

# Automation systems Drive solutions

Controls  
Inverters

**Motors**  
**Gearboxes**  
Engineering Tools

**Motors:** MH three-phase AC motors

**Gearboxes:** GSS helical-worm gearboxes



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# Lenze makes many things easy for you.

With our motivated and committed approach, we work together with you to create the best possible solution and set your ideas in motion - whether you are looking to optimise an existing machine or develop a new one. We always strive to make things easy and seek perfection therein. This is anchored in our thinking, in our services and in every detail of our products. It's as easy as that!

**1**

## **Developing ideas**

Are you looking to build the best machine possible and already have some initial ideas? Then get these down on paper together with us, starting with small innovative details and stretching all the way to completely new machines. Working together, we will develop an intelligent and sustainable concept that is perfectly aligned with your specific requirements.

**2**

## **Drafting concepts**

We see welcome challenges in your machine tasks, supporting you with our comprehensive expertise and providing valuable impetus for your innovations. We take a holistic view of the individual motion and control functions here and draw up consistent, end-to-end drive and automation solutions for you - keeping everything as easy as possible and as extensive as necessary.

**3**

## **Implementing solutions**

Our easy formula for satisfied customers is to establish an active partnership with fast decision-making processes and an individually tailored offer. We have been using this simple principle to meet the ever more specialised customer requirements in the field of mechanical engineering for many years.

**4**

## **Manufacturing machines**

Functional diversity in perfect harmony: as one of the few full-range providers in the market, we can provide you with precisely those products that you actually need for any machine task – no more and no less. Our L-force product portfolio, a consistent platform for implementing drive and automation tasks, is invaluable in this regard.

**5**

## **Ensuring productivity**

Productivity, reliability and new performance peaks on a daily basis – these are our key success factors for your machine. After delivery, we offer you cleverly devised service concepts to ensure continued safe operation. The primary focus here is on technical support, based on the excellent application expertise of our highly-skilled and knowledgeable after-sales team.

# A matter of principle: the right products for every application.

Lenze's extensive L-force product portfolio follows a very simple principle. The functions of our finely scaled products are assigned to the three lines Base-Line, State-Line or High-Line.

But what does this mean for you? It allows you to quickly recognise which products represent the best solution for your own specific requirements.

**Powerful products with a major impact:**

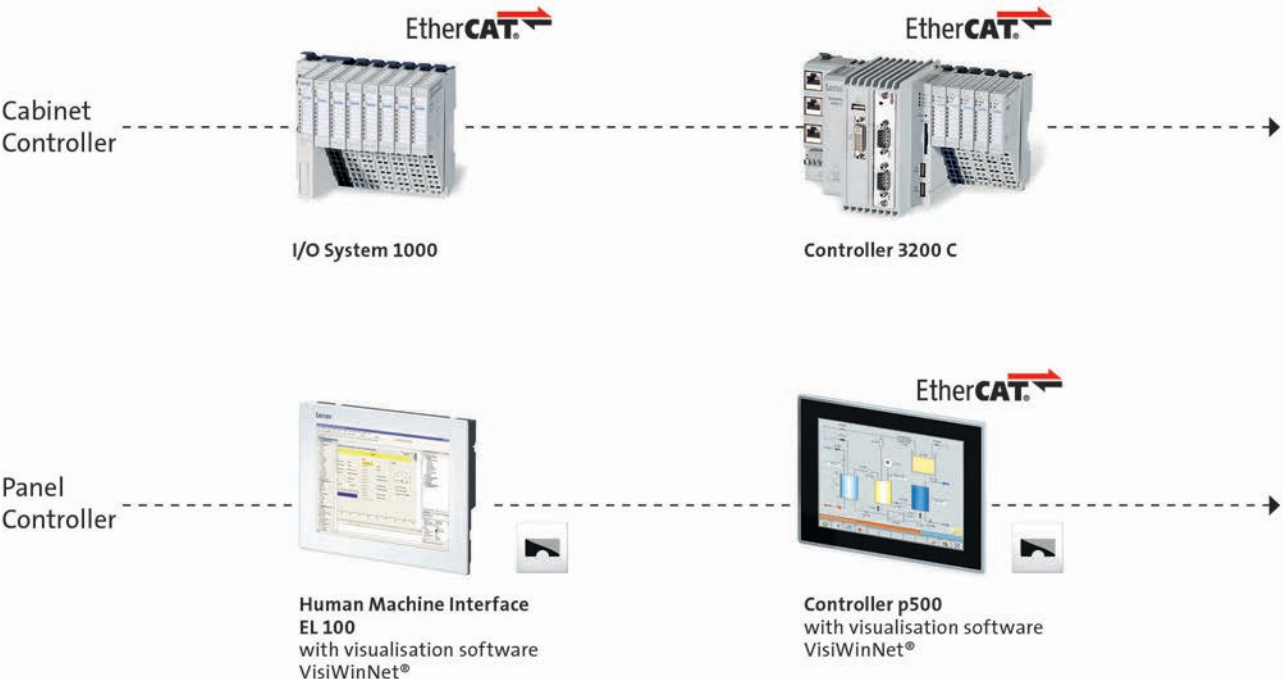
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

Lenze products undergo the most stringent testing in our own laboratory. This allows us to ensure that you will receive consistently high quality and a long service life. In addition to this, five logistics centres ensure that the Lenze products you select are available for quick delivery anywhere across the globe. It's as easy as that!

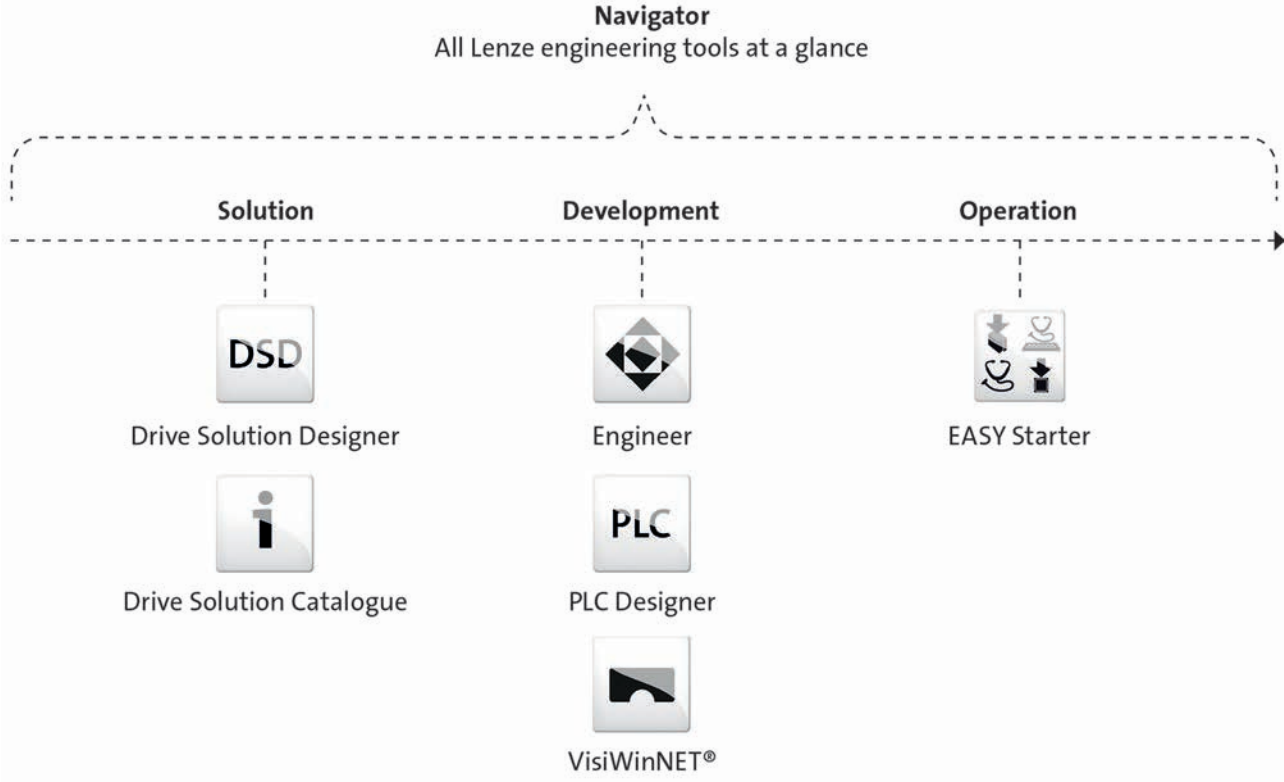


# L-force product portfolio

## Controls

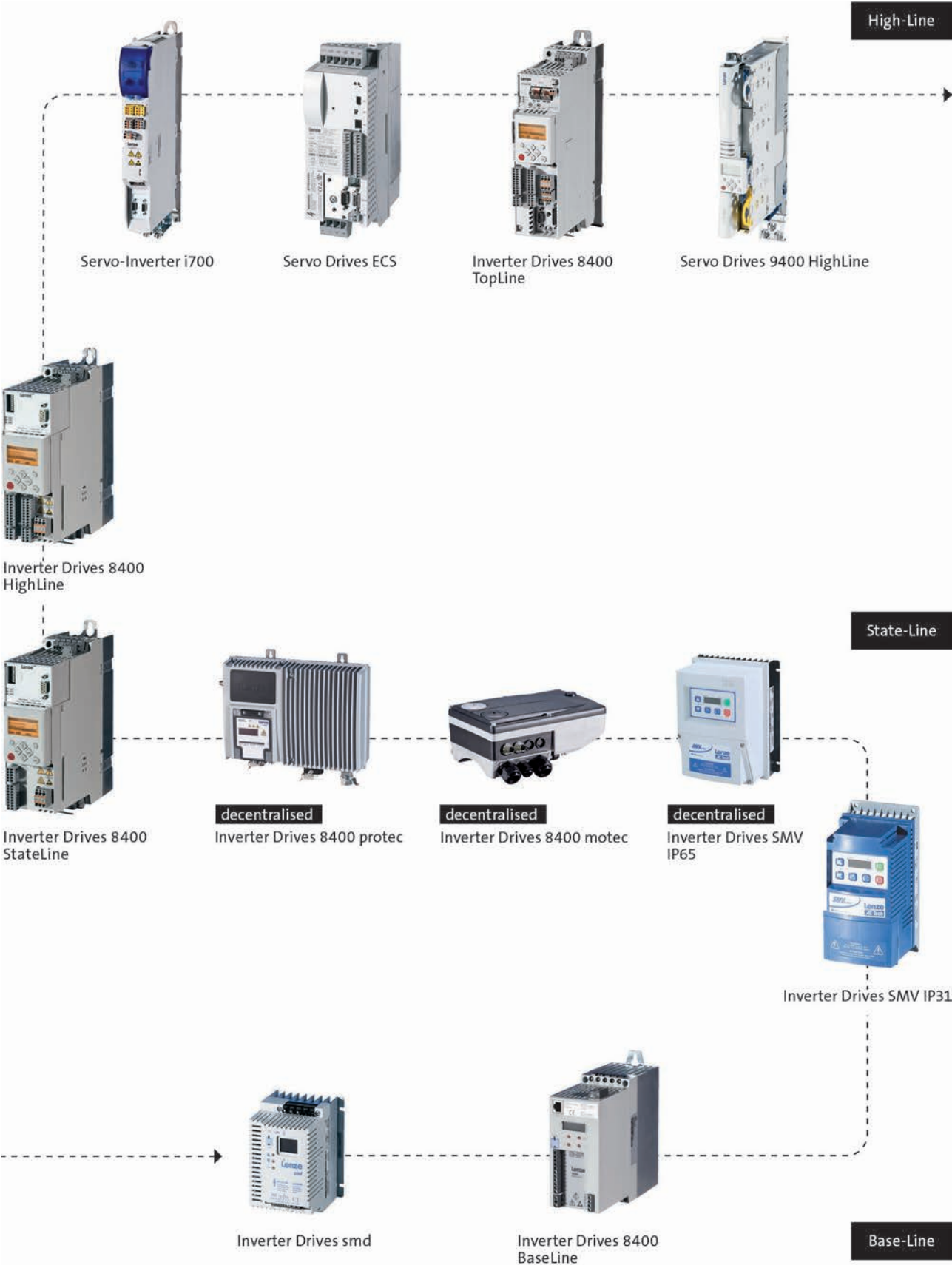


## Engineering Tools



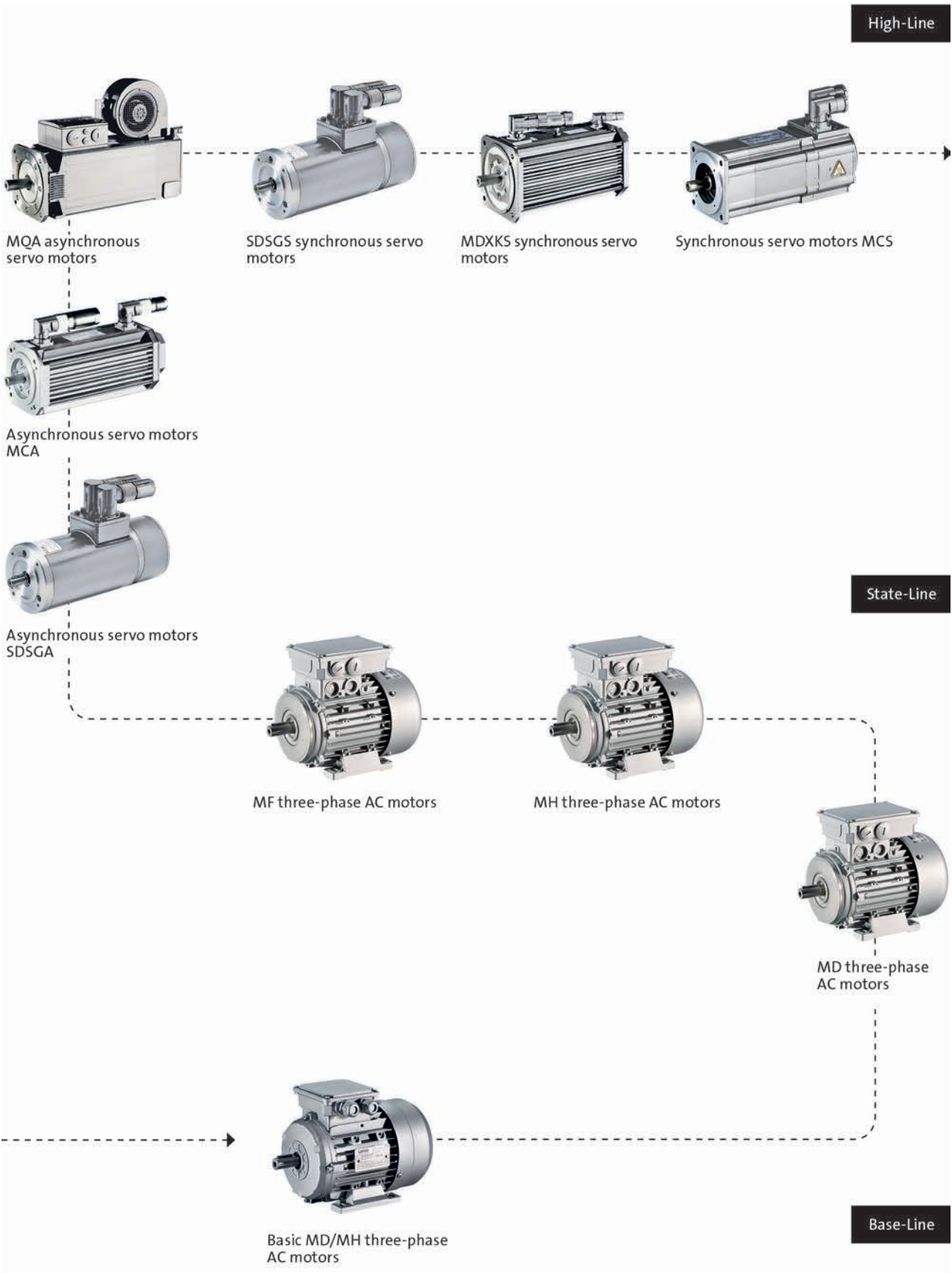
# L-force product portfolio

## Inverters



# L-force product portfolio

## Motors



# L-force product portfolio

## Gearboxes

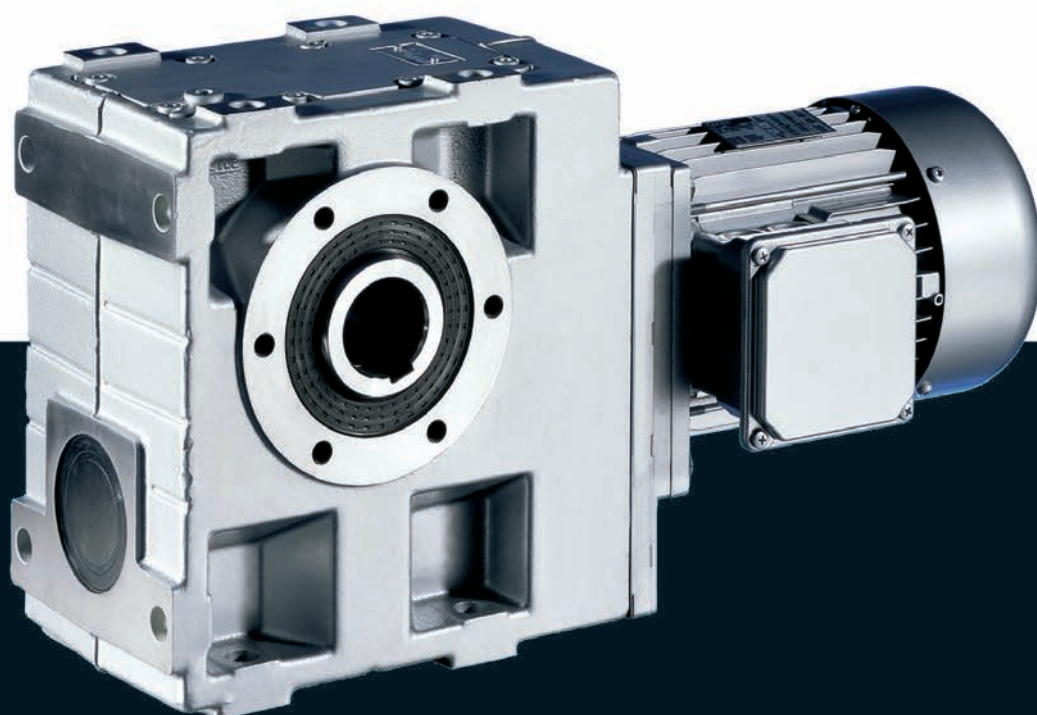




Gearboxes

# GSS helical-worm gearboxes

0.75 ... 15 kW





# GSS helical-worm gearboxes

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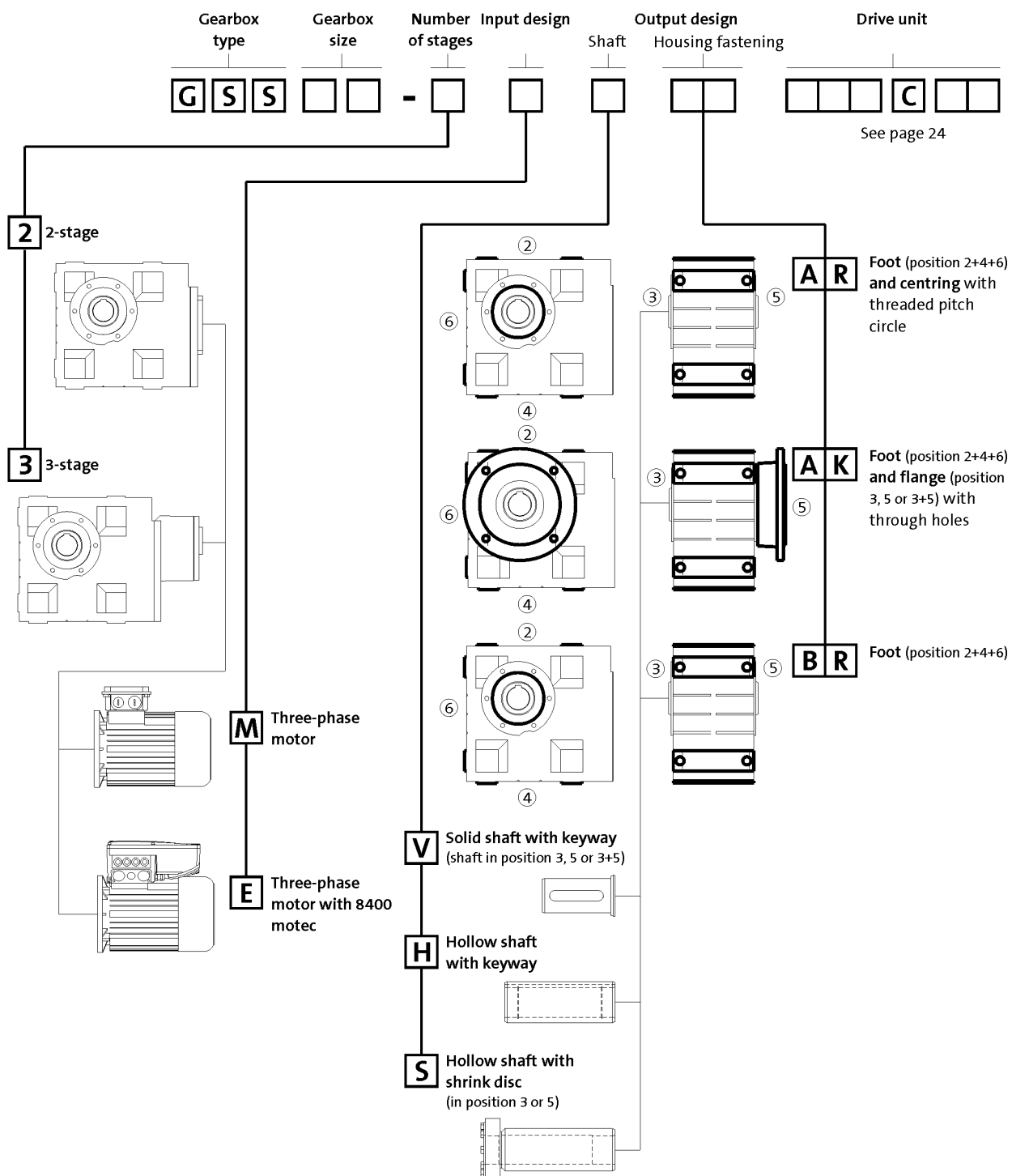
### List of abbreviations

