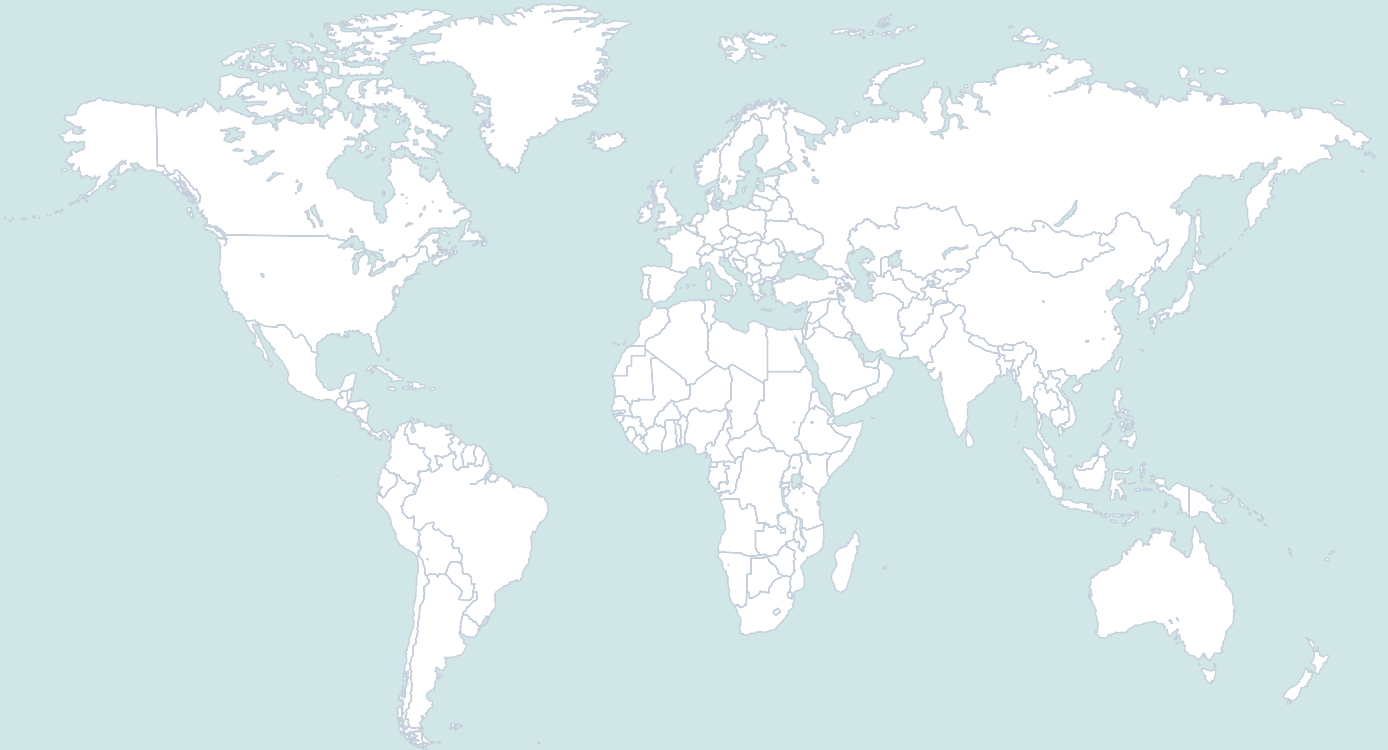

















# Catalog



## Gear Units





	<b>1 Introduction .....</b>	<b>7</b>	<b>1</b>
	<b>2 Product Description of the Gear Units .....</b>	<b>12</b>	<b>2</b>
	<b>3 Overview of Types and Type Designation .....</b>	<b>25</b>	<b>3</b>
	<b>4 Project Planning Information .....</b>	<b>42</b>	<b>4</b>
<b>M1 ... M6</b>	<b>5 Mounting Position of Gear Units .....</b>	<b>71</b>	<b>5</b>
	<b>6 Design and Operating Notes.....</b>	<b>98</b>	<b>6</b>
	<b>7 Important Notes on Selection Tables and Dimension Sheets .....</b>	<b>125</b>	<b>7</b>
	<b>8 Helical Gear Units .....</b>	<b>133</b>	<b>8</b>
	<b>9 Parallel Shaft Helical Gear Units.....</b>	<b>224</b>	<b>9</b>
	<b>10 Helical-Bevel Gear Units.....</b>	<b>322</b>	<b>10</b>
	<b>11 Helical-Worm Gear Units .....</b>	<b>420</b>	<b>11</b>
	<b>12 SPIROPLAN® Gear Units.....</b>	<b>513</b>	<b>12</b>
	<b>13 Abbreviation Key.....</b>	<b>532</b>	<b>13</b>
	<b>14 Address Directory .....</b>	<b>533</b>	<b>14</b>



