Geared Servomotors

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Catalog

1051 9718 / EN
<table>
<thead>
<tr>
<th></th>
<th>Product Information</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Geared Servomotors Project Planning</td>
<td>38</td>
</tr>
<tr>
<td>3</td>
<td>Mounting Positions and Important Order Information</td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td>Geared Synchronous Servomotors with Helical Gear Units R..DS/CM</td>
<td>95</td>
</tr>
<tr>
<td>5</td>
<td>Geared Synchronous Servomotors with Planetary Gear Units PSx..DS/CM</td>
<td>147</td>
</tr>
<tr>
<td>6</td>
<td>Geared Synchronous Servomotors with Parallel Shaft Helical Gear Units F..DS/CM</td>
<td>203</td>
</tr>
<tr>
<td>7</td>
<td>Geared Synchronous Servomotors with Helical-Bevel Gear Units K..DS/CM</td>
<td>245</td>
</tr>
<tr>
<td>8</td>
<td>Geared Synchronous Servomotors with Helical-Worm Gear Units S..DS/CM</td>
<td>281</td>
</tr>
<tr>
<td>9</td>
<td>Synchronous Servomotors DS/CM</td>
<td>299</td>
</tr>
<tr>
<td>10</td>
<td>Geared Asynchronous Servomotors with Helical Gear Units R..CT/CV</td>
<td>355</td>
</tr>
<tr>
<td>11</td>
<td>Geared Asynchronous Servomotors with Planetary Gear Units PSx..CT/CV</td>
<td>421</td>
</tr>
<tr>
<td>12</td>
<td>Geared Asynchronous Servomotors with Parallel Shaft Helical Gear Units F..CT/CV</td>
<td>481</td>
</tr>
<tr>
<td>13</td>
<td>Geared Asynchronous Servomotors with Helical-Bevel Gear Units K..CT/CV</td>
<td>531</td>
</tr>
<tr>
<td>14</td>
<td>Geared Asynchronous Servomotors with Helical-Worm Gear Units S..CT/CV</td>
<td>585</td>
</tr>
<tr>
<td>15</td>
<td>Asynchronous Servomotors CT/CV</td>
<td>603</td>
</tr>
<tr>
<td>16</td>
<td>Appendix</td>
<td>667</td>
</tr>
</tbody>
</table>
Contents

1 Product Information ........................................................................................................... 6
  1.1 The SEW-EURODRIVE group of companies ......................................................... 6
  1.2 Product description and overview of types ......................................................... 8
  1.3 R / F / K / S geared servomotors ................................................................. 9
  1.4 PSF/PSB/PSE geared servomotors ............................................................... 17
  1.5 Unit designations for gear units and options ............................................... 18
  1.6 Type designations of servomotors and options ........................................... 20
  1.7 Sample unit designation of a geared servomotor ...................................... 22
  1.8 Assembly/removal of gear units with hollow shafts and keys .................. 23
  1.9 Shouldered hollow shaft with shrink disk option ...................................... 26
  1.10 Flange contours of the RF.. and R..F geared motors .................................. 32
  1.11 Gear unit mounting ....................................................................................... 33
  1.12 Torque arms ................................................................................................. 33
  1.13 Fixed hood covers ....................................................................................... 34
  1.14 MOVIDRIVE® and MOVIDRIVE® compact drive inverters ...................... 36

2 Project Planning for Geared Servomotors ..................................................................... 38
  2.1 Additional documentation ............................................................................. 38
  2.2 Drive selection data ....................................................................................... 39
  2.3 Features of synchronous and asynchronous servomotors ......................... 40
  2.4 Project planning sequence ............................................................................ 42
  2.5 Gear unit features ......................................................................................... 47
  2.6 Overhung and axial loads ............................................................................. 49

3 Mounting Positions and Important Order Information .................................................. 53
  3.1 General information on mounting positions .................................................. 53
  3.2 Important order information ......................................................................... 55
  3.3 Scope of delivery ........................................................................................... 59
  3.4 Key to the mounting position sheets ............................................................. 60
  3.5 Mounting positions for helical geared motors ............................................ 61
  3.6 Mounting positions for low backlash planetary geared motors .................. 66
  3.7 Mounting positions for parallel shaft helical geared motors ...................... 69
  3.8 Mounting positions for helical-bevel geared motors ................................... 72
  3.9 Mounting positions for helical-worm geared motors .................................. 77
  3.10 Lubricants ................................................................................................... 83
  3.11 Information on dimension sheets .................................................................. 90

4 Geared Synchronous Servomotors with Helical Gear Units R..DS/CM .. ..................... 95
  Combination overview ....................................................................................... 96
  Dimension sheets ............................................................................................... 117

5 Geared Synchronous Servomotors with Planetary Gear Units PSx..DS/CM .. ............ 147
  Combination overview PSF ............................................................................... 148
  Combination overview PSB ............................................................................... 157
  Combination overview PSE ............................................................................... 162
  Dimension sheets PSF ...................................................................................... 168
  Dimension sheets PSB ...................................................................................... 184
  Dimension sheets PSE ...................................................................................... 192

6 Geared Synchronous Servomotors with Parallel Shaft Helical Gear Units F..DS/CM .. 203
  Combination overview ....................................................................................... 206
  Dimension sheets ............................................................................................... 217

7 Geared Synchronous Servomotors with Helical-Bevel Gear Units K..DS/CM .. ......... 245
  Combination overview ....................................................................................... 247
  Dimension sheets ............................................................................................... 257

8 Geared Synchronous Servomotors with Helical-Worm Gear Units S..DS/CM .. ....... 281
  Combination overview ....................................................................................... 283
  Dimension sheets ............................................................................................... 287
Contents