|                |                      |                                    |
|----------------|----------------------|------------------------------------|
| $\eta_{c=1}$   |                      | Efficiency                         |
| c              |                      | Load capacity                      |
| $f_N$          | [Hz]                 | Rated frequency                    |
| $F_{ax,max}$   | [N]                  | Max. axial force                   |
| $F_{rad,max}$  | [N]                  | Max. radial force                  |
| $H_{max}$      | [m]                  | Site altitude                      |
| i              |                      | Ratio                              |
| J              | [kgcm <sup>2</sup> ] | Moment of inertia                  |
| m              | [kg]                 | Mass                               |
| $M_2$          | [Nm]                 | Output torque                      |
| $n_2$          | [r/min]              | Output speed                       |
| $n_N$          | [r/min]              | Rated speed                        |
| $P_N$          | [kW]                 | Rated power                        |
| $S_{hü}$       | [1/h]                | Transition operating frequency     |
| $T_{opr,max}$  | [°C]                 | Max. ambient operating temperature |
| $T_{opr,min}$  | [°C]                 | Min. ambient operating temperature |
| $U_{N,\Delta}$ | [V]                  | Rated voltage                      |
| $U_{N,Y}$      | [V]                  | Rated voltage                      |

|          |                                                                                 |
|----------|---------------------------------------------------------------------------------|
| CE       | Communauté Européenne                                                           |
| CSA      | Canadian Standards Association                                                  |
| DIN      | Deutsches Institut für Normung e.V.                                             |
| EMC      | Electromagnetic compatibility                                                   |
| EN       | European standard                                                               |
| IEC      | International Electrotechnical Commission                                       |
| IM       | International Mounting Code                                                     |
| IP       | International Protection Code                                                   |
| NEMA     | National Electrical Manufacturers Association                                   |
| UL       | Underwriters Laboratory Listed Product                                          |
| UR       | Underwriters Laboratory Recognized Product                                      |
| VDE      | Verband deutscher Elektrotechniker (Association of German Electrical Engineers) |
| CCC      | China Compulsory Certificate                                                    |
| GOST     | Certificate for Russian Federation                                              |
| cURus    | Combined certification marks of UL for the USA and Canada                       |
| UkrSEPRO | Certificate for Ukraine                                                         |



### Product key



|           | Output design |        |        |                        |
|-----------|---------------|--------|--------|------------------------|
|           | V             | H      | S      | K                      |
|           | d x l [mm]    | d [mm] | d [mm] | Øaz [mm]               |
| GSS04-2   | 25x50         | 25/30  | 25/30  | 160                    |
| GSS05-2/3 | 30x60         | 30/35  | 35     | 200                    |
| GSS06-2/3 | 40x80         | 40/45  | 40     | 200 <sup>1)</sup> /250 |
| GSS07-2/3 | 50x100        | 50/55  | 50     | 250/300                |

<sup>1)</sup> Only in the case of H and S type of output

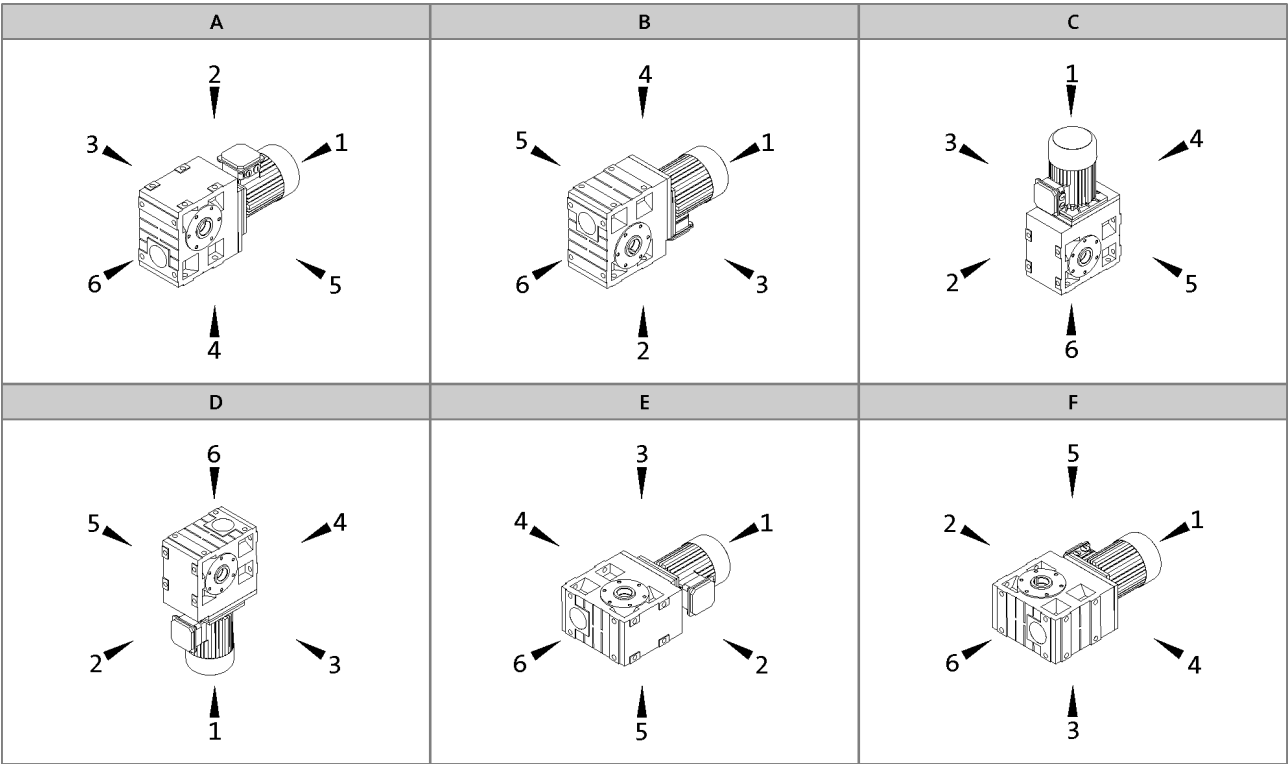
# GSS helical-worm gearboxes

## General information



### Product key

Mounting position (A...F) and position of system blocks (1...6)



Hollow shaft: 0  
Solid shaft: 3, 5, 8 (3+5)  
Hollow shaft with shrink disc: 3, 5

Without flange: 0  
Flange: 3, 5, 8 (3+5)  
Terminal box / motec: 2, 3, 4, 5

### Gearbox designs

| Basic versions                   |                                                                          |
|----------------------------------|--------------------------------------------------------------------------|
| Motor efficiency                 | Standard efficiency<br>Increased efficiency (IE2)                        |
| Surface and corrosion protection | OKS-G (primer: grey)<br>OKS-S (paint: RAL 7012)                          |
| Lubricant                        | CLP PG 460 (synthetic)                                                   |
| Ventilation                      | Oil control plugs for GSS05 ... 07<br>Breather elements for GSS05 ... 07 |

| Options                          |                                                                                                                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Surface and corrosion protection | OKS-S (special paint according to RAL)<br>OKS-M (special paint according to RAL)<br>OKS-L (special paint according to RAL)                                                               |
| Lubricant                        | CLP HC 220 USDA H1 (synthetic)                                                                                                                                                           |
| Shaft sealing rings              | Driven shaft: Viton                                                                                                                                                                      |
| Accessories                      | Torque plate on threaded pitch circle<br>Housing foot torque plate<br>2nd output shaft end<br>Shrink disc cover<br>Hoseproof hollow shaft cover<br>Mounting set for hollow shaft circlip |
| Nameplate                        | Metal nameplate (supplied loose)<br>Adhesive nameplate (supplied loose)                                                                                                                  |

# GSS helical-worm gearboxes

## General information



### Product information

Lenze provides a geared motor construction kit, which covers a wide range of requirements. Numerous drive-side and output-side options enable precise adaptation of the drive to the specific application. This is the basis for versatile applications and functional scalability of our gearboxes and geared motors.

The modular concept and high power density make extremely compact sizes possible. Optimised teeth profiles and ground gears ensure low-noise operation and low backlash. The gearboxes are of compact and hence space-saving construction.

### Designs

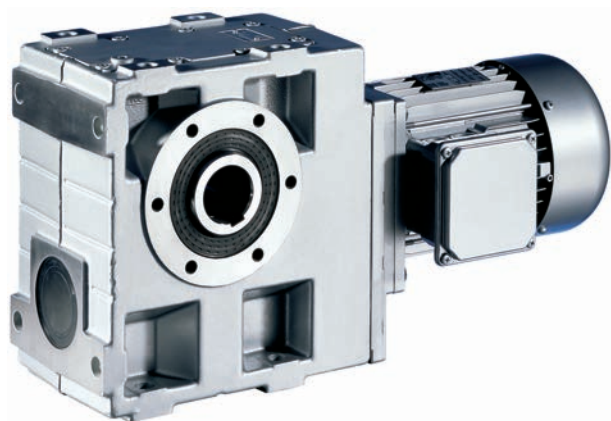
- 2-stage and 3-stage gearboxes
- Hollow shaft with keyway or shrink disc
- Solid shaft with keyway
- Foot or flange mounting
- Torque plate, including rubber buffer
- With MH three-phase AC motors (efficiency classes IE2) power range 0.75 ... 15 kW

### A low noise solution

Helical worm gearboxes are particularly low-noise drive components. They create a compact drive unit in combination with our servo motors. The helical worm gearboxes are designed in 2- and 3-stage versions and can reach a torque of up to 1,250 Nm and a ratio of up to  $i=1847$ .

### Inverters for motor-proximity installation

The Drive Package with decentralised Inverter Drives 8400 motec covers a power range up to 7.5 kW.



Helical-bevel geared motor GSS07-2M HBR 100-32

# GSS helical-worm gearboxes

## General information



### Functions and features

|                                    |                                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gearbox type</b>                | GSS                                                                                                                                                      |
| <b>Housing</b>                     |                                                                                                                                                          |
| Design                             | Cuboid                                                                                                                                                   |
| Material                           | Aluminium / cast iron                                                                                                                                    |
| <b>Solid shaft</b>                 |                                                                                                                                                          |
| Design                             | with keyway to DIN 6885                                                                                                                                  |
| Tolerance                          | m6 (d > 50 mm)<br>k6 (d ≤ 50 mm)                                                                                                                         |
| Material                           | Tempered steel C45 or 42CrMo4                                                                                                                            |
| <b>Hollow shaft</b>                |                                                                                                                                                          |
| Design                             | H: with keyway<br>S: smooth                                                                                                                              |
| Tolerance                          | Bore H7                                                                                                                                                  |
| Material                           | Tempered steel C45                                                                                                                                       |
| <b>Toothed parts</b>               |                                                                                                                                                          |
| Design                             | Optimised tooth flanks and profile geometry<br>Ground tooth flanks                                                                                       |
| Material                           | Case-hardened steel, bronze (worm gear only)                                                                                                             |
| <b>Shaft-hub joint</b>             |                                                                                                                                                          |
|                                    | 1st stage/prestage/helical (bevel) gearbox: Friction-type connection<br>Output stage (= 2nd, 3rd or 4th stage): Friction-type or positive-fit connection |
| <b>Shaft sealing rings</b>         |                                                                                                                                                          |
| Design                             | With dust lip                                                                                                                                            |
| Material                           | NB / FP                                                                                                                                                  |
| <b>Bearing</b>                     |                                                                                                                                                          |
| Design                             | Ball bearing / tapered-roller bearing depending on size and design                                                                                       |
| <b>Lubricants</b>                  |                                                                                                                                                          |
| Standard                           | DIN 51502                                                                                                                                                |
| Quantities                         | corresponding to mounting position (see operating instructions)                                                                                          |
| <b>Mechanical efficiency</b>       |                                                                                                                                                          |
| 1-stage gearboxes [ $\eta_{c=1}$ ] |                                                                                                                                                          |
| 2-stage gearboxes [ $\eta_{c=1}$ ] | 0.62 ... 0.92 <sup>1)</sup>                                                                                                                              |
| 3-stage gearboxes [ $\eta_{c=1}$ ] | 0.64 ... 0.92 <sup>1)</sup>                                                                                                                              |
| 4-stage gearboxes [ $\eta_{c=1}$ ] |                                                                                                                                                          |
| Notes                              | Dependent on transmission ratio<br>Housing at operating temperature and teeth run in                                                                     |

<sup>1)</sup>  32 - Efficiencies depending on ratio

# GSS helical-worm gearboxes

## General information



### Functions and features

#### Lubricants

Lenze gearboxes and geared motors are ready for operation on delivery and are filled with lubricants specific to both the drive and the design. The mounting position and design specified in the order are key factors in choosing the volume of lubricant.

The lubricants listed in the lubricant table are approved for use in Lenze drives.

#### Lubricant table

| Mode                     | CLP PG 460                                                                             | CLP HC 220<br>USDA H1                                                                  |
|--------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Ambient temperature [°C] | -20 ... +40                                                                            |                                                                                        |
| Specification            | Synthetic-based oil (polyglycol)                                                       | Synthetic-based oil (synthetic hydrocarbon / poly-alpha-olefin oil)                    |
| Note                     | Cannot be mixed with other oil types.                                                  | For food processing industry                                                           |
| Changing interval        | 25000 operating hours<br>not later than after three years (oil temperature 70...80 °C) | 16000 operating hours<br>not later than after three years (oil temperature 70...80 °C) |
| Fuchs                    |                                                                                        | bremer & leguil<br>Cassida Fluid GL 220                                                |
| Klüber                   | Klübersynth<br>GH 6-460                                                                | Klüberoil<br>4 UH1-220 N                                                               |
| Shell                    | Shell Tivela<br>S 460                                                                  |                                                                                        |

- Please contact your Lenze office if you are operating at ambient temperatures in areas up to < -20 °C > or up to +40°C.
- Caution: when using the lubricant CLP HC 220 with the GSS helical-worm gearbox, the load capacity  $c$  is reduced to 80 % of the values stated in the catalogue.



### Functions and features

#### Surface and corrosion protection

For optimum protection of geared motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

Various surface coatings combined with other protective measures ensure that the geared motors operate reliably even at high air humidity, in outdoor installations or in the presence of atmospheric impurities. Any colour from the RAL Classic collection can be chosen for the top coat. The geared motors are also available unpainted (no surface and corrosion protection).

| Surface and corrosion protection system | Applications                                                                                                                                                                      | Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | Catalogue text                                                                                                                                                                    | Catalogue text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OKS-G (primed)                          | <ul style="list-style-type: none"> <li>Dependent on subsequent top coat applied</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>1K priming coat (grey)</li> <li>Zinc-coated screws</li> <li>Rust-free breather elements</li> </ul> Optional measures <ul style="list-style-type: none"> <li>Stainless steel nameplate</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| OKS-S (small)                           | <ul style="list-style-type: none"> <li>Standard applications</li> <li>Internal installation in heated buildings</li> <li>Air humidity up to 90%</li> </ul>                        | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C1 (in line with EN 12944-2)</li> <li>Zinc-coated screws</li> <li>Rust-free breather elements</li> </ul> Optional measures <ul style="list-style-type: none"> <li>Stainless steel nameplate</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| OKS-M (medium)                          | <ul style="list-style-type: none"> <li>Internal installation in non-heated buildings</li> <li>Covered, protected external installation</li> <li>Air humidity up to 95%</li> </ul> | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C2 (in line with EN 12944-2)</li> <li>Zinc-coated screws</li> <li>Rust-free breather elements</li> </ul> Optional measures <ul style="list-style-type: none"> <li>Stainless steel shaft</li> <li>Stainless steel nameplate</li> <li>Rust-free shrink disc (on request)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| OKS-L (high)                            | <ul style="list-style-type: none"> <li>External installation</li> <li>Air humidity above 95%</li> <li>Chemical industry plants</li> <li>Food industry</li> </ul>                  | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C3 (in line with EN 12944-2)</li> <li>Blower cover and B end shield additionally primed</li> <li>Cable glands with gaskets</li> <li>Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request)</li> <li>All screws/screw plugs zinc-coated</li> <li>Stainless breather elements</li> <li>Threaded holes that are not used are closed by means of plastic plugs</li> </ul> Optional measures <ul style="list-style-type: none"> <li>Sealed recesses on motor (on request)</li> <li>Stainless steel shaft</li> <li>Stainless steel nameplate</li> <li>Rust-free shrink disc (on request)</li> <li>Additional priming coat on cast iron fan</li> <li>Oil expansion tank and torque plates painted separately and supplied loose</li> </ul> |

# GSS helical-worm gearboxes

## General information



## Functions and features

### Structure of surface coating

| Surface and corrosion protection system | Corrosivity category | Surface coating                                                 | Colour                                      |
|-----------------------------------------|----------------------|-----------------------------------------------------------------|---------------------------------------------|
|                                         | DIN EN ISO 12944-2   | Structure                                                       |                                             |
| Without OKS (uncoated)                  |                      | Dipping primed gearbox                                          |                                             |
| OKS-G (primed)                          |                      | Dipping primed gearbox<br>1K priming coat                       |                                             |
| OKS-S (small)                           | C1                   | Dipping primed gearbox<br>2K-PUR top coat                       | Standard: RAL 7012<br>Optional: RAL Classic |
| OKS-M (medium)                          | C2                   | Dipping primed gearbox<br>1K priming coat<br>2K-PUR top coat    | Standard: RAL 7012<br>Optional: RAL Classic |
| OKS-L (high)                            | C3                   | Dipping primed gearbox<br>2K-EP priming coat<br>2K-PUR top coat | Standard: RAL 7012<br>Optional: RAL Classic |

# GSS helical-worm gearboxes

## General information

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## Functions and features

### Ventilation

#### **Gearboxes without ventilation**

No ventilation is required for gearbox GSS04.

#### **Gearboxes with ventilation**

Gearboxes GSS05 ... 07 are supplied with breather elements as standard.



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### Dimensioning

#### General information about the data provided in this catalogue

##### Powers, torques and speeds

The powers, torques and speeds specified in this catalogue are rounded values and are valid under the following conditions:

- Operating time/day = 8 h (100% OT)
- Duty class I for up to 10 switching operations/h
- Mounting positions and designs in this catalogue
- Standard lubricant
- $T_{amb} = 20\text{ °C}$  for gearboxes,  
 $T_{amb} = 40\text{ °C}$  for motors (in accordance with EN 60034)
- Site altitude  $< = 1000\text{ m amsl}$
- The selection tables provide the permissible mechanical powers and torques. For notes on the thermal power limit, see chapter drive dimensioning.
- The rated power specified for motors and geared motors applies to operating mode S1 (in accordance with EN 60034).