<b>1</b>	<b>Introduction .....</b>	<b>7</b>
1.1	The SEW-EURODRIVE Group of Companies .....	7
1.2	Products and systems from SEW-EURODRIVE.....	8
1.3	Additional documentation.....	10
1.4	Copyright.....	11
<b>2</b>	<b>Product Description of the Gear Units .....</b>	<b>12</b>
2.1	General information .....	12
2.2	Surface protection.....	14
2.3	Extended storage.....	16
2.4	Explosion protection according to ATEX.....	18
2.5	Components on the input side .....	19
<b>3</b>	<b>Overview of Types and Type Designation .....</b>	<b>25</b>
3.1	Product variants and options .....	25
3.2	Type designation.....	39
3.3	Gear unit nameplate .....	40
3.4	Overview of gear units .....	41
<b>4</b>	<b>Project Planning Information .....</b>	<b>42</b>
4.1	Drive and gear unit selection data.....	42
4.2	Project planning procedure .....	44
4.3	Project planning information.....	45
4.4	Project planning for components on the input side .....	54
4.5	RM gear units.....	67
4.6	Additional documentation.....	70
<b>5</b>	<b>Mounting Positions .....</b>	<b>71</b>
5.1	General information on the mounting positions.....	71
5.2	Order information for gear units .....	72
5.3	Key to the mounting position sheets .....	74
5.4	Mounting positions of helical gear units .....	76
5.5	Mounting positions of parallel shaft helical gear units.....	81
5.6	Mounting positions of helical-bevel gearmotors.....	84
5.7	Mounting positions of helical-worm gear units .....	89
5.8	Mounting positions of SPIROPLAN® gear units" .....	95
<b>6</b>	<b>Design and Operating Notes .....</b>	<b>98</b>
6.1	Lubricants and fill quantities.....	98
6.2	Reduced backlash gear unit types .....	106
6.3	Installation/removal of gear units with hollow shaft and key .....	107
6.4	Gear units with hollow shaft .....	112
6.5	TorqLOC® hollow shaft mounting system for gear units with hollow shaft. ....	113
6.6	Fastening the gear unit .....	115
6.7	Torque arms.....	115
6.8	Flange contours of RF.. and R..F gear units .....	116
6.9	Flange contours of FF., KF., SF.. and WF.. gear units .....	117
6.10	Flange contours of FAF., KAF., SAF.. and WAF.. gear units.....	118
6.11	Fixed covers.....	119
6.12	Condition monitoring: Oil aging and vibration sensor.....	121



<b>7</b>	<b>Important Information on Selection Tables and Dimension Sheets</b> .....	<b>125</b>	<b>1</b>
7.1	Information on selection tables .....	125	
7.2	Notes on the dimension sheets.....	127	
7.3	Gear unit (gearmotor) dimensions .....	130	
<b>8</b>	<b>Helical Gear Units R</b> .....	<b>133</b>	<b>2</b>
8.1	Selection tables for adapters for mounting IEC/NEMA motors (AM) .....	133	
8.2	Selection tables for adapters with hydraulic centrifugal coupling (AT).....	149	
8.3	Selection tables for input shaft assembly (AD) .....	158	<b>3</b>
8.4	Dimension sheets for adapters for mounting IEC motors (AM).....	167	
8.5	Dimension sheets for adapters for mounting NEMA motors (AM) .....	210	<b>4</b>
8.6	Dimension sheets for adapters with torque limiting coupling (AR).....	212	
8.7	Dimension sheets for adapters with hydraulic centrifugal coupling (AT)....	214	
8.8	Dimension sheets for adapters with hydraulic centrifugal coupling and disk brake (AT../BMG).....	217	<b>5</b>
8.9	Dimension sheets for input shaft assembly (AD) .....	220	
8.10	Dimension sheets for input shaft assembly with motor mounting platform	221	
<b>9</b>	<b>Parallel Shaft Helical Gear Units F</b> .....	<b>224</b>	<b>6</b>
9.1	Selection tables for adapters for mounting IEC/NEMA motors (AM) .....	224	
9.2	Selection tables for adapters with hydraulic centrifugal coupling (AT).....	237	
9.3	Selection tables for input shaft assembly (AD) .....	246	<b>7</b>
9.4	Dimension sheets for adapters for mounting IEC motors (AM).....	255	
9.5	Dimension sheets for adapters for mounting NEMA motors (AM) .....	309	
9.6	Dimension sheets for adapters with torque limiting coupling (AR).....	310	<b>8</b>
9.7	Dimension sheets for adapters with hydraulic centrifugal coupling (AT)....	312	
9.8	Dimension sheets for adapters with hydraulic centrifugal coupling and disk brake (AT../BMG).....	315	<b>9</b>
9.9	Dimension sheets for input shaft assembly (AD) .....	318	
9.10	Dimension sheets for input shaft assembly with motor mounting platform	319	
<b>10</b>	<b>Helical-Bevel Gear Units K</b> .....	<b>322</b>	<b>10</b>
10.1	Selection tables for adapters for mounting IEC/NEMA motors (AM) .....	322	
10.2	Selection tables for adapters with hydraulic centrifugal coupling (AT) .....	336	
10.3	Selection tables for input shaft assembly (AD) .....	345	<b>11</b>
10.4	Dimension sheets for adapters for mounting IEC motors (AM).....	353	
10.5	Dimension sheets for adapters for mounting NEMA motors (AM) .....	407	
10.6	Dimension sheets for adapters with torque limiting coupling (AR).....	409	<b>12</b>
10.7	Dimension sheets for adapters with hydraulic centrifugal coupling (AT)....	411	
10.8	Dimension sheets for adapters with hydraulic centrifugal coupling and disk brake (AT../BMG).....	414	<b>13</b>
10.9	Dimension sheets for input shaft assembly (AD) .....	417	
10.10	Dimension sheets for input shaft assembly with motor mounting platform	418	
<b>11</b>	<b>Helical-Worm Gear Units S</b> .....	<b>420</b>	<b>14</b>
11.1	Selection tables for adapters for mounting IEC/NEMA motors (AM) .....	420	
11.2	Selection tables for adapters with hydraulic centrifugal coupling (AT) .....	429	
11.3	Selection tables for input shaft assembly (AD) .....	436	
11.4	Dimension sheets for adapters for mounting IEC motors (AM).....	443	
11.5	Dimension sheets for adapters for mounting NEMA motors (AM) .....	477	
11.6	Dimension sheets for adapters with torque limiting coupling (AR).....	478	
11.7	Dimension sheets for adapters with hydraulic centrifugal coupling (AT)....	479	
11.8	Dimension sheets for adapters with hydraulic centrifugal coupling and disk brake (AT../BMG).....	481	