9  DS/CM Synchronous Servomotors ........................................................................................................ 299
  9.1 Type designation of synchronous servomotors ........................................................................ 300
  9.2 Standards and regulations ........................................................................................................... 300
  9.3 Circuit breaker and protection equipment .................................................................................. 301
  9.4 Project planning of cable cross section ...................................................................................... 303
  9.5 Plug connectors for DS motors .................................................................................................. 304
  9.6 Plug connectors for CM motors .................................................................................................. 306
  9.7 Connection with terminal box ..................................................................................................... 325
  9.8 Mechanical characteristics ........................................................................................................ 325
  9.9 Overhung and axial loads .......................................................................................................... 326
  9.10 Technical data of synchronous servomotors (system voltage 400 V) ..................................... 329
  9.11 Torques .................................................................................................................................. 332
  9.12 Motor options .......................................................................................................................... 336
  9.13 Brakes .................................................................................................................................... 337
  9.14 Brake connection ..................................................................................................................... 342
  9.15 Dimensions drawings of synchronous servomotors ............................................................... 345
10  Geared Asynchronous Servomotors with Helical Gear Units R..CT/CV........................................ 355
    Combination overview .................................................................................................................. 356
    Dimensions sheets ....................................................................................................................... 383
11  Geared Asynchronous Servomotors with Planetary Gear Units PSx..CT/CV............................... 421
    Combination overview PSF .......................................................................................................... 422
    Combination overview PSB .......................................................................................................... 435
    Combination overview PSE .......................................................................................................... 440
    Dimension sheets PSF .................................................................................................................. 446
    Dimension sheets PSB .................................................................................................................. 462
    Dimension sheets PSE .................................................................................................................. 470
12  Geared Asynchronous Servomotors with Parallel Shaft Helical Gear Unit F..CT/CV ............... 481
    Combination overview ................................................................................................................ 483
    Dimensions sheets ....................................................................................................................... 498
13  Geared Asynchronous Servomotors with Helical-Bevel Gear Units K..CT/CV......................... 531
    Combination overview ................................................................................................................ 534
    Dimensions sheets ....................................................................................................................... 550
14  Geared Asynchronous Servomotors with Helical-Worm Gear Units S..CT/CV....................... 585
    Combination overview ................................................................................................................ 587
    Dimensions sheets ....................................................................................................................... 591
15  CT/CV Asynchronous Servomotors ............................................................................................... 603
    15.1 Type designation of asynchronous servomotors ................................................................... 604
    15.2 Standards and regulations ...................................................................................................... 604
    15.3 Circuit breaker and protective equipment .............................................................................. 605
    15.4 Thermal characteristics ......................................................................................................... 606
    15.5 Mechanical characteristics .................................................................................................... 606
    15.6 Overhung loads ..................................................................................................................... 607
    15.7 Technical data of asynchronous servomotors (system voltage 400 V) ............................... 609
    15.8 Torque characteristics .......................................................................................................... 612
    15.9 Motor options ........................................................................................................................ 637
    15.10 Brakes .................................................................................................................................. 647
    15.11 Block diagrams of brake control systems ......................................................................... 656
    15.12 Dimension drawings of asynchronous servomotors .......................................................... 660
16  Appendix ..................................................................................................................................... 667
    16.1 Index .................................................................................................................................... 667
    16.2 Addresses ............................................................................................................................... 671
1 Product Information

1.1 The SEW-EURODRIVE group of companies

What is SEW?

SEW-EURODRIVE is a leading company in the global market for electrical drive engineering. SEW’s global presence, extensive product range and broad spectrum of services mean it is the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding applications.

SEW possesses many years of experience in drive engineering which it puts to good use when developing, producing and selling all its drives with components drawn from mechanical and electrical engineering and electronics.

The headquarters of the group of companies is located in Bruchsal, Germany. Components for SEW’s modular drive system are manufactured to the highest quality standards in production plants sited in Germany, France, the USA, Brazil and China. These stocked components are utilized in assembly plants in over 30 industrialized countries all over the world. The assembly plants offer close proximity to customers and particularly short delivery times for individual drive systems – with a constantly high standard of quality. SEW’s sales, consulting, customer and spare parts services are to be found in more than 50 countries all over the world.

The product range

• Geared motors, gear units and motors
  – Helical gear units/geared motors
  – Parallel shaft helical gear units/geared motors
  – Helical-bevel gear units/geared motors
  – Helical-worm gear units/geared motors
  – Spiroplan® right-angle geared motors
  – Planetary geared motors
  – Industrial gear units
  – Low backlash gear units/geared motors
  – Brake motors
  – Drives for Telpher Lines
  – Geared torque motors
  – Pole-Changing Geared Motors

• Electronically controlled drives
  – MOVITRAC® frequency inverters
  – MOVIDRIVE® drive inverters
  – MOVIDYN® servo controllers
  – Technology and communications options for the inverters
  – Asynchronous AC motors and AC geared motors
  – Asynchronous and synchronous servomotors and geared servomotors
  – DC motors, brake motors and geared motors

• Components for decentralized installation
  – MOVIMOT® geared motors with integrated frequency inverter
  – MOVI-SWITCH® geared motors with integrated circuit breaker and protective function
  – Field distributors, fieldbus interfaces
The SEW-EURODRIVE group of companies

- Mechanical variable speed drives
  - VARIBLOC® wide V-belt variable speed geared motors
  - VARIMOT® friction disk variable speed geared motors

- Explosion-proof drives according to ATEX 100a

- Services
  - Technical consulting
  - Application software
  - Seminars and training courses
  - Extensive technical documentation
  - Worldwide customer service

**Content of the catalog**

This catalog describes SEW geared servomotors and servomotors. It contains project planning notes, mounting positions, technical data, selection tables and dimension sheets. Additional information on geared motors, gear units, pole-changing geared motors and variable speed geared motors can be found in separate catalogs.

**Other catalogs**

- Geared motors
- Gear units
- Low backlash planetary gear units
- MOVIMOT® geared motors
- Pole-changing geared motors
- Variable speed geared motors
- Drives for overhead trolley drives
- Explosion-proof drives
- Geared torque motors
- Planetary geared motors
- Bucket elevator gear units
- Compact gear units
1.2 Product description and overview of types

Power output and torque

The details on power and torque given in the catalog refer to mounting position M1 and similar mounting positions, where the input gear stage does not completely run under oil. In addition, the geared motors are assumed to be standard versions with standard lubrication and under normal ambient conditions.

Speeds

Information about torques listed in this catalog are based on an input speed of:

- \( n_e = 1500 \text{ 1/min for DS/CM synchronous servomotors} \)
- \( n_e = 1400 \text{ 1/min for CT/CV asynchronous servomotors} \)

The maximum torques for PSF/PSB/PSE low-backlash planetary gear units in S3 operation (60 % CDF / cyclic duration factor) are based on an input speed of:

- \( n_e = 1000 \text{ 1/min} \)

Noise levels

The noise levels of all SEW geared servomotors are well within the maximum permissible noise levels laid down by the VDI guideline 2159 for gear units and EN 60034 for motors.

Coating

The standard coating of SEW geared servomotors is as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>DS/CM synchronous servomotor</th>
<th>CT/CV asynchronous servomotor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servomotor without gear unit</td>
<td>Black RAL 9005</td>
<td>Blue-gray RAL 7031</td>
</tr>
<tr>
<td>Geared servomotors R / F / K / S</td>
<td>Blue-gray RAL 7031</td>
<td>Blue-gray RAL 7031</td>
</tr>
<tr>
<td>PSF/PSB/PSE geared servomotors</td>
<td>Black RAL 9005</td>
<td>Black RAL 9005</td>
</tr>
</tbody>
</table>

Special coatings are available on request.