Under different operating conditions, the values obtained may vary from those listed here.

In the case of extreme operating conditions, please consult your Lenze sales office.

# GSS helical-worm gearboxes

## General information



### Dimensioning

#### Thermal power limit

The thermal power limit, defined by the heat balance, limits the permissible gearbox continuous power. It may be less than the mechanical power ratings listed in the selection tables.

The thermal power limit is affected by:

- the churning losses in the lubricant. These are determined by the mounting position and the circumferential speed of the wheels
- the load and the speed
- the ambient conditions: temperature, air circulation, input or dissipation via shafts and the foundation

Please consult your Lenze subsidiary

- if the following input speeds  $n_1$  are exceeded on a continuous basis (continuous is defined as more than 8 h/day):

| Motor frame size | Mounting position A, B, E, F | Mounting position C, D |
|------------------|------------------------------|------------------------|
| 063 ... 100      | 3000 r/min                   | 3000 r/min             |
| 112 ... 132      | 3000 r/min                   | 1500 r/min             |
| 160 ... 225      | 2000 r/min                   | 1500 r/min             |

- if the following input speeds  $n_1$  are exceeded:

| Motor frame size | Mounting position A, B, E, F | Mounting position C, D |
|------------------|------------------------------|------------------------|
| 063 ... 100      | 4000 r/min                   | 3000 r/min             |
| 112 ... 132      | 4000 r/min                   | 2000 r/min             |
| 160 ... 225      | 3000 r/min                   | 1500 r/min             |

#### Possible ways of extending the application area

- synthetic lubricant (option)
- shaft sealing rings made from FP material/Viton (option)
- reduction in lubricant quantity
- cooling of the geared motor by means of air convection on the machine/system



Dimensioning

Load capacity and application factor

Load capacity *c* of gearbox

Rated value for the load capacity of Lenze geared motors.

- *c* is the ratio of the permissible rated torque of the gearbox to the rated torque supplied by the drive component (e.g. the built-in Lenze motor).
- The value of *c* must always be greater than the value of the application factor *k* calculated for the application.

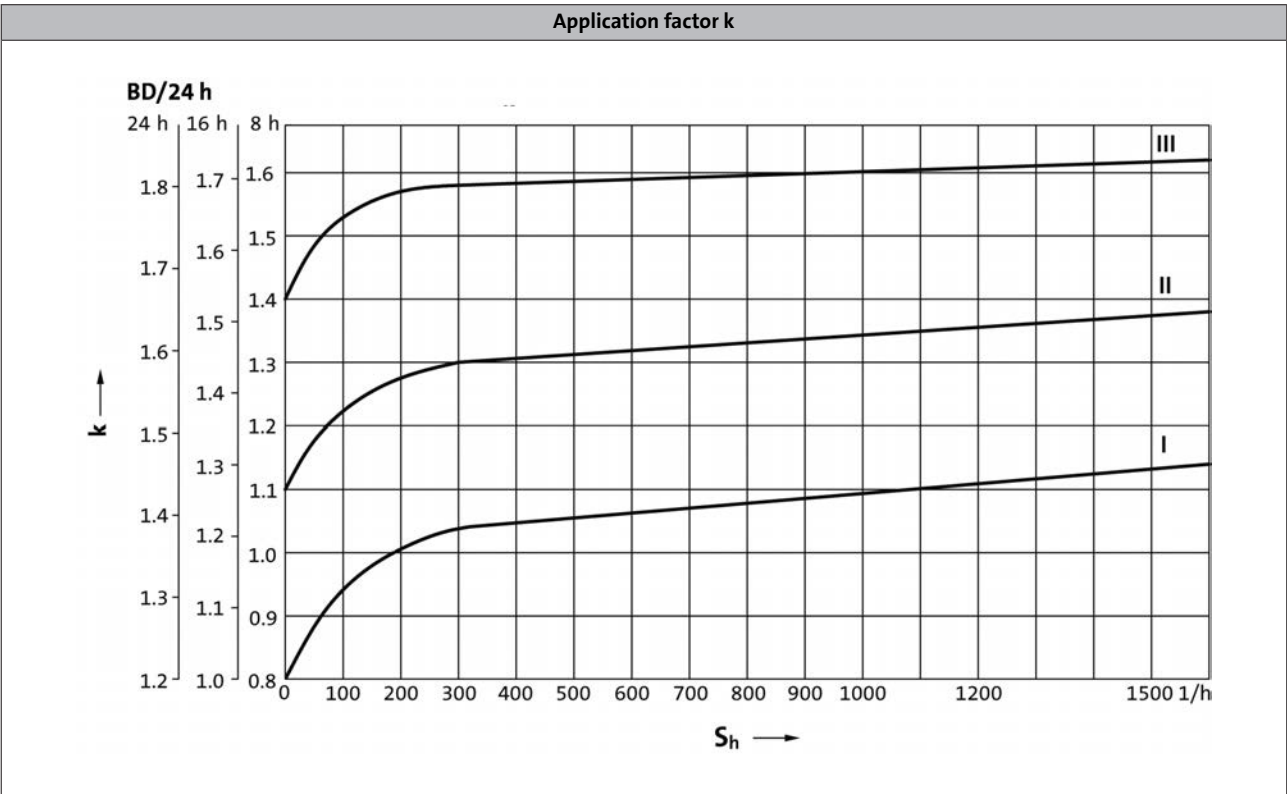
Application factor *k* (according to DIN 3990)

Takes into account the influence of temporally variable loads which are actually present during the anticipated operating time of gearboxes and geared motors.

*k* is determined by:

- the type of load
- the load intensity
- temporal influences

| Duty class | Load type                                              |
|------------|--------------------------------------------------------|
| I          | Smooth operation, small or light jolts                 |
| II         | Uneven operation, average jolts                        |
| III        | Uneven operation, severe jolts and/or alternating load |



# GSS helical-worm gearboxes

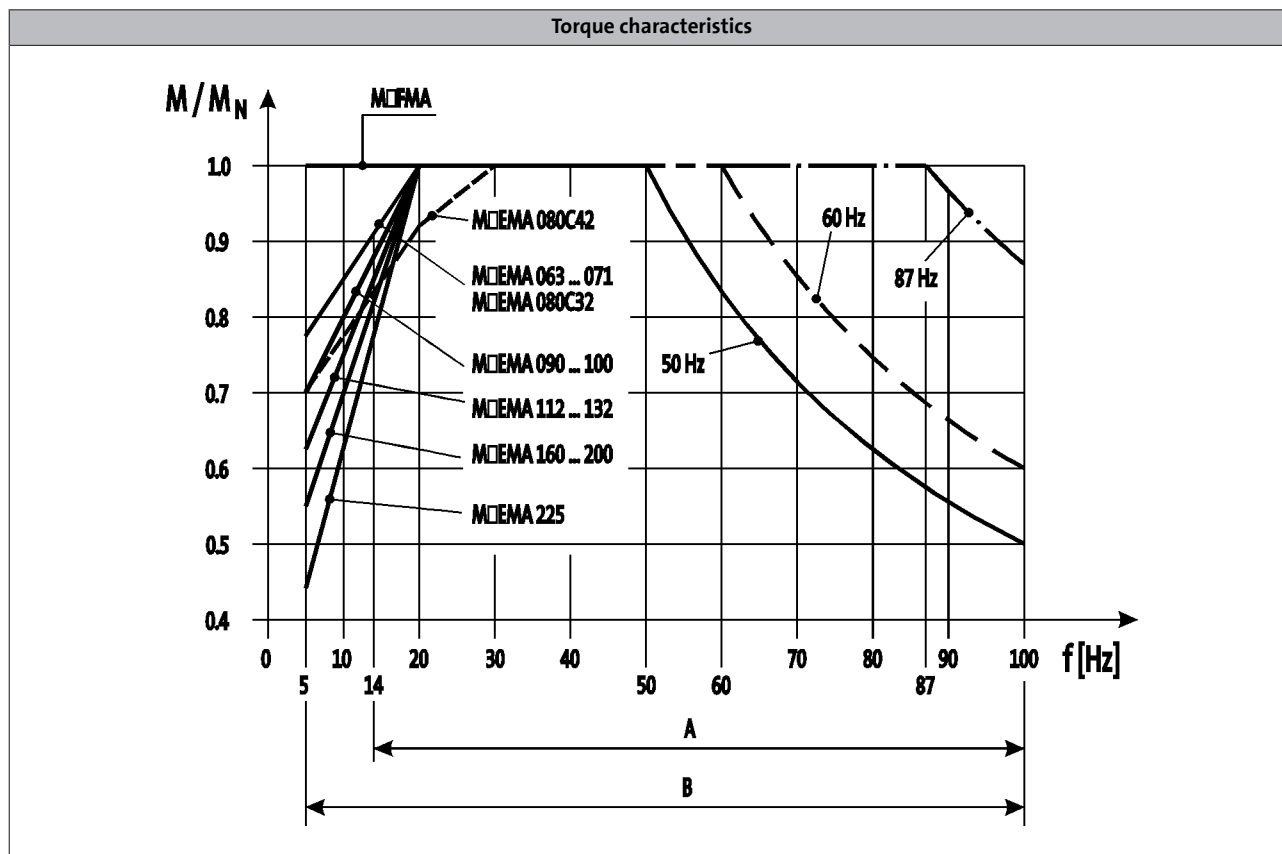
## General information



## Dimensioning

### Torque derating at low motor frequencies

Motor size-dependent torque reduction, taking into account the thermal response during operation on the inverter.



A = Operation with integral fan and brake

B = Operation with integral fan and brake control "Holding current reduction"

**You can use the Drive Solution Designer for precise drive dimensioning.**

The Drive Solution Designer helps you to carry out a fast and high-quality drive dimensioning. The software includes well-founded and proven knowledge on drive applications and electro-mechanical drive components.

Please contact your Lenze sales office.

# GSS helical-worm gearboxes

## General information



## Dimensioning

### Notes on the selection tables

The selection tables show the available combinations of gearbox type, number of stages, ratio and motor. The following legend indicates the structure of the selection tables.

Gearbox type  
↓  
**GST helical gearbox**  
Technical data

Selection tables

Rated speed  $n_N$  of the drive motor

Product key of geared motor

Rated power  $P_N$  of the drive motor in relation to the rated frequency

► 50 Hz, 60 Hz:  $P_N = 0.75$  kW

| $n_N$ | 1410 r/min       |               |     | 1720 r/min       |               |     | $i$   | Product key of geared motor |  |
|-------|------------------|---------------|-----|------------------|---------------|-----|-------|-----------------------------|-------------------------------------------------------------------------------------|
| $f_N$ | 50 Hz            |               |     | 60 Hz            |               |     |       |                             |                                                                                     |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | $c$ | $n_2$<br>[r/min] | $M_2$<br>[Nm] | $c$ |       |                             |                                                                                     |
|       | 881              | 8.0           | 2.4 | 1069             | 6.6           | 2.8 | 1.600 | GST04-1M □□□080C32          | 76                                                                                  |
|       | 689              | 10            | 2.2 | 835              | 8.4           | 2.6 | 2.048 | GST04-1M □□□080C32          | 76                                                                                  |

Output speed  $n_2$

Output torque  $M_2$  (constant for all listed frequencies)

The load capacity  $c$  of the gearbox  $c$  is the ratio of the gearbox's rated torque to the rated torque of the three-phase motor (calculated in respect of its application to the output shaft).  $c$  must always be greater than the application factor  $k$  determined for the application

Ratio  $i$

Page number for dimensions

$$c = \frac{M_{2,zul}}{M_{1N} \cdot i \cdot \eta_{Getr}} > k$$

# GSS helical-worm gearboxes

## General information



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### Dimensioning

#### Notes on the selection tables

##### Motor voltages

The power values and torques indicated in the selection tables relate to the following motor voltages:

- 50 Hz :  $\Delta$  230 V / Y 400 V
- 60 Hz :  $\Delta$  265 V / Y 460 V
- 87 Hz :  $\Delta$  400 V

##### Operation at 87 Hz

In 87 Hz operation, the three-phase AC motor (which is designed for a voltage of  $\Delta$  230 V / Y 400 V at 50 Hz) is operated on an inverter with 400 V rated voltage in a delta connection. It is important to note here that the inverter must be configured for 87Hz output.

This offers the following advantages over 50 Hz operation:

- the setting range of the motor is increased by a factor of 1.73.
- the motor can then provide around 1.73 times greater output, which in turn allows a smaller and more affordable motor to be selected for the application.
- the efficiency of the motor is also improved.

# GSS helical-worm gearboxes

## General information



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### Notes on ordering

**We want to be sure that you receive the correct products in good time.**

To allow us to achieve this we need:

- your address and your company data
- our product key for the individual products in this catalogue
- your delivery date and delivery address

#### Ordering procedure

Please use the ordering information checklist to ensure that you provide all the ordering information required for the various products.

The ordering information checklist, the product key, the basic versions, options, mounting position and position of the system blocks will be found in the General – Product key section.

A list of Lenze's worldwide sales offices can be found on the Internet: [www.Lenze.com](http://www.Lenze.com).

# GSS helical-worm gearboxes

General information



## Ordering details checklist

☐ Offer

Page \_\_ of \_\_

☐ Order

Customer No.

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|

Job No.

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

Fax No.

## Sender

Company

Street/P.O. Box

P.O. Box, City

Date

Signature

Made out by (name)

Department

Telephone No.

## Delivery address (if different)

Street/P.O. Box

P.O. Box, City

Desired delivery date

Dispatching notes

## Invoice recipient (if different)

Street/P.O. Box

Postal code, City



## Ordering details checklist

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|

[illegible]
$$d = \frac{1}{2}$$

\_\_\_\_\_

1

7

9

9

9

Page 10

| A | B | C | D | E | F |
|---|---|---|---|---|---|
|   |   |   |   |   |   |

|   |   |   |   |
|---|---|---|---|
| 0 | 3 | 4 | 8 |
|   |   |   |   |

|                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 3                        | 5                        | 8                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| 2 | 3 | 4 | 5 |
|---|---|---|---|
|   |   |   |   |

9

7

OKS-G  
(primed)

9

9

7

11

7

9

7

9

7

□

7

1

9

9

Breather elements for  
GSS05

# GSS helical-worm gearboxes

## General information



### Ordering details checklist

#### Three-phase AC motors options

Customer No.

Job No.

Page \_\_\_\_

#### Motor connection

Terminal box

- ☐ with plug-in connector ICN 6-pin.  
Adhere to permissible rated motor current 20 A!
- ☐ with plug-in connector ICN 8-pin.  
Adhere to permissible rated motor current 20 A!
- ☐ with plug-in connector HAN10E.  
Adhere to permissible rated current 16 A!
- ☐ with plug-in connector HAN-Modular.  
Adhere to permissible rated current 16 / 40 A!

Cable entry

only with M□□MAXX/LL063 ... 132  
or terminal box with plug-in connector  
in position

|                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1                    | 2                    | 3                    | 4                    | 5                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

#### Blower

|                             |                             |
|-----------------------------|-----------------------------|
| <input type="checkbox"/> 1~ | <input type="checkbox"/> 3~ |
|-----------------------------|-----------------------------|

☐ Terminal box with plug-in connector ICN

Terminal box position

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| 2                    | 3                    | 4                    | 5                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

#### Spring-applied brake

Brake version

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> Standard | <input type="checkbox"/> Longlife |
|-----------------------------------|-----------------------------------|

Brake size

Characteristic torque

 Nm

Rated voltage

|                      |                      |                        |
|----------------------|----------------------|------------------------|
| AC                   | DC                   |                        |
| <input type="text"/> | <input type="text"/> | <input type="text"/> V |

Rectifier

Only in the case of AC supply voltage

|                                                                         |                                                                                    |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <input type="checkbox"/> Half-wave rectifier                            | <input type="checkbox"/> Bridge rectifier                                          |
| <input type="checkbox"/> Bridge/half-wave rectifier<br>(overexcitation) | <input type="checkbox"/> Bridge/half-wave rectifier<br>(holding current reduction) |

Brake options

Manual release lever  
in position

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| 2                    | 3                    | 4                    | 5                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

☐ Low-noise version  
(Standard in the case of brake with speed/position encoder)

# GSS helical-worm gearboxes

## General information



### Ordering details checklist

#### Three-phase AC motors options

Customer No.

Job No.

Page \_\_\_\_

Speed/position  
encoder

Resolver ☐ RS1

Incremental encoder HTL ☐ IG128-24V-H ☐ IG512-24V-H ☐ IG1024-24V-H ☐ IG2048-24V-H

Incremental encoder TTL ☐ IG512-5V-T ☐ IG1024-5V-T ☐ IG2048-5V-T

Feedback with ICN connector ☐ IG128-24V-H not possible with plug-in connector!

Motor protection

☐ PTC

☐ KTY 83-110

☐ KTY 84-130

Approval

☐ UL/CSA  
approval: cURus

☐ CCC

☐ China Energy Label

#### Further options

Indication of supply voltage only for motor frame sizes 112C32 to 225C22

☐ Δ; 400V-50Hz; 460V-60Hz

☐ Y/Δ; 400/230V-50Hz; 460/265V-60Hz  
(-/400V-87Hz possible in operation with  
frequency inverter)

☐ Protection cover

☐ 2nd shaft end

☐ Handwheel

☐ Increased centrifugal mass

☐ 2nd nameplate (adhesive nameplate/metal nameplate)

# GSS helical-worm gearboxes

## General information

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### Permissible radial and axial forces at output

#### Permissible radial force

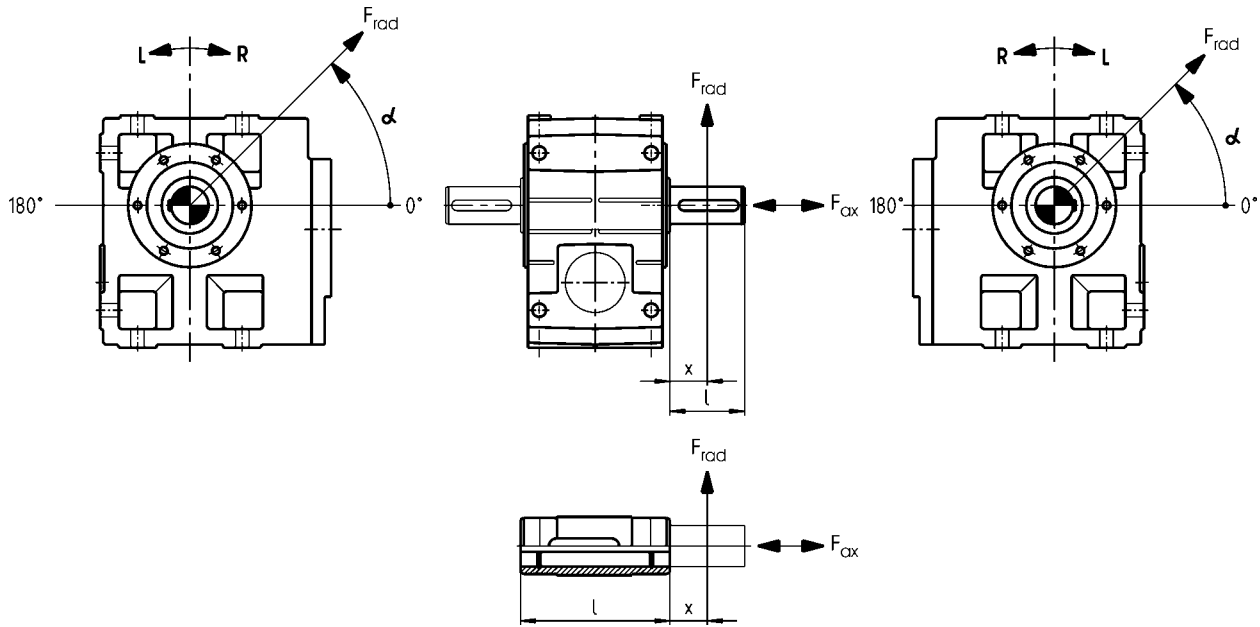
$F_{rad,per} = \min(f_w \times f_Q \times F_{rad,max} ; f_w \times F_{rad,max} \text{ at } n_2 \leq 16 \text{ r/min})$

#### Permissible axial force

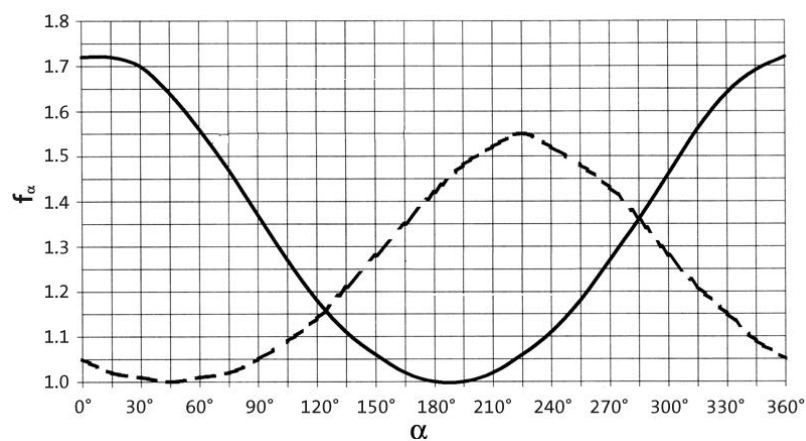
$F_{ax,per} = F_{ax,max} \text{ if } F_{rad} = 0$

If  $F_{rad}$  and  $F_{ax} \neq 0$ ; please contact Lenze.