11.9	Dimension sheets for input shaft assembly (AD) .....	483
11.10	Dimension sheets for input shaft assembly with motor mounting platform .....	484
11.11	Technical data for S, SF, SA, SAF 37 .....	485
11.12	Technical data for S, SF, SA, SAF 47 .....	489
11.13	Technical data for S, SF, SA, SAF 57 .....	493
11.14	Technical data for S, SF, SA, SAF 67 .....	497
11.15	Technical data for S, SF, SA, SAF 77 .....	501
11.16	Technical data for S, SF, SA, SAF 87 .....	505
11.17	Technical data for S, SF, SA, SAF 97 .....	509
<b>12</b>	<b>SPRIOPLAN® W Gear Units.....</b>	<b>513</b>
12.1	Selection tables for adapters for mounting IEC/NEMA motors (AM) .....	513
12.2	Selection tables for input shaft assembly (AD)] .....	517
12.3	Dimension sheets for adapters for mounting IEC motors (AM).....	520
12.4	Dimension sheets for adapters for mounting NEMA motors (AM) .....	529
12.5	Dimension sheets for adapters with torque limiting coupling (AR) .....	530
12.6	Dimension sheets for input shaft assembly (AD) .....	531
<b>13</b>	<b>Abbreviation Key.....</b>	<b>532</b>
<b>14</b>	<b>Address Directory .....</b>	<b>533</b>
<b>15</b>	<b>Index.....</b>	<b>553</b>



## 1 Introduction

### 1.1 The SEW-EURODRIVE Group of Companies

#### *Global presence*

Driving the world with innovative drive solutions for all branches and every application. Products and systems from SEW-EURODRIVE are used in a multitude of applications worldwide. 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 13 manufacturing plants, 67 assembly plants in 47 countries and our comprehensive range of services, which we consider an integrative service that continues our commitment to outstanding quality.

#### *Always the right drive*

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, 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.

The gearmotors are powered by MOVITRAC<sup>®</sup> frequency inverters, MOVIDRIVE<sup>®</sup> inverters and MOVIAXIS<sup>®</sup> multi-axis servo inverters, a combination that blends perfectly with the existing SEW-EURODRIVE program. As in the case for mechanical systems, the development, production and assembly is also 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<sup>®</sup> 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<sup>®</sup>, the gearmotor with integrated frequency inverter or MOVI-SWITCH<sup>®</sup>, 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: MOVITRANS<sup>®</sup> – system components for contactless energy transfer, MOVIPRO<sup>®</sup> – the decentralized drive control and MOVIFIT<sup>®</sup> – the new decentralized intelligence.

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.