Surface and corrosion protection

If required, all SEW geared servomotors can also be supplied with special surface protection for applications in extremely humid and chemically aggressive environments. The dimensions of the terminal box on motors with additional internal corrosion protection (feature KS) differ slightly from those of the standard type. Please request a special dimension sheet if required.

Weights

Please note that all weights of the geared servomotors shown in the catalog exclude the oil fill. The weights vary depending on the gear unit type and gear unit size. The lubricant fill is dependent on the mounting position, and consequently it is impossible to make any generally valid statements. Please refer to "Lubricants" in the "Design and Operating Notes" section for approximate lubricant fill volumes depending on the mounting position. The exact weight is given in the order acknowledgment.

Air admission and accessibility

The geared servomotors must be mounted on the driven machine in such a way that both axially and radially there is enough space left for unimpeded air admission and for the purposes of maintenance of the brake. Please also refer to the notes on the motor dimension sheets in this regard.
1.3 *R / F / K / S geared servomotors*

*Helical geared motors*

The following types of helical geared motors can be supplied:

- **RX..DS/CM..**
  - **RX..CT/CV..**
  - Single-stage foot-mounted helical geared motor

- **RF..DS/CM..**
  - Foot and flange-mounted helical geared motor

- **RF..CT/CV..**
  - Flange-mounted helical geared motor

- **RF..CT/CV..**
  - Flange-mounted helical geared motor

- **RF..DS/CM..**
  - Foot and flange-mounted helical geared motor

- **RXF..DS/CM..**
  - Single-stage flange-mounted helical geared motor

- **RXF..CT/CV..**
  - Single-stage flange-mounted helical geared motor

- **R..DS/CM..**
  - **R..CT/CV..**
  - Foot-mounted helical geared motor

- **R..F DS/CM..**
  - **R..F CT/CV..**
  - Foot and flange-mounted helical geared motor

- **R..F DS/CM..**
  - **R..F CT/CV..**
  - Foot and flange-mounted helical geared motor

- **R..F DS/CM..**
  - **R..F CT/CV..**
  - Foot and flange-mounted helical geared motor

- **R..DS/CM..**
  - **R..CT/CV..**
  - Foot-mounted helical geared motor

- **R..DS/CM..**
  - **R..CT/CV..**
  - Foot-mounted helical geared motor

- **R..DS/CM..**
  - **R..CT/CV..**
  - Foot-mounted helical geared motor

- **R..DS/CM..**
  - **R..CT/CV..**
  - Foot-mounted helical geared motor
The following types of parallel shaft helical geared motors can be supplied:

- **F..DS/CM..**
  - Foot-mounted parallel shaft helical geared motor

- **FA..B DS/CM..**
  - Foot-mounted parallel shaft helical geared motor with hollow shaft

- **FV..B DS/CM..**
  - Foot-mounted parallel shaft helical geared motor with hollow shaft and splined hollow shaft to DIN 5480

- **FH..B DS/CM..**
  - Foot-mounted parallel shaft helical geared motor with hollow shaft and shrink disk

- **FF..DS/CM..**
  - Parallel shaft helical geared motor in B5 flange-mounted version

- **FAF..DS/CM..**
  - Parallel shaft helical geared motor in B5 flange-mounted version with hollow shaft

- **FVF..DS/CM..**
  - Parallel shaft helical geared motor in B5 flange-mounted version with hollow shaft and splined hollow shaft to DIN 5480

03165AXX
Parallel shaft helical geared motor in B5 flange-mounted version with hollow shaft and shrink disk

Parallel shaft helical geared motor with hollow shaft

Parallel shaft helical geared motor with hollow shaft and splined hollow shaft to DIN 5480

Parallel shaft helical geared motor with hollow shaft and shrink disk

Parallel shaft helical geared motor in B14 flange-mounted version with hollow shaft

Parallel shaft helical geared motor in B14 flange-mounted version with hollow shaft and splined hollow shaft to DIN 5480

Parallel shaft helical geared motor in B14 flange-mounted version with hollow shaft and shrink disk
The following types of helical-bevel geared motors can be supplied:

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>K..DS/CM..</td>
<td>Foot-mounted helical-bevel geared motor</td>
</tr>
<tr>
<td>K..CT/CV..</td>
<td>Foot-mounted helical-bevel geared motor with hollow shaft</td>
</tr>
<tr>
<td>KV..B DS/CM..</td>
<td>Foot-mounted helical-bevel geared motor with hollow shaft and splined hollow shaft to DIN 5480</td>
</tr>
<tr>
<td>KV..B CT/CV..</td>
<td>Foot-mounted helical-bevel geared motor with hollow shaft and splined hollow shaft to DIN 5480</td>
</tr>
<tr>
<td>KH..B DS/CM..</td>
<td>Foot-mounted helical-bevel geared motor with hollow shaft and shrink disk</td>
</tr>
<tr>
<td>KH..B CT/CV..</td>
<td>Foot-mounted helical-bevel geared motor with hollow shaft and shrink disk</td>
</tr>
<tr>
<td>KF..DS/CM..</td>
<td>Helical-bevel geared motor in B5 flange-mounted version</td>
</tr>
<tr>
<td>KF..CT/CV..</td>
<td>Helical-bevel geared motor in B5 flange-mounted version with hollow shaft</td>
</tr>
<tr>
<td>KVF..DS/CM..</td>
<td>Helical-bevel geared motor in B5 flange-mounted version with hollow shaft and splined hollow shaft to DIN 5480</td>
</tr>
</tbody>
</table>
R / F / K / S geared servomotors

KHF..DS/CM..
KHF..CT/CV..
Helical-bevel geared motor in B5 flange-mounted version with hollow shaft and shrink disk

KA..DS/CM..
KA..CT/CV..
Helical-bevel geared motor with hollow shaft

KV..DS/CM..
KV..CT/CV..
Helical-bevel geared motor with hollow shaft and splined hollow shaft to DIN 5480

KH..DS/CM..
KH..CT/CV..
Helical-bevel geared motor with hollow shaft and shrink disk

KAZ..DS/CM..
KAZ..CT/CV..
Helical-bevel geared motor in B14 flange-mounted version with hollow shaft

KVZ..DS/CM..
KVZ..CT/CV..
Helical-bevel geared motor in B14 flange-mounted version with hollow shaft and splined hollow shaft to DIN 5480

KHZ..DS/CM..
KHZ..CT/CV..
Helical-bevel geared motor in B14 flange-mounted version with hollow shaft and shrink disk
The following types of helical-worm geared motors can be supplied:

- S..DS/CM..
- S..CT/CV..
  Foot-mounted helical-worm geared motor

- SF..DS/CM..
- SF..CT/CV..
  Helical-worm geared motor in B5 flange-mounted version

- SAF..DS/CM..
- SAF..CT/CV..
  Helical-worm geared motor in B5 flange-mounted version with hollow shaft

- SHF..DS/CM..
- SHF..CT/CV..
  Helical-worm geared motor in B5 flange-mounted version with hollow shaft and shrink disk
SA..DS/CM..
SA..CT/CV..
Helical-worm geared motor with hollow shaft

SH..DS/CM..
SH..CT/CV..
Helical-worm geared motor with hollow shaft and shrink disk

SAZ..DS/CM..
SAZ..CT/CV..
Helical-worm geared motor in B14 flange-mounted version with hollow shaft

SHZ..DS/CM..
SHZ..CT/CV..
Helical-worm geared motor in B14 flange-mounted version with hollow shaft and shrink disk
### Reduced backlash version

Helical, parallel shaft helical and helical-bevel gear units with reduced backlash are available from gear unit size 37 and up. The circumferential backlash of these gear units is significantly less than the standard unit versions, which means that positioning tasks can be accomplished with greater precision. The circumferential backlash is specified in angular minutes [''] in the technical data. The dimension sheets for the standard versions are applicable.

### NOCO® Fluid paste for protection against contact corrosion

As standard, all shaft-mounted geared motors are supplied with NOCO® Fluid paste, the compound which prevents contact corrosion. Use this paste in accordance with the information in the gear unit operating instructions. It simplifies service work and stripping down the unit.

### Brake motors

On request, SEW motors and geared motors can be supplied with an integrated mechanical brake. The SEW brake is an electromagnetic disc brake with a DC coil which is opened electrically and braked using spring force. The design principle means the brake is applied if the power fails. This means it complies with fundamental safety requirements. The SEW brake can also be released mechanically if fitted with manual brake release. In this case, an automatically disengaging hand lever is provided. A manual brake release for DS synchronous servomotors is not available. The brake is activated by a brake control system housed either in the wiring space of the motor or in the switch cabinet.

A significant feature of SEW brakes is their very short length. The brake bearing end shield is a part of both the motor and the brake. The integrated construction of the SEW brake motor permits particularly compact and sturdy solutions.

### International markets

SEW-EURODRIVE is a member of the AGMA (American Gear Manufacturers’ Association), and as such, all its gear units and geared motors conform to AGMA specifications.

We supply motors for connection conditions according to CSA and NEMA standards on request (registered with UL).
1.4 PSF/PSB/PSE geared servomotors

SEW planetary gear units are available as flange-mounted PSF/PSE and as flange block-mounted PSB.

**Features**

- **Low backlash**
  Optimal gearing geometry and close production tolerances ensure circumferential backlash values between 3 and 6 angular minutes (< 1’ available on request).

- **Precise gradings**
  All gear ratios between i = 4 and i = 100 are whole number ratios. This means the gear units are particularly suited to applications in controllers in which it is important to have divisible resolution values in terms of encoder increments.

- **Precise positioning**
  The special design guarantees very high levels of torsional rigidity.

- **High overload capacity**

- **Compact**
  The high power-to-weight ratio means the units are as small as possible.

- **Quiet**
  All PSF, PSB and PSE low backlash planetary gear units operate below the permitted noise levels as defined in VDI directive 2159 for gear units.

- **Low-maintenance**
  PSF, PSB and PSE low backlash planetary gear units are supplied with lubrication for life employing a synthetic lubricant.

**Design**

SEW PSF planetary gear units are single and two-stage flange-mounted gear units in eight sizes with rated output torques of 55 to 3000 Nm.

SEW PSB planetary gear units are single and two-stage flange block-mounted gear units in four sizes with rated output torques of 110 to 600 Nm.

SEW PSE planetary gear units are single and two-stage flange-mounted gear units in five sizes with rated output torques of 55 to 600 Nm.

The distribution of load between several planet wheels results in a power-to-weight ratio which is significantly higher than in helical gear units, meaning that the units are more compact.

PSF/PSE gear units are delivered with smooth output shaft as standard. Keyed connections are also available as options.

PSF/PSB/PSE gear units are laid out for ambient temperatures between –10 °C and +60 °C.

**Gear unit backlash**

PSF/PSB/PSE low backlash gear units are optionally available with regular gear unit backlash N or reduced backlash R.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSF/PSB/PSE</td>
<td>α &lt; 6’</td>
<td>α &lt; 3’</td>
</tr>
</tbody>
</table>

Gear units with reduced backlash of α < 1’ are also available as special version.
1.5 Unit designations for gear units and options

Helical gear units

R.. Foot-mounted
RF.. Flange-mounted
RF..F Foot and flange-mounted
RX.. Single-stage foot-mounted
RXF.. Single-stage flange-mounted

Low backlash planetary gear units

PSF Planetary gear units, low backlash, flange-mounted for motor mounting
PSB Planetary gear units, low backlash, flange block-mounted for motor mounting
PSE Planetary gear units, low backlash, flange-mounted for motor mounting
EK Coupling on the input side

Parallel shaft helical gear units

F.. Foot-mounted
FA..B Foot-mounted and hollow shaft
FH..B Foot-mounted and hollow shaft with shrink disk
FV..B Foot-mounted and splined hollow shaft to DIN 5480
FF.. B5 flange-mounted
FAF.. B5 flange-mounted and hollow shaft
FHF.. B5 flange-mounted and hollow shaft with shrink disk
FVF.. B5 flange-mounted and splined hollow shaft to DIN 5480
FA.. Hollow shaft
FH.. Hollow shaft with shrink disk
FV.. Splined hollow shaft to DIN 5480
FAZ.. B14 flange-mounted and hollow shaft
FHZ.. B14 flange-mounted and hollow shaft with shrink disk
FVZ.. B14 flange-mounted and splined hollow shaft to DIN 5480
**Helical-bevel gear units**

- **K..** Foot-mounted
- **KA..B** Foot-mounted and hollow shaft
- **KH..B** Foot-mounted and hollow shaft with shrink disk
- **KV..B** Foot-mounted and splined hollow shaft to DIN 5480
- **KF..** B5 flange-mounted
- **KAF..** B5 flange-mounted and hollow shaft
- **KHF..** B5 flange-mounted and hollow shaft with shrink disk
- **KVF..** B5 flange-mounted and splined hollow shaft to DIN 5480
- **KA..** Hollow shaft
- **KH..** Hollow shaft with shrink disk
- **KV..** Splined hollow shaft to DIN 5480
- **KAZ..** B14 flange-mounted and hollow shaft
- **KHZ..** B14 flange-mounted and hollow shaft with shrink disk
- **KVZ..** B14 flange-mounted and splined hollow shaft to DIN 5480

**Helical-worm gear units**

- **S..** Foot-mounted
- **SF..** B5 flange-mounted
- **SAF..** B5 flange-mounted and hollow shaft
- **SHF..** B5 flange-mounted and hollow shaft with shrink disk
- **SA..** Hollow shaft
- **SH..** Hollow shaft with shrink disk
- **SAZ..** B14 flange-mounted and hollow shaft
- **SHZ..** B14 flange-mounted and hollow shaft with shrink disk

**Options for PSx low backlash planetary gear units**

- **/N** Regular backlash
- **/R** Reduced backlash

**Option for helical gear unit R, parallel shaft helical gear unit F and helical bevel gear unit K**

- **/R** Reduced backlash

**Option for helical bevel gear unit K and helical-worm gear unit S**

- **/T** With torque arm

**Option for parallel shaft helical gear unit F**

- **/G** With rubber buffer
1.6 Type designations of servomotors and options

Synchronous servomotors

DFS... Flange-mounted version size 56
DS... Mount-on motor for gear unit size 56
CFM... Flange-mounted version size 71 / 90 / 112
CM... Mount-on motor for gear unit size 71 / 90 / 112

Standard design of synchronous servomotors

/SM.0 Motor plug connector (socket at motor side only)
/SB.0 Motor + brake plug connector (socket at motor side only)
/RH1M Resolver
/TF Thermistor sensor (PTC resistance)
/KTY Thermistor (in preparation)

Options of synchronous servomotors

/B Disc brake size 56
/BR Disc brake size 71 / 90 / 112
../HR .. Size 71 / 90 / 112 with automatic manual brake disengagement
/SM.. Complete motor plug connector with code number for size and wire range
/SB.. Complete motor + brake plug connector with code number for size and wire range
/ES1H Encoder Hiperface single-turn, spread shaft, size 71 / 90 / 112
/AS1H Multi-turn Hiperface encoder with spread shaft, size 71 / 90 / 112
/AV1H Multi-turn Hiperface encoder with solid shaft, size 56
/AV1Y Multi-turn SSI encoder with solid shaft, size 56
/VR Forced cooling fan, 1 × 24 VDC
/VR Forced cooling fan, 1 × 100 ... 240 VAC, 50/60 Hz
/KK Terminal box
### Type designations of servomotors and options

#### Asynchronous servomotors
- **CT...** Foot-mounted / mount-on motor size 71 ... 90
- **CV...** Foot-mounted / mount-on motor size 100 ... 200
- **CFT...** Flange-mounted version size 71 ... 90
- **CFV...** Flange-mounted version size 100 ... 200

#### Standard design of asynchronous servomotors
- **/TF** Thermistor sensor (PTC resistance)
- **/ES1S** Encoder with spread shaft, sin/cos signals and 24 VDC supply for size 71 ... 100
- **/ES2S** Encoder with spread shaft, sin/cos signals and 24 VDC supply for size 132S
- **/EV1S** Encoder with spread shaft, sin/cos signals and 24 VDC supply for size 132M ... 200

#### Options for asynchronous servomotors
- **/BM(G)** Disk brake
  - **../HF** . With lockable manual brake release
  - **../HR** . With automatic manual brake disengagement
- **/TH** Thermostat (bimetallic switch)
- **/V** Forced cooling fan, 3 × 380 ... 415 VAC, 50 Hz for size 132M ... 200
- **/VR** Forced cooling fan, 1 × 24 VDC / 1 × 100 ... 240 VAC for size 71 ... 132S
- **/C** Protection cowl for the fan guard
- **/ES1R** Encoder with spread shaft, TTL(RS-422) and 24 VDC supply for size 71 ... 100
- **/ES2R** Encoder with spread shaft, TTL(RS-422) and 24 VDC supply for size 132S
- **/EV1R** Encoder with solid shaft, TTL(RS-422) and 24 VDC supply for size 71 ... 200
- **/EV1S** Encoder with spread shaft, sin/cos signals and 24 VDC supply for size 71 ... 132S
- **/AV1Y** Multi-turn SSI encoder with solid shaft
- **/AV1H** Multi-turn Hiperface encoder with solid shaft
- **/EV1A** Mounting device for encoder with solid shaft
- **/IS** Integrated plug connection
1.7 Sample unit designation of a geared servomotor

The unit designation of the geared motor starts from the component on the output end. A geared motor with low backlash planetary gear unit, synchronous motor with brake, manual brake release, PTC thermistor and plug connector with 1.5 mm² connection cross section has the following unit designation, for example:

```
PSF 612 /R /EK CM 71M /BR /HR /TF /RH1M /SB51
```

- **PSF**: Plug connector connection cross section 1.5 mm²
- **R**: Resolver
- **EK**: PTC thermistor
- **CM**: Manual brake release
- **71M**: Brake
- **BR**: Motor size
- **HR**: Motor series
- **TF**: Coupling on the input side
- **RH1M**: Reduced backlash
- **SB51**: Gear unit size
- **Gear unit series**

*Fig. 1: Sample unit designation*
1.8 Assembly/removal of gear units with hollow shafts and keys

- Always use the supplied NOCO® Fluid paste during the assembly procedure. This avoids contact corrosion and facilitates subsequent removal.
- The key dimension X is defined by the customer, however X must be > DK.

**Mounting**

SEW recommends two variants for mounting gear units with hollow shaft and key onto the input shaft of the driven machine (= customer's shaft):

1. Assemble with the supplied mounting parts.
2. Assemble using the optional SEW assembly/disassembly kit.

**1. Supplied mounting parts**

The following mounting parts are supplied as standard:

- Retaining screw with washer (2)
- Circlip (3)

**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.

![Fig. 2: Customer shaft with contact shoulder (A) and without contact shoulder (B)](image)

**Dimensions and tightening torque**

The retaining screw (2) must be tightened to the tightening torque MS given in the following table.

| Gear unit type  | D
| mm            | DK [mm] | L8 [mm] | MS [Nm] |
|----------------|---------|---------|---------|---------|
| SA..37         | 20      | 20      | 84, 106, 104 | 8       |
| FA..27, SA..47 | 25      | 25      | 88, 105  | 20      |
| FA..37, KA..37, SA..47 | 30      | 30      | 105      | 20      |
| SA..57         | 35      | 35      | 132      | 20      |
| FA..47, KA..47, SA..57 | 40      | 40      | 142      | 20      |
| FA..57, KA..57 | 40      | 40      | 156      | 40      |
| SA..67         | 40      | 40      | 144      | 40      |
| SA..67         | 40      | 40      | 144      | 40      |
| FA..77, KA..77, SA..77 | 50      | 50      | 183      | 40      |
| FA..87, KA..87 | 60      | 60      | 210      | 80      |
| SA..77, SA..87 | 60      | 60      | 210      | 80      |
| FA..97, KA..97 | 70      | 70      | 270      | 80      |
| SA..87, SA..97 | 70      | 70      | 270      | 80      |
| FA..107, KA..107, SA..97 | 90      | 90      | 313, 313, 255 | 200   |
| FA..127, KA..127 | 100     | 100     | 373      | 200   |
| FA..157, KA..157 | 120     | 120     | 460      | 200   |
2. SEW assembly/removal kit

You can also use the optional SEW assembly/removal kit for assembly. This kit can be ordered for the specific gear unit types by quoting the part numbers in the table below. The scope of delivery includes:

- Distance piece for assembly without contact shoulder (5)
- Retaining screw for assembly (2)
- Forcing disk for removal (7)
- Fixed nut for removal (8)

The short retaining screw supplied as standard is not used.

**Customer shaft**

- The installation length of the customer shaft must be LK2. The distance piece must not be used if the customer shaft does have a contact shoulder (A).
- The installation length of the customer shaft must be LK2. The distance piece must be used if the customer shaft does not have a contact shoulder (B).

![Fig. 3: Customer shaft with contact shoulder (A) and without contact shoulder (B)](03152BXX)

(1) Hollow shaft
(2) Retaining screw with washer
(3) Circlip
(4) Customer shaft
(5) Distance piece

**Dimensions, tightening torque and part numbers**

The retaining screw (2) must be tightened to the tightening torque MS given in the following table.

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<th>Type</th>
<th>D&lt;sup&gt;in&lt;/sup&gt; [mm]</th>
<th>DK [mm]</th>
<th>LK2 [mm]</th>
<th>LX&lt;sup&gt;2&lt;/sup&gt; [mm]</th>
<th>C7 [mm]</th>
<th>MS [Nm]</th>
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</table>
Assembly/removal of gear units with hollow shafts and keys

Disassembly

Only applies if the SEW assembly/removal kit was previously used for assembly (→ Fig. 3).

Proceed as follows for removal:

1. Loosen the retaining screw (6).
2. Remove the circlip (3) and, if used, the distance piece (5).
3. Insert the forcing disk (7) and the fixed nut (8) between customer shaft (4) and circlip (3) according to Fig. 4.
4. Re-insert the circlip (3).
5. Re-insert the retaining screw (6). You can now push the gear unit off the shaft.

Fig. 4: Removal

(6) Retaining screw
(7) Forcing disk
(8) Fixed nut for disassembly

<table>
<thead>
<tr>
<th>Type</th>
<th>D&lt;sub&gt;H7&lt;/sub&gt;</th>
<th>M</th>
<th>C4 [mm]</th>
<th>C5 [mm]</th>
<th>C6 [mm]</th>
<th>U&lt;sub&gt;-0.5&lt;/sub&gt; [mm]</th>
<th>T&lt;sub&gt;-0.5&lt;/sub&gt; [mm]</th>
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</table>
1.9 Shouldered hollow shaft with shrink disk option

As an option, gear units with a hollow shaft and shrink disk (parallel shaft helical gear units FH/FHF/FHZ37-157, helical-bevel gear units KH/KHF/KHZ37-157 and helical-worm gear units SH/SHF/SHZ47-97) can be supplied with a larger bore diameter D'.

As standard, D' = D.

![Optional bore diameter D']

**Sample order**

FH37 DT80N4 with hollow shaft 30/32 mm
Shouldered hollow shaft with shrink disk option

Parallel shaft helical gear unit with offset hollow shaft

**Fig. 6: Offset hollow shaft FH/FHF/FHZ37...77**
Shouldered hollow shaft with shrink disk option

Fig. 7: Offset hollow shaft FH/FHF/FHZ87...157
Shouldered hollow shaft with shrink disk option

**Helical-bevel gear unit with shouldered hollow shaft**

**KH / KHF / KHZ37**

ø 30 \( h7 \)/ ø 32 \( h7 \)

**KH / KHF / KHZ47**

ø 35 \( h7 \)/ ø 36 \( h7 \)

**KH / KHF / KHZ57**

ø 40 \( h7 \)/ ø 42 \( h7 \)

**KH / KHF / KHZ67**

ø 40 \( h7 \)/ ø 42 \( h7 \)

**KH / KHF / KHZ77**

ø 50 \( h7 \)/ ø 52 \( h7 \)

---

Fig. 8: Shouldered hollow shaft KH/KHF/KHZ37...77
Shouldered hollow shaft with shrink disk option

Fig. 9: Shouldered hollow shaft KH/KHF/KHZ87...157
Shouldered hollow shaft with shrink disk option

Helical-worm gear unit with shouldered hollow shaft

SH / SHF / SHZ47
\( \phi 30 \text{ HT/ } \phi 32 \text{ HT} \)

SH / SHF / SHZ57
\( \phi 35 \text{ HT/ } \phi 36 \text{ HT} \)

SH / SHF / SHZ67
\( \phi 40 \text{ HT/ } \phi 42 \text{ HT} \)

Fig. 10: Shouldered hollow shaft SH/SHF/SHZ47...67
Please note dimensions L1 and L2 when selecting and mounting output elements.

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<th>Type</th>
<th>A1</th>
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<th>D1</th>
<th>D2</th>
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<td>80</td>
</tr>
<tr>
<td>RF87, R87F</td>
<td>300</td>
<td>50</td>
<td>62</td>
<td>123</td>
<td>122</td>
<td>210</td>
<td>4</td>
<td>100</td>
<td>100</td>
</tr>
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<td></td>
<td>350</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>226</td>
<td>5</td>
<td></td>
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<tr>
<td>RF97</td>
<td>350</td>
<td>60</td>
<td>72</td>
<td>136</td>
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<td>120</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td></td>
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<td></td>
<td></td>
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<td>RF107</td>
<td>350</td>
<td>70</td>
<td>82</td>
<td>157</td>
<td></td>
<td></td>
<td>140</td>
<td>140</td>
<td>0</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>316</td>
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<td>RF137</td>
<td>450</td>
<td>90</td>
<td>108</td>
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<td>550</td>
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<td></td>
<td></td>
<td>416</td>
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<tr>
<td>RF147</td>
<td>450</td>
<td>110</td>
<td>125</td>
<td>210</td>
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<td></td>
<td>210</td>
<td>210</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>550</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>RF167</td>
<td>550</td>
<td>120</td>
<td>145</td>
<td>290</td>
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<td>210</td>
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<td>1</td>
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<tr>
<td></td>
<td>660</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>517</td>
<td>2</td>
<td>11</td>
</tr>
</tbody>
</table>
1.11 **Gear unit mounting**

Always use bolts of quality 8.8 for mounting gear units and geared motors.

**Exception**

Bolts of quality **10.9** must be used for fixing the flange to the customer’s unit in order to transmit the rated torque specified in the catalog in the case of the following flange-mounted helical geared motors (RF..) and foot/flange-mounted helical geared motors (R..F):

- RF37, R37F with flange ∅ 120 mm
- RF47, R47F with flange ∅ 140 mm
- RF57, R57F with flange ∅ 160 mm

1.12 **Torque arms**

**Available torque arms**

<table>
<thead>
<tr>
<th>Gear units</th>
<th>27</th>
<th>37</th>
<th>47</th>
<th>57</th>
<th>67</th>
<th>77</th>
</tr>
</thead>
<tbody>
<tr>
<td>KA, KH, KV</td>
<td>–</td>
<td>643 425 8</td>
<td>643 428 2</td>
<td>643 431 2</td>
<td>643 431 2</td>
<td>643 434 7</td>
</tr>
<tr>
<td>SA, SH</td>
<td>–</td>
<td>126 994 1</td>
<td>644 237 4</td>
<td>644 240 4</td>
<td>644 243 9</td>
<td>644 246 3</td>
</tr>
<tr>
<td>FA, FH, FV</td>
<td>013 348 5</td>
<td>013 348 5</td>
<td>013 348 5</td>
<td>013 348 5</td>
<td>013 348 5</td>
<td>013 349 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gear units</th>
<th>87</th>
<th>97</th>
<th>107</th>
<th>127</th>
<th>157</th>
</tr>
</thead>
<tbody>
<tr>
<td>KA, KH, KV</td>
<td>643 437 1</td>
<td>643 440 1</td>
<td>643 443 6</td>
<td>643 294 8</td>
<td>643 295 6</td>
</tr>
<tr>
<td>SA, SH</td>
<td>644 249 8</td>
<td>644 252 8</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>FA, FH, FV</td>
<td>013 349 3</td>
<td>013 350 7</td>
<td>013 350 7</td>
<td>013 351 5</td>
<td>013 347 7</td>
</tr>
</tbody>
</table>

**Torque arms for KH167.., KH187..**

As standard, there are no torque arms available for gear unit sizes KH167.. and KH187... Please contact SEW if you require torque arms for these gear units. We can give you proposed configurations.
1.13 Fixed hood covers

As standard, parallel shaft helical gear units, helical-bevel gear units and helical-worm gear units with hollow shafts and shrink disks from size 37 up to 97 have a hood cover that turns with the unit. If fixed hood covers are required for these gear units for safety reasons, you can order them for the respective gear unit types by quoting the part numbers in the following tables. As standard, parallel shaft helical gear units, helical-bevel gear units and helical-worm gear units with hollow shafts and shrink disks of size 107 and parallel shaft helical gear units of size 27 have a fixed hood cover.

Fig. 11: Replacing a hood cover that turns with the unit for a fixed hood cover

1. Pull off the hood cover that turns with the unit.
2. Put on the fixed hood cover and fasten in place.
**Part numbers and dimensions**

**Parallel shaft helical geared motors**

<table>
<thead>
<tr>
<th>Part number</th>
<th>FH..37</th>
<th>FH..47</th>
<th>FH..57</th>
<th>FH..67</th>
<th>FH..77</th>
<th>FH..87</th>
<th>FH..97</th>
</tr>
</thead>
<tbody>
<tr>
<td>643 513 0</td>
<td>643 514 9</td>
<td>643 515 7</td>
<td>643 515 7</td>
<td>643 516 5</td>
<td>643 517 3</td>
<td>643 518 1</td>
<td></td>
</tr>
</tbody>
</table>

**Max. size of motor which can be fitted**

<table>
<thead>
<tr>
<th>Part number</th>
<th>G4</th>
<th>O1</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>FH..37</td>
<td>78</td>
<td>157</td>
<td>2</td>
<td>75</td>
</tr>
<tr>
<td>FH..47</td>
<td>88</td>
<td>188.5</td>
<td>4.5</td>
<td>83</td>
</tr>
<tr>
<td>FH..57</td>
<td>100</td>
<td>207.5</td>
<td>7.5</td>
<td>83</td>
</tr>
<tr>
<td>FH..67</td>
<td>100</td>
<td>221.5</td>
<td>6</td>
<td>93</td>
</tr>
<tr>
<td>FH..77</td>
<td>121</td>
<td>255</td>
<td>6</td>
<td>114</td>
</tr>
<tr>
<td>FH..87</td>
<td>164</td>
<td>295</td>
<td>4</td>
<td>159</td>
</tr>
<tr>
<td>FH..97</td>
<td>185</td>
<td>363.5</td>
<td>6.5</td>
<td>174</td>
</tr>
</tbody>
</table>

**Helical-bevel geared motors**

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

<table>
<thead>
<tr>
<th>Part number</th>
<th>KH..37</th>
<th>KH..47</th>
<th>KH..57</th>
<th>KH..67</th>
<th>KH..77</th>
<th>KH..87</th>
<th>KH..97</th>
</tr>
</thead>
<tbody>
<tr>
<td>643 513 0</td>
<td>643 514 9</td>
<td>643 515 7</td>
<td>643 515 7</td>
<td>643 516 5</td>
<td>643 517 3</td>
<td>643 518 1</td>
<td></td>
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</table>

**Max. size of motor which can be fitted**

<table>
<thead>
<tr>
<th>Part number</th>
<th>G4</th>
<th>O2</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>KH..37</td>
<td>78</td>
<td>95</td>
<td>0</td>
<td>75</td>
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<tr>
<td>KH..47</td>
<td>88</td>
<td>111.5</td>
<td>1.5</td>
<td>83</td>
</tr>
<tr>
<td>KH..57</td>
<td>100</td>
<td>122.5</td>
<td>5.5</td>
<td>83</td>
</tr>
<tr>
<td>KH..67</td>
<td>100</td>
<td>129</td>
<td>3</td>
<td>93</td>
</tr>
<tr>
<td>KH..77</td>
<td>121</td>
<td>147</td>
<td>1</td>
<td>114</td>
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<tr>
<td>KH..87</td>
<td>164</td>
<td>172</td>
<td>2</td>
<td>159</td>
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<tr>
<td>KH..97</td>
<td>185</td>
<td>210.5</td>
<td>4.5</td>
<td>174</td>
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</table>

**Helical-worm geared motors**

<table>
<thead>
<tr>
<th>Part number</th>
<th>SH..37</th>
<th>SH..47</th>
<th>SH..57</th>
<th>SH..67</th>
</tr>
</thead>
<tbody>
<tr>
<td>643 512 2</td>
<td>643 513 0</td>
<td>643 514 9</td>
<td>643 515 7</td>
<td></td>
</tr>
</tbody>
</table>

**Max. size of motor which can be fitted**

<table>
<thead>
<tr>
<th>Part number</th>
<th>G4</th>
<th>O2</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH..37</td>
<td>59</td>
<td>88</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>SH..47</td>
<td>78</td>
<td>95</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>SH..57</td>
<td>88</td>
<td>111.5</td>
<td>1.5</td>
<td>83</td>
</tr>
<tr>
<td>SH..67</td>
<td>88</td>
<td>123</td>
<td>3</td>
<td>93</td>
</tr>
</tbody>
</table>
1.14 MOVIDRIVE® and MOVIDRIVE® compact drive inverters

Special features

Drive inverters in the power range of 1.5 to 75 kW are designed for special efficiency with a large application range, straightforward project planning, simple startup and safe operation.

Series

The following series of the MOVIDRIVE® unit family is used for servo drives:

- **MOVIDRIVE® MDV / MCV / MCH**: for AC asynchronous motors with encoder feedback. CFC control mode.
- **MOVIDRIVE® MDS / MCS / MCH**: for servomotors with encoder feedback (MDS/MCS: resolver; MCH: Hiperface). CFC control mode.

Control mode

The VFC (Voltage Flux Control) and CFC (Current Flux Control) control modes are features of the MOVIDRIVE® series. Continuous calculation of the complete motor model forms the basis for both control modes. The CFC control mode is used for servo drives.

<table>
<thead>
<tr>
<th>CFC (Current Flux Control) control mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current-controlled control mode for AC asynchronous motors and permanent-field AC servomotors. Encoder feedback is always required.</td>
</tr>
<tr>
<td>- 250 … 360 % torque, even with the rotor stopped (for a sufficiently dimensioned inverter)</td>
</tr>
<tr>
<td>- Maximum precision and concentric running characteristics right down to standstill</td>
</tr>
<tr>
<td>- Servo characteristics and torque control even for AC asynchronous motors</td>
</tr>
<tr>
<td>- Reacts to load changes within a few milliseconds</td>
</tr>
</tbody>
</table>

SBus

The system bus (SBus) is available as standard. It permits several MOVIDRIVE® drive inverters to be networked together. As a result, data can be exchanged rapidly between the units. MOVILINK® – the uniform SEW unit profile – is used for communication via the SBus.

MOVILINK®

MOVILINK® means the same message structure is always used, regardless of the selected interface (SBus, RS-232, RS-485, fieldbus interfaces). As a result, the control software is independent of the selected interface.

System expansion

Options

- Extensive range of expansion options, e.g.:
  - PROFIBUS, INTERBUS, CAN and DeviceNet fieldbus interfaces
  - Synchronous operation
  - Positioning control
  - Terminal expansion board
  - Evaluation of absolute encoders
  - Removable plain text keypad with parameter memory
  - RS-232 and RS-485 serial interfaces
  - Braking resistors
  - Line filters, line chokes, output chokes and output filters
- Simple startup with MOVIT OOLS
- Oscilloscope functions and process data visualization with MX_SCOPE
- Regenerative power supply
- Application modules
MOVIDRIVE® and MOVIDRIVE® compact drive inverters

Standards / certificates

CE-marking

- Low-Voltage Directive
  MOVIDRIVE® drive inverters comply with the regulations of the Low-Voltage Directive 73/23/EEC.
- Electromagnetic compatibility (EMC)
  The designated use of MOVIDRIVE® drive inverters and regenerative power supply units is as components for installation in machinery and systems. As far as EMC is concerned, they comply with the generic standards EN 50081 (emitted interference) and EN 50082 (interference immunity). Provided the information relating to EMC compliant installation is complied with, they satisfy the appropriate requirements for CE-marking of the entire machine/system in which they are fitted, on the basis of the EMC Directive 89/336/EEC.

MOVIDRIVE® MDF/MDV/MDS drive inverters of size 1 and 2 are fitted with a line filter as standard. These units comply with class A limit to EN 55011 and 55014 on the line side without further measures.

The CE-mark on the nameplate indicates conformity with the Low-voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. A declaration of conformity to this effect can be issued on request.

UL approval
UL approval is being prepared for the entire MOVIDRIVE® range and some approvals have already been issued. This approval is of equal standing to cUL and CSA approval.

The units at a glance

MOVIDRIVE® for 3 x 380...500 V_AC connection voltage

<table>
<thead>
<tr>
<th>Recommended motor power</th>
<th>Continuous output current (CFC/servo)</th>
<th>MOVIDRIVE® type</th>
<th>MCH42A for asynchronous motors and synchronous motors with encoder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MDV60A / MCV4_A (VFC/CFC) for asynchronous motors with encoder</td>
<td></td>
</tr>
<tr>
<td>1.5 kW (2.0 HP)</td>
<td>4 A</td>
<td>0015-5A3-4</td>
<td></td>
</tr>
<tr>
<td>2.2 kW (3.0 HP)</td>
<td>5.5 A</td>
<td>0022-5A3-4</td>
<td></td>
</tr>
<tr>
<td>3.0 kW (4.0 HP)</td>
<td>7 A</td>
<td>0030-5A3-4</td>
<td></td>
</tr>
<tr>
<td>4.0 kW (5.0 HP)</td>
<td>9.5 A</td>
<td>0040-5A3-4</td>
<td></td>
</tr>
<tr>
<td>5.5 kW (7.5 HP)</td>
<td>12.5 A</td>
<td>0055-5A3-4</td>
<td></td>
</tr>
<tr>
<td>7.5 kW (10 HP)</td>
<td>16 A</td>
<td>0075-5A3-4</td>
<td></td>
</tr>
<tr>
<td>11 kW (15 HP)</td>
<td>24 A</td>
<td>0110-5A3-4</td>
<td></td>
</tr>
<tr>
<td>15 kW (20 HP)</td>
<td>32 A</td>
<td>0150-503-4</td>
<td></td>
</tr>
<tr>
<td>22 kW (30 HP)</td>
<td>46 A</td>
<td>0220-503-4</td>
<td></td>
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<tr>
<td>30 kW (40 HP)</td>
<td>60 A</td>
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<td></td>
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<td>37 kW (50 HP)</td>
<td>73 A</td>
<td>0370-503-4</td>
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<td>45 kW (60 HP)</td>
<td>89 A</td>
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<td>55 kW (75 HP)</td>
<td>105 A</td>
<td>0550-503-4</td>
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</tr>
<tr>
<td>75 kW (100 HP)</td>
<td>130 A</td>
<td>0750-503-4</td>
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</table>

GSE2002