#### Application of forces



#### Effective direction factor $f_Q$ at output shaft

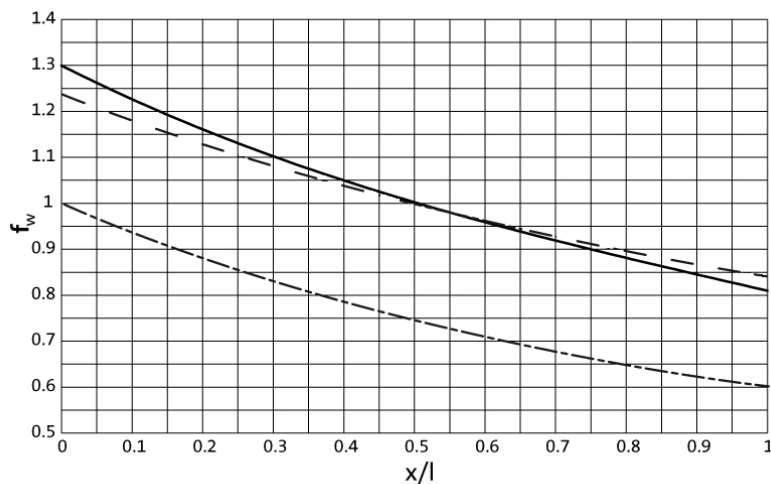


— Direction of rotation R  
 - - - Direction of rotation L



### Permissible radial and axial forces at output

Additional load factor  $f_w$  at output shaft



— Solid shaft (V□□)

— Solid shaft with flange (V□K)

— Hollow shaft (H□□)

GSS□□-2/3□ H□□

| Size    | $n_2$ [r/min] |     |     |     |     |    |    |    |     |
|---------|---------------|-----|-----|-----|-----|----|----|----|-----|
| Gearbox | 630           | 400 | 250 | 160 | 100 | 63 | 40 | 25 | ≤16 |

| Max. radial force, Hollow shaft |               |               |               |               |               |               |               |               |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                 | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ |
|                                 | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           |
| GSS04                           | 2800          | 3000          | 3800          | 4500          | 5300          | 6000          | 6000          | 6000          | 6000          |
| GSS05                           | 3000          | 3200          | 3600          | 4300          | 5100          | 6000          | 7000          | 7500          | 7500          |
| GSS06                           | 4400          | 4600          | 4800          | 5600          | 6600          | 7700          | 9100          | 10700         | 11500         |
| GSS07                           | 4600          | 5100          | 5600          | 6700          | 8200          | 10000         | 12100         | 14800         | 16000         |

| Max. axial force, Hollow shaft |              |              |              |              |              |              |              |              |              |
|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ | $F_{ax,max}$ |
|                                | [N]          | [N]          | [N]          | [N]          | [N]          | [N]          | [N]          | [N]          | [N]          |
| GSS04                          | 2200         | 2900         | 3700         | 4200         | 4900         | 5500         | 5500         | 5500         | 5500         |
| GSS05                          | 1600         | 2200         | 2800         | 3500         | 4400         | 5500         | 6000         | 6000         | 6000         |
| GSS06                          | 1900         | 2500         | 3200         | 4100         | 5200         | 6500         | 8200         | 9000         | 9000         |
| GSS07                          | 1800         | 2400         | 3100         | 4100         | 5500         | 7200         | 9500         | 12500        | 12500        |

- Application of force  $F_{rad}$ : at hollow shaft end face ( $x = 0$ )
- $F_{ax,max}$  only valid with  $F_{rad} = 0$
- Neither radial nor axial forces are permissible for the hollow shaft with shrink disc (S□□).

# GSS helical-worm gearboxes

Technical data



## Permissible radial and axial forces at output

GSS□□-2/3□ V□R

| Size                                                 | $n_2$ [r/min] |               |               |               |               |               |               |               |               |
|------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Gearbox                                              | 630           | 400           | 250           | 160           | 100           | 63            | 40            | 25            | ≤16           |
| <b>Max. radial force, Solid shaft without flange</b> |               |               |               |               |               |               |               |               |               |
|                                                      | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ |
|                                                      | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           |
| GSS04                                                | 2200          | 2400          | 3000          | 3500          | 4100          | 4200          | 4200          | 4200          | 4200          |
| GSS05                                                | 2300          | 2500          | 2900          | 3400          | 4000          | 4300          | 4300          | 4300          | 4300          |
| GSS06                                                | 3400          | 3500          | 3600          | 4200          | 5000          | 5900          | 6900          | 8200          | 8500          |
| GSS07                                                | 3700          | 4000          | 4200          | 5100          | 6300          | 7700          | 9300          | 11300         | 12000         |
| <b>Max. axial force, Solid shaft without flange</b>  |               |               |               |               |               |               |               |               |               |
|                                                      | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  |
|                                                      | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           |
| GSS04                                                | 2200          | 2900          | 3700          | 4200          | 4900          | 5500          | 5500          | 5500          | 5500          |
| GSS05                                                | 1600          | 2200          | 2800          | 3500          | 4400          | 5500          | 6000          | 6000          | 6000          |
| GSS06                                                | 1900          | 2500          | 3200          | 4100          | 5200          | 6500          | 8200          | 9000          | 9000          |
| GSS07                                                | 1800          | 2400          | 3100          | 4100          | 5500          | 7200          | 9500          | 12500         | 12500         |

GSS□□-2/3□ V□K

| Size                                              | $n_2$ [r/min] |               |               |               |               |               |               |               |               |
|---------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Gearbox                                           | 630           | 400           | 250           | 160           | 100           | 63            | 40            | 25            | ≤16           |
| <b>Max. radial force, Solid shaft with flange</b> |               |               |               |               |               |               |               |               |               |
|                                                   | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ | $F_{rad,max}$ |
|                                                   | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           |
| GSS04                                             | 2750          | 3000          | 4100          | 4400          | 4700          | 4700          | 4700          | 4700          | 4700          |
| GSS05                                             | 3450          | 3750          | 4900          | 4900          | 4900          | 4900          | 4900          | 4900          | 4900          |
| GSS06                                             | 5100          | 5250          | 7000          | 8100          | 9400          | 9400          | 9400          | 9400          | 9400          |
| GSS07                                             | 5500          | 6000          | 7900          | 9100          | 10600         | 12400         | 14000         | 14000         | 14000         |
| <b>Max. axial force, Solid shaft with flange</b>  |               |               |               |               |               |               |               |               |               |
|                                                   | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  | $F_{ax,max}$  |
|                                                   | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           | [N]           |
| GSS04                                             | 2100          | 2800          | 3500          | 4000          | 4200          | 4200          | 4200          | 4200          | 4200          |
| GSS05                                             | 1500          | 2000          | 2500          | 3100          | 4000          | 4900          | 5500          | 5500          | 5500          |
| GSS06                                             | 1600          | 2200          | 2800          | 3500          | 4500          | 5700          | 7300          | 8800          | 8800          |
| GSS07                                             | 1400          | 1900          | 2400          | 3200          | 4300          | 5900          | 8000          | 10000         | 10000         |

- Application of force  $F_{rad}$ : centre of shaft journal ( $x = l/2$ )
- $F_{ax,max}$  only valid with  $F_{rad} = 0$

6.10

# GSS helical-worm gearboxes

## Technical data



### Moments of inertia

#### GSS□□-2

- Moment of inertia (J) depending on ratio i

| Gearbox |   |                      | GSS04 |
|---------|---|----------------------|-------|
| 5.639   | J | [kgcm <sup>2</sup> ] | 1.120 |
| 7.733   | J | [kgcm <sup>2</sup> ] | 0.652 |
| 9.042   | J | [kgcm <sup>2</sup> ] | 0.809 |
| 9.897   | J | [kgcm <sup>2</sup> ] | 0.430 |
| 10.827  | J | [kgcm <sup>2</sup> ] | 0.368 |
| 12.400  | J | [kgcm <sup>2</sup> ] | 0.487 |
| 13.810  | J | [kgcm <sup>2</sup> ] | 0.247 |
| 15.869  | J | [kgcm <sup>2</sup> ] | 0.329 |
| 17.360  | J | [kgcm <sup>2</sup> ] | 0.284 |
| 20.417  | J | [kgcm <sup>2</sup> ] | 0.673 |
| 22.143  | J | [kgcm <sup>2</sup> ] | 0.195 |
| 24.800  | J | [kgcm <sup>2</sup> ] | 0.420 |
| 27.125  | J | [kgcm <sup>2</sup> ] | 0.145 |
| 31.738  | J | [kgcm <sup>2</sup> ] | 0.288 |
| 34.100  | J | [kgcm <sup>2</sup> ] | 0.096 |
| 39.200  | J | [kgcm <sup>2</sup> ] | 0.247 |
| 43.917  | J | [kgcm <sup>2</sup> ] | 0.064 |
| 50.000  | J | [kgcm <sup>2</sup> ] | 0.173 |
| 54.250  | J | [kgcm <sup>2</sup> ] | 0.131 |
| 61.250  | J | [kgcm <sup>2</sup> ] | 0.130 |
| 68.200  | J | [kgcm <sup>2</sup> ] | 0.087 |
| 77.000  | J | [kgcm <sup>2</sup> ] | 0.086 |
| 87.833  | J | [kgcm <sup>2</sup> ] | 0.059 |
| 99.167  | J | [kgcm <sup>2</sup> ] | 0.058 |
| 111.318 | J | [kgcm <sup>2</sup> ] | 0.039 |
| 125.682 | J | [kgcm <sup>2</sup> ] | 0.038 |
| 139.500 | J | [kgcm <sup>2</sup> ] | 0.027 |
| 157.500 | J | [kgcm <sup>2</sup> ] | 0.026 |
| 183.786 | J | [kgcm <sup>2</sup> ] | 0.016 |
| 207.500 | J | [kgcm <sup>2</sup> ] | 0.016 |

| Gearbox |   |                      | GSS05 |
|---------|---|----------------------|-------|
| 5.639   | J | [kgcm <sup>2</sup> ] | 2.821 |
| 7.733   | J | [kgcm <sup>2</sup> ] | 1.664 |
| 9.042   | J | [kgcm <sup>2</sup> ] | 2.014 |
| 9.897   | J | [kgcm <sup>2</sup> ] | 1.102 |
| 10.827  | J | [kgcm <sup>2</sup> ] | 0.941 |
| 12.400  | J | [kgcm <sup>2</sup> ] | 1.235 |
| 13.810  | J | [kgcm <sup>2</sup> ] | 0.638 |
| 15.869  | J | [kgcm <sup>2</sup> ] | 0.840 |
| 17.360  | J | [kgcm <sup>2</sup> ] | 0.722 |
| 20.417  | J | [kgcm <sup>2</sup> ] | 1.601 |
| 22.143  | J | [kgcm <sup>2</sup> ] | 0.504 |
| 24.800  | J | [kgcm <sup>2</sup> ] | 1.059 |
| 27.125  | J | [kgcm <sup>2</sup> ] | 0.377 |
| 31.738  | J | [kgcm <sup>2</sup> ] | 0.733 |
| 35.306  | J | [kgcm <sup>2</sup> ] | 0.233 |
| 39.200  | J | [kgcm <sup>2</sup> ] | 0.610 |
| 43.917  | J | [kgcm <sup>2</sup> ] | 0.167 |
| 50.000  | J | [kgcm <sup>2</sup> ] | 0.435 |
| 54.250  | J | [kgcm <sup>2</sup> ] | 0.341 |
| 61.250  | J | [kgcm <sup>2</sup> ] | 0.332 |
| 70.611  | J | [kgcm <sup>2</sup> ] | 0.211 |
| 79.722  | J | [kgcm <sup>2</sup> ] | 0.206 |
| 87.833  | J | [kgcm <sup>2</sup> ] | 0.153 |
| 99.167  | J | [kgcm <sup>2</sup> ] | 0.149 |
| 113.667 | J | [kgcm <sup>2</sup> ] | 0.096 |
| 128.333 | J | [kgcm <sup>2</sup> ] | 0.094 |
| 137.950 | J | [kgcm <sup>2</sup> ] | 0.070 |
| 155.750 | J | [kgcm <sup>2</sup> ] | 0.069 |
| 176.313 | J | [kgcm <sup>2</sup> ] | 0.045 |
| 199.063 | J | [kgcm <sup>2</sup> ] | 0.044 |

- The moments of inertia relate to the drive shaft of the gearbox.
- The total moment of inertia is calculated by adding the values of the gearbox, motor and accessories.

# GSS helical-worm gearboxes

## Technical data



### Moments of inertia

#### GSS□□-2

- Moment of inertia (J) depending on ratio i

| Gearbox |   |                      | GSS06 |
|---------|---|----------------------|-------|
| 5.833   | J | [kgcm <sup>2</sup> ] | 6.966 |
| 8.000   | J | [kgcm <sup>2</sup> ] | 4.219 |
| 9.042   | J | [kgcm <sup>2</sup> ] | 5.541 |
| 10.238  | J | [kgcm <sup>2</sup> ] | 2.811 |
| 11.200  | J | [kgcm <sup>2</sup> ] | 2.393 |
| 12.400  | J | [kgcm <sup>2</sup> ] | 3.461 |
| 14.286  | J | [kgcm <sup>2</sup> ] | 1.630 |
| 15.869  | J | [kgcm <sup>2</sup> ] | 2.348 |
| 17.360  | J | [kgcm <sup>2</sup> ] | 2.006 |
| 20.417  | J | [kgcm <sup>2</sup> ] | 4.172 |
| 22.143  | J | [kgcm <sup>2</sup> ] | 1.392 |
| 24.800  | J | [kgcm <sup>2</sup> ] | 3.056 |
| 27.125  | J | [kgcm <sup>2</sup> ] | 1.039 |
| 31.738  | J | [kgcm <sup>2</sup> ] | 2.101 |
| 35.306  | J | [kgcm <sup>2</sup> ] | 0.660 |
| 39.200  | J | [kgcm <sup>2</sup> ] | 1.635 |
| 43.917  | J | [kgcm <sup>2</sup> ] | 0.475 |
| 50.000  | J | [kgcm <sup>2</sup> ] | 1.164 |
| 54.250  | J | [kgcm <sup>2</sup> ] | 0.955 |
| 61.250  | J | [kgcm <sup>2</sup> ] | 0.887 |
| 70.611  | J | [kgcm <sup>2</sup> ] | 0.610 |
| 79.722  | J | [kgcm <sup>2</sup> ] | 0.570 |
| 87.833  | J | [kgcm <sup>2</sup> ] | 0.443 |
| 99.167  | J | [kgcm <sup>2</sup> ] | 0.417 |
| 113.667 | J | [kgcm <sup>2</sup> ] | 0.276 |
| 128.333 | J | [kgcm <sup>2</sup> ] | 0.260 |
| 137.950 | J | [kgcm <sup>2</sup> ] | 0.201 |
| 155.750 | J | [kgcm <sup>2</sup> ] | 0.191 |
| 174.375 | J | [kgcm <sup>2</sup> ] | 0.130 |
| 196.875 | J | [kgcm <sup>2</sup> ] | 0.123 |

| Gearbox |   |                      | GSS07  |
|---------|---|----------------------|--------|
| 5.862   | J | [kgcm <sup>2</sup> ] | 21.357 |
| 8.125   | J | [kgcm <sup>2</sup> ] | 12.754 |
| 9.086   | J | [kgcm <sup>2</sup> ] | 17.436 |
| 10.000  | J | [kgcm <sup>2</sup> ] | 9.140  |
| 11.200  | J | [kgcm <sup>2</sup> ] | 7.498  |
| 12.594  | J | [kgcm <sup>2</sup> ] | 10.713 |
| 14.286  | J | [kgcm <sup>2</sup> ] | 4.837  |
| 15.500  | J | [kgcm <sup>2</sup> ] | 7.792  |
| 17.360  | J | [kgcm <sup>2</sup> ] | 6.424  |
| 20.517  | J | [kgcm <sup>2</sup> ] | 13.579 |
| 22.143  | J | [kgcm <sup>2</sup> ] | 4.177  |
| 25.188  | J | [kgcm <sup>2</sup> ] | 9.590  |
| 27.125  | J | [kgcm <sup>2</sup> ] | 3.130  |
| 31.000  | J | [kgcm <sup>2</sup> ] | 7.051  |
| 35.306  | J | [kgcm <sup>2</sup> ] | 1.955  |
| 39.200  | J | [kgcm <sup>2</sup> ] | 5.368  |
| 43.271  | J | [kgcm <sup>2</sup> ] | 1.433  |
| 50.000  | J | [kgcm <sup>2</sup> ] | 3.527  |
| 54.250  | J | [kgcm <sup>2</sup> ] | 2.888  |
| 61.250  | J | [kgcm <sup>2</sup> ] | 2.698  |
| 70.611  | J | [kgcm <sup>2</sup> ] | 1.812  |
| 79.722  | J | [kgcm <sup>2</sup> ] | 1.700  |
| 86.542  | J | [kgcm <sup>2</sup> ] | 1.338  |
| 97.708  | J | [kgcm <sup>2</sup> ] | 1.263  |
| 113.667 | J | [kgcm <sup>2</sup> ] | 0.833  |
| 128.333 | J | [kgcm <sup>2</sup> ] | 0.789  |
| 137.950 | J | [kgcm <sup>2</sup> ] | 0.609  |
| 155.750 | J | [kgcm <sup>2</sup> ] | 0.579  |
| 174.375 | J | [kgcm <sup>2</sup> ] | 0.391  |
| 196.875 | J | [kgcm <sup>2</sup> ] | 0.373  |

- The moments of inertia relate to the drive shaft of the gearbox.
- The total moment of inertia is calculated by adding the values of the gearbox, motor and accessories.