#### *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 applications in all branches of industries and applications.



## 1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into the following 4 product groups:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial gear units

Products and systems used in several group applications are listed in a separate group "Products and systems covering several product groups". Consult the following tables to locate the products and systems included in the respective product group:

1. Gearmotors and frequency inverters		
Gear units/gearmotors	Motors	Frequency inverters
<ul style="list-style-type: none"> <li>• Helical gear units/helical gearmotors</li> <li>• Parallel-shaft helical gear units/parallel-shaft helical gearmotors</li> <li>• Helical-bevel gear units/helical-bevel gearmotors</li> <li>• Helical-worm gear units/helical-worm gearmotors</li> <li>• SPIROPLAN® right-angle gearmotors</li> <li>• EMS drives</li> <li>• Geared torque motors</li> <li>• Pole-changing gearmotors</li> <li>• Variable speed gear units/variable speed gearmotors</li> <li>• Aseptic gearmotors</li> <li>• Gear units/gearmotors to ATEX standard</li> <li>• Variable speed gear units/variable speed gearmotors to ATEX standard</li> </ul>	<ul style="list-style-type: none"> <li>• Asynchronous AC motors/AC brakemotors</li> <li>• Pole-changing AC motors/AC brakemotors</li> <li>• Energy-efficient motors</li> <li>• Explosion-proof AC motors/AC brakemotors</li> <li>• Torque motors</li> <li>• Single-phase motors/single-phase brakemotors</li> <li>• Asynchronous linear motors</li> </ul>	<ul style="list-style-type: none"> <li>• MOVITRAC® frequency inverters</li> <li>• MOVIDRIVE® inverters</li> <li>• Control, technology and communication options for inverters</li> </ul>

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





3. Decentralized drive systems		
Decentralized drives	Communication and installation	Contactless energy transfer
<ul style="list-style-type: none"> <li>• MOVIMOT® gearmotors with integrated frequency inverter</li> <li>• MOVIMOT® motors/brake-motors with integrated frequency inverter</li> <li>• MOVI-SWITCH® gearmotors with integrated switching and protection function</li> <li>• MOVI-SWITCH® motors/brakemotors with integrated switching and protection function</li> <li>• Explosion-proof MOVIMOT® and MOVI-SWITCH® gearmotors</li> </ul>	<ul style="list-style-type: none"> <li>• Fieldbus interfaces</li> <li>• Field distributors for decentralized installation</li> <li>• MOVIFIT® product range                             <ul style="list-style-type: none"> <li>– MOVIFIT® MC for controlling MOVIMOT® drives</li> <li>– MOVIFIT® SC with integrated electronic motor switch</li> <li>– MOVIFIT® FC with integrated frequency inverter</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• MOVITRANS® system                             <ul style="list-style-type: none"> <li>– Stationary components for energy supply</li> <li>– Mobile components for energy consumption</li> <li>– Line cables and installation material</li> </ul> </li> </ul>

4. Industrial gear units
<ul style="list-style-type: none"> <li>• Helical gear units</li> <li>• Bevel-helical gear units</li> <li>• Planetary gear units</li> </ul>

Products and systems covering several product groups
<ul style="list-style-type: none"> <li>• Operator terminals</li> <li>• MOVI-PLC® drive-based control system</li> </ul>

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

- Technical consulting
- Application software
- Seminars and training
- Extensive technical documentation
- International customer service

Visit our homepage at

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

The website provides comprehensive information and services.



### 1.3 Additional documentation

#### **Content of this publication**

This "Gear Units" catalog provides a detailed description of the following product groups from SEW-EURODRIVE:

- R., F., K., S., and SPIROPLAN® W gear units in combination with
  - AM adapter
  - AT adapter
  - AD input shaft assembly
  - AR Torque limiting coupling

The descriptions include:

- Product descriptions
- Overview of types
- Project planning information
- Description of mounting positions
- Explanation on the order information
- Combination overviews and technical data
- Dimension sheets

For information on options for the motors, refer to the catalogs/price catalogs "DT/DV Gearmotors" and "AC Motors".

For information on R., F., K., S.. and SPIROPLAN® W gear units in combination with the AQ adapter for servomotors, refer to the "Servo Gear Units" catalog/price catalog.

#### **Additional documentation**

The following price catalogs and catalogs are available from SEW-EURODRIVE in addition to this "Gear Units" catalog:

- Servo gear units
- Synchronous servo gearmotors
- Asynchronous servo gearmotors
- DR gearmotors
- AC motors

These price catalogs and catalogs offer the following information:

- Product descriptions
- Technical data and inverter assignments
- Important information about tables and dimension sheets
- Description of the different types
- Selection tables
- Dimension sheets
- Technical data
- Notes on adapter mounting



## 1.4 Copyright

© 2010 - SEW-EURODRIVE. All rights reserved.

Copyright law prohibits the unauthorized duplication, modification, distribution, and use of this document, in whole or in part.



