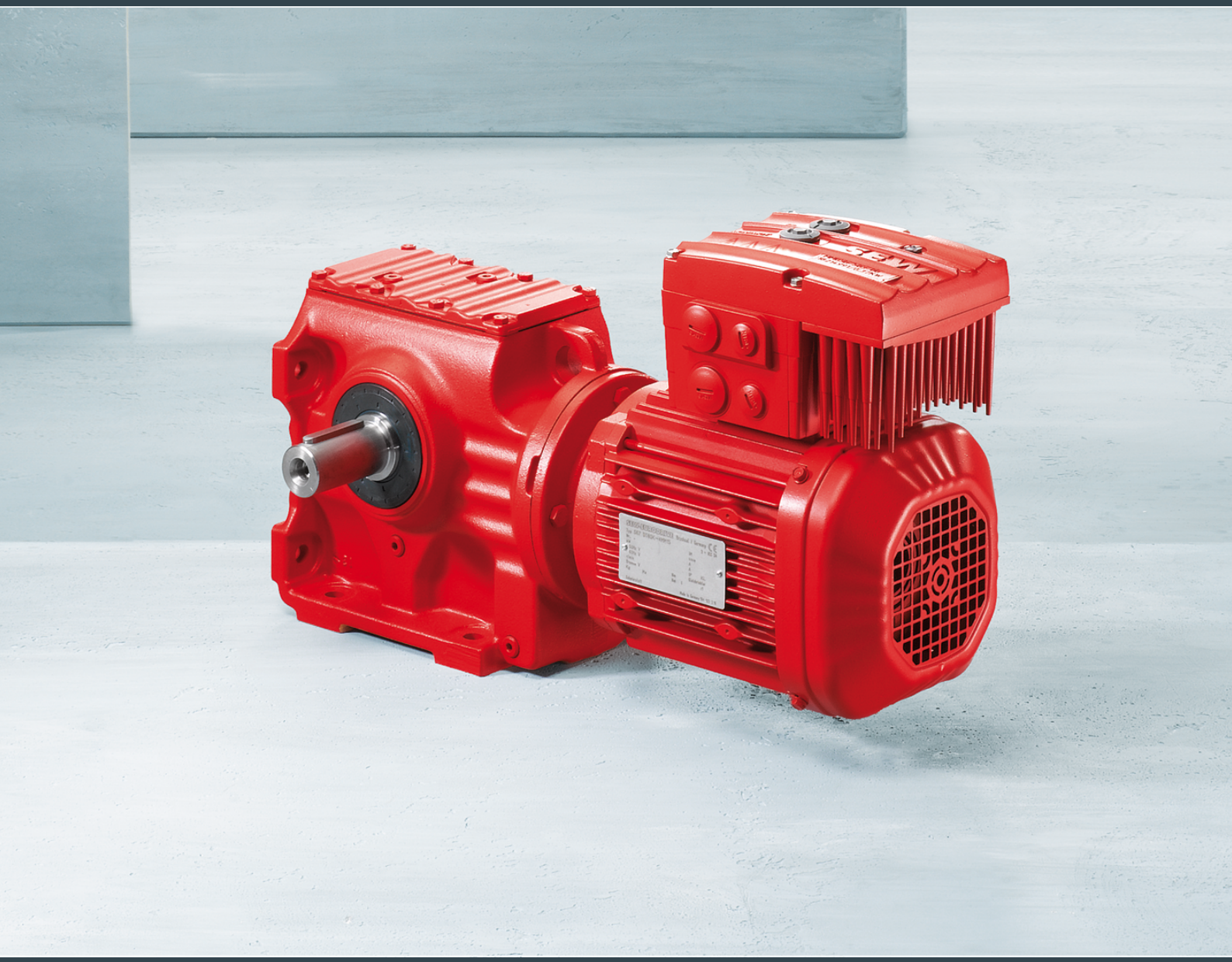
SEW EURODRIVE

Catalog



MOVIMOT® Gearmotors

Edition 09/2016

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Contents

22148205/EN – 09/2016

22148205/EN – 09/2016

1 Introduction

1.1 The SEW-EURODRIVE group of companies

1.1.1 Global presence

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

We are represented in the most important branches of industry all over the world: With 14 manufacturing plants and 79 Drive Technology Centers worldwide as well as our customer support, which we consider an integrative service that continues our commitment to outstanding quality.

1.1.2 Always the right drive

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

Our electronic components — MOVITRAC® frequency inverters, MOVIDRIVE® drive inverters and MOVIAXIS® multi-axis servo inverters — enhance the gearmotors, forming a combination that blends perfectly with the existing SEW-EURODRIVE systems program. As is the case for mechanical systems, development, production and assembly is carried out completely by SEW-EURODRIVE. In combination with our drive electronics, these drives provide the utmost in flexibility.

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

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

Power, quality and sturdy design combined in one standard product: With high torque levels, industrial gear units from SEW-EURODRIVE realize major movements. The modular concept will once again provide optimum adaptation of industrial gear units to meet a wide range of different applications.

1.1.3 Your ideal partner

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

22148205/EN – 09/2016

1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into 4 product groups. These 4 product groups are:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial Gear Units

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

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

22148205/EN – 09/2016

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

22148205/EN – 09/2016

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

4. Industrial Gear Units
• Helical gear unit • Bevel-helical gear units • Planetary gear units

Products and systems covering several product groups
• Operator terminals • MOVI-PLC® drive-based control system

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

- Technical consulting
- User software

22148205/EN – 09/2016

- Seminars and training
- Extensive technical documentation
- Worldwide customer service

Visit our website at

→ **www.sew-eurodrive.com**

The website provides comprehensive information and services.

22148205/EN – 09/2016

1.3 Documentation

1.3.1 Contents of this publication

This MOVIMOT® gearmotors price catalog/catalog includes the detailed technical data of the following SEW-EURODRIVE product groups:

- Helical gearmotor of the DR.. series with MOVIMOT® inverter
- Parallel-shaft helical gearmotor of the DR.. series with MOVIMOT® inverter
- Helical-bevel gearmotor of the DR.. series with MOVIMOT® inverter
- Helical-worm gearmotor of the DR.. series with MOVIMOT® inverter
- SPIROPLAN® gearmotor of the DR.. series with MOVIMOT® inverter

The price catalogs and catalogs offer the following information:

- Product descriptions
- Type designations
- Project planning instructions for drives and gear units
- Description of mounting positions
- Explanation on the order information
- Design and operating notes
- Important information on selection tables and dimension sheets
- Description of the different design types
- Overview of all permitted combinations
- Selection tables gearmotors of the DR.. series with MOVIMOT® inverter
- Dimension sheets gearmotors of the DR.. series with MOVIMOT® inverter
- Technical data
- Price catalog → prices and option pricing of options and accessories

22148205/EN – 09/2016

1.3.2 Additional documentation

In addition to the "MOVIMOT® Gearmotors" catalog/price catalog, SEW-EURODRIVE also offers a "DR.. Gearmotors" catalog and a "DR.. AC Motors" catalog.

These catalogs offer the following information:

- Type designations
- Product descriptions
- Notes on the project planning for the motors
- Technical data of the motors
- Technical data of the options and additional features
- Important information on the dimensions sheets
- Dimension sheets of the motors
- Information on brakes from SEW-EURODRIVE
- Information on prefabricated cables
- Price catalog → prices and option pricing of options and accessories

For detailed information about the MOVIMOT® gearmotors with LSPM technology, refer to the "MOVIMOT® Gearmotors (LSPM Technology) DR.71SJ - DR.100LJ with R, F, K and W Gear Units" addendum.

The complete range of technical documentation is available on the SEW-EURODRIVE website: "www.sew-eurodrive.com"

1.4 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

1.5 Copyright notice

22148205/EN – 09/2016

2 Product description

2.1 Product characteristics

2.1.1 Operating temperatures

Gear units and gearmotors from SEW-EURODRIVE can be operated in a wide ambient temperature range.

Gear unit

The following standard temperature ranges are permitted for filling the gear units according to the lubricant table:

Gear unit	Filled with	Permitted standard temperature range
K..19, K..29, K..39, K..49	CLP(PG) VG460	-20 °C to +60 °C
K..37, K..47, K..57– K..187 **RX.57 – RX.107** **R.07 – R.167** **F..27 – F..157**	CLP(CC) VG220	-15 °C to +40 °C
S..37 – S..97	CLP(CC) VG680	0 °C to +40 °C
W..10 – W..30, W..37, W..47	CLP(SEW-PG) VG460	-20 °C to +40 °C

The rated data of the gear units and gearmotors specified in the catalog refer to an ambient temperature of +25 °C.

Gear units from SEW-EURODRIVE can be operated outside the standard temperature range if project planning is adapted to ambient temperatures from as low as up to -40 °C in the intensive cooling range until up to +60 °C. Project planning must take special operating conditions into account and adapt the drive to the ambient conditions by selecting suitable lubricants and seals.

SEW-EURODRIVE recommends thermal project planning for the drives in general and offers to perform the project planning.

Motors

The motors of the DR.. series are designed for use in a temperature range from -20 °C to +40 °C.

This expands the standardized temperature range required by IEC 60034.

Using the motors outside the above temperature range is possible with some special adjustments. Contact SEW-EURODRIVE in this case.

MOVIMOT®

MOVIMOT® gearmotors are designed for use in the following temperature ranges:

- -30 °C to +40 °C for MOVIMOT® standard
- -25 °C to +40 °C for MOVIMOT® with AS-Interface

Contact SEW-EURODRIVE if the MOVIMOT® gearmotors are operated outside this temperature range.

2.1.2 Installation altitude

Gearmotor

Due to the low air density at high installation altitudes, heat dissipation on the surface of motors and gear units decreases. The rated data listed in the catalog applies to an installation altitude of maximum 1000 m above sea level. Installation altitudes of more than 1000 m above sea level must be taken into account for project planning of gear units and gearmotors.

22148205/EN – 09/2016

MOVIMOT®

MOVIMOT® drives can also be operated with line voltages of 200 – 240 V or 380 – 500 V at an altitude of 1000 – 4000 m above sea level. Therefore, observe the following basic conditions.

- At heights above 1000 m asl, the nominal continuous power is reduced due to reduced cooling: I_N reduction by 1% per 100 m.
- At altitudes of 2000 – 4000 m amsl limiting measures must be taken, which reduce the line side overvoltage from category III to category II for the entire system.

2.1.3 Degree of protection to EN 60034 (IEC60034-5)

AC motors and AC brakemotors of the DR.. series are available with degree of protection IP54 as standard. Enclosures IP55, IP56, IP65 or IP66 are available upon request.

IP	1st digit		2nd digit
	Touch guard	Protection against foreign objects	Protection against water
0	No protection	No protection	No protection
1	Protected against access to hazardous parts with the back of your hand	Protection against solid foreign objects Ø 50 mm and larger	Protection against dripping water
2	Protected against access to hazardous parts with a finger	Protection against solid foreign objects Ø 12 mm and larger	Protected against dripping water when housing is tilted up to 15°
3	Protected against access to hazardous parts with a tool	Protection against solid foreign objects Ø 2.5 mm and larger	Protection against spraying water
4	Protected against access to hazardous parts with a wire	Protection against solid foreign objects Ø 1 mm and larger	Protection against splashing water
5		Dust-protected	Protection against water jets
6		Dust-tight	Protection against powerful water jets
7	–	–	Protection against temporary immersion in water
8	–	–	Protection against permanent immersion in water

2.1.4 Power and torque

The power and torque ratings refer to mounting position M1 and similar mounting positions in which the input stage is not completely submerged in oil. In addition, the gearmotors are assumed to be standard versions with standard lubrication and under normal ambient conditions.

2.1.5 Speeds

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

2.1.6 Noise

The noise levels of all SEW-EURODRIVE gear units, motors and gearmotors are well within the maximum permitted noise levels set forth in the VDI guideline 2159 for gear units and IEC/EN 60034 for motors.

2.1.7 Painting

The gear units, motors and gearmotors from SEW-EURODRIVE are coated as follows:

Gear unit	Coating according to standard 1843
R, F, K, S, W gear units	blue/gray RAL 7031

Exception: SPIROPLAN® W..10DT56 gearmotors have an aluminum housing and are supplied unpainted as standard.

Special coatings are available on request.

2.1.8 Surface and anti-corrosion protection

If required, all gear units, motors and gearmotors from SEW-EURODRIVE can also be supplied with surface protection for applications in extremely humid and chemically aggressive environments.

2.1.9 Heat dissipation and accessibility

Make sure to maintain adequate distance from heat-sensitive components when installing gearmotors/geared brakemotors to the driven machine. The distance is necessary for air circulation for the heat dissipation, for maintenance of the brake and of the MOVIMOT® inverter, if installed.

Please also observe to the notes in the motor dimension sheets in the "AC Motors" catalog.

2.1.10 Weights

Please note that the weight information shown in the catalogs only apply to the gear units and gearmotors without lubricant. The weight varies according to gear unit design and gear unit size. The lubricant fill depends on the mounting position selected, which means that in this case no universally applicable information can be given. Refer to the chapter "Lubricant fill quantities" (→ 🗎 111) for recommended lubricant fill quantities depending on the mounting position. For the exact weight, refer to the quotation or the order confirmation.

22148205/EN – 09/2016

2.1.11 Reduced backlash variant

Helical, parallel-shaft helical and helical-bevel gear units with reduced backlash are available as of gear unit size 37. The rotational clearance of these gear units is considerably less than that of the standard versions so that positioning tasks can be solved with great precision. The rotational clearance is specified in angular minutes in the technical data. The rotational clearance for the output shaft is specified without load (max. 1% of the rated output torque); the gear unit input end is blocked. The dimension drawings for the standard versions are applicable.

2.1.12 RM gear units, RM gearmotors

RM gear units and RM gearmotors are a special type of helical gear units with an extended output bearing hub. They were designed especially for agitating applications and allow for high overhung and axial loads and bending moments. The other data are the same as for standard helical gear units and standard helical gearmotors. You can find special project planning notes for RM gear units in the chapter "Project planning for RM gear units" (→ 🗎 55).

2.1.13 SPIROPLAN® gearmotors

SPIROPLAN® right-angle gearmotors are robust, single- and two-stage right-angle gearmotors with SPIROPLAN® gearing. The difference to the helical-worm gear units is the material combination of the steel-on-steel gearing, the special tooth meshing relation and the aluminum housing. As a result, SPIROPLAN® right-angle gearmotors are wear-free and lightweight.

The particularly short design and the aluminum housing make for very compact and lightweight drive solutions.

The wear-free gearing and the life-long lubrication facilitate long periods of maintenance-free operation. The identical hole spacing in the foot and face as well as the same axle height to both makes for a number of mounting options.

On request, SPIROPLAN® gearmotors can be equipped with a torque arm.

22148205/EN – 09/2016

2.1.14 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 the MOVIMOT® inverter.

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.

2.1.15 International markets

On request, SEW-EURODRIVE delivers UL-approved MOVIMOT® drives for the North American market or special variants for the Asian market. Contact your sales representative to assist you in such cases.

22148205/EN – 09/2016

2.2 Surface protection

2.2.1 General information

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

- OS surface protection for motors and gear units
- Special optional protective measures for the output shafts are also available.

2.2.2 OS surface protection

Instead of the standard surface protection, the motors and gear units are available with surface protection OS1 as an option.

Surface protection		Ambient conditions	Sample applications
Standard		Suitable for machines and systems within buildings and interior rooms with neutral atmospheres. Similar to corrosivity category[1]: • C1 (negligible)	• Machines and systems in the automobile industry • Transport systems in logistics • Conveyor belts at airports
OS1		Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection device. According to corrosivity category[1]: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers

1) According to DIN EN ISO 12944-2, classification of ambient conditions

2.2.3 Special protection measures

Gearmotor output shafts can be treated with special optional protective measures for operation subject to severe environmental pollution or in particularly demanding applications.

Measure	Protection principle	Suitable for
FKM oil seal	High quality material	Drives subject to chemical contamination
Coating on output shaft end	Surface treatment on the contact surface of the oil seal	Severe environmental impact and in conjunction with fluorocarbon rubber oil seal
Output shaft made of stainless steel	Surface protection with high-quality material	Particularly demanding applications in terms of surface protection

22148205/EN – 09/2016

2.2.4 NOCO® fluid

As standard, SEW-EURODRIVE supplies NOCO® fluid corrosion protection and lubricant with every hollow shaft gear unit. Use NOCO® fluid when installing hollow shaft gear units. Using this fluid helps prevent contact corrosion and makes it easier to disassemble the drive at a later time. NOCO® fluid is also suitable for protecting machined metal surfaces that do not have corrosion protection, such as parts of shaft ends or flanges. You can also order NOCO® fluid in larger quantities from SEW-EURODRIVE.

Batch size	Packaging type	Part number
5.5 g	Sachet	09107819
100 g	Tube	03253147
1 kg	Tub	09107827

NOCO® fluid is a food grade substance according to NSF-H1. The food-grade NOCO® fluid has a corresponding NSF-H1 label on the packaging.

2.3 Extended storage

2.3.1 Variant

You can also order gear units designed for "extended storage". SEW-EURODRIVE recommends the extended storage type for storage periods longer than 9 months.

The lubricant of gear units for extended storage is mixed with a VCI anti-corrosion agent (**v**olatile **c**orrosion **i**nhibitors). Please note that this VCI anti-corrosion agent is only effective in a temperature range of -25 °C to +50 °C. The flange contact surfaces and shaft ends are also treated with an anti-corrosion agent. If not specified otherwise in your order, the gear unit with "extended storage" option will be supplied with OS1 surface protection.

INFORMATION

The gear units must remain tightly sealed until taken into operation to prevent the VCI anti-corrosion agent from evaporating. The gear units come with the oil fill according to the specified mounting position (M1 – M6). Always check the oil level before you take the gear unit into operation.

22148205/EN – 09/2016

2.3.2 Storage conditions

Observe the storage conditions specified in the following table for extended storage:

Climate zone	Packaging[1)]	Storage[2)]	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap	• Roofed • Protected against rain and snow • Shock-free	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%)
	Open	• Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity) • No sudden temperature variations • Controlled ventilation with filter (free from dust and dirt) • No aggressive vapors • No shocks	2 years or more with regular inspections • Check for cleanness and mechanical damage during the inspection • Check corrosion protection
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap • Protected against insect damage and mildew by chemical treatment	• Roofed • Protected against rain and snow • Shock-free	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%)
	Open	• Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity) • No sudden temperature variations • Controlled ventilation with filter (free from dust and dirt) • No aggressive vapors • No shocks • Protected against insect damage	2 years or more with regular inspections • Check for cleanness and mechanical damage during the inspection • Check corrosion protection

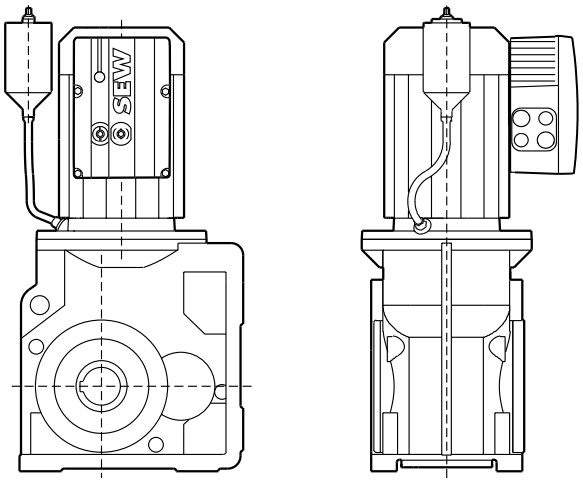
1) The packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends to store the gear units according to the mounting position.

2.4 Oil expansion tank

The oil expansion tank allows the lubricant or air in the gear unit to expand. This means no lubricant can escape the breather valve at high operating temperatures.

SEW-EURODRIVE recommends to use oil expansion tanks for gear units and gearmotors in M4 mounting position and for input speeds > 2000 min^{-1}.



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The oil expansion tank is provided as assembly kit. It is intended for mounting onto the gearmotor. However, if installation space is limited or if the expansion tank is intended for gear units without motor, it can be mounted to nearby machine parts.

For further information, please contact your SEW-EURODRIVE sales representative.

2.5 Condition monitoring: Oil aging sensor

2.5.1 DUO10A diagnostic unit

The diagnostic unit consists of a temperature sensor and the actual evaluation unit. The service life curves of the oil grades common in SEW-EURODRIVE gear units are stored in the evaluation unit. SEW-EURODRIVE can customize any oil grade in the diagnostic unit. Standard parameterization is performed directly on the evaluation unit. During operation, the evaluation unit uses the oil temperature to continuously calculate the remaining service life in days until the next oil change. The remaining service life is displayed directly on the evaluation unit. When the service life is expired, a binary signal can be sent to a higher-level system and evaluated or visualized in the system.

Using the DUO10A diagnostic unit, the system operator no longer has to replace the oil within predefined intervals, but can adapt the replacement interval individually to the actual load. The benefits are reduced maintenance and service costs, and increased system availability.

22148205/EN – 09/2016

3 Overview of types and variants

3.1 Design types and options of R, F, K, S, and W gear units

Below an overview of type designations for R, F, K, S, and W gear units and their options.

3.1.1 Helical gear units

Designation	Description
RX..	Single-stage foot-mounted design
RXF..	Single-stage B5 flange-mounted design
R..	Foot-mounted design
R..F	Foot-mounted and B5 flange-mounted design
RF..	B5 flange-mounted design
RZ..	B14 flange-mounted design
RM..	B5 flange-mounted design with extended bearing hub

3.1.2 Parallel-shaft helical gear units

Designation	Description
F..	Foot-mounted design
FA..B	Foot-mounted design and hollow shaft
FH..B	Foot-mounted design and hollow shaft with shrink disk
FV..B	Foot-mounted design and splined hollow shaft to DIN 5480
FF..	B5 flange-mounted design
FAF..	B5 flange-mounted design and hollow shaft
FHF..	B5 flange-mounted design and hollow shaft with shrink disk
FVF..	B5 flange-mounted design and hollow shaft with splined hollow shaft to DIN 5480
FA..	Hollow shaft
FH..	Hollow shaft with shrink disk
FT..	Hollow shaft with TorqLOC® hollow shaft mounting system
FV..	Splined hollow shaft to DIN 5480
FZ..	B14 flange-mounted design
FAZ..	B14 flange-mounted design and hollow shaft
FHZ..	B14 flange-mounted design and hollow shaft with shrink disk
FVZ..	B14 flange-mounted design and hollow shaft with splined hollow shaft to DIN 5480

22148205/EN – 09/2016

3.1.3 Helical-bevel gear units

Designation	
K..	Foot-mounted design
KA..B	Foot-mounted design and hollow shaft
KAF..B	B5 flange-mounted design, hollow shaft and foot-mounted design
KF..B	Foot-mounted design, B5 flange-mounted design
KH..B	Foot-mounted design and hollow shaft with shrink disk
KHF..B	B5 flange-mounted design and hollow shaft with shrink disk and foot-mounted design
KV..B	Foot-mounted design and hollow shaft with splined hollow shaft to DIN 5480
KF..	B5 flange-mounted design
KAF..	B5 flange-mounted design and hollow shaft
KHF..	B5 flange-mounted design and hollow shaft with shrink disk
KVF..	B5 flange-mounted design and hollow shaft with splined hollow shaft to DIN 5480
KA..	Hollow shaft
KH..	Hollow shaft with shrink disk
KT..	Hollow shaft with TorqLOC® hollow shaft mounting system
KV..	Splined hollow shaft according DIN 5480
KZ..	B14 flange-mounted design
KAZ..	B14 flange-mounted design and hollow shaft
KHZ..	B14 flange-mounted design and hollow shaft with shrink disk
KVZ..	B14 flange-mounted design and hollow shaft with splined hollow shaft to DIN 5480

3.1.4 Helical-worm gear units

Designation	Description
S..	Foot-mounted design
SF..	B5 flange-mounted design
SAF..	B5 flange-mounted design and hollow shaft
SHF..	B5 flange-mounted design and hollow shaft with shrink disk
SA..	Hollow shaft
SH..	Hollow shaft with shrink disk
ST..	Hollow shaft with TorqLOC® hollow shaft mounting system
SAZ..	B14 flange-mounted design and hollow shaft
SHZ..	B14 flange-mounted design and hollow shaft with shrink disk

22148205/EN – 09/2016

3.1.5 SPIROPLAN® gear units

Designation	Description
W..	Foot-mounted design
WF..	B5 flange-mounted design
WAF..	B5 flange-mounted design and hollow shaft
WA..	Hollow shaft
WA..B	Foot-mounted design and hollow shaft
WH..B	Foot-mounted design and hollow shaft with shrink disk
WHF..	B5 flange-mounted design and hollow shaft with shrink disk
WH..	Hollow shaft with shrink disk
WT..	Hollow shaft with TorqLOC® hollow shaft mounting system

3.1.6 Options

R, F and K gear units:

Designation	Description
/R	Reduced backlash

K, S and W gear units:

Designation	Description
/T	With torque arm

F gear units:

Designation	Description
/G	With rubber buffer

3.1.7 Condition monitoring

Designation	Description
/DUO	Diagnostic Unit Oil = Oil aging sensor

22148205/EN – 09/2016

3.2 Design types and options of the DR.. motor series

3.2.1 AC motors of the DR.. series

Designation	Motor
DRS..	Motor, Standard Efficiency IE1
DRE..	Energy-efficient motor, High Efficiency IE2
DRP..	Energy-efficient motor, Premium Efficiency IE3
DRN..	Energy-efficient motor, Premium Efficiency IE3
DRE...J	Line start permanent magnet motor (LSPM motor)
DRU...J	Energy-efficient motor, Super Premium Efficiency IE4
71 – 132	Sizes: 71 / 80 / 90 / 100 / 112 / 132
K – L, LC	Lengths: K= very short / S = short / M = medium / L = long LC = Rotors with copper cage
4	Number of poles

3.2.2 Output variants

Designation	Option
/FI	IEC foot-mounted motor
/F.A, /F.B	Universal foot-mounted motor
/FG	7series integral motor, as stand-alone motor
/FF	IEC flange-mounted motor with bore
/FT	IEC flange-mounted motor with threads
/FL	Flange-mounted motor (deviating from IEC)
/FM	7-series integral motor with IEC feet
/FE	IEC flange-mounted motor with bore and IEC feet
/FY	IEC flange-mounted motor with threads and IEC feet
/FK	Flange-mounted motor (deviating from IEC) with feet
/FC	C-face flange-mounted motor, dimensions in inch

22148205/EN – 09/2016

3.2.3 Mechanical attachments

Designation	Option
/BE..	Spring-loaded brake with specification of size
/HR	Manual brake release of the brake, automatic re-engaging function
/HF	Manual brake release, lockable
/RS	Backstop
/MSW	MOVI-SWITCH®
/MI	Motor identification module for MOVIMOT®
/MM03 – MM40	MOVIMOT®
/MO	MOVIMOT® option(s)

3.2.4 Connection options

Designation	Option
/ASA.	Harting HAN® 10 ES pin insert (built-on housing with 2 clips)
/AMA.	Harting HAN-Modular® pin insert (built-on housing with 2 clips)
/AMD.	Harting HAN-Modular® Modular pin insert (built-on housing with 1 clip)
/AVT.	M12 × 1 round plug connector

3.2.5 Encoder

Designation	Option
/EI7.	Built-in speed sensor with HTL interface EI7C with 24 periods EI76 with 6 periods EI72 with 2 periods EI71 with 1 period

3.2.6 Ventilation

Designation	Option
/V	Forced cooling fan
/C	Canopy for the fan guard
/LF	Air filter
/LN	Low-noise fan guard (for DR.71 – 100)

22148205/EN – 09/2016

3.2.7 Condition monitoring

Designation	Description
/DUE	Diagnostic Unit Eddy Current = function/wear monitoring for BE1 – BE122 brake

3.2.8 Other additional features

Designation	Option
/DH	Condensation drain hole
/RI	Reinforced winding insulation
/2W	Second shaft end on the motor/brakemotor

22148205/EN – 09/2016

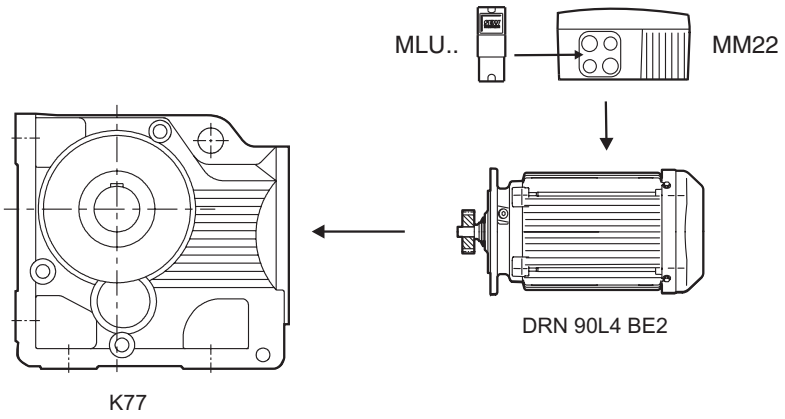
3.3 Example of the type designation of a gearmotor

The type designation of the gearmotor starts from the component on the output end. For example, a helical-bevel gearmotor with MOVIMOT® inverter has the following type designation:

K77 DRN90L4BE2/MM22/MO:

K	**Gear unit type**
77	**Gear unit size**
DRN	**Motor series**
90	**Motor size**
L	**Length**
4	**Number of motor poles**
BE2	**Additional feature motor (brake)**
/	
MM22	**MOVIMOT® inverter**
/	
MO	**Additional feature: inverter, e.g. MLU**[1)]

1) The nameplate only displays options installed at the factory.



9007205172534795

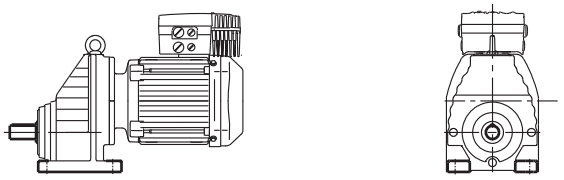
22148205/EN – 09/2016

3.4 Gearmotor types

The types described in this chapter refer to DR.. gearmotors from SEW-EURODRIVE. They also apply to gear units without motors.

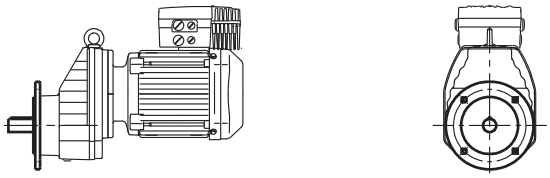
3.4.1 Helical gearmotors

The following types of helical gearmotors are available:



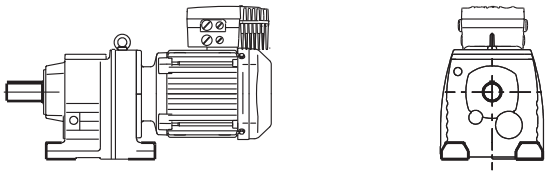
RX.. DR../MM..

Single-stage, helical gearmotor in foot-mounted design



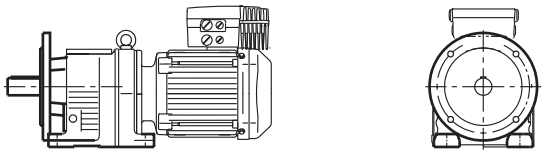
RXF.. DR../MM..

Single-stage helical gearmotor in B5 flange-mounted design



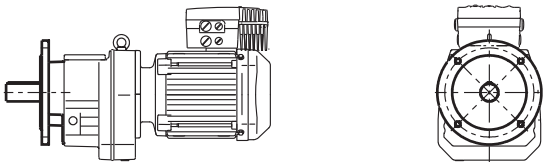
R.. DR../MM..

Helical gearmotor in foot-mounted design



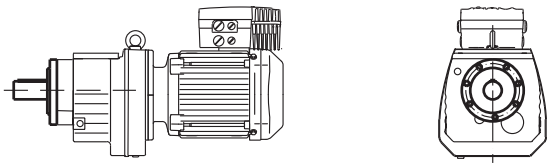
R..F DR../MM..

Helical gearmotor in foot-mounted and B5 flange-mounted design



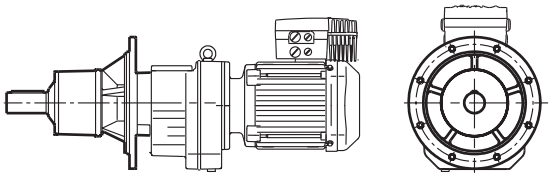
RF.. DR../MM..

Helical gearmotor in B5 flange-mounted design



RZ.. DR../MM..

Helical gearmotor in B14 flange-mounted design



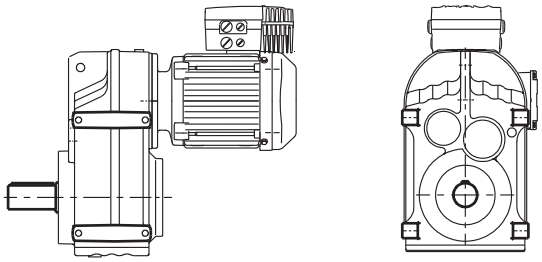
RM.. DR../MM..

Helical gearmotor in B5 flange-mounted design with extended bearing hub

22148205/EN – 09/2016

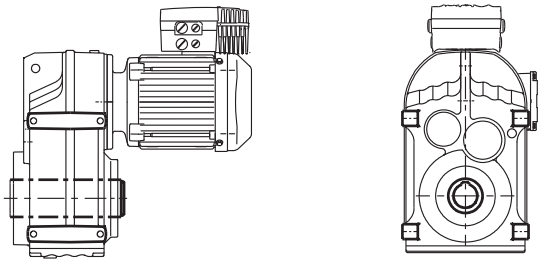
3.4.2 Parallel-shaft helical gearmotors

The following types of parallel-shaft helical gearmotors are available:



F.. DR../MM..

Parallel-shaft helical gearmotor in foot-mounted design

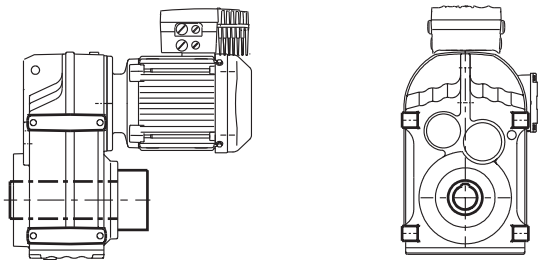


FA..B DR../MM..

Parallel-shaft helical gearmotor in foot-mounted design with hollow shaft

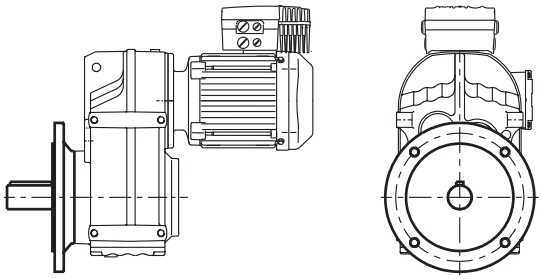
FV..B DR../MM..

Parallel-shaft helical gearmotor in foot-mounted design with splined hollow shaft to DIN 5480



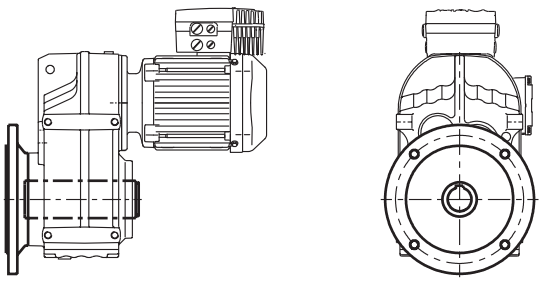
FH..B DR../MM..

Parallel-shaft helical gearmotor in foot-mounted design with hollow shaft and shrink disk



FF.. DR../MM..

Parallel-shaft helical gearmotor in B5 flange-mounted design



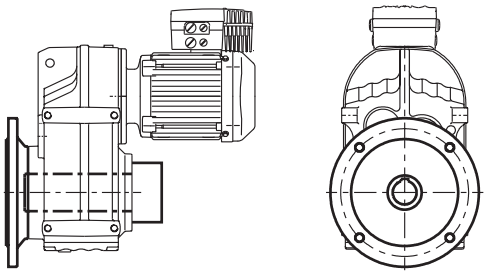
FAF.. DR../MM..

Parallel-shaft helical gearmotor in B5 flange-mounted design with hollow shaft

FVF.. DR../MM..

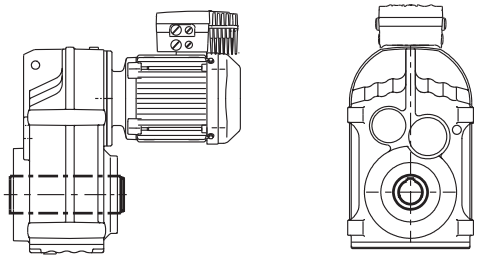
Parallel-shaft helical gearmotor in B5 flange-mounted design with splined hollow shaft to DIN 5480

22148205/EN – 09/2016



FHF.. DR../MM..

Parallel-shaft helical gearmotor in B5 flange-mounted design with hollow shaft and shrink disk

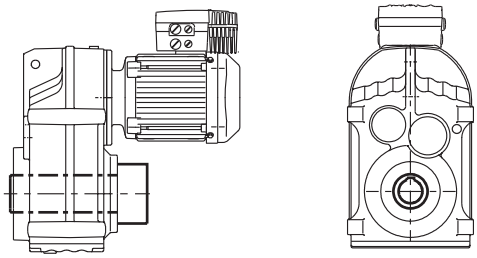


FA.. DR../MM..

Parallel-shaft helical gearmotor with hollow shaft

FV.. DR../MM..

Parallel-shaft helical gearmotor with splined hollow shaft to DIN 5480

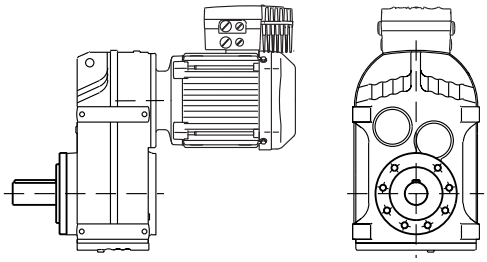


FH.. DR../MM..

Parallel-shaft helical gearmotor with hollow shaft and shrink disk

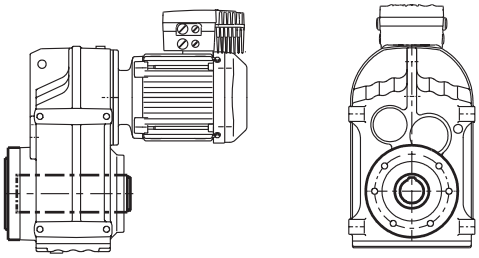
FT.. DR../MM..

Parallel-shaft helical gearmotor with hollow shaft and TorqLOC® hollow shaft mounting system



FZ.. DR../MM

Parallel-shaft helical gearmotor in B14 flange-mounted design



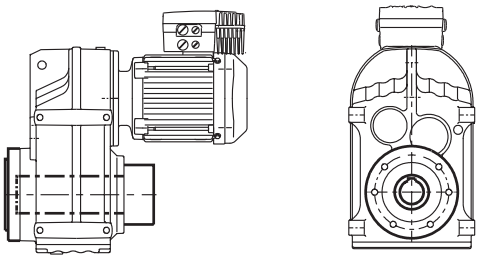
FAZ.. DR../MM..

Parallel-shaft helical gearmotor in B14 flange-mounted design with hollow shaft

FVZ.. DR../MM..

Parallel-shaft helical gearmotor in B14 flange-mounted design with splined hollow shaft to DIN 5480

22148205/EN – 09/2016

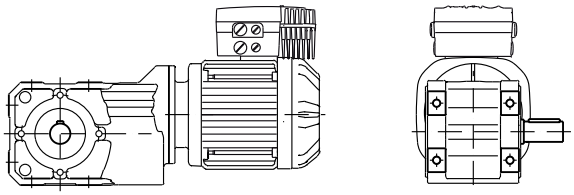


FHZ.. DR../MM..

Parallel-shaft helical gearmotor in B14 flange-mounted design with hollow shaft and shrink disk

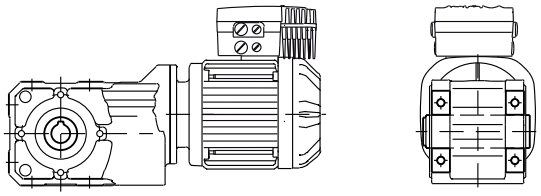
3.4.3 Helical-bevel gearmotors, gear unit sizes K..19 and K..29

The following designs of helical-bevel gearmotors with gear units of size K..19 and K..29 are available:



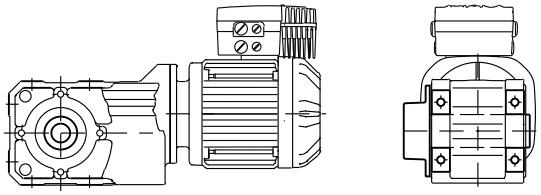
K19 DR../MM.., K29 DR../MM..

Helical-bevel gearmotor in foot-mounted design



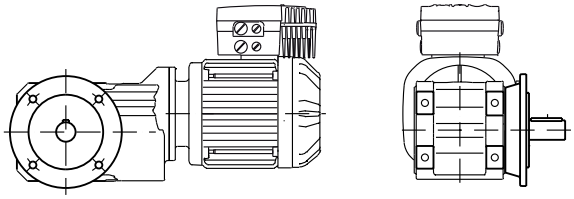
KA19B DR../MM.., KA29B DR../MM..

Helical-bevel gearmotor in foot-mounted design with hollow shaft



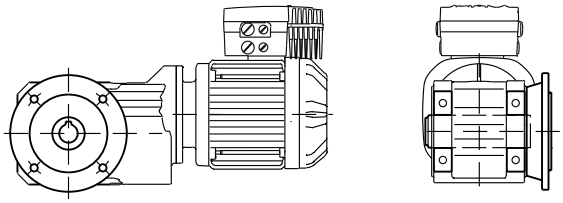
KH19B DR../MM.., KH29B DR../MM..

Helical-bevel gearmotor in foot-mounted design with hollow shaft and shrink disk



KF19B DR../MM.., KF29B DR../MM..

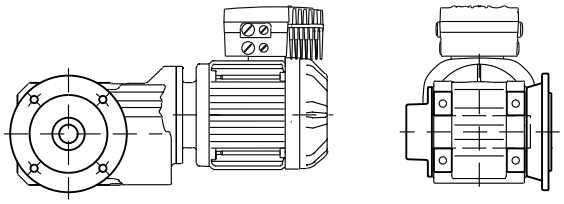
Helical-bevel gearmotor in B5 flange-mounted design in foot-mounted design



KAF19B DR../MM.., KAF29B DR../MM..

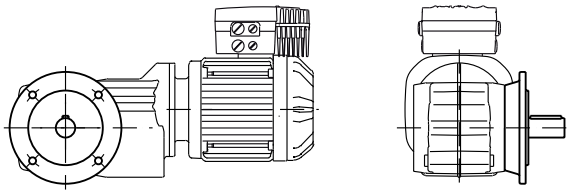
Helical-bevel gearmotor in B5 flange-mounted design in foot-mounted design with hollow shaft

22148205/EN – 09/2016



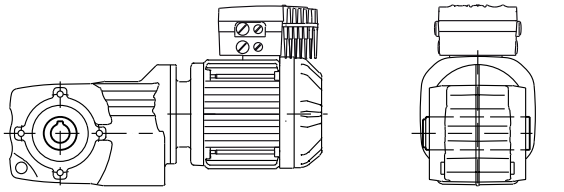
KHF19B DR../MM.., KHF29B DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design in foot-mounted design with hollow shaft and shrink disk



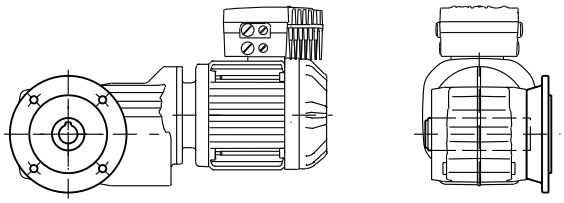
KF19 DR../MM.., KF29 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design



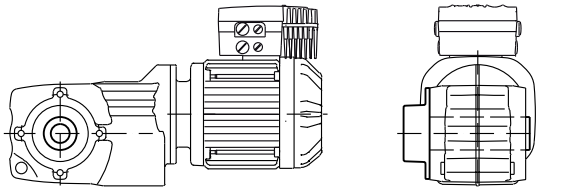
KA19 DR../MM.., KA29 DR../MM..