# GSS helical-worm gearboxes

## Technical data



### Moments of inertia

#### GSS□□-3

- Moment of inertia (J) depending on ratio i

| Gearbox  |   |                      | GSS05 |
|----------|---|----------------------|-------|
| 125.476  | J | [kgcm <sup>2</sup> ] | 0.154 |
| 153.708  | J | [kgcm <sup>2</sup> ] | 0.117 |
| 193.233  | J | [kgcm <sup>2</sup> ] | 0.078 |
| 222.133  | J | [kgcm <sup>2</sup> ] | 0.206 |
| 250.952  | J | [kgcm <sup>2</sup> ] | 0.151 |
| 283.333  | J | [kgcm <sup>2</sup> ] | 0.148 |
| 307.417  | J | [kgcm <sup>2</sup> ] | 0.115 |
| 347.083  | J | [kgcm <sup>2</sup> ] | 0.113 |
| 386.467  | J | [kgcm <sup>2</sup> ] | 0.077 |
| 436.333  | J | [kgcm <sup>2</sup> ] | 0.076 |
| 497.722  | J | [kgcm <sup>2</sup> ] | 0.053 |
| 561.944  | J | [kgcm <sup>2</sup> ] | 0.052 |
| 630.803  | J | [kgcm <sup>2</sup> ] | 0.035 |
| 712.197  | J | [kgcm <sup>2</sup> ] | 0.034 |
| 790.500  | J | [kgcm <sup>2</sup> ] | 0.024 |
| 892.500  | J | [kgcm <sup>2</sup> ] | 0.024 |
| 1041.452 | J | [kgcm <sup>2</sup> ] | 0.015 |
| 1175.833 | J | [kgcm <sup>2</sup> ] | 0.015 |

| Gearbox  |   |                      | GSS06 |
|----------|---|----------------------|-------|
| 126.531  | J | [kgcm <sup>2</sup> ] | 0.310 |
| 142.857  | J | [kgcm <sup>2</sup> ] | 0.298 |
| 155.000  | J | [kgcm <sup>2</sup> ] | 0.271 |
| 175.000  | J | [kgcm <sup>2</sup> ] | 0.263 |
| 194.857  | J | [kgcm <sup>2</sup> ] | 0.144 |
| 220.000  | J | [kgcm <sup>2</sup> ] | 0.139 |
| 238.700  | J | [kgcm <sup>2</sup> ] | 0.128 |
| 269.500  | J | [kgcm <sup>2</sup> ] | 0.124 |
| 310.689  | J | [kgcm <sup>2</sup> ] | 0.112 |
| 350.778  | J | [kgcm <sup>2</sup> ] | 0.110 |
| 386.467  | J | [kgcm <sup>2</sup> ] | 0.103 |
| 436.333  | J | [kgcm <sup>2</sup> ] | 0.102 |
| 497.722  | J | [kgcm <sup>2</sup> ] | 0.069 |
| 561.944  | J | [kgcm <sup>2</sup> ] | 0.068 |
| 630.803  | J | [kgcm <sup>2</sup> ] | 0.045 |
| 712.197  | J | [kgcm <sup>2</sup> ] | 0.044 |
| 816.333  | J | [kgcm <sup>2</sup> ] | 0.042 |
| 921.667  | J | [kgcm <sup>2</sup> ] | 0.042 |
| 1023.000 | J | [kgcm <sup>2</sup> ] | 0.029 |
| 1155.000 | J | [kgcm <sup>2</sup> ] | 0.029 |
| 1241.550 | J | [kgcm <sup>2</sup> ] | 0.028 |
| 1401.750 | J | [kgcm <sup>2</sup> ] | 0.028 |
| 1635.693 | J | [kgcm <sup>2</sup> ] | 0.017 |
| 1846.750 | J | [kgcm <sup>2</sup> ] | 0.017 |

- The moments of inertia relate to the drive shaft of the gearbox.
- The total moment of inertia is calculated by adding the values of the gearbox, motor and accessories.

# GSS helical-worm gearboxes

## Technical data



### Moments of inertia

#### GSS□□-3

- Moment of inertia (J) depending on ratio i

| Gearbox  |   |                      | GSS07 |
|----------|---|----------------------|-------|
| 126.531  | J | [kgcm <sup>2</sup> ] | 0.857 |
| 142.857  | J | [kgcm <sup>2</sup> ] | 0.822 |
| 155.000  | J | [kgcm <sup>2</sup> ] | 0.742 |
| 175.000  | J | [kgcm <sup>2</sup> ] | 0.719 |
| 201.746  | J | [kgcm <sup>2</sup> ] | 0.372 |
| 227.778  | J | [kgcm <sup>2</sup> ] | 0.358 |
| 247.139  | J | [kgcm <sup>2</sup> ] | 0.327 |
| 279.028  | J | [kgcm <sup>2</sup> ] | 0.317 |
| 321.673  | J | [kgcm <sup>2</sup> ] | 0.281 |
| 363.179  | J | [kgcm <sup>2</sup> ] | 0.276 |
| 394.245  | J | [kgcm <sup>2</sup> ] | 0.258 |
| 445.116  | J | [kgcm <sup>2</sup> ] | 0.255 |
| 490.403  | J | [kgcm <sup>2</sup> ] | 0.183 |
| 553.681  | J | [kgcm <sup>2</sup> ] | 0.181 |
| 634.639  | J | [kgcm <sup>2</sup> ] | 0.114 |
| 716.528  | J | [kgcm <sup>2</sup> ] | 0.113 |
| 833.556  | J | [kgcm <sup>2</sup> ] | 0.105 |
| 941.111  | J | [kgcm <sup>2</sup> ] | 0.105 |
| 1011.633 | J | [kgcm <sup>2</sup> ] | 0.076 |
| 1142.167 | J | [kgcm <sup>2</sup> ] | 0.076 |
| 1227.755 | J | [kgcm <sup>2</sup> ] | 0.074 |
| 1386.175 | J | [kgcm <sup>2</sup> ] | 0.073 |
| 1569.181 | J | [kgcm <sup>2</sup> ] | 0.047 |
| 1771.656 | J | [kgcm <sup>2</sup> ] | 0.047 |

- The moments of inertia relate to the drive shaft of the gearbox.
- The total moment of inertia is calculated by adding the values of the gearbox, motor and accessories.

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS04-2

|         |          |      | $n_2$ [r/min] |      |      |      |      |      |      |      |      |      |      |      |
|---------|----------|------|---------------|------|------|------|------|------|------|------|------|------|------|------|
|         |          |      | 10            | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  | 800  |
| 5.639   | $\eta_a$ | 0.71 | $\eta_{c=1}$  | 0.83 | 0.86 | 0.88 | 0.89 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.89 |
| 7.733   | $\eta_a$ | 0.71 | $\eta_{c=1}$  | 0.83 | 0.86 | 0.88 | 0.89 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.89 |
| 9.042   | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 |      |
| 9.897   | $\eta_a$ | 0.71 | $\eta_{c=1}$  | 0.83 | 0.86 | 0.88 | 0.89 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.89 |
| 10.827  | $\eta_a$ | 0.71 | $\eta_{c=1}$  | 0.83 | 0.86 | 0.88 | 0.89 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.89 |
| 12.400  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 |      |
| 13.810  | $\eta_a$ | 0.71 | $\eta_{c=1}$  | 0.83 | 0.86 | 0.88 | 0.89 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.89 |
| 15.869  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 17.360  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 20.417  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 22.143  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 24.800  | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 27.125  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 31.738  | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 34.100  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 39.200  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 43.917  | $\eta_a$ | 0.67 | $\eta_{c=1}$  | 0.81 | 0.84 | 0.86 | 0.87 | 0.87 | 0.88 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 |
| 50.000  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 54.250  | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 61.250  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 | 0.78 |      |      |
| 68.200  | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 77.000  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 87.833  | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 99.167  | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 111.318 | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 125.682 | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 139.500 | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 157.500 | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |
| 183.786 | $\eta_a$ | 0.56 | $\eta_{c=1}$  | 0.77 | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.80 | 0.80 | 0.79 |      |      |
| 207.500 | $\eta_a$ | 0.55 | $\eta_{c=1}$  | 0.76 | 0.78 | 0.79 | 0.79 | 0.79 | 0.79 | 0.78 | 0.78 |      |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS05-2

|         |                |      | n <sub>2</sub> [r/min] |      |      |      |      |      |      |      |      |      |      |      |      |
|---------|----------------|------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|         |                |      |                        | 10   | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  | 800  |
| 5.639   | η <sub>a</sub> | 0.71 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.89 | 0.90 | 0.90 | 0.91 | 0.91 | 0.91 | 0.91 | 0.90 | 0.90 | 0.90 |
| 7.733   | η <sub>a</sub> | 0.71 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.89 | 0.90 | 0.90 | 0.91 | 0.91 | 0.91 | 0.91 | 0.90 | 0.90 | 0.90 |
| 9.042   | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 9.897   | η <sub>a</sub> | 0.71 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.89 | 0.90 | 0.90 | 0.91 | 0.91 | 0.91 | 0.91 | 0.90 | 0.90 | 0.90 |
| 10.827  | η <sub>a</sub> | 0.71 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.89 | 0.90 | 0.90 | 0.91 | 0.91 | 0.91 | 0.91 | 0.90 | 0.90 | 0.90 |
| 12.400  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 13.810  | η <sub>a</sub> | 0.71 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.89 | 0.90 | 0.90 | 0.91 | 0.91 | 0.91 | 0.91 | 0.90 | 0.90 | 0.90 |
| 15.869  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 17.360  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 20.417  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |      |
| 22.143  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 24.800  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 27.125  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 31.738  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 35.306  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 39.200  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |      |
| 43.917  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |      |
| 50.000  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 54.250  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 61.250  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 70.611  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 79.722  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 87.833  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 99.167  | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 113.667 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 128.333 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 137.950 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 155.750 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 176.313 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |      |
| 199.063 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS05-3

|         |                |      | n <sub>2</sub> [r/min] |      |      |      |      |      |      |      |      |      |      |      |
|---------|----------------|------|------------------------|------|------|------|------|------|------|------|------|------|------|------|
|         |                |      | 10                     | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  |      |
| 125.476 | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |
| 153.708 | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |
| 193.233 | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.83 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | 0.88 |
| 222.133 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |      |
| 250.952 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |
| 283.333 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |
| 307.417 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |
| 347.083 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |
| 386.467 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |
| 436.333 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |
| 497.722 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |
| 561.945 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |
| 630.803 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.79 | 0.81 | 0.82 | 0.82 | 0.83 | 0.83 | 0.82 | 0.82 | 0.82 |      |      |
| 712.197 | η <sub>a</sub> | 0.55 | η <sub>c=1</sub>       | 0.79 | 0.80 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS06-2

|         |                |      | n <sub>2</sub> [r/min] |      |      |      |      |      |      |      |      |      |      |      |      |
|---------|----------------|------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|         |                |      |                        | 10   | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  | 800  |
| 5.833   | η <sub>a</sub> | 0.72 | η <sub>c=1</sub>       | 0.87 | 0.89 | 0.90 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 |
| 8.000   | η <sub>a</sub> | 0.72 | η <sub>c=1</sub>       | 0.87 | 0.89 | 0.90 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 |
| 9.042   | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 10.238  | η <sub>a</sub> | 0.72 | η <sub>c=1</sub>       | 0.87 | 0.89 | 0.90 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 |
| 11.200  | η <sub>a</sub> | 0.72 | η <sub>c=1</sub>       | 0.87 | 0.89 | 0.90 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 |
| 12.400  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.80 |
| 14.286  | η <sub>a</sub> | 0.72 | η <sub>c=1</sub>       | 0.89 | 0.90 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 |      |
| 15.869  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 17.360  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 20.417  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |      |
| 22.143  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 24.800  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |      |
| 27.125  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 31.738  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |      |
| 35.306  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 39.200  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |      |
| 43.917  | η <sub>a</sub> | 0.67 | η <sub>c=1</sub>       | 0.85 | 0.87 | 0.88 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |      |
| 50.000  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |      |
| 54.250  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 61.250  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 70.611  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 79.722  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 87.833  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 99.167  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 113.667 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 128.333 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 137.950 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 155.750 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 174.375 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 196.875 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS06-3

|          |                |      | n <sub>2</sub> [r/min] |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------|------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|          |                |      | 10                     | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  | 800  |      |
| 126.531  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.91 | 0.91 | 0.91 |
| 142.857  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 155.000  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 175.000  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 194.857  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 220.000  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 238.700  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 269.500  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 310.689  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 350.778  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 386.467  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 436.333  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 497.722  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 561.945  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 630.803  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 712.197  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 816.333  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 921.667  | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1023.000 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1155.000 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1241.550 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1401.750 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1635.693 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |
| 1846.750 | η <sub>a</sub> | 0.57 | η <sub>c=1</sub>       | 0.81 | 0.82 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |      |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS07-2

|         |          |      | $n_2$ [r/min] |      |      |      |      |      |      |      |      |      |      |      |
|---------|----------|------|---------------|------|------|------|------|------|------|------|------|------|------|------|
|         |          |      | 10            | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  | 400  | 630  | 800  |
| 5.862   | $\eta_a$ | 0.74 | $\eta_{c=1}$  | 0.89 | 0.91 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| 8.125   | $\eta_a$ | 0.74 | $\eta_{c=1}$  | 0.89 | 0.91 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| 9.086   | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 10.000  | $\eta_a$ | 0.74 | $\eta_{c=1}$  | 0.89 | 0.91 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| 11.200  | $\eta_a$ | 0.74 | $\eta_{c=1}$  | 0.89 | 0.91 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| 12.594  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 14.286  | $\eta_a$ | 0.74 | $\eta_{c=1}$  | 0.89 | 0.91 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| 15.500  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 17.360  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 20.517  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 22.143  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 25.188  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 27.125  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 31.000  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 35.306  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 39.200  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 43.271  | $\eta_a$ | 0.69 | $\eta_{c=1}$  | 0.88 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |      |
| 50.000  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 54.250  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 61.250  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 70.611  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 79.722  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 86.542  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 97.708  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 113.667 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 128.333 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 137.950 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 155.750 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 174.375 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |
| 196.875 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |      |      |      |

# GSS helical-worm gearboxes

## Technical data



### Efficiencies

- During start-up, the start-up efficiency  $\eta_a$  of a helical-worm gearbox is lower than its operative efficiency at rated speed.  
**The start-up efficiency  $\eta_a$  must therefore always be considered when starting under load.**

#### GSS07-3

|          |          |      | $n_2$ [r/min] |      |      |      |      |      |      |      |      |
|----------|----------|------|---------------|------|------|------|------|------|------|------|------|
|          |          |      | 10            | 16   | 25   | 32   | 40   | 63   | 100  | 160  | 250  |
| 126.531  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 142.857  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 155.000  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 175.000  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 201.746  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 227.778  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 247.139  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 279.028  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 321.673  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 363.179  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 394.245  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 445.116  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 490.403  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 553.681  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 634.639  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 716.528  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 833.556  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 941.111  | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1011.633 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1142.167 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1227.755 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1386.175 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1569.181 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| 1771.656 | $\eta_a$ | 0.60 | $\eta_{c=1}$  | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |

# GSS helical-worm gearboxes

Technical data



## Weights

### GSS□□-2M HAR / HBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 23     | 29     | 31     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 32     | 38     | 40     | 46     | 49     |        |        |        |        |        |
| GSS06 | m | [kg] | 45     | 51     | 53     | 59     | 61     | 74     | 96     | 103    |        |        |
| GSS07 | m | [kg] | 70     | 76     | 78     | 84     | 86     | 99     | 122    | 129    | 172    | 187    |

### GSS□□-2M HAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 26     | 31     | 33     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 36     | 42     | 44     | 50     | 53     |        |        |        |        |        |
| GSS06 | m | [kg] | 52     | 58     | 60     | 66     | 68     | 81     | 103    | 110    |        |        |
| GSS07 | m | [kg] | 81     | 87     | 89     | 95     | 97     | 110    | 133    | 140    | 183    | 198    |

- Weights with oil filling for mounting position A; all values are approximate.  
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.

# GSS helical-worm gearboxes

Technical data



## Weights

### GSS□□-2M VAR / VBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 24     | 29     | 31     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 33     | 39     | 41     | 47     | 50     |        |        |        |        |        |
| GSS06 | m | [kg] | 47     | 53     | 55     | 61     | 64     | 77     | 99     | 106    |        |        |
| GSS07 | m | [kg] | 75     | 81     | 83     | 89     | 91     | 104    | 127    | 134    | 177    | 192    |

### GSS□□-2M VAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 26     | 32     | 34     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 37     | 43     | 45     | 51     | 54     |        |        |        |        |        |
| GSS06 | m | [kg] | 54     | 60     | 62     | 68     | 71     | 84     | 106    | 113    |        |        |
| GSS07 | m | [kg] | 86     | 92     | 94     | 100    | 102    | 115    | 138    | 145    | 188    | 203    |

- Weights with oil filling for mounting position A; all values are approximate.  
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.

# GSS helical-worm gearboxes

## Technical data



### Weights

#### GSS□□-2M SAR / SBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 24     | 29     | 31     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 33     | 39     | 41     | 47     | 50     |        |        |        |        |        |
| GSS06 | m | [kg] | 46     | 52     | 54     | 60     | 62     | 75     | 97     | 104    |        |        |
| GSS07 | m | [kg] | 71     | 77     | 79     | 85     | 88     | 101    | 123    | 130    | 173    | 188    |

#### GSS□□-2M SAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 | 100C32 | 112C22 | 132C12 | 132C22 | 160C22 | 160C32 |
|-------|---|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GSS04 | m | [kg] | 26     | 32     | 34     |        |        |        |        |        |        |        |
| GSS05 | m | [kg] | 37     | 43     | 45     | 51     | 54     |        |        |        |        |        |
| GSS06 | m | [kg] | 53     | 59     | 61     | 67     | 69     | 82     | 104    | 111    |        |        |
| GSS07 | m | [kg] | 82     | 88     | 90     | 96     | 99     | 112    | 134    | 141    | 184    | 199    |

- Weights with oil filling for mounting position A; all values are approximate.  
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.

# GSS helical-worm gearboxes

## Technical data



### Weights

#### GSS□□-3M HAR / HBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 49     | 54     |        |        |
| GSS07 | m | [kg] | 78     | 83     | 85     | 91     |

#### GSS□□-3M HAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 56     | 61     |        |        |
| GSS07 | m | [kg] | 89     | 94     | 96     | 102    |

#### GSS□□-3M VAR / VBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 51     | 57     |        |        |
| GSS07 | m | [kg] | 83     | 88     | 90     | 96     |

#### GSS□□-3M VAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 58     | 64     |        |        |
| GSS07 | m | [kg] | 94     | 99     | 101    | 107    |

#### GSS□□-3M SAR / SBR

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 50     | 55     |        |        |
| GSS07 | m | [kg] | 79     | 85     | 87     | 93     |

#### GSS□□-3M SAK

|       |   |      | 080C32 | 090C12 | 090C32 | 100C12 |
|-------|---|------|--------|--------|--------|--------|
| GSS06 | m | [kg] | 57     | 62     |        |        |
| GSS07 | m | [kg] | 90     | 96     | 98     | 104    |