## 2 Product Description of the Gear Units

### 2.1 General information

#### **Ambient temperature**

Gear units and gearmotors from SEW-EURODRIVE can be operated in a wide ambient temperature range. 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
<b>R, F, and K</b>	CLP(CC) VG220	-10 °C ... +40 °C
<b>S</b>	CLP(CC) VG680	0 °C ... +40 °C
<b>W</b>	CLP(SEW-PG) VG460	-10 °C ... +40 °C

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

Gear units and gearmotors 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. This kind of project planning is generally recommended for increased ambient temperatures as of size 97 and for helical-worm gear units with small gear ratios. SEW-EURODRIVE will gladly perform this project planning for you.

If the drive is to be operated on a frequency inverter, you must also consider the project planning notes for the inverter and take into account the thermal effects of inverter operation.

#### **Installation altitude**

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/price catalog applies to an installation altitude of maximum 1000 m above sea level. Installation altitudes of more than 1000 m asl must be taken into account for project planning of gear units and gearmotors.

#### **Power and torque**

The power and torque ratings listed in the catalogs 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.



**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.

**Paint** Gear units from SEW-EURODRIVE are painted as follows:

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

Special paints are available on request.

**Air admission and accessibility**

The gearmotors/brakemotors must be mounted on the driven machine in such a way that both axially and radially there is enough space left for unimpeded air admission, for maintenance work on the brake and, if required, for the MOVIMOT® inverter. Please also refer to the notes in the motor dimension sheets.

**Multi-stage gearmotors**

You can achieve particularly low output speeds by using multi-stage gear units or multi-stage gearmotors. Such a setup requires a helical gear unit or gearmotor on the input end as a second gear unit.

It may be necessary to limit the motor power to match the maximum permitted output torque of the gear unit.

**Reduced backlash design**

Helical, parallel shaft helical and helical-bevel gear units with reduced backlash are available from gear unit size 37. The circumferential backlash of these gear units is considerably less than that of the standard versions so that positioning tasks can be solved with great precision. The circumferential backlash is specified in angular minutes [ ' ] in the technical data. The circumferential backlash for the output shaft is specified without load (max. 1% of the rated output torque); the gear unit input end is blocked. For further information, refer to chapter "Reduced backlash gear units" on page 106.

**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 gearmotors in the "Project Planning/RM gear units" chapter.

**SPIROPLAN® right-angle gear units**

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 relationships, and the aluminum housing. These features make SPIROPLAN® right-angle gearmotors very quiet, 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 allow for 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.

Two different flange diameters are available. On request, SPIROPLAN® right-angle gearmotors can be equipped with a torque arm.

#### **Components on the input side**

The following components on the input side are available for the gear units from SEW-EURODRIVE:

- **Input covers with input shaft extension, optionally with**
  - Centering shoulder
  - Backstop
  - Motor mounting platform
- **Adapter**
  - For mounting IEC or NEMA motors with the option of a backstop
  - For mounting servomotors with a square flange
  - With torque limiting safety couplings and speed or slip monitor
  - With hydraulic centrifugal coupling, also with disk brake or backstop

#### **Weights**

Please note that all weights shown in the catalogs exclude the oil fill for the gear units and gearmotors. The weights vary according to gear unit type and gear unit size. The lubricant fill depends on the mounting position which means no universally applicable information can be given. Please refer to "Lubricants" in the "Design and Operating Notes" chapter for recommended lubricant fill quantities depending on the mounting position. For the exact weight, refer to the order confirmation.

## **2.2 Surface protection**

#### **General information**

SEW-EURODRIVE offers the following optional protective measure for operating gear units under special environmental conditions.



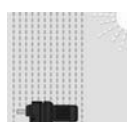
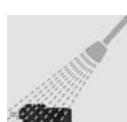

- Surface protection OS for motors and gear units

Special optional protective measures for the output shafts are also available.



**OS surface protection**

Instead of the standard surface protection, the motors and gear units are available with surface protection OS1 to OS4 as an option. The special procedure "Z" is also available. Special procedure "Z" means that large surface recesses are sprayed with a rubber filling prior to painting.