Helical-bevel gearmotor with hollow shaft



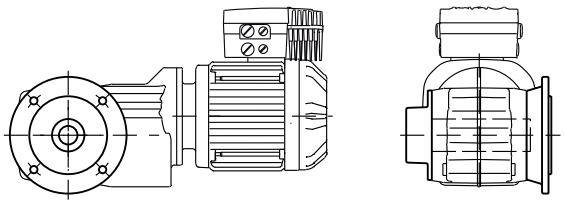
KAF19 DR../MM.., KAF29 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with hollow shaft



KH19 DR../MM.., KH29 DR../MM..

Helical-bevel gearmotor with hollow shaft and shrink disk



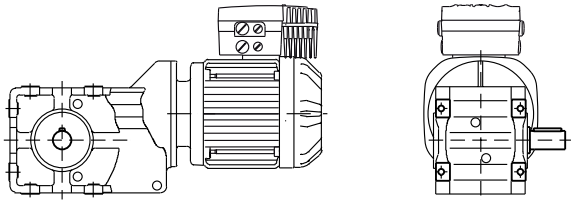
KHF19 DR../MM.., KHF29 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with hollow shaft and shrink disk

22148205/EN – 09/2016

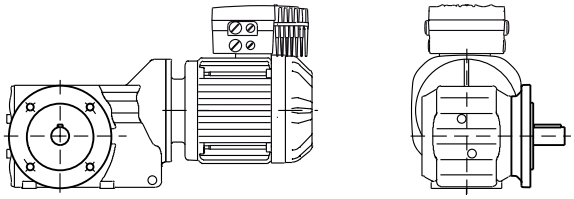
3.4.4 Helical-bevel gearmotors, gear unit sizes K..39 and K..49

The following types of helical-bevel gearmotors with gear units of size K..39 and K..49 are available:



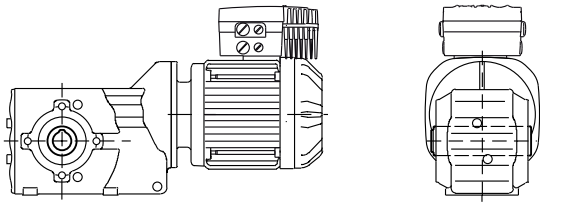
K39 DR../MM.., K49 DR../MM..

Helical-bevel gearmotor in foot-mounted design



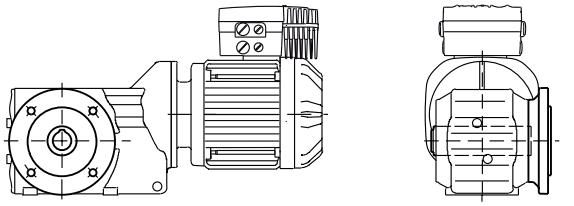
KF39 DR../MM.., KF49 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design



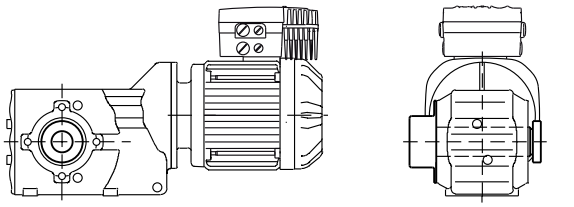
KA39 DR../MM.., KA49 DR../MM..

Helical-bevel gearmotor with hollow shaft



KAF39 DR../MM.., KAF49 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with hollow shaft



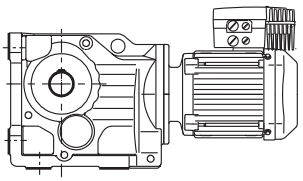
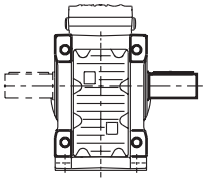
KT39 DR../MM.., KT49 DR../MM..

Helical-bevel gearmotor with hollow shaft and TorqLOC® hollow shaft mounting system

22148205/EN – 09/2016

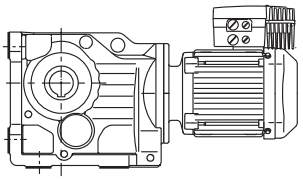
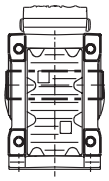
3.4.5 Helical-bevel gearmotors, gear unit sizes K..7

The following types of helical-bevel gearmotors with gear units of size K..7 are available:

K..7 DR../MM..

Helical-bevel gearmotor in foot-mounted design

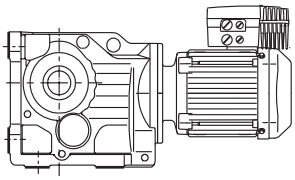
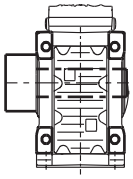



KA..7B DR../MM..

Helical-bevel gearmotor in foot-mounted design with hollow shaft

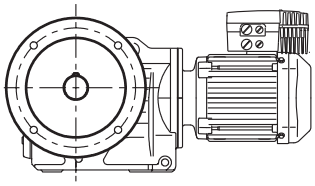
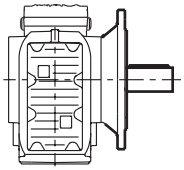
KV..7B DR../MM..

Helical-bevel gearmotor in foot-mounted design with splined hollow shaft to DIN 5480

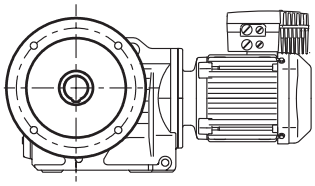
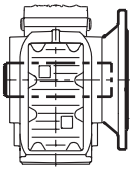
KH..7B DR../MM..

Helical-bevel gearmotor in foot-mounted design with hollow shaft and shrink disk

KF..7 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design

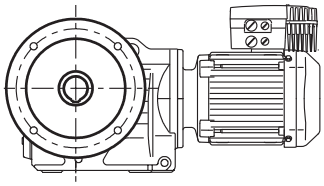
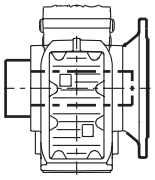



KAF..7 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with hollow shaft

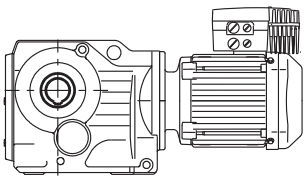
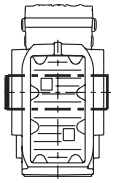
KVF..7 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with splined hollow shaft to DIN 5480

KHF..7 DR../MM..

Helical-bevel gearmotor in B5 flange-mounted design with hollow shaft and shrink disk

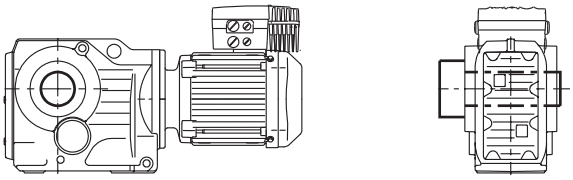
KA..7 DR../MM..

Helical-bevel gearmotor with hollow shaft

KV..7 DR../MM..

Helical-bevel gearmotor with splined hollow shaft to DIN 5480

22148205/EN – 09/2016

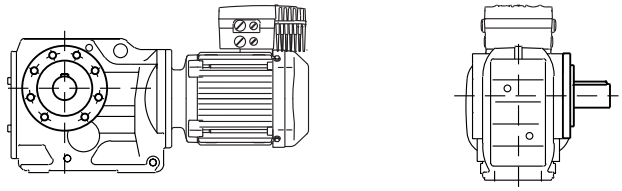


KH..7 DR../MM..

Helical-bevel gearmotor with hollow shaft and shrink disk

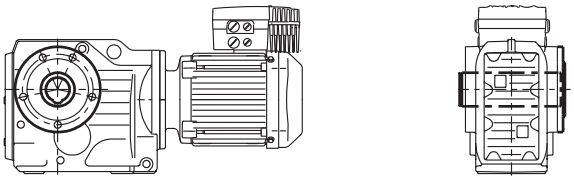
KT..7 DR../MM..

Helical-bevel gearmotor with hollow shaft and TorqLOC® hollow shaft mounting system



KZ..7 DR../MM

Helical-bevel gearmotor in B14 flange-mounted design

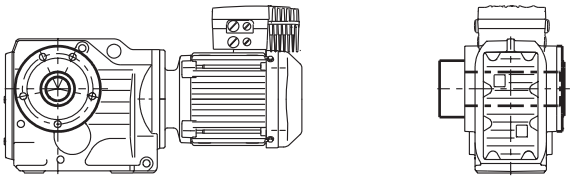


KAZ..7 DR../MM..

Helical-bevel gearmotor in B14 flange-mounted design with hollow shaft

KVZ..7 DR../MM..

Helical-bevel gearmotor in B14 flange-mounted design with splined hollow shaft to DIN 5480



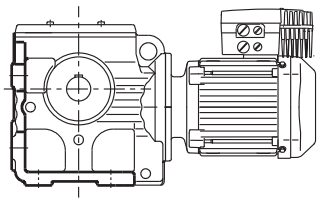
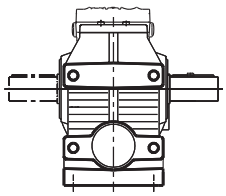
KHZ..7 DR../MM..

Helical-bevel gearmotor in B14 flange-mounted design with hollow shaft and shrink disk

22148205/EN – 09/2016

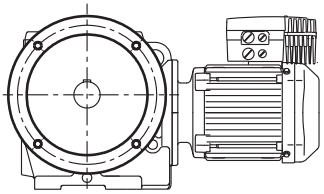
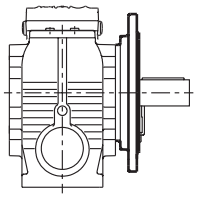
3.4.6 Helical-worm gearmotors

The following types of helical-worm gearmotors are available:

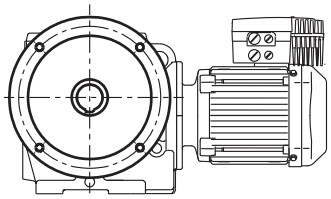
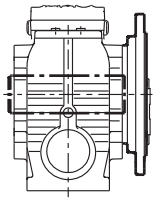
S.. DR../MM..

Helical-worm gearmotor in foot-mounted design

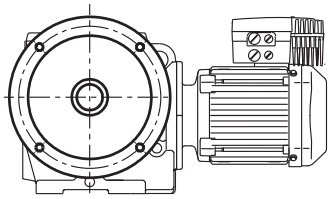
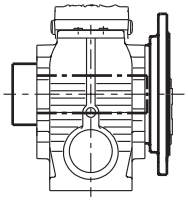
SF.. DR../MM..

Helical-worm gearmotor in B5 flange-mounted design

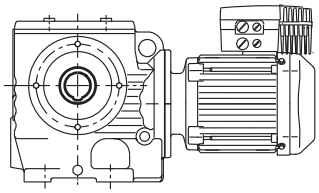
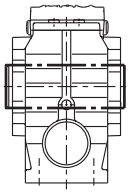
SAF.. DR../MM..

Helical-worm gearmotor in B5 flange-mounted design with hollow shaft

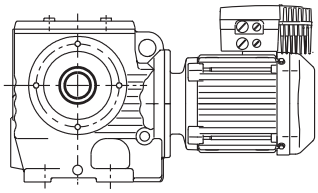
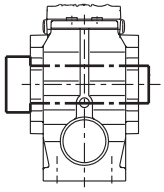
SHF.. DR../MM..

Helical-worm gearmotor in B5 flange-mounted design with hollow shaft and shrink disk

SA.. DR../MM..

Helical-worm gearmotor with hollow shaft

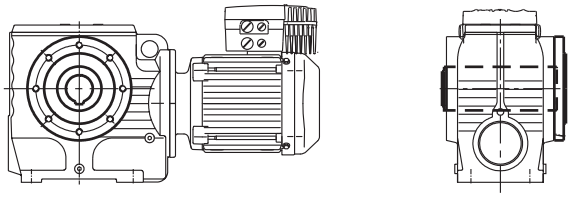
SH.. DR../MM..

Helical-worm gearmotor with hollow shaft and shrink disk

ST.. DR../MM..

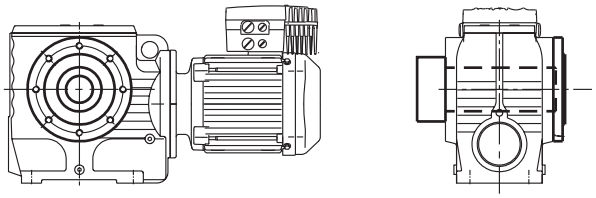
Helical-worm gearmotor with hollow shaft and TorqLOC® hollow shaft mounting system

22148205/EN – 09/2016



SAZ.. DR../MM..

Helical-worm gearmotor in B14 flange-mounted design with hollow shaft

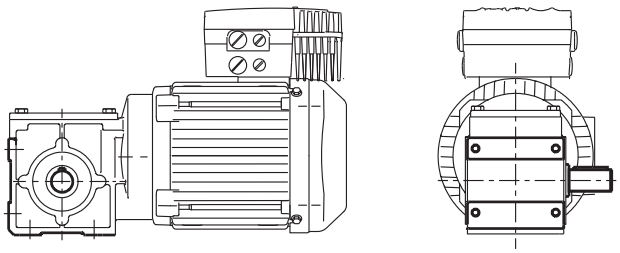


SHZ.. DR../MM..

Helical-worm gearmotor in B14 flange-mounted design with hollow shaft and shrink disk

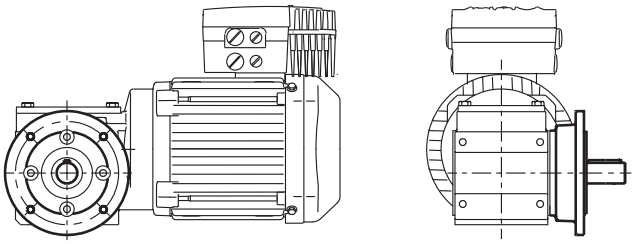
3.4.7 SPIROPLAN® gearmotors, gear unit sizes W..20 and W..30

The following designs of SPIROPLAN® gearmotors with gear units in sizes W..20 and W..30 are available:



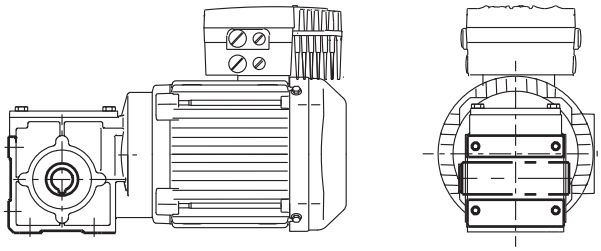
W20 DR../MM.., W30 DR../MM..

SPIROPLAN® gearmotor in foot-mounted design



WF20 DR../MM.., WF30 DR../MM..

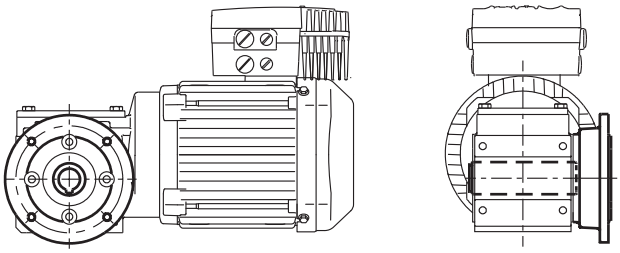
SPIROPLAN® gearmotor in flange-mounted design



WA20 DR../MM.., WA30 DR../MM..

SPIROPLAN® gearmotor with hollow shaft

22148205/EN – 09/2016

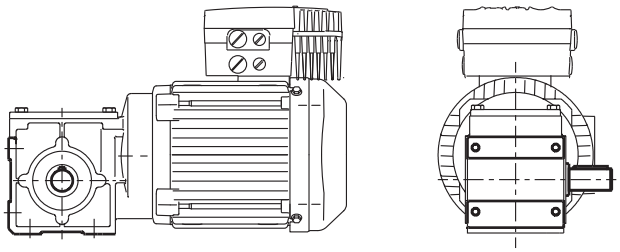


WAF20 DR../MM.., WAF30 DR../MM..

SPIROPLAN® gearmotor in flange-mounted design with hollow shaft

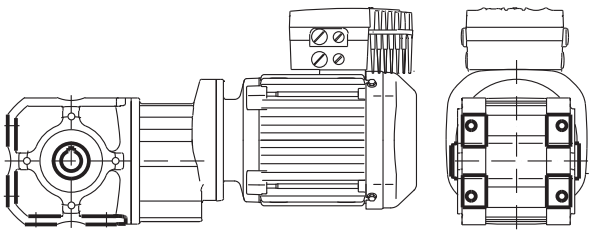
3.4.8 SPIROPLAN® gearmotors, gear unit sizes W..37 and W..47

The following designs of SPIROPLAN® gearmotors with gear units in sizes W..37 and W..47 are available:



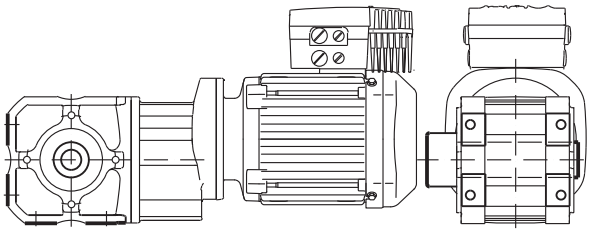
W37 DR../MM.., **W47 DR../MM..**,

SPIROPLAN® gearmotor in foot-mounted design



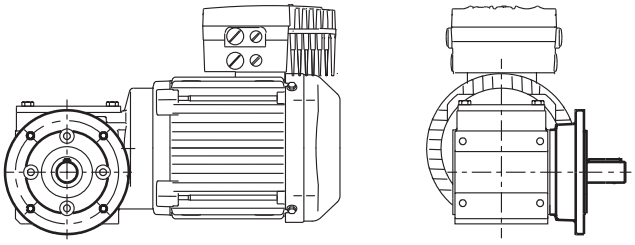
WA37B DR../MM.., WA47B DR../MM..

SPIROPLAN® gearmotor in foot-mounted design with hollow shaft



WH37B DR../MM.., WH47B DR../MM..

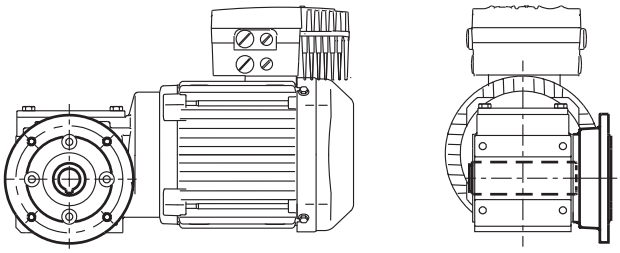
SPIROPLAN® gearmotor in foot-mounted design with hollow shaft and shrink disk



WF37 DR../MM.., WF47 DR../MM..

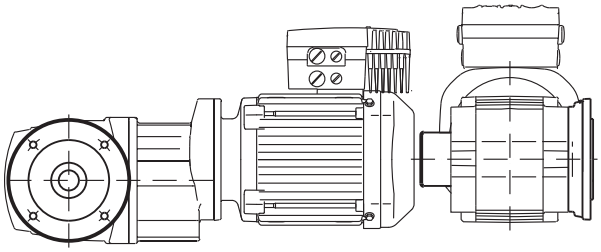
SPIROPLAN® gearmotor in B5 flange-mounted design

22148205/EN – 09/2016



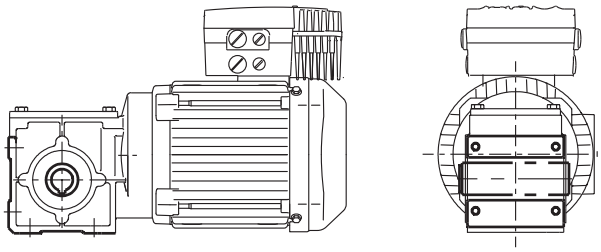
WAF37 DR../MM.., **WAF47 DR../MM..**

SPIROPLAN® gearmotor in B5 flange-mounted design with hollow shaft



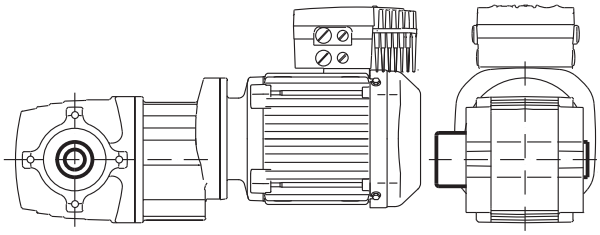
WHF37 DR../MM.., WHF47 DR../MM..

SPIROPLAN® gearmotor in B5 flange-mounted design with hollow shaft and shrink disk



WA37 DR../MM.., WA47 DR../MM..

SPIROPLAN® gearmotor with hollow shaft



WH37 DR../MM.., WH47 DR../MM..

SPIROPLAN® gearmotor with hollow shaft and shrink disk

WT37 DR../MM.., WT47 DR../MM..

SPIROPLAN® gearmotor with hollow shaft and TorqLOC® hollow shaft mounting system

22148205/EN – 09/2016

4 Project planning for drives

4.1 Additional documentation

For more detailed information about the project planning for drives, refer to the website of SEW-EURODRIVE where you can download the following publications of the "Drive Engineering – Practical Implementation" series. The series can also be ordered as hard copy.

- Project planning for drives
- EMC in Drive Engineering – Basic Theoretical Principles and EMC-Compliant Installation in Practice
- Efficient Plant Automation with Mechatronic Drive Solutions
- SEW Encoder Systems
- Servo technology
- Drive Engineering – Practical Implementation: Explosion-Proof Drives to EU Directive 94/9/EC

22148205/EN – 09/2016

4.2 Data for drive selection

Certain data is required to be able to precisely define the components for your drive.

Drive selection data			Your entry
n_{amin}	Minimum output speed	[min^{-1}]	
n_{amax}	Maximum output speed	[min^{-1}]	
P_a at n_{amin}	Output power at minimum output speed	[kW]	
P_a at n_{amax}	Output power at maximum output speed	[kW]	
M_a at n_{amin}	Output torque at minimum output speed	[Nm]	
M_a at n_{amax}	Output torque at maximum output speed	[Nm]	
F_R	Overhung load acting on the output shaft. Force application in center of shaft end is assumed. If not, specify the application point giving the application angle and direction of rotation of the shaft for recalculation.	[N]	
F_A	Axial load (tension and compression) on the input shaft	[N]	
J_{load}	Mass moment of inertia to be driven	[10^{-4}kgm²]	
R, F, K, S, W, M1 - M6	Required gear unit type and mounting position (see chapter "Churning losses" (→ 🗎 45))	–	
IP..	Required degree of protection	–	
ϑ_{Amb}	Ambient temperature	[°C]	
H	Installation altitude	[m above sea level]	
S.., ..% cdf	Duty type and cyclic duration factor cdf, the exact load cycle can be entered instead.	–	
Z	Starting frequency or exact load cycle can be specified.	[1/h]	
f_{line}	Line frequency	[Hz]	
V_{mot} V_{brake}	Operating voltage of motor and brake	[V]	
M_B	Required braking torque	[Nm]	
For inverter operation:Control type and setting range			

Determining the motor data

To select the proper drive, you first need the data (weight, speed, setting range, etc.) of the machine to be driven. These data help determine the required power, torque and speed. Refer to the "Drive Engineering – Practical Implementation, Project Planning" publication or the SEW Workbench project planning software for assistance.

Selecting the correct drive

The appropriate drive can be determined with the calculated power and speed and with other mechanical requirements taken into account.

22148205/EN – 09/2016

4.3 Project planning procedure

4.3.1 Example

The following flow diagram presents a schematic view of the project planning procedure for a MOVIMOT® gearmotor:

Necessary information regarding the machine to be driven

- Technical data
- Ambient conditions
- Special application requirements
- Speed setting range
- Design features

↓

Calculation of the relevant application data

- Static, dynamic, regenerative power
- Speed profile
- Torque characteristics

↓

Gear unit selection

- Determining
  - Gear unit size
  - Gear unit ratio
  - Gear unit design
- Checking the gear unit utilization ($M_{a\,max} \geq M_{a(t)}$)

↓

Motor selection

- Maximum torque
- Maximum speed
- Thermal load (setting range, cyclic duration factor)
- Motor equipment (brake, plug connector, etc.)

↓

Options

- Operation
- Communication
- Installation/cabling (field distributor)
- Diagnostic tools

↓

Make sure that all requirements have been met.

22148205/EN – 09/2016

4.4 Project planning information – R, F, K, S, and W gear units

4.4.1 Efficiency of gear units

General information

The efficiency of gear units is mainly determined by the gearing and bearing friction. Keep in mind that the starting efficiency of a gear unit is always less than its efficiency at operating speed. This applies in particular to helical-worm and SPIROPLAN® right-angle gear units.

R, F, K gear units

Depending on the number of gear stages, the gearing efficiency of helical, parallel-shaft and helical-bevel gear units is up to 96% (3-stage), 97% (2-stage) and 98% (1-stage).

S and W gear units

The gearing in helical-worm and SPIROPLAN® gear units produces a high proportion of sliding friction. This is the reason why these gear units have higher gearing losses and lower efficiency than R, F or K gear units.

Other factors influencing the efficiency:

- Gear ratio of the helical-worm or SPIROPLAN® stage
- Input speed
- Ambient temperature

Helical-worm gear units from SEW-EURODRIVE are helical gear/worm combinations that have a significantly higher efficiency than plain worm gear units, see chapter Technical data S. SF. SA. SAF 37 and following.

The efficiency may reach $\eta < 0.5$ if the helical-worm gear stage has a very high gear ratio.

Self-locking

Retrodriving torque in helical-worm or SPIROPLAN® gear units produces an efficiency of $\eta' = 2 - 1/\eta$, which is significantly less favorable than the forward efficiency. The helical-worm or SPIROPLAN® gear unit is statically self-locking if the forward efficiency is ≤ 0.5. The SPIROPLAN® gear units W..10 – W..30 are to some extent (with high ratios) dynamically self-locking. Contact SEW-EURODRIVE if you want to make technical use of the braking effect of self-locking characteristics.

INFORMATION

Note that the self-locking effect of helical-worm and SPIROPLAN® gear units is not permitted as the sole safety function for hoists.

22148205/EN – 09/2016

Run-in phase

The tooth flanks of new helical-worm and SPIROPLAN® gear units are not yet completely smooth. That fact makes for a greater friction angle and less efficiency than during later operation. This effect intensifies with increasing gear ratio.

During the run-in phase, the nominal efficiency of the gear unit is reduced by the relevant value from the following tables.

	Worm	
	i range	**η reduction**
1-start	approx. 50 – 280	approx. 12%
2-start	approx. 20 – 75	approx. 6%
3-start	approx. 20 – 90	approx. 3%
5-start	approx. 6 – 25	approx. 3%
6 start	approx. 7 – 25	approx. 2 %

SPIROPLAN® W10 to W30		SPIROPLAN® W37 and W47	
i range	**η reduction**	**i range**	**η reduction**
approx. 35 – 75	approx. 15%	-	-
approx. 20 – 35	approx. 10%	-	-
approx. 10 – 20	approx. 8%	approx. 30 – 70	approx. 8%
approx. 8	approx. 5%	approx. 10 – 30	approx. 5%
approx. 6	approx. 3%	approx. 3 – 10	approx. 3%

The run-in phase usually lasts 48 hours. The following conditions must be met for helical-worm and SPIROPLAN® gear units to achieve their nominal efficiency ratings:

- The gear unit has been completely run-in.
- The gear unit has reached nominal operating temperature.
- The recommended lubricant has been filled.
- The gear unit is operating in the nominal load range.

22148205/EN – 09/2016

4.4.2 Churning losses and thermal rating

* (→ 🗎 X)

Churning losses may occur with the following conditions. They must be considered during thermal check:

- A mounting position where the first gear unit stage is fully immersed in the lubricant. The respective mounting position of the gear units are indicated with a * in chapter "Mounting position sheets" (→ 🗎 67).
- A high mean input speed and thus high circumferential velocity of the gears of the input gear stage.

If one or both requirements are met, determine the requirements of the application and the corresponding operating conditions (see chapter "Data for calculating the thermal rating" (→ 🗎 45)) and contact SEW-EURODRIVE. SEW-EURODRIVE can calculate the thermal rating based on the actual operating conditions. The thermal rating of the gear unit can be increased by appropriate measure e.g. by using a synthetic lubricant with higher thermal endurance properties.

INFORMATION

To reduce churning losses to a minimum, use gear units preferably in M1 mounting position.

Data for calculating the thermal rating

The following information is required for calculating the thermal rating:

Gear unit type and design:

- Gear unit ratio i
- Mean input speed n_{e_m} or mean output speed n_{a_m} in min^{-1}
- Effective motor torque M_{eff} in Nm
- Input motor power P_e in kW
- Mounting position M1 – M6

Installation site:

- Ambient temperature T_{amb} in °C
- In small, closed rooms or in large rooms (halls) or outdoors

Installation on site:

- Space-critical or well ventilated
- Steel or concrete base

22148205/EN – 09/2016

4.5 Service factor

4.5.1 Determining the service factor

The effect of the driven machine on the gear unit is taken into account to a sufficient level of accuracy using the service factor f_B. The service factor is determined according to the daily operating time and the starting frequency Z. Three load classifications are taken into account depending on the mass acceleration factor. You can read the service factor applicable to your application from the following diagram. The determined service factor must be smaller than or equal to the service factor according to the selection tables (see chapter Structure of the selection tables).

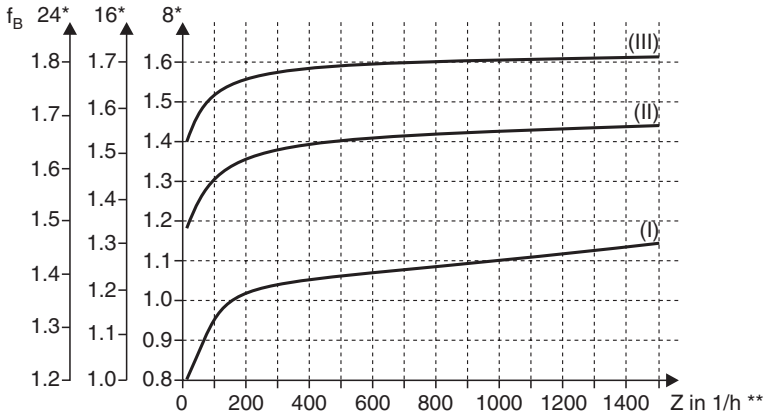
Conditions for the service factor

$$M_a \times f_B \leq M_{a\max}$$

M_a Output torque in Nm

f_B SEW service factor

M_{amax} Maximum output torque in Nm



* Service factor in relation to the daily operating time in hours/day

** Starting frequency Z: The cycles include all starting and braking procedures as well as changeovers from low to high speed and vice versa.

I, II, III Load classification

Load classification

Three load classifications are distinguished:

(I) Uniform, permitted mass acceleration factor ≤ 0.2

(II) Non-uniform, permitted mass acceleration factor ≤ 3

(III) Non-uniform, permitted mass acceleration factor ≤ 10

22148205/EN – 09/2016

Mass acceleration factor

The mass acceleration factor is calculated as follows:

$$\text{Mass acceleration factor} = \frac{\text{All external mass moments of inertia}}{\text{Mass moment of inertia at motor end}}$$

"All external mass moments of inertia" are the mass moments of inertia of the driven machine and the gear unit, scaled down to the motor speed. The calculation for scaling down to motor speed is performed using the following formula:

Scaling down the mass moment of inertia on the motor shaft

$$J_X = J \times \left(\frac{n}{n_M} \right)^2$$

J_X Reduced mass moment of inertia on the motor shaft
J Mass moment of inertia with reference to the output speed of the gear unit
n Output speed of the gear unit
n_M Motor speed

"Mass moment of inertia at the motor end" is the mass moment of inertia of the motor and, if installed, the brake and the flywheel fan (Z fan).

Service factors f_B > 1.8 may occur with large mass acceleration factors (> 10), high levels of backlash in the transmission elements or large overhung loads. Contact SEW-EURODRIVE in such a case.

4.5.2 Service factor SEW f_B

The method for determining the maximum permitted continuous torque M_{amax} and using this value to derive the service factor $f_B = M_{amax}/M_a$ is not defined in a standard and varies greatly from manufacturer to manufacturer. Even at a SEW service factor $f_B = 1$, the gear units afford an extremely high level of safety and reliability in the fatigue strength range (exception: wearing of the worm gear in helical-worm gear units). The service factor may differ from specifications of other gear unit manufacturers. If in doubt, contact SEW-EURODRIVE.

Example

Mass acceleration factor 2.5 (load classification II), operating time 14 hours/day (read off at 16 h/d) and 300 cycles/hour produce a service factor $f_B = 1.5$, as shown in the figure on the previous page. According to the selection tables, the selected gearmotor must have an SEW-f_B value of 1.5 or greater.

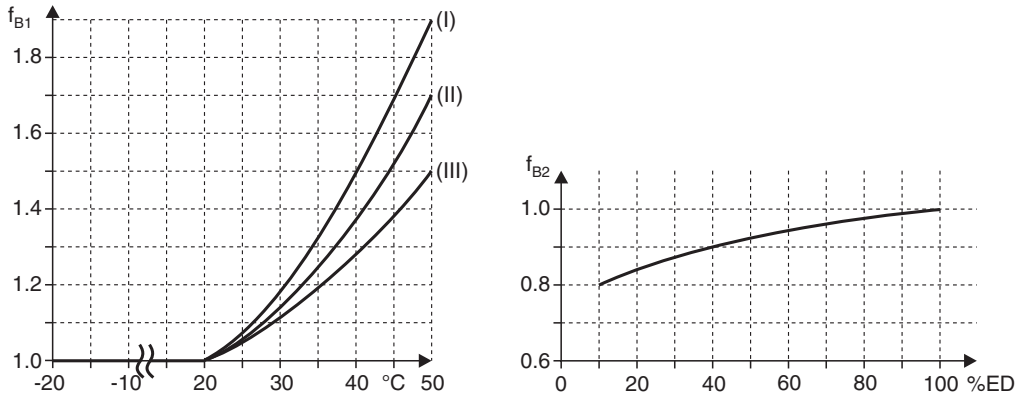
22148205/EN – 09/2016

4.5.3 Helical-worm gear unit

Two further service factors have to be taken into account with helical-worm gear units in addition to the service factor f_B shown the above diagram. These are:

- f_{B1} = Service factor from ambient temperature
- f_{B2} = Service factor from cyclic duration factor

The additional service factors f_{B1} and f_{B2} can be determined by referring to the diagram below. For f_{B1}, the load classification is taken into account in the same way as for f_B. The following diagram shows the additional service factors f_{B1} and f_{B2}:



4532296843

Cyclic duration factor

$$CDF = \frac{Time\ under\ load\ in\ min\ /\ h}{60} \times 100$$

9007203787961099

cdf Cyclic duration factor in %

For temperatures below -20 °C (→ diagram f_{B1}) contact SEW-EURODRIVE.

The total service factor for helical-worm gear units is calculated as follows:

Total service factor

$$f_{Btot} = f_B \times f_{B1} \times f_{B2}$$

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f_{Btot} Total service factor

f_B SEW service factor

f_{B1} Service factor from ambient temperature

f_{B2} Service factor from cyclic duration factor

Example

The gearmotor with the service factor f_B = 1.51 in the previous example is to be a helical-worm gearmotor.

Ambient temperature ϑ = 40°C → f_{B1} = 1.38 (read off at load classification II)

Time under load = 40 min/h → CDF = 66.67% → f_{B2} = 0.95

The total service factor is f_{Btot} = 1.51 × 1.38 × 0.95 = 1.98

According to the selection tables, the selected helical-worm gearmotor must have an SEW f_B service factor of 1.98 or greater.

22148205/EN – 09/2016

4.6 Overhung and axial loads

4.6.1 Determining the overhung load

When determining the resulting overhung load, the type of transmission element mounted on the shaft end must be considered. The following transmission element factors f_Z have to be considered for various transmission elements.

Transmission element	Transmission element factor f_Z	Comments
Gears	1.15	< 17 teeth
Sprockets	1.40	< 13 teeth
Sprockets	1.25	< 20 teeth
Narrow V-belt pulleys	1.75	Influence of the pre-tensioning force
Flat belt pulleys	2.50	Influence of the pre-tensioning force
Toothed belt pulleys	1.50	Influence of the pre-tensioning force
Gear rack pinion, pre-tensioned	2.00	Influence of the pre-tensioning force

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

$$F_R = \frac{M_d \times 2000}{d_0} \times f_Z$$

F_R Overhung load in N

M_d Torque in Nm

d_0 Mean diameter of the installed transmission element in mm

f_Z Transmission element factor

4.6.2 Permitted overhung load

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

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

The permitted overhung loads F_{Ra} for the output shafts of foot-mounted gear units with a solid shaft are listed in the selection tables for gearmotors. For other designs, please contact SEW-EURODRIVE.

22148205/EN – 09/2016

INFORMATION

The values refer to force applied to the center of the shaft end (in right-angle gear units as viewed onto the A-side output). The values for the force application angle α and direction of rotation are based on the most unfavorable conditions.

- Only 50% of the F_{Ra} value specified in the selection tables is permitted in mounting position M1 with wall attachment on the front face for K and S gear units.
- Foot and flange-mounted helical gearmotors (R..F): A maximum of 50% of the overhung load F_{Ra} specified in the selection tables is permitted in the case of torque transmission via the flange mounting.

4.6.3 Higher permitted overhung loads

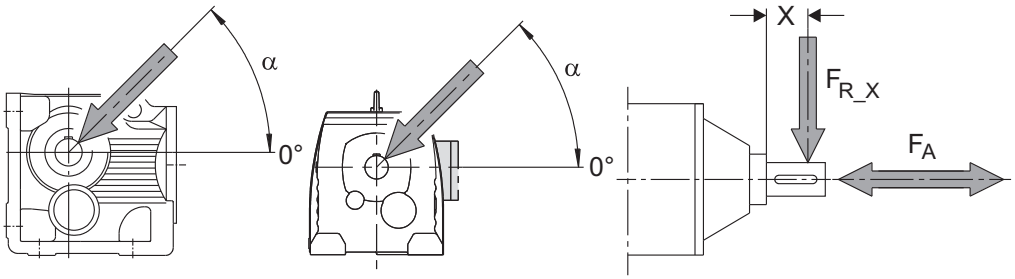
Exactly considering the force application angle α and the direction of rotation makes it possible to achieve a higher overhung load than listed in the selection tables.

Furthermore, higher output shaft loads are permitted if heavy duty bearings are installed, especially with R, F and K gear units.

Contact SEW-EURODRIVE in such cases.

4.6.4 Definition of the force application

Force application is defined according to the following figure:



F_{R_X} Permitted overhung load at point x in N

F_A Permitted axial load in N

α Force application angle

4.6.5 Permitted axial forces

If there is no overhung load, then an axial load F_A (tension or compression) amounting to 50 % of the overhung load given in the selection tables is permitted. This condition applies to the following gearmotors:

- Helical gearmotors except for R..137... to R..167...
- Parallel shaft and helical-bevel gearmotors with solid shaft except for F97...
- Helical-worm gearmotors with solid shaft

INFORMATION

Contact SEW-EURODRIVE for all other types of gear units and in the event of significantly greater axial forces or combinations of overhung load and axial force.

22148205/EN – 09/2016

4.6.6 Input end: Overhung load conversion for off-center force application

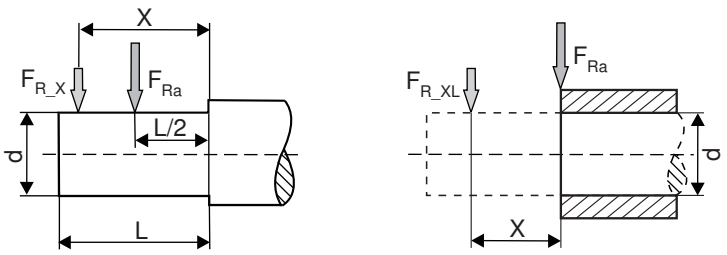
INFORMATION

Contact SEW-EURODRIVE with regard to the project planning of gear units with input shaft assemblies and off-center force application.

22148205/EN – 09/2016

4.6.7 On the output side: Overhung load conversion for off-center force application

The permitted overhung loads must be calculated according the selection tables using the following formula in the event that force is not applied at the center of the shaft end. The smaller of the two values F_{R_XL} (according to bearing service life) and F_{R_RW} (according to shaft strength) is the permitted value for the overhung load at point X. Note that the calculations apply to M_{a_max}.



Overhung load F_{R_x} for off-center force application

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F_{R_XL} based on bearing service life

$$F_{R\_XL} = F_{Ra} \times \frac{a}{b + X}$$

F_{R_XW} based on shaft strength

$$F_{R\_XW} = \frac{c}{f + X}$$

F_{Ra}	Permitted overhung load (X = L/2) based on M_{a_max} in N for foot-mounted gear units according to selection tables
X	Distance from the shaft shoulder to the force application point in mm
a, b, f	Gear unit constants for overhung load conversion in mm
c	Gear unit constant for overhung load conversion in Nmm

Gear unit constants for overhung load conversion

Gear unit type	a mm	b mm	c Nmm	f mm	d mm	l mm
RX57	43.5	23.5	1.51×10^5	34.2	20	40
RX67	52.5	27.5	2.42×10^5	39.7	25	50
RX77	60.5	30.5	1.95×10^5	0	30	60
RX87	73.5	33.5	7.69×10^5	48.9	40	80
RX97	86.5	36.5	1.43×10^6	53.9	50	100
RX107	102.5	42.5	2.47×10^6	62.3	60	120
R07	72.0	52.0	4.67×10^4	11	20	40
R17	88.5	68.5	6.53×10^4	17	20	40
R27	106.5	81.5	1.56×10^5	11.8	25	50
R37	118	93	1.24×10^5	0	25	50
R47	137	107	2.44×10^5	15	30	60
R57	147.5	112.5	3.77×10^5	18	35	70
R67	168.5	133.5	2.65×10^5	0	35	70
R77	173.7	133.7	3.97×10^5	0	40	80
R87	216.7	166.7	8.47×10^5	0	50	100
R97	255.5	195.5	1.06×10^6	0	60	120
R107	285.5	215.5	2.06×10^6	0	70	140
R137	343.5	258.5	4.58×10^6	0	90	170
R147	402	297	8.65×10^6	33	110	210
R167	450	345	1.26×10^7	0	120	210
F27	109.5	84.5	1.13×10^5	0	25	50

22148205/EN – 09/2016

Gear unit type	a mm	b mm	c Nmm	f mm	d mm	l mm
F37	123.5	98.5	1.07×10^5	0	25	50
F47	153.5	123.5	1.40×10^5	0	30	60
F57	170.7	135.7	2.70×10^5	0	35	70
F67	181.3	141.3	4.12×10^5	0	40	80
F77	215.8	165.8	7.87×10^5	0	50	100
F87	263	203	1.06×10^6	0	60	120
F97	350	280	2.09×10^6	0	70	140
F107	373.5	288.5	4.23×10^6	0	90	170
F127	442.5	337.5	9.45×10^6	0	110	210
F157	512	407	1.05×10^7	0	120	210
K19	103.7	83.7	8.66×10^4	0	20	40
K29	124.5	99.5	1.26×10^5	0	25	50
K37	123.5	98.5	1.30×10^5	0	25	50
K39	155.5	125.5	2.25×10^5	0	30	60
K47	153.5	123.5	1.40×10^5	0	30	60
K49	183.5	148.5	2.63×10^5	0	35	70
K57	169.7	134.7	2.70×10^5	0	35	70
K67	181.3	141.3	4.12×10^5	0	40	80
K77	215.8	165.8	7.69×10^5	0	50	100
K87	252	192	1.64×10^6	0	60	120
K97	319	249	2.80×10^6	0	70	140
K107	373.5	288.5	5.53×10^6	0	90	170
K127	443.5	338.5	8.31×10^6	0	110	210
K157	509	404	1.18×10^7	0	120	210
K167	621.5	496.5	1.88×10^7	0	160	250
K187	720.5	560.5	3.04×10^7	0	190	320
S37	118.5	98.5	6.0×10^4	0	20	40
S47	130	105	1.33×10^5	0	25	50
S57	150	120	2.14×10^5	0	30	60
S67	184	149	3.04×10^5	0	35	70
S77	224	179	5.26×10^5	0	45	90
S87	281.5	221.5	1.68×10^6	0	60	120
S97	326.3	256.3	2.54×10^6	0	70	140
W10	84.8	64.8	3.6×10^4	0	16	40
W20	98.5	78.5	4.4×10^4	0	20	40
W30	109.5	89.5	6.0×10^4	0	20	40
W37	121.1	101.1	6.95×10^4	0	20	40
W47	145.5	115.5	4.26×10^5	35.6	30	60

Values for types not listed are available on request.

Gear unit constants for overhung load conversion

Gear unit type	a mm	b mm	c Nmm	f mm	d mm	l mm
RX57	43.5	23.5	1.51×10^5	34.2	20	40
RX67	52.5	27.5	2.42×10^5	39.7	25	50
RX77	60.5	30.5	1.95×10^5	0	30	60
RX87	73.5	33.5	7.69×10^5	48.9	40	80
RX97	86.5	36.5	1.43×10^6	53.9	50	100
RX107	102.5	42.5	2.47×10^6	62.3	60	120
R07	72.0	52.0	4.67×10^4	11	20	40
R17	88.5	68.5	6.53×10^4	17	20	40
R27	106.5	81.5	1.56×10^5	11.8	25	50
R37	118	93	1.24×10^5	0	25	50

22148205/EN – 09/2016

Gear unit type	a mm	b mm	c Nmm	f mm	d mm	l mm
R47	137	107	2.44×10^5	15	30	60
R57	147.5	112.5	3.77×10^5	18	35	70
R67	168.5	133.5	2.65×10^5	0	35	70
R77	173.7	133.7	3.97×10^5	0	40	80
R87	216.7	166.7	8.47×10^5	0	50	100
R97	255.5	195.5	1.06×10^6	0	60	120
R107	285.5	215.5	2.06×10^6	0	70	140
R137	343.5	258.5	4.58×10^6	0	90	170
R147	402	297	8.65×10^6	33	110	210
R167	450	345	1.26×10^7	0	120	210
F27	109.5	84.5	1.13×10^5	0	25	50
F37	123.5	98.5	1.07×10^5	0	25	50
F47	153.5	123.5	1.40×10^5	0	30	60
F57	170.7	135.7	2.70×10^5	0	35	70
F67	181.3	141.3	4.12×10^5	0	40	80
F77	215.8	165.8	7.87×10^5	0	50	100
F87	263	203	1.06×10^6	0	60	120
F97	350	280	2.09×10^6	0	70	140
F107	373.5	288.5	4.23×10^6	0	90	170
F127	442.5	337.5	9.45×10^6	0	110	210
F157	512	407	1.05×10^7	0	120	210
K19	103.7	83.7	8.66×10^4	0	20	40
K29	124.5	99.5	1.26×10^5	0	25	50
K37	123.5	98.5	1.30×10^5	0	25	50
K39	155.5	125.5	2.25×10^5	0	30	60
K47	153.5	123.5	1.40×10^5	0	30	60
K49	183.5	148.5	2.63×10^5	0	35	70
K57	169.7	134.7	2.70×10^5	0	35	70
K67	181.3	141.3	4.12×10^5	0	40	80
K77	215.8	165.8	7.69×10^5	0	50	100
K87	252	192	1.64×10^6	0	60	120
K97	319	249	2.80×10^6	0	70	140
K107	373.5	288.5	5.53×10^6	0	90	170
K127	443.5	338.5	8.31×10^6	0	110	210
K157	509	404	1.18×10^7	0	120	210
K167	621.5	496.5	1.88×10^7	0	160	250
K187	720.5	560.5	3.04×10^7	0	190	320
W10	84.8	64.8	3.6×10^4	0	16	40
W20	98.5	78.5	4.4×10^4	0	20	40
W30	109.5	89.5	6.0×10^4	0	20	40
W37	121.1	101.1	6.95×10^4	0	20	40
W47	145.5	115.5	4.26×10^5	35.6	30	60

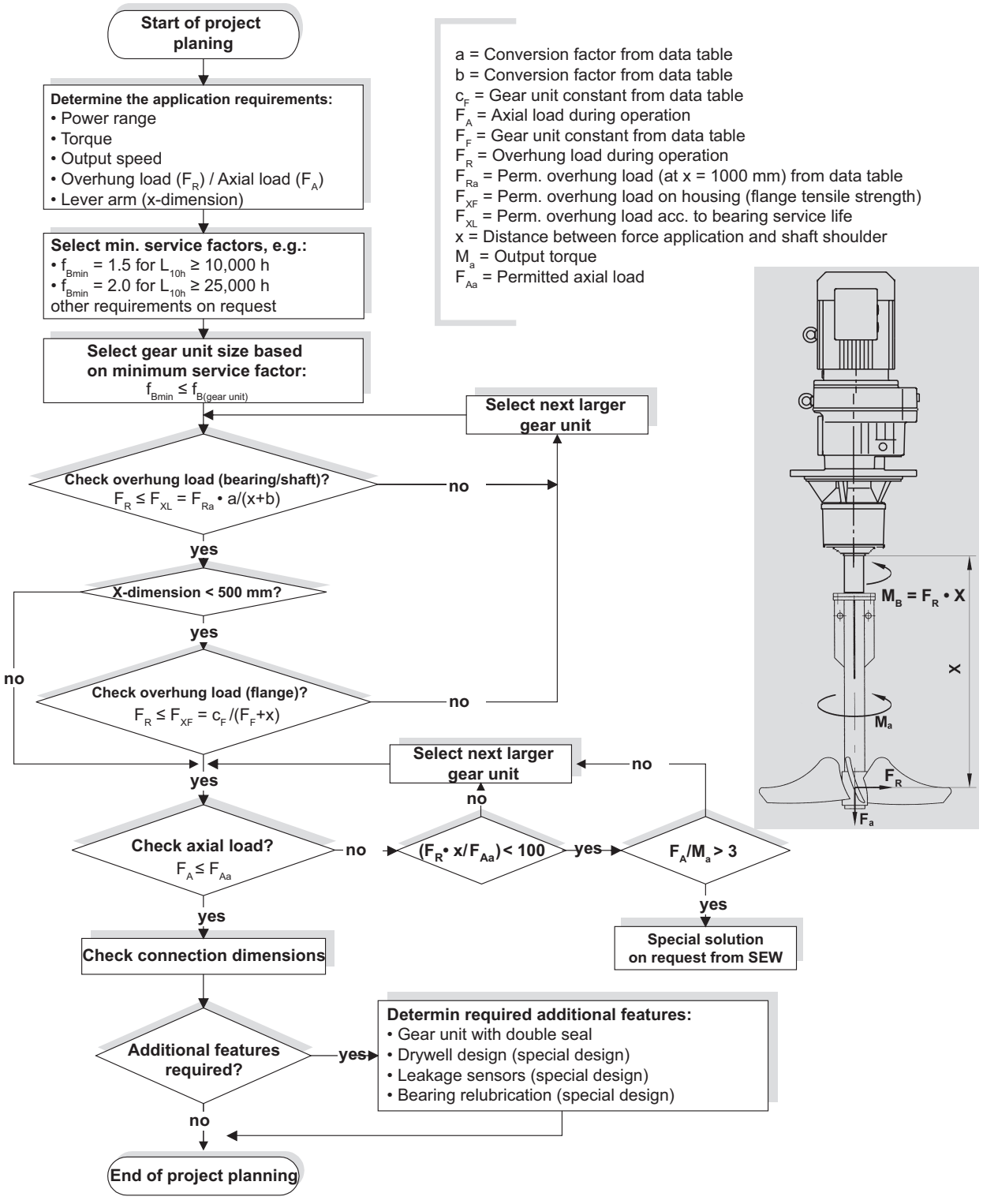
Values for types not listed are available on request.

22148205/EN – 09/2016

4.7 Project planning for RM gear units

4.7.1 Project planning procedure

You must take account of the higher overhung and axial loads when planning projects with RM helical gearmotors with an extended bearing hub. Observe the following project planning procedure:



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4.7.2 Permitted overhung loads and axial forces

The permitted overhung loads F_{Ra} and axial forces F_{Aa} are specified for various service factors f_B and nominal bearing service life L_{10h}.

f_{Bmin} = 1.5; L_{10h} = 10 000 h

		n_a [1/min]							
		< 16	16 – 25	26 – 40	41 – 60	61 – 100	101 – 160	161 – 250	251 – 400
RM57	F_{Ra} [N]	400	400	400	400	400	405	410	415
	F_{Aa} [N]	18800	15000	11500	9700	7100	5650	4450	3800
RM67	F_{Ra} [N]	575	575	575	580	575	585	590	600
	F_{Aa} [N]	19000	18900	15300	11900	9210	7470	5870	5050
RM77	F_{Ra} [N]	1200	1200	1200	1200	1200	1210	1210	1220
	F_{Aa} [N]	22000	22000	19400	15100	11400	9220	7200	6710
RM87	F_{Ra} [N]	1970	1970	1970	1970	1980	1990	2000	2010
	F_{Aa} [N]	30000	30000	23600	18000	14300	11000	8940	8030
RM97	F_{Ra} [N]	2980	2980	2980	2990	3010	3050	3060	3080
	F_{Aa} [N]	40000	36100	27300	20300	15900	12600	9640	7810
RM107	F_{Ra} [N]	4230	4230	4230	4230	4230	4230	3580	3830
	F_{Aa} [N]	48000	41000	30300	23000	18000	13100	9550	9030

f_{Bmin} = 2.0; L_{10h} = 25 000 h

		n_a [1/min]							
		< 16	16 – 25	26 – 40	41 – 60	61 – 100	101 – 160	161 – 250	251 – 400
RM57	F_{Ra} [N]	410	410	410	410	410	415	415	420
	F_{Aa} [N]	12100	9600	7350	6050	4300	3350	2600	2200
RM67	F_{Ra} [N]	590	590	590	595	590	595	600	605
	F_{Aa} [N]	15800	12000	9580	7330	5580	4460	3460	2930
RM77	F_{Ra} [N]	1210	1210	1210	1210	1210	1220	1220	1220
	F_{Aa} [N]	20000	15400	11900	9070	6670	5280	4010	3700
RM87	F_{Ra} [N]	2000	2000	2000	2000	2000	1720	1690	1710
	F_{Aa} [N]	24600	19200	14300	10600	8190	6100	5490	4860
RM97	F_{Ra} [N]	3040	3040	3040	3050	3070	3080	2540	2430
	F_{Aa} [N]	28400	22000	16200	11600	8850	6840	5830	4760
RM107	F_{Ra} [N]	4330	4330	4330	4330	4330	3350	2810	2990
	F_{Aa} [N]	32300	24800	17800	13000	9780	8170	5950	5620

22148205/EN – 09/2016

4.7.3 Conversion factors and gear unit constants

The following conversion factors and gear unit constants apply to calculating the permitted overhung load F_{xL} at point x ≠ 1000 mm for RM gearmotors:

Gear unit type	a	b	c_F (f_B = 1.5)	c_F (f_B = 2.0)	F_F
RM57	1047	47	1220600	1260400	277
RM67	1047	47	2047600	2100000	297.5
RM77	1050	50	2512800	2574700	340.5
RM87	1056.5	56.5	4917800	5029000	414
RM97	1061	61	10911600	11124100	481
RM107	1069	69	15367000	15652000	554.5

4.7.4 Additional weight of RM gear units

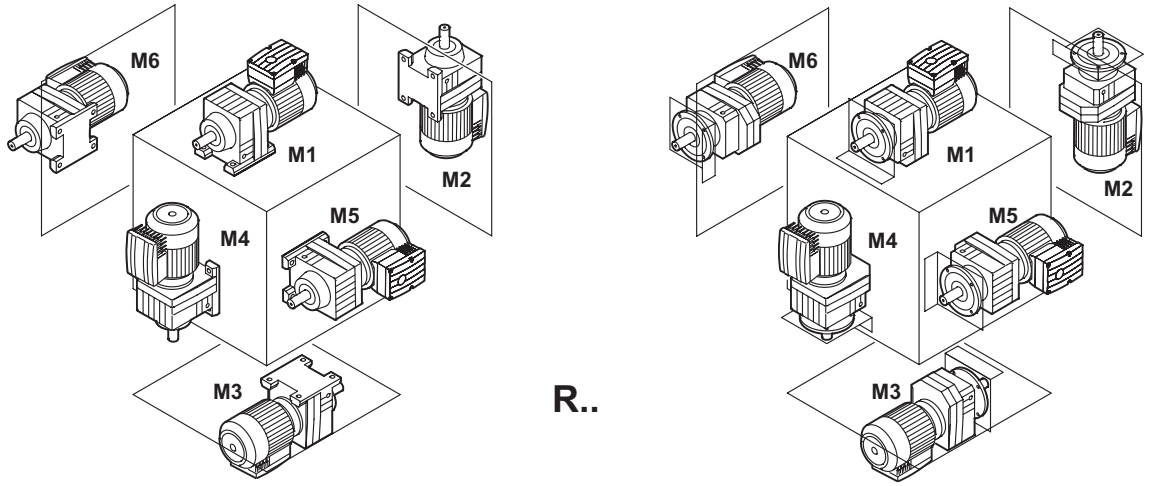
Type	Additional weight compared to RF with reference to the smallest RF flange Δm [kg]
RM57	12.0
RM67	15.8
RM77	25.0
RM87	29.7
RM97	51.3
RM107	88.0

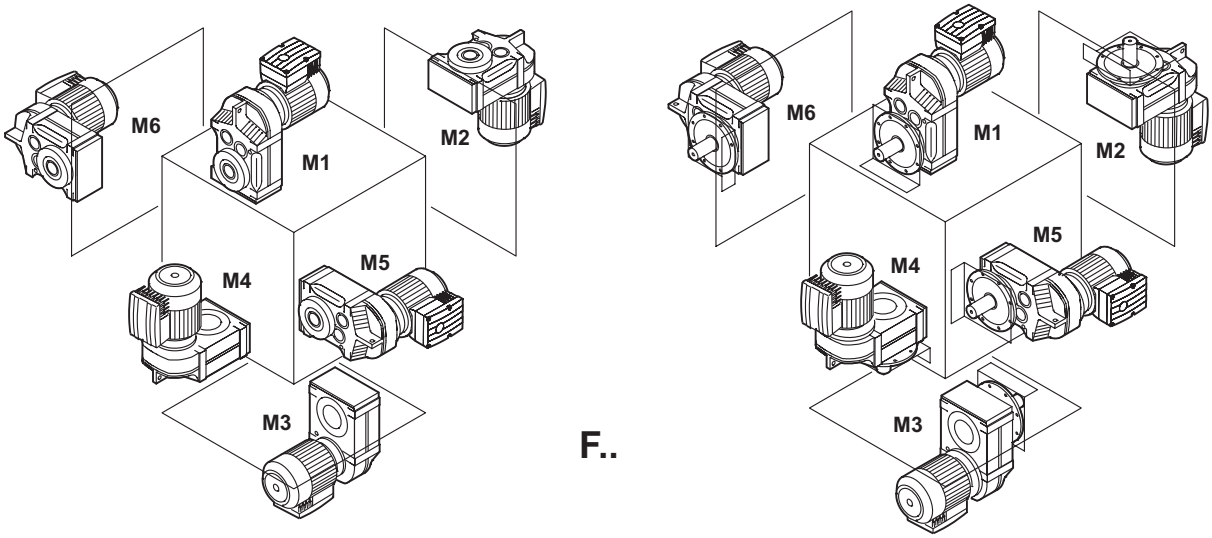
22148205/EN – 09/2016

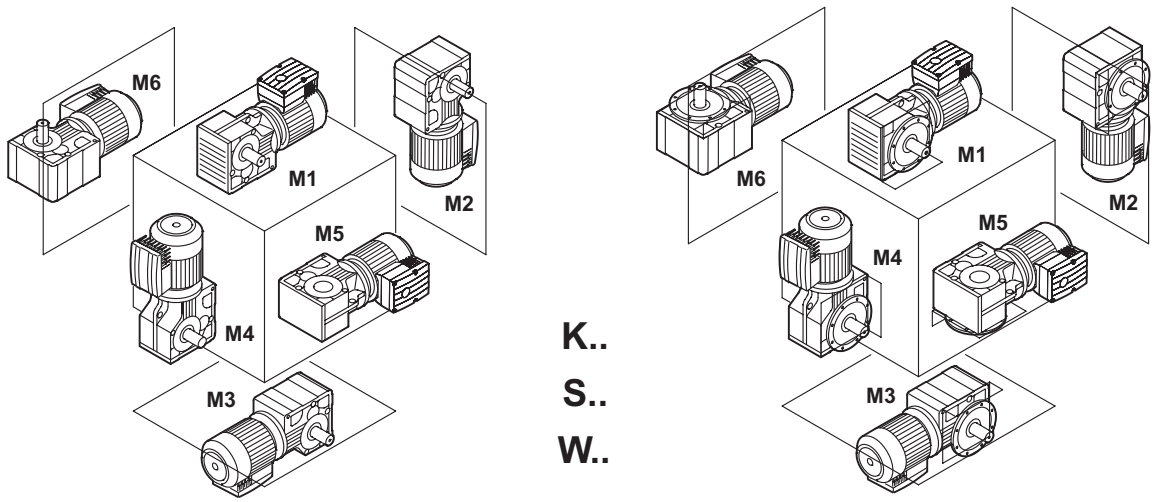
5 Mounting positions of the gear units

5.1 General mounting position information – R, F, K, S, and W gear units

SEW-EURODRIVE distinguishes between the 6 gear unit mounting positions M1 – M6. The following figure shows the spatial orientation of the gear unit in mounting positions M1 – M6:







22148205/EN – 09/2016

5.2 Order information

INFORMATION

The following order information is required for R, F, K and S gear units or gearmotors in addition to the mounting position to exactly determine the type of drive.

This information is also required for SPIROPLAN® gearmotors (W gearmotors) that do not depend on a particular mounting position.

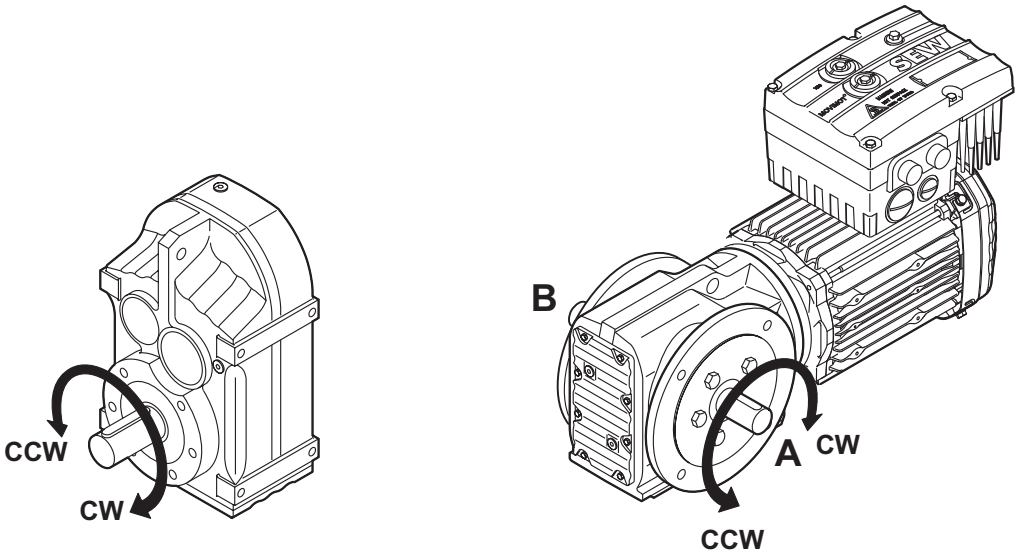
5.2.1 The following applies to all gear units and gearmotors

Output direction of rotation with backstop

Observe the following notes for all gear units and gearmotors from SEW-EURODRIVE.

If the drive has an RS backstop, you have to indicate the direction of rotation of the output for the drive. The following definition applies:

As viewed at the output shaft:	Clockwise (CW) = Rotating clockwise Counterclockwise (CCW) = Rotating counterclockwise



5925987467

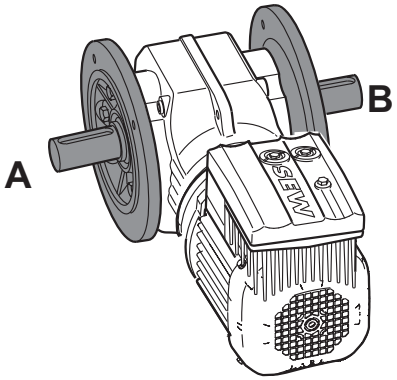
In right-angle gear units, you also have to indicate whether the direction of rotation is given looking onto the A or B-side.

22148205/EN – 09/2016

Position of the output shaft and output flange

In right-angle gear units, you also have to indicate the position of the output shaft and the output flange:

- A or B or AB

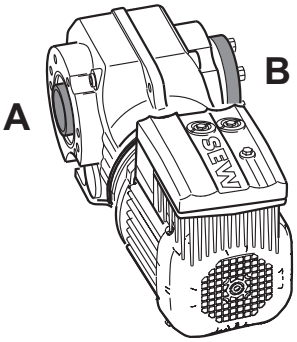


5926196235

Position of the output end in right-angle gear units

In shaft mounted right-angle gear units with a shrink disk, you also have to indicate whether the A or B-side is the output end. In the figure below, the A-side is the output end. The shrink disk is located opposite the output end.

In shaft mounted right-angle gear units, the output end is equivalent to the shaft position of right-angle gear units with solid shaft.



5926563467

INFORMATION

You find the permitted mounting surfaces (= hatched area) in the mounting position sheets.

Example: Only the mounting surface at the bottom is possible with helical-bevel gear units K167/K187 in mounting positions M5 and M6.

22148205/EN – 09/2016

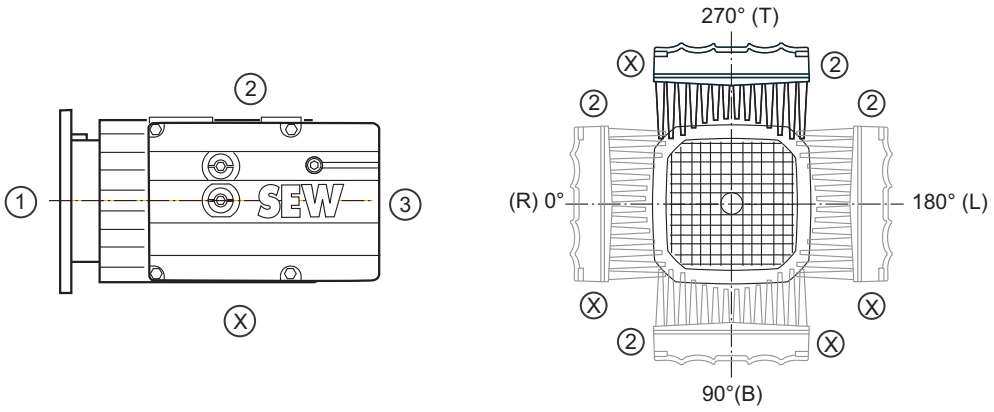
5.2.2 For all gearmotors

Position of terminal box and cable entry

The position of the connection box has so far been indicated with 0°, 90°, 180° or 270° as viewed onto the fan guard = B-side, see the following figure. A change in the product standard EN 60034 specifies that the following designations will have to be used for connection box positions for foot-mounted motors in the future:

- As viewed onto the output shaft = A-side
- Designation as R (right), B (bottom), L (left) and T (top)

This new designation applies to foot-mounted motors without a gear unit in mounting position B3 (= M1). For gearmotors, the previous designation is retained. The following figure shows both designations. If the mounting position of the motor changes, R, B, L and T are rotated accordingly. In motor mounting position B8 (= M3), T is at the bottom.



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INFORMATION

Not all connection box positions are possible with MOVIMOT® drives. For all positions other than the standard 270°, a type-specific individual verification by SEW-EURODRIVE is required.

Position of the cable entry:

You do not have to select the position of the cable entry for MOVIMOT® drives. Positions "X" (= standard position) and position "2" are always possible (see above figure).

INFORMATION

- If the connection box position deviates from the standard, you have to check whether the gear unit must be supported, depending on the mounting position.
- When using plug connectors or MOVIMOT® options, the choice of possible mounting positions might be limited. If in doubt, please contact SEW-EURODRIVE.

22148205/EN – 09/2016

5.2.3 Sample orders

Type (examples)	Mounting position	Shaft position	Flange position	Terminal box position	Output direction of rotation
K77 DRN90L4/RS/MM22	M2	A	–	0°	CW
SF77 DRS71M4/MM07	M6	AB	AB	90°	–
KA97 DRN100L4/MM40	M4	B	–	270°	–
KH19 DRN80M4/MM11	M1	A	–	180°	–
WF20 DRS71S4/MM05	–	A	A	0°	–

5.2.4 Changing the mounting position

It is important that you read the following information when you operate the gearmotor in a mounting position other than indicated in the order:

- Adjust the lubricant fill quantity so that it matches the new mounting position.
- Adjust the position of the breather valve.
- For helical-bevel gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M5 or M6, independent of the initial mounting position.
- For helical-worm gearmotors: Contact the SEW-EURODRIVE when changing to mounting position M2 or M3.

22148205/EN – 09/2016

5.3 Key to the mounting position sheets

INFORMATION

The positions of the breather valve, oil level plug, and oil drain plug specified in the mounting position sheets are binding and comply with the assembly specifications.

The motors are only depicted symbolically on the mounting position sheets.

INFORMATION

For gear units with solid shaft: The displayed shaft is always on the A-side.

For shaft-mounted gear units: The shaft with dashed lines represents the customer shaft. The output end (= shaft position) is always shown on the A-side.

INFORMATION

SPRIOPLAN® gearmotors are not dependent on the mounting position, except for W..37 and W..47 gearmotors in mounting position M4. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

INFORMATION

SPIROPLAN® gearmotors W..10 to W..30 cannot be equipped with breather valves, oil level plugs or oil drain plugs.

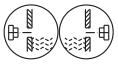
SPIROPLAN® gear units W..37 and W..47 are equipped with breather valves in mounting position M4 and with oil drain plugs in mounting position M2.

INFORMATION

Some gear units can be supplied in mounting position M0. In this case, the gear unit is delivered in a universal mounting position and can be adjusted to various mounting positions by the customer. It may be necessary to contact SEW-EURODRIVE.

5.3.1 Symbols used

The following table shows the icons used in the mounting position sheets.

Icon	Meaning
	Breather valve
	Oil level plug [1]
	Oil drain plug

1) Does not apply to the 1st gear unit (large gear unit) of compound gear units. See chapter "Position of the oil level plug of compound gear units".

22148205/EN – 09/2016

5.3.2 Breather valve/oil drain plug position in the motor flange

As shown in the mounting position sheets in chapter Helical gearmotors mounting positions and the following, the position of the breather valve or the oil drain plug depend on the gearmotor mounting position.

The following table shows the position of the breather valve and the oil drain plug depending on the mounting position:

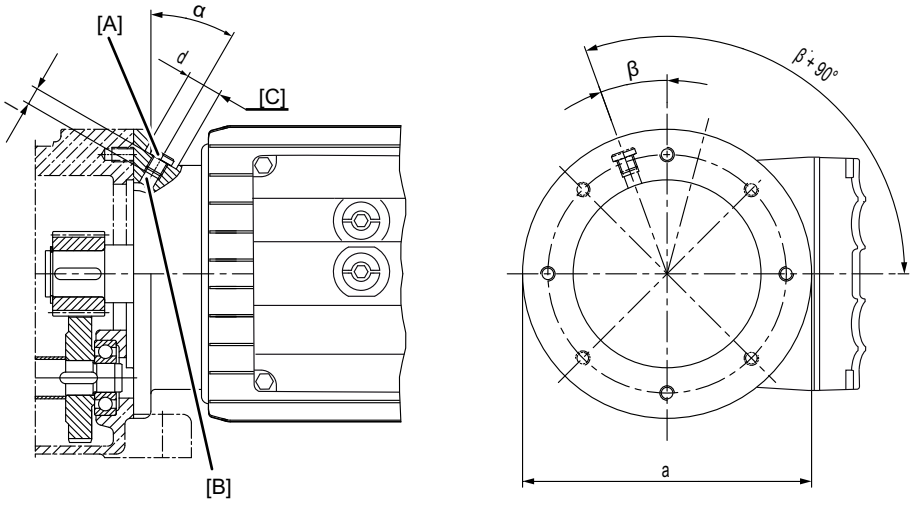
Mounting position	Breather valve position	Oil drain plug position
M1, M3, M5, M6	In the gear unit housing	In the gear unit housing
M4	**In the motor flange**	In the gear unit housing
M2	In the gear unit housing	**In the motor flange**

If the breather valve (M4 mounting position) or the oil drain plug (M2 mounting position) is positioned in the motor flange, the position depends on the connection box position.

INFORMATION

The positions of the breather valve or the oil drain plug in the mounting position sheets in chapter Helical gearmotors mounting positions and the following chapters always refers to the standard position 0°. Note that the position of the breather valve or oil drain plug is changed depending on the possible connection box positions (90°, 180°, 270°).

The following illustration shows the exact position of the breather valve or oil drain plug in the motor flange.



14699978251

[A] Position of breather valve or oil drain plug
[B] Continuous core drilling
[C] Counterbored bore
[α] Drill angle
[d] Diameter of the countersinking
[l] Thread length
[a] Flange diameter
[β] Position angle

22148205/EN – 09/2016

DRN.. dimension table

The following tables contain the dimensions regarding the position of the breather and the oil drain plug depending on the motor size.

DRN80 – 132 motor type	a in mm	α in °	β in °	Thread designation	Ø d in mm	l in mm
DRN80	120	30	22.5	M10×1.5	15	10
	160					
	200			M12×1.5	18	12
	250					
	300	90		M22×1.5	28	14
DRN90	120	30	22.5	M10×1.5	15	12
	160					
	200			M12×1.5	15	16
	250				18	12
	300			M22×1.5	28	
DRN100	120	30	22.5	M10×1.5	15	10
	160					12
	200			M12×1.5	18	
	250					
	300			M22×1.5	28	14
	350					
DRN112M DRN132S	160	30	22.5	M10×1.5	15	10
	200			M12×1.5	18	12
	250					
	300			M22×1.5	28	14
	350					
	400	45				10
	450			M33×2	40	16
DRN132M/L	160	30	22.5	M10×1.5	15	10
	200	15		M12×1.5	18	14
	250	30				
	300			M22×1.5	28	12
	350					14
	400					13
	450	75		M33×2	40	16
	550	90		M42×2	50	18

22148205/EN – 09/2016

DRS.., DRE.., DRP.. dimension table

The following table contains the dimensions regarding the position of the breather valve and the oil drain plug depending on the motor size.

Motor type DR63 – DR..132	a in mm	α in °	β in °	Thread designation	Ø d in mm	l in mm
DR63	120	30	45	M10×1	15	10
	160		22.5			
	200			M12×1.5	18	12
DR..71	120 [2]	0°	45°	M10×1.5	15	10
	160 [2]	30°	22.5°			
	200 [1]			M12×1.5	18	12
	250 [1]					
	300 [1]	90°		M22×1.5	28	14
DR..80	120	30°	22.5°	M10×1.5	15	10
	160					
	200			M12×1.5	18	12
	250					
	300	90°		M22×1.5	28	14
DR..90	120	30°	22.5°	M10×1.5	15	10
	160					11
	200			M12×1.5	18	14
	250					12
	300			M22×1.5	28	12
DR..100	120	30°	22.5°	M10×1.5	15	10
	160					11
	200			M12×1.5	18	14
	250					12
	300			M22×1.5	28	12
	350					9
DR..112	160	30°	22.5°	M10×1.5	15	10
	200			M12×1.5	18	12
	250					
	300			M22×1.5	28	14
	350					
DR..132	160	30°	22.5°	M10×1.5	15	10
	200			M12×1.5	18	12
	250					
	300			M22×1.5	28	14
	350					
	400	45°				10
	450			M33×2	40	16

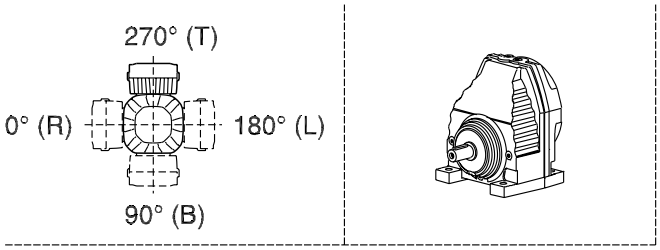
22148205/EN – 09/2016

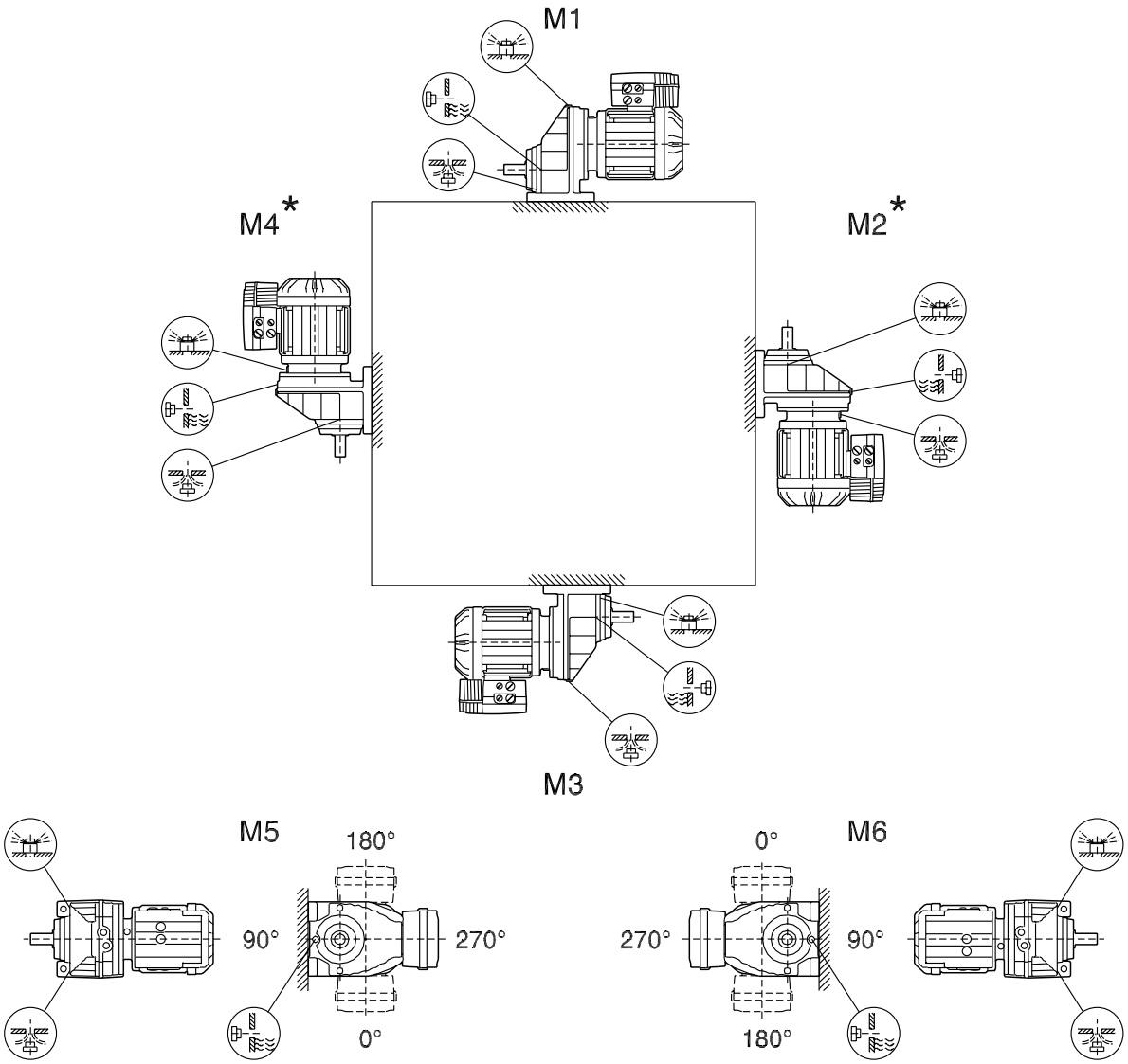
5.4 Mounting position sheets

5.4.1 Mounting positions of helical gearmotors

RX57 – RX107

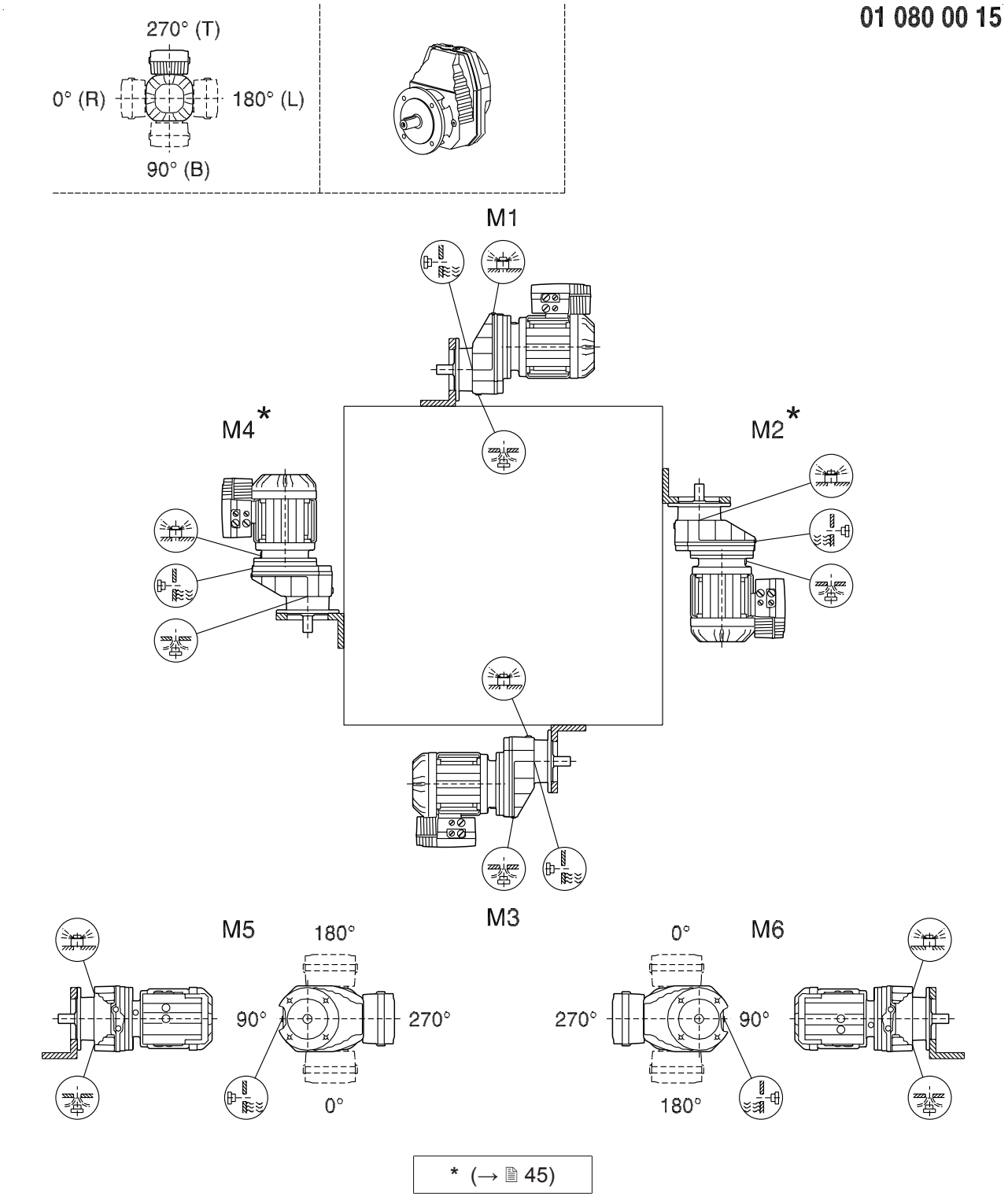
01 079 00 15





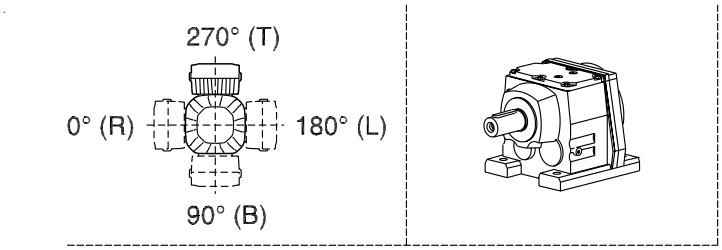
* (→ 45)

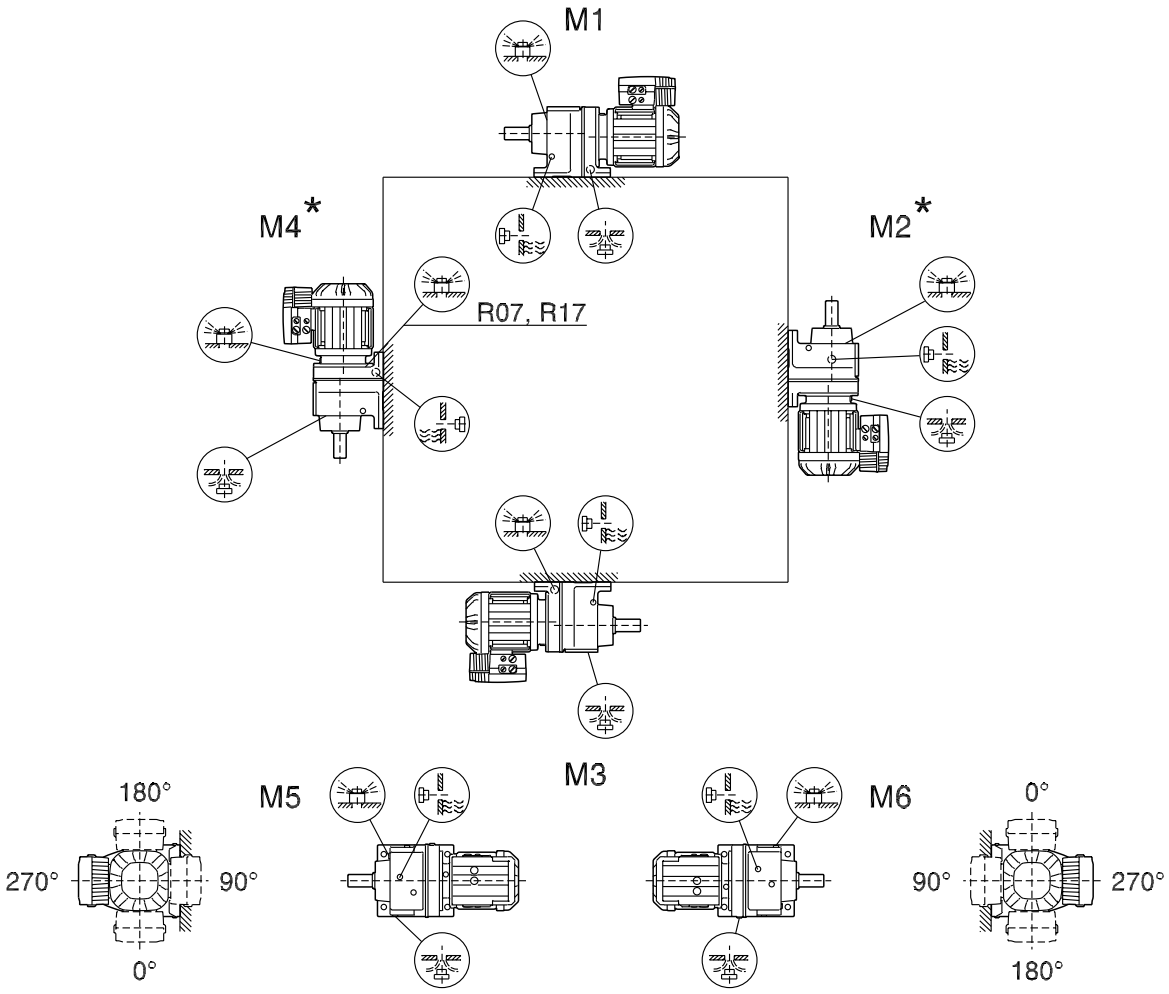
RXF57 – RXF107



* (→ 🗎 45)

R07 – R107





R07	M1, M2, M3, M5, M6
R17, R27	M1, M3, M5, M6
R07, R17, R27	
R47, R57	M5

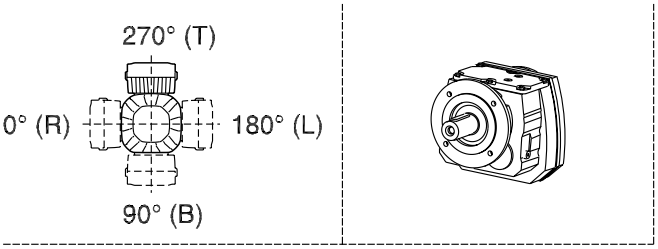
* (→ 🖹 45)

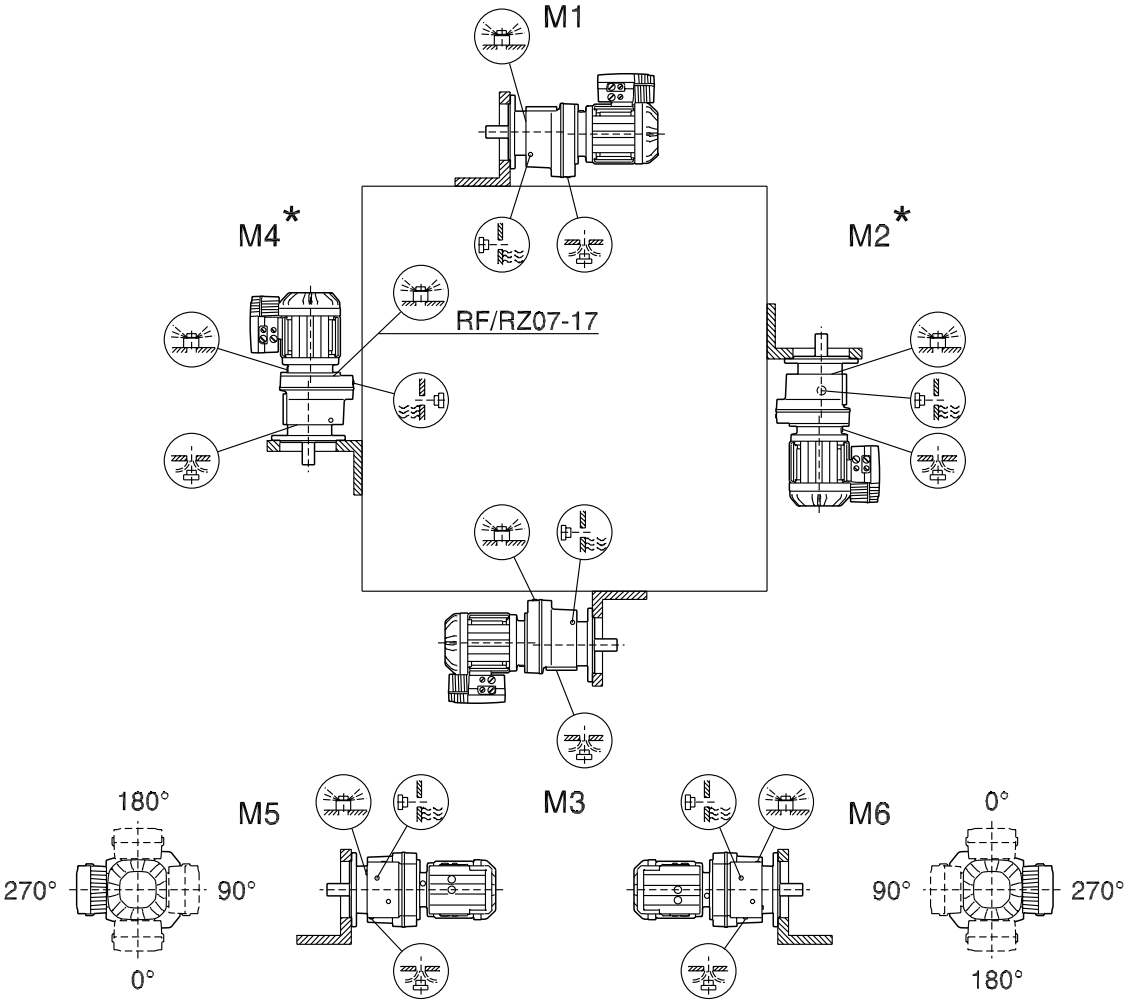
Also refer to the information in chapter "Overhung and axial loads" (→ 🖹 49).

22148205/EN – 09/2016

RF07 – RF107 / RZ07 – RZ87

01 082 00 15



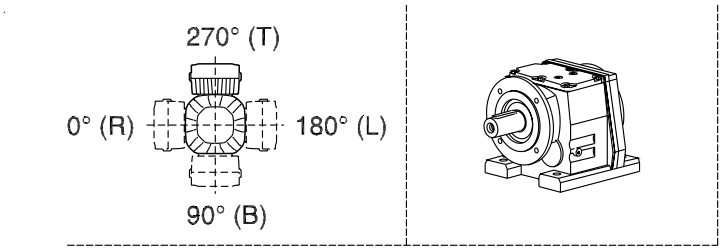


RF/RZ07	M1, M2, M3, M5, M6
RF/RZ17, 27	M1, M3, M5, M6
RF/RZ07, 17, 27	
RF/RZ47, 57	M5

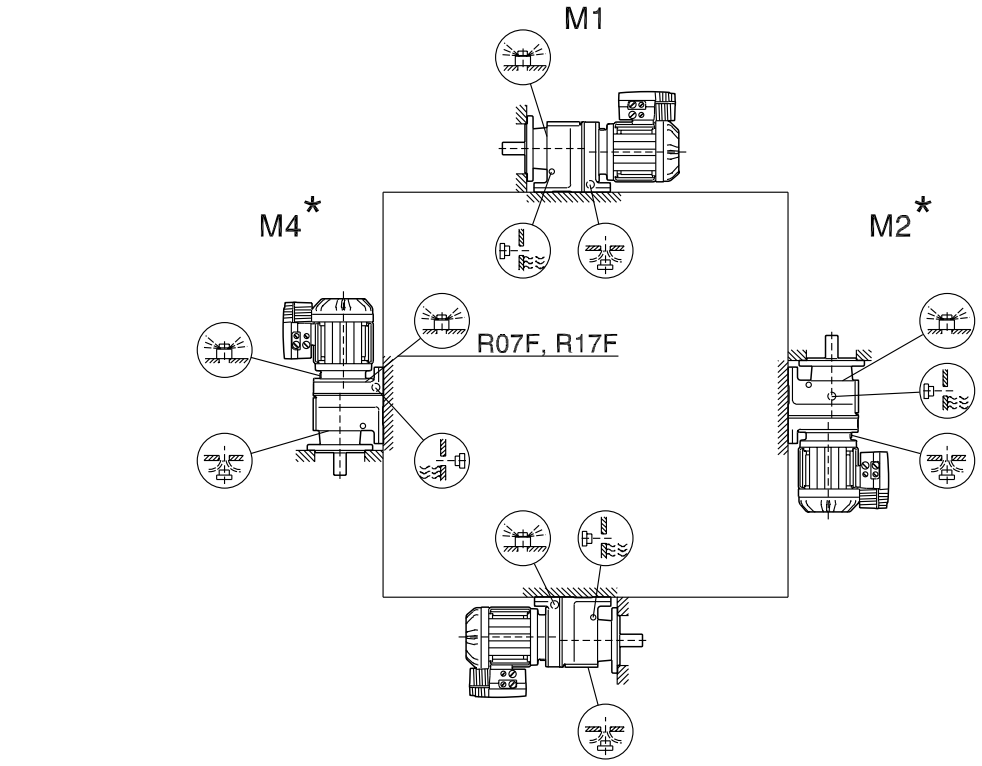
* (→ 🗎 45)

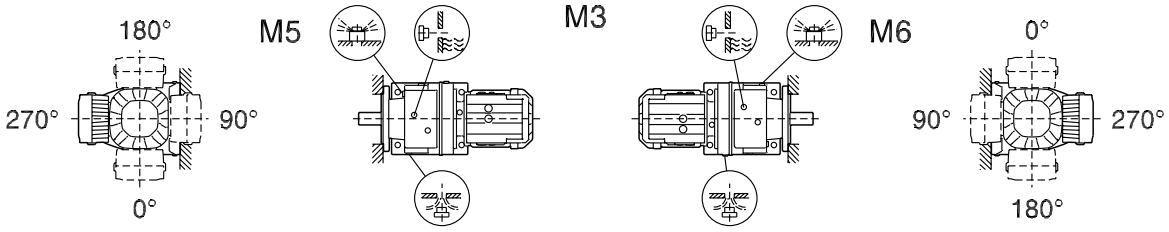
22148205/EN – 09/2016

R07F – R87F



01 083 00 15





R07F	M1, M2, M3, M5, M6
R17F, R27F	M1, M3, M5, M6
R07F, R17F, R27F	
R47F, R57F	M5

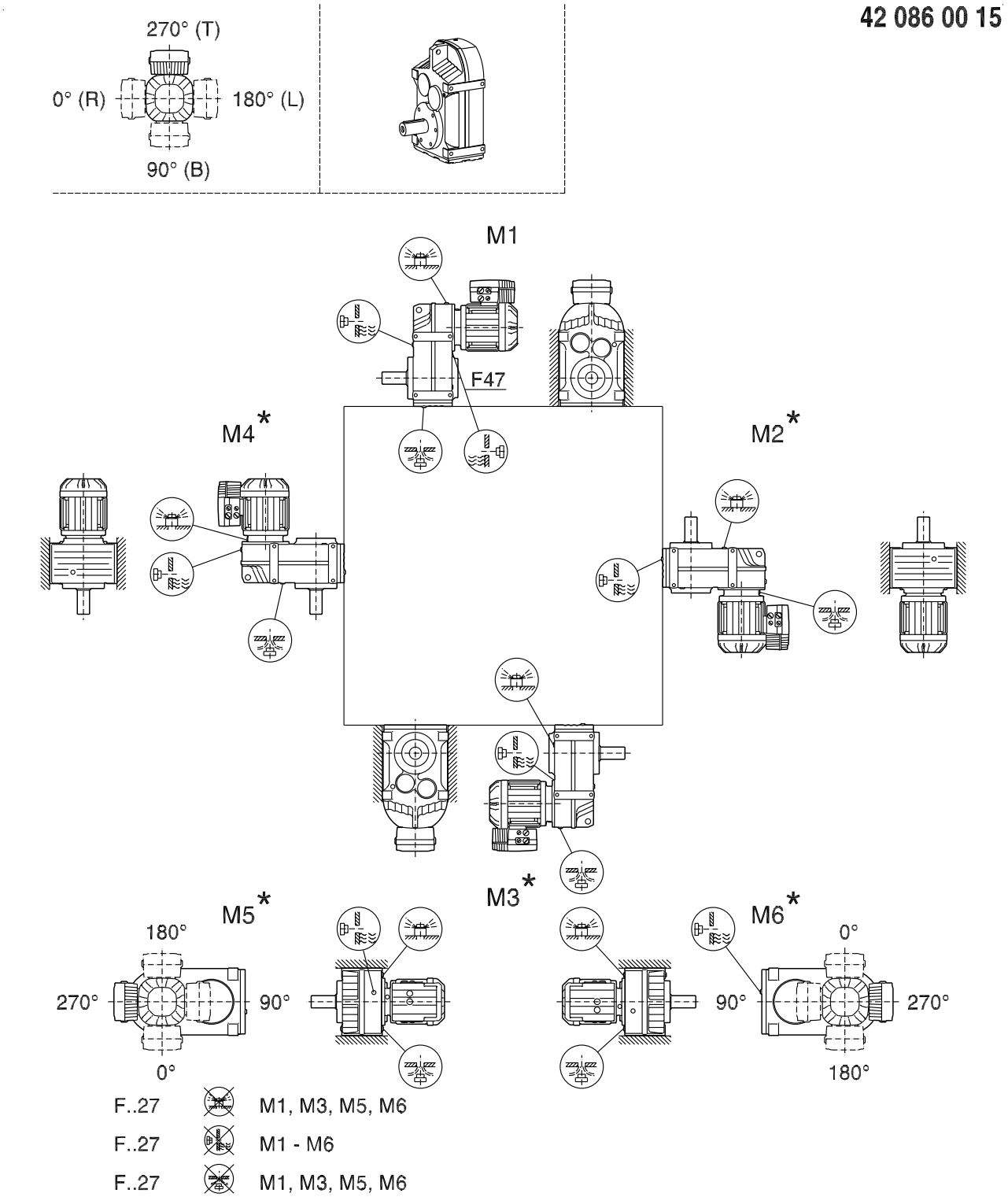
* (→ 🖹 45)

Also refer to the information in chapter "Overhung and axial loads" (→ 🖹 49).

22148205/EN – 09/2016

5.4.2 Mounting positions of parallel-shaft helical gearmotors

F / FA..B / FH..B / FV27B – 107B

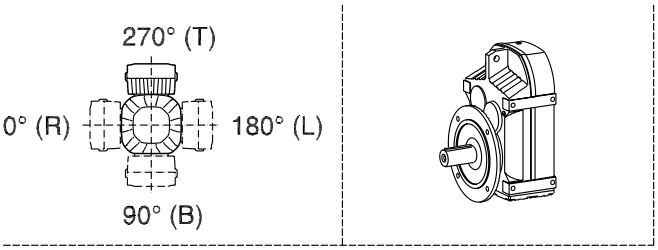


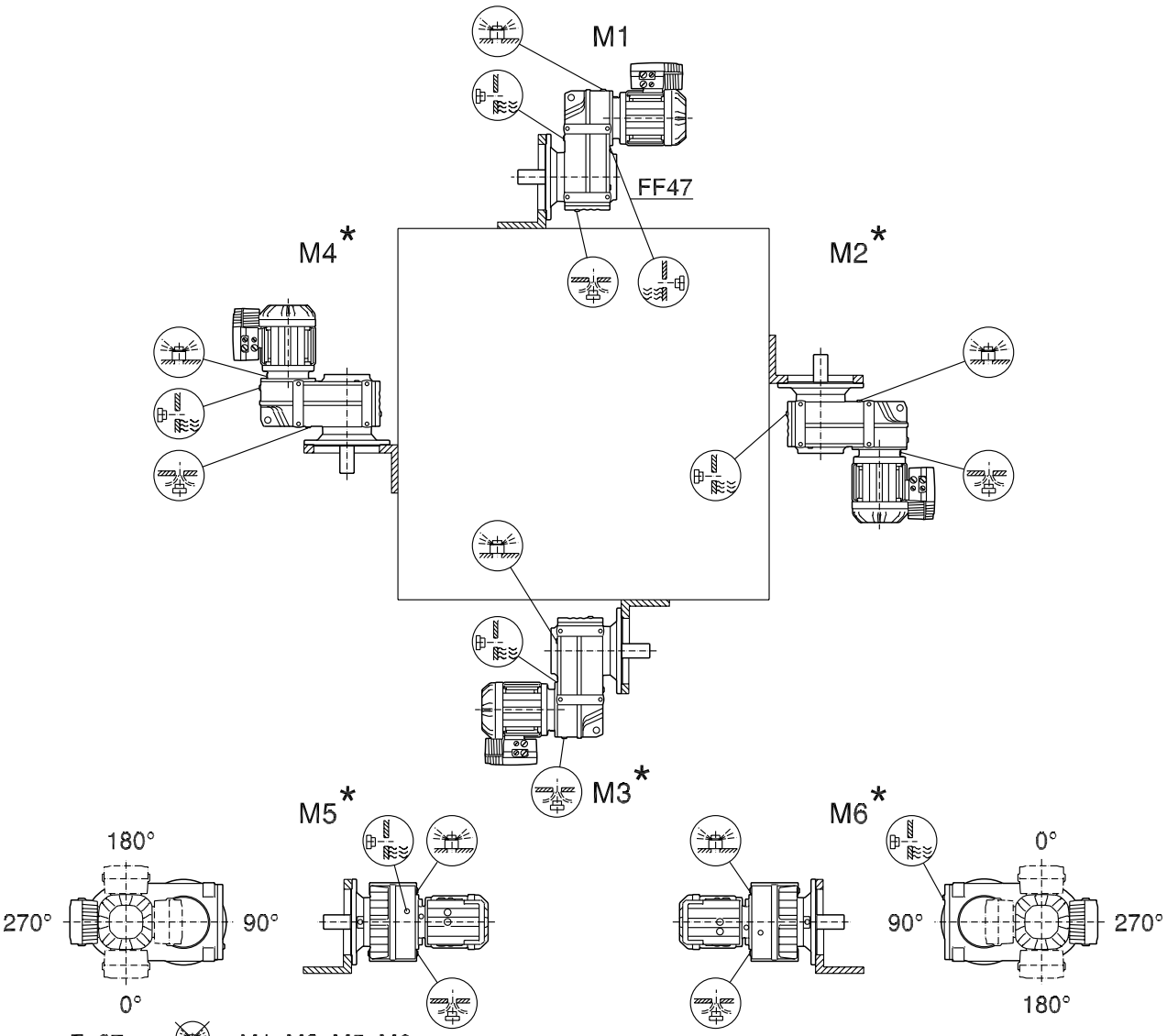
* (→ 🗎 45)

22148205/EN – 09/2016

FF / FAF / FHF / FAZ / FHZ / FVF / FVZ27 – 107

42 087 00 15



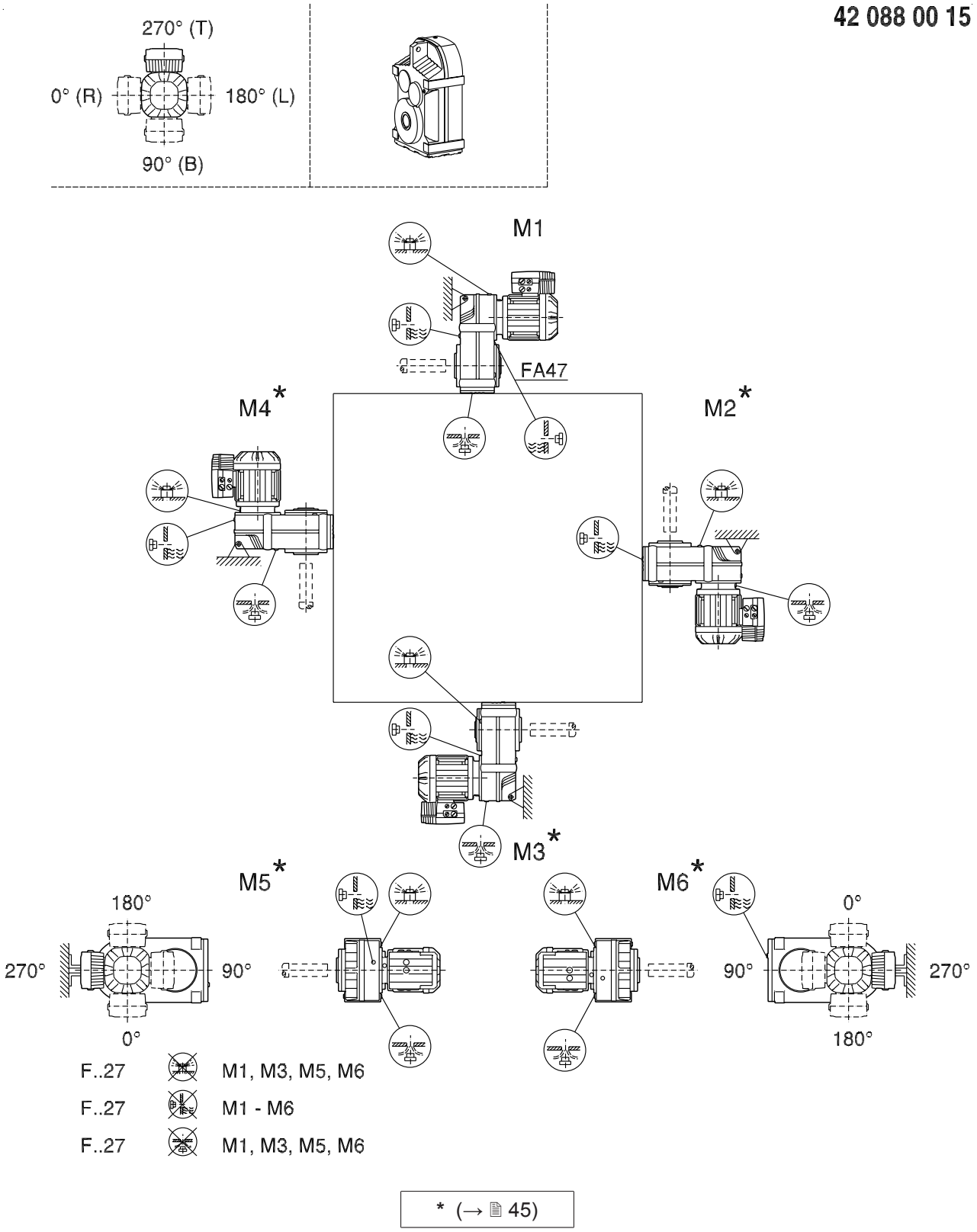


F..27		M1, M3, M5, M6
F..27		M1 - M6
F..27		M1, M3, M5, M6

* (→ 45)

22148205/EN – 09/2016

FA / FH / FV / FT37 – 107



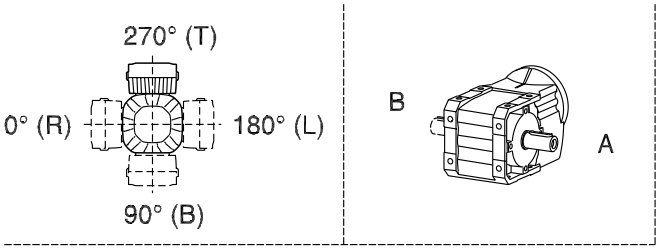
* (→ 🗎 45)

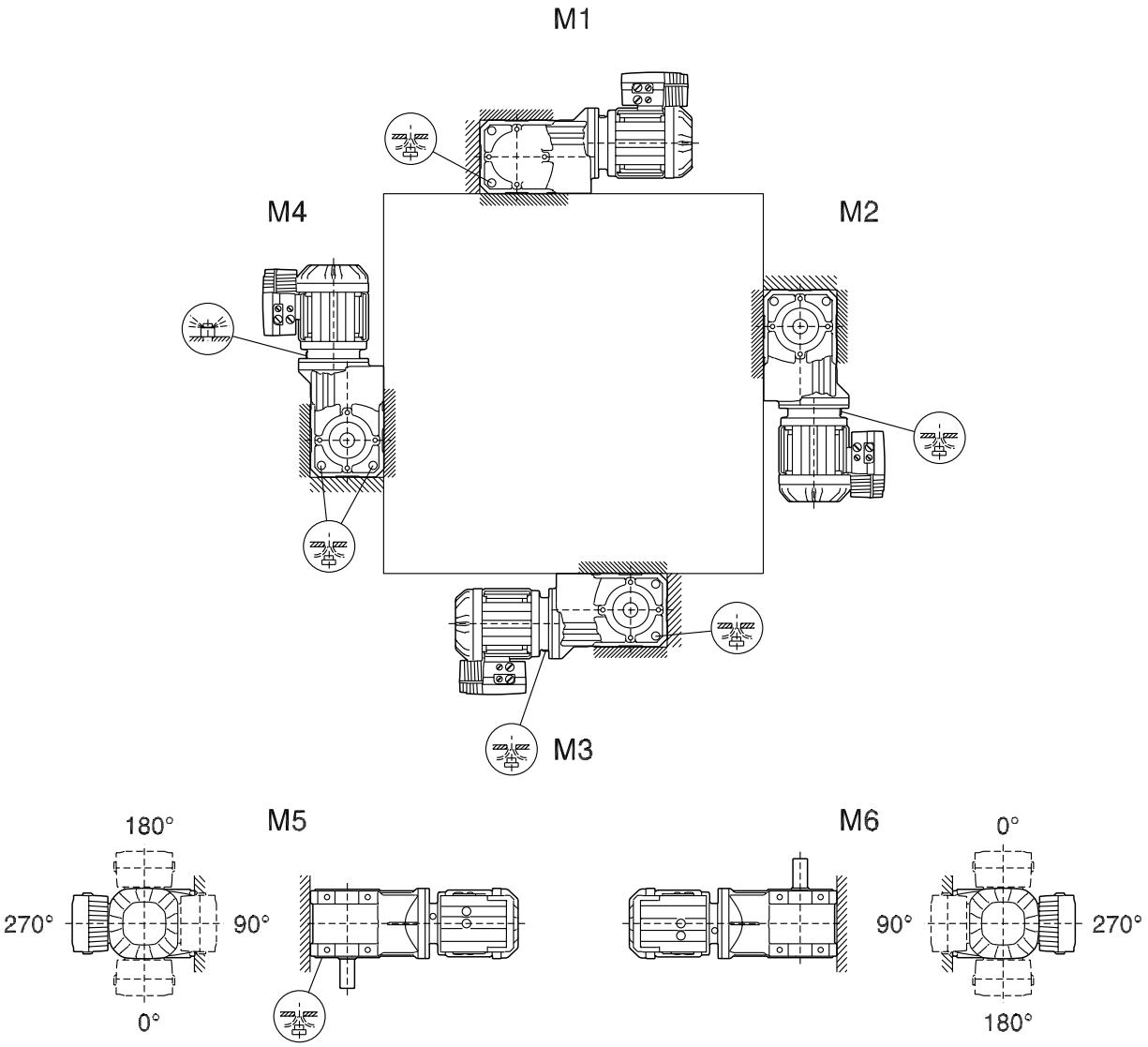
22148205/EN – 09/2016

5.4.3 Mounting positions of helical-bevel gearmotors

K / KA..B / KH19B – 29B

33 259 00 15

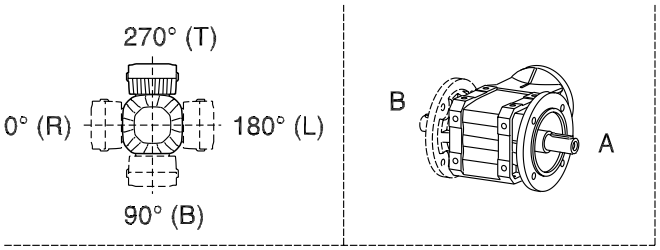


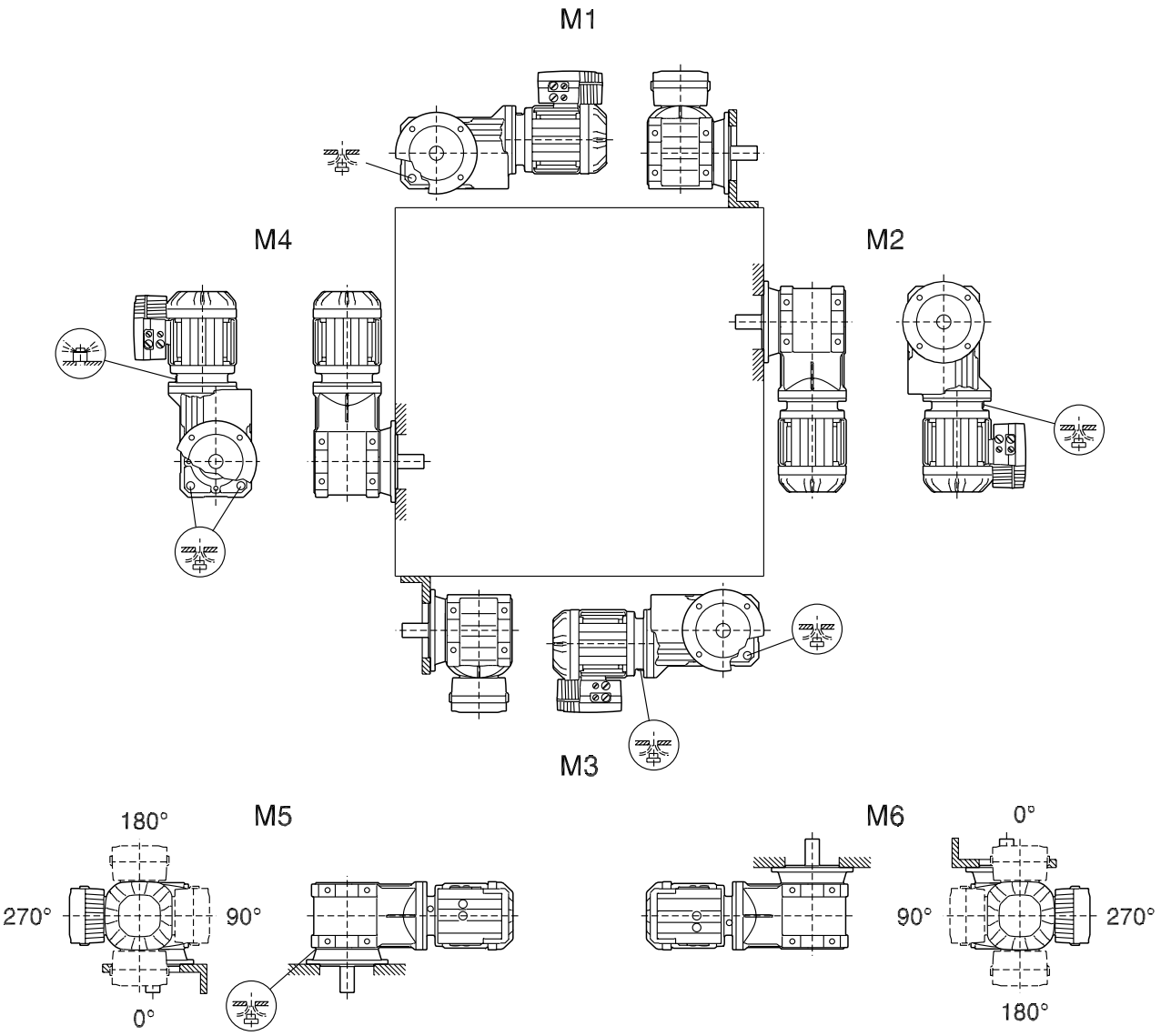


Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

KF..B / KAF..B / KHF19B – 29B

33 260 00 15



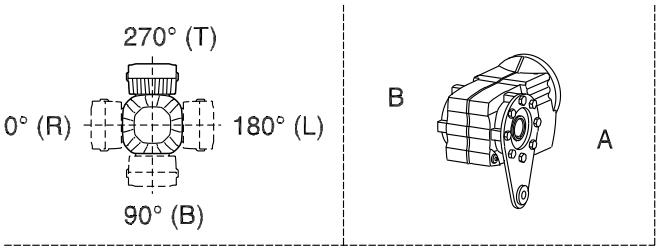


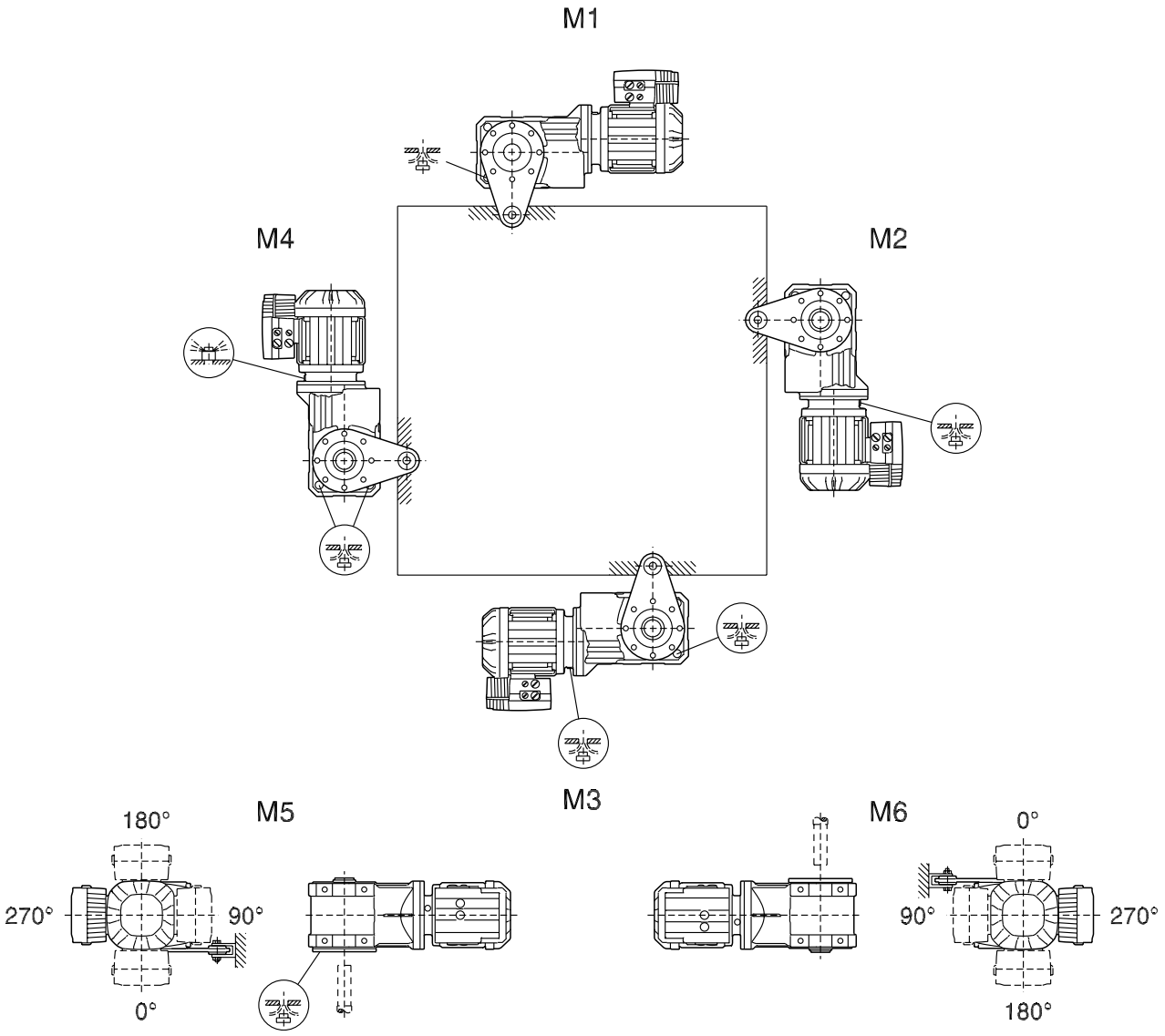
Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

22148205/EN – 09/2016

KA..B / KH19B – 29B

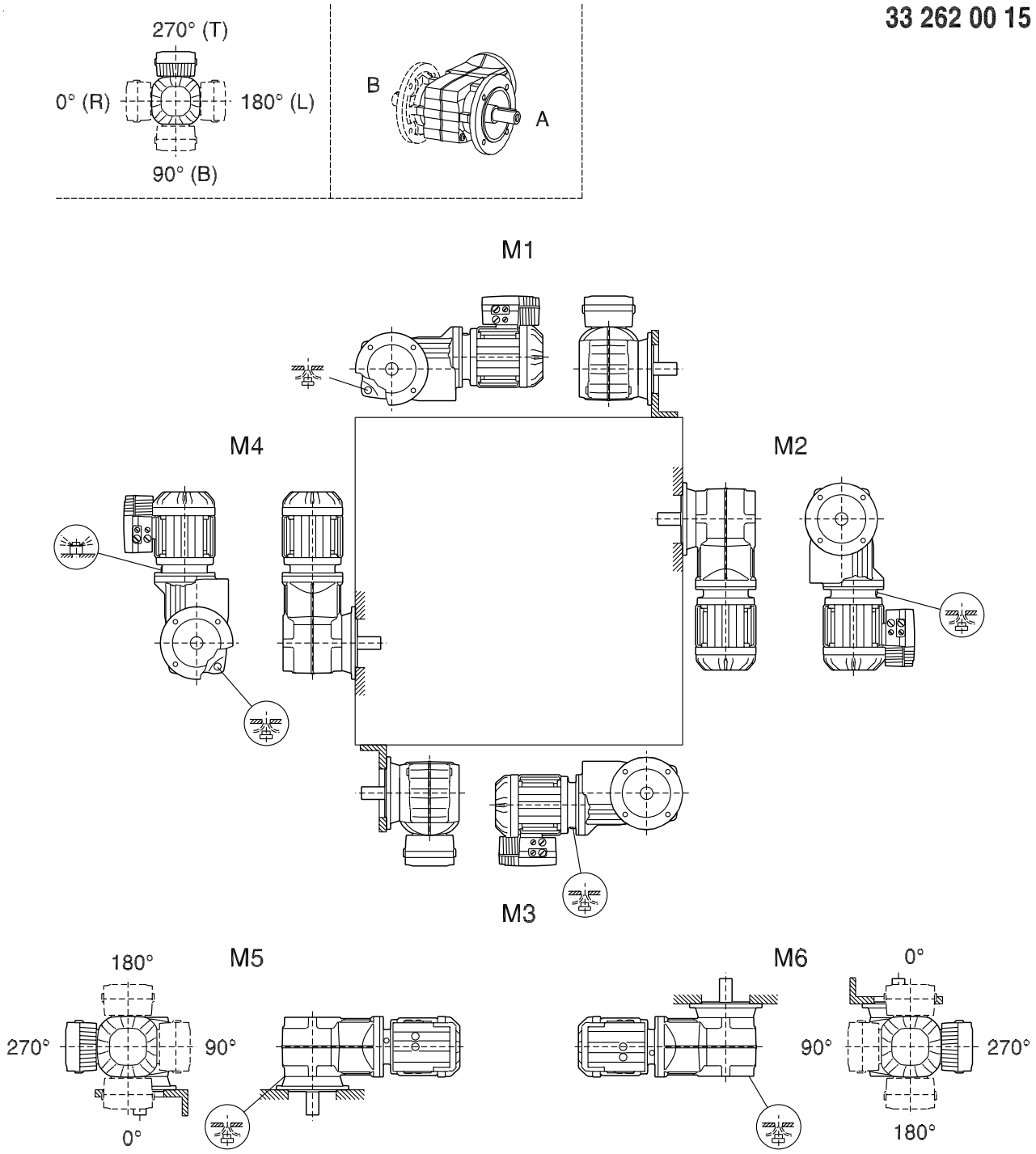
33 261 00 15





Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

KF / KAF / KHF19 – 29

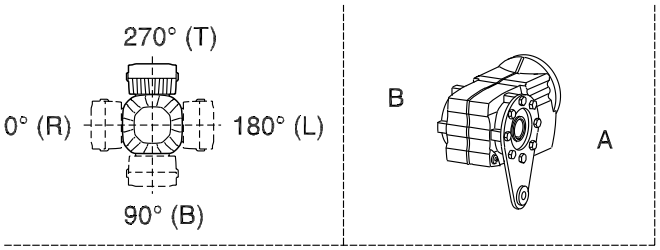


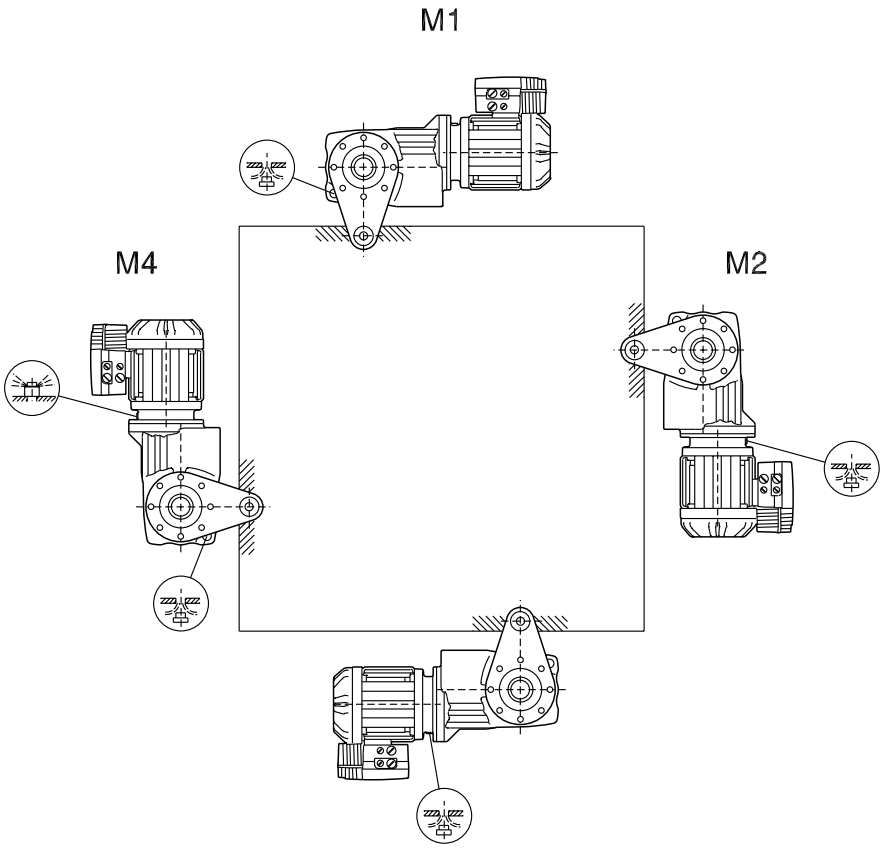
Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

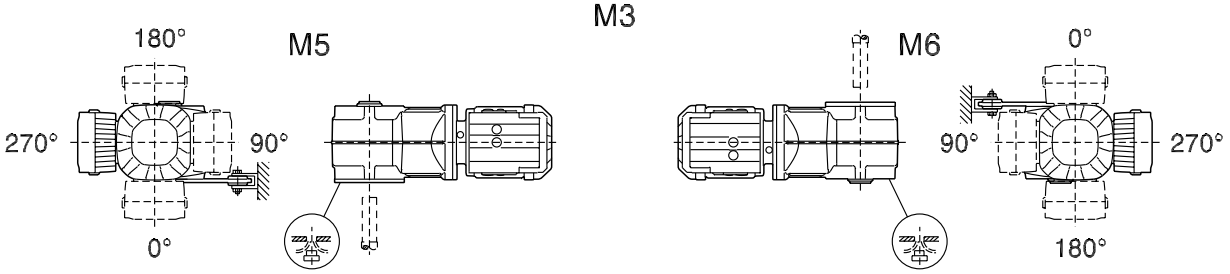
22148205/EN – 09/2016

KA / KH19 – 29

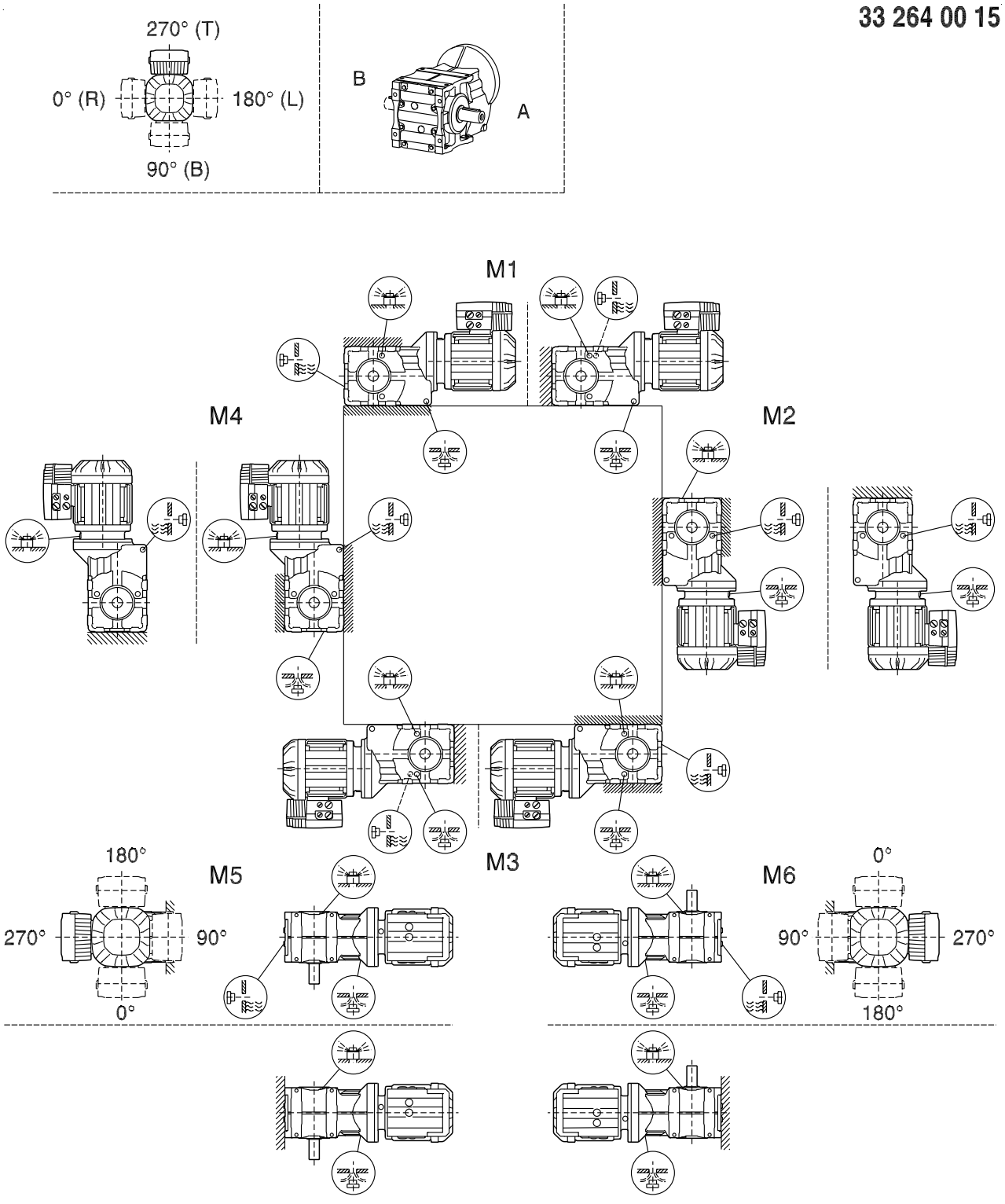
33 263 00 15







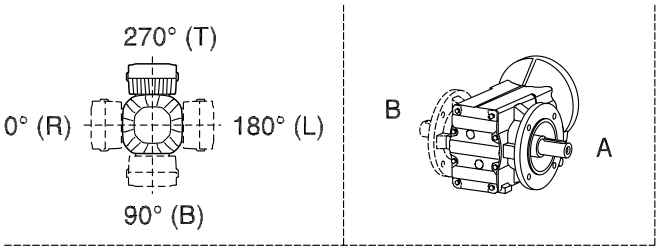
K39 – 49

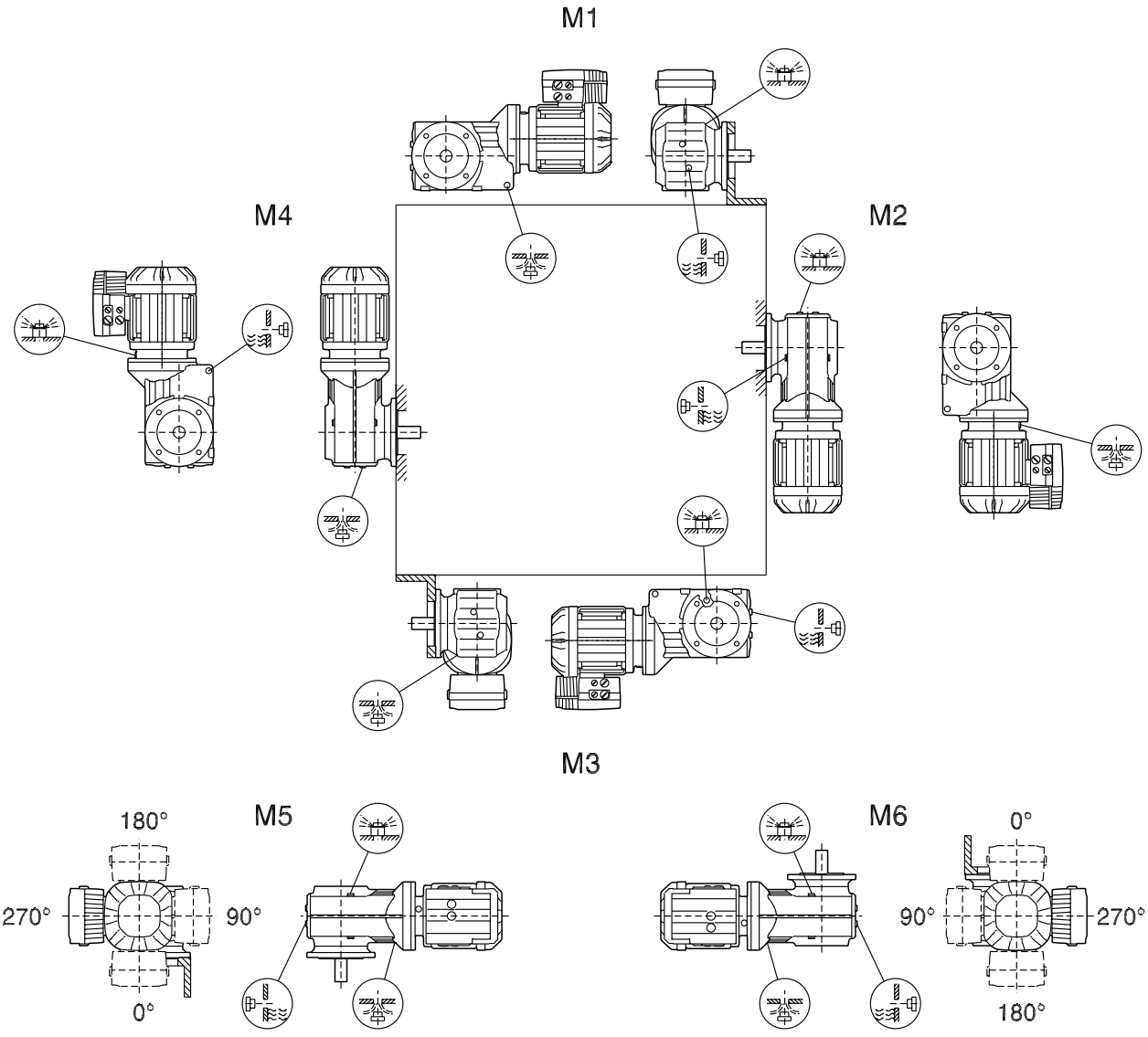


22148205/EN – 09/2016

KF / KAF39 – 49

33 265 00 15

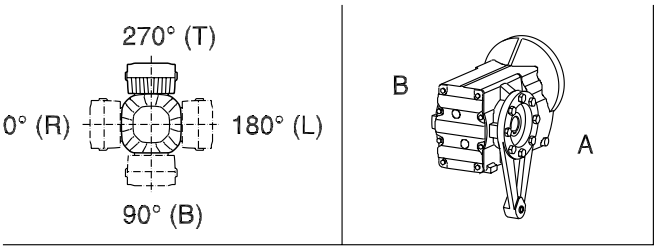


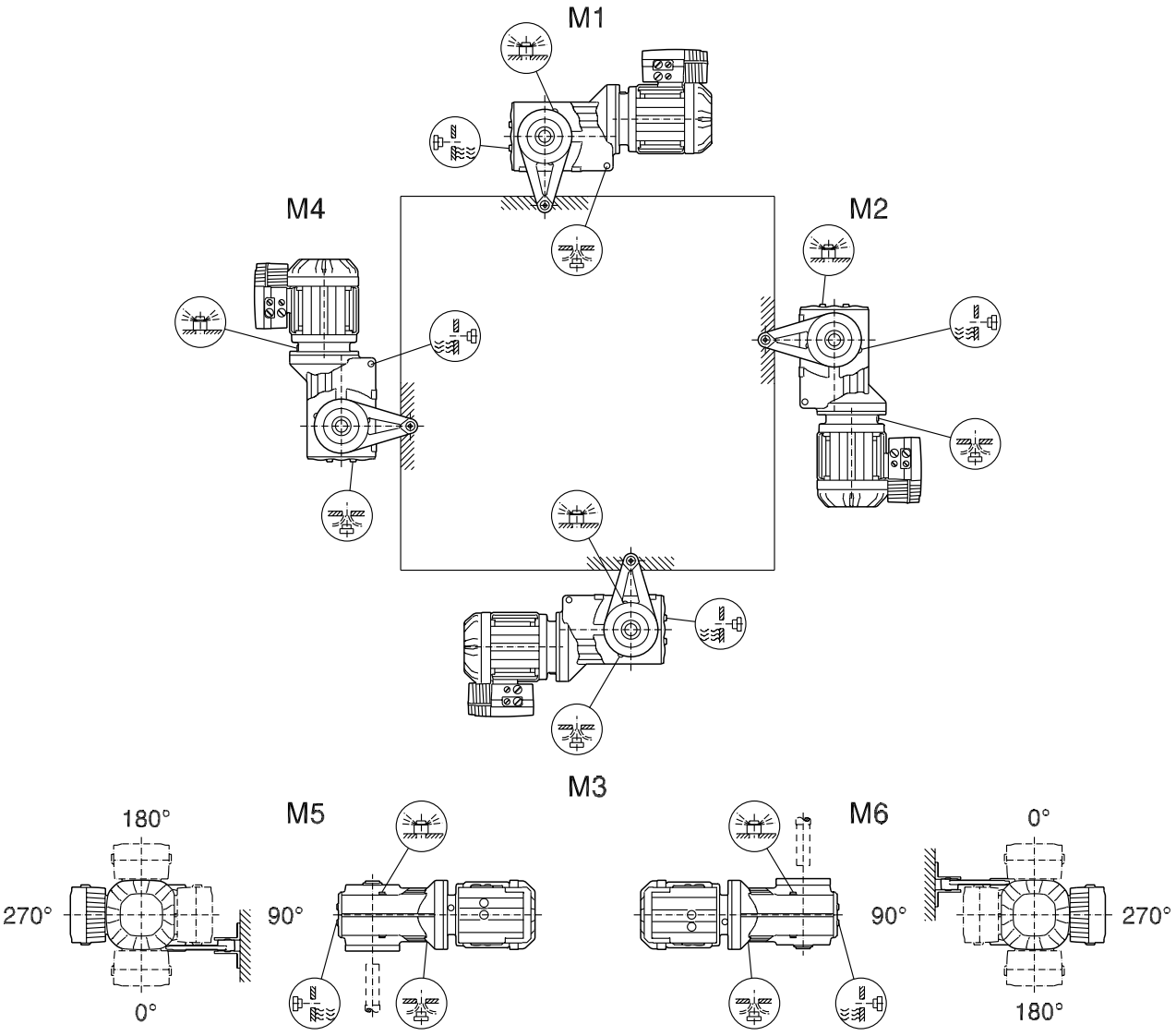


22148205/EN – 09/2016

KA / KT39 – 49

33 266 00 15

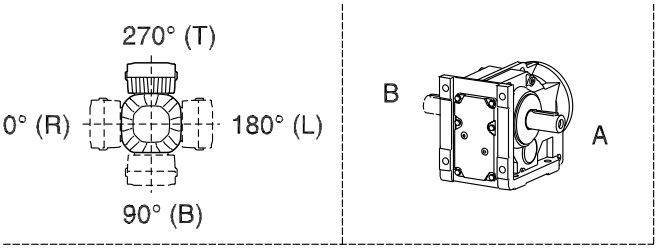


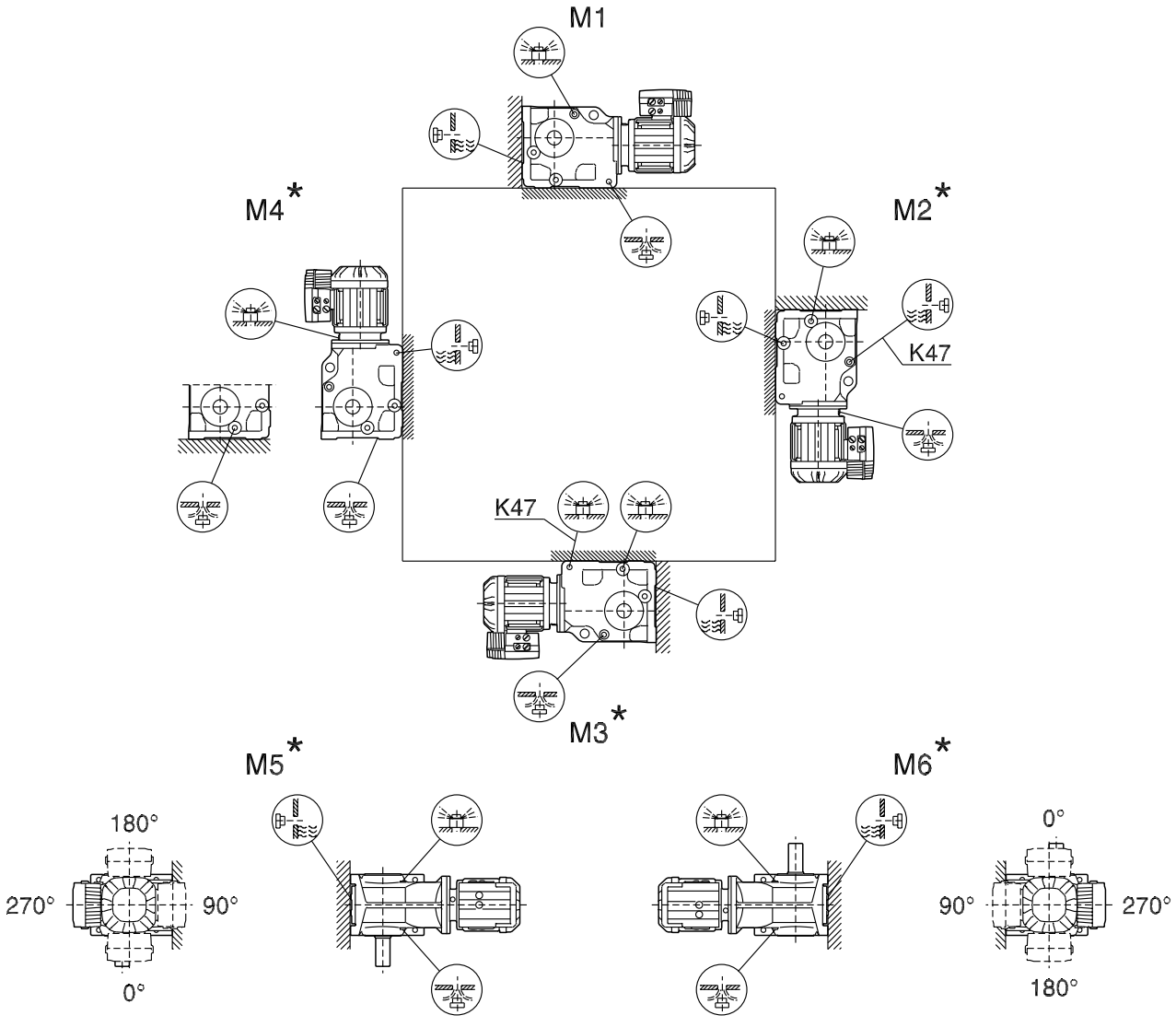


22148205/EN – 09/2016

K / KA..B / KH / KV37B – 107B

33 267 00 15



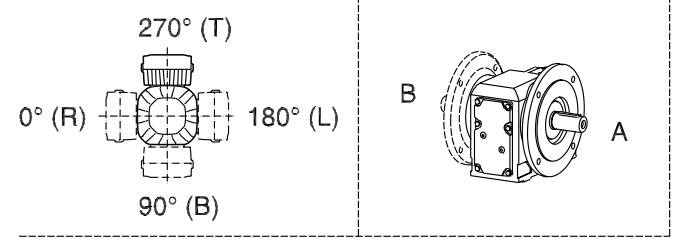


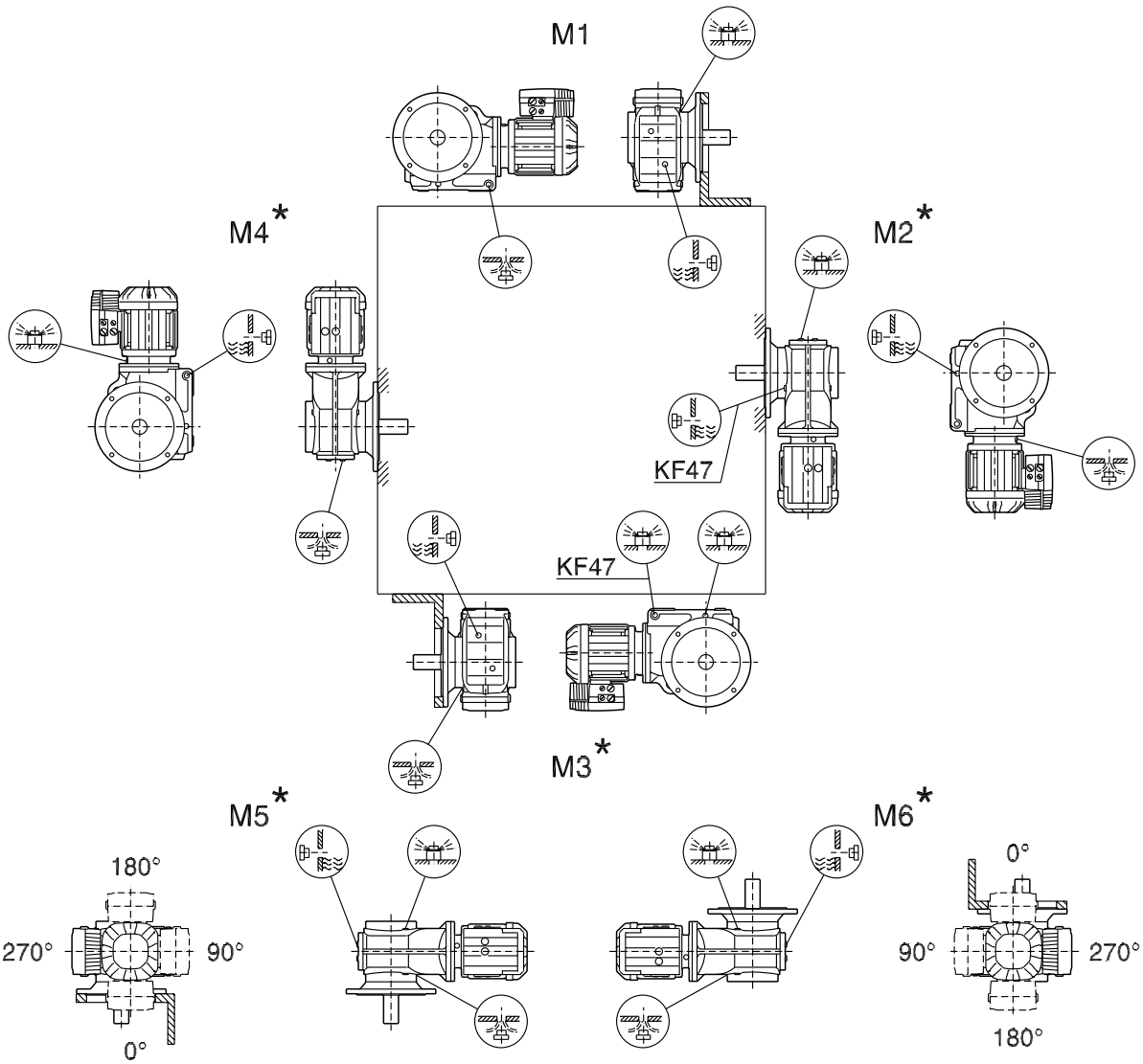
* (→ 🗎 45)

Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

KF / KAF / KHF / KAZ / KHZ / KVF / KVZ37 – 107

33 268 00 15



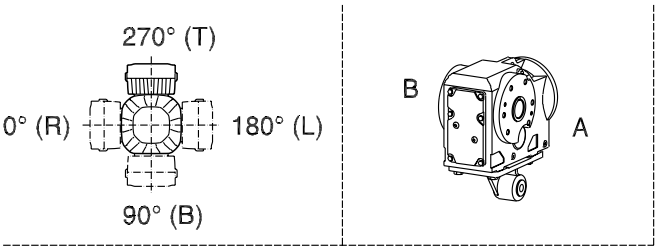


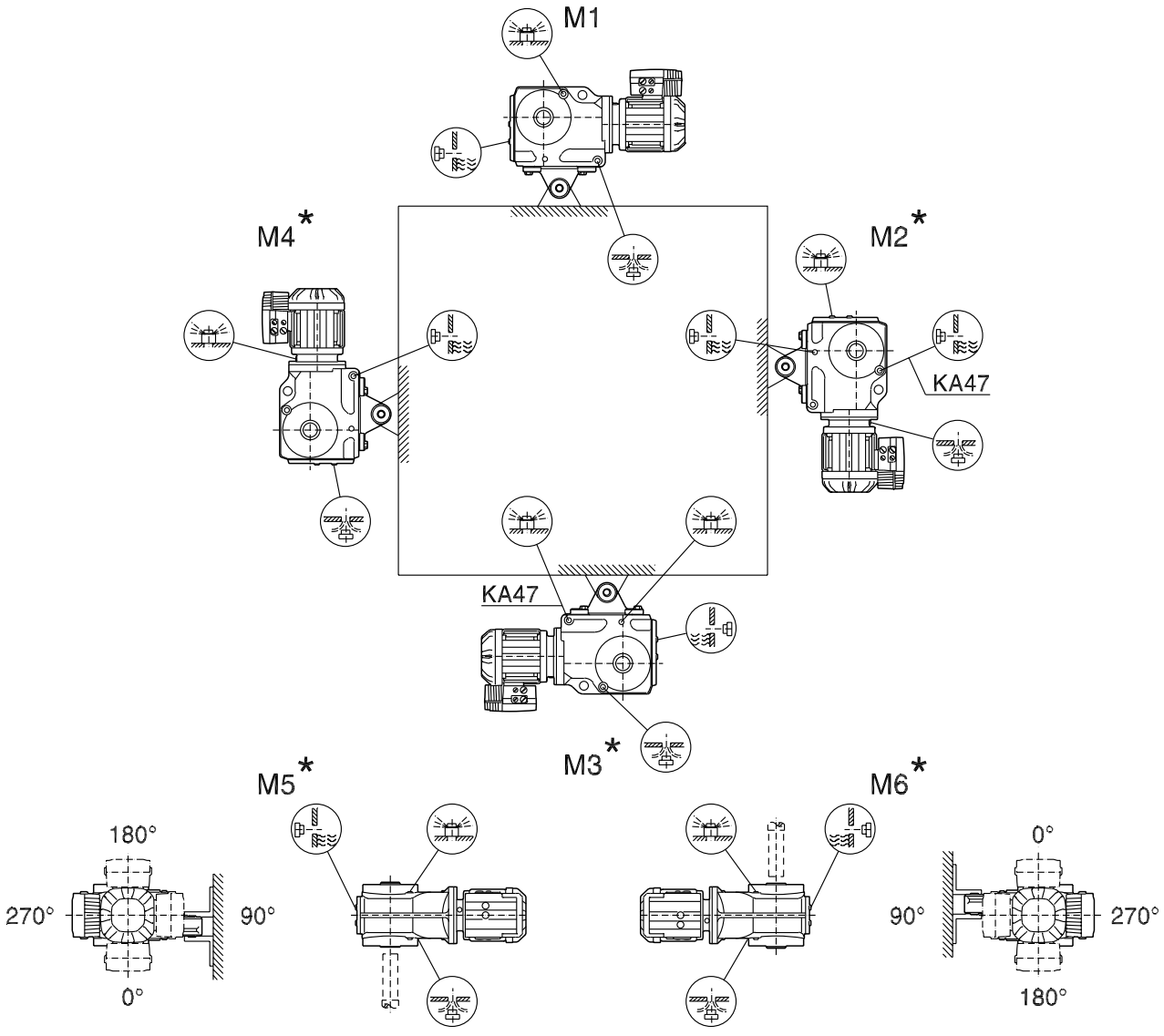
* (→ 🗎 45)

22148205/EN – 09/2016

KA / KH / KV / KT37 – 107

33 269 00 15



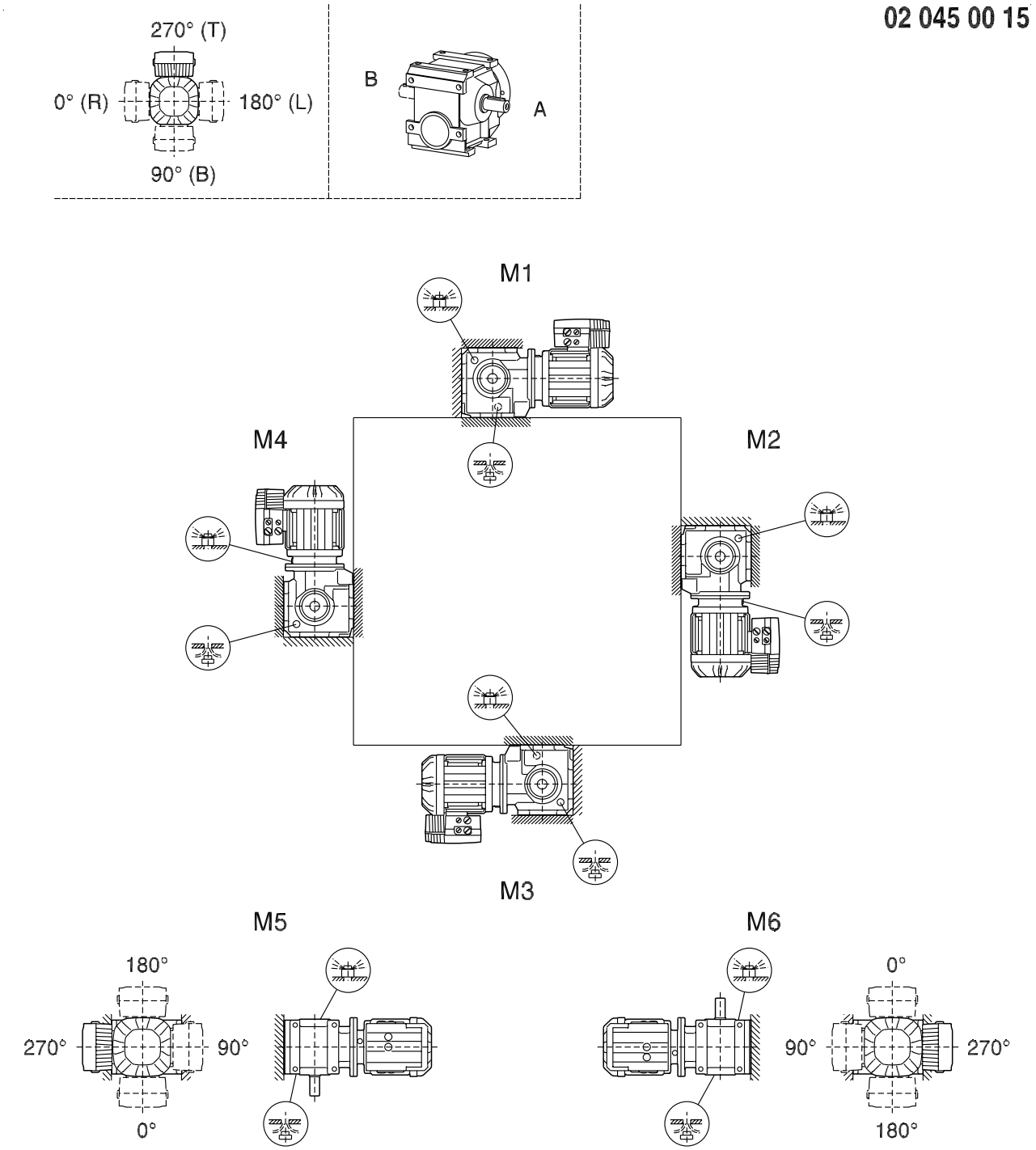


* (→ 🗎 45)

22148205/EN – 09/2016

5.4.4 Mounting positions of helical-worm gearmotors

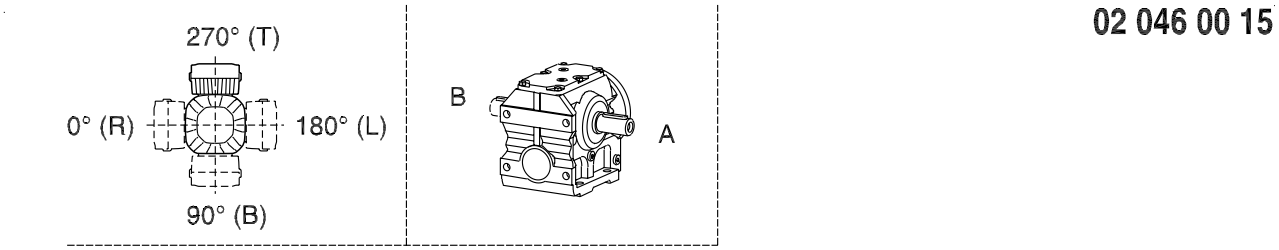
S37

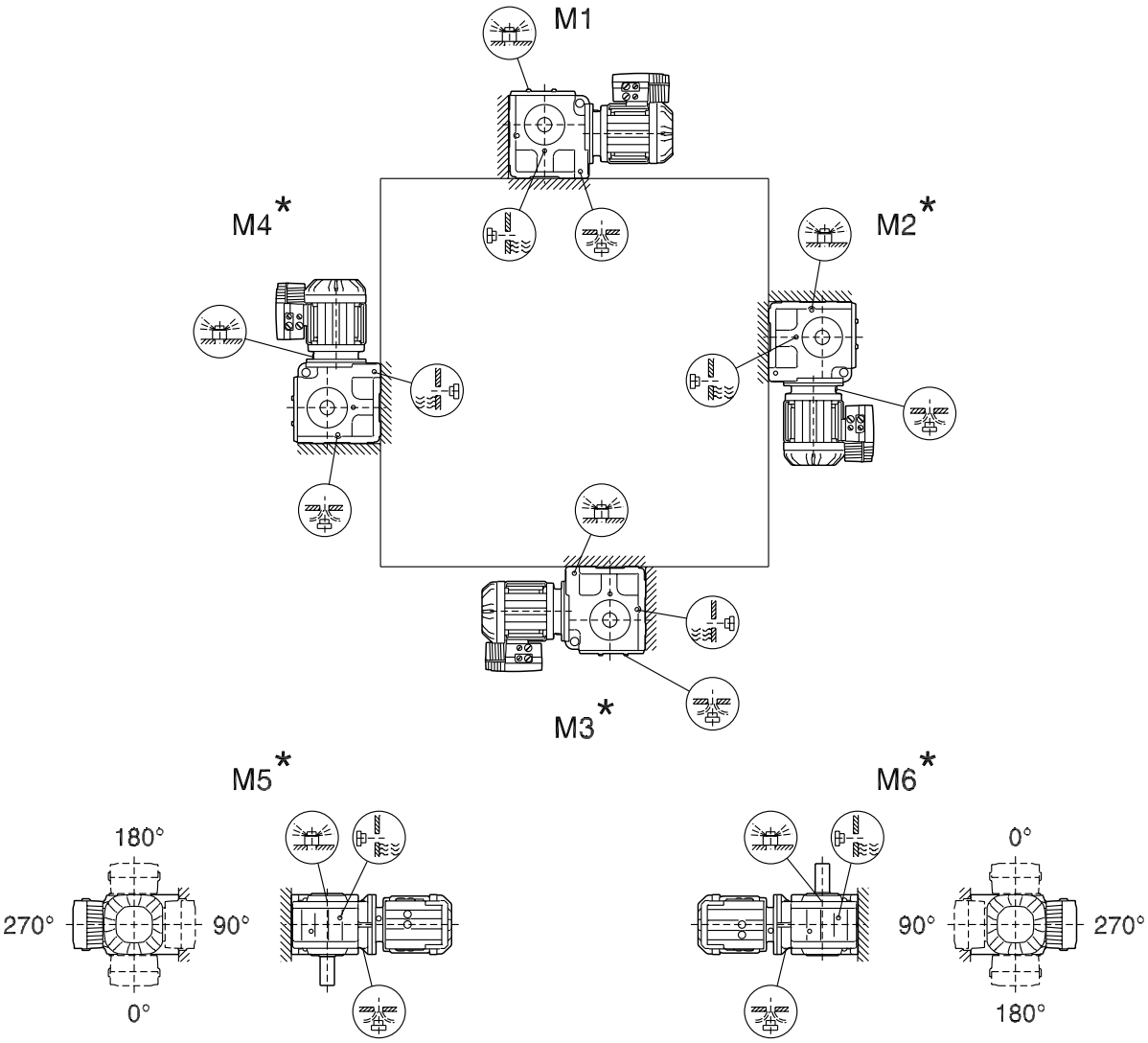


Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

22148205/EN – 09/2016

S47 – S97

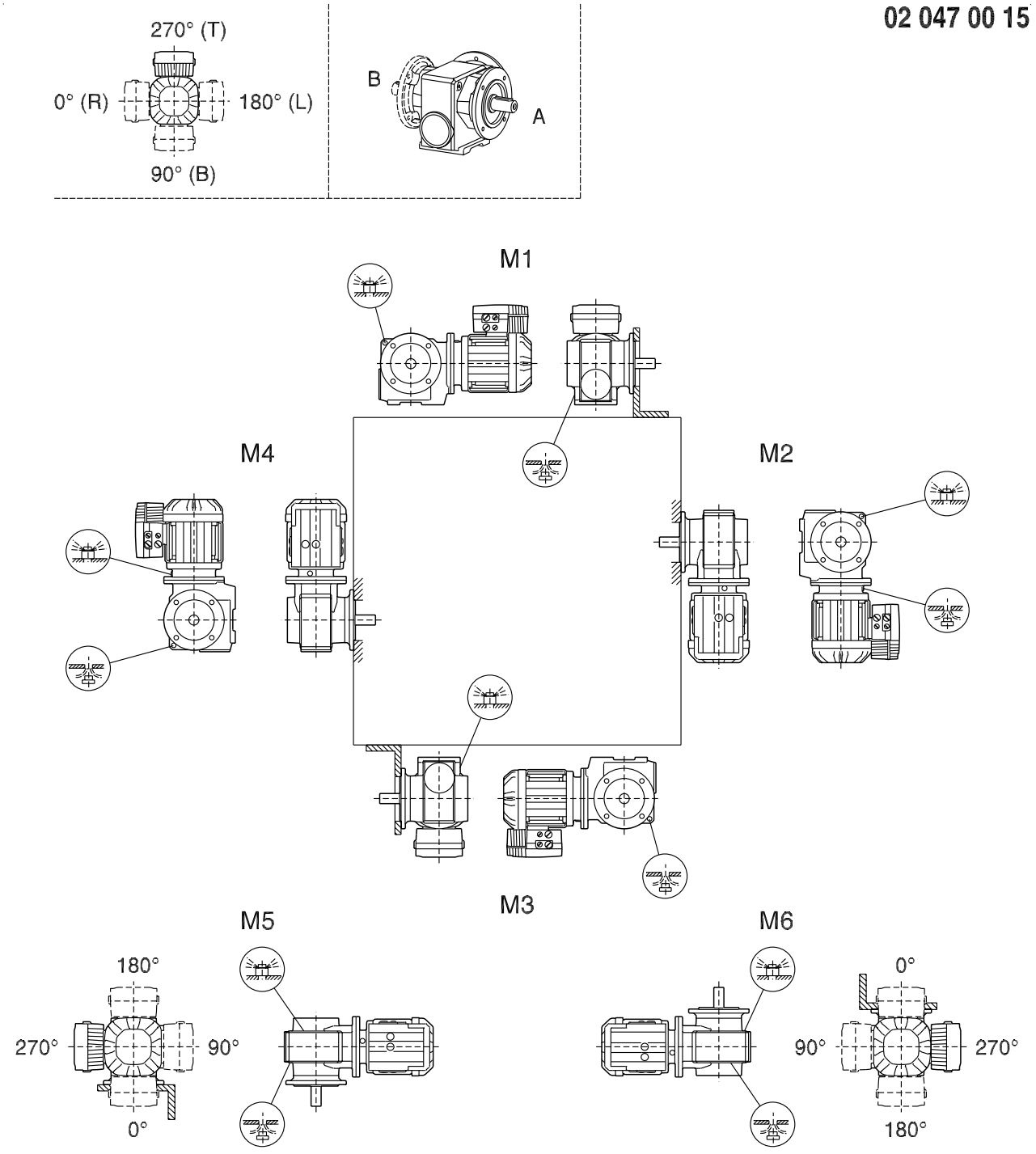




* (→ 🗎 45)

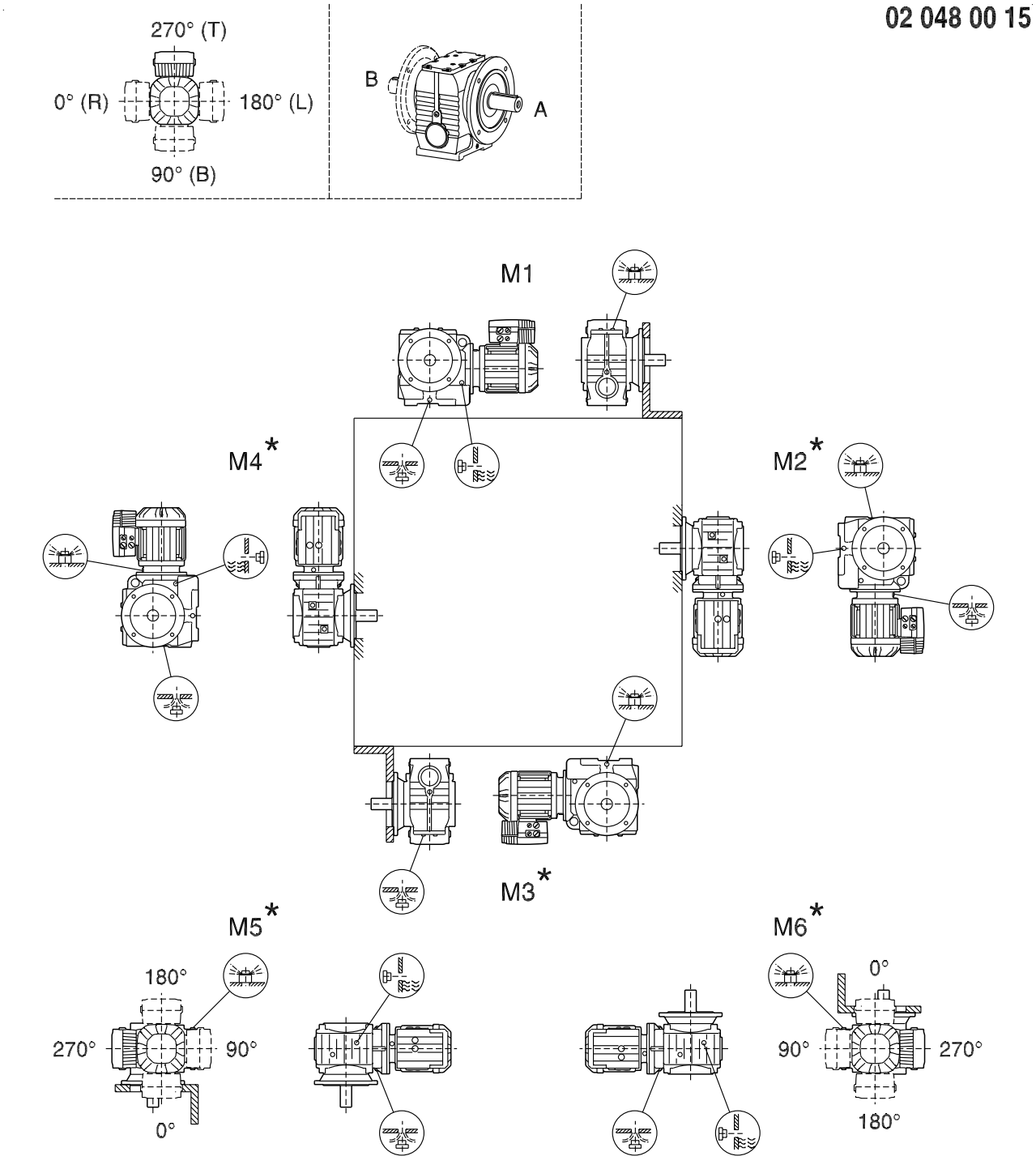
Also refer to the information in chapter "Overhung and axial loads" (→ 🗎 49).

SF / SAF / SHF37



22148205/EN – 09/2016

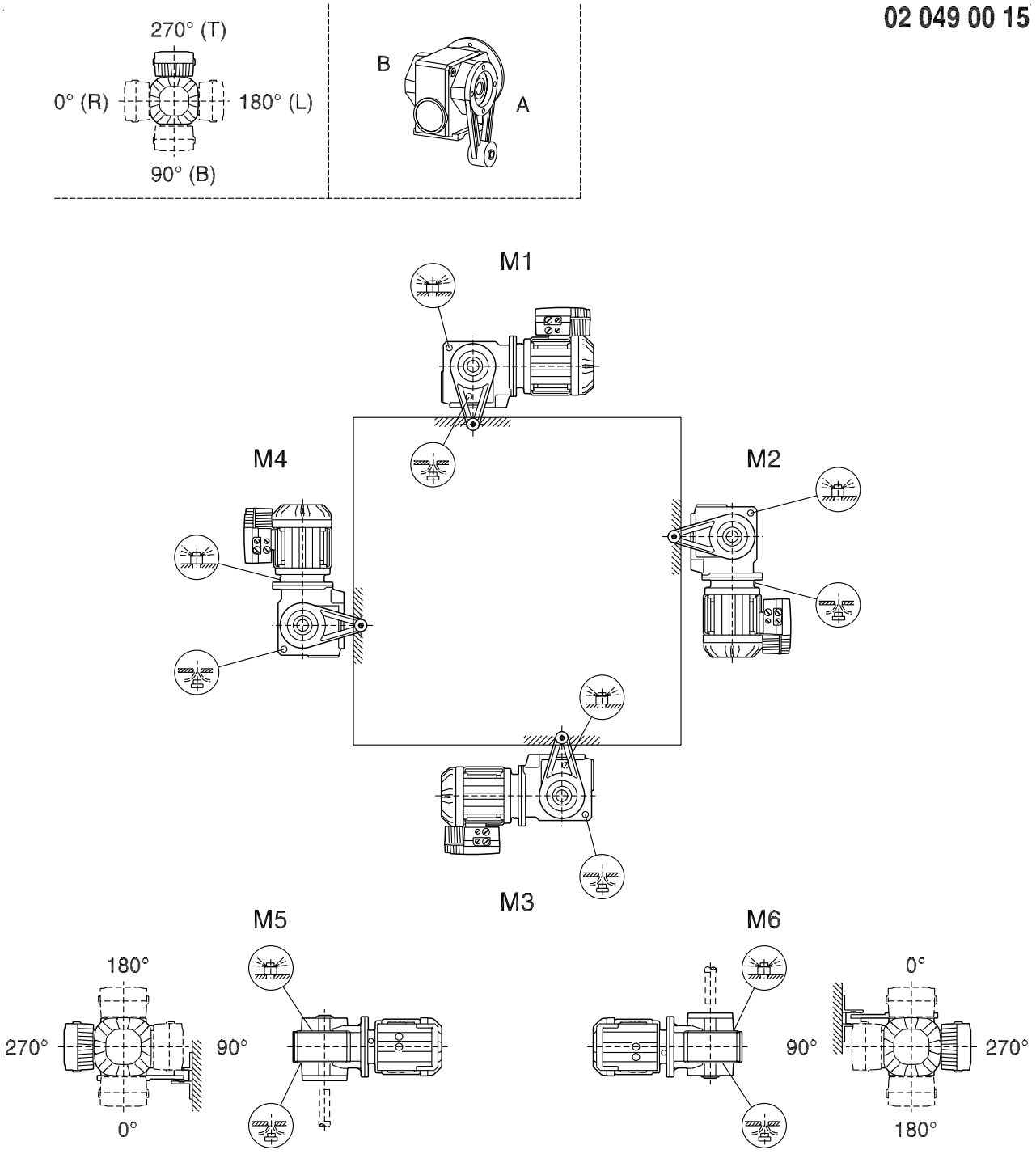
SF / SAF / SHF / SAZ / SHZ47 – 97



* (→ 🗎 45)

22148205/EN – 09/2016

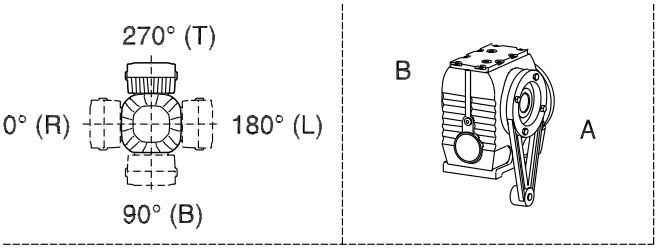
SA / SH / ST37

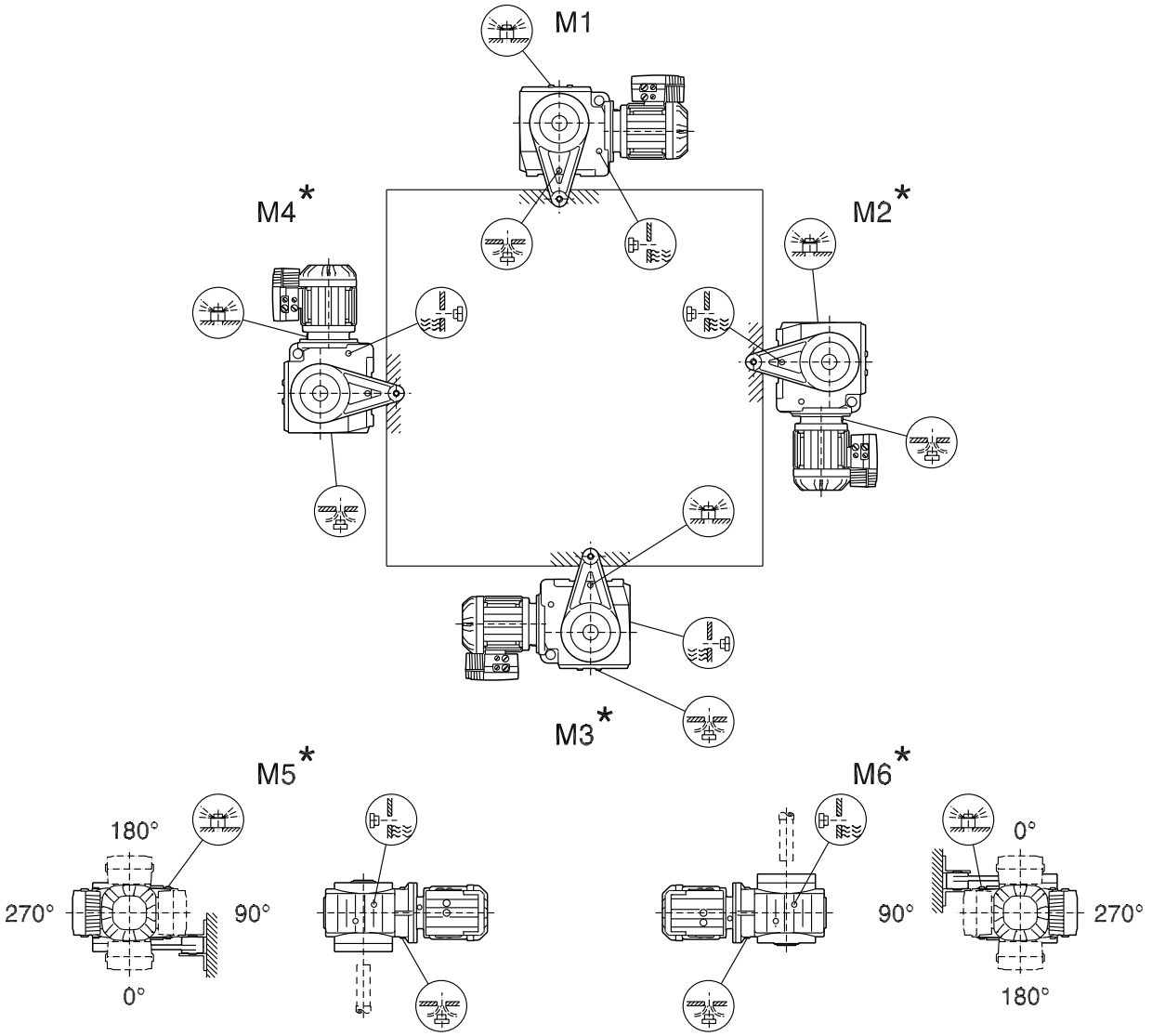


22148205/EN – 09/2016

SA / SH / ST47 – 97

02 050 00 15

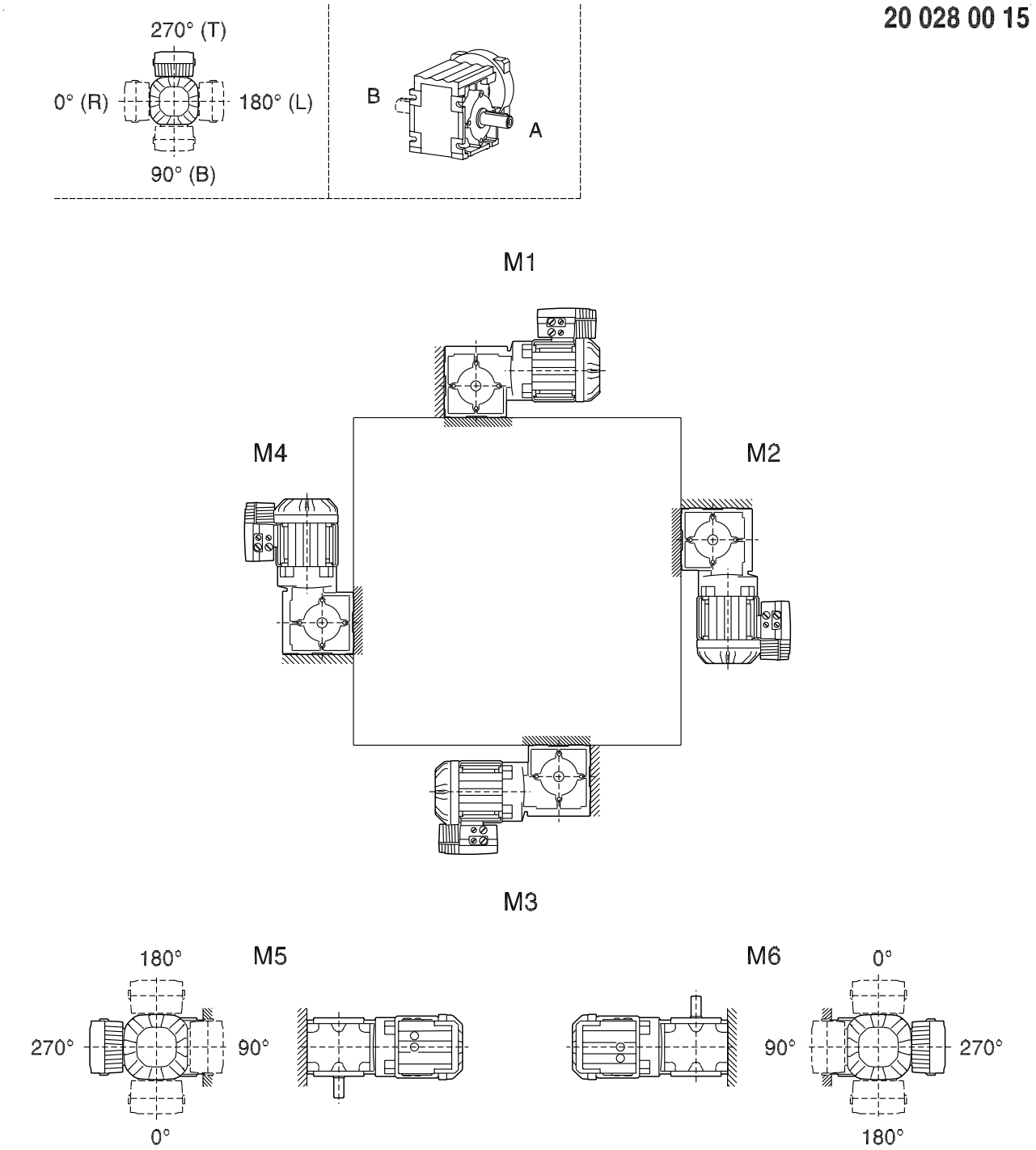




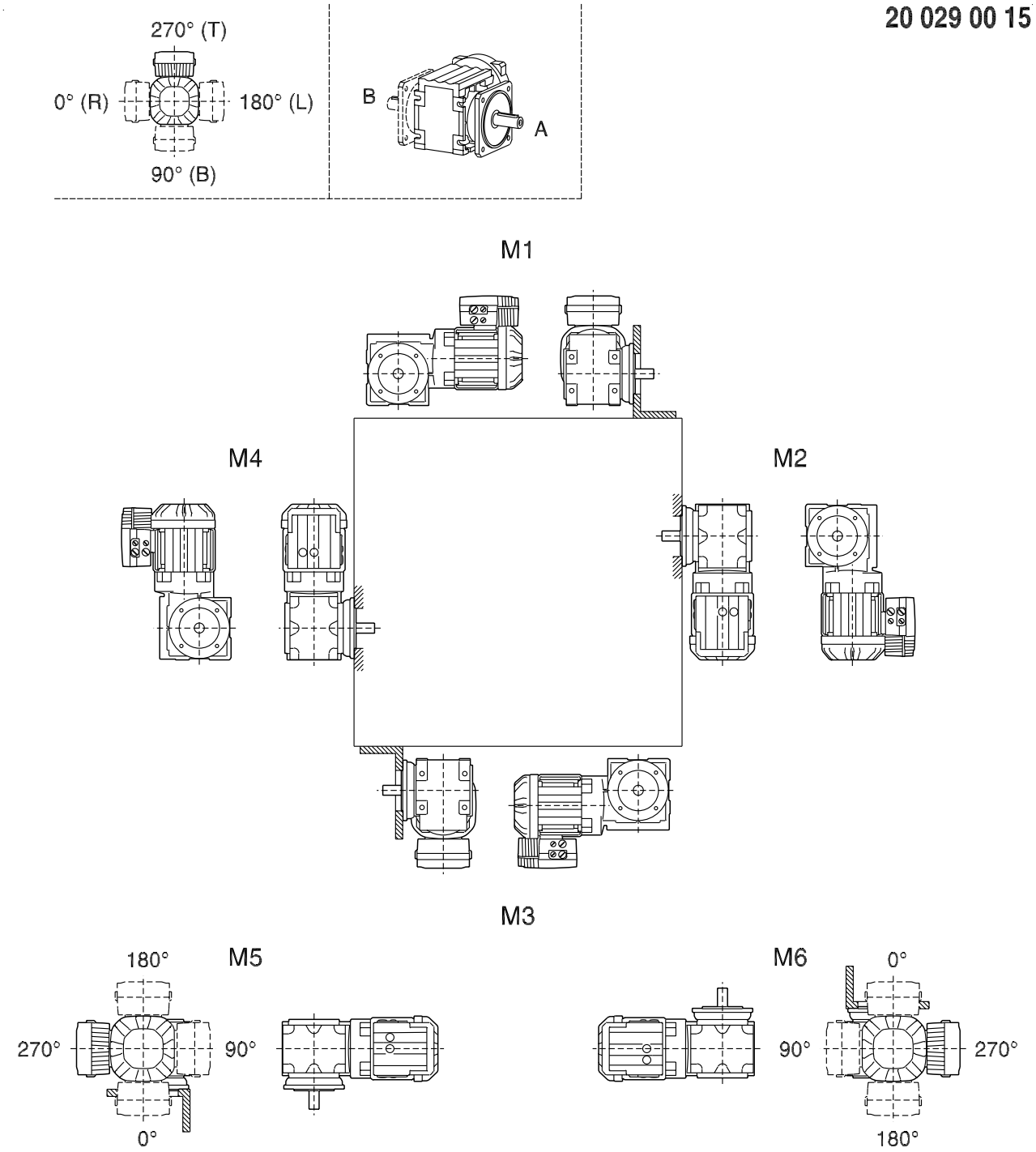
* (→ 🗎 45)

5.4.5 Mounting positions of SPIROPLAN® gearmotors

W10 – 30

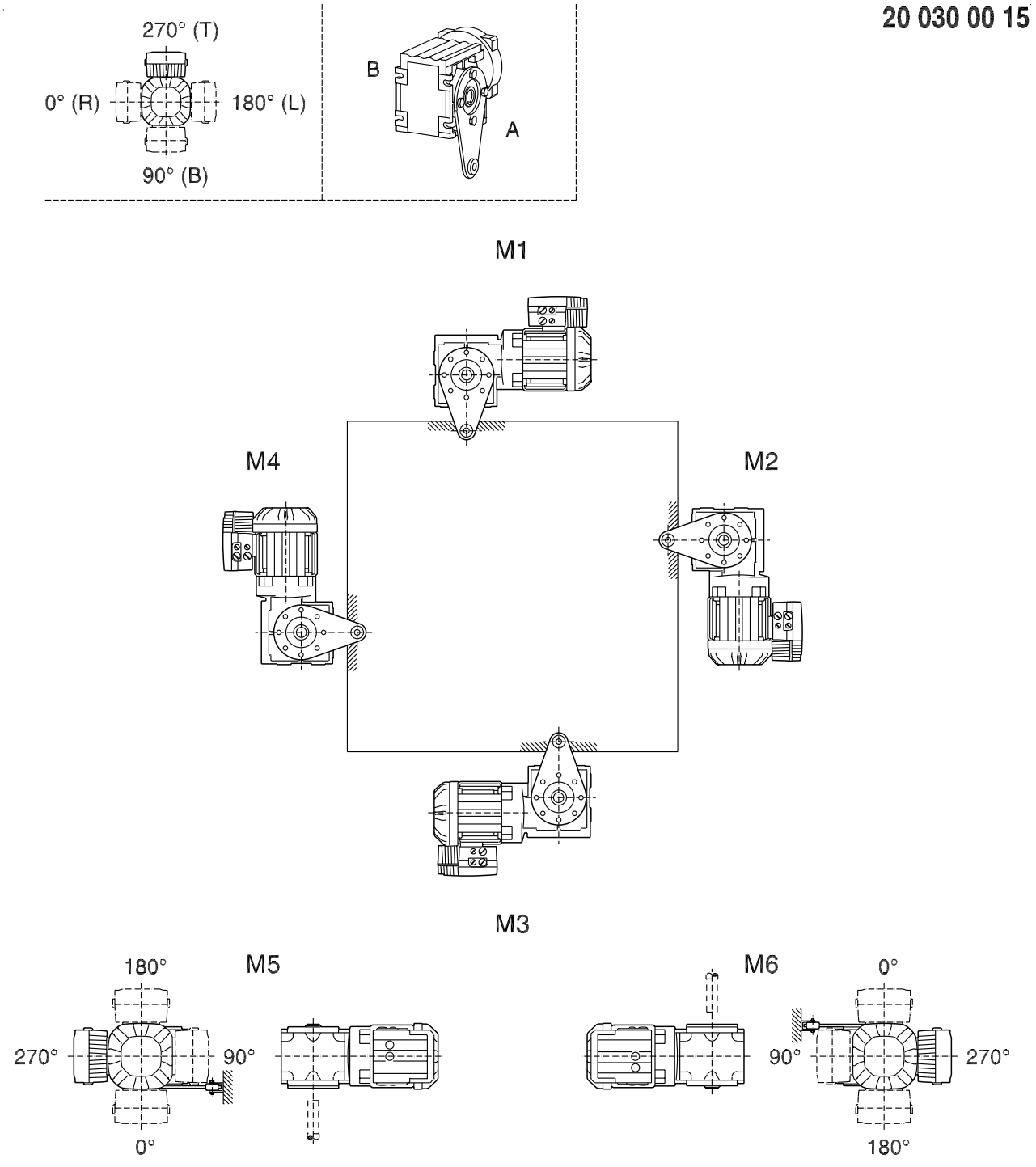


WF10 – 30

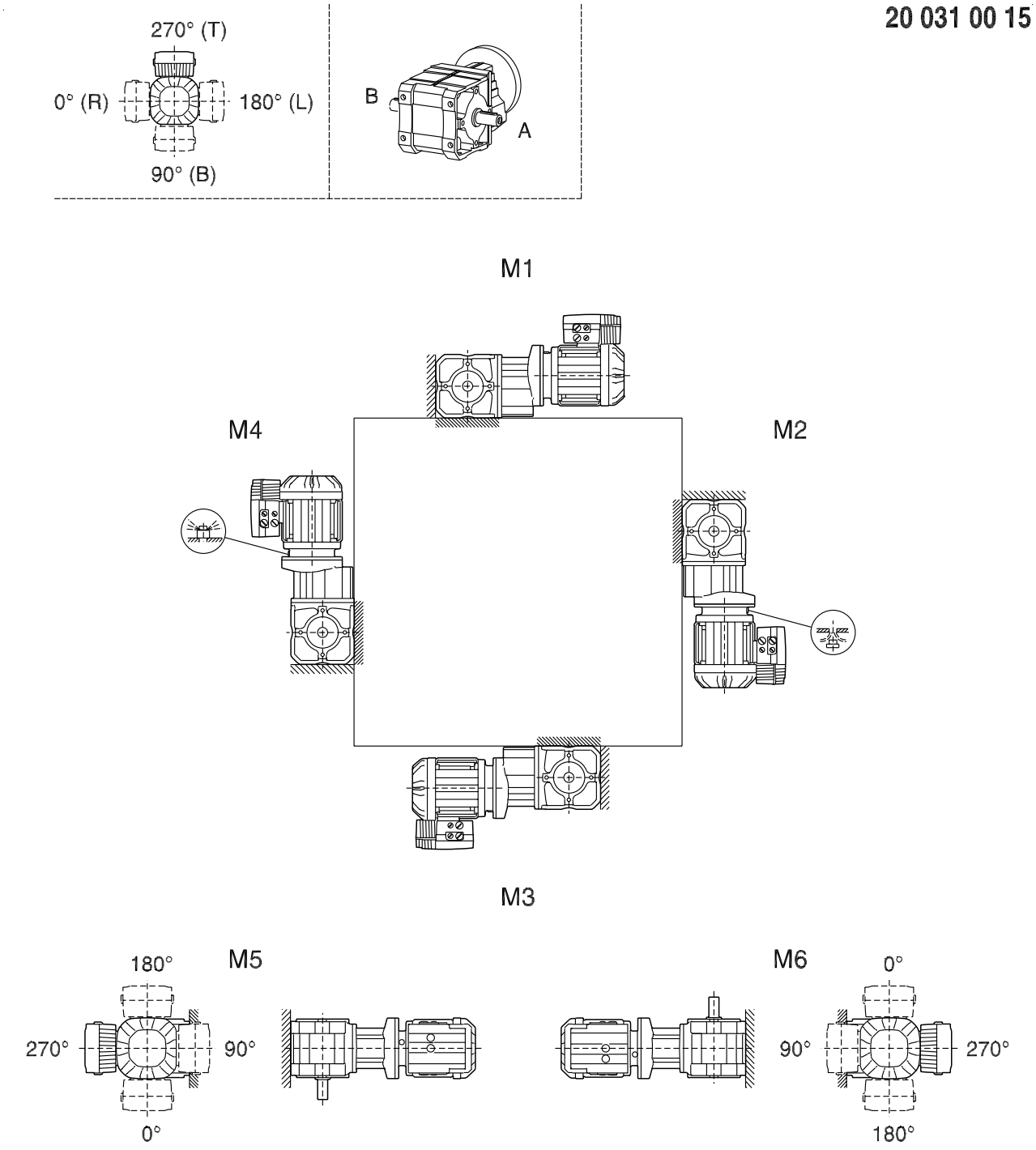


22148205/EN – 09/2016

WA10 – 30

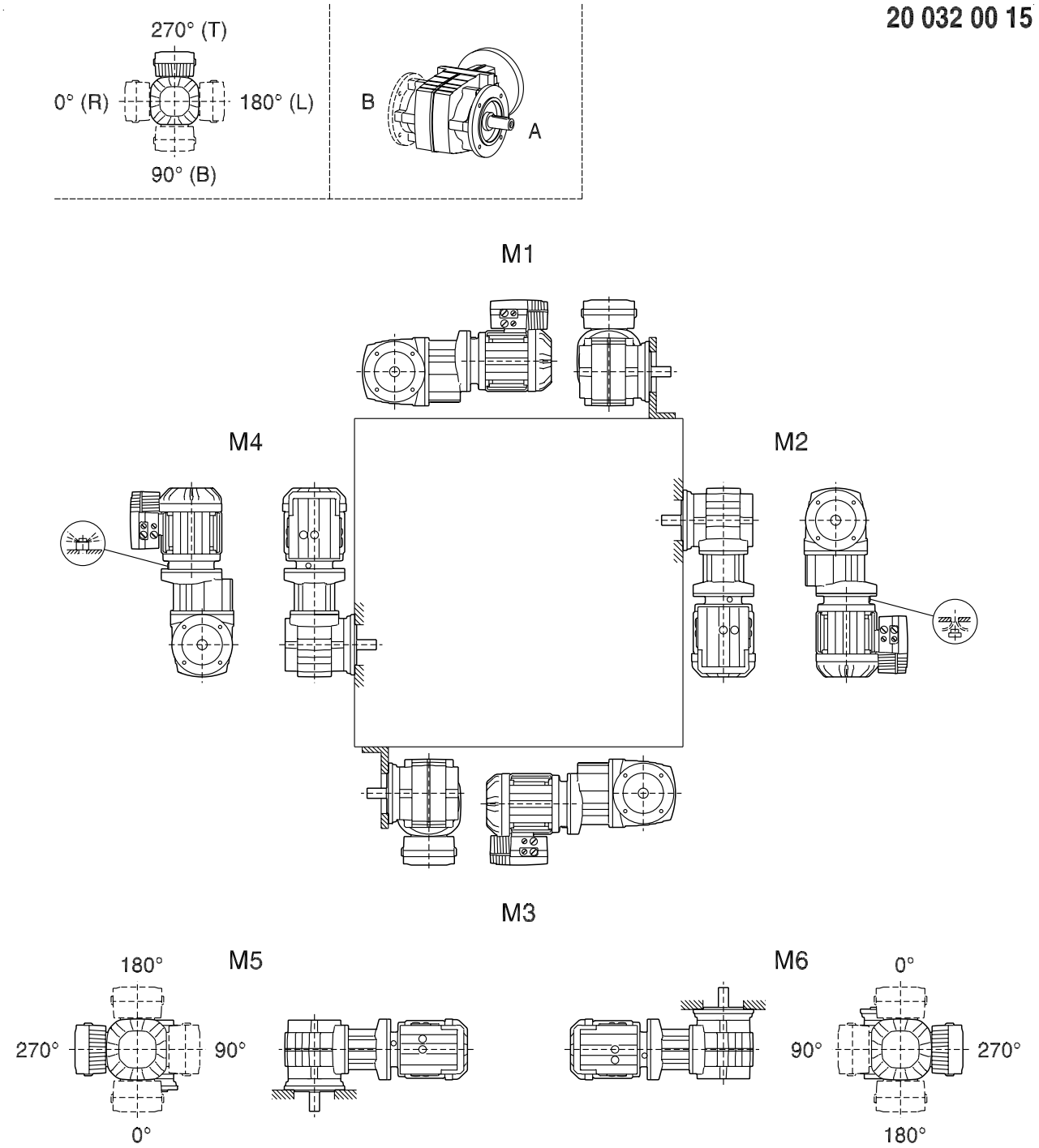

20 030 00 15
270° (T)
0° (R)
180° (L)
90° (B)
B
A
M1
M4
M2
M3
M5
180°
270°
90°
0°
M6
0°
90°
270°
180°

W / WA37 – 47B



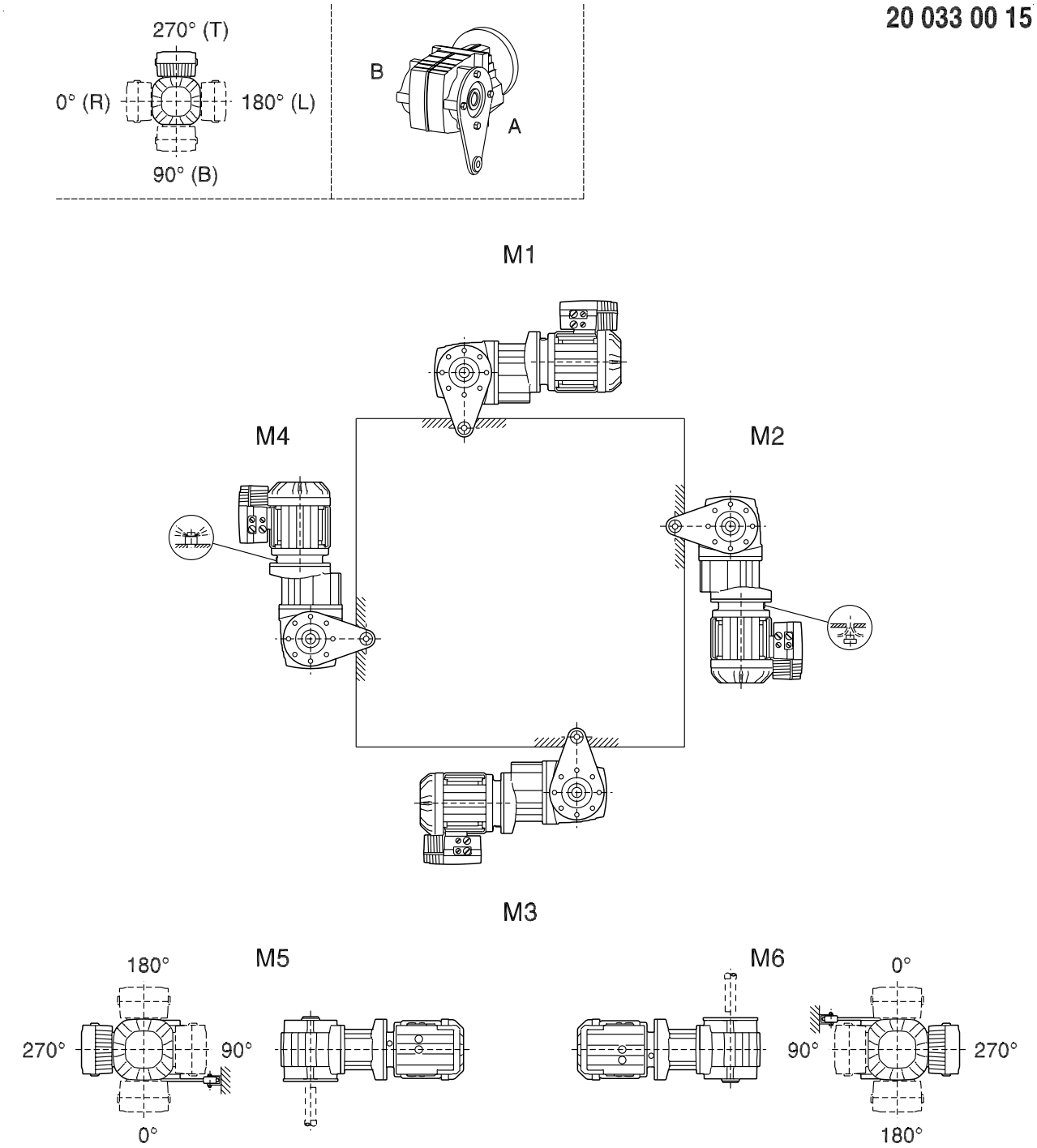
22148205/EN – 09/2016

WF / WAF / WHF37 – 47



22148205/EN – 09/2016

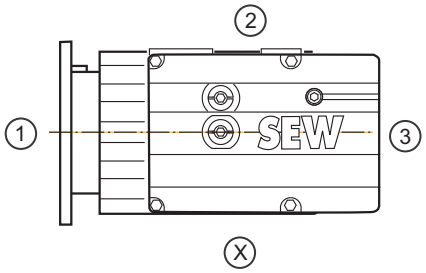
WA / WH / WT37 – 47

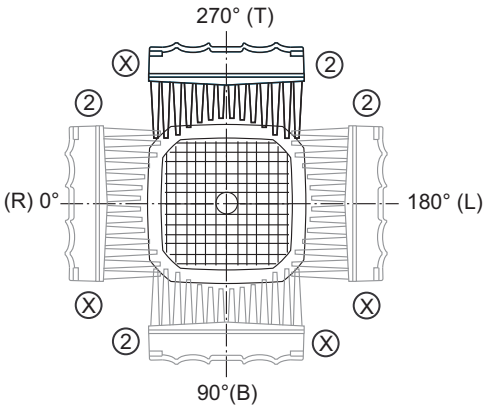


22148205/EN – 09/2016

5.5 Mounting positions of AC motors

5.5.1 Position of connection box and cable entry





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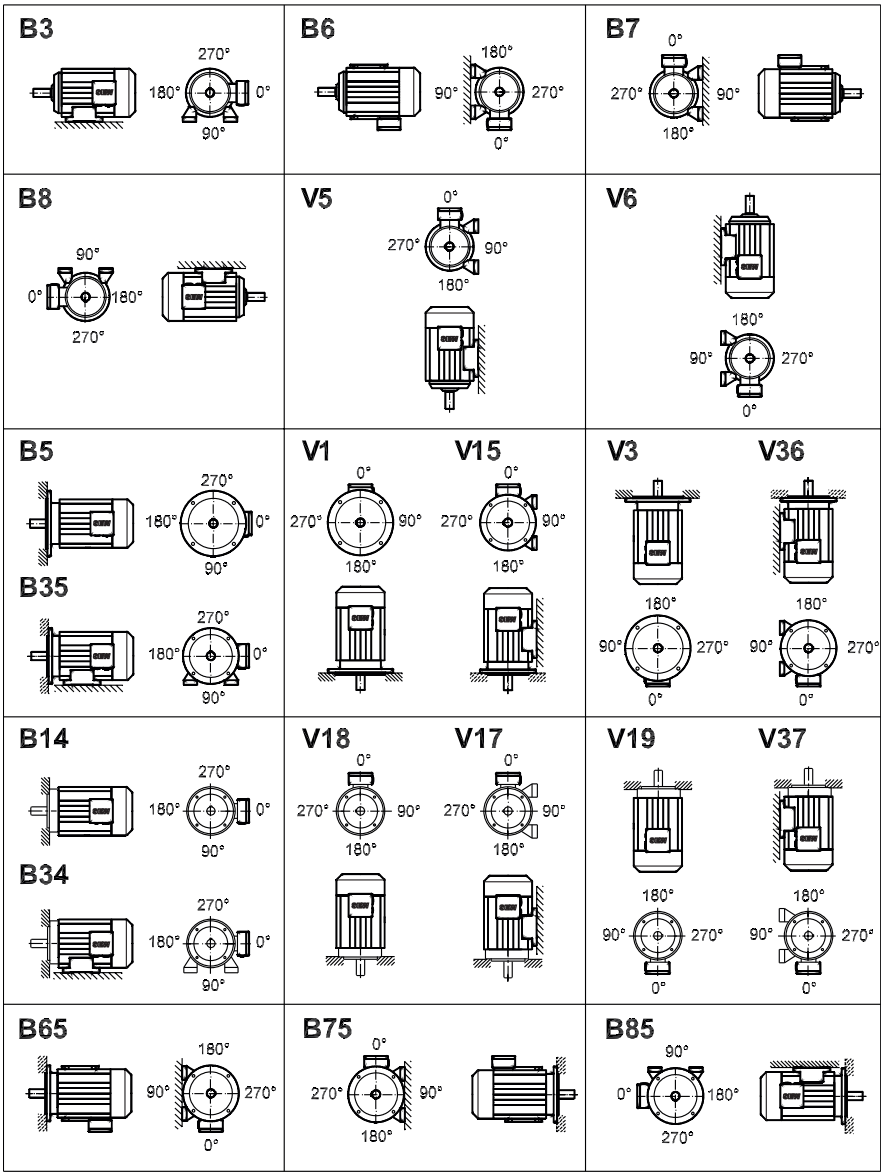
5.5.2 Mounting positions



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6 Design and operating notes

6.1 Lubricants

6.1.1 Bearing greases

The gear unit rolling bearings are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends re-greasing the rolling bearings with a grease filling at the same time as changing the oil.

	Ambient temperature	Manufac-turer	Type
Gear unit rolling bearings	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15[1)]
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
	-40 °C to +40 °C	Bremer & Leguil	Cassida Grease GTS 2
	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil

INFORMATION

The following grease quantities are required:

- **For fast-running bearings (gear unit input side):** Fill the cavities between the rolling elements one-third full with grease.
- **For slow-running bearings (gear unit output end):** Fill the cavities between the rolling elements two-thirds full with grease.

22148205/EN – 09/2016

6.1.2 Lubricant table

NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Note the following information.

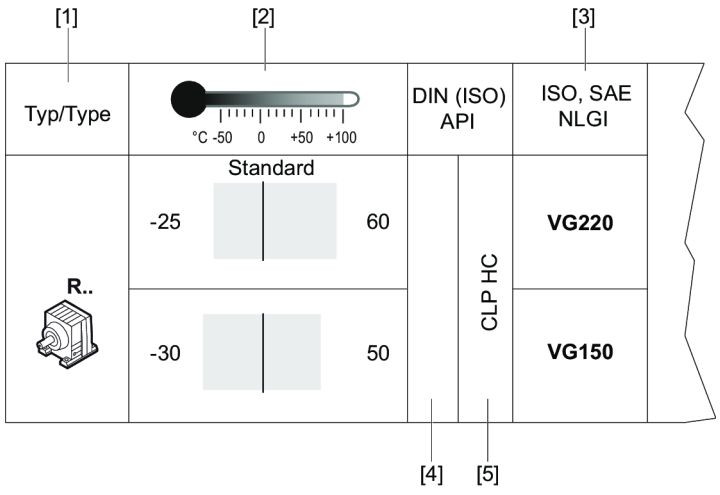
- The oil viscosity and type (mineral/synthetic) that are to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate.

  If you use other lubricants for the gear units and/or use the lubricants at temperatures outside the recommended temperature range, SEW-EURODRIVE does not assume liability.

  The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of their product.
- Do not mix synthetic lubricants.
- Do not mix synthetic and mineral lubricants.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimally and maximally permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

  www.sew-eurodrive.de/lubricants

Information on table structure



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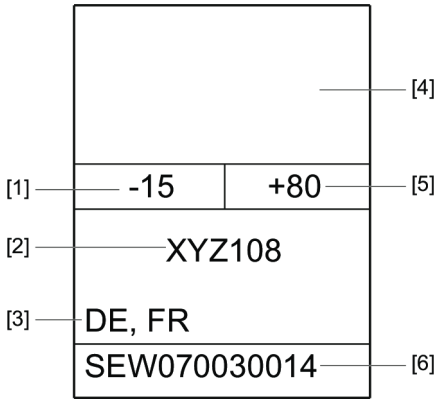
[1] Gear unit type
[2] Ambient temperature
[3] Viscosity class
[4] Note on special approvals
[5] Lubricant type

Information on the various lubricants



18017517707

[1] Lowest oil sump temperature, **Temperatures below this value are not permitted**
[2] Trade name
[3] Factory filling for these countries
[4] Manufacturer
[5] Highest oil sump temperature, **Temperatures above this value are not permitted**
[6] Approvals regarding compatibility of the lubricant with approved oil seals

Lubricant compatibility with oil seal

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.

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

Material class			Manufacturer		Material		Approved oil sump temperature
S	1	NBR	1	Freudenberg		72 NBR 902	-40 °C to +80 °C
			2	Trelleborg		4NV11	
	2	FKM	1	Freudenberg	1	75 FKM 585	-25 °C to +115 °C
					2	75 FKM 170055	
			2	Trelleborg	1	VCBVR	

Examples:

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

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

22148205/EN – 09/2016

Key

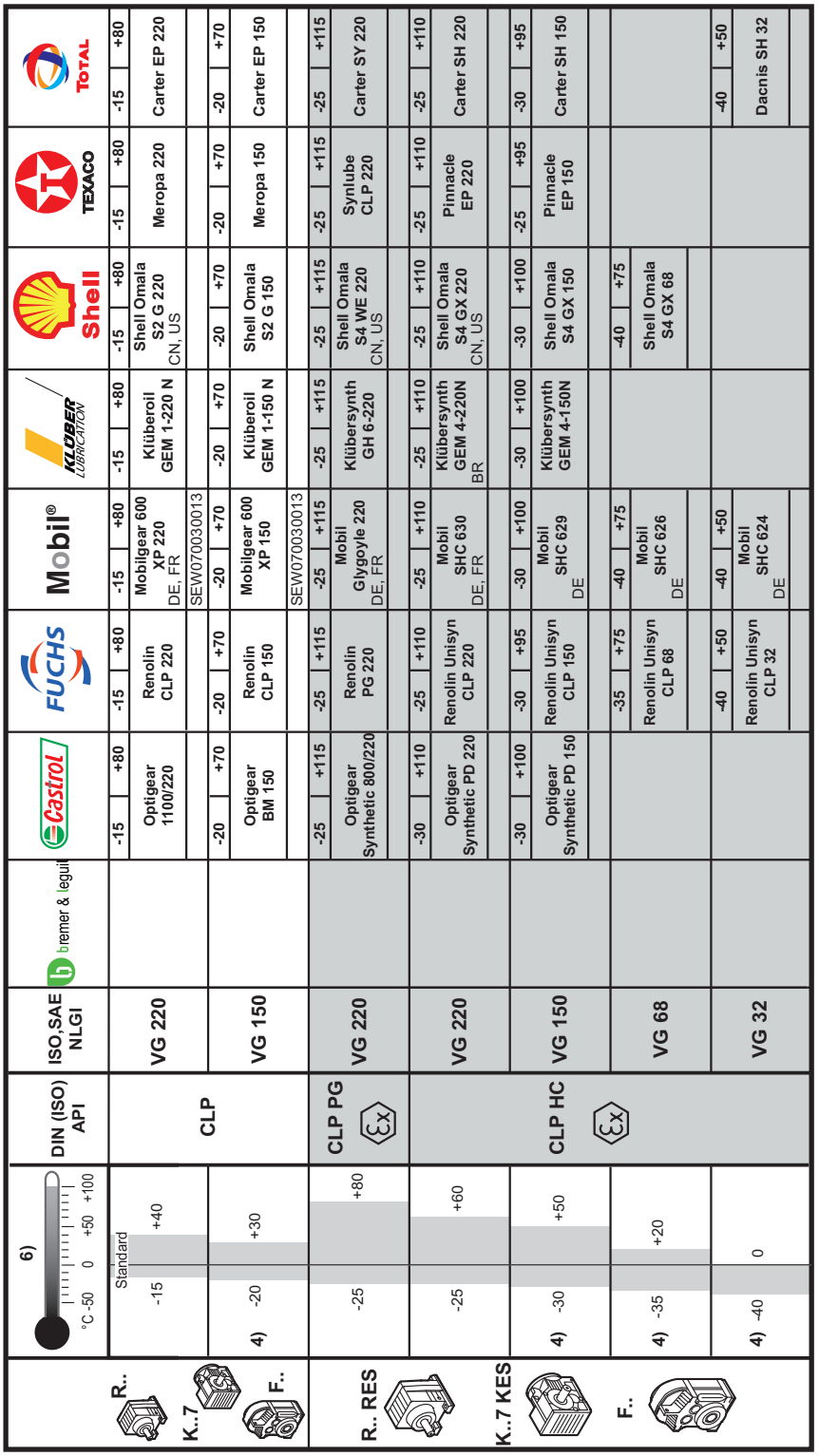
The following table shows the abbreviations and icons used in the lubricant table and explains what they mean:

Abbreviation/ icon	Meaning
	Synthetic lubricant (marked gray)
	Mineral lubricant
CLP	Mineral oil
CLP PG	Polyglycol
CLP HC	Synthetic hydrocarbons – polyalphaolefin (PAO)
E	Ester-based oil
HLP	Hydraulic oil
	Lubricant for the food processing industry – NSF-H1-compliant
	Easily biodegradable oil for environmentally sensitive areas (agriculture, forestry, water management)
	Lubricant for explosion-proof gear units
1)	Helical-worm gear units with CLP-PG: Contact SEW-EURODRIVE.
2)	Special lubricant only for SPIROPLAN® gear units
3)	SEW-fB ≥ 1.2 required
4)	Observe the critical starting behavior at low temperatures
5)	Low-viscosity grease
6)	The specified ambient temperature are guide values for preselection of a suitable lubricant. The exact upper and lower temperature limits for project planning are specified in the table with the respective trade name.
Oil seal	Oil seal

22148205/EN – 09/2016

Lubricant table for R.., F.., and K.7 gear units

The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.



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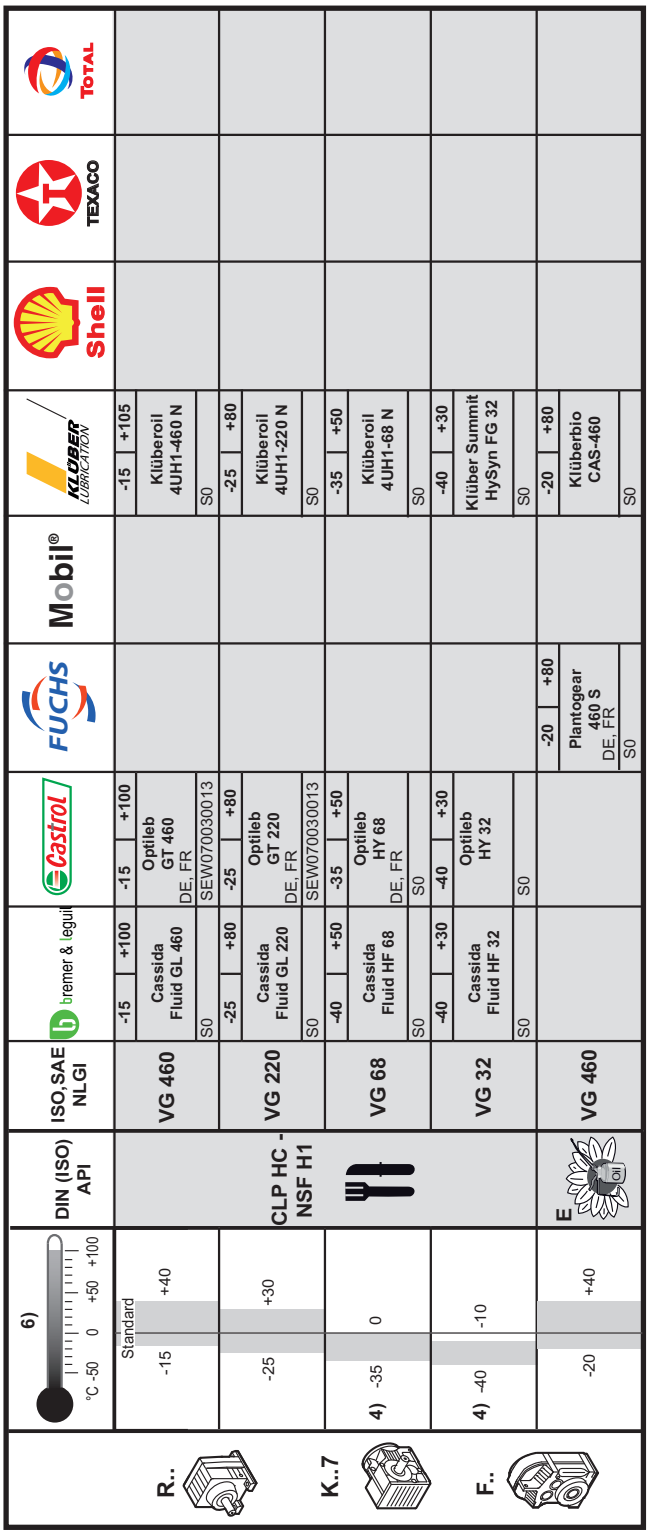
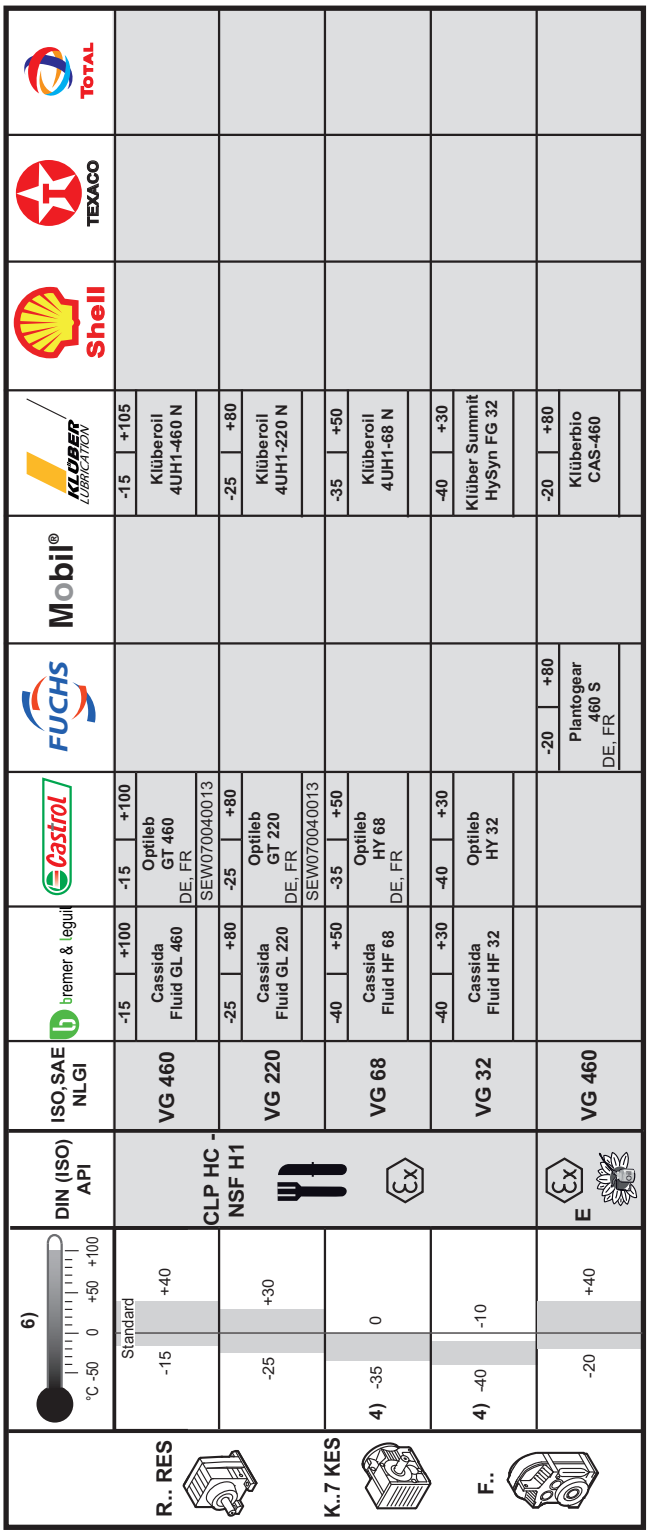
Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🖹 102).



9007217630584331

Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🗎 102).



9007217630587019

Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🗎 102).

Lubricant table for K.9 gear units

The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

K.9	6)	DIN (ISO) API	ISO,SAE NLGI	bremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL
	Standard -20 +60	CLP PG	VG 460					-20 +95 Klübersynth GH 6-460 DE			
	-15 +80		VG 680					-15 +115 Klübersynth GH 6-680 DE			
	-25 +40		VG 220					-25 +70 Klübersynth GH 6-220 DE			
	4) -30 +30		VG 150					-30 +60 Klübersynth GH 6-150 DE			
	Standard -20 +60	CLP HC - NSF H1	VG 460					-20 +95 Klübersynth UH1 6-460 DE			
	-15 +80		VG 680					-15 +115 Klübersynth UH1 6-680 DE			
	-25 +40		VG 220					-25 +70 Klübersynth UH1 6-220 DE			
	4) -30 +30		VG 150					-30 +60 Klübersynth UH1 6-150 DE			

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Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🖹 102).

Lubricant table for S.. gear units

The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

S.. (HS...)	6)	DIN (ISO) API	ISO,SAE NLGI	bremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL
					0 | +80	0 | +80	0 | +80	0 | +80	0 | +80	0 | +80
	Standard 0 +40	CLP	VG 680		Optigear BM 680	Renolin SEW 680 DE, FR	Mobilgear 600 XP 680	Klüberoil GEM 1-680 N	Shell Omala S2 G 680 US	Meropa 680	Carter EP 680
					S0		SEW070030013				
	4) -20 +25		VG 150		-20 | +65 Optigear BM 150	-20 | +65 Renolin CLP 150	-20 | +65 Mobilgear 600 XP 150 DE, FR	-20 | +65 Klüberoil GEM 1-150 N	-20 | +65 Shell Omala S2 G 150	-20 | +65 Meropa 150	-20 | +65 Carter EP 150
					SEW070030013		SEW070030013				
	1) -15 +80	CLP PG	VG 680		-15 | +115 Optigear Synthetic 800/600	-15 | +115 Renolin PG 680	-15 | +115 Mobil Glygoyle 680	-15 | +115 Klübersynth GH 6-680	-15 | +115 Shell Omala S4 WE 680	-20 | +115 Synlube CLP 680	
	1) -25 +40		VG 220		-25 | +90 Optigear Synthetic 800/220	-25 | +95 Renolin PG 220	-25 | +100 Mobil Glygoyle 220 DE, FR	-25 | +100 Klübersynth GH 6-220	-25 | +90 Shell Omala S4 WE 220	-25 | +90 Synlube CLP 220	-25 | +90 Carter SY 220
	-15 +60		VG 460		-20 | +110 Optigear Synthetic PD 460	-15 | +100 Renolin Unisyn CLP 460	-20 | +105 Mobil SHC 634	-15 | +105 Klübersynth GEM 4-460 N	-15 | +105 Shell Omala S4 GX 460	-15 | +105 Pinnacle EP 460	-15 | +105 Carter SH 460
	4) -30 +30	CLP HC	VG 150		-30 | +75 Optigear Synthetic PD 150	-30 | +70 Renolin Unisyn CLP 150	-30 | +75 Mobil SHC 629	-30 | +70 Klübersynth GEM 4-150 N	-30 | +75 Shell Omala S4 GX 150	-30 | +70 Pinnacle EP 150	-30 | +70 Carter SH 150
	4) -35 +20		VG 68			-35 | +50 Renolin Unisyn CLP 68	-35 | +55 Mobil SHC 626 DE		-40 | +50 Shell Omala S4 GX 68		
	4) -40 0		VG 32			-40 | +30 Renolin Unisyn OL 32	-40 | +30 Mobil SHC 624 DE				-40 | +30 Dacnis SH 32

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Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🖹 102).

22148205/EN – 09/2016

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Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🗎 102).

Lubricant table for W.. gear units

The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

W.. (HW..)	6) °C -50 0 +50 +100	DIN (ISO) API	ISO,SAE NLGI	bremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL
	Standard +40 -20 2)	SEW PG Ex	VG 460					-20 | +80 Klüber SEW FR HT-460-5 S1			
	+60 -20 3)	H1 PG Ex	VG 460					-20 | +115 Klübersynth UH1 6-460			
	+10 -40 4)	API GL5 Ex	SAE 75W90 (~VG 100)				-40 | +65 Mobil Synth Gear FR Oil 75 W90				

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Observe the thermal limit of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🗎 102).

6.1.3 Lubricant fill quantities

INFORMATION

The specified fill quantities are **guide values**. The precise values vary depending on the number of stages and gear ratio. Check the **oil level plug for the exact oil quantity**.

INFORMATION

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific mounting position. The decisive factor is the mounting position (see chapter "Gear unit mounting positions") specified when ordering the drive.

When the mounting position is changed, the lubricant fill quantity must be adapted accordingly (see the following chapters). Consequently, a **mounting position** may only be **changed** after consultation with SEW-EURODRIVE, otherwise your **rights to claim under limited warranty no longer apply**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 – M6.

22148205/EN – 09/2016

Helical (R) gear units

R.., R..F

Gear unit	Fill quantity in liters					
	M1[1)]	M2	M3	M4	M5	M6
R07	0.12	0.20				
R17	0.25	0.55	0.35	0.55	0.35	0.40
R27	0.25/0.40	0.70	0.50	0.70	0.50	
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	
R57	0.80/1.70	1.90	1.70	2.10	1.70	
R67	1.10/2.30	2.40	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30	3.60	3.80	2.50	3.40
R87	2.30/6.0	6.4	7.2		6.3	6.5
R97	4.60/9.8	11.7		13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil quantity.

RF.., RZ..

Gear unit	Fill quantity in liters					
	M1[1)]	M2	M3	M4	M5	M6
RF07	0.12	0.20				
RF17	0.25	0.55	0.35	0.55	0.35	0.40
RF27	0.25/0.40	0.70	0.50	0.70	0.50	
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	
RF57	0.80/1.70	1.80	1.70	2.00	1.70	
RF67	1.20/2.50	2.50	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.4	7.1	7.2	6.3	6.4
RF97	5.1/10.2	11.9	11.2	14.0	11.2	11.8
RF107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF137	9.5/25.0	27.0	29.0	32.5	25.0	
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil quantity.

22148205/EN – 09/2016

RX..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30		0.90	
RX67	0.80		1.70	1.90	1.10	
RX77	1.10	1.50	2.60	2.70	1.60	
RX87	1.70	2.50	4.80		2.90	
RX97	2.10	3.40	7.4	7.0	4.80	
RX107	3.90	5.6	11.6	11.9	7.7	

RXF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10		0.70	
RXF67	0.70	0.80	1.50	1.40	1.00	
RXF77	0.90	1.30	2.40	2.00	1.60	
RXF87	1.60	1.95	4.90	3.95	2.90	
RXF97	2.10	3.70	7.1	6.3	4.80	
RXF107	3.10	5.7	11.2	9.3	7.2	

Parallel shaft helical (F) gear units

F.., FA..B, FH..B, FV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.5	51.7	31.5	60.1	45.6	44.2
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.30	3.10	1.70	3.10	2.30	2.40
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.90	7.30	4.30	8.10	6.00	6.30
FF87	10.8	13.2	7.80	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	40.6	51.6	31.5	61.2	46.3	44.9
FF157	72.0	105.0	64.0	106.0	87.0	79.0

22148205/EN – 09/2016

FA.., FH.., FV.., FAF.., FAZ.., FHF.., FZ.., FHZ.., FVF.., FVZ.., FT..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	38.3	50.9	31.5	59.7	44.7	43.3
F..157	68.0	103.0	62.0	104.0	85.0	77.0

Helical-bevel (K) gear units

INFORMATION

All K..19 and K..29 gear units have a universal mounting position, which means that K..19 and K..29 gear units of the same design are filled with the same oil quantity independent of the mounting position. An exception to this is the M4 mounting position.

K.., KA..B, KH..B, KV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19	0.40			0.45	0.40	
K..29	0.70			0.85	0.70	
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50	1.00		1.25	0.95	
K..47	0.80	1.30	1.50	2.00	1.60	
K..57	1.10	2.20		2.80	2.30	2.10
K..67	1.10	2.40	2.60	3.45	2.60	
K..77	2.20	4.10	4.40	5.80	4.20	4.40
K..87	3.70	8.0	8.70	10.90	8.0	
K..97	7.0	14.0	15.70	20.0	15.70	15.50
K..107	10.0	21.0	25.50	33.50	24.0	
K..127	21.0	41.50	44.0	54.0	40.0	41.0
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

KF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF19	0.40			0.45	0.40	
KF29	0.70			0.85	0.70	
KF39	0.90	1.70	1.55	1.9	1.55	1.30
KF49	1.70	3.40	2.80	4.20	3.15	2.80
KF37	0.50	1.10		1.50	1.00	
KF47	0.80	1.30	1.70	2.20	1.60	
KF57	1.20	2.20	2.40	3.15	2.50	2.30
KF67	1.10	2.40	2.80	3.70	2.70	
KF77	2.10	4.10	4.40	5.90	4.50	

22148205/EN – 09/2016

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF87	3.70	8.20	9.0	11.90	8.40	
KF97	7.0	14.70	17.30	21.50	15.70	16.50
KF107	10.0	21.80	25.80	35.10	25.20	
KF127	21.0	41.50	46.0	55.0	41.0	
KF157	31.0	66.0	69.0	92.0	62.0	63.0

KA.., KH.., KV.., KAF.., KHF.., KVF.., KZ.., KAZ.., KHZ.., KVZ.., KT..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19	0.40			0.45	0.40	
K..29	0.70			0.85	0.70	
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50	1.00		1.40	1.00	
K..47	0.80	1.30	1.60	2.15	1.60	
K..57	1.20	2.20	2.40	3.15	2.70	2.40
K..67	1.10	2.40	2.70	3.70	2.60	
K..77	2.10	4.10	4.60	5.90	4.40	
K..87	3.70	8.20	8.80	11.10	8.0	
K..97	7.0	14.70	15.70	20.0	15.70	
K..107	10.0	20.50	24.0	32.40	24.0	
K..127	21.0	41.50	43.0	52.0	40.0	
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

Helical-worm (S) gear units

S..

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S37	0.25	0.40	0.50	0.55	0.40	
S47	0.35	0.80	0.70/0.90	1.00	0.80	
S57	0.50	1.20	1.00/1.20	1.45	1.30	
S67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S77	1.90	4.20	3.70/5.4	5.9	4.40	
S87	3.30	8.1	6.9/10.4	11.3	8.4	
S97	6.8	15.0	13.4/18.0	21.8	17.0	

1) The larger gear unit of multi-stage gear units must be filled with the larger oil quantity.

22148205/EN – 09/2016

SF..

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	
SF47	0.40	0.90	0.90/1.05	1.05	1.00	
SF57	0.50	1.20	1.00/1.50	1.55	1.40	
SF67	1.00	2.20	2.30/3.00	3.20	2.70	
SF77	1.90	4.10	3.90/5.8	6.5	4.90	
SF87	3.80	8.0	7.1/10.1	12.0	9.1	
SF97	7.4	15.0	13.8/18.8	22.6	18.0	

1) The larger gear unit of multi-stage gear units must be filled with the larger oil quantity.

SA.., SH.., SAF.., SHZ.., SAZ.., SHF.., ST..

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50		0.40	
S..47	0.40	0.80	0.70/0.90	1.00	0.80	
S..57	0.50	1.10	1.00/1.50	1.50	1.20	
S..67	1.00	2.00	1.80/2.60	2.90	2.50	
S..77	1.80	3.90	3.60/5.0	5.8	4.50	
S..87	3.80	7.4	6.0/8.7	10.8	8.0	
S..97	7.0	14.0	11.4/16.0	20.5	15.7	

1) The larger gear unit of multi-stage gear units must be filled with the larger oil quantity.

SPIROPLAN® (W) gear units

INFORMATION

SPIROPLAN® gear units W..10 to W..30 have a universal mounting position, which means that gear units of the same design are filled with the same oil quantity independent of the mounting position.

The oil fill quantity of SPIROPLAN® gear units W..37 and W..47 in mounting position M4 is different from that of the other mounting positions.

W.., WA..B, WH..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37	0.50			0.70	0.50	
W..47	0.90			1.40	0.90	

WF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
WF10	0.16					
WF20	0.24					
WF30	0.40					
WF37	0.50			0.70	0.50	
WF47	0.90			1.55	0.90	

22148205/EN – 09/2016

WA.., WAF..,WH.., WT.., WHF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37	0.50			0.70	0.50	
W..47	0.80			1.40	0.80	

6.2 Gear unit venting

INFORMATION

The function of breather valves can be impaired by dirt and dust in the environment.

If necessary, contact SEW-EURODRIVE to discuss alternative venting systems.

22148205/EN – 09/2016

6.3 Reduced backlash gear unit design /R

Helical, parallel-shaft helical and helical-bevel gear units with reduced backlash are available as of gear unit size 37. The rotational clearance of these gear units is considerably less than that of the standard designs so that positioning tasks can be solved with great precision. The rotational clearance is specified in angular minutes in the chapter "Geometrically possible combinations". The rotational clearance for the output shaft is specified without load (max. 1 % of the rated output torque); the gear unit input end is blocked. For information on the combination tables, refer to chapter Structure of the combination tables.

The reduced backlash design is available for the following gear units:

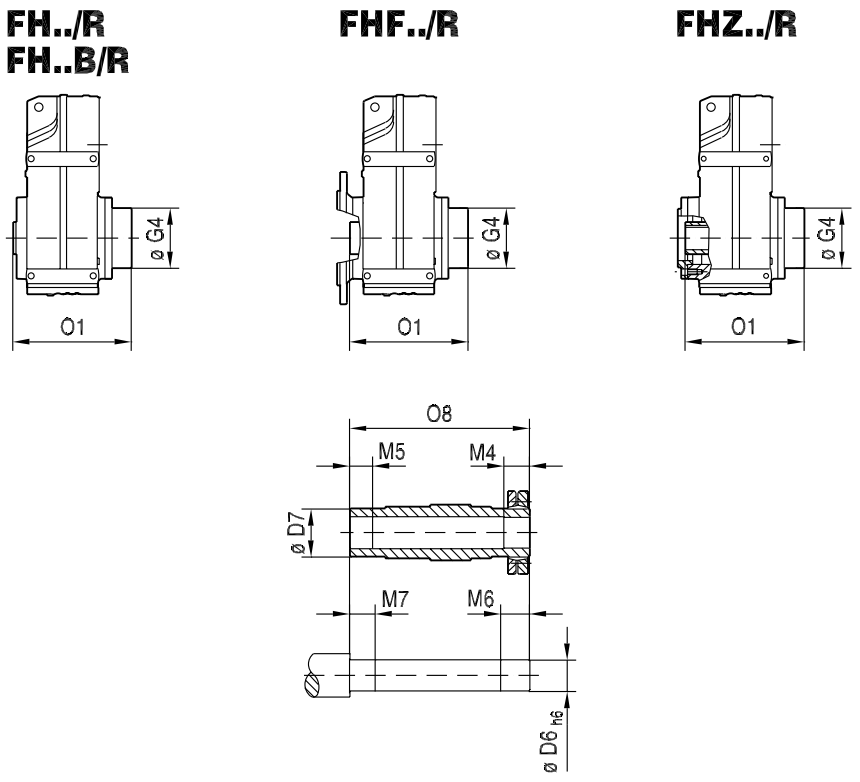
- Helical gear units (R), sizes 37 to 167
- Parallel-shaft helical gear units (F), sizes 37 to 157
- Helical-bevel gear units (K), sizes 37 to 187

Multi-stage gear units are not available with reduced backlash.

The dimensions of the reduced backlash designs correspond to the dimensions of the standard designs, except for parallel-shaft helical gear units FH.87 and FH.97 with reduced backlash.

The following figure shows the dimensions of FH.87 and FH.97 gear units with reduced backlash:

42 020 00 09



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Type	Dimensions in mm								
	D6	D7	G4	M4	M5	M6	M7	O1	O8
FH.87/R	Ø 65 $_{h6}$	Ø 85	Ø 163	41	40	46	45	312.5	299.5
FH.97/R	Ø 75 $_{h6}$	Ø 95	Ø 184	55	50	60	55	382.5	367

22148205/EN – 09/2016

6.4 Assembly/disassembly of gear units with hollow shaft and key

INFORMATION

Use the supplied NOCO® fluid for assembly. The fluid facilitates removal as it prevents contact corrosion.

The key dimension X is specified by the customers, but X > DK must apply (DK = Diameter of customer shaft).

See figure "Customer shaft with and without contact shoulder".

SEW-EURODRIVE recommends 2 ways of installing gear units with hollow shaft and key onto the input shaft of the driven machine (= customer shaft):

- Assembly using supplied fastening parts
- Assembly/disassembly with SEW-EURODRIVE assembly and disassembly kit

The following sections describe the two options.

6.4.1 Assembly using supplied fastening parts

The following fastening parts are provided as standard:

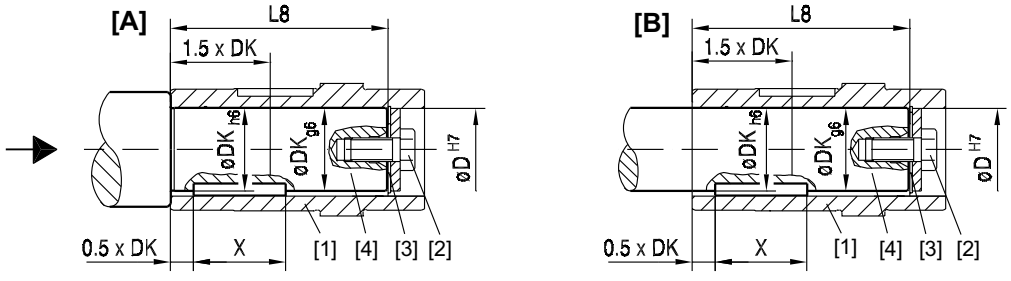
- Retaining screw with washer [2]
- Retaining ring [3]

Note the following information concerning the customer shaft:

- The installation length of the customer shaft with contact shoulder [A] must be "L8" - 1 mm.
- The installation length of the customer shaft without contact shoulder [B] must equal "L8".

The following figure shows the customer shaft with contact shoulder [A] and without contact shoulder [B].

00 001 00 02



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DK	Diameter of customer shaft	[2]	Retaining screw with washer
X	Key dimension	[3]	Retaining ring
[1]	Hollow shaft	[4]	Customer shaft

Dimensions and tightening torques MS for retaining screw [2] for the standard gear units:

Gear unit type	D^{H7} mm	DK mm	L8 mm	MS Nm
WA..10	16		69	8
WA..20	18		84	8
WA..20	20		84	8
KA..19	20		92	8
FA..27	25		89	20

Gear unit type	D^{H7} mm	DK mm	L8 mm	MS Nm
KA..29	25		107	20
KA..29	30		107	20
WA..30, WA..37	20		105	8
SA..37	20		104	8
FA..37, KA..37, SA..47	30		105	20
KA..39	30		137	20
KA..39	35		137	20
KA..49	35		160	20
KA..49	40		154	20
SA..47, WA..37	25		105	20
FA..47, KA..47, SA..57	35		132	20
WA..47	30		122	20
SA..57	30		132	20
FA..57, KA..57	40		142	40
FA..67, KA..67	40		156	40
SA..67	40		144	40
SA..67	45		144	40
FA..77, KA..77, SA..77	50		183	40
SA..77	60		180	80
FA..87, KA..87	60		210	80
SA..87	60		220	80
SA..87	70		220	80
FA..97, KA..97	70		270	80
SA..97	70		260	80
FA..107, KA..107	80		313	80
SA..97	90		255	200
FA..107, KA..107	90		313	200
FA..127, KA..127	100		373	200
FA..157, KA..157	120		460	200

6.4.2 Assembly/disassembly with SEW-EURODRIVE assembly and disassembly kit

Assembly

You can use the optional assembly/disassembly kit for installation. This can be ordered for the specific gear unit types by quoting the part numbers in the following table. The delivery includes:

- Spacer tube for installation without contact shoulder [5]
- Retaining screw for assembly [2]
- Forcing washer for disassembly [7]
- Locked nut for disassembly [8]

The short retaining screw delivered as standard is not required.

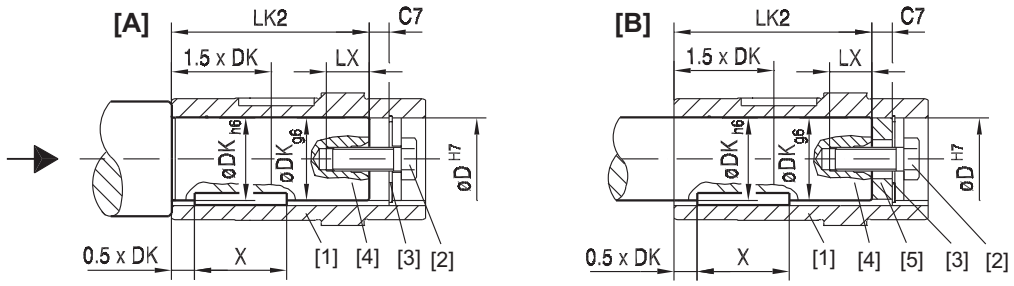
Note the following information concerning the customer shaft:

- The installation length of the customer shaft must be LK2. **Do not use the spacer tube** if the customer shaft **has a contact shoulder [A]**.
- The installation length of the customer shaft must be LK2. Use the spacer tube if the customer shaft **has no contact shoulder [B]**.

22148205/EN – 09/2016

The following figure shows the customer shaft with contact shoulder [A] and without contact shoulder [B].

00 002 00 02



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DK	Diameter of customer shaft	[3]	Retaining ring
X	Key dimension	[4]	Customer shaft
[1]	Hollow shaft	[5]	Spacer tube
[2]	Retaining screw with washer		

Dimensions, tightening torque MS and part numbers for retaining screw [2]:

Type	D^{H7} mm	DK mm	LK2 mm	LX^{+2} mm	C7 mm	MS Nm	Part number of the assembly/ disassembly kit
WA..10	16		58	12.5	11	8	6437125
WA..20	18		72	16	12	8	643682X
WA..20	20		72	16	12	8	6436838
WA..30, WA..37	20		93	16	12	8	6436838
SA..37	20		92	16	12	8	6436838
KA..19	20		80	16	12	8	6436838
KA..29	25		91	22	16	20	6436846
FA..27	25		73	22	16	20	6436846
SA..47, WA..37	25		89	22	16	20	6436846
WA..47	30		106	22	16	20	6436854
FA..37, KA..37	30		89	22	16	20	6436854
SA..47	30		89	22	16	20	6436854
SA..57	30		116	22	16	20	6436854
KA..29	30		91	22	16	20	6436854
KA..39	30		121	22	16	20	6436854
KA..39	35		119	28	18	20	6436862
FA..47, KA..47, SA..57	35		114	28	18	20	6436862
KA..49	35		142	28	18	20	6436862
KA..49	40		136	36	18	40	6436870
FA..57, KA..57	40		124	36	18	40	6436870
FA..67	40		138	36	18	40	6436870
KA..67	40		138	36	18	40	6436870
SA..67	40		126	36	18	40	6436870
SA..67	45		126	36	18	40	6436889
FA..77, KA..77, SA..77	50		165	36	18	40	6436897
FA..87, KA..87	60		188	42	22	80	6436900
SA..77	60		158	42	22	80	6436900
SA..87	60		198	42	22	80	6436900
FA..97, KA..97	70		248	42	22	80	6436919
SA..87	70		198	42	22	80	6436919
SA..97	70		238	42	22	80	6436919
FA..107, KA..107	80		287	42	26	80	10682112
FA..107, KA..107	90		287	50	26	200	6436927
SA..97	90		229	50	26	200	6436927

Type	D^{H7} mm	DK mm	LK2 mm	LX^{+2} mm	C7 mm	MS Nm	Part number of the assembly/ disassembly kit
FA..127, KA..127	100		347	50	26	200	6436935
FA..157, KA..157	120		434	50	26	200	6436943

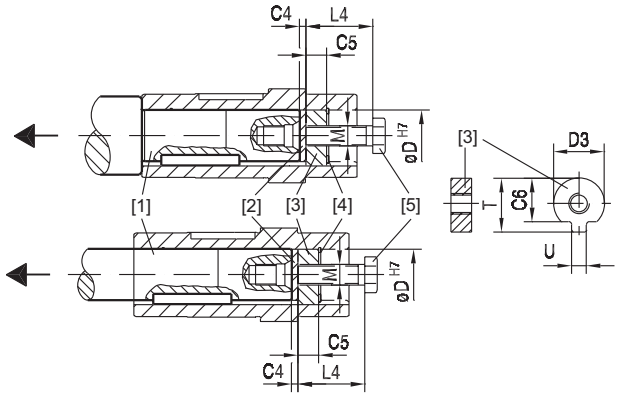
Disassembly

INFORMATION

The depicted assembly kit for attaching the customer shaft is a recommendation by SEW-EURODRIVE.

- You must always check whether this design can compensate the present axial loads.
- In particular applications (e.g. mounting agitator shafts), a different design may have to be used to secure the shaft axially. You can use your own devices to secure the shaft axially, if you ensure that these designs do not cause potential sources of combustion according to DIN EN 13463 (e.g. impact sparks).

The following figure shows the SEW-EURODRIVE assembly/disassembly kit.



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[1] Customer shaft
[2] Forcing washer
[3] Locked nut for disassembly
[4] Retaining ring
[5] Retaining screw

Dimensions and part numbers of the assembly/disassembly kit:

Type	D^{H7} mm	M[1)]	C4 mm	C5 mm	C6 mm	$U^{-0.5}$ mm	$T^{-0.5}$ mm	$D3^{-0.5}$ mm	L4 mm	Part number of the assembly/disassembly kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	6437125
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643682X
WA..20, WA..30, SA..37, WA..37, KA..19	20	M6	5	6	15.5	5.5	22.5	19.7	25	6436838
FA..27, SA..47, WA..47, KA..29	25	M10	5	10	20	7.5	28	24.7	35	6436846
FA..37, KA..29, KA..37, KA..39, SA..47, SA..57, WA..47,	30	M10	5	10	25	7.5	33	29.7	35	6436854
FA..47, KA..39, KA..47, KA..49, SA..57	35	M12	5	12	29	9.5	38	34.7	45	6436862
FA..57, KA..57, FA..67, KA..49, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	6436870
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	6436889
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	6436897

22148205/EN – 09/2016

Type	D^{H7} mm	M[1)]	C4 mm	C5 mm	C6 mm	$U^{-0.5}$ mm	$T^{-0.5}$ mm	$D3^{-0.5}$ mm	L4 mm	Part number of the assembly/disassembly kit
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	6436900
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	6436919
FA..107, KA..107	80	M20	5	20	75.5	21.5	85	79.7	70	10682112
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	6436927
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	6436935
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	6436943

1) Retaining screw

22148205/EN – 09/2016

6.5 Gear units with hollow shaft

6.5.1 Chamfers on hollow shafts

The following illustration shows the chamfers of parallel-shaft helical, helical-bevel, helical-worm and SPIROPLAN® gear units with hollow shaft:

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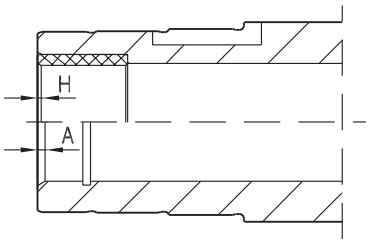

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Dimension tables for the chamfers of the F, K, S, and W gear units:

Gear unit	Design	
	with hollow shaft (A)	with hollow shaft and shrink disk (H)
W..10	1.5 × 30°	-
W..20	2 × 30°	-
W..30	2 × 30°	-
F..27	2 × 30°	0.5 × 45 °
K..19	2 × 30°	0.5 × 45 °
K..29	2 × 30°	0.5 × 45 °
F../K../S../W..37	2 × 30°	0.5 × 45 °
K..39	2 × 30°	-
F../K../S../ W..47	2 × 30°	0.5 × 45 °
K..49	2 × 30°	-
S..57	2 × 30°	0.5 × 45 °
F../K..57	2 × 30°	0.5 × 45 °
F../K../S..67	2 × 30°	0.5 × 45 °
F../K../S..77	2 × 30°	0.5 × 45 °
F../K../S..87	3 × 30°	0.5 × 45 °
F../K../S..97	3 × 30°	0.5 × 45 °
F../K..107	3 × 30°	0.5 × 45 °
F../K..127	5 × 30°	0.5 × 45 °
F../K..157	5 × 30°	0.5 × 45 °
KH167	-	0.5 × 45 °
KH187	-	0.5 × 45 °

22148205/EN – 09/2016

6.5.2 Special motor/gear unit combinations

Please note for parallel-shaft helical gearmotors with hollow shaft (FA..B, FV..B, FH..B, FAF, FVF, FHF, FA, FV, FH, FT, FAZ, FVZ, FHZ):

- If you are using a customer shaft pushed through on the motor end, there may be a collision when a "small gear unit" is used in combination with a "large motor."
- Check the motor dimension AC to decide whether there will be a collision with a pushed-through customer shaft.

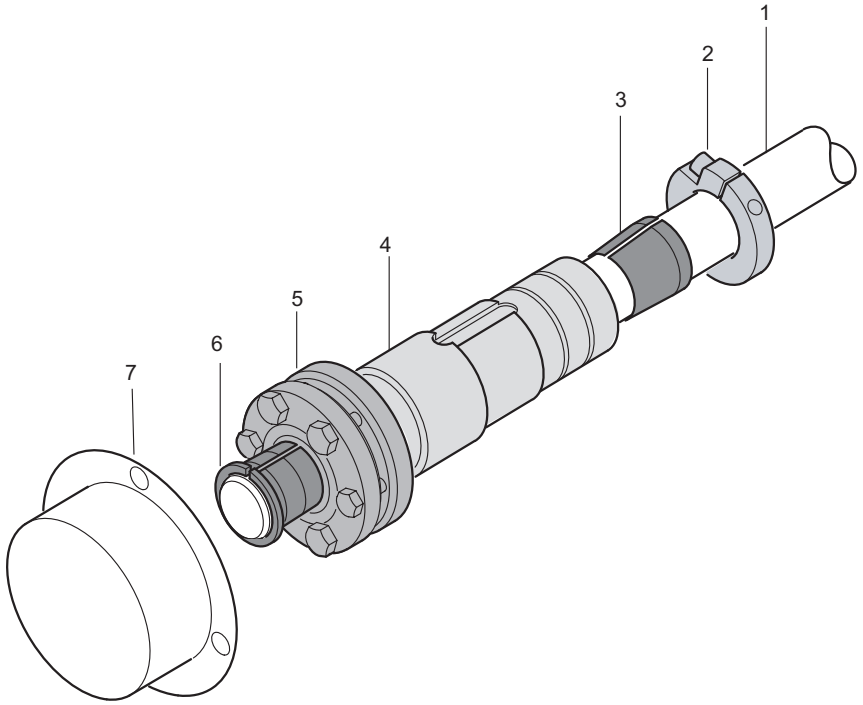
22148205/EN – 09/2016

6.6 TorqLOC® mounting system for gear units with hollow shaft

6.6.1 Description of TorqLOC®

The TorqLOC® hollow shaft mounting system is used for achieving a non-positive connection between the customer's shaft and the hollow shaft in the gear unit. The TorqLOC® hollow shaft mounting system is an alternative to the hollow shaft with shrink disk, the hollow shaft with key and the splined hollow shaft that have been used so far.

The TorqLOC® hollow shaft mounting system consists of the following components:



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[1]	Customer shaft	[5]	Shrink disk
2]	Clamping ring	[6]	Conical steel bushing
[3]	Conical bronze bushing	[7]	Fixed hood cover
[4]	Hollow shaft in gear unit		

6.6.2 Benefits of TorqLOC®

The TorqLOC® hollow shaft mounting system provides the following advantages:

- Cost saving because the customer shaft can be made from drawn material up to quality h11.
- Cost saving because different customer shaft diameters can be covered by one hollow shaft diameter and different bushings.
- Simple installation since there is no need to accommodate any shaft connections.
- Simple removal even after many hours of operation because the formation of contact corrosion has been reduced and the conical connections can easily be released.

22148205/EN – 09/2016

6.6.3 Technical data of TorqLOC®

The TorqLOC® hollow shaft mounting system is approved for input torques of 92 Nm to 18 000 Nm.

The following gear units are available with TorqLOC® hollow shaft mounting system:

- Parallel-shaft helical gear units in gear unit sizes 37 to 157 (FT37 – FT157)
- Helical-bevel gear units in gear unit sizes 37 to 157 (KT37 – KT157), 39 and 49 (KT39, KT49)
- Helical-worm gear units in gear unit sizes 37 to 97 (ST37 – ST97)
- SPIROPLAN® gear unit sizes 37 and 47 (WT.7)

Available options

The following options are available for gear units with a TorqLOC® hollow shaft mounting system:

- For helical-bevel, helical-worm and SPIROPLAN® gear units (KT.., ST.., WT.7..): "torque arm" option (../T)
- For parallel-shaft helical gear units (FT..): "rubber buffer" option (../G)

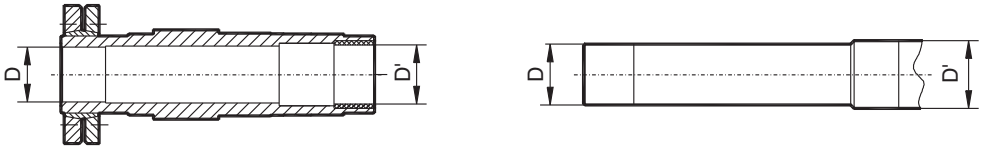
22148205/EN – 09/2016

6.7 Shouldered hollow shaft option with shrink disk

The following gear units with a hollow shaft and shrink disk also have the option of the larger bore diameter D':

- Parallel-shaft helical gear units FH/FHF/FHZ37 – 157
- Helical-bevel gear units KH/KHF/KHZ37 – 157
- Helical-worm gear units SH/SHF47 – 97

D’ = D as standard.



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Gear unit	Bore diameter D/ optionally D' mm
FH/FHF/FHZ37, KH/KHF/KHZ37, SH/SHF/SHZ47	30/32
FH/FHF/FHZ47, KH/KHF/KHZ47, SH/SHF/SHZ57	35/36
FH/FHF/FHZ57, KH/KHF/KHZ57	40/42
FH/FHF/FHZ67, KH/KHF/KHZ67, SH/SHF/SHZ67	40/42
FH/FHF/FHZ77, KH/KHF/KHZ77, SH/SHF/SHZ77	50/52
FH/FHF/FHZ87, KH/KHF/KHZ87, SH/SHF/SHZ87	65/66
FH/FHF/FHZ97, KH/KHF/KHZ97, SH/SHF/SHZ97	75/76
FH/FHF/FHZ107, KH/KHF/KHZ107	95/96
FH/FHF/FHZ127, KH/KHF/KHZ127	105/106
FH/FHF/FHZ157, KH/KHF/KHZ157	125/126

Diameter D/D' must be specified when ordering gear units with a shouldered hollow shaft (optional bore diameter D').

6.7.1 Sample order

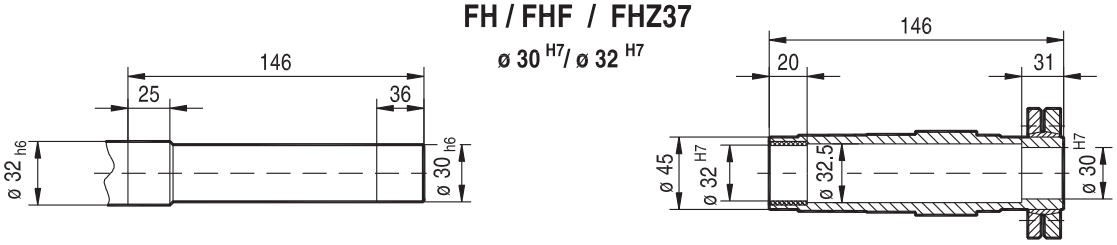
FH37 DRN80M4 with hollow shaft 30/32 mm

22148205/EN – 09/2016

6.7.2 Parallel-shaft helical gear units with shouldered hollow shaft (dimensions in mm):

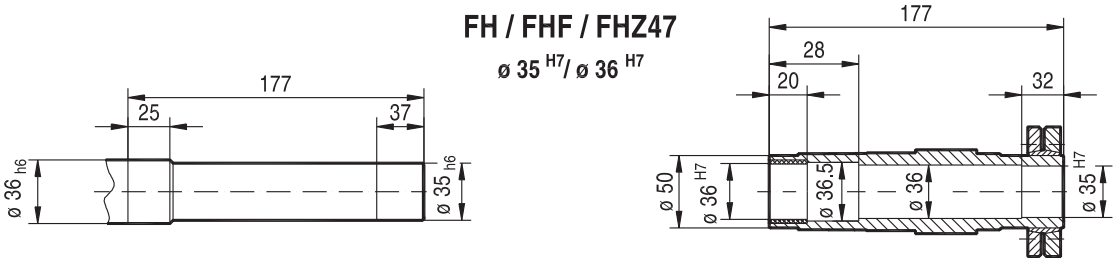
FH / FHF / FHZ37

ø 30 H7 / ø 32 H7



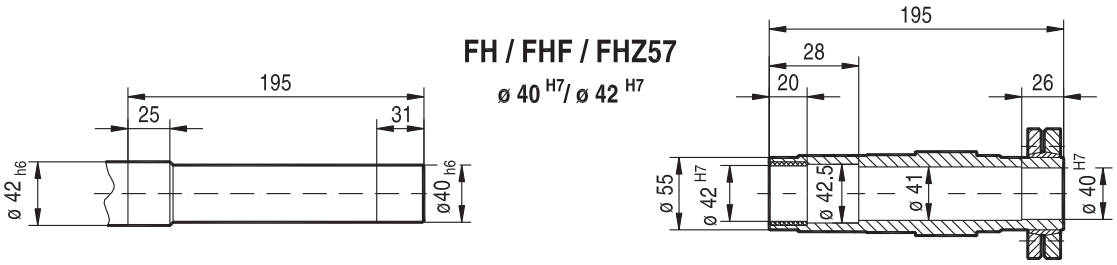
FH / FHF / FHZ47

ø 35 H7 / ø 36 H7



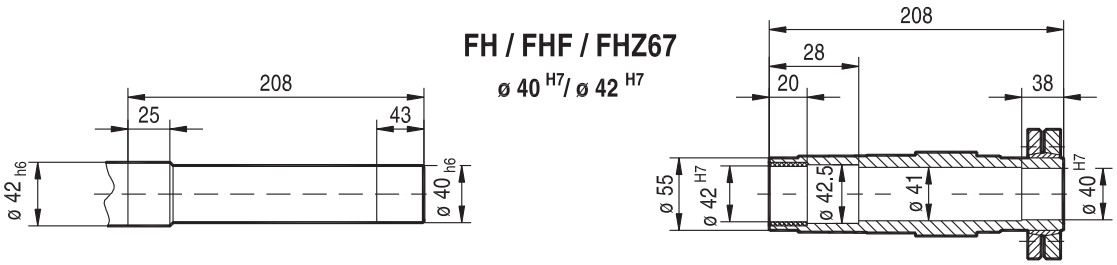
FH / FHF / FHZ57

ø 40 H7 / ø 42 H7



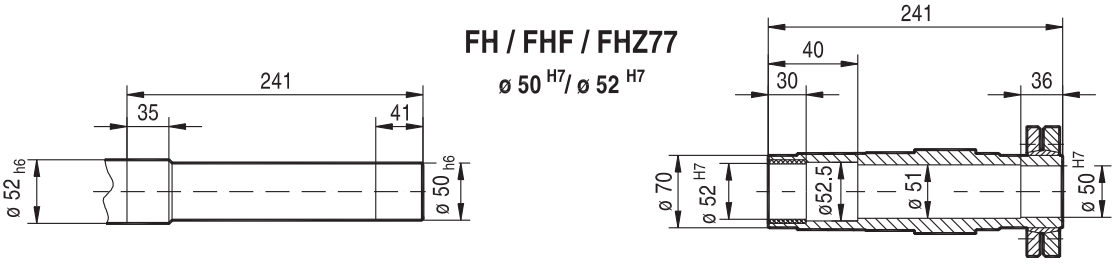
FH / FHF / FHZ67

ø 40 H7 / ø 42 H7



FH / FHF / FHZ77

ø 50 H7 / ø 52 H7



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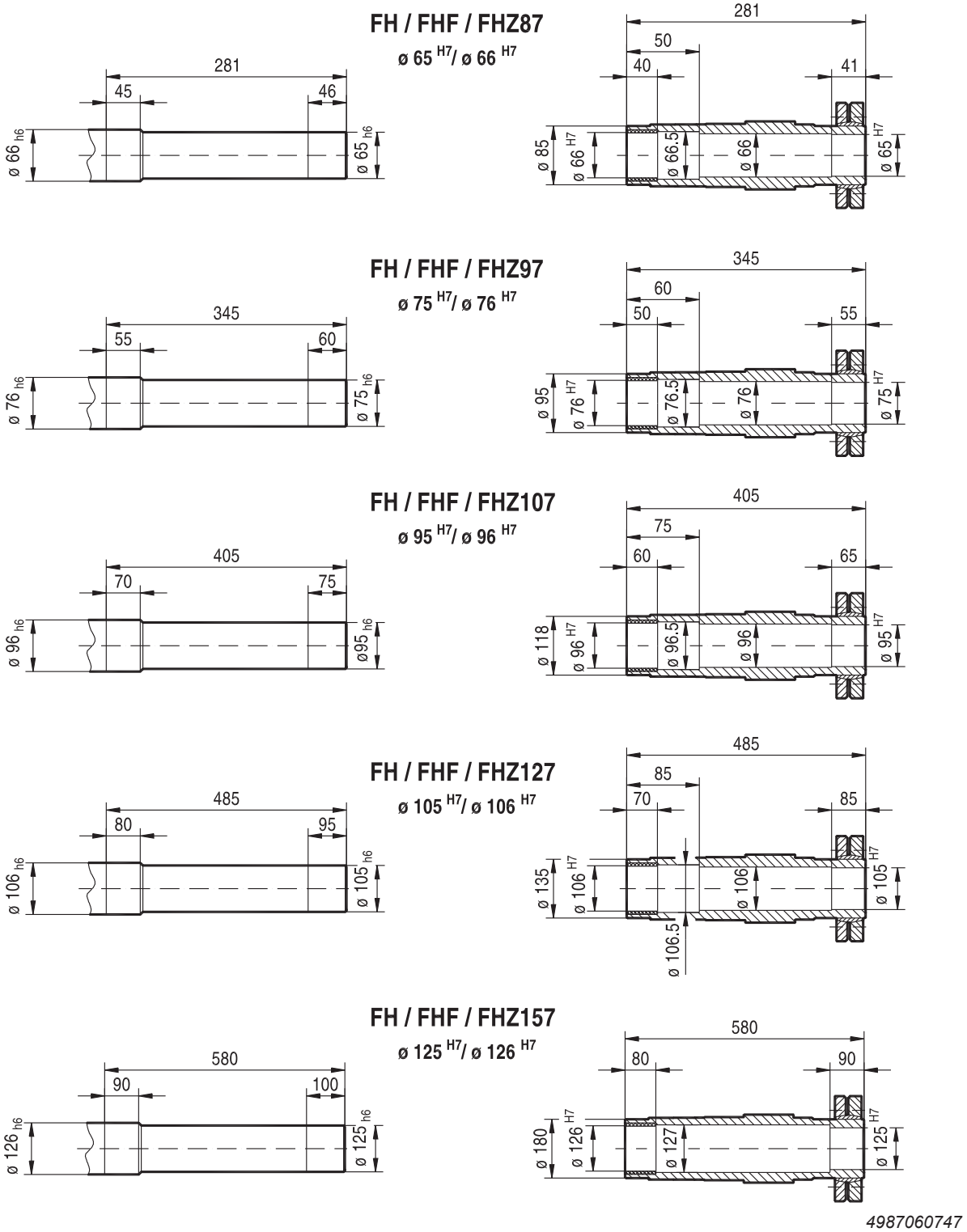

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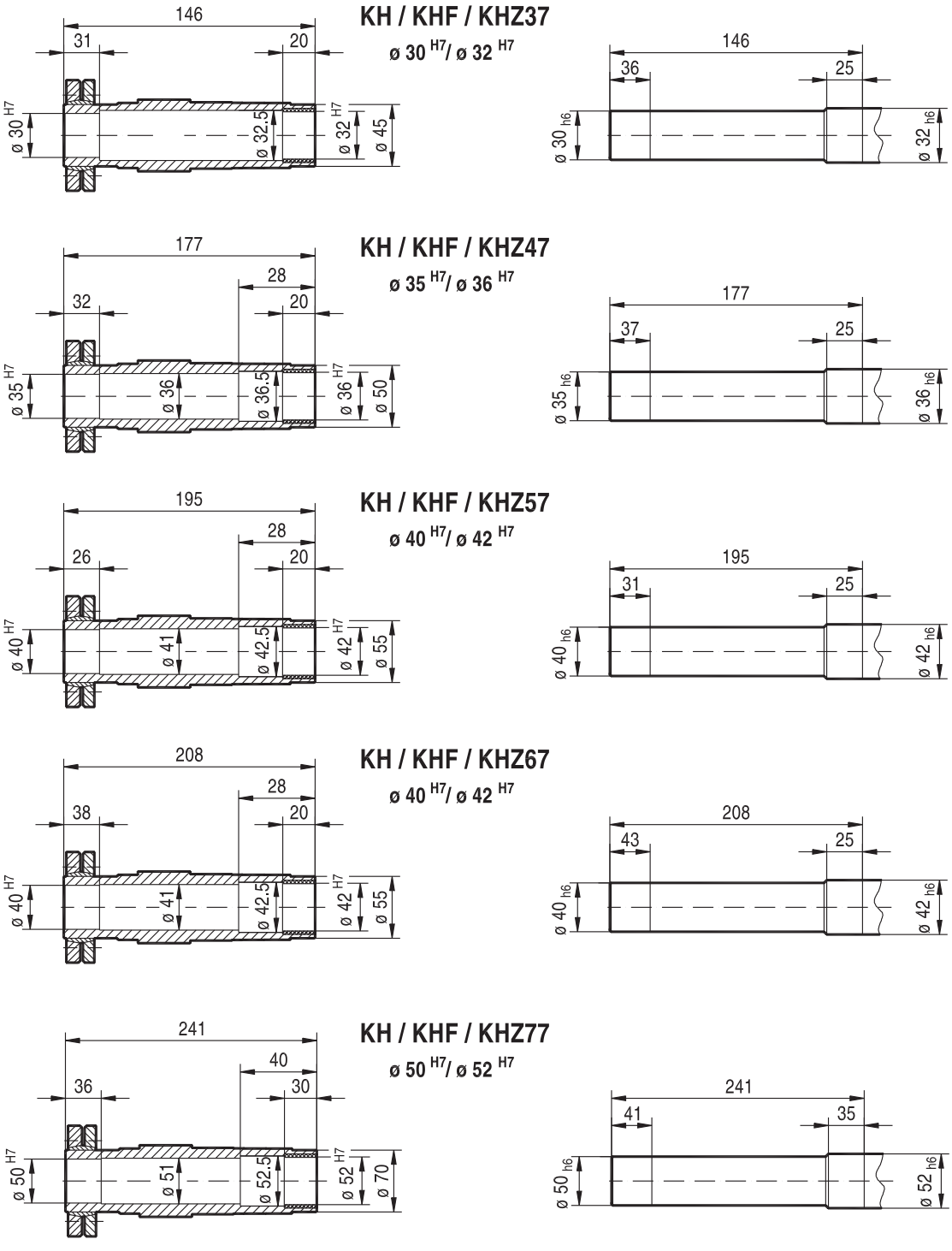
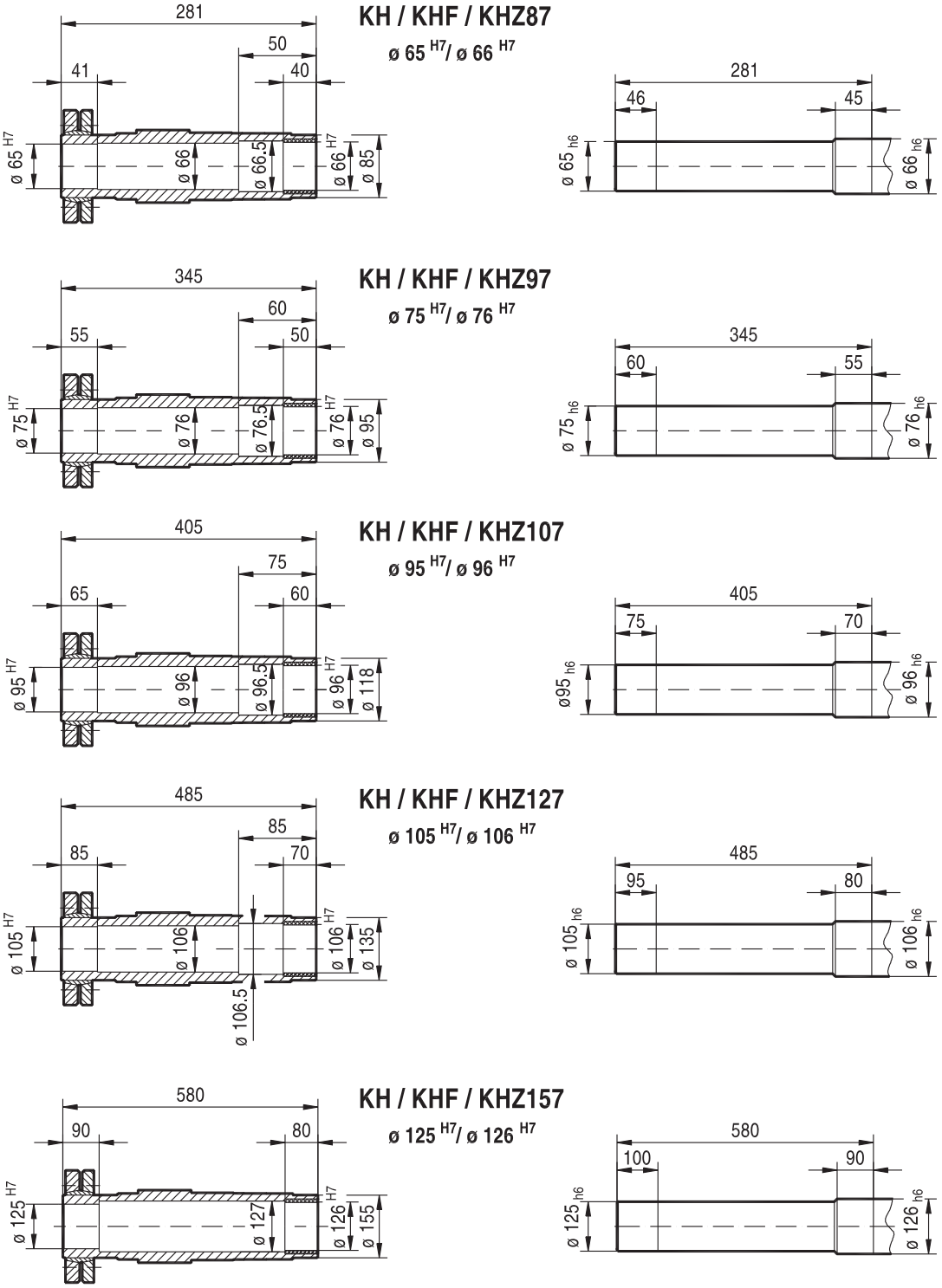
22148205/EN – 09/2016

6.7.3 Helical-bevel gear units with shouldered hollow shaft (dimensions in mm):



4987063435



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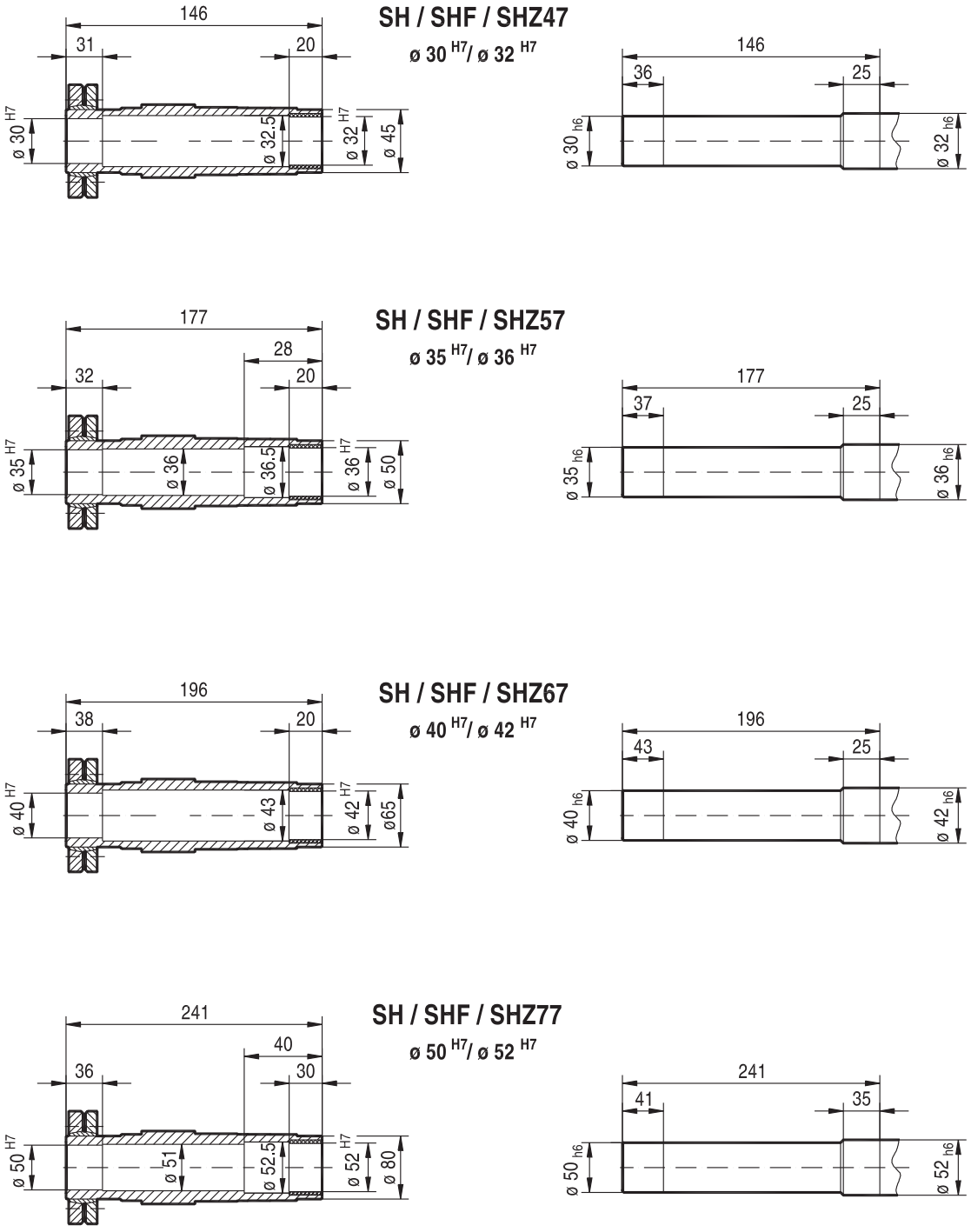
22148205/EN – 09/2016

6.7.4 Helical-worm gear units with shouldered hollow shaft (dimensions in mm):



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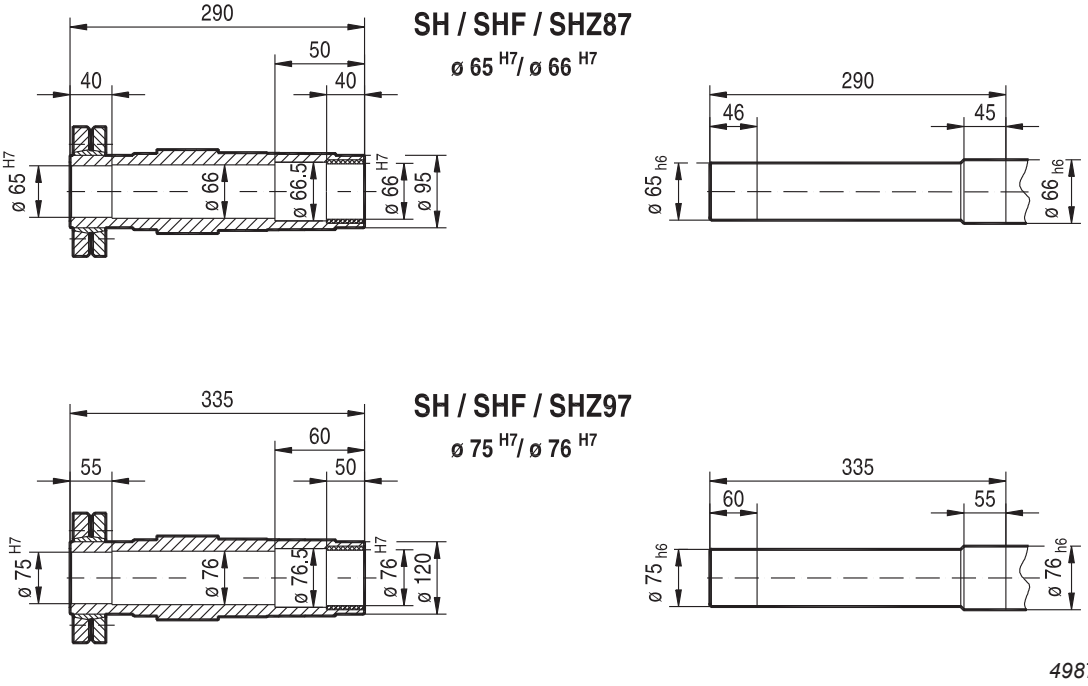

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22148205/EN – 09/2016

6.8 Gear unit mounting

Strength class of the screws

Always mount gearmotors using screws of strength class 8.8.

The gearmotors in flange-mounted design and in foot-/flange-mounted design listed in the following table are an exception. Always use screws of strength class 10.9 for these gearmotors. Use suitable washers.

Gear unit	Flange Ø in mm	Strength class of the screws
RF37/R37F	120	10.9
RF47/R47F	140	
RF57/R57F	160	
FF/FAF77/KF/KAF77	250	
RF147	450	
RF167	550	
RZ37 – RZ87	60ZR – 130ZR	

22148205/EN – 09/2016

6.9 Torque arms

6.9.1 Available torque arms

NOTICE

Danger due to static overdetermination if gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) are mounted both via the torque arm and via the foot plate.

Risk of injuries and damage to property.

- Especially with the KA.9B/T design, it is not permitted to use the foot plates and the torque arm at the same time.
- Attach the KA.9B/T design only via the torque arm.
- Attach the K.9 or KA.9B design only via the foot plate.
- If you want to use foot plates and torque arms for mounting, contact SEW-EURODRIVE.

The following table lists the part numbers of available torque arms.

Gear unit	Size			
	19	29	39	49
KA, KH, KT	10684115	10684107	10682163	06442439

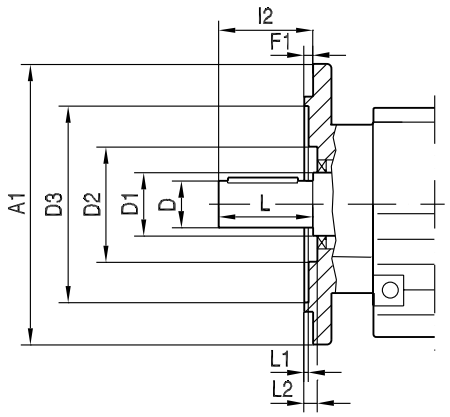
Gear unit	Size					
	27	37	47	57	67	77
KA, KH, KV, KT	-	6434258	6434282	6434312	6434312	6434347
SA, SH, ST	-	1269941	6442374	6442404	6442439	6442463
FA, FH, FV, FT Rubber buffer (2 pieces)	0133485	0133485	0133485	0133485	0133485	0133493

Gear unit	Size				
	87	97	107	127	157
KA, KH, KV, KT	6434371	6434401	6434436	6432948	-
SA, SH, ST	6442498	6442528	-	-	-
FA, FH, FV, FT Rubber buffer (2 pieces)	0133493	0133507	0133507	0133515	0133477

Gear unit	Size				
	10	20	30	37	47
WA, WH, WT	10610219	1680730	1680110	10611290	10611851

22148205/EN – 09/2016

6.10 Flange contours of RF.. and R..F gear units

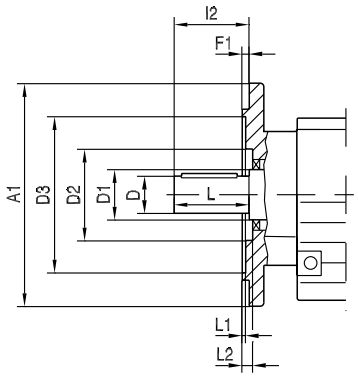


Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm										
	A1	D	D1	D2		D3	F1	l2	L	L1		L2
				RF	R..F					RF	R..F	
RF07, R07F	120	20	22	38	38	72	3	40	40	2	2	6
	140[1)]				-	85					-	
	160[1)]					100	3.5			2.5	-	6.5
RF17, R17F	120		25	46	46	65	3			1	1	5
	140				-	78					-	
	160[1)]					95	3.5					6
RF27, R27F	120	25	30	54	54	66	3	50	50	1	1	6
	140				-	79				3	-	7
	160					92	3.5					
RF37, R37F	120		35	60	63	70	3			5	4	
	160				-	96	3.5			1	-	7.5
	200[1)]					119						
RF47, R47F	140	30		72	64	82	3	60	60	4	1	6
	160				-	96	3.5			0.5	-	6.5
	200					116						
RF57, R57F	160	35	40	76	75	96		70	70	4	2.5	5
	200				-	116				0	-	
	250[1)]					160	4			0.5		5.5
RF67, R67F	200		50	90	90	118	3.5			2	4	7
	250				-	160	4			1	-	7.5
RF77, R77F	250	40	52	112	100	160		80	80	0.5	2.5	7
	300[1)]				-	210					-	
RF87, R87F	300	50	62	123	122	210		100	100	0	1.5	8
	350				-	226	5			1	-	9
RF97		60	72	136		236		120	120	0		9
	450					320						
RF107	350	70	82	157		232		140	140			11
	450			186		316						
RF137		90	108	180		316		170	170			10
	550					416						
RF147	450	110	125	210		316		210	210			
RF167	550	120	145	290		416				1		
	660					517	6			2		11

1) The flange contour protrudes from under the base surface.

6.11 Flange contours of FF.., KF.., SF.. and WF.. gear units



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Check dimensions L1 and L2 for selection and installation of output elements.

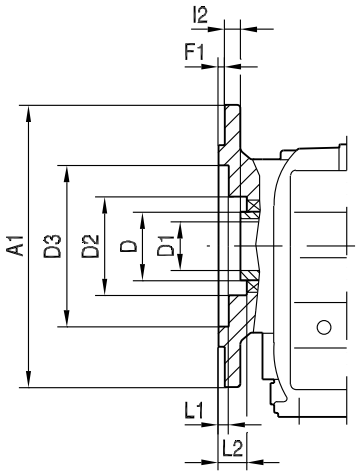
Type	Dimensions in mm									
	A1	D	D1	D2	D3	F1	I2	L	L1	L2
FF27	160	25	40	66	96	3.5	50	50	3	18.5
FF37			30	70	94				2	6
FF47	200	30	40	72	115		60	60	3.5	7.5
FF57	250	35		84	155	4	70	70	4	9
FF67	250	40	50				80	80		
FF77	300	50	55	82	205		100	100	5	
FF87	350	60	65	115	220	5	120	120		
FF97	450	70	75	112	320		140	140	8	10
FF107		90	100	159	318		170	170	16	9
FF127	550	110	118	-	420		210	210	10	-
FF157	660	120	135	190	520	6			8	14
KF19	120	20	25	-	70	2.5	40	40	-	11.5
	160				100					
KF29		25	30		109	3.5	50	50		6.5
	200				115					
KF37	160			70	94				2	6
KF39		30	39	68	96		60	60	13.5	23.5
KF47	200		40	72	115				3.5	7.5
KF49		35	49	76	115		70	70	24.5	28
KF57	250	35	40	84	155	4	70	70	4	9
KF67		40	50				80	80		
KF77	300	50	55	82	205		100	100	5	
KF87	350	60	65	115	220	5	120	120		
KF97	450	70	75	112	320		140	140	8	10
KF107		90	100	159	318		170	170	16	9
KF127	550	110	118	-	420		210	210	10	-
KF157	660	120	135	190	520	6			8	14
SF37	120	20	25	-	68	3	40	40	6	-
	160	20		-	96	3.5			5.5	
SF47		25	30	70	94		50	50	2	6
SF57	200	30	40	72	115		60	60	3.5	7.5
SF67		35	45	-			70	70	8.5	-
SF77	250	45	55	108	160	4	90	90	8	9
SF87	350	60	65	130	220	5	120	120	6	10
SF97	450	70	75	150	320		140	140	8.5	
WF10	80	16	25	-	39	2.5	40	40	30	-
	120		25	39	74	3			5	30

22148205/EN – 09/2016

Type	Dimensions in mm									
	A1	D	D1	D2	D3	F1	I2	L	L1	L2
WF20	110	20	30	44	53	-4	40	40	27	35
	120			-	45	2.5			37.5	-
WF30				48	63				18	27
	160								33	42
WF37	120			-	70				-	10.5
	160									25.5
WF47		30	35		92	3.5	10	60	6	-

22148205/EN – 09/2016

6.12 Flange contours of FAF.., KAF.., SAF.. and WAF.. gear units



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Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm								
	A1	D	D1	D2	D3	F1	I2	L1	L2
FAF27	160	40	25	66	96	3.5	20	3	18.5
FAF37		45	30	62	94		24	2	30
FAF47	200	50	35	70	115		25	3.5	31.5
FAF57	250	55	40	76	155	4	23.5	4	31
FAF67							23		
FAF77	300	70	50	95	205		37	5	45
FAF87	350	85	60	120	220	5	30		39
FAF97	450	95	70	135	320		41.5	5.5	51
FAF107		118	90	224			41	16	52
FAF127	550	135	100	185	420		51	6	63
FAF157	660	155	120	200	520	6	60	10	74
KAF19	120	30	20	60	70	2.5	25	9	25.5
	160				100				
KAF29	160	40	25 / 30	-	105	3.5	33.5	-	6.5
	200			-	118				
KAF39	160	50	30 / 35	68	96		24.5	10	27
KAF37	160	45	30	62	94		24	2	30
KAF47	200	50	35	70	115		25	3.5	8.5
KAF49	200	55	35 / 40	76	115		32.5	16	34.5
KAF57	250	55	40	76	155	4	23.5	4	31
KAF67							23		
KAF77	300	70	50	95	205		37	5	45
KAF87	350	85	60	120	220	5	30		39
KAF97	450	95	70	135	320		41.5	5.5	51
KAF107		118	90	224			41	16	52
KAF127	550	135	100	185	420		51	6	63
KAF157	660	155	120	200	520	6	60	10	74
SAF37	120	35	20	-	68	3	15	6	-
	160				96	3.5		5.5	
SAF47		45	30 / 25	62	94		24	2	30
SAF57	200	50	35 / 30	70	115		25	3.5	31.5
SAF67		65	45 / 40	91			42.5	4	48.5
SAF77	250	80	60 / 50	112	164	4	45.5	5	53.5
SAF87	350	95	70 / 60	131	220	5	52.5	6	62.5

22148205/EN – 09/2016

Type	Dimensions in mm								
	A1	D	D1	D2	D3	F1	I2	L1	L2
SAF97	450	120	90 / 70	160	320	5	60	6.5	69
WAF10	80	25	16	-	39	2.5	23	30	-
	120			39	74	3		5	30
WAF20	110	30	18 / 20	44	53	-4	30	27	35
	120			-	45	2.5		37.5	-
WAF30			20	48	63		19.5	18	27
	160				63		34.5	33	42
WAF37	120	35	20 / 25	54	70		19.5	10.5	27
	160						34.5	25.5	42
WAF47		45	25 / 30	72	92	3.5	10	6	45

22148205/EN – 09/2016

6.13 Covers

6.13.1 Rotating cover

The following gear unit types with hollow shaft and shrink disk are equipped with a rotating cover as standard:

Gear unit type	Sizes
KH..	19 – 29 and 37 – 97
FH.., SH.., WH..	37 – 97

6.13.2 Fixed plastic cover

The following gear unit types with hollow shaft and shrink disk are equipped with a rotating plastic cover as standard:

Gear unit type	Sizes
FH..	27 and 107 – 157
KH..	107 – 157

Should you require a fixed plastic cover for other gear unit types or sizes, the part number required to order the cover can be found in the following chapter.

6.13.3 Fixed sheet metal cover

The following gear unit types with hollow shaft and shrink disk are equipped with a fixed sheet metal cover as standard:

Gear unit type	Sizes
KH..	167 and 187
FT.., KT.., ST.., WT.. (with TorqLOC® hollow shaft mounting system)	All available sizes
Explosion-proof gear units FH.., KH.., SH.., WH.. gear units	All available sizes

Should you require a fixed sheet metal cover for other gear unit types or sizes, the part number required to order the cover can be found in the following chapter.

22148205/EN – 09/2016

6.13.4 Maximum motor mounting sizes with fixed cover

In case of parallel-shaft helical gear units the size of the attached motor may be limited by the use of a fixed cover.

Fixed plastic cover

The following table shows the maximum possible motor mounting surface, depending in the gear unit size, for a fixed plastic cover:

Gear unit size	F..37	F..47	F..57	F..67	F..77	F..87	.F.97
Maximum possible motor mounting sizes	71M	80M	90L	112M	132L	160L	180L

Fixed sheet metal cover

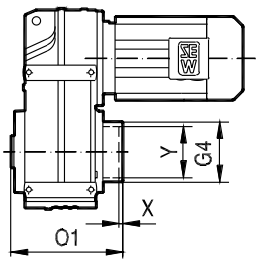
The following table shows the maximum possible motor mounting surface, depending in the gear unit size, for a fixed sheet metal cover:

Gear unit size	F..37	F..47	F..57	F..67	F..77	F..87	F..97
Maximum possible motor mounting sizes	71M	80M	80M	100L	132L	160L	180L

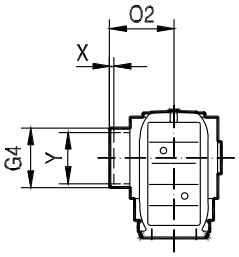
22148205/EN – 09/2016

6.13.5 Part numbers and dimensions for fixed plastic covers

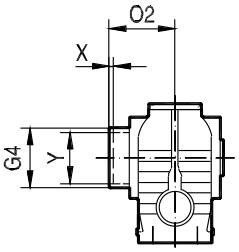
FH../FA..



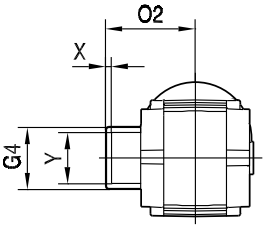
KH../KA..



SH../SA..



WH../WA..



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Parallel-shaft helical gearmotors	FH/FA ..37	FH/FA ..47	FH/FA ..57	FH/FA ..67	FH/FA ..77	FH/FA ..87	FH/FA ..97
Part number	6435130	6435149	6435157	6435157	6435165	6435173	6435181
G4 in mm	78	88	100	100	121	164	185
O1 in mm	157	188.5	207.5	221.5	255	295	363.5
X in mm	2	4.5	7.5	6	6	4	6.5
Y in mm	75	83	83	93	114	159	174

Helical-bevel gearmotors	KH/KA ..19	KH/KA ..29
Part number	1068415 8	1068416 6
G4 in mm	62	68
O2 in mm	83	90
X in mm	2	4
Y in mm	50	60

Helical-bevel gearmotors[1)]	KH/KA ..37	KH/KA ..47	KH/KA ..57	KH/KA ..67	KH/KA ..77	KH/KA ..87	KH/KA ..97
Part number	6435130	6435149	6435157	6435157	6435165	6435173	6435181
G4 in mm	78	88	100	100	121	164	185
O2 in mm	95	111.5	122.5	129	147	172	210.5
X in mm	0	1.5	5.5	3	1	2	4.5
Y in mm	75	83	83	93	114	159	174

1) Not possible in foot-mounted helical-bevel gear units with hollow shafts (KH..B and KA..B).

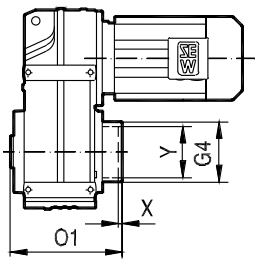
Helical-worm gearmotors	SH/SA ..37	SH/SA ..47	SH/SA ..57	SH/SA ..67	SH/SA ..77	SH/SA .. 87	SH/SA ..97
Part number	6435122	6435130	6435149	6435157	6435165	6435173	6435181
G4 in mm	59	78	88	100	121	164	185
O2 in mm	88	95	111.5	123	147	176	204.5
X in mm	1	0	1.5	3	1	0	0.5
Y in mm	53	75	83	93	114	159	174

SPIROPLAN® gearmotors	WH/WA ..37	WH/WA ..47
Part number	1061136 3	10611940
G4 in mm	68	80.5
O2 in mm	95.5	109.5
X in mm	11	12.5
Y in mm	50	72

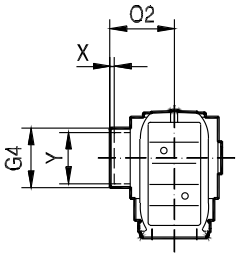
22148205/EN – 09/2016

6.13.6 Part numbers and dimensions for fixed sheet metal covers

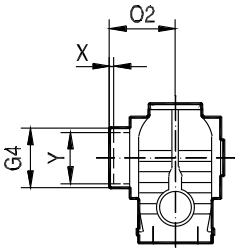
FT../FH../FA..



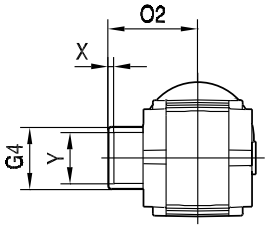
KT../KH../KA..



ST../SH../SA..



WT../WH../WA..



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Parallel-shaft helical gearmotors	FT/FH/FA ..37	FT/FH/FA ..47	FT/FH/FA ..57	FT/FH/FA ..67	FT/FH/FA ..77	FT/FH/FA ..87	FT/FH/FA ..97	FT/FH/FA ..107	FT/FH/FA ..127	FT/FH/FA 157
Part number	0643584X	06435858	06435866	06435866	06435874	06435882	06435890	06421814	06421822	06421830
G4 in mm	81	90	101	101	124	165	200	196	229	275
O1 in mm	166	199	222	236	285	322	382	421	502	605
X in mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Y in mm	78	87	98	98	121	162	197	193	226	272

Helical-bevel gear-motors	KH/KA ..19	KH/KA ..29	KT/KA ..39	KT/KA ..49
Part number	06442595	10631259	10682651	10682964
G4 in mm	62	68	86	97
O2 in mm	83	90	117.5	138
X in mm	1.5	1.5	1	1
Y in mm	80	87	84	95

Helical-bevel gear-motors[1)]	KT/KH/KA ..37	KT/KH/KA ..47	KT/KH/KA ..57	KT/KH/KA ..67	KT/KH/KA ..77	KT/KH/KA ..87	KT/KH/KA ..97	KT/KH/KA ..107	KT/KH/KA ..127	KT/KH/KA ..157
Part number	0643584X	06435858	06435866	06435866	06435874	06435882	06435890	06421814	06421822	06421879
G4 in mm	81	90	101	101	124	165	200	196	229	275
O2 in mm	104	122	137	143	177	229	382	246	297	375
X in mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Y in mm	78	87	98	98	121	162	197	193	226	272

1) Not possible in foot-mounted helical-bevel gear units with hollow shafts (KH..B and KA..B)

Helical-worm gear-motors	ST/SH/SA ..37	ST/SH/SA ..47	ST/SH/SA ..57	ST/SH/SA ..67	ST/SH/SA ..77	ST/SH/SA ..87	ST/SH/SA ..97
Part number	06444768	0643584X	06435858	06435866	06435874	06435882	06435882
G4 in mm	64	81	90	101	124	165	165
O2 in mm	98	104	122	137	177	203	223
X in mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Y in mm	61	78	87	98	121	162	162

SPIROPLAN® gear-motors	WT/WH/WA ..37	WT/WH/WA ..47
Part number	10611479	10611959
G4 in mm	67	78
O2 in mm	95.5	109
X in mm	1	1
Y in mm	64	76

22148205/EN – 09/2016

6.14 Condition monitoring: Oil aging sensor

6.14.1 Technical data of oil aging sensor

DUO10A diagnostic unit

DUO10A	Technical data		
Preset oil grades	OIL1	CLP mineral oil.	T_{max} = 100 °C
		Bio oil	T_{max} = 100 °C
	OIL2	CLP HC synthetic oil:	T_{max} = 130 °C
		CLP PAO oil	T_{max} = 130 °C
	OIL3	Polyglycol CLP PG	T_{max} = 130 °C
	OIL4	Food grade oil	T_{max} = 100 °C
Switch outputs	1: Early warning (time to next oil change can be set to between 2 and 100 days) 2: Main alarm (time to oil change 0 days) 3: Maximum temperature exceeded T_{max} 4: DUO10A is ready for operation		
Permitted oil temperature	-40 °C – +130 °C		
Permitted temperature sensor	PT1000		
EMC	IEC1000-4-2/3/4/6		
Ambient temperature	-25 °C – +70 °C		
Operating voltage	DC 18 – 28 V		
Current consumption for DC 24 V	< 90 mA		
Protection class	III		
Degree of protection	IP67 (optionally IP69K)		
Housing materials	Evaluation unit: V2A, EPDM/X, PBT, FPM Temperature sensor: V4A		
Electrical connection	Evaluation unit: M12 plug connector PT1000 temperature sensor: M12 plug connector		

22148205/EN – 09/2016

Designations and part numbers

Designation	Description	Part number
 DUO10A	Evaluation unit (basic unit)	13438751
DUO10A-PUR-M12-5m	5 m PUR cable with 1 connector	13438778
DUO10A-PVC-M12-5m	5 m PVC cable with 1 connector	13438786
DUO10A	Angle bracket	13438808
DUO10A D = 34	Mounting clamp	13438794
W4843 PT1000 	PT1000 temperature sensor	13438816
W4843_4x0,34-2m-PUR	2 m PUR cable for PT1000[1)]	13438824
W4843_4x0,34-2m-PVC	2 m PVC cable for PT1000[2)]	13438832
 DUO10A	Protection cap (for aseptic design, IP69K)	13439022

1) PUR cables are particularly suited for use in oil-contaminated environments.
2) PVC cables are particularly suited for use in moist environments.

22148205/EN – 09/2016

Mounting to standard gear units (R, F, K,S)

Adapter for mounting the PT1000 temperature sensor in screw plug holes:

Complete adapter for PT1000 sensor	Part number
M10 × 1	13439030
M12 × 1.5	13439049
M22 × 1.5	13439057
M33 × 2	13439065
M42 × 2	13439073

Mounting base for installing the diagnostic unit at the gear unit with an angle bracket:

Mounting base with sealing ring	Part number
M10 × 1	13434411
M12 × 1.5	13438271
M22 × 1.5	13438298
M33 × 2	13438301
M42 × 2	13438328

22148205/EN – 09/2016

7 Important information on selection tables and dimension drawings

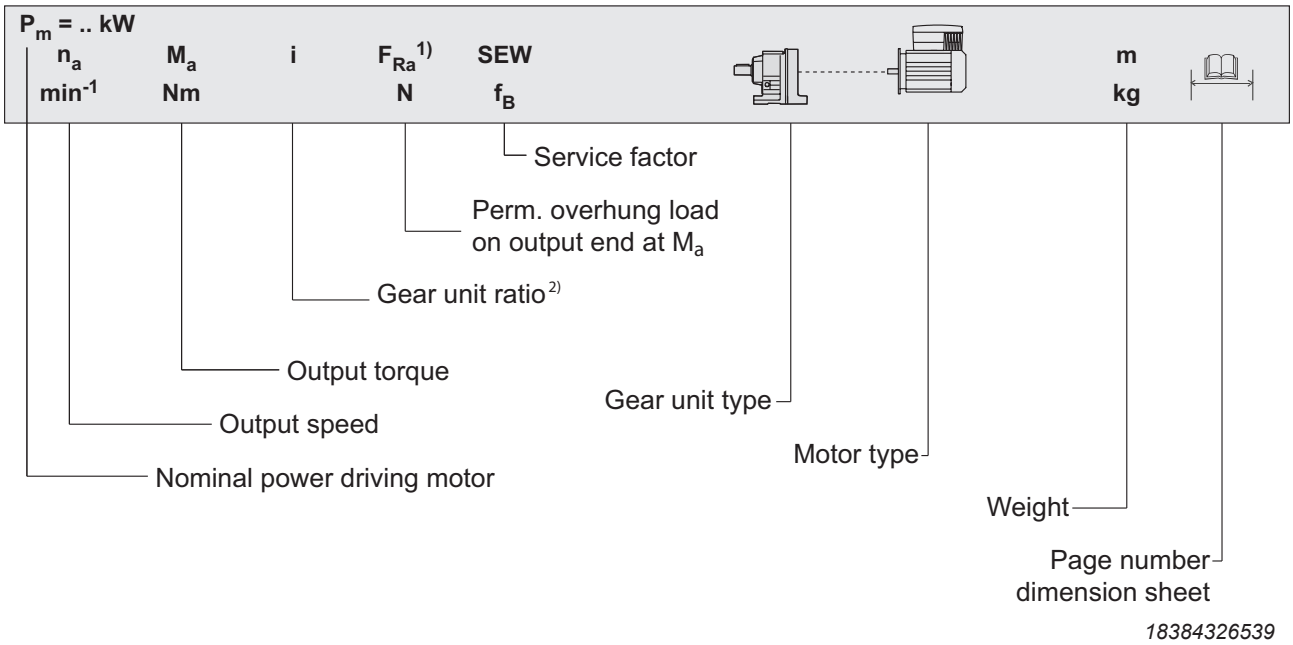
7.1 Selection tables for gearmotors

7.1.1 Structure of the selection tables

The two figures below illustrate the structure of the selection tables for gearmotors. There are two types of selection tables:

1. For standard output speeds, sorted by the rated power P_m of the driving motor in kW.
2. For extremely low output speeds, always compound gearmotors sorted by the maximum permitted output torque M_{amax} in Nm.

Table for standard output speeds:



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[1] Overhung load for foot-mounted gear units with solid shaft; overhung loads for other design types upon request.
[2] A value marked with * indicates finite gear unit ratio.

INFORMATION

Only applies to SPIROPLAN® (W) gearmotors:

If a lubricant is used for the food industry (food grade), a service factor SEW $f_B \geq 1.2$ is required.

22148205/EN – 09/2016

7.2 Dimension sheet information

7.2.1 Symbols for scope of delivery

Standard parts supplied by SEW-EURODRIVE.

Standard parts not supplied by SEW-EURODRIVE.

7.2.2 Tolerances

Shaft heights

The following tolerances apply to the indicated dimensions:

h	≤ 250 mm	→ -0.5 mm
h	> 250 mm	→ -1 mm

Foot-mounted gear units: Check the mounted motor because it may project below the mounting surface.

Shaft ends

Diameter tolerance:

Ø	≤ 50 mm	→ ISO k6
Ø	> 50 mm	→ ISO m6

Centering bores according to DIN 332, shape DR:

Ø	= 7 – 10 mm	→ M3	Ø	> 30 – 38 mm	→ M12
Ø	> 10 – 13 mm	→ M4	Ø	> 38 – 50 mm	→ M16
Ø	> 13 – 16 mm	→ M5	Ø	> 50 – 85 mm	→ M20
Ø	> 16 – 21 mm	→ M6	Ø	> 85 – 130 mm	→ M24
Ø	> 21 – 24 mm	→ M8	Ø	> 130 mm	→ M30
Ø	> 24 – 30 mm	→ M10			

Keys: according to DIN 6885 (domed type)

Keyway width to ISO N9

Hollow shafts

Diameter tolerance:

Ø	→ ISO H7 measured with plug gauge

Keys: according to DIN 6885 (domed type)

Exception: Key for WA.37 with shaft Ø 25 mm and for KA.29 with shaft Ø 30 mm according to DIN 6885-3 (low form)

Keyway width to ISO JS9

22148205/EN – 09/2016

Multiple-spline shafts

D_m Measuring roller diameter

M_e Check size

Flanges

Centering shoulder tolerance:

Ø ≤ 230 mm (flange sizes A120 – A300) → ISO j6

Ø > 230 mm (flange sizes A350 – A660) → ISO h6

Up to 3 different flange dimensions are available for each size of helical gear unit, SPIROPLAN® gear unit, AC (brake) motor and explosion-proof AC (brake) motor. The mountable flange for each size can be found in the respective dimension sheets.

7.2.3 Eyebolts, lifting eyes

R07 – R27 helical gear units, motors up to DR..100 and SPIROPLAN® gearmotors W..10 – W..30 are delivered without special transportation fixtures. All other gear units and motors are equipped with cast-on lifting eyes, screw-on lifting eyes or screw-on lifting eyebolts.

Gear unit/motor type	Screw-on		Cast-on
	Eyebolts	Lifting eyes	Lifting eyes
R..37 – R..57	—	X	—
R..67 – R..167	X	—	—
RX57 – RX67	—	X	—
RX77 – RX107	X	—	—
F..27 – F..157	—	—	X
K..19 – K..49	—	X	—
K..37 – K..157	—	—	X
K..167 – K..187	X	—	—
S..37 – S..47	—	X	—
S..57 – S..97	—	—	X
W..37 – W..47	—	X	—
≥ DR..112	X	—	—

Key: —not available, X available

7.2.4 Breather valves

The gear unit dimension drawings always show the screw plugs. The corresponding screw plug is replaced by an activated breather valve at the factory depending on the ordered mounting position M1 to M6. The result may be slightly altered contour dimensions.

22148205/EN – 09/2016

7.2.5 Shrink disk connection

In order to non-positively transfer the torques stated in the catalog in case of gear units with hollow shaft and shrink disk connection, observe the following peripheral conditions in addition to the information on the respective dimension sheet when dimensioning the customer shaft:

- Surface roughness Rz ≤ 16 µm
- Elastic limit of the customer shaft material R_e and/or $Rp_{0.2}$ ≥ 305 N/mm²
- Design of the customer shaft as solid shaft

For customer shaft designs as hollow shaft, contact SEW-EURODRIVE.

7.2.6 Splined hollow shaft

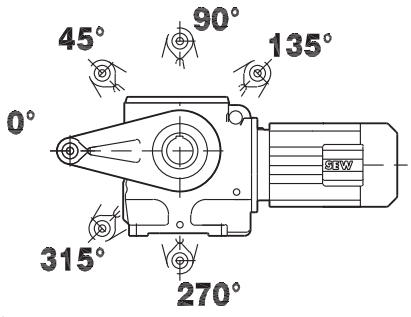
FV.. hollow shaft gear unit sizes 27 to 107, and KV.. sizes 37 to 107 are supplied with splining according to standard 5480.

7.2.7 Rubber buffer for FA/FH/FV/FT

The depictions on the dimension sheets show the rubber buffers for FA/FH/FV/FT gear units in loose state. Preload rubber buffer by the indicated value ΔL. The characteristic curve of spring for the rubber buffer is available upon request from SEW-EURODRIVE.

7.2.8 Torque arm position

The following illustration shows the possible torque arm positions for helical-worm gear units, the 2-stage K..9 helical-bevel gear units, and SPIROPLAN® gear units (135° position not possible with SPIROPLAN® gear units) as well as the respective angles:



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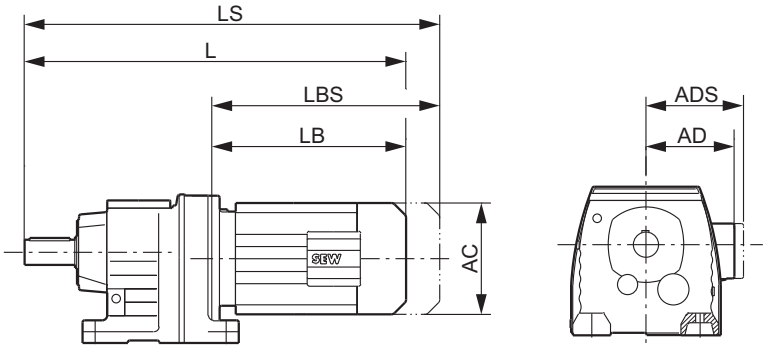
For more information about torque arms, refer to the respective dimension sheets of the gearmotors.

22148205/EN – 09/2016

7.2.9 Gearmotor dimension drawings

The dimension drawings of the gearmotors are described below:



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L	Total length of gearmotor
LS	Total length of gearmotor including brake
LB	Length of motor
LBS	Length of brakemotor
AC	Diameter of motor
AD	Center of motor shaft to top part of terminal box
ADS	Center of brakemotor shaft to top part of terminal box

7.2.10 Motor options

The motor dimensions may change when installing motor options. Refer to the dimension drawings of the motor options in the "AC Motors" catalog.

7.2.11 Special designs

The terminal box dimensions in special designs might vary from the standard.

22148205/EN – 09/2016