- Weights with oil filling for mounting position A; all values are approximate.  
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 0.75$  kW

| $n_N$ | 1410 r/min       |               |     | 1720 r/min       |               |     | i       |                    |    |
|-------|------------------|---------------|-----|------------------|---------------|-----|---------|--------------------|----|
|       | 50 Hz            |               |     | 60 Hz            |               |     |         |                    |    |
|       |                  |               |     |                  |               |     |         |                    |    |
| $f_N$ | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |         |                    |    |
|       | 250              | 25            | 4.2 | 303              | 20            | 5.1 | 5.639   | GSS04-2M □□□080C32 | 58 |
|       | 182              | 34            | 4.2 | 221              | 28            | 5.1 | 7.733   | GSS04-2M □□□080C32 | 58 |
|       | 156              | 39            | 3.8 | 189              | 32            | 4.4 | 9.042   | GSS04-2M □□□080C32 | 58 |
|       | 143              | 45            | 3.5 | 173              | 36            | 4.3 | 9.897   | GSS04-2M □□□080C32 | 58 |
|       | 130              | 49            | 3.2 | 158              | 40            | 3.9 | 10.827  | GSS04-2M □□□080C32 | 58 |
|       | 114              | 54            | 3.1 | 138              | 44            | 3.5 | 12.400  | GSS04-2M □□□080C32 | 58 |
|       | 102              | 63            | 2.5 | 124              | 51            | 3.1 | 13.810  | GSS04-2M □□□080C32 | 58 |
|       | 89               | 69            | 2.5 | 108              | 57            | 3.0 | 15.869  | GSS04-2M □□□080C32 | 58 |
|       | 81               | 76            | 2.3 | 99               | 62            | 2.8 | 17.360  | GSS04-2M □□□080C32 | 58 |
|       | 69               | 82            | 1.9 | 84               | 67            | 2.1 | 20.417  | GSS04-2M □□□080C32 | 58 |
|       | 69               | 81            | 3.0 | 84               | 66            | 3.5 | 20.417  | GSS05-2M □□□080C32 | 58 |
|       | 64               | 97            | 1.8 | 77               | 79            | 2.2 | 22.143  | GSS04-2M □□□080C32 | 58 |
|       | 57               | 101           | 1.7 | 69               | 83            | 1.9 | 24.800  | GSS04-2M □□□080C32 | 58 |
|       | 52               | 118           | 1.5 | 63               | 97            | 1.8 | 27.125  | GSS04-2M □□□080C32 | 58 |
|       | 52               | 120           | 2.9 | 63               | 98            | 3.4 | 27.125  | GSS05-2M □□□080C32 | 58 |
|       | 44               | 129           | 1.4 | 54               | 106           | 1.6 | 31.738  | GSS04-2M □□□080C32 | 58 |
|       | 44               | 131           | 2.3 | 54               | 107           | 2.6 | 31.738  | GSS05-2M □□□080C32 | 58 |
|       | 41               | 148           | 1.2 | 50               | 122           | 1.5 | 34.100  | GSS04-2M □□□080C32 | 58 |
|       | 40               | 157           | 2.3 | 48               | 128           | 2.8 | 35.306  | GSS05-2M □□□080C32 | 58 |
|       | 36               | 155           | 1.2 | 44               | 128           | 1.4 | 39.200  | GSS04-2M □□□080C32 | 58 |
|       | 36               | 159           | 2.0 | 44               | 130           | 2.3 | 39.200  | GSS05-2M □□□080C32 | 58 |
|       | 32               | 190           | 0.9 | 39               | 156           | 1.1 | 43.917  | GSS04-2M □□□080C32 | 58 |
|       | 32               | 196           | 1.8 | 39               | 160           | 2.2 | 43.917  | GSS05-2M □□□080C32 | 58 |
|       | 32               | 191           | 2.9 | 39               | 156           | 3.5 | 43.917  | GSS06-2M □□□080C32 | 58 |
|       | 28               | 196           | 0.9 | 34               | 162           | 1.1 | 50.000  | GSS04-2M □□□080C32 | 58 |
|       | 28               | 204           | 1.7 | 34               | 167           | 2.0 | 50.000  | GSS05-2M □□□080C32 | 58 |
|       | 26               | 217           | 0.8 | 32               | 179           | 1.0 | 54.250  | GSS04-2M □□□080C32 | 58 |
|       | 26               | 226           | 1.6 | 32               | 184           | 1.9 | 54.250  | GSS05-2M □□□080C32 | 58 |
|       | 23               | 251           | 1.4 | 28               | 205           | 1.7 | 61.250  | GSS05-2M □□□080C32 | 58 |
|       | 20               | 294           | 1.2 | 24               | 241           | 1.5 | 70.611  | GSS05-2M □□□080C32 | 58 |
|       | 20               | 285           | 2.5 | 24               | 234           | 3.0 | 70.611  | GSS06-2M □□□080C32 | 58 |
|       | 18               | 328           | 1.1 | 21               | 268           | 1.3 | 79.722  | GSS05-2M □□□080C32 | 58 |
|       | 18               | 318           | 2.2 | 21               | 262           | 2.7 | 79.722  | GSS06-2M □□□080C32 | 58 |
|       | 16               | 365           | 1.0 | 20               | 300           | 1.2 | 87.833  | GSS05-2M □□□080C32 | 58 |
|       | 16               | 352           | 2.0 | 20               | 290           | 2.4 | 87.833  | GSS06-2M □□□080C32 | 58 |
|       | 14               | 405           | 0.9 | 17               | 334           | 1.1 | 99.167  | GSS05-2M □□□080C32 | 58 |
|       | 14               | 393           | 1.8 | 17               | 324           | 2.2 | 99.167  | GSS06-2M □□□080C32 | 58 |
|       | 12               | 451           | 1.6 | 15               | 372           | 1.9 | 113.667 | GSS06-2M □□□080C32 | 58 |
|       | 12               | 462           | 2.7 | 15               | 379           | 3.2 | 113.667 | GSS07-2M □□□080C32 | 58 |
|       | 11               | 478           | 1.5 | 14               | 394           | 1.8 | 126.531 | GSS06-3M □□□080C32 | 66 |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 0.75$  kW

| $n_N$ | 1410 r/min       |               |     | 1720 r/min       |               |     | i       |                    |  |
|-------|------------------|---------------|-----|------------------|---------------|-----|---------|--------------------|-------------------------------------------------------------------------------------|
| $f_N$ | 50 Hz            |               |     | 60 Hz            |               |     |         |                    |                                                                                     |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |         |                    |                                                                                     |
|       | 11               | 490           | 2.5 | 14               | 402           | 3.0 | 126.531 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 11               | 503           | 1.4 | 13               | 415           | 1.7 | 128.333 | GSS06-2M □□□080C32 | 58                                                                                  |
|       | 11               | 515           | 2.4 | 13               | 424           | 2.9 | 128.333 | GSS07-2M □□□080C32 | 58                                                                                  |
|       | 10               | 544           | 1.3 | 12               | 449           | 1.6 | 137.950 | GSS06-2M □□□080C32 | 58                                                                                  |
|       | 10               | 560           | 2.2 | 12               | 459           | 2.7 | 137.950 | GSS07-2M □□□080C32 | 58                                                                                  |
|       | 9.9              | 530           | 1.4 | 12               | 439           | 1.6 | 142.857 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 9.9              | 546           | 2.3 | 12               | 449           | 2.7 | 142.857 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 9.1              | 579           | 1.2 | 11               | 479           | 1.5 | 155.000 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 9.1              | 599           | 2.1 | 11               | 492           | 2.5 | 155.000 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 9.1              | 605           | 1.2 | 11               | 500           | 1.4 | 155.750 | GSS06-2M □□□080C32 | 58                                                                                  |
|       | 9.1              | 623           | 2.0 | 11               | 512           | 2.4 | 155.750 | GSS07-2M □□□080C32 | 58                                                                                  |
|       | 8.1              | 679           | 1.1 | 9.8              | 561           | 1.3 | 174.375 | GSS06-2M □□□080C32 | 58                                                                                  |
|       | 8.1              | 701           | 1.8 | 9.8              | 579           | 2.1 | 174.375 | GSS07-2M □□□080C32 | 58                                                                                  |
|       | 8.1              | 645           | 1.1 | 9.8              | 532           | 1.3 | 175.000 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 8.1              | 664           | 1.9 | 9.8              | 547           | 2.2 | 175.000 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 7.2              | 722           | 1.0 | 8.8              | 595           | 1.2 | 194.857 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 7.2              | 755           | 1.0 | 8.7              | 625           | 1.1 | 196.875 | GSS06-2M □□□080C32 | 58                                                                                  |
|       | 7.2              | 782           | 1.6 | 8.7              | 644           | 1.9 | 196.875 | GSS07-2M □□□080C32 | 58                                                                                  |
|       | 7.0              | 768           | 1.6 | 8.5              | 636           | 1.9 | 201.746 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 6.4              | 803           | 0.9 | 7.8              | 664           | 1.1 | 220.000 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 6.2              | 855           | 1.5 | 7.5              | 707           | 1.8 | 227.778 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 5.9              | 876           | 0.8 | 7.2              | 724           | 1.0 | 238.700 | GSS06-3M □□□080C32 | 66                                                                                  |
|       | 5.7              | 935           | 1.3 | 6.9              | 770           | 1.6 | 247.139 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 5.1              | 1039          | 1.2 | 6.1              | 858           | 1.4 | 279.028 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 4.4              | 1203          | 1.0 | 5.3              | 994           | 1.3 | 321.673 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 3.9              | 1335          | 0.9 | 4.7              | 1105          | 1.1 | 363.179 | GSS07-3M □□□080C32 | 66                                                                                  |
|       | 3.6              | 1455          | 0.9 | 4.3              | 1207          | 1.0 | 394.245 | GSS07-3M □□□080C32 | 66                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 1.1 \text{ kW}$

| n <sub>N</sub><br>f <sub>N</sub> | 1430 r/min                |                        |     | 1740 r/min                |                        |     | i      |                    |  |
|----------------------------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|-------------------------------------------------------------------------------------|
|                                  | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |                                                                                     |
|                                  | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |                                                                                     |
|                                  | 254                       | 36                     | 4.0 | 307                       | 30                     | 4.2 | 5.639  | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 185                       | 50                     | 3.1 | 224                       | 41                     | 3.7 | 7.733  | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 158                       | 58                     | 2.6 | 191                       | 47                     | 3.0 | 9.042  | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 145                       | 65                     | 2.4 | 175                       | 53                     | 2.9 | 9.897  | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 132                       | 72                     | 2.2 | 160                       | 58                     | 2.7 | 10.827 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 115                       | 79                     | 2.1 | 140                       | 65                     | 2.4 | 12.400 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 104                       | 92                     | 1.8 | 125                       | 75                     | 2.1 | 13.810 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 104                       | 91                     | 3.0 | 125                       | 74                     | 3.6 | 13.810 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 90                        | 101                    | 1.8 | 109                       | 83                     | 2.0 | 15.869 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 90                        | 101                    | 2.9 | 109                       | 83                     | 3.3 | 15.869 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 82                        | 111                    | 1.6 | 100                       | 91                     | 1.9 | 17.360 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 82                        | 111                    | 2.7 | 100                       | 91                     | 3.1 | 17.360 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 70                        | 119                    | 1.3 | 85                        | 98                     | 1.5 | 20.417 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 70                        | 119                    | 2.1 | 85                        | 97                     | 2.4 | 20.417 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 65                        | 141                    | 1.3 | 78                        | 116                    | 1.5 | 22.143 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 65                        | 142                    | 2.3 | 78                        | 116                    | 2.7 | 22.143 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 58                        | 147                    | 1.2 | 70                        | 121                    | 1.3 | 24.800 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 58                        | 148                    | 1.9 | 70                        | 121                    | 2.1 | 24.800 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 53                        | 172                    | 1.0 | 64                        | 142                    | 1.3 | 27.125 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 53                        | 175                    | 2.0 | 64                        | 143                    | 2.3 | 27.125 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 45                        | 187                    | 1.0 | 55                        | 155                    | 1.1 | 31.738 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 45                        | 191                    | 1.6 | 55                        | 156                    | 1.8 | 31.738 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 45                        | 188                    | 3.2 | 55                        | 155                    | 3.6 | 31.738 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 41                        | 229                    | 1.6 | 49                        | 187                    | 1.9 | 35.306 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 41                        | 223                    | 3.2 | 49                        | 182                    | 3.8 | 35.306 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 36                        | 225                    | 0.8 | 44                        | 186                    | 1.0 | 39.200 | GSS04-2M □□□090C12 | 58                                                                                  |
|                                  | 37                        | 232                    | 1.4 | 44                        | 190                    | 1.6 | 39.200 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 37                        | 231                    | 2.7 | 44                        | 190                    | 3.1 | 39.200 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 33                        | 285                    | 1.3 | 39                        | 234                    | 1.5 | 43.917 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 33                        | 277                    | 2.6 | 39                        | 228                    | 3.1 | 43.917 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 29                        | 297                    | 1.2 | 35                        | 243                    | 1.3 | 50.000 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 29                        | 294                    | 2.3 | 35                        | 242                    | 2.6 | 50.000 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 26                        | 328                    | 1.1 | 32                        | 269                    | 1.3 | 54.250 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 26                        | 321                    | 2.2 | 32                        | 264                    | 2.6 | 54.250 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 23                        | 365                    | 1.0 | 28                        | 299                    | 1.2 | 61.250 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 23                        | 359                    | 2.0 | 28                        | 296                    | 2.3 | 61.250 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 20                        | 427                    | 0.8 | 25                        | 351                    | 1.0 | 70.611 | GSS05-2M □□□090C12 | 58                                                                                  |
|                                  | 20                        | 416                    | 1.7 | 25                        | 343                    | 2.1 | 70.611 | GSS06-2M □□□090C12 | 58                                                                                  |
|                                  | 20                        | 421                    | 2.9 | 25                        | 346                    | 3.5 | 70.611 | GSS07-2M □□□090C12 | 58                                                                                  |
|                                  | 18                        | 464                    | 1.5 | 22                        | 383                    | 1.9 | 79.722 | GSS06-2M □□□090C12 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 1.1 \text{ kW}$

| $n_N$ | 1430 r/min       |               |     |  | 1740 r/min       |               |     | i       |                    |    |
|-------|------------------|---------------|-----|--|------------------|---------------|-----|---------|--------------------|----|
| $f_N$ | 50 Hz            |               |     |  | 60 Hz            |               |     |         |                    |    |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |  | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |         |                    |    |
|       | 18               | 473           | 2.6 |  | 22               | 389           | 3.1 | 79.722  | GSS07-2M □□□090C12 | 58 |
|       | 17               | 515           | 2.4 |  | 20               | 424           | 2.9 | 86.542  | GSS07-2M □□□090C12 | 58 |
|       | 16               | 513           | 1.4 |  | 20               | 424           | 1.7 | 87.833  | GSS06-2M □□□090C12 | 58 |
|       | 15               | 577           | 2.1 |  | 18               | 476           | 2.6 | 97.708  | GSS07-2M □□□090C12 | 58 |
|       | 14               | 572           | 1.3 |  | 17               | 473           | 1.5 | 99.167  | GSS06-2M □□□090C12 | 58 |
|       | 13               | 657           | 1.1 |  | 15               | 544           | 1.3 | 113.667 | GSS06-2M □□□090C12 | 58 |
|       | 13               | 674           | 1.8 |  | 15               | 556           | 2.2 | 113.667 | GSS07-2M □□□090C12 | 58 |
|       | 11               | 695           | 1.0 |  | 14               | 576           | 1.2 | 126.531 | GSS06-3M □□□090C12 | 66 |
|       | 11               | 715           | 1.7 |  | 14               | 589           | 2.1 | 126.531 | GSS07-3M □□□090C12 | 66 |
|       | 11               | 731           | 1.0 |  | 14               | 606           | 1.2 | 128.333 | GSS06-2M □□□090C12 | 58 |
|       | 11               | 752           | 1.6 |  | 14               | 621           | 2.0 | 128.333 | GSS07-2M □□□090C12 | 58 |
|       | 10               | 791           | 0.9 |  | 13               | 655           | 1.1 | 137.950 | GSS06-2M □□□090C12 | 58 |
|       | 10               | 816           | 1.5 |  | 13               | 672           | 1.8 | 137.950 | GSS07-2M □□□090C12 | 58 |
|       | 10               | 771           | 0.9 |  | 12               | 641           | 1.1 | 142.857 | GSS06-3M □□□090C12 | 66 |
|       | 10               | 796           | 1.6 |  | 12               | 658           | 1.9 | 142.857 | GSS07-3M □□□090C12 | 66 |
|       | 9.2              | 842           | 0.9 |  | 11               | 699           | 1.0 | 155.000 | GSS06-3M □□□090C12 | 66 |
|       | 9.2              | 874           | 1.4 |  | 11               | 720           | 1.7 | 155.000 | GSS07-3M □□□090C12 | 66 |
|       | 9.2              | 880           | 0.8 |  | 11               | 729           | 1.0 | 155.750 | GSS06-2M □□□090C12 | 58 |
|       | 9.2              | 907           | 1.4 |  | 11               | 750           | 1.7 | 155.750 | GSS07-2M □□□090C12 | 58 |
|       | 8.2              | 1021          | 1.2 |  | 9.9              | 847           | 1.5 | 174.375 | GSS07-2M □□□090C12 | 58 |
|       | 8.2              | 968           | 1.3 |  | 9.9              | 801           | 1.6 | 175.000 | GSS07-3M □□□090C12 | 66 |
|       | 7.3              | 1137          | 1.1 |  | 8.8              | 941           | 1.3 | 196.875 | GSS07-2M □□□090C12 | 58 |
|       | 7.1              | 1117          | 1.1 |  | 8.6              | 930           | 1.3 | 201.746 | GSS07-3M □□□090C12 | 66 |
|       | 6.3              | 1244          | 1.0 |  | 7.6              | 1032          | 1.2 | 227.778 | GSS07-3M □□□090C12 | 66 |
|       | 5.8              | 1359          | 0.9 |  | 7.0              | 1124          | 1.1 | 247.139 | GSS07-3M □□□090C12 | 66 |
|       | 5.1              | 1510          | 0.8 |  | 6.2              | 1251          | 1.0 | 279.028 | GSS07-3M □□□090C12 | 66 |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 1.5 \text{ kW}$

| n <sub>N</sub><br>f <sub>N</sub> | 1435 r/min                |                        |     | 1745 r/min                |                        |     | i      |                    |  |
|----------------------------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|-------------------------------------------------------------------------------------|
|                                  | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |                                                                                     |
|                                  | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |                                                                                     |
|                                  | 255                       | 50                     | 2.9 | 308                       | 41                     | 3.1 | 5.639  | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 186                       | 69                     | 2.3 | 224                       | 57                     | 2.7 | 7.733  | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 159                       | 79                     | 1.9 | 192                       | 65                     | 2.2 | 9.042  | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 159                       | 78                     | 3.1 | 192                       | 64                     | 3.6 | 9.042  | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 145                       | 89                     | 1.8 | 175                       | 73                     | 2.2 | 9.897  | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 145                       | 88                     | 3.0 | 175                       | 72                     | 3.6 | 9.897  | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 133                       | 98                     | 1.6 | 160                       | 80                     | 2.0 | 10.827 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 133                       | 97                     | 2.8 | 160                       | 79                     | 3.3 | 10.827 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 116                       | 108                    | 1.6 | 140                       | 89                     | 1.8 | 12.400 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 116                       | 108                    | 2.5 | 140                       | 88                     | 2.9 | 12.400 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 104                       | 126                    | 1.3 | 126                       | 103                    | 1.6 | 13.810 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 104                       | 125                    | 2.2 | 126                       | 102                    | 2.6 | 13.810 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 90                        | 138                    | 1.3 | 109                       | 114                    | 1.5 | 15.869 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 90                        | 139                    | 2.1 | 109                       | 114                    | 2.4 | 15.869 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 83                        | 151                    | 1.2 | 100                       | 124                    | 1.4 | 17.360 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 83                        | 152                    | 2.0 | 100                       | 125                    | 2.3 | 17.360 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 70                        | 163                    | 0.9 | 85                        | 134                    | 1.1 | 20.417 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 70                        | 163                    | 1.5 | 85                        | 133                    | 1.8 | 20.417 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 65                        | 192                    | 0.9 | 78                        | 158                    | 1.1 | 22.143 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 65                        | 195                    | 1.7 | 78                        | 160                    | 2.0 | 22.143 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 58                        | 201                    | 0.8 | 70                        | 166                    | 1.0 | 24.800 | GSS04-2M □□□090C32 | 58                                                                                  |
|                                  | 58                        | 203                    | 1.4 | 70                        | 166                    | 1.6 | 24.800 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 53                        | 239                    | 1.5 | 64                        | 196                    | 1.7 | 27.125 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 53                        | 234                    | 3.0 | 64                        | 192                    | 3.4 | 27.125 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 45                        | 261                    | 1.2 | 55                        | 214                    | 1.3 | 31.738 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 45                        | 258                    | 2.3 | 55                        | 213                    | 2.6 | 31.738 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 41                        | 312                    | 1.2 | 49                        | 256                    | 1.4 | 35.306 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 41                        | 305                    | 2.3 | 49                        | 251                    | 2.8 | 35.306 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 37                        | 317                    | 1.0 | 44                        | 260                    | 1.2 | 39.200 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 37                        | 316                    | 2.0 | 44                        | 261                    | 2.3 | 39.200 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 33                        | 375                    | 2.9 | 40                        | 308                    | 3.6 | 43.271 | GSS07-2M □□□090C32 | 58                                                                                  |
|                                  | 33                        | 389                    | 0.9 | 40                        | 319                    | 1.1 | 43.917 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 33                        | 379                    | 1.9 | 40                        | 312                    | 2.3 | 43.917 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 29                        | 405                    | 0.9 | 35                        | 332                    | 1.0 | 50.000 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 29                        | 403                    | 1.7 | 35                        | 332                    | 1.9 | 50.000 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 29                        | 407                    | 3.0 | 35                        | 334                    | 3.5 | 50.000 | GSS07-2M □□□090C32 | 58                                                                                  |
|                                  | 26                        | 447                    | 0.8 | 32                        | 367                    | 0.9 | 54.250 | GSS05-2M □□□090C32 | 58                                                                                  |
|                                  | 27                        | 439                    | 1.6 | 32                        | 362                    | 1.9 | 54.250 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 23                        | 491                    | 1.5 | 28                        | 405                    | 1.7 | 61.250 | GSS06-2M □□□090C32 | 58                                                                                  |
|                                  | 20                        | 568                    | 1.3 | 25                        | 469                    | 1.5 | 70.611 | GSS06-2M □□□090C32 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 1.5 \text{ kW}$