Surface protection <sup>1)</sup>	Ambient conditions	Sample applications
<b>Standard</b> 	Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C1 (negligible)</li> </ul>	<ul style="list-style-type: none"> <li>• Machines and systems in the automobile industry</li> <li>• Transport systems in logistics</li> <li>• Conveyor belts at airports</li> </ul>
<b>OS1</b> 	Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C2 (low)</li> </ul>	<ul style="list-style-type: none"> <li>• Systems in saw mills</li> <li>• Hall gates</li> <li>• Agitators and mixers</li> </ul>
<b>OS2</b> 	Suitable for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C3 (moderate)</li> </ul>	<ul style="list-style-type: none"> <li>• Applications in amusement parks</li> <li>• Funiculars and chair-lifts</li> <li>• Applications in gravel plants</li> <li>• Systems in nuclear power plants</li> </ul>
<b>OS3</b> 	Suited for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C4 (high)</li> </ul>	<ul style="list-style-type: none"> <li>• Sewage treatment plants</li> <li>• Port cranes</li> <li>• Mining applications</li> </ul>
<b>OS4</b> 	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C5-1 (very high)</li> </ul>	<ul style="list-style-type: none"> <li>• Drives in malting plants</li> <li>• Wet areas in the beverage industry</li> <li>• Conveyor belts in the food industry</li> </ul>

1) Motors/brakemotors in degree of protection IP56 or IP66 are only available with OS2, OS3, or OS4 surface protection

2) To DIN EN ISO 12944-2 classification of ambient conditions

**Special protective 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
<b>FKM oil seal (Viton)</b>	High quality material	Drives subject to chemical contamination
<b>Coating on output shaft end</b>	Surface coating of the contact surface of the oil seal	Severe environmental impact and in conjunction with FKM oil seal (Viton)
<b>Stainless steel output shaft</b>	Surface protection with high-quality material	Particularly demanding applications in terms of surface protection



#### 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 can help 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 order larger quantities of NOCO® fluid from SEW-EURODRIVE.

NOCO® fluid is a food grade substance according to NSF-H1. You can tell that NOCO® fluid is a food grade oil by the NSF-H1 identification label on its packaging.

### 2.3 Extended storage

#### Type

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

In this case, a VCI corrosion inhibitor (volatile corrosion inhibitor) is added to the lubricant in these gear units. Please note that this VCI corrosion inhibitor is only effective in a temperature range between -25 °C and +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. You can order OS2, OS3 or OS4 instead of OS1.

Surface protection	Suitable for
OS1	Low environmental impact
OS2	Medium environmental impact
OS3	High environmental impact
OS4	Very high environmental impact



#### INFORMATION

The gear units must remain tightly sealed until taken into operation to prevent the VCI corrosion protection agent from evaporating.

At the factory, the gear units are filled with oil to the appropriate level depending on the specified mounting position (M1 to M6). Check the oil level before you start operating the gear unit for the first time.





**Storage conditions**

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

Climate zone	Packaging <sup>1)</sup>	Storage location <sup>2)</sup>	Storage duration
<b>Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)</b>	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < 9 < 60 °C, 50% relative atmospheric humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
<b>Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)</b>	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	With roof, protected against rain and shocks.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	With roof, enclosed at constant temperature and atmospheric humidity (5 °C < 9 < 50 °C, 50% relative atmospheric humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.

- 1) 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 Explosion protection according to ATEX

##### Validity

EU directive 94/9/EC or ATEX lays down new regulations for explosion protection in all types of devices for the European market. This directive applies to gearmotors and motors as well. Since July 1, 2003, EU directive 94/9/EC has been applicable without restrictions to the use of gearmotors and motors within the European Union. Other European countries, such as Switzerland, have fallen in with this regulation since.

##### Extent

SEW-EURODRIVE now only supplies explosion-proof gear units in accordance with the corresponding ATEX directive. This also applies to options and accessories in explosion-proof design.

Depending on their features and dimensions, explosion-proof gear units are suitable for:

- Potentially explosive gas atmosphere, zone 1 or 2.
- Potentially explosive dust atmosphere, zone 21 or 22.

SEW-EURODRIVE supplies gearmotors and motors in the following categories for use in zones 1, 21, 2, and 22:

- II2G
- II2D
- II3GD
- II3D

Stand-alone gear units with components on the input side are available in the following categories:

- Gear units with AM adapter and input shaft assembly for use in zones 1, 21, 2 and 22
  - II2GD
- Gear units with AR adapter for use in zones 2 and 22
  - II3GD

AT adapters and drives on a motor swing are not available according to ATEX regulation.

##### Other documentation

The "Explosion-Proof Drives to EU Directive 94/9/EC" system description and the volume of the same name in the "Drive Engineering - Practical Implementation" series provide you with basic information about this topic.

Please refer to the "Explosion-Proof Drives" catalog and the "Variable Speed Gearmotors" catalog for detailed information on explosion-proof products of SEW-EURODRIVE.



## 2.5 Components on the input side

### 2.5.1 Gear units with IEC or NEMA adapter AM

The following figure shows a helical gear unit with AM adapter:

2



04588AXX

AM adapters are used for mounting motors according to IEC standard or NEMA (type C or TC) to SEW helical gear units, parallel shaft helical gear units, helical-bevel, helical-worm, and SPIROPLAN® gear units.

Adapters are available for sizes 63 to 280 for IEC motors. Adapters are available for sizes 56 to 365 for NEMA motors.

The designation of the adapter size corresponds to the respective IEC or NEMA motor size.

Torque is transmitted between the motor and the gear unit via a positive and impact resistant dog clutch. Vibrations and shocks occurring during operation are effectively attenuated by an inserted polyurethane ring gear.

For more information, refer to chapter "Project planning for components on the input side" / "Gear units with IEC or NEMA adapter AM", page 54.



#### 2.5.2 AR adapter with torque limiting coupling

The following figure shows a helical-bevel gear unit with AR adapter:



04604AXX

The torque is transmitted non-positive via friction linings. The slip torque of the coupling can be adjusted with a setting nut and cup springs. Different slip torques are possible depending on the thickness and arrangement of the cup springs. In the event of an overload, the coupling slips and interrupts the power flow between motor and gear unit. This prevents damages to the system and drive.

For more information, refer to chapter "Project planning for components on the input side" / "AR adapter with torque limiting coupling", page 56.



### 2.5.3 AT adapter with hydraulic centrifugal coupling

The following figure shows a parallel shaft gear unit with AT adapter:



04607AXX

Helical, parallel shaft helical, helical-bevel, helical-worm, and SPIROPLAN® gear units can be combined with adapters and hydraulic centrifugal couplings for machines with high inertia starting (e.g. mixers, agitators, etc.). The hydraulic centrifugal coupling protects the motor and the driven machine against overload during the startup phase and ensures that the machine starts up smoothly. The coupling is installed in a housing to prevent anyone touching it. Cooling of the coupling is ensured by ventilation openings in the housing. It is possible to mount SEW motor sizes 71 to 180 (0.37 to 22 kW)<sup>1)</sup>.

Preferred speeds are 1400 rpm and 2800 rpm, i.e. 4 or 2-pole attached motors. Note that the noise level increases when using the 2-pole drive combination.

For more information, refer to chapter "Project planning for components on the input side" / "AT adapter with hydraulic centrifugal coupling", page 60.

1) Helical-bevel gear units with a hydraulic centrifugal coupling on a swing base are available for motors of size 200 to 280 (30 to 90 kW).



## Product Description of the Gear Units Components on the input side

### **Disk brake AT../BM(G) option**

The following figure shows a parallel shaft gear unit with AT adapter and disk brake BM(G):



04611AXX

The adapter with hydraulic centrifugal coupling can be configured with an SEW disk brake if the machine is to be braked in a defined manner. The brake is an electromagnetic disk brake with a DC coil which is released electrically and braked using spring force. As a result, the brake satisfies the safety requirement of braking in the event of a power failure. The braking torque can be varied by means of the type and number of brake springs used. The brake can be supplied with DC or AC voltage connection; the equipment needed for controlling the brake and the connection terminals are accommodated in a terminal box attached to the adapter. The brake can additionally be equipped with manual brake release on request.

For more information, refer to chapter "Project planning for components on the input side" / "AT adapter with hydraulic centrifugal coupling", page 60.

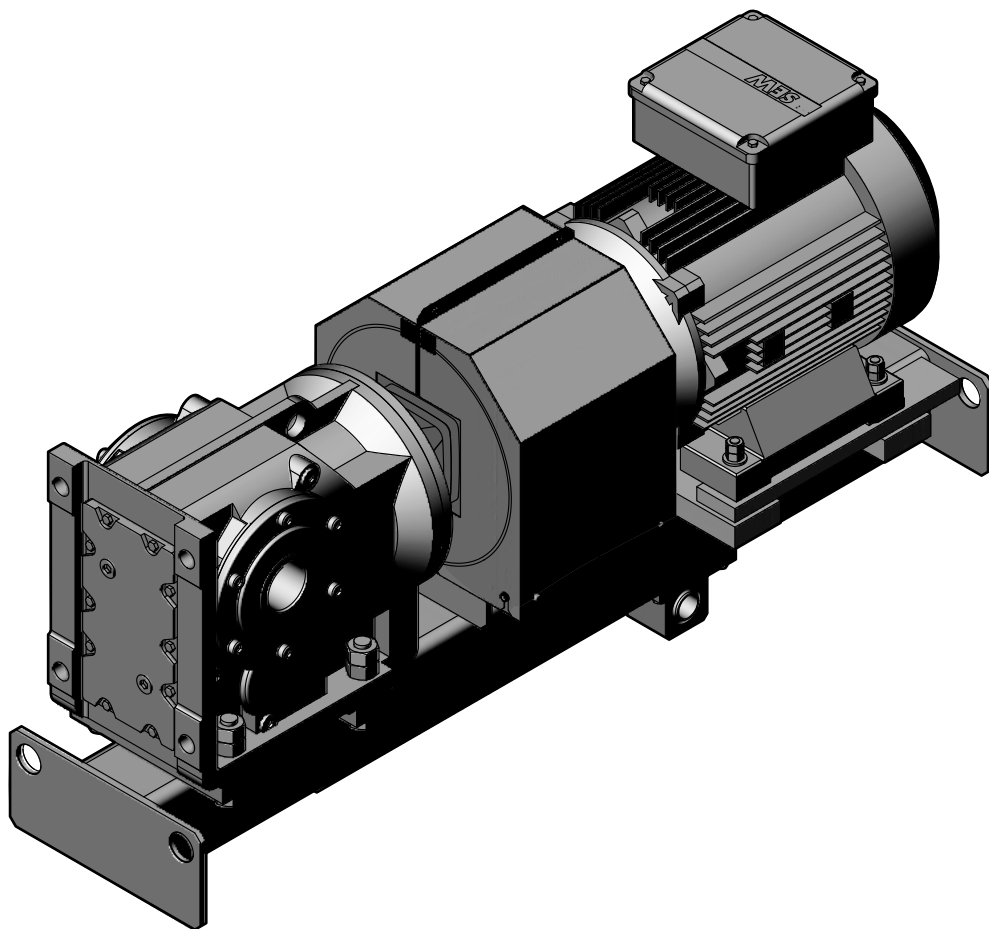


#### 2.5.4 Adapter with hydraulic centrifugal coupling on a swing base

SEW-EURODRIVE provides helical-bevel gear units with hydraulic centrifugal coupling (and brake if requested) on a swing base for motors from size 200. The relevant dimension sheets are available on request.

2

The following figure shows a helical-bevel gear unit on a swing base:



68152axx



#### 2.5.5 AD input shaft assembly

The following figure shows a helical gear unit with AD input shaft assembly:



04583AXX

Helical, parallel shaft helical, helical-bevel, helical-worm, and SPIROPLAN® gear units are equipped with an input shaft assembly for drive via an exposed shaft extension. The dimensions of the drive shafts are given in metric units according to IEC standard (dimensions in inch on request). The end of the input shaft has a center bore to standard 332 for mounting and attaching drive components.

The bearings of the input shaft are grease-lubricated. NBR oil seals and gap rings are used for sealing the cover. The solid output shaft bearings allows for high overhung loads.

For more information, refer to chapter "Project planning for components on the input side" / "AD input shaft assembly", page 63.

#### **Motor mounting platform AD../P**

Belt drives are available with adjustable motor mounting platform for space-saving installation. The motor mounting platform is arranged parallel to the drive shaft and has tapped holes for IEC standard motors (also available without tapped holes on request). The distance from the input shaft can be adjusted using threaded columns. The following figure depicts a helical gear unit with input shaft assembly and motor mounting platform AD../P:



53585AXX





### 3 Overview of Types and Type Designation

#### 3.1 Product variants and options

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

##### Helical gear units

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

##### Parallel shaft helical gear units

Designation	
F..	Foot-mounted
FA..B	Foot-mounted, hollow shaft
FH..B	Foot-mounted, hollow shaft with shrink disk
FV..B	Foot-mounted, hollow shaft with splined hollow shaft to standard 5480
FF..	B5 flange-mounted
FAF..	B5 flange-mounted type and hollow shaft
FHF..	B5 flange-mounted type and hollow shaft with shrink disk
FVF..	B5 flange-mounted type and hollow shaft with splined hollow shaft to standard 5480
FA..	Hollow shaft
FH..	Hollow shaft with shrink disk
FT..	Hollow shaft with TorqLOC® hollow shaft mounting system
FV..	Hollow shaft with splining to standard 5480
FAZ..	B14 flange-mounted type and hollow shaft
FHZ..	B14 flange-mounted type and hollow shaft with shrink disk
FVZ..	B14 flange-mounted type and hollow shaft with splined hollow shaft to standard 5480



#### Helical-bevel gear units

Designation	
K..	Foot-mounted
KA..B	Foot-mounted, hollow shaft
KH..B	Foot-mounted, hollow shaft with shrink disk
KV..B	Foot-mounted, hollow shaft with splined hollow shaft to standard 5480
KF..	B5 flange-mounted
KAF..	B5 flange-mounted type and hollow shaft
KHF..	B5 flange-mounted type and hollow shaft with shrink disk
KVF..	B5 flange-mounted type and hollow shaft with splined hollow shaft to standard 5480
KA..	Hollow shaft
KH..	Hollow shaft with shrink disk
KT..	Hollow shaft with TorqLOC <sup>®</sup> hollow shaft mounting system
KV..	Hollow shaft with splining to standard 5480
KAZ..	B14 flange-mounted type and hollow shaft
KHZ..	B14 flange-mounted type and hollow shaft with shrink disk
KVZ..	B14 flange-mounted type and hollow shaft with splined hollow shaft to standard 5480

#### Helical-worm gear units

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