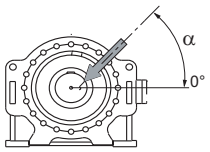
4.9 Forces acting on the input shaft HSS [X] [...]

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



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





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

Application angle of radial force α [°]
or variable ☐

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

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

Degree of protection: IP

Explosion protection required: ☐ Yes ☐ No

4.12 Permitted cooling (if required) [X]

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

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

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

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

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5.1.3 Step 3: Selection of the application factor

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

Application-specific service factor – $F_{S\,min}$ and peak load

The application-specific service factor takes into account all continuously occurring dynamic torques that are applied to the gear unit from outside beyond nominal operation based on the application factor according to DIN 3990.

These torques depend on the following factors and apply to gear units with even power demand:

- The characteristics of the driving and driven machine
- The size and distribution of the mass moments of inertia
- The spring stiffness in the drive and output train (shafts and couplings, etc.)
- Preventive measures such as safety clutches
- The operating conditions

Furthermore, an additional check for peak loads is required only if this condition does not apply. This is necessary, for example, for intermittent duty, operation with extreme, repeated shock loads, etc.

In general, the gear units can be loaded with up to twice the nominal gear unit torque for a limited number of load changes.

In this specific case, we recommend contacting SEW-EURODRIVE.

The application-specific service factor $F_{S\,min}$ takes account of the typical load behavior with regard to the driven machine. When determining the application-specific service factor $F_{S\,min}$, at least a value of 1.40 must be taken into account.

Recommended values in relation to

- Area of application
- Type of driven machine

are listed in the table below.

INFORMATION

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

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

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

Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\,min}$
Wastewater treatment	Impeller aerators	2.00
	Thickeners	1.50
	Vacuum filters	1.50
	Accumulators	1.50
	Screw pumps	1.50
	Brush aerators	2.00

Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\ min}$
Mining	Crushers	2.00
	Shakers and screens	2.00
	Slewing gears	1.80
	Bucket-wheel excavators	1)
Energy	Frequency inverters	2.00
	Water wheels (rotating slowly)	1.70
	Water turbines	1)
Conveyor systems	Bucket elevators	1.50
	Vertical conveyors – other	1.80
	Belt conveyor ≤ 100 kW	1.40
	Belt conveyor > 100 kW	1.50
	Apron feeders	1.50
	Feeding screw	1.50
	Shakers, screens	2.00
	Escalators	1.50
	Passenger elevators	1)
Rubber and plastics industry	Extruders (plastic)	1.60
	Extruders (rubber)	1.80
	Rubber rollers (2 consecutive)	2.00
	Rubber rollers (3 consecutive)	1.75
	Heated rollers	1.75
	Calenders	1.65
	Mills	2.00
	Mixing rollers	1)
	Slab rollers	2.00
	Refining rollers	2.00
	Tire machine	1)
Wood industry	Wood industry	1)
Crane systems	Cranes and hoists	2)
Food industry	Crushers and mills	1.75
	Beet cutters	1.50
	Drying drums	1.50
Metal production and processing	Winders	1.75
	Cutting rollers	2.00
	Table conveyors, single drive	1)
	Table conveyors, group drive	1)
	Table conveyors, running in and out	1)
	Wire drawing machines	1.75
	Rollers	1)
Mills and drums	Cooling and drying drums	1.60
	Rotary kilns	2.00
	Ball mills	2.00
	Coal mills	1.75

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Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\ min}$
Paper and pulp industry	Debarking drums and barkers	-
	Rollers (pick-up, wire drive, and wire suction)	2.00
	Drying cylinders (rolling bearing)	2.00
	Calenders (rolling bearing)	2.00
	Filters (pressure and vacuum)	2.00
	Beaters and chippers	2.00
	Jordan mills	1.75
	Presses (bark, felt, glue, suction)	1.75
	Reels	1.75
	Pulpers	1)
	Washer filters	1.50
	Yankee cylinders (dryers)	1)
Pumps	Centrifugal pumps	1.45
	Reciprocating pumps (single-cylinder)	1.80
	Reciprocating pumps (multi-cylinder)	1.50
	Screw pumps	1.50
	Rotary pumps (gear wheel, wing pumps)	1)
Agitators and mixers	Agitators for liquids	1.50
	Agitators for liquids (variable density)	1.65
	Agitators for solids (non-uniform material)	1.70
	Agitators for solids (uniform material)	1.40
	Concrete mixers	1.50
Cableways	Material ropeways	1.50
	Aerial tramways	1)
	Surface lifts	1)
	Continuous aerial tramways	1)
	Funicular railways	1)
Fans	Heat exchangers	1.50
	Dry cooling tower	2.00
	Wet cooling tower	2.00
	Blowers (axial and radial)	1.50
Compressors	Reciprocating compressors	1.90
	Radial compressors	1.50
	Screw-type compressors	1.75

1) Contact SEW-EURODRIVE

2) Contact SEW-EURODRIVE; dimensioning according to FEM1001

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5.1.4 Step 4: Calculating the required nominal gear unit torque – M_{N2}

Constant load direction – constant torque:

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

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

Reversing load direction – constant torque:

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

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

Depending on the ratio of the load between the two directions of rotation, the reversing factor must be assumed according to the following table. The values apply as an example to the load ratio. If the load ratio differs, contact SEW-EURODRIVE.

Load ratio of the directions of rotation	Factor f_{rev}
100%	1.43
50%	1.25
10%	1.0

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

Size	M_{N2} Nm
P.042	100 170
P.052	124 060
P.062	185 660
P.072	245 660
P.082	359 400
P.092	423 000
P.102	500 000

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5.1.6 Step 6: Selection of 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".

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

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

The following figure shows the structure of the selection tables.

P.002e X1KP060e					
n_1 min^{-1}	i_{nom}	i_{ex}	M_{n2} Nm	n_2 min^{-1}	P_{N1} kW
1000	22.4	21.19	24830	47.2	127
	25	24.28	24830	41.2	111
	28	27.17	24830	36.8	99
	31.5	31.18	24830	32.1	87
	35.5	37.12	24830	26.9	73
	40	41.30	24830	24.2	65
	45	46.80	24830	21.4	58
	50	47.74	24830	20.9	57
	56	54.37	24830	18.4	50
	63	60.20	24830	16.6	45
	71	69.93	24830	14.3	39
	80	76.25	24830	13.1	36
	90	88.58	24830	11.3	31
	100	108.22	24830	9.2	25
	112	108.22	24830	9.2	25
	125	119.27	24830	8.4	23
	140	138.55	24830	7.2	20

9007254110606347

n_1 = Input speed
i_{nom} = Nominal gear unit ratio
i_{ex} = Exact gear unit ratio
M_{N2} = Nominal gear unit torque
n_2 = Output speed
P_{N1} = Nominal gear unit power (in relation to HSS)

5.1.7 Step 7: Selecting the nominal motor power P_M

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

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

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5.1.8 Step 8: Checking of the thermal rating – P_T

The thermal rating P_T of a gear unit is the power that a gear unit can transmit continuously without exceeding a specific 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 base at the installation site
- Gear unit type, size and gear ratio
- External cooling type of the gear unit
- Lubrication type of the gear unit
- Lubricant type
- Cyclic duration factor

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

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

INFORMATION

- For other ambient temperatures and lubrication types, 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. 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 against direct sunlight, the thermal calculation must take the actual sunlight in kW/m^2 into account.

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

P_T = Thermal rating of the gear unit in kW

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

f_1 = Altitude factor

f_T = Temperature factor

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Altitude factor f_1

The following table lists the altitude factor f_1.

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

Temperature factors f_T

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

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

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

→ Contact SEW-EURODRIVE

P_T = Thermal rating of the gear unit in kW

P_{N1} = Nominal gear unit power

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

$$P_T \geq P_{K1}$$

P_T = Thermal rating of the gear unit in kW

P_{K1} = Operating power at HSS in kW

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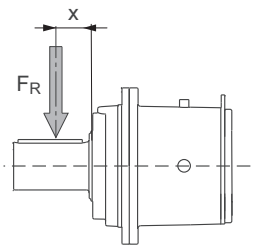
5.1.9 Step 9: Checking of the shafts in case of external additional forces

Checking the shaft strength

The shaft strength is checked according to the following table for its permissibility.

$$S_{St} = \frac{M_{b,all.1}}{F_R \times (x + x_s)} \geq 1$$

S_{St} = Static safety value
$M_{b,all.1}$ = Permitted bending moment in Nm (see table)
F_R = Radial load in kN
x = Force application point in mm
x_s = Correction factor (see table)



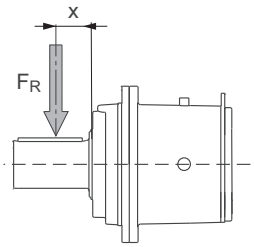
	P.042	P.052	P.062	P.072	P.082	P.092	P.102
$M_{b,all.1}$	51140	69480	96650	129420	161970	195080	254390
Value x_s	140.3	158.4	158.8	188	187	205.5	220.2

Checking the dynamic shaft strength according to the required service life

The dynamic shaft strength is checked according to the following table for its permissibility.

$$S_{Dy} = \frac{M_{b,ref} \times f_L}{F_R \times (x + x_D)} \geq 1 \qquad f_L = \left(\frac{100000}{n_2 \times L_h} \right)^{0.3}$$

S_{Dy} = Dynamic safety value
$M_{b,ref}$ = Permitted bending moment in Nm (see table)
f_L = Service life factor
F_R = Radial load in kN
x = Force application point in mm
x_D = Dynamic correction factor (see table)
n_2 = Output speed in min^{-1}
L_h = Required service life in h



	P.042	P.052	P.062	P.072	P.082	P.092	P.102
$M_{b,ref}$	109700	152000	172400	163700	305200	455800	476100
Value x_D	319.5	374	334.6	278.6	403.2	563.5	472.4

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5.1.10 Step 10: Selection of the optional equipment/accessories

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

X2K..e
- Motor adapter
- Fan
- Pt100 temperature sensor

5.1.11 Step 11: Selection of lubricant

Lubricants can be chosen according to the lubricant table.

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

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

5.1.12 Step 12: Technical specification

PHF042/T X2KP110e/HP/F	
PHF..	Flange-mounted design, hollow shaft with shrink disk
042	Size
/T	Torque arm
X2KP	X series bevel-helical gear unit
110	Size
e	Generation e
/HP	Housing for planetary gear unit
/F	Flange-mounted design

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5.2 Selection example

5.2.1 Step 1: Drive selection data

- Application: Apron feeders
- Bevel-helical planetary gear unit (mounting position M1)
- Output shaft: Hollow shaft with shrink disk and torque arm
- Required output speed n_2 = 4.0 min^{-1}
- Required operating power at LSS P_{K2} = 75 kW
- 4 pole motor, frequency inverter operation
- Input speed n_1 = 1500 min^{-1}
- Operating time: 12 hours per day
- Cyclic duration factor: 100% cdf, 10 startups per hour
- Direction of rotation under load: Clockwise rotation
- Outdoors, dusty environment
- Ambient temperature = 0 °C to 40 °C
- Installation altitude H = 800 m
- Motor mounting with IEC motor adapter
- No axial loads or radial loads acting on the output shaft.

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

Operating torque on LSS:

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

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

$$M_{K2} = \frac{75\,kW \times 9550}{4\,min^{-1}} = 179062.5\,Nm$$

Required gear ratio:

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

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

Efficiency:

η = "0.96 "

5.2.3 Step 3: Selection of the application factor $F_{S\,min}$

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

Application: Apron feeders t > 10 h → $F_{S\,min}$ = 1.5 (→ 🗎 81)

t = Daily operating period

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

Constant direction of the load – constant torque:

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

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

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

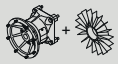
M_{N2} = 268 594 Nm

Size	M_{N2} Nm
P.042	100 170
P.052	124 060
P.062	185 660
P.072	245 660
P.082	**359 400**
P.092	423 000
P.102	500 000

- Selection of the gear unit size: P.082

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5.2.6 Step 6: Selection of the gear unit combination

P.082 X2KP150e					359400 Nm
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW	P_{TH} kW / M1 T_{amb} = 20 °C	
1500	164	9,1	362	148	237
	176	8,5	338	151	238
	208	7,2	286	155	230
	222	6,8	268	156	230
	254	5,9	234	156	224
	272	5,5	218	157	224
	304	4,9	195	159	247
	326	4,6	182	161	247
	385	3,9	154	162	237
	413	3,6	144	163	236
	471	3,2	126	161	229
	504	3,0	118	161	228

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

5.2.7 Step 7: Selecting the motor power P_M

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

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

Motor selection → P_M = 90 kW

5.2.8 Step 8: Checking of the thermal rating

$$P_T \geq P_{TH} \times f_1 \times f_T = 237\,kW \times 1.00 \times 0.7 = 166\,kW$$

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

Altitude factor f_1:

Altitude factor	Altitude H [m above sea level]
	Up to 999
f_1	1.00

Temperature factor f_T:

Temperature factor f_T	
Without additional cooling or with fan	
Lubrication type	Ambient temperature 40 °C
Splash lubrication	0.7

$P_T \geq P_{K1} \rightarrow o.k.$

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5.2.9 Step 9: Checking of the shafts in case of external additional forces

Checking the shaft strength

$$S_{St} = \frac{M_{b,all.1}}{F_R \times (x + x_s)} \geq 1$$

S_{St} = Static safety value
$M_{b,all.1}$ = Permitted bending moment in Nm (see table)
F_R = Radial load in kN
x = Force application point in mm
x_s = Correction factor (see table)

	P.042	P.052	P.062	P.072	P.082	P.092	P.102
$M_{b,all.1}$	51140	69480	96650	129420	161970	195080	254390
Value x_s	140.3	158.4	158.8	188	187	205.5	220.2

$$S_{St} = \frac{161970\,Nm}{120\,kN \times (225\,mm + 187\,mm)} = 3.28$$

$$S_{St} \geq 1 \rightarrow o.k.$$

Checking the dynamic shaft strength according to the required service life

$$S_{Dy} = \frac{M_{b,ref} \times f_L}{F_R \times (x + x_D)} \geq 1 \qquad f_L = \left(\frac{100000}{n_2 \times L_h} \right)^{0.3}$$

S_{Dy} = Dynamic safety value
$M_{b,ref}$ = Permitted bending moment in Nm (see table)
f_L = Service life factor
F_R = Radial load in kN
x = Force application point in mm
x_D = Dynamic correction factor (see table)
n_2 = Output speed in min^{-1}
L_h = Required service life in h

	P.042	P.052	P.062	P.072	P.082	P.092	P.102
$M_{b,ref}$	109700	152000	172400	163700	305200	455800	476100
Value x_D	319.5	374	334.6	278.6	403.2	563.5	472.4

$$S_{Dy} = \frac{305200\,Nm \times 0.812}{120\,kN \times (225\,mm + 403.2\,mm)} = 3.29$$

$$f_L = \left(\frac{100000}{4\,min^{-1} \times 50000\,h} \right)^{0.3} = 0.812$$

$$S_{Dy} \geq 1 \rightarrow o.k.$$

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5.2.10 Step 10: Selection of lubricant

As n_2 = 4.0 min^{-1} (n_2 > 1.0 min^{-1}), you can choose the lubricants according to the "lubricant table" (→ 🗎 42).

5.2.11 Step 11: Technical specification

PHF082 /T X2K150e/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
e	Generation e
/HP	Housing for planetary gear unit
/F	Flange-mounted design

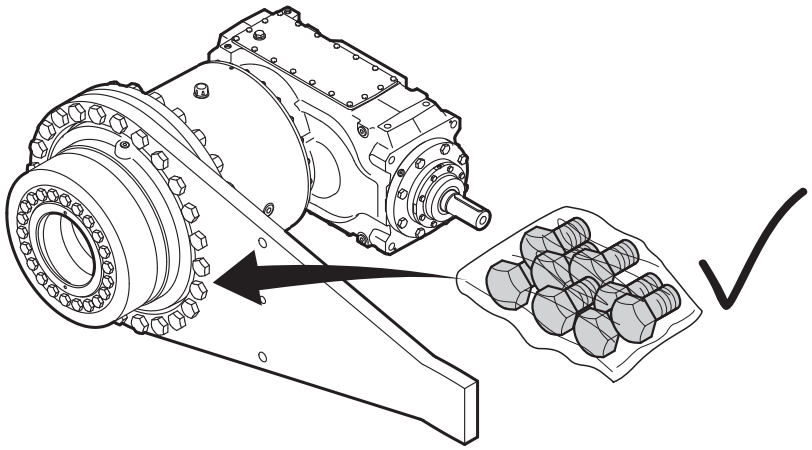
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6 Design and operating notes

6.1 Screws included in the delivery

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

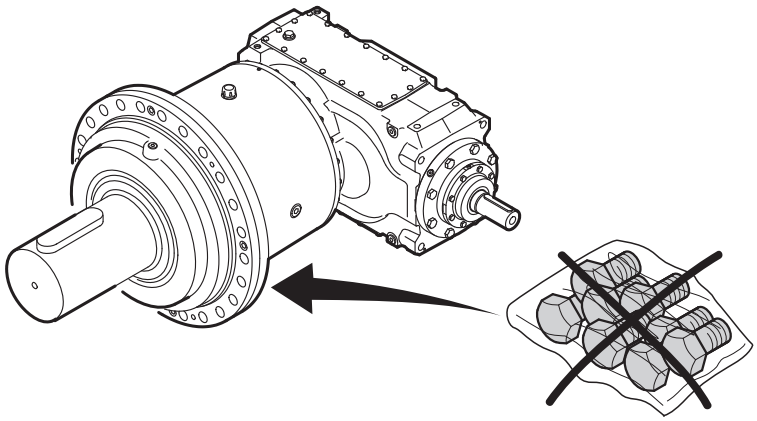
- Gear unit with torque arm



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Not included in the scope of delivery:

- Wrench set
- Torque wrench
- Retractor
- Compensation elements (washers, spacing rings), if necessary
- Fasteners for input/output elements
- Lubricant, e.g. NOCO® fluid from SEW-EURODRIVE
- Aids for assembly/disassembly onto the machine shaft
- Fastening parts for the gear unit base
- Connection screws for gear units in flange-mounted design

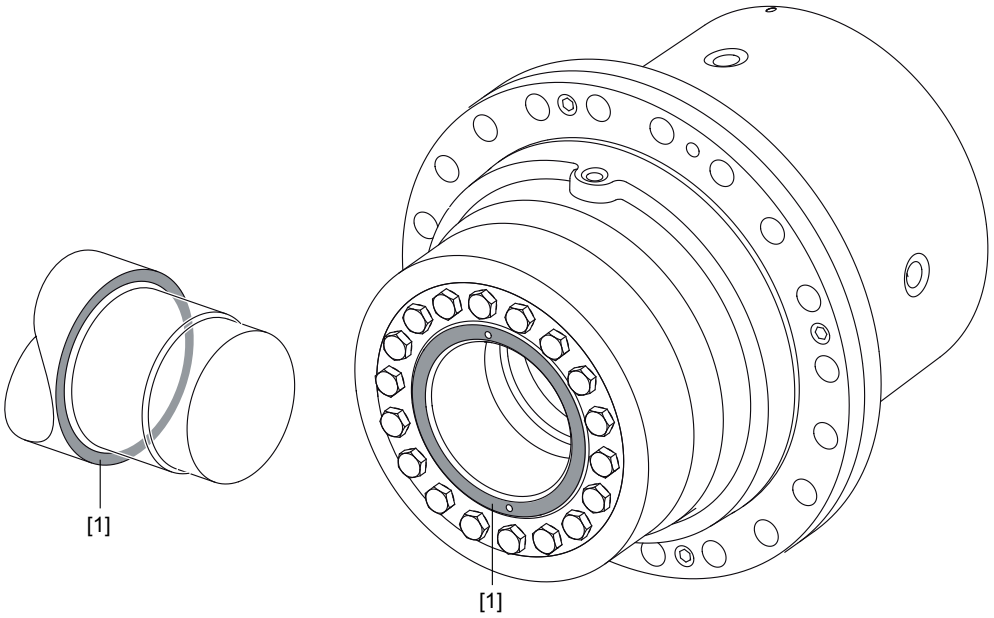


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6.2 Output shaft as hollow shaft with shrink disk

To guarantee a complete torque transmission from the gear unit to the machine shaft, observe the following steps during construction and assembly: Push the gear unit onto the machine shaft until the contact surfaces touch.



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7 Important information on selection tables and dimension sheets

INFORMATION

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

7.1 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. Contact SEW-EURODRIVE.

The following figure shows the structure of the selection tables.

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
P.042 X2KP110e							**100170 Nm**
					P_{TH} kW / M1		
					T_{amb} = 20 °C		
n_1 min^{-1}		**i_{Ges}**	**n_2 min^{-1}**	**P_{N1} kW**			
1000		159	6.3	69	73	103	
		178	5.6	62	75	105	
		202	5.0	55	72	99	
		226	4.4	49	72	99	
		246	4.1	45	68	93	
		276	3.6	40	69	94	
		310	3.2	36	72	101	

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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 power

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

[6] Without fan

[7] With fan in motor adapter

[8] Nominal gear unit torque

* X2K. primary gear units have a gear ratio $i_N \geq 10$

7.2 Dimension sheets

7.2.1 Scope of delivery

= Standard parts supplied by SEW-EURODRIVE.

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= Standard parts not supplied by SEW-EURODRIVE.

7.2.2 Tolerances

Keys

Keys: according to DIN 6885 (domed type B)

Spline

Splined shaft according to DIN 5480

7.2.3 Dimensions of motors and planetary gear units

Motor options

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

Special designs

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

EN 50347

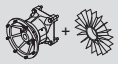
European standard EN 50347 became effective in August 2001. This standard adopts the dimension designations for three-phase AC motors for sizes 56 to 315M and flange sizes 65 to 740 from the IEC 72-1 standard.

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

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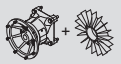
8 Selection tables

8.1 Size P.042 X2KP..

P.042 X2KP110e					100170 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	159	6.3	69	73	103
	178	5.6	62	75	105
	202*	5.0	55	72	99
	226*	4.4	49	72	99
	246*	4.1	45	68	93
	276*	3.6	40	69	94
	310	3.2	36	72	101
	348	2.9	32	74	103
	393*	2.5	28	71	98
	440*	2.3	25	71	97
	480*	2.1	23	67	91
	538*	1.9	21	68	92
1200	159	7.5	83	70	105
	178	6.7	74	72	108
	202*	5.9	66	72	104
	226*	5.3	59	72	104
	246*	4.9	54	68	97
	276*	4.3	48	69	99
	310	3.9	43	70	104
	348	3.4	38	71	106
	393*	3.1	34	71	102
	440*	2.7	30	70	102
	480*	2.5	28	67	96
	538*	2.2	25	68	97
1500	159	9.4	104	61	105
	178	8.4	93	65	108
	202*	7.4	82	68	107
	226*	6.6	73	68	107
	246*	6.1	67	67	102
	276*	5.4	60	68	104
	310	4.8	53	61	103
	348	4.3	48	64	106
	393*	3.8	42	68	105
	440*	3.4	38	68	105
	480*	3.1	35	66	100
	538*	2.8	31	67	102
1800	159	11.3	125	45	98
	178	10.1	112	50	101
	202*	8.9	98	61	105
	226*	8.0	88	63	105
	246*	7.3	81	63	102
	276*	6.5	72	65	104
	310	5.8	64	47	97
	348	5.2	57	50	100
	393*	4.6	51	61	104
	440*	4.1	45	62	104
	480*	3.8	41	63	101
	538*	3.3	37	64	102

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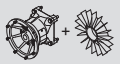
8.2 Size P.052 X2KP..

P.052 X2KP110e					124060 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	310	3.2	44	77	106
	348	2.9	39	78	109
	393*	2.5	35	75	103
	440*	2.3	31	75	102
	480*	2.1	28	71	96
	538*	1.9	25	72	97
1200	310	3.9	53	74	110
	348	3.4	47	76	112
	393*	3.1	42	75	108
	440*	2.7	37	75	107
	480*	2.5	34	71	101
	538*	2.2	31	72	103
1500	310	4.8	66	66	110
	348	4.3	59	69	112
	393*	3.8	52	72	111
	440*	3.4	47	72	111
	480*	3.1	43	70	106
	538*	2.8	38	71	107
1800	310	5.8	79	52	104
	348	5.2	71	56	107
	393*	4.6	63	66	110
	440*	4.1	56	67	110
	480*	3.8	51	67	107
	538*	3.3	46	68	108

P.052 X2KP130e					124060 Nm
1000	160	6.3	85	87	124
	182	5.5	75	88	125
	200	5.0	68	87	121
	227*	4.4	60	89	123
	248*	4.0	55	84	114
	281*	3.6	49	84	114
1200	160	7.5	103	74	123
	182	6.6	90	77	124
	200	6.0	82	82	123
	227*	5.3	72	85	126
	248*	4.8	66	82	118
	281*	4.3	58	82	118
1500	160	9.4	128	47	110
	182	8.2	113	52	115
	200	7.5	103	66	121
	227*	6.6	90	72	125
	248*	6.0	83	74	120
	281*	5.3	73	76	121
1800	160	11.3	154	10	82
	182	9.9	135	18	89
	200	9.0	123	45	109
	227*	7.9	108	51	116
	248*	7.3	99	60	117
	281*	6.4	88	63	117

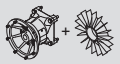
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8.3 Size P.062 X2KP..

P.062 X2KP130e					185660 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	160	6.3	128	104	146
	182	5.5	112	104	146
	200	5.0	102	102	141
	227*	4.4	90	105	144
	248*	4.0	83	98	132
	281*	3.6	73	98	132
	312	3.2	66	106	149
	354	2.8	58	107	149
	390	2.6	52	104	142
	443*	2.3	46	107	146
	483*	2.1	42	99	134
	548*	1.8	37	99	133
1200	160	7.5	153	95	147
	182	6.6	135	97	147
	200	6.0	123	99	145
	227*	5.3	108	102	148
	248*	4.8	99	97	138
	281*	4.3	87	97	138
	312	3.8	79	98	150
	354	3.4	69	100	150
	390	3.1	63	101	147
	443*	2.7	55	104	150
	483*	2.5	51	98	140
	548*	2.2	45	98	140
1500	160	9.4	192	69	139
	182	8.2	169	74	141
	200	7.5	153	87	145
	227*	6.6	135	93	149
	248*	6.0	124	92	142
	281*	5.3	109	93	142
	312	4.8	98	74	143
	354	4.2	87	79	144
	390	3.8	79	91	148
	443*	3.4	69	96	152
	483*	3.1	64	95	144
	548*	2.7	56	95	144
1800	160	11.3	230	34	114
	182	9.9	202	42	121
	200	9.0	184	67	138
	227*	7.9	162	73	142
	248*	7.3	149	80	140
	281*	6.4	131	83	141
	312	5.8	118	41	121
	354	5.1	104	48	127
	390	4.6	94	71	142
	443*	4.1	83	78	146
	483*	3.7	76	83	143
	548*	3.3	67	86	143

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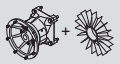
8.4 Size P.072 X2KP..

P.072 X2KP130e					245660 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	303	3.3	89	120	167
	344	2.9	79	121	167
	378	2.6	72	117	159
	430*	2.3	63	120	162
	469*	2.1	58	111	149
	532*	1.9	51	111	148
1200	303	4.0	107	114	170
	344	3.5	94	115	170
	378	3.2	86	115	165
	430*	2.8	76	118	169
	469*	2.6	69	111	156
	532*	2.3	61	111	156
1500	303	5.0	134	93	165
	344	4.4	118	97	166
	378	4.0	107	108	168
	430*	3.5	94	111	172
	469*	3.2	87	108	162
	532*	2.8	76	108	162
1800	303	5.9	161	61	149
	344	5.2	142	68	152
	378	4.8	129	90	163
	430*	4.2	113	96	167
	469*	3.8	104	100	162
	532*	3.4	92	102	162

P.072 X2KP150e					245660 Nm
1000	162	6.2	167	151	202
	174	5.7	156	151	202
	206*	4.9	131	143	189
	220*	4.5	123	143	188
	251*	4.0	108	138	180
	269*	3.7	101	137	180
1200	162	7.4	201	145	210
	174	6.9	187	146	210
	206*	5.8	158	143	199
	220*	5.5	148	144	199
	251*	4.8	129	140	191
	269*	4.5	121	140	191
1500	162	9.3	251	130	212
	174	8.6	233	132	214
	206*	7.3	197	137	208
	220*	6.8	185	138	208
	251*	6.0	162	139	202
	269*	5.6	151	140	202
1800	162	11.1	301	108	199
	174	10.3	280	112	202
	206*	8.7	237	126	207
	220*	8.2	222	128	208
	251*	7.2	194	133	207
	269*	6.7	181	135	207

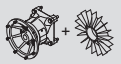
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8.5 Size P.082 X2KP..

P.082 X2KP150e					359400 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	164	6.1	242	167	223
	176	5.7	225	168	223
	208*	4.8	190	159	209
	222*	4.5	178	158	208
	254*	3.9	156	152	199
	272*	3.7	146	152	198
	304	3.3	130	173	229
	326	3.1	122	173	228
	385*	2.6	103	162	212
	413*	2.4	96	162	212
	471*	2.1	84	155	202
	504*	2.0	79	155	201
1200	164	7.3	290	163	232
	176	6.8	270	165	233
	208*	5.8	229	160	220
	222*	5.4	214	160	220
	254*	4.7	187	155	211
	272*	4.4	175	155	211
	304	3.9	156	171	239
	326	3.7	146	172	239
	385*	3.1	123	164	225
	413*	2.9	115	164	224
	471*	2.5	101	159	215
	504*	2.4	94	159	214
1500	164	9.1	362	148	237
	176	8.5	338	151	238
	208*	7.2	286	155	230
	222*	6.8	268	156	230
	254*	5.9	234	156	224
	272*	5.5	218	157	224
	304	4.9	195	159	247
	326	4.6	182	161	247
	385*	3.9	154	162	237
	413*	3.6	144	163	236
	471*	3.2	126	161	229
	504*	3.0	118	161	228
1800	164	11.0	435	125	226
	176	10.2	405	130	230
	208*	8.7	343	144	232
	222*	8.1	321	146	233
	254*	7.1	281	151	230
	272*	6.6	262	153	230
	304	5.9	235	140	241
	326	5.5	219	144	243
	385*	4.7	185	153	241
	413*	4.4	173	155	241
	471*	3.8	151	158	236
	504*	3.6	141	159	235

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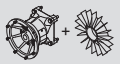
8.6 Size P.092 X2KP..

P.092 X2KP150e					423000 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	318	3.1	147	182	240
	340	2.9	137	182	240
	403*	2.5	116	171	223
	431*	2.3	108	170	223
	492*	2.0	95	163	212
	527*	1.9	88	163	212
1200	318	3.8	176	181	252
	340	3.5	165	182	252
	403*	3.0	139	173	237
	431*	2.8	130	173	236
	492*	2.4	114	167	226
	527*	2.3	106	167	226
1500	318	4.7	220	171	261
	340	4.4	206	173	261
	403*	3.7	174	172	250
	431*	3.5	162	173	249
	492*	3.0	142	171	241
	527*	2.8	133	170	241
1800	318	5.7	264	154	258
	340	5.3	247	157	260
	403*	4.5	208	165	255
	431*	4.2	195	167	255
	492*	3.7	171	169	249
	527*	3.4	159	170	249

P.092 X2KP170e					423000 Nm
1000	160	6.3	291	224	302
	179	5.6	260	227	301
	198	5.1	235	227	297
	223*	4.5	209	226	296
	242*	4.1	193	213	277
	272*	3.7	171	212	275
1200	160	7.5	350	209	310
	179	6.7	313	214	310
	198	6.1	283	221	310
	223*	5.4	251	224	309
	242*	5.0	231	215	292
	272*	4.4	206	214	290
1500	160	9.4	437	175	299
	179	8.4	391	183	306
	198	7.6	353	201	317
	223*	6.7	314	206	317
	242*	6.2	289	207	305
	272*	5.5	257	209	304
1800	160	11.3	525	126	267
	179	10.1	469	139	277
	198	9.1	424	170	301
	223*	8.1	376	178	307
	242*	7.4	347	191	306
	272*	6.6	309	195	307

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8.7 Size P.102 X2KP..

P.102 X2KP150e					500000 Nm
				P_{TH} kW / M1 T_{amb} = 20 °C	
n_1 min^{-1}	i_{Ges}	n_2 min^{-1}	P_{N1} kW		
1000	314	3.2	176	202	266
	336	3.0	164	202	266
	398*	2.5	138	189	247
	426*	2.3	129	189	246
	486*	2.1	113	181	234
	520*	1.9	106	180	234
1200	314	3.8	211	203	280
	336	3.6	197	203	279
	398*	3.0	166	193	262
	426*	2.8	155	192	261
	486*	2.5	136	185	250
	520*	2.3	127	185	249
1500	314	4.8	263	196	291
	336	4.5	246	198	291
	398*	3.8	208	194	277
	426*	3.5	194	195	277
	486*	3.1	170	190	268
	520*	2.9	159	190	267
1800	314	5.7	316	1800	292
	336	5.4	295	183	293
	398*	4.5	249	189	284
	426*	4.2	233	191	284
	486*	3.7	204	191	277
	520*	3.5	191	192	277

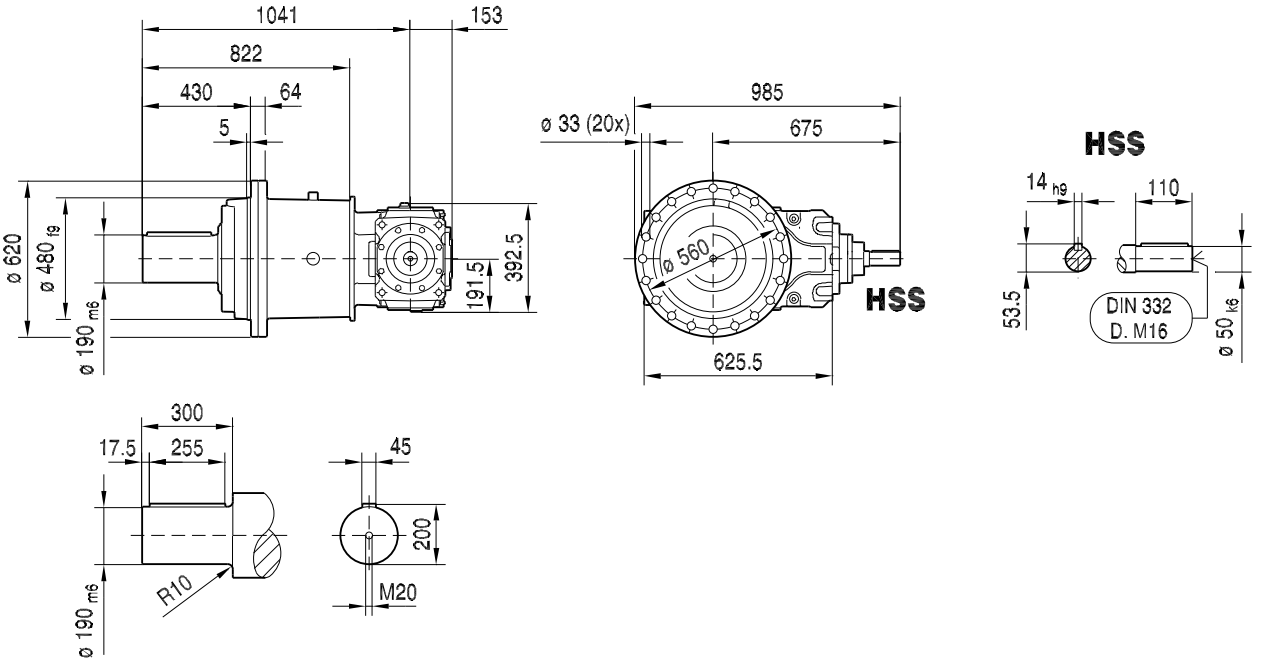
P.102 X2KP170e					500000 Nm
1000	157	6.4	351	257	341
	177	5.6	311	258	341
	196	5.1	281	257	337
	220*	4.5	251	256	335
	239*	4.2	231	241	312
	269*	3.7	205	239	310
1200	157	7.6	421	243	351
	177	6.8	374	249	352
	196	6.1	337	255	351
	220*	5.5	301	255	351
	239*	5.0	277	243	330
	269*	4.5	246	242	328
1500	157	9.6	527	207	347
	177	8.5	467	217	353
	196	7.7	422	235	360
	220*	6.8	376	240	361
	239*	6.3	346	238	346
	269*	5.6	307	241	344
1800	157	11.5	632	156	314
	177	10.2	560	171	326
	196	9.2	506	203	350
	220*	8.2	451	212	356
	239*	7.5	415	223	349
	269*	6.7	369	228	349

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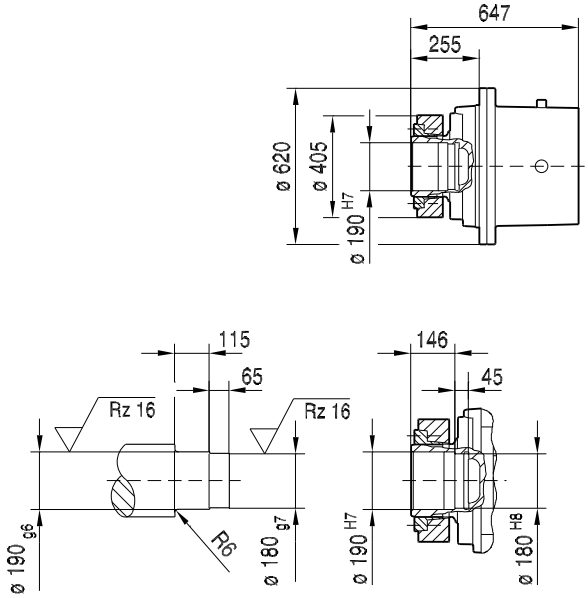
9 Dimension sheets

45 004 00 14

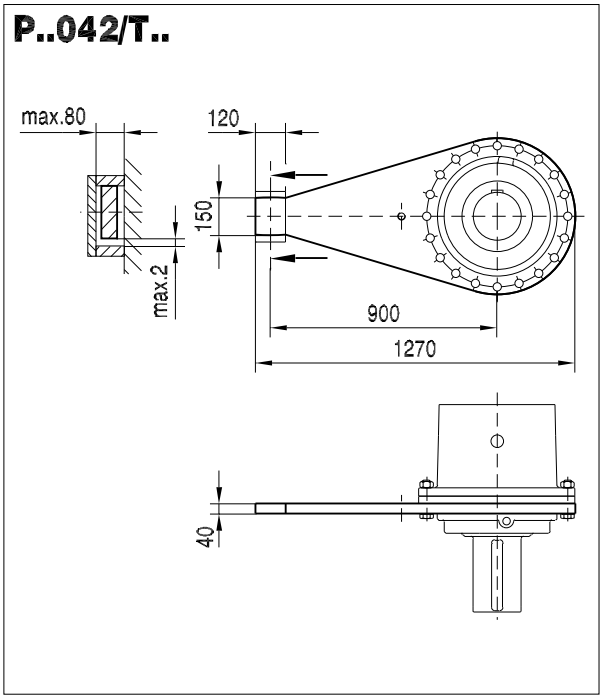
PF042X2K110..



PHF042X2K110..



P..042/T..

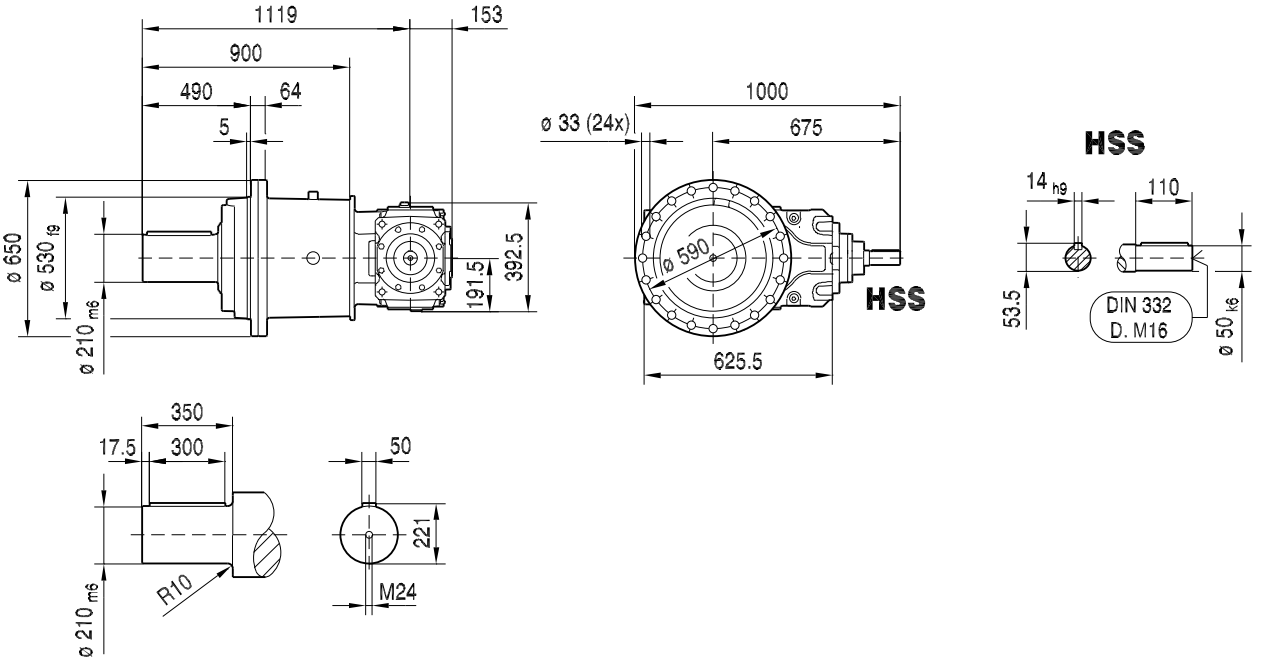


PF.. kg	PHF... kg
860	865

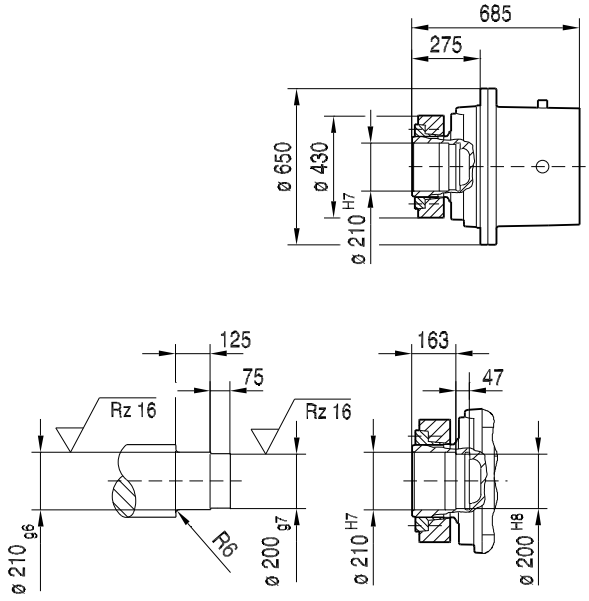
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45 005 00 14

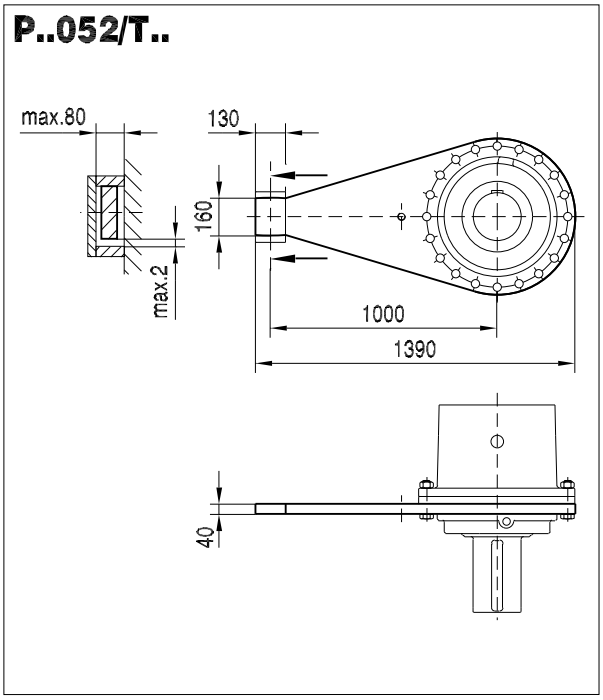
PF052X2K110..



PHF052X2K110..



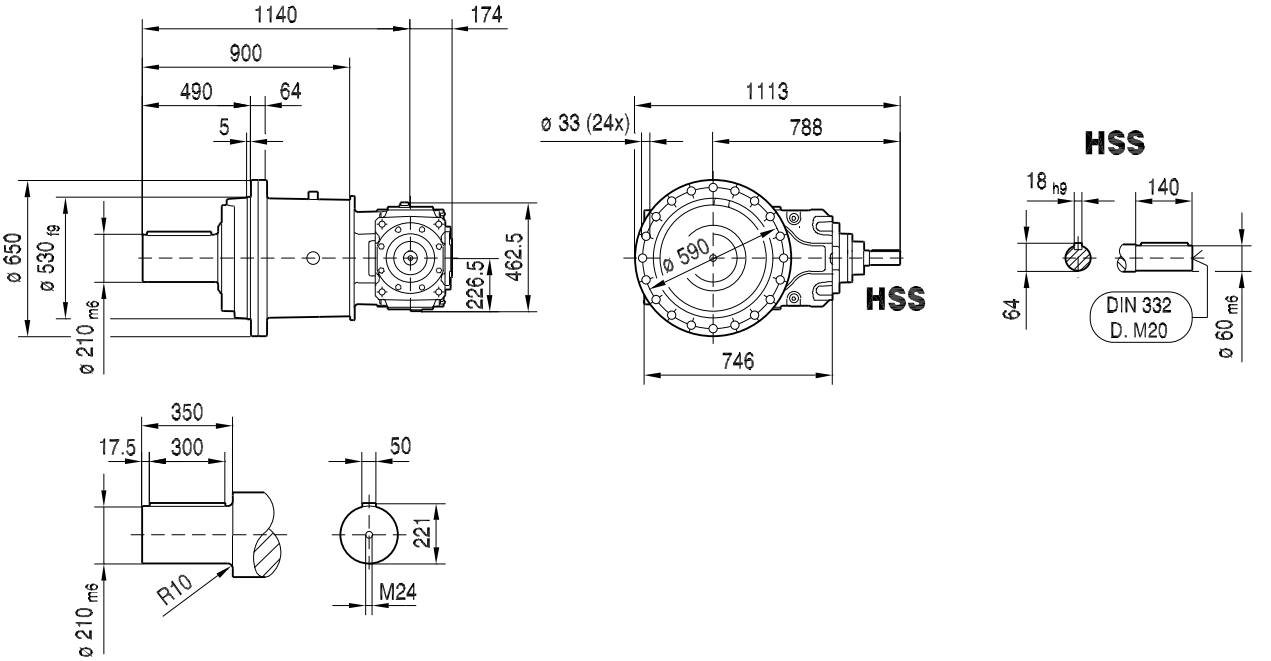
P..052/T..



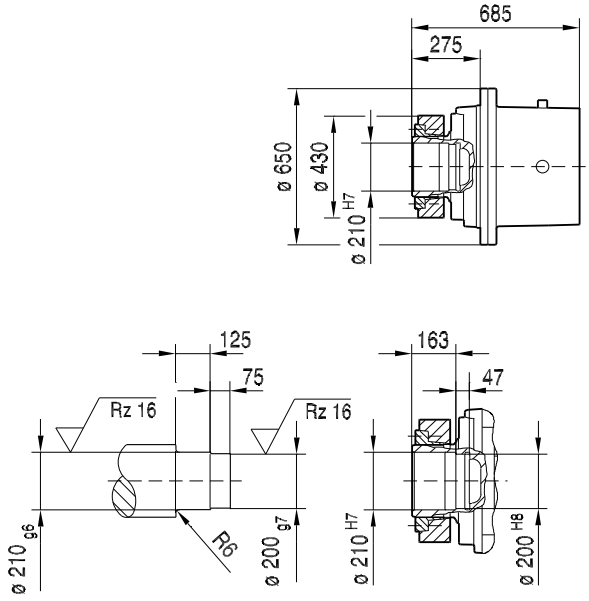
PF.. kg	PHF... kg
1 000	990

45 006 00 14

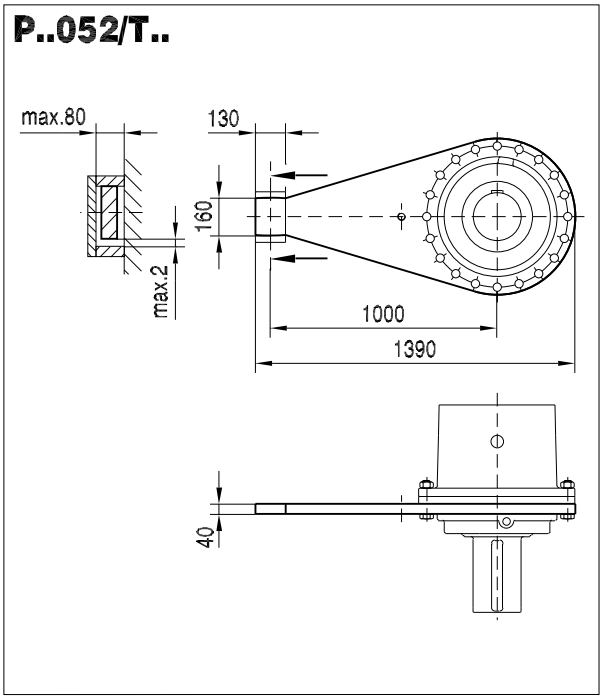
PF052X2K130..



PHF052X2K130..



P..052/T..

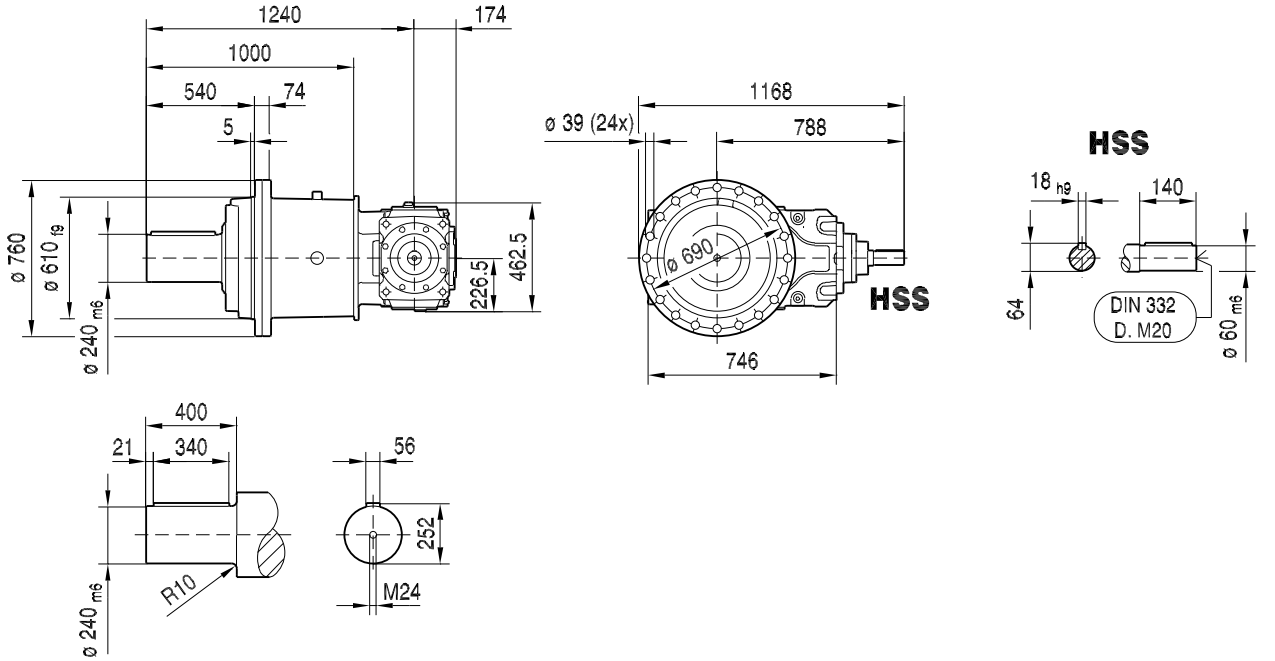


PF.. kg	PHF... kg
1 130	1 125

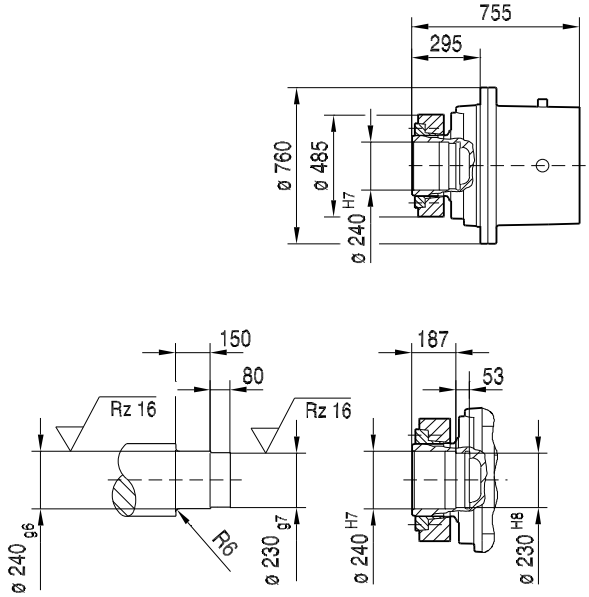
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45 007 00 14

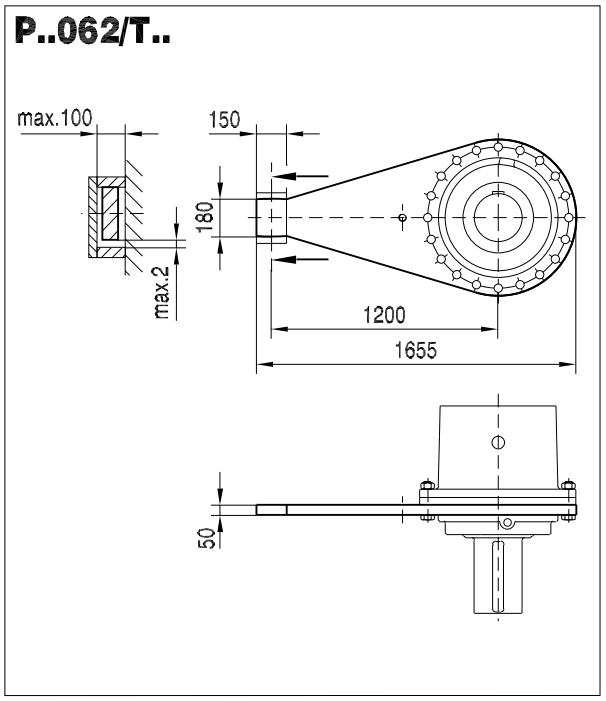
PF062X2K130..



PHF062X2K130..



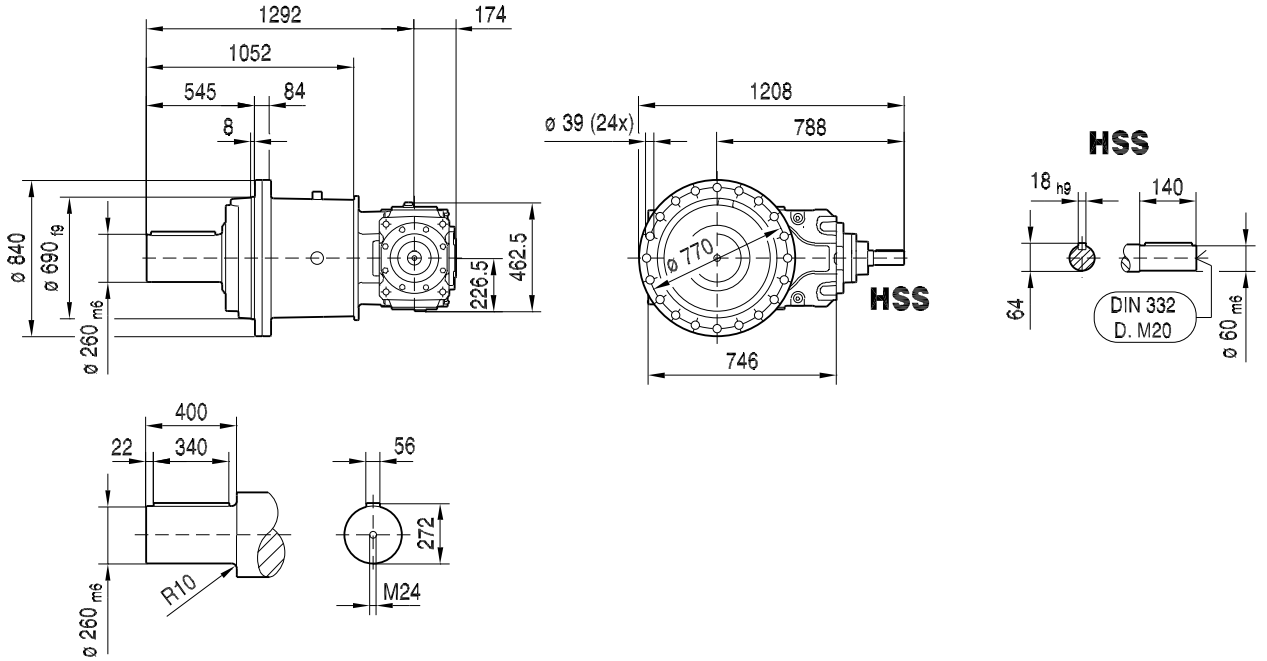
P..062/T..



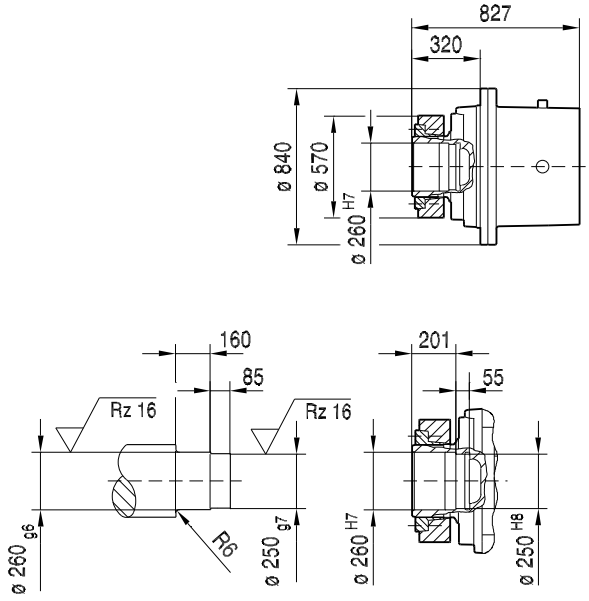
PF.. kg	PHF... kg
1 475	1 465

45 008 00 14

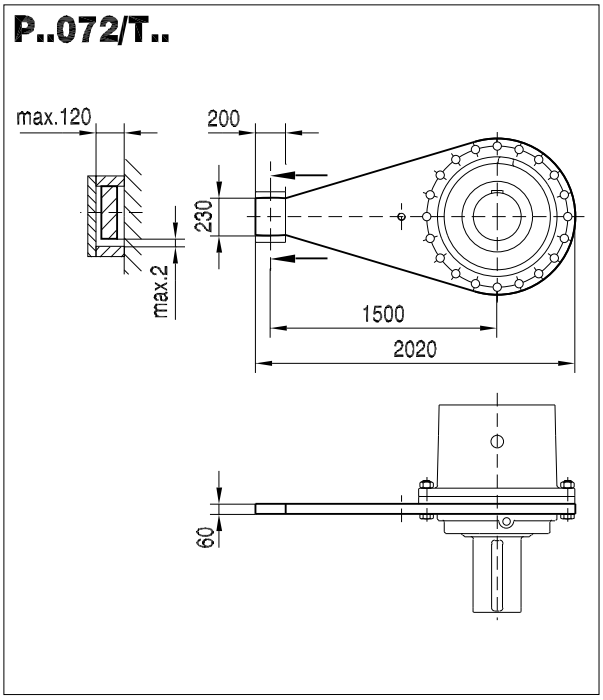
PF072X2K130..



PHF072X2K130..



P..072/T..

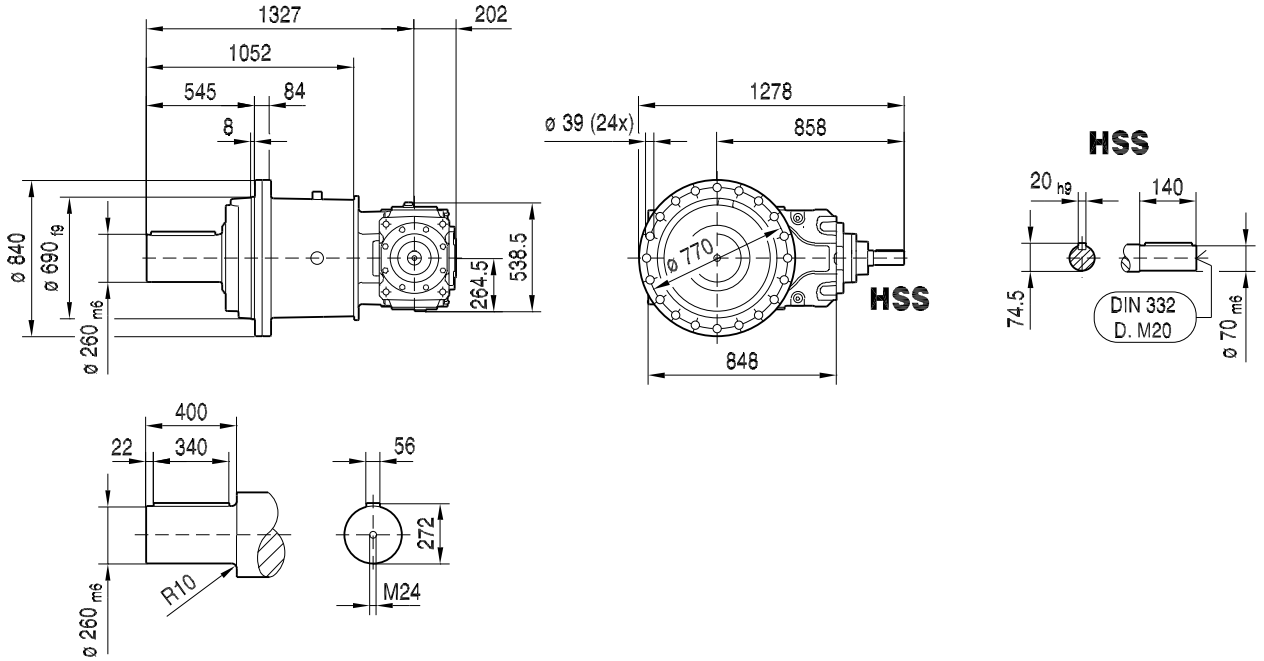


PF.. kg	PHF... kg
1 775	1 825

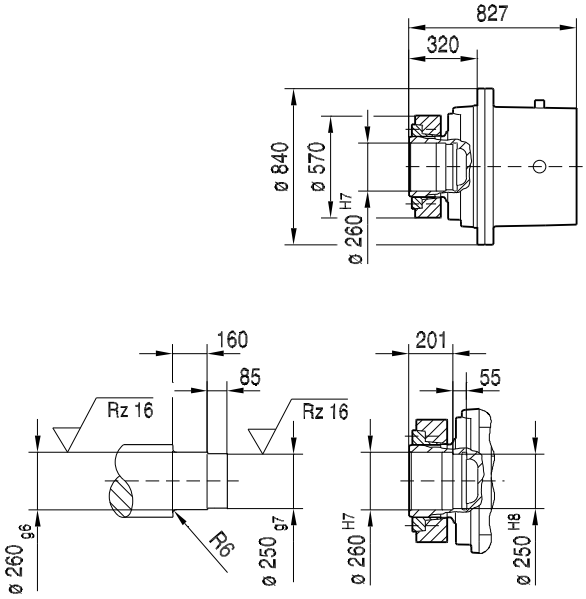
31548873/EN – 12/2025

45 009 00 14

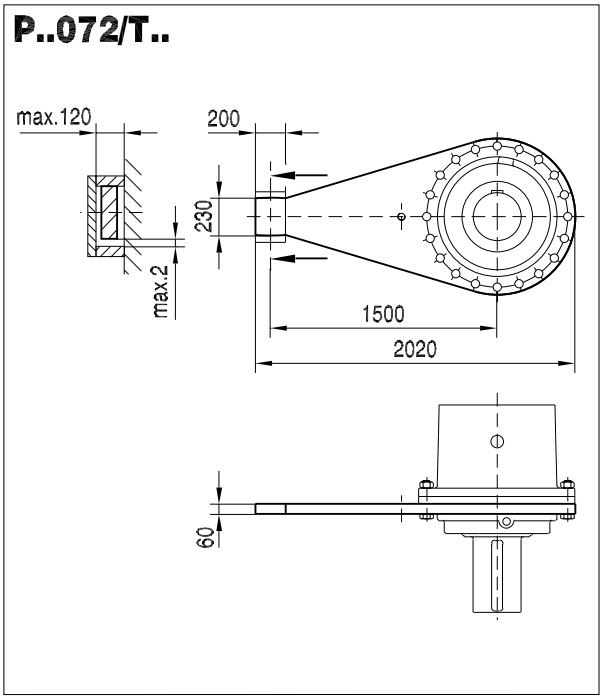
PF072X2K150..



PHF072X2K150..



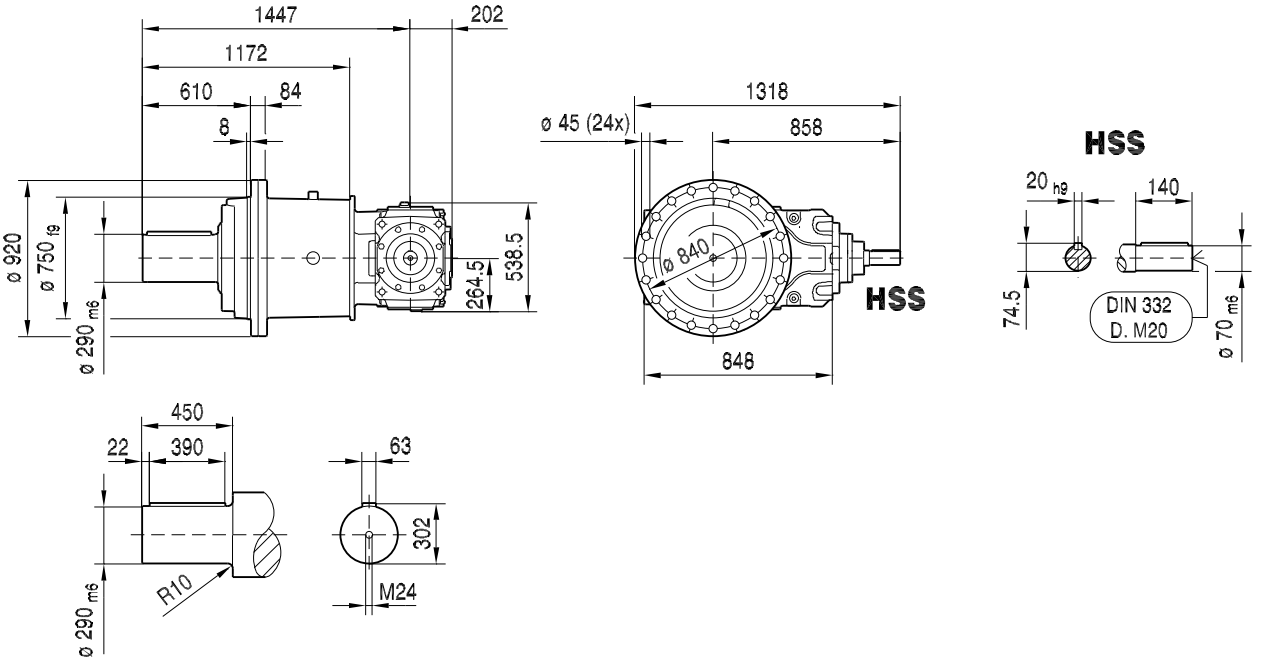
P..072/T..



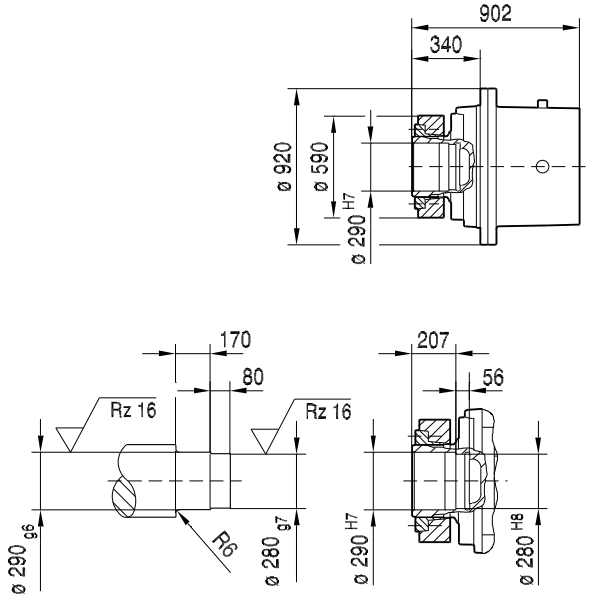
PF.. kg	PHF... kg
1 985	2 040

45 010 00 14

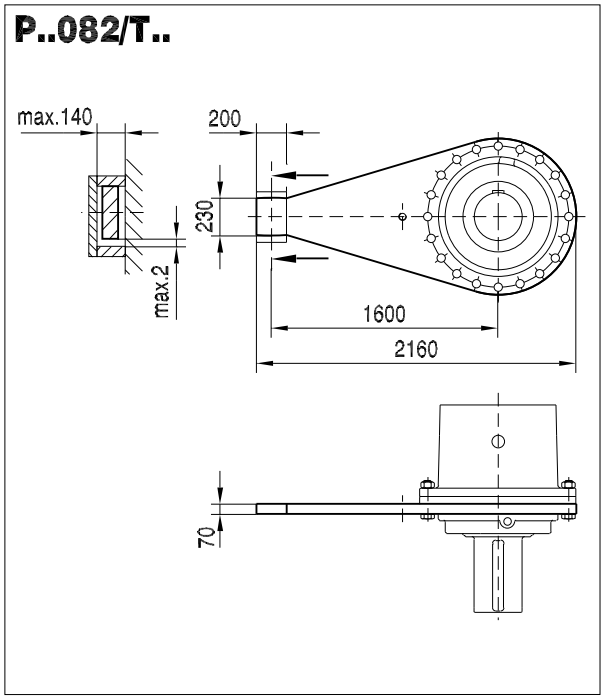
PF082X2K150..



PHF082X2K150..



P..082/T..

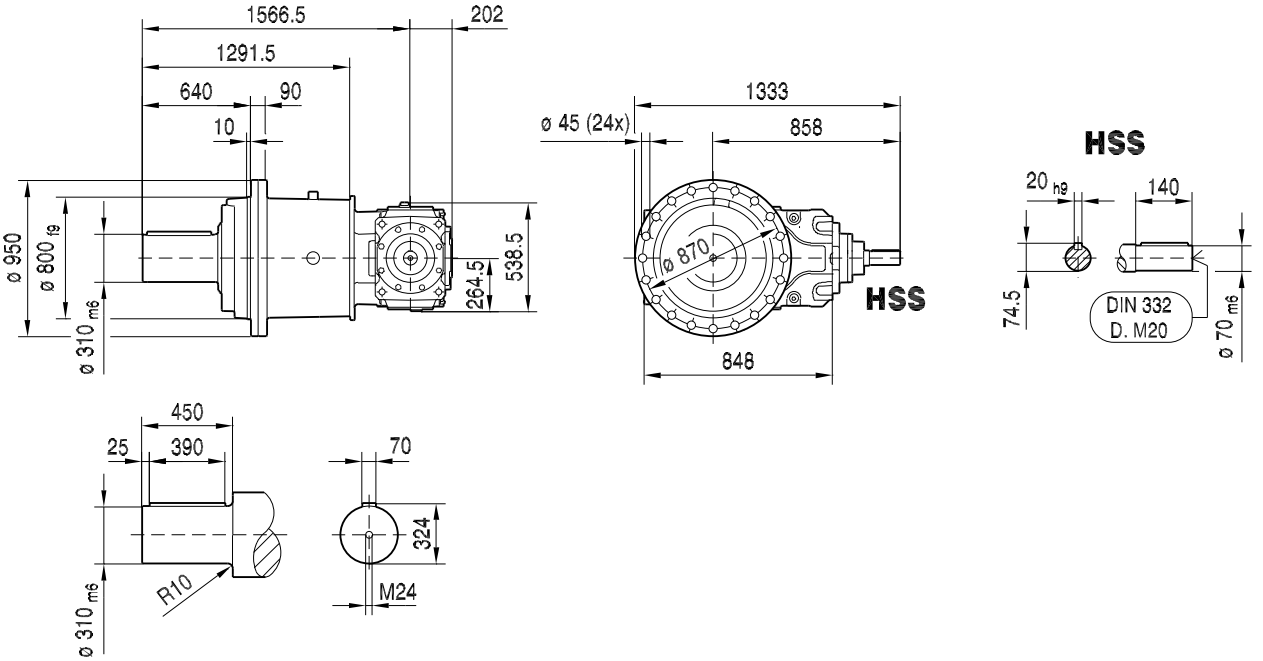


PF.. kg	PHF... kg
2 510	2 505

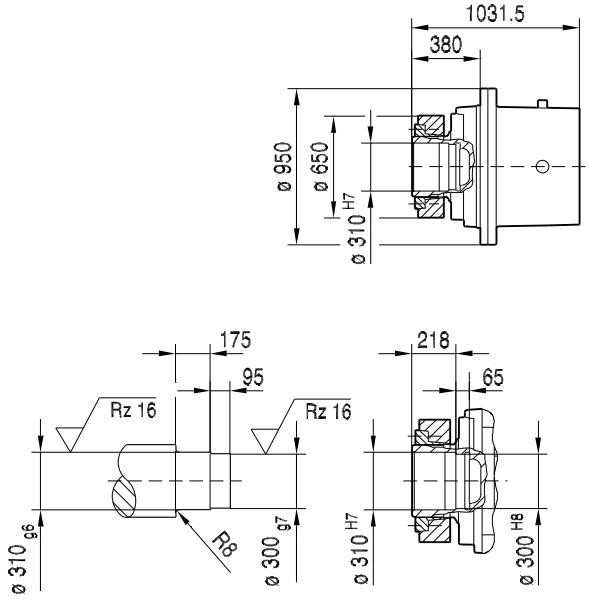
31548873/EN – 12/2025

45 011 00 14

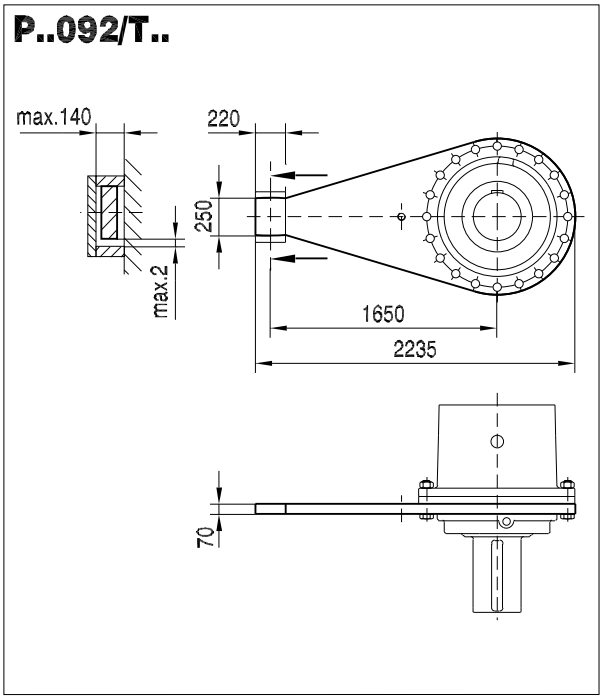
PF092X2K150..



PHF092X2K150..



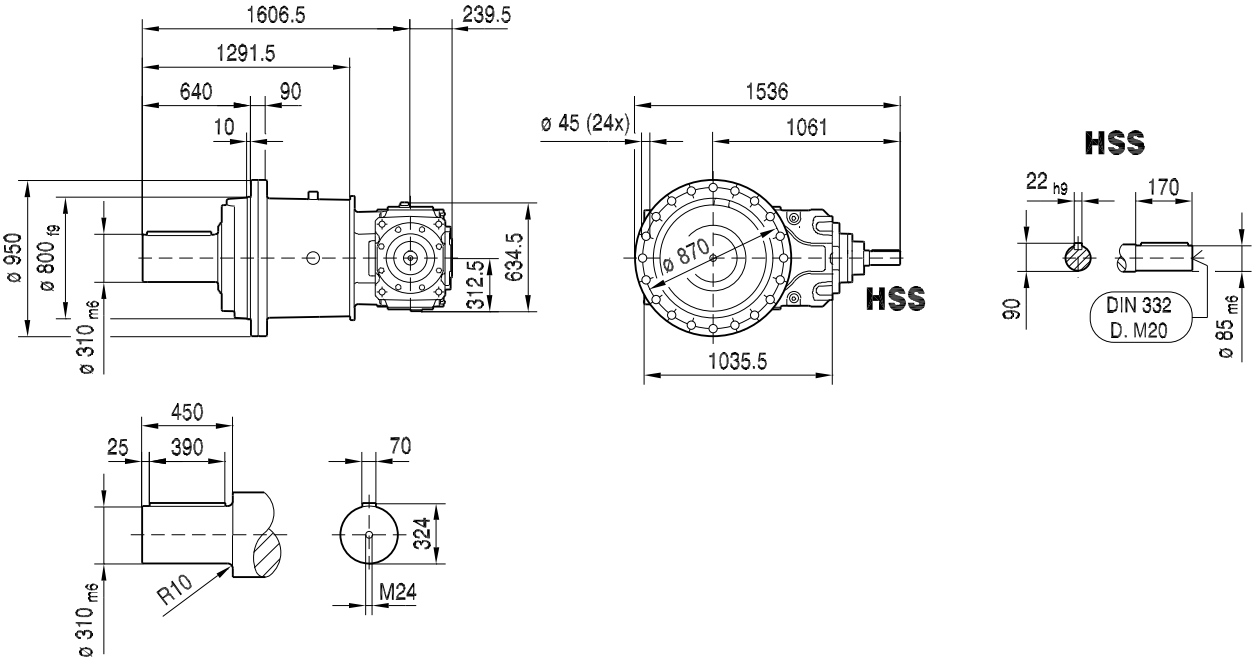
P..092/T..



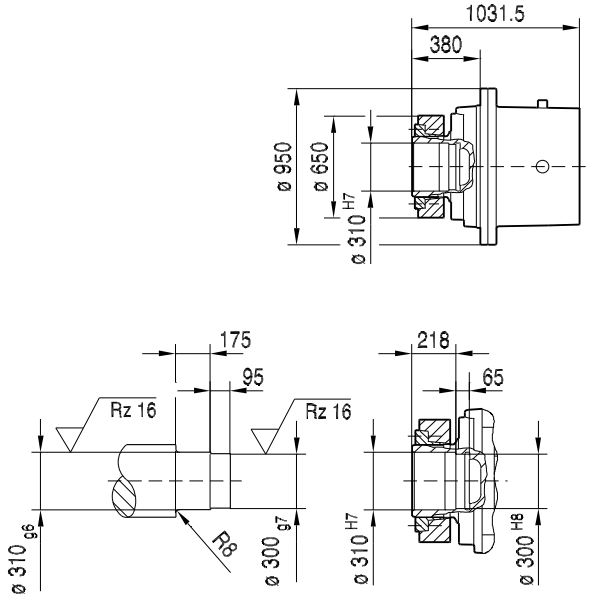
PF.. kg	PHF... kg
2 985	3 000

45 012 00 14

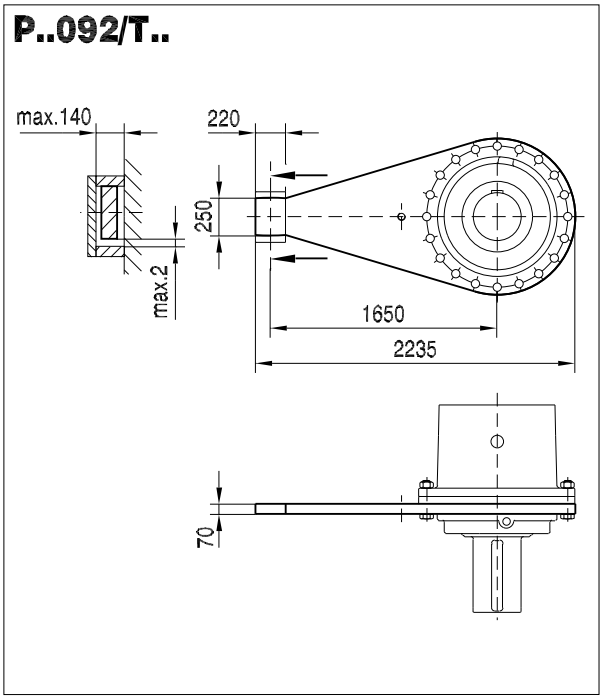
PF092X2K170..



PHF092X2K170..



P..092/T..

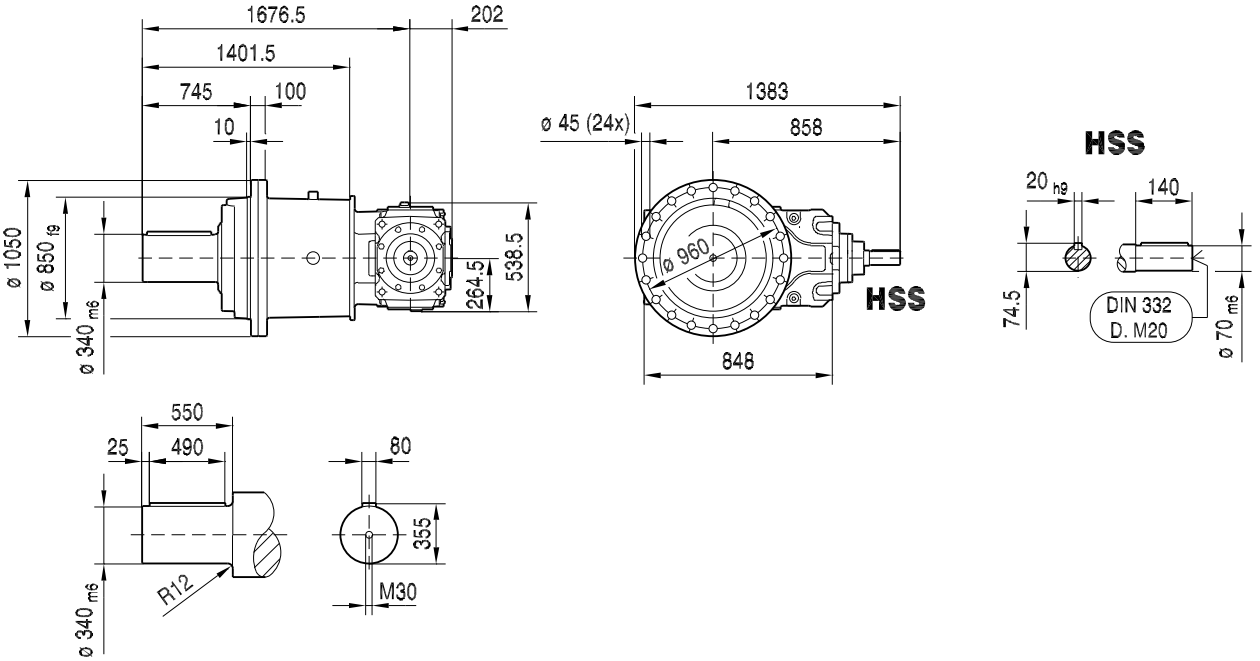


PF.. kg	PHF... kg
3 305	3 320

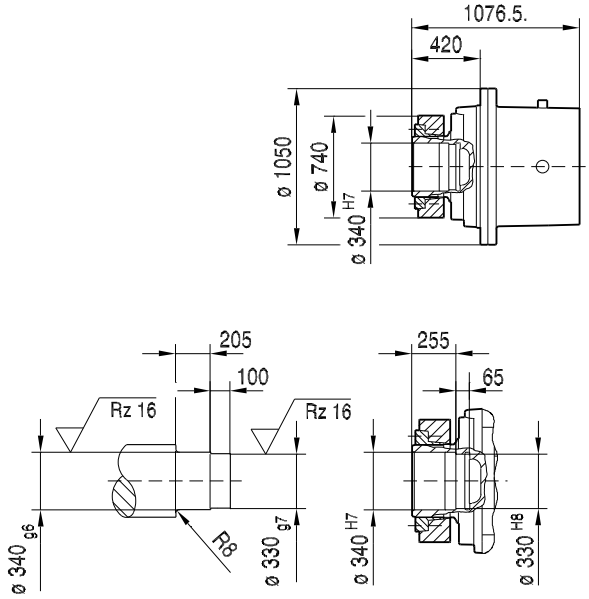
31548873/EN – 12/2025

45 013 00 14

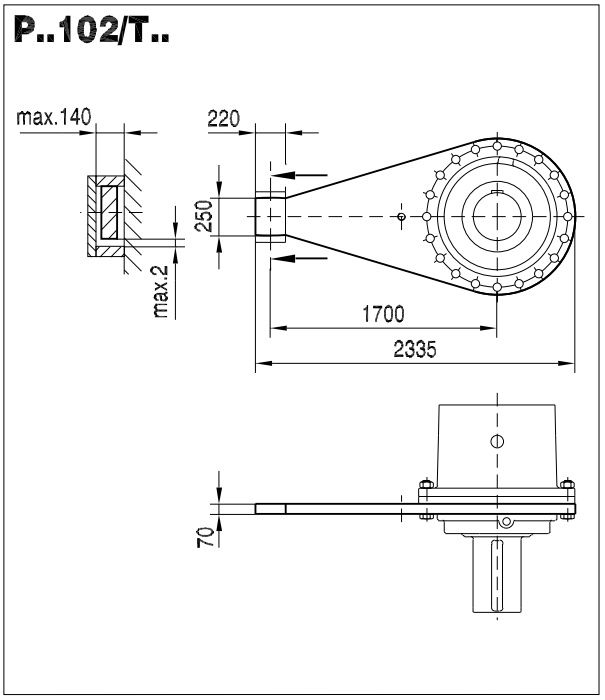
PF102X2K150..



PHF102X2K150..



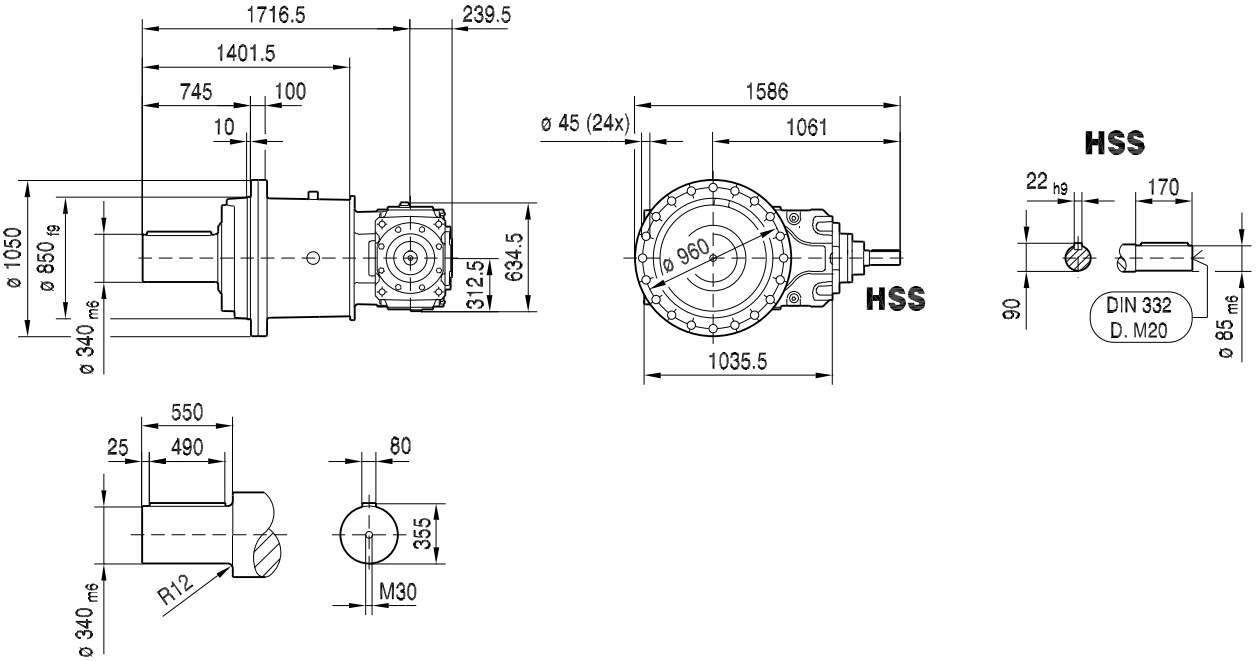
P..102/T..



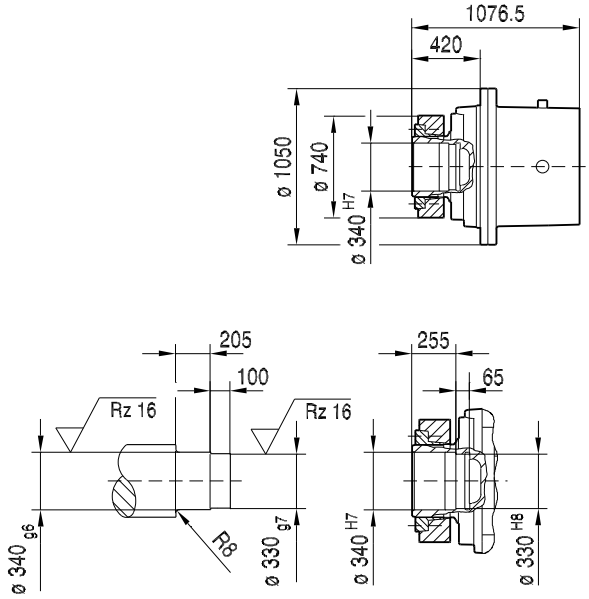
PF.. kg	PHF... kg
3 580	3 645

45 014 00 14

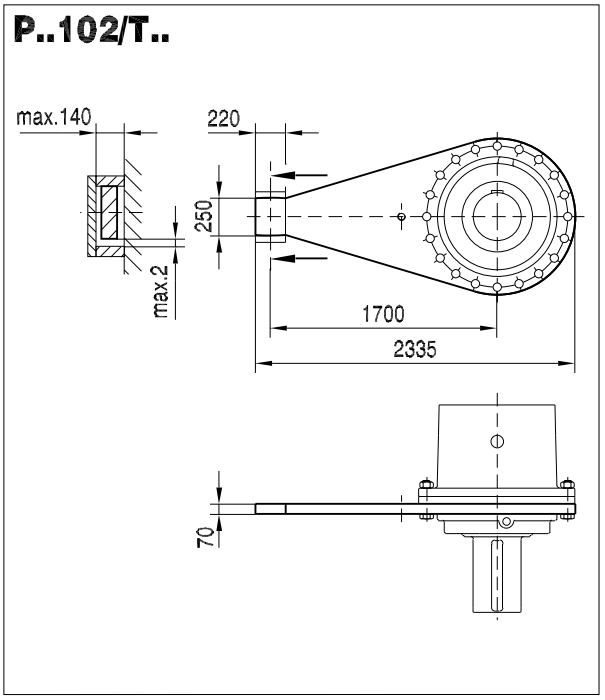
PF102X2K170..



PHF102X2K170..



P..102/T..



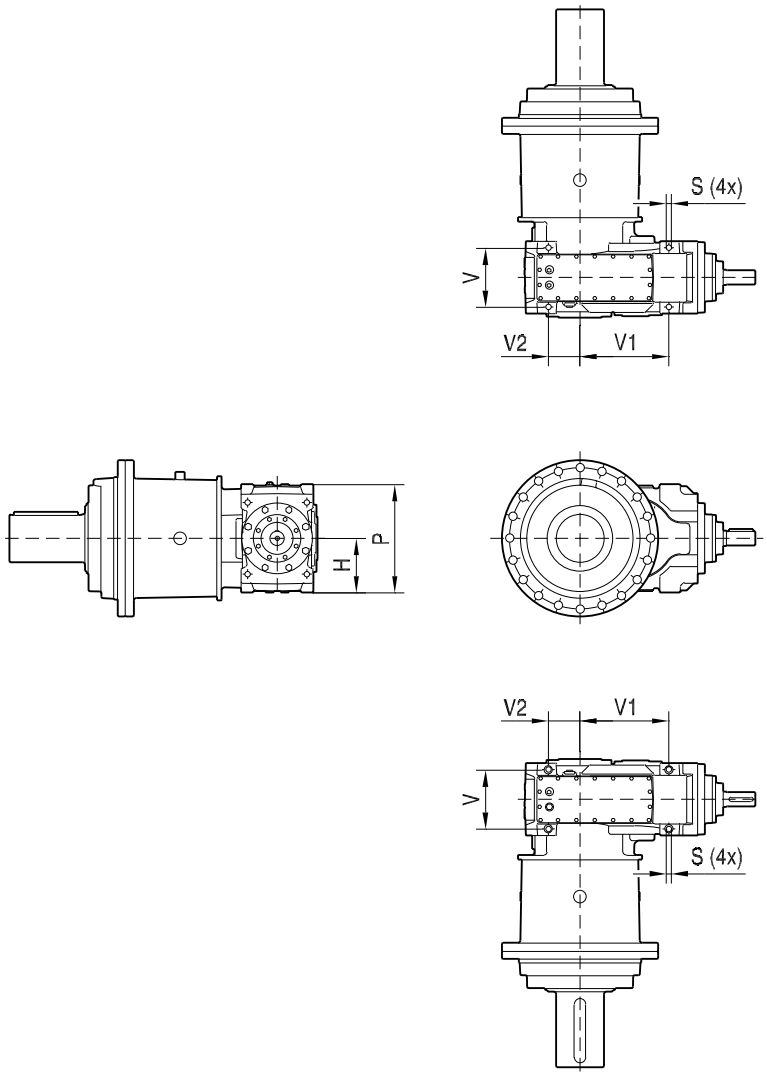
PF.. kg	PHF... kg
3 900	3 965

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9.1 Housing with additional foot connection /HPB

HPB

45 211 01 23



44325559819

Size	H	P	V	V1	V2	LHPB	S (4×)
X2K110e	190	380	210	335	115	114	M20 × 40
X2K130e	225	450	245	405	140	117.5	M24 × 42
X2K150e	265	530	290	435	155	130	M30 × 51
X2K170e	315	630	340	545	185	145	M36 × 55

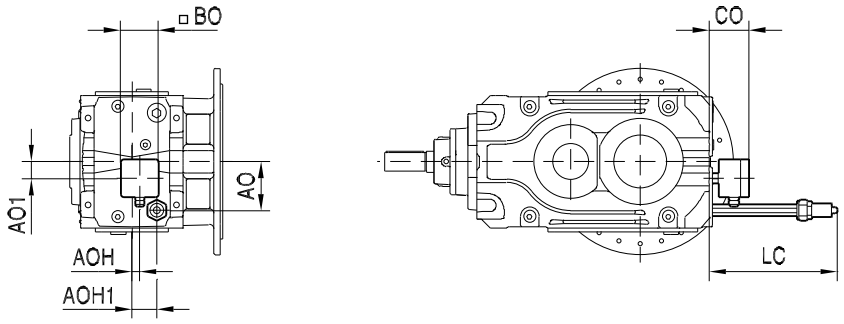
31548873/EN – 12/2025

10 Options dimension sheets

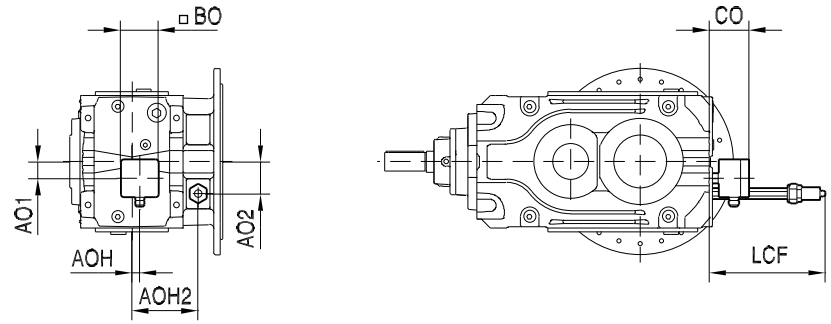
10.1 Oil heater /OH

45 001 00 15

OH



OH-F



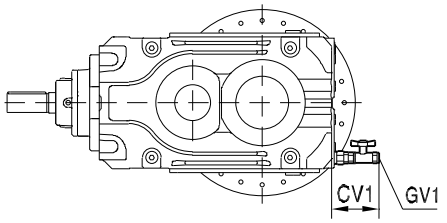
Size	AO	AO1	AO2	AOH	AOH1	AOH2	□BO	CO	LC	LCF
X2K110e	129	44.5	85	20	50	158.5	100	100	580	340
X2K130e	170	85	103	22	60	178.5	100	100	680	340
X2K150e	205	122.5	115	24	70	205	100	100	780	510
X2K170e	250	162.5	151	35	80	238	100	100	890	560

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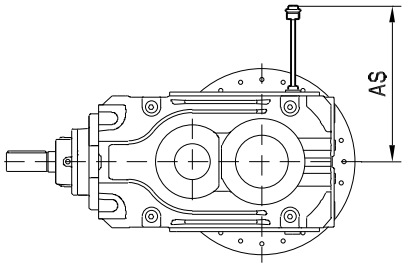
10.2 Oil drain valve /ODV, oil dipstick /OD

45 002 00 15

ODV



OD



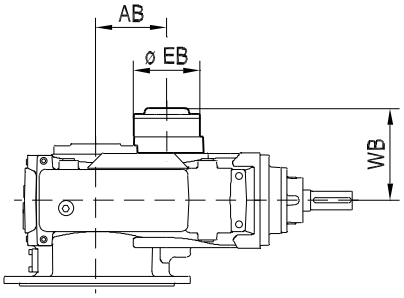
Size	ODV		OD
	CV1	GV1	AS
X2K110e	155	G1/2″	465
X2K130e	121.5	G1/2″	550
X2K150e	121.5	G1/2″	630
X2K170e	121.5	G1/2″	735

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10.3 Backstop /BS

45 003 00 15

BS



Size	AB	Ø EB	WB
X2K110e	184	175	244
X2K130e	226	190	268
X2K150e	267	210	295
X2K170e	325	245	343

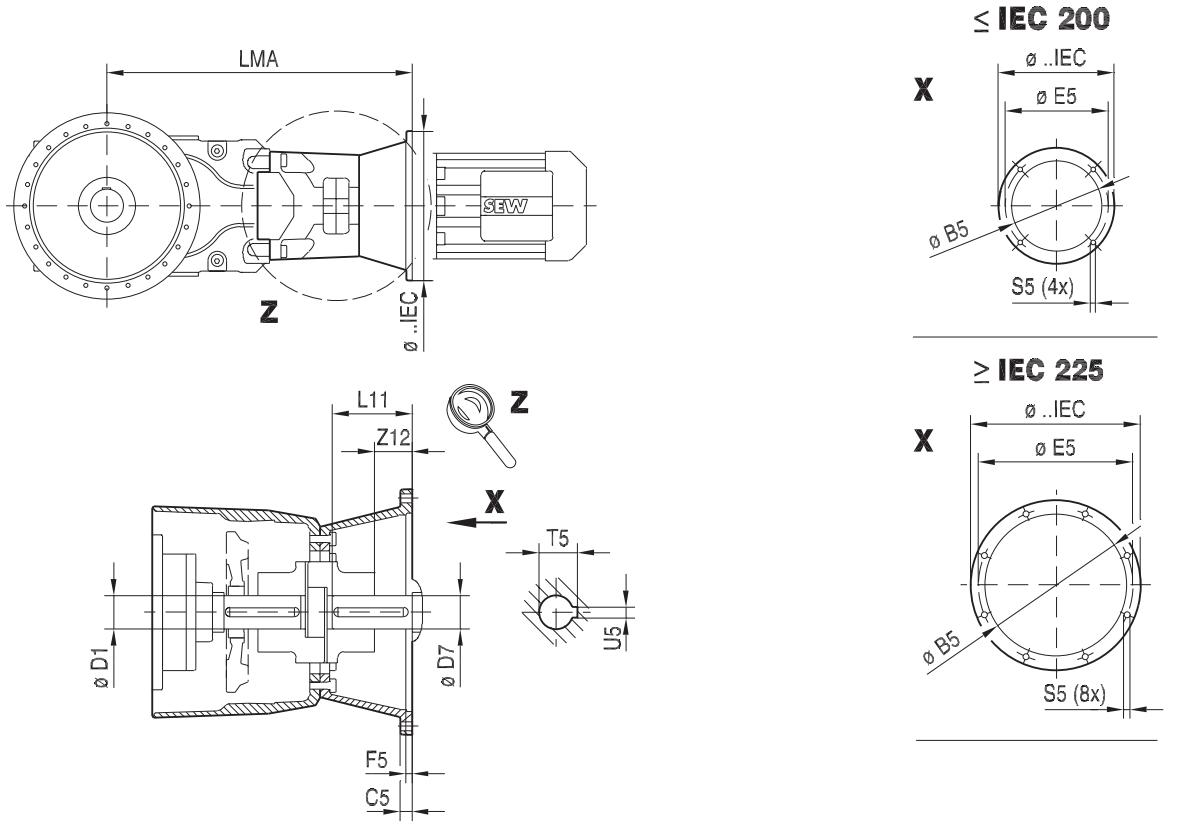
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10.4 IEC motor adapter

10.4.1 IEC motor adapter MA1

IEC motor adapter without fan, for use at non-critical temperatures.

MA1 45 005 00 15



X2K..	IEC	Ø IEC	Ø B5	C5	Ø D7	Ø E5	F5	L11	S5	T5	U5	Ø D1	LMA	Z12	kg
110e	200	400	300^{H7}	20	55^{H7}	350	7	110	M16 (4×)	59.3	16^{JS9}	50	788	38	50
	225	450	350^{H7}	20	60^{H7}	400	7	140	M16 (8×)	64.4	18^{JS9}	50	818	66	55
130e[1)]	225	450	350^{H7}	20	60^{H7}	400	7	140	M16 (8×)	64.4	18^{JS9}	60	931	36	70
150e	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8×)	69.4	18^{JS9}	70	1031	54	100
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8×)	79.9	20^{JS9}	70	1031	49	100
170e	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8×)	85.4	22^{JS9}	85	1234	43	150

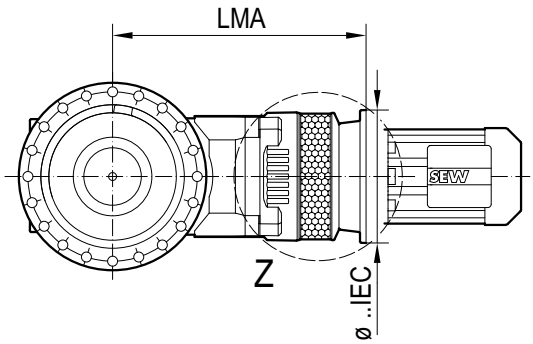
1) Observe the chapter concerning maximum motor weight depending on the motor adapter size

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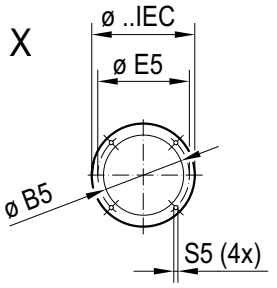
10.4.2 IEC motor adapter MA2

IEC motor adapter with optional fan to increase the thermal rating of the gear unit.

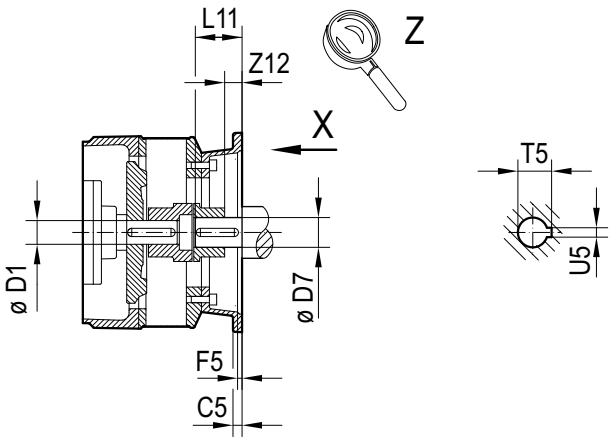
MA2 **45 068 01 22**

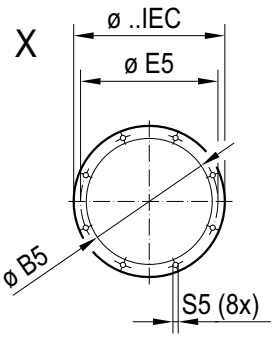


≤ IEC 200



≥ IEC 225





X2K..	IEC	Ø IEC	Ø B5	C5	Ø D7	Ø E5	F5	L11	S5	T5	U5	Ø D1	LMA	Z12	kg
110e	200	400	300^{H7}	20	55^{H7}	350	6	110	M16 (4×)	59.3	16^{JS9}	50	823	53	114
	225	450	350^{H7}	20	60^{H7}	400	6	140	M16 (8×)	64.4	18^{JS9}	50	853	83	122
	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8×)	69.4	18^{JS9}	50	863	78	132
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8×)	79.9	20^{JS9}	50	863	78	133
130e[1].	225	450	350^{H7}	20	60^{H7}	400	6	140	M16 (8×)	64.4	18^{JS9}	60	951	53	188
	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8×)	69.4	18^{JS9}	60	961	48	194
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8×)	79.9	20^{JS9}	60	961	48	194
	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8×)	85.4	22^{JS9}	60	1000	87	214
150e	250	550	450^{H7}	25	65^{H7}	500	7	140	M16 (8×)	69.4	18^{JS9}	70	1031	53	219
	280	550	450^{H7}	25	75^{H7}	500	7	140	M16 (8×)	79.9	20^{JS9}	70	1031	53	219
	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8×)	85.4	22^{JS9}	70	1070	57	262
170e	315S-L	660	550^{H7}	25	80^{H7}	600	7	170	M20 (8×)	85.4	22^{JS9}	85	1240	49	372
	315	800	680^{H7}	30	85^{H7}	740	7	170	M20 (8×)	90.4	22^{JS9}	85	1276	60	405
	355	800	680^{H7}	30	100^{H7}	740	7	210	M20 (8×)	106.4	28^{JS9}	85	1316	75	439

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

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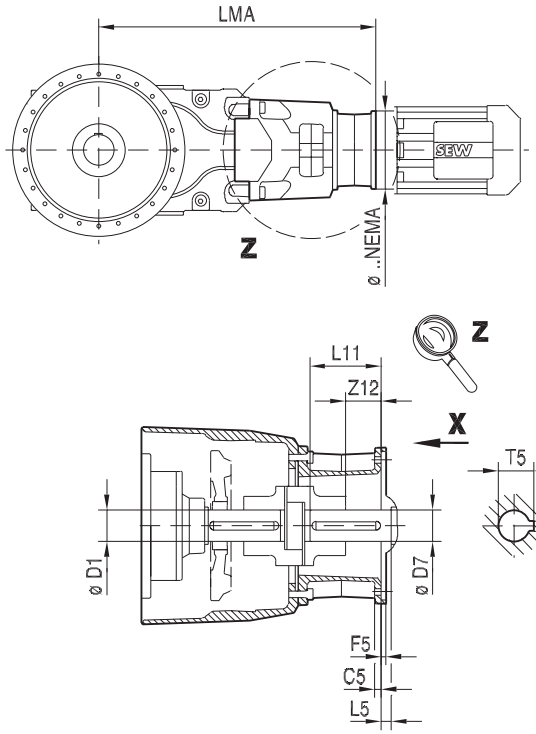
10.5 NEMA motor adapter [inch]

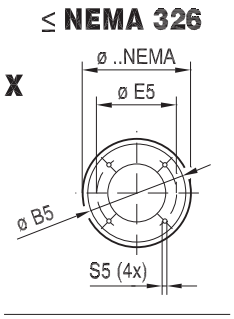
10.5.1 NEMA motor adapter NEMA-MA1

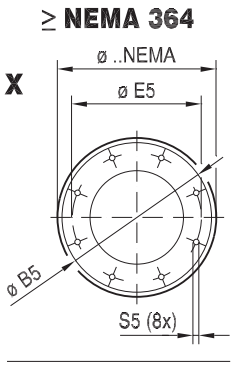
NEMA motor adapter without fan, for use at non-critical temperatures.

45 004 00 15

NEMA-MA1







X2K..	NEMA	Ø NEMA	Ø B5	C5	Ø D7	Ø E5	F5	L5	L11
110e	324TC-326TC	13	12 $½^{H7}$	0.71	2.12^{M7}	11	0.2	¼	5
	364TC-365TC	13	12 $½^{H7}$	0.71	2.38^{M7}	11	0.2	¼	5 ⅝
130e	364TC-365TC	13	12 $½^{H7}$	0.71	2.38^{M7}	11	0.2	¼	5 ⅝
150e	404TC-405TC	13	12 $½^{H7}$	0.79	2.88^{M7}	11	0.2	¼	8 ¼
170e	444TC-445TC	16.6	16^{H7}	0.79	3.38^{M7}	14	0.2	¼	8 ¼

X2K..	NEMA	S5	T5	U5	Ø D1	LMA	Z12	kg
110e	324TC-326TC	0.69 (4×)	2362	1/2 $^{+0.00197}$	1.97	32.01	2.36	45
	364TC-365TC	0.69 (8×)	2661	5/8 $^{+0.00197}$	1.97	32.87	1.37	60
130e	364TC-365TC	0.69 (8×)	2661	5/8$^{+0.00197}$	2.36	37.32	2.56	60
150e	404TC-405TC	0.69 (8×)	3213	3/4$^{+0.00197}$	2.76	42.36	3.77	90
170e	444TC-445TC	0.69 (8×)	3772	7/8$^{+0.00197}$	3.35	51.57	4.32	145

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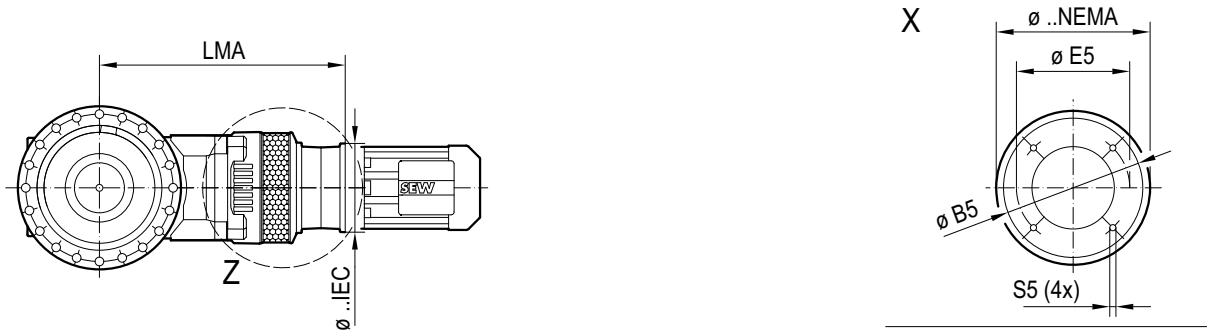
10.5.2 NEMA motor adapter NEMA-MA2

NEMA motor adapter with optional fan to increase the thermal rating of the gear unit.

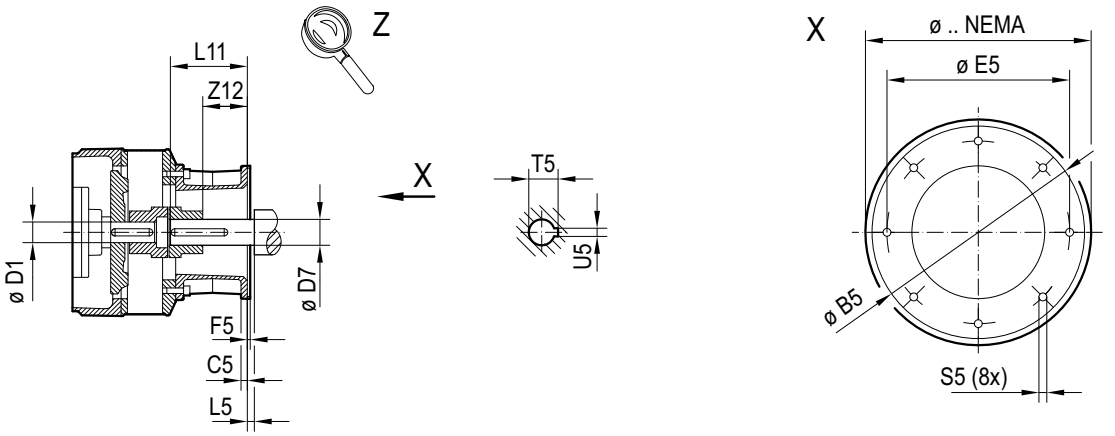
NEMA-MA2

45 069 01 22

≤ NEMA 326



≥ NEMA 364



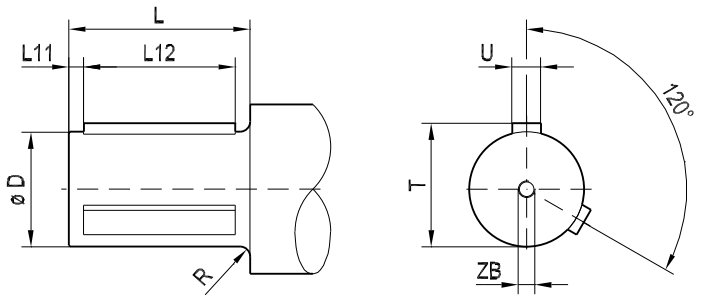
X2K..	NEMA	Ø NEMA	Ø B5	C5	Ø D7	Ø E5	F5	L5	L11
110e	324TC-326TC	13	12 ½^{H7}	0.669	2.12^{M7}	11	0.2	¼	5
	364TC-365TC	13	12 ½^{H7}	0.669	2.38^{M7}	11	0.2	¼	5 ⅝
	404TC-405TC	13	12 ½^{H7}	0.669	2.88^{M7}	11	0.2	¼	7
130e	364TC-365TC	13	12 ½^{H7}	0.669	2.38^{M7}	11	0.2	¼	5 ⅝
	404TC-405TC	13	12 ½^{H7}	0.669	2.88^{M7}	11	0.2	¼	7
	444TC-445TC	16.6	16^{H7}	0.787	3.38^{M7}	14	0.2	¼	8 ¼
150e	404TC-405TC	13	12 ½^{H7}	0.669	2.88^{M7}	11	0.2	¼	8 ¼
	444TC-445TC	16.6	16^{H7}	0.787	3.38^{M7}	14	0.2	¼	8 ¼
170e	444TC-445TC	16.6	16^{H7}	0.669	3.38^{M7}	14	0.2	¼	8 ¼
	447TC-449TC	16.6	16^{H7}	0.787	3.38^{M7}	14	0.2	¼	8 ¼

X2K..	NEMA	S5	T5	U5	Ø D1	LMA	Z12	kg
110e	324TC-326TC	0.69 (4×)	2.362	½ $^{+0.00197}$	1.97	33.11	2.795	110
	364TC-365TC	0.69 (8×)	2.661	5/8 $^{+0.00197}$	1.97	33.11	1.215	121
	404TC-405TC	0.69 (8×)	3.213	3/4 $^{+0.00197}$	1.97	35.472	3.575	128
130e	364TC-365TC	0.69 (8×)	2.661	5/8$^{+0.00197}$	2.36	36.968	2.590	170
	404TC-405TC	0.69 (8×)	3.213	3/4$^{+0.00197}$	2.36	39.33	3.574	183
	444TC-445TC	0.69 (8×)	3.772	7/8$^{+0.00197}$	2.36	42.362	6.399	198
150e	404TC-405TC	0.69 (8×)	3.213	3/4$^{+0.00197}$	2.76	42.086	3.574	244
	444TC-445TC	0.69 (8×)	3.772	7/8$^{+0.00197}$	2.76	45.118	5.218	272
170e	444TC-445TC	0.69 (8×)	3.772	7/8$^{+0.00197}$	3.35	51.811	4.312	383
	447TC-449TC	0.69 (8×)	3.772	7/8$^{+0.00197}$	3.35	51.811	3.722	396

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10.6 P.. solid shaft with 2 keys

45 002 01 14

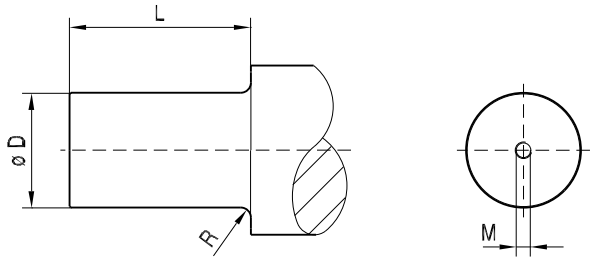


Size	ØD	L11	L12	L	T	U	M	R
P.042	190_{m6}	17.5	255	300	200	45	M20	10
P.052	210_{m6}	17.5	300	350	221	50	M24	10
P.062	240_{m6}	21	340	400	252	56	M24	10
P.072	260_{m6}	22	340	400	272	56	M24	10
P.082	290_{m6}	22	390	450	302	63	M24	10
P.092	310_{m6}	25	390	450	324	70	M24	10
P.102	340_{m6}	25	490	550	355	80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

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10.7 PR.. smooth solid shaft

45 003 00 14

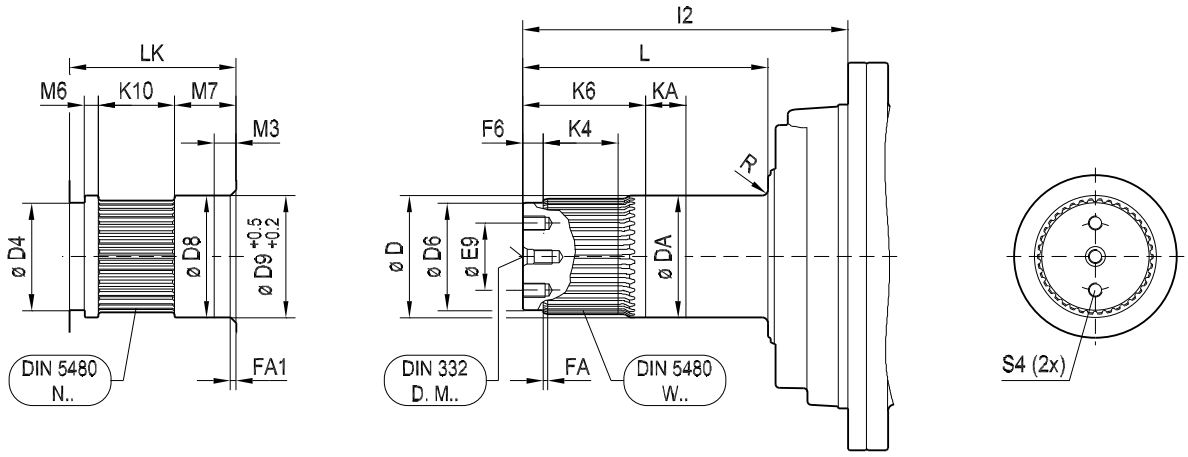


Size	Ø D	L	M	R
P.042	190_{v6}	300	M20	10
P.052	210_{v6}	350	M24	10
P.062	240_{v6}	400	M24	10
P.072	260_{v6}	400	M24	10
P.082	290_{v6}	450	M24	10
P.092	310_{v6}	450	M24	10
P.102	340_{v6}	550	M30	12

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10.8 PL.. splined solid shaft

45 002 02 16



DIN 5480 – Solid shaft															
Type	**ø D**	**ø DA**	**ø D6**	**KA**	**F6**	**L**	**I2**	**K6**	**K4**	**R**	**ø E9**	**DIN 332 D.M..**	**S4 (2 ×)**	**FA**	**DIN 5480-W..**
PLF042	190_{h9}	190_{m6}	165_{m6}	30	30	300	430	175	110	10	125	M20	M20	8	180×5×30×34×8f
PLF052	210_{h9}	210_{m6}	185_{m6}	35	35	350	490	180	110	10	140	M24	M24	8	200×5×30×38×8f
PLF062	240_{h9}	240_{m6}	205_{m6}	35	35	400	540	210	130	10	160	M24	M24	8	220×5×30×42×8f
PLF072	260_{h9}	260_{m6}	235_{m6}	40	40	400	545	215	135	10	160	M24	M24	8	250×5×30×48×8f
PLF082	290_{h9}	290_{m6}	265_{m6}	40	40	450	610	235	155	10	190	M24	M24	8	280×5×30×54×8f
PLF092	310_{h9}	310_{m6}	280_{m6}	45	45	450	640	245	160	10	220	M24	M24	8	300×5×30×58×8f
PLF102	340_{h9}	340_{m6}	300_{m6}	50	50	550	745	265	167	12	235	M30	M30	8	320×5×30×62×8f

Recommendations for customer shaft										
Type	**ø D4**	**ø D8**	**ø D9**	**M6**	**M7**	**M3**	**K10**	**FA1**	**LK**	**DIN 5480-N..**
PLF042	165^{F7}	190^{F7}	190	12	162	95	100	12×45°	300	180×5×30×34×9H
PLF052	185^{F7}	210^{F7}	210	12	207	135	100	12×45°	350	200×5×30×38×9H
PLF062	205^{F7}	240^{F7}	240	12	237	155	120	12×45°	400	220×5×30×42×9H
PLF072	235^{F7}	260^{F7}	260	12	227	145	125	12×45°	400	250×5×30×48×9H
PLF082	265^{F7}	290^{F7}	290	12	257	175	145	12×45°	450	280×5×30×54×9H
PLF092	280^{F7}	310^{F7}	310	12	247	160	150	12×45°	450	300×5×30×58×9H
PLF102	300^{F7}	340^{F7}	340	12	335	235	155	12×45°	550	320×5×30×62×9H

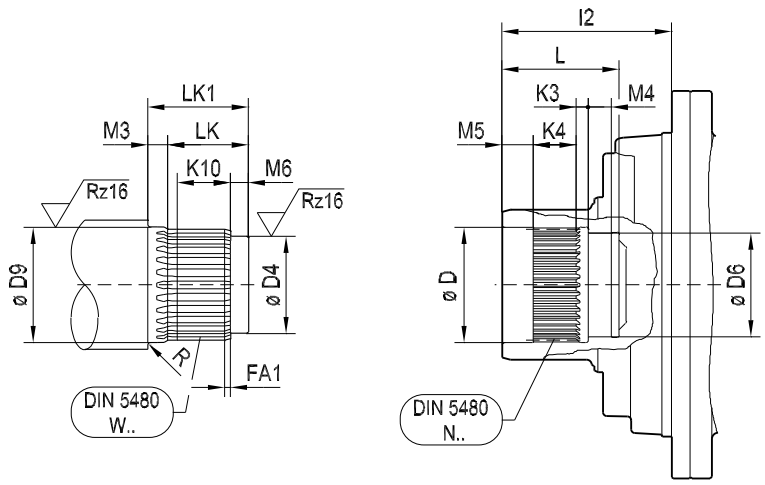
INFORMATION

For applications with overhung loads, consult SEW-EURODRIVE.

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10.9 PV.. splined hollow shaft

45 001 01 16



DIN 5480 – Hollow shaft									
Type	**ø D**	**ø D6**	**M5**	**M4**	**L**	**l2**	**K4**	**K3**	**DIN 5480-N..**
PVF042	202^{H7}	180^{H7}	45	30	191	255	80	21	200×5×30×38×9H
PVF052	222^{H7}	200^{H7}	55	35	210	275	82	23	220×5×30×42×9H
PVF062	252^{H7}	230^{H7}	60	35	240	295	95	32	250×5×30×48×9H
PVF072	282^{H7}	250^{H7}	60	37	256	320	98	43	280×5×30×54×9H
PVF082	302^{H7}	280^{H7}	60	38	263	340	125	22	300×5×30×58×9H
PVF092	322^{H7}	300^{H7}	70	40	283	380	130	23	320×5×30×62×9H
PVF102	362^{H7}	330^{H7}	90	45	320	420	125	40	360×8×30×44×9H

Recommendations for customer shaft										
Type	**ø D9**	**ø D4**	**M3**	**M6**	**LK1**	**LK**	**K10**	**R**	**FA1**	**DIN 5480-W..**
PVF042	202_{g6}	180_{g6}	34	43	178	144	92	5	8×30°	200×5×30×38×8f
PVF052	222_{g6}	200_{g6}	44	50	197	153	94	5	8×30°	220×5×30×42×8f
PVF062	252_{g6}	230_{g6}	49	59	224	175	107	5	8×30°	250×5×30×48×8f
PVF072	282_{g6}	250_{g6}	49	72	240	191	110	6	8×30°	280×5×30×54×8f
PVF082	302_{g6}	280_{g6}	49	52	247	198	137	6	8×30°	300×5×30×58×8f
PVF092	322_{g6}	300_{g6}	59.5	55	265	205.5	142	8	8×30°	320×5×30×62×8f
PVF102	362_{g6}	330_{g6}	77	75	302	225	139	8	10×30°	360×8×30×44×8f

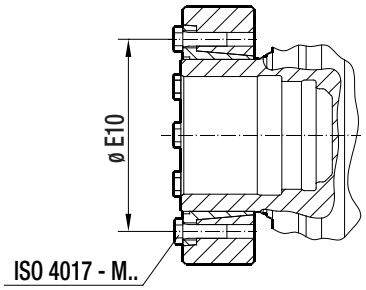
INFORMATION

For applications with overhung loads, consult SEW-EURODRIVE.

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10.10 Locking screws of the shrink disk

45 001 00 20

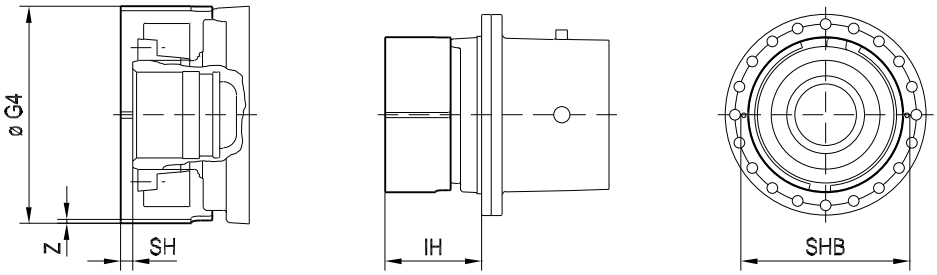


Gear unit type	Size	Ø E10	ISO
PH../PHF..	042	296	ISO 4017 – M20×60
PH../PHF..	052	318	ISO 4017 – M20×60
PH../PHF..	062	360	ISO 4017 – M24×80
PH../PHF..	072	402	ISO 4017 – M24×80
PH../PHF..	082	424	ISO 4017 – M24×80
PH../PHF..	092	458	ISO 4017 – M27×80
PH../PHF..	102	518	ISO 4017 – M27×80

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10.11 Protective cover for shrink disk

45 133 02 08



Size	B	ø D	L	Z	SH
P.042	522	479	269	2	14
P.052	566	523	293	2	18
P.062	636	593	312	2	17
P.072	712	669	335.5	2	15.5
P.082	776	733	360	2	20
P.092	734	684	399.5	2	19.5
P.102	824	774	435.5	2	14.5

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11 Appendix

11.1 Abbreviation key

d_0	Mean diameter of the installed transmission element	mm
F_{A1}	Axial load on HSS	N
F_{A2}	Axial load on LSS	N
F_F	Peak load factor	–
F_R	Radial load	N
$F_{R\ per}$	Permitted radial load	N
$F_{R\ max}$	Maximum radial load	N
F_{Start}	Startup factor	–
$F_{S\ min}$	Application-specific service factor	–
F_S	Service factor = MN2 / MK2 = PN1 / PK1	–
f_1	Altitude factor	
f_{rev}	Reversing factor	
f_T	Temperature factor	
f_z	Transmission element factor	–
η	Efficiency	–
H	Installation altitude above sea level	m
HSS	High-speed gear shaft (normally input shaft)	–
i	Gear ratio	–
i_{ex}	Exact gear unit ratio	–
IP..	Degree of protection of electrical instruments	–
L_H	Required service life	h
$L_{h\ min.}$	Required minimum bearing life of the gear unit	h
LSS	Low-speed gear shaft (usually output shaft)	–
M_a	Output torque in relation to motor power	Nm
M_{K1}	Input torque (= operating torque on HSS)	Nm
$M_{K1\ max}$	Peak input torque (= peak operating torque on HSS)	Nm
M_{K2}	Output torque (= operating torque on LSS)	Nm
$M_{K2\ max}$	Peak output torque (= peak operating torque on LSS)	Nm
$M_{K2\ per}$	Permitted peak output torque	Nm
M_M	Nominal torque of the motor	Nm
M_{N2}	Nominal gear unit torque	Nm
n_1	Input speed	min^{-1}
n_2	Output speed	min^{-1}
n_M	Motor speed	min^{-1}
P_{K1}	Operating power at HSS	kW
$P_{K1\ max}$	Peak operating power at HSS	kW
$P_{K1\ per}$	Permitted peak operating power at HSS	kW
P_{K2}	Operating power at LSS	kW
P_M	Nominal motor power	kW
P_{N1}	Nominal gear unit power (in relation to HSS)	kW
P_T	Thermal rating of the gear unit	kW
P_{TH}	Nominal thermal rating of the gear unit	kW
S_{St}	Static safety value	–
S_{Dy}	Dynamic safety value	–
t	Time under load within a cycle	s
T_{amb}	Ambient temperature	°C

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12 Contacting SEW-EURODRIVE

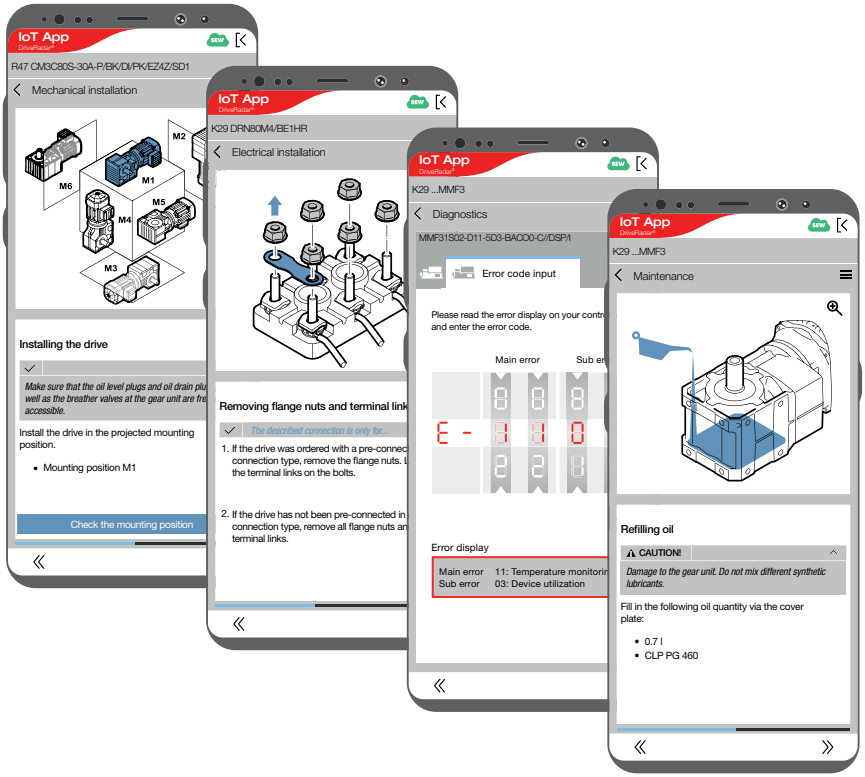
You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

https://www.sew-eurodrive.de/contacts-worldwide



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