| $n_N$ | 1435 r/min       |               |     |  | 1745 r/min       |               |     | i       |                    |  |
|-------|------------------|---------------|-----|--|------------------|---------------|-----|---------|--------------------|-------------------------------------------------------------------------------------|
| $f_N$ | 50 Hz            |               |     |  | 60 Hz            |               |     |         |                    |                                                                                     |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |  | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |         |                    |                                                                                     |
|       | 20               | 578           | 2.1 |  | 25               | 476           | 2.6 | 70.611  | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 18               | 634           | 1.1 |  | 22               | 524           | 1.4 | 79.722  | GSS06-2M □□□090C32 | 58                                                                                  |
|       | 18               | 648           | 1.9 |  | 22               | 534           | 2.3 | 79.722  | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 17               | 706           | 1.8 |  | 20               | 582           | 2.1 | 86.542  | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 16               | 700           | 1.0 |  | 20               | 580           | 1.2 | 87.833  | GSS06-2M □□□090C32 | 58                                                                                  |
|       | 15               | 790           | 1.6 |  | 18               | 652           | 1.9 | 97.708  | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 15               | 780           | 0.9 |  | 18               | 647           | 1.1 | 99.167  | GSS06-2M □□□090C32 | 58                                                                                  |
|       | 13               | 896           | 0.8 |  | 15               | 743           | 1.0 | 113.667 | GSS06-2M □□□090C32 | 58                                                                                  |
|       | 13               | 922           | 1.4 |  | 15               | 761           | 1.6 | 113.667 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 11               | 978           | 1.3 |  | 14               | 807           | 1.5 | 126.531 | GSS07-3M □□□090C32 | 66                                                                                  |
|       | 11               | 1028          | 1.2 |  | 14               | 850           | 1.5 | 128.333 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 10               | 1114          | 1.1 |  | 13               | 920           | 1.4 | 137.950 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 10               | 1088          | 1.1 |  | 12               | 901           | 1.4 | 142.857 | GSS07-3M □□□090C32 | 66                                                                                  |
|       | 9.3              | 1193          | 1.0 |  | 11               | 984           | 1.3 | 155.000 | GSS07-3M □□□090C32 | 66                                                                                  |
|       | 9.2              | 1238          | 1.0 |  | 11               | 1025          | 1.2 | 155.750 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 8.2              | 1392          | 0.9 |  | 10               | 1157          | 1.1 | 174.375 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 8.2              | 1321          | 0.9 |  | 9.9              | 1094          | 1.1 | 175.000 | GSS07-3M □□□090C32 | 66                                                                                  |
|       | 7.3              | 1551          | 0.8 |  | 8.8              | 1284          | 1.0 | 196.875 | GSS07-2M □□□090C32 | 58                                                                                  |
|       | 7.1              | 1524          | 0.8 |  | 8.6              | 1270          | 1.0 | 201.746 | GSS07-3M □□□090C32 | 66                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 2.2 \text{ kW}$

| n <sub>N</sub><br>f <sub>N</sub> | 1445 r/min                |                        |     | 1750 r/min                |                        |     | i      |                    |    |
|----------------------------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|----|
|                                  | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |    |
|                                  | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |    |
|                                  | 256                       | 73                     | 3.0 | 310                       | 60                     | 3.2 | 5.639  | GSS05-2M □□□100C12 | 58 |
|                                  | 187                       | 101                    | 2.6 | 226                       | 83                     | 2.9 | 7.733  | GSS05-2M □□□100C12 | 58 |
|                                  | 160                       | 115                    | 2.2 | 193                       | 94                     | 2.5 | 9.042  | GSS05-2M □□□100C12 | 58 |
|                                  | 146                       | 130                    | 2.1 | 176                       | 107                    | 2.5 | 9.897  | GSS05-2M □□□100C12 | 58 |
|                                  | 134                       | 143                    | 1.9 | 161                       | 117                    | 2.3 | 10.827 | GSS05-2M □□□100C12 | 58 |
|                                  | 117                       | 159                    | 1.7 | 141                       | 131                    | 2.0 | 12.400 | GSS05-2M □□□100C12 | 58 |
|                                  | 117                       | 157                    | 3.2 | 141                       | 130                    | 3.4 | 12.400 | GSS06-2M □□□100C12 | 58 |
|                                  | 105                       | 183                    | 1.5 | 126                       | 151                    | 1.8 | 13.810 | GSS05-2M □□□100C12 | 58 |
|                                  | 101                       | 188                    | 2.8 | 122                       | 154                    | 3.3 | 14.286 | GSS06-2M □□□100C12 | 58 |
|                                  | 91                        | 204                    | 1.5 | 110                       | 168                    | 1.7 | 15.869 | GSS05-2M □□□100C12 | 58 |
|                                  | 91                        | 202                    | 2.9 | 110                       | 166                    | 3.2 | 15.869 | GSS06-2M □□□100C12 | 58 |
|                                  | 83                        | 223                    | 1.4 | 101                       | 184                    | 1.6 | 17.360 | GSS05-2M □□□100C12 | 58 |
|                                  | 83                        | 221                    | 2.8 | 101                       | 182                    | 3.1 | 17.360 | GSS06-2M □□□100C12 | 58 |
|                                  | 71                        | 239                    | 1.1 | 86                        | 196                    | 1.2 | 20.417 | GSS05-2M □□□100C12 | 58 |
|                                  | 71                        | 243                    | 2.0 | 86                        | 201                    | 2.1 | 20.417 | GSS06-2M □□□100C12 | 58 |
|                                  | 65                        | 285                    | 1.2 | 79                        | 235                    | 1.3 | 22.143 | GSS05-2M □□□100C12 | 58 |
|                                  | 65                        | 281                    | 2.4 | 79                        | 232                    | 2.7 | 22.143 | GSS06-2M □□□100C12 | 58 |
|                                  | 58                        | 297                    | 0.9 | 70                        | 245                    | 1.1 | 24.800 | GSS05-2M □□□100C12 | 58 |
|                                  | 58                        | 297                    | 1.9 | 70                        | 246                    | 2.0 | 24.800 | GSS06-2M □□□100C12 | 58 |
|                                  | 53                        | 350                    | 1.0 | 64                        | 289                    | 1.2 | 27.125 | GSS05-2M □□□100C12 | 58 |
|                                  | 53                        | 345                    | 2.1 | 64                        | 285                    | 2.3 | 27.125 | GSS06-2M □□□100C12 | 58 |
|                                  | 47                        | 375                    | 2.8 | 56                        | 309                    | 2.9 | 31.000 | GSS07-2M □□□100C12 | 58 |
|                                  | 46                        | 381                    | 0.8 | 55                        | 314                    | 0.9 | 31.738 | GSS05-2M □□□100C12 | 58 |
|                                  | 46                        | 379                    | 1.6 | 55                        | 314                    | 1.8 | 31.738 | GSS06-2M □□□100C12 | 58 |
|                                  | 41                        | 449                    | 1.6 | 49                        | 371                    | 1.9 | 35.306 | GSS06-2M □□□100C12 | 58 |
|                                  | 41                        | 449                    | 2.7 | 49                        | 370                    | 3.3 | 35.306 | GSS07-2M □□□100C12 | 58 |
|                                  | 37                        | 464                    | 1.4 | 45                        | 385                    | 1.5 | 39.200 | GSS06-2M □□□100C12 | 58 |
|                                  | 37                        | 470                    | 2.5 | 45                        | 388                    | 2.7 | 39.200 | GSS07-2M □□□100C12 | 58 |
|                                  | 33                        | 550                    | 2.2 | 40                        | 454                    | 2.7 | 43.271 | GSS07-2M □□□100C12 | 58 |
|                                  | 33                        | 556                    | 1.3 | 40                        | 461                    | 1.6 | 43.917 | GSS06-2M □□□100C12 | 58 |
|                                  | 29                        | 590                    | 1.2 | 35                        | 489                    | 1.3 | 50.000 | GSS06-2M □□□100C12 | 58 |
|                                  | 29                        | 599                    | 2.1 | 35                        | 495                    | 2.4 | 50.000 | GSS07-2M □□□100C12 | 58 |
|                                  | 27                        | 644                    | 1.1 | 32                        | 534                    | 1.3 | 54.250 | GSS06-2M □□□100C12 | 58 |
|                                  | 27                        | 655                    | 1.9 | 32                        | 541                    | 2.3 | 54.250 | GSS07-2M □□□100C12 | 58 |
|                                  | 24                        | 719                    | 1.0 | 29                        | 597                    | 1.2 | 61.250 | GSS06-2M □□□100C12 | 58 |
|                                  | 24                        | 734                    | 1.7 | 29                        | 606                    | 2.0 | 61.250 | GSS07-2M □□□100C12 | 58 |
|                                  | 21                        | 831                    | 0.9 | 25                        | 691                    | 1.0 | 70.611 | GSS06-2M □□□100C12 | 58 |
|                                  | 21                        | 848                    | 1.5 | 25                        | 703                    | 1.8 | 70.611 | GSS07-2M □□□100C12 | 58 |
|                                  | 18                        | 950                    | 1.3 | 22                        | 787                    | 1.6 | 79.722 | GSS07-2M □□□100C12 | 58 |
|                                  | 17                        | 1035                   | 1.2 | 20                        | 858                    | 1.4 | 86.542 | GSS07-2M □□□100C12 | 58 |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 2.2 \text{ kW}$

| n <sub>N</sub> | 1445 r/min                |                        |     | 1750 r/min                |                        |     | i       |                    |  |
|----------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|---------|--------------------|-------------------------------------------------------------------------------------|
| f <sub>N</sub> | 50 Hz                     |                        |     | 60 Hz                     |                        |     |         |                    |                                                                                     |
|                | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |         |                    |                                                                                     |
|                | 15                        | 1157                   | 1.1 | 18                        | 961                    | 1.3 | 97.708  | GSS07-2M □□□100C12 | 58                                                                                  |
|                | 13                        | 1350                   | 0.9 | 15                        | 1120                   | 1.1 | 113.667 | GSS07-2M □□□100C12 | 58                                                                                  |
|                | 11                        | 1431                   | 0.9 | 14                        | 1187                   | 1.1 | 126.531 | GSS07-3M □□□100C12 | 66                                                                                  |
|                | 11                        | 1504                   | 0.8 | 14                        | 1251                   | 1.0 | 128.333 | GSS07-2M □□□100C12 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 3.0 \text{ kW}$

| n <sub>N</sub><br>f <sub>N</sub> | 1445 r/min                |                        |     | 1755 r/min                |                        |     | i      |                    |    |
|----------------------------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|----|
|                                  | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |    |
|                                  | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |    |
|                                  | 256                       | 101                    | 2.2 | 310                       | 82                     | 2.3 | 5.639  | GSS05-2M □□□100C32 | 58 |
|                                  | 187                       | 139                    | 1.9 | 226                       | 114                    | 2.1 | 7.733  | GSS05-2M □□□100C32 | 58 |
|                                  | 160                       | 158                    | 1.6 | 193                       | 129                    | 1.8 | 9.042  | GSS05-2M □□□100C32 | 58 |
|                                  | 160                       | 158                    | 2.6 | 193                       | 130                    | 2.8 | 9.042  | GSS06-2M □□□100C32 | 58 |
|                                  | 146                       | 179                    | 1.5 | 176                       | 146                    | 1.8 | 9.897  | GSS05-2M □□□100C32 | 58 |
|                                  | 141                       | 183                    | 2.8 | 170                       | 150                    | 3.3 | 10.238 | GSS06-2M □□□100C32 | 58 |
|                                  | 134                       | 196                    | 1.4 | 161                       | 160                    | 1.7 | 10.827 | GSS05-2M □□□100C32 | 58 |
|                                  | 129                       | 201                    | 2.6 | 156                       | 164                    | 3.1 | 11.200 | GSS06-2M □□□100C32 | 58 |
|                                  | 117                       | 217                    | 1.3 | 141                       | 178                    | 1.5 | 12.400 | GSS05-2M □□□100C32 | 58 |
|                                  | 117                       | 217                    | 2.4 | 141                       | 179                    | 2.5 | 12.400 | GSS06-2M □□□100C32 | 58 |
|                                  | 105                       | 251                    | 1.1 | 126                       | 206                    | 1.3 | 13.810 | GSS05-2M □□□100C32 | 58 |
|                                  | 101                       | 258                    | 2.0 | 122                       | 212                    | 2.5 | 14.286 | GSS06-2M □□□100C32 | 58 |
|                                  | 91                        | 279                    | 1.1 | 110                       | 229                    | 1.2 | 15.869 | GSS05-2M □□□100C32 | 58 |
|                                  | 91                        | 278                    | 2.2 | 110                       | 228                    | 2.4 | 15.869 | GSS06-2M □□□100C32 | 58 |
|                                  | 83                        | 305                    | 1.0 | 101                       | 251                    | 1.2 | 17.360 | GSS05-2M □□□100C32 | 58 |
|                                  | 83                        | 304                    | 2.0 | 101                       | 250                    | 2.3 | 17.360 | GSS06-2M □□□100C32 | 58 |
|                                  | 71                        | 334                    | 1.5 | 86                        | 275                    | 1.5 | 20.417 | GSS06-2M □□□100C32 | 58 |
|                                  | 65                        | 390                    | 0.9 | 79                        | 321                    | 1.0 | 22.143 | GSS05-2M □□□100C32 | 58 |
|                                  | 65                        | 386                    | 1.7 | 79                        | 318                    | 2.0 | 22.143 | GSS06-2M □□□100C32 | 58 |
|                                  | 65                        | 385                    | 3.1 | 79                        | 317                    | 3.3 | 22.143 | GSS07-2M □□□100C32 | 58 |
|                                  | 58                        | 408                    | 1.4 | 70                        | 336                    | 1.5 | 24.800 | GSS06-2M □□□100C32 | 58 |
|                                  | 53                        | 473                    | 1.5 | 64                        | 390                    | 1.7 | 27.125 | GSS06-2M □□□100C32 | 58 |
|                                  | 53                        | 473                    | 2.6 | 64                        | 388                    | 3.1 | 27.125 | GSS07-2M □□□100C32 | 58 |
|                                  | 47                        | 515                    | 2.0 | 56                        | 424                    | 2.2 | 31.000 | GSS07-2M □□□100C32 | 58 |
|                                  | 46                        | 520                    | 1.2 | 55                        | 430                    | 1.3 | 31.738 | GSS06-2M □□□100C32 | 58 |
|                                  | 41                        | 615                    | 1.2 | 49                        | 507                    | 1.4 | 35.306 | GSS06-2M □□□100C32 | 58 |
|                                  | 41                        | 617                    | 2.0 | 49                        | 507                    | 2.4 | 35.306 | GSS07-2M □□□100C32 | 58 |
|                                  | 37                        | 636                    | 1.0 | 45                        | 526                    | 1.1 | 39.200 | GSS06-2M □□□100C32 | 58 |
|                                  | 37                        | 646                    | 1.8 | 45                        | 532                    | 2.0 | 39.200 | GSS07-2M □□□100C32 | 58 |
|                                  | 33                        | 756                    | 1.6 | 40                        | 623                    | 2.0 | 43.271 | GSS07-2M □□□100C32 | 58 |
|                                  | 33                        | 761                    | 0.9 | 40                        | 629                    | 1.1 | 43.917 | GSS06-2M □□□100C32 | 58 |
|                                  | 29                        | 808                    | 0.9 | 35                        | 667                    | 1.0 | 50.000 | GSS06-2M □□□100C32 | 58 |
|                                  | 29                        | 822                    | 1.5 | 35                        | 678                    | 1.8 | 50.000 | GSS07-2M □□□100C32 | 58 |
|                                  | 27                        | 881                    | 0.8 | 32                        | 729                    | 0.9 | 54.250 | GSS06-2M □□□100C32 | 58 |
|                                  | 27                        | 898                    | 1.4 | 32                        | 741                    | 1.7 | 54.250 | GSS07-2M □□□100C32 | 58 |
|                                  | 24                        | 1006                   | 1.2 | 29                        | 829                    | 1.5 | 61.250 | GSS07-2M □□□100C32 | 58 |
|                                  | 21                        | 1162                   | 1.1 | 25                        | 961                    | 1.3 | 70.611 | GSS07-2M □□□100C32 | 58 |
|                                  | 18                        | 1301                   | 1.0 | 22                        | 1076                   | 1.2 | 79.722 | GSS07-2M □□□100C32 | 58 |
|                                  | 17                        | 1417                   | 0.9 | 20                        | 1172                   | 1.1 | 86.542 | GSS07-2M □□□100C32 | 58 |

6.10

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 4.0 \text{ kW}$

| $n_N$ | 1455 r/min       |               |     | 1760 r/min       |               |     | i      |                    |    |
|-------|------------------|---------------|-----|------------------|---------------|-----|--------|--------------------|----|
| $f_N$ | 50 Hz            |               |     | 60 Hz            |               |     |        |                    |    |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |        |                    |    |
|       | 249              | 138           | 2.5 | 301              | 114           | 2.7 | 5.833  | GSS06-2M □□□112C22 | 58 |
|       | 182              | 190           | 2.5 | 219              | 157           | 2.4 | 8.000  | GSS06-2M □□□112C22 | 58 |
|       | 161              | 211           | 2.0 | 194              | 174           | 2.1 | 9.042  | GSS06-2M □□□112C22 | 58 |
|       | 160              | 211           | 2.9 | 193              | 174           | 3.1 | 9.086  | GSS07-2M □□□112C22 | 58 |
|       | 142              | 245           | 2.1 | 171              | 201           | 2.5 | 10.238 | GSS06-2M □□□112C22 | 58 |
|       | 130              | 268           | 1.9 | 157              | 221           | 2.3 | 11.200 | GSS06-2M □□□112C22 | 58 |
|       | 130              | 267           | 3.2 | 157              | 220           | 3.4 | 11.200 | GSS07-2M □□□112C22 | 58 |
|       | 117              | 289           | 1.8 | 142              | 239           | 1.9 | 12.400 | GSS06-2M □□□112C22 | 58 |
|       | 116              | 293           | 2.7 | 139              | 242           | 2.8 | 12.594 | GSS07-2M □□□112C22 | 58 |
|       | 102              | 344           | 1.5 | 123              | 283           | 1.8 | 14.286 | GSS06-2M □□□112C22 | 58 |
|       | 102              | 343           | 2.6 | 123              | 282           | 3.1 | 14.286 | GSS07-2M □□□112C22 | 58 |
|       | 94               | 361           | 2.5 | 113              | 298           | 2.7 | 15.500 | GSS07-2M □□□112C22 | 58 |
|       | 92               | 370           | 1.6 | 111              | 306           | 1.8 | 15.869 | GSS06-2M □□□112C22 | 58 |
|       | 84               | 404           | 1.5 | 101              | 334           | 1.7 | 17.360 | GSS06-2M □□□112C22 | 58 |
|       | 84               | 404           | 2.5 | 101              | 334           | 2.6 | 17.360 | GSS07-2M □□□112C22 | 58 |
|       | 71               | 444           | 1.1 | 86               | 367           | 1.2 | 20.417 | GSS06-2M □□□112C22 | 58 |
|       | 71               | 451           | 1.7 | 86               | 373           | 1.8 | 20.517 | GSS07-2M □□□112C22 | 58 |
|       | 66               | 514           | 1.3 | 79               | 426           | 1.5 | 22.143 | GSS06-2M □□□112C22 | 58 |
|       | 66               | 514           | 2.3 | 79               | 426           | 2.4 | 22.143 | GSS07-2M □□□112C22 | 58 |
|       | 59               | 542           | 1.0 | 71               | 449           | 1.1 | 24.800 | GSS06-2M □□□112C22 | 58 |
|       | 58               | 558           | 1.6 | 70               | 462           | 1.7 | 25.188 | GSS07-2M □□□112C22 | 58 |
|       | 54               | 629           | 1.1 | 65               | 521           | 1.3 | 27.125 | GSS06-2M □□□112C22 | 58 |
|       | 54               | 631           | 2.0 | 65               | 521           | 2.3 | 27.125 | GSS07-2M □□□112C22 | 58 |
|       | 47               | 686           | 1.5 | 57               | 568           | 1.6 | 31.000 | GSS07-2M □□□112C22 | 58 |
|       | 46               | 691           | 0.9 | 55               | 573           | 1.0 | 31.738 | GSS06-2M □□□112C22 | 58 |
|       | 41               | 822           | 1.5 | 50               | 679           | 1.8 | 35.306 | GSS07-2M □□□112C22 | 58 |
|       | 37               | 859           | 1.4 | 45               | 711           | 1.5 | 39.200 | GSS07-2M □□□112C22 | 58 |
|       | 34               | 1005          | 1.2 | 41               | 832           | 1.5 | 43.271 | GSS07-2M □□□112C22 | 58 |
|       | 29               | 1094          | 1.1 | 35               | 906           | 1.3 | 50.000 | GSS07-2M □□□112C22 | 58 |
|       | 27               | 1194          | 1.0 | 32               | 990           | 1.3 | 54.250 | GSS07-2M □□□112C22 | 58 |
|       | 24               | 1337          | 0.9 | 29               | 1107          | 1.1 | 61.250 | GSS07-2M □□□112C22 | 58 |
|       | 21               | 1544          | 0.8 | 25               | 1282          | 1.0 | 70.611 | GSS07-2M □□□112C22 | 58 |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 5.5 \text{ kW}$

| n <sub>N</sub> | 1470 r/min                |                        |     | 1775 r/min                |                        |     | i      |                    |  |
|----------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|-------------------------------------------------------------------------------------|
| f <sub>N</sub> | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |                                                                                     |
|                | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |                                                                                     |
|                | 252                       | 189                    | 1.9 | 303                       | 156                    | 2.0 | 5.833  | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 251                       | 190                    | 2.8 | 302                       | 157                    | 2.9 | 5.862  | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 184                       | 260                    | 1.9 | 221                       | 216                    | 1.8 | 8.000  | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 181                       | 265                    | 2.5 | 218                       | 219                    | 2.7 | 8.125  | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 163                       | 289                    | 1.4 | 196                       | 239                    | 1.5 | 9.042  | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 162                       | 290                    | 2.1 | 195                       | 240                    | 2.3 | 9.086  | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 147                       | 327                    | 2.4 | 177                       | 270                    | 2.5 | 10.000 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 144                       | 335                    | 1.5 | 173                       | 276                    | 1.8 | 10.238 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 131                       | 367                    | 1.4 | 158                       | 303                    | 1.7 | 11.200 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 131                       | 367                    | 2.3 | 158                       | 303                    | 2.5 | 11.200 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 119                       | 395                    | 1.3 | 143                       | 328                    | 1.4 | 12.400 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 117                       | 402                    | 2.0 | 141                       | 333                    | 2.1 | 12.594 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 103                       | 470                    | 1.1 | 124                       | 388                    | 1.4 | 14.286 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 103                       | 469                    | 2.2 | 124                       | 387                    | 2.3 | 14.286 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 95                        | 495                    | 1.9 | 114                       | 410                    | 2.0 | 15.500 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 93                        | 506                    | 1.2 | 112                       | 419                    | 1.3 | 15.869 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 85                        | 553                    | 1.1 | 102                       | 458                    | 1.3 | 17.360 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 85                        | 554                    | 1.8 | 102                       | 459                    | 1.9 | 17.360 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 72                        | 606                    | 0.8 | 87                        | 503                    | 0.9 | 20.417 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 72                        | 618                    | 1.2 | 86                        | 512                    | 1.3 | 20.517 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 66                        | 702                    | 1.0 | 80                        | 583                    | 1.1 | 22.143 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 66                        | 705                    | 1.7 | 80                        | 584                    | 1.8 | 22.143 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 58                        | 763                    | 1.2 | 70                        | 633                    | 1.3 | 25.188 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 54                        | 859                    | 0.8 | 65                        | 713                    | 0.9 | 27.125 | GSS06-2M□□□132C12  | 58                                                                                  |
|                | 54                        | 864                    | 1.4 | 65                        | 715                    | 1.7 | 27.125 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 47                        | 939                    | 1.1 | 57                        | 778                    | 1.2 | 31.000 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 42                        | 1123                   | 1.1 | 50                        | 931                    | 1.3 | 35.306 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 38                        | 1175                   | 1.0 | 45                        | 974                    | 1.1 | 39.200 | GSS07-2M □□□132C12 | 58                                                                                  |
|                | 29                        | 1494                   | 0.8 | 35                        | 1240                   | 1.0 | 50.000 | GSS07-2M □□□132C12 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 7.5 \text{ kW}$

| n <sub>N</sub> | 1460 r/min                |                        |     | 1765 r/min                |                        |     | i      |                    |    |
|----------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|----|
| f <sub>N</sub> | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |    |
|                | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |    |
|                | 250                       | 261                    | 1.4 | 302                       | 216                    | 1.4 | 5.833  | GSS06-2M□□□132C22  | 58 |
|                | 249                       | 263                    | 2.0 | 300                       | 217                    | 2.1 | 5.862  | GSS07-2M □□□132C22 | 58 |
|                | 183                       | 360                    | 1.4 | 220                       | 297                    | 1.3 | 8.000  | GSS06-2M□□□132C22  | 58 |
|                | 180                       | 366                    | 1.9 | 217                       | 303                    | 2.0 | 8.125  | GSS07-2M □□□132C22 | 58 |
|                | 162                       | 398                    | 1.0 | 195                       | 329                    | 1.1 | 9.042  | GSS06-2M□□□132C22  | 58 |
|                | 161                       | 401                    | 1.6 | 194                       | 331                    | 1.6 | 9.086  | GSS07-2M □□□132C22 | 58 |
|                | 146                       | 452                    | 1.8 | 176                       | 373                    | 1.9 | 10.000 | GSS07-2M □□□132C22 | 58 |
|                | 143                       | 462                    | 1.1 | 172                       | 381                    | 1.3 | 10.238 | GSS06-2M□□□132C22  | 58 |
|                | 130                       | 506                    | 1.0 | 157                       | 417                    | 1.3 | 11.200 | GSS06-2M□□□132C22  | 58 |
|                | 130                       | 507                    | 1.7 | 157                       | 418                    | 1.8 | 11.200 | GSS07-2M □□□132C22 | 58 |
|                | 118                       | 545                    | 1.0 | 142                       | 451                    | 1.0 | 12.400 | GSS06-2M□□□132C22  | 58 |
|                | 116                       | 555                    | 1.4 | 140                       | 459                    | 1.5 | 12.594 | GSS07-2M □□□132C22 | 58 |
|                | 102                       | 648                    | 0.8 | 123                       | 534                    | 1.0 | 14.286 | GSS06-2M□□□132C22  | 58 |
|                | 102                       | 647                    | 1.6 | 123                       | 535                    | 1.7 | 14.286 | GSS07-2M □□□132C22 | 58 |
|                | 94                        | 683                    | 1.4 | 114                       | 565                    | 1.4 | 15.500 | GSS07-2M □□□132C22 | 58 |
|                | 92                        | 697                    | 0.9 | 111                       | 577                    | 1.0 | 15.869 | GSS06-2M□□□132C22  | 58 |
|                | 84                        | 762                    | 0.8 | 102                       | 630                    | 0.9 | 17.360 | GSS06-2M□□□132C22  | 58 |
|                | 84                        | 765                    | 1.3 | 101                       | 633                    | 1.4 | 17.360 | GSS07-2M □□□132C22 | 58 |
|                | 71                        | 851                    | 0.9 | 86                        | 705                    | 1.0 | 20.517 | GSS07-2M □□□132C22 | 58 |
|                | 66                        | 972                    | 1.2 | 80                        | 806                    | 1.3 | 22.143 | GSS07-2M □□□132C22 | 58 |
|                | 58                        | 1052                   | 0.9 | 70                        | 872                    | 0.9 | 25.188 | GSS07-2M □□□132C22 | 58 |
|                | 54                        | 1191                   | 1.0 | 65                        | 985                    | 1.2 | 27.125 | GSS07-2M □□□132C22 | 58 |
|                | 47                        | 1293                   | 0.8 | 57                        | 1071                   | 0.9 | 31.000 | GSS07-2M □□□132C22 | 58 |
|                | 41                        | 1547                   | 0.8 | 50                        | 1282                   | 1.0 | 35.306 | GSS07-2M □□□132C22 | 58 |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 11.0$  kW

| $n_N$ | 1470 r/min       |               |     | 1775 r/min       |               |     | i      |                    |  |
|-------|------------------|---------------|-----|------------------|---------------|-----|--------|--------------------|-------------------------------------------------------------------------------------|
| $f_N$ | 50 Hz            |               |     | 60 Hz            |               |     |        |                    |                                                                                     |
|       | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   | $n_2$<br>[r/min] | $M_2$<br>[Nm] | c   |        |                    |                                                                                     |
|       | 251              | 386           | 1.4 | 302              | 319           | 1.5 | 5.862  | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 181              | 537           | 1.3 | 218              | 444           | 1.3 | 8.125  | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 162              | 587           | 1.1 | 195              | 486           | 1.1 | 9.086  | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 147              | 662           | 1.2 | 177              | 548           | 1.3 | 10.000 | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 131              | 742           | 1.2 | 158              | 614           | 1.2 | 11.200 | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 117              | 813           | 1.0 | 141              | 673           | 1.0 | 12.594 | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 95               | 1000          | 0.9 | 114              | 829           | 1.0 | 15.500 | GSS07-2M □□□160C22 | 58                                                                                  |
|       | 85               | 1119          | 0.9 | 102              | 928           | 1.0 | 17.360 | GSS07-2M □□□160C22 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



## Selection tables

50 Hz, 60 Hz:  $P_N = 15.0 \text{ kW}$

| n <sub>N</sub> | 1470 r/min                |                        |     | 1775 r/min                |                        |     | i      |                    |  |
|----------------|---------------------------|------------------------|-----|---------------------------|------------------------|-----|--------|--------------------|-------------------------------------------------------------------------------------|
| f <sub>N</sub> | 50 Hz                     |                        |     | 60 Hz                     |                        |     |        |                    |                                                                                     |
|                | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   | n <sub>2</sub><br>[r/min] | M <sub>2</sub><br>[Nm] | c   |        |                    |                                                                                     |
|                | 251                       | 529                    | 1.0 | 302                       | 437                    | 1.1 | 5.862  | GSS07-2M □□□160C32 | 58                                                                                  |
|                | 181                       | 735                    | 0.9 | 218                       | 608                    | 1.0 | 8.125  | GSS07-2M □□□160C32 | 58                                                                                  |
|                | 147                       | 906                    | 0.9 | 178                       | 749                    | 0.9 | 10.000 | GSS07-2M □□□160C32 | 58                                                                                  |
|                | 131                       | 1015                   | 0.9 | 158                       | 840                    | 0.9 | 11.200 | GSS07-2M □□□160C32 | 58                                                                                  |

# GSS helical-worm gearboxes

Technical data



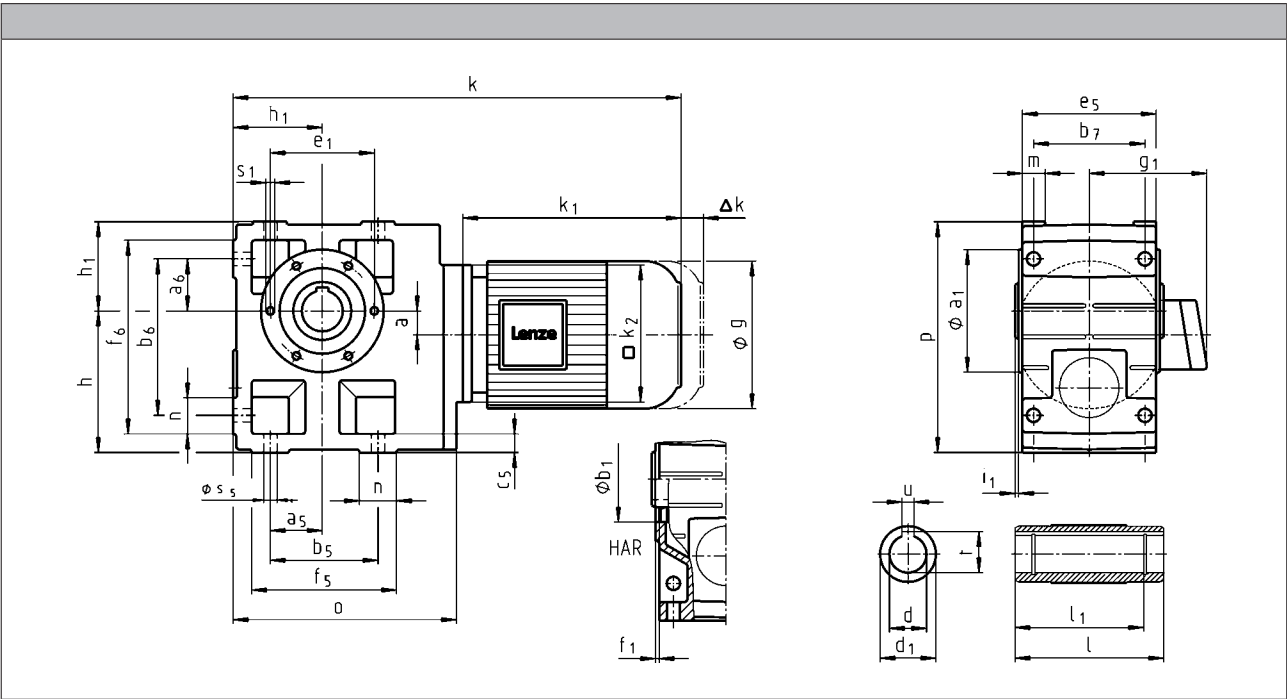
# GSS helical-worm gearboxes

Technical data



## Dimensions

GSS□□-2M H□R



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    | 194    |        |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    | 137    | 147    |        |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    | 309    |        |
| k <sub>2</sub> |         | 145    | 180    |        |        |
| $\Delta k$     | MHEMABR | 73     | 68     | 76     |        |
|                | MHFMAXX | 128    | 109    |        |        |
|                | MHFMABR | 183    | 181    | 170    |        |
|                |         | k      |        |        |        |
| GSS04          |         | 420    | 479    | 536    |        |
| GSS05          |         | 441    | 501    | 576    |        |
| GSS06          |         | 481    | 541    | 619    |        |
| GSS07          |         | 524    | 584    |        |        |

# GSS helical-worm gearboxes

## Technical data



|                |         | 100C32 | 112C22 | 132C12<br>132C22 | 160C22 | 160C32 |
|----------------|---------|--------|--------|------------------|--------|--------|
| g              |         | 194    | 218    | 258              | 310    |        |
| g <sub>1</sub> | MHEMAXX | 166    | 176    | 195              | 210    |        |
|                | MHEMABR | 147    | 158    | 187              | 210    |        |
| k <sub>1</sub> | MHEMAXX | 324    | 363    | 403              | 457.5  | 501.5  |
| k <sub>2</sub> |         | 180    | 222    | 265              | 300    |        |
| Δ k            | MHEMABR | 76     | 90     | 109.5            | 105    |        |
|                | MHFMAXX | 109    | 102    | 115              | 149    |        |
|                | MHFMABR | 170    | 183    | 201.5            | 179    |        |
|                |         | k      |        |                  |        |        |
| GSS05          |         | 551    |        |                  |        |        |
| GSS06          |         | 591    | 636    | 684              |        |        |
| GSS07          |         | 634    | 679    | 727              | 786    | 830    |

|       | a  | h <sup>1)</sup> | h <sub>1</sub> | o   | p <sup>1)</sup> |
|-------|----|-----------------|----------------|-----|-----------------|
| GSS04 | 20 | 100             | 71             | 181 | 171             |
| GSS05 | 23 | 125             | 80             | 212 | 205             |
| GSS06 | 26 | 150             | 100            | 255 | 250             |
| GSS07 | 33 | 190             | 120            | 305 | 310             |

|       | d  | d <sub>1</sub> | l <sup>1)</sup> | l <sub>1</sub> | u   | t    | i <sub>1</sub> | a <sub>1</sub> | b <sub>1</sub> | e <sub>1</sub> | f <sub>1</sub> | s <sub>1</sub> |
|-------|----|----------------|-----------------|----------------|-----|------|----------------|----------------|----------------|----------------|----------------|----------------|
|       | H7 |                |                 |                | JS9 | +0,2 |                |                | H7             |                |                |                |
| GSS04 | 25 | 45             | 115             | 100            | 8   | 28.3 | 2.5            | 104            | 75             | 90             | 3              | M6x12          |
|       | 30 | 45             | 115             | 100            | 8   | 33.3 | 2.5            |                |                |                |                |                |
| GSS05 | 30 | 50             | 140             | 124            | 8   | 33.3 | 4              | 118            | 80             | 100            | 4              | M8x15          |
|       | 35 | 50             | 140             | 124            | 10  | 38.3 | 4              |                |                |                |                |                |
| GSS06 | 40 | 65             | 160             | 140            | 12  | 43.3 | 5              | 140            | 100            | 120            | 4              | M10x16         |
|       | 45 | 65             | 160             | 140            | 14  | 48.8 | 5              |                |                |                |                |                |
| GSS07 | 50 | 75             | 200             | 175            | 14  | 53.8 | 5              | 165            | 115            | 140            | 5              | M12x18         |
|       | 55 | 75             | 200             | 175            | 16  | 59.3 | 5              |                |                |                |                |                |

|       | a <sub>5</sub> | a <sub>6</sub> | b <sub>5</sub> | b <sub>6</sub> | b <sub>7</sub> | c <sub>5</sub> | e <sub>5</sub> | f <sub>5</sub> | f <sub>6</sub> | m  | n  | s <sub>5</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----------------|
| GSS04 | 45             | 45             | 90             | 119            | 85             | 14             | 100            | 112            | 141            | 20 | 22 | 9              |
| GSS05 | 47.5           | 47.5           | 95             | 140            | 105            | 17             | 115            | 124            | 169            | 21 | 29 | 11             |
| GSS06 | 60             | 60             | 120            | 170            | 120            | 20             | 145            | 156            | 206            | 23 | 36 | 14             |
| GSS07 | 70             | 70             | 140            | 210            | 150            | 25             | 180            | 185            | 255            | 28 | 45 | 18             |

<sup>1)</sup> k<sub>2</sub> !

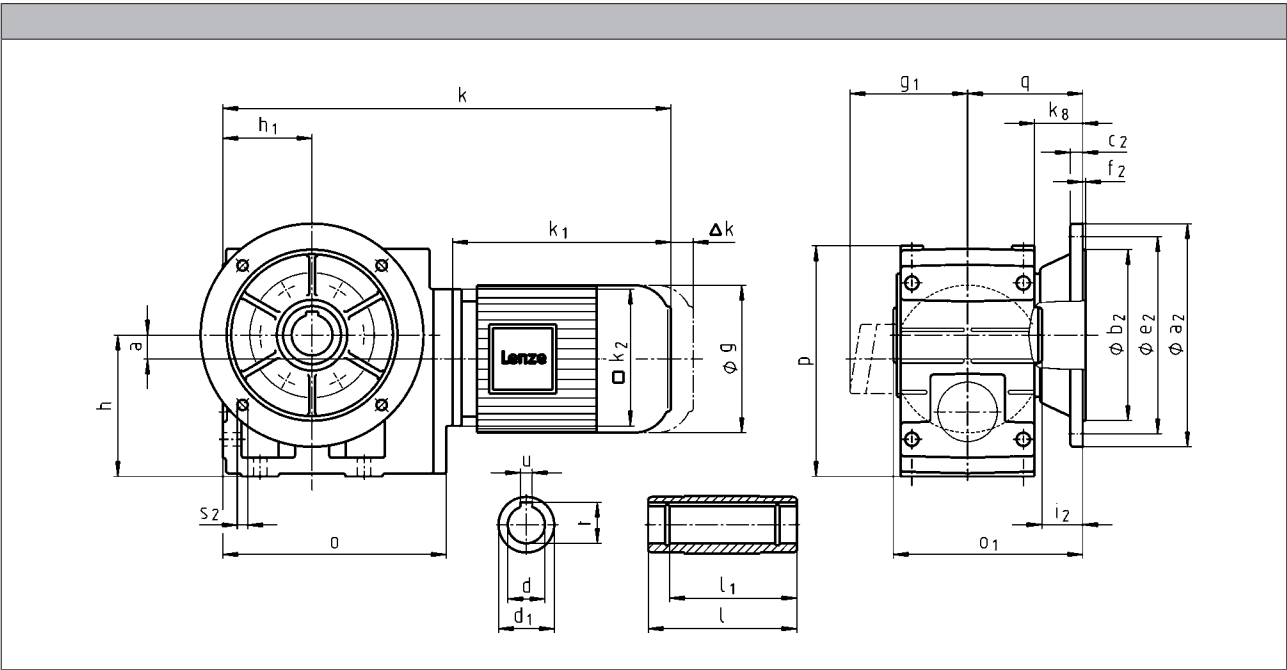
# GSS helical-worm gearboxes

Technical data



## Dimensions

GSS□□-2M HAK



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    |        | 176    | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    |        | 137    | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  |        | 274    | 309    |
| k <sub>2</sub> |         | 145    |        | 180    |        |
|                | MHEMABR | 73     |        | 68     | 76     |
| $\Delta k$     | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    |        | 181    | 170    |
|                |         |        |        | k      |        |
|                | GSS04   | 420    |        | 479    |        |
|                | GSS05   | 441    |        | 501    | 536    |
|                | GSS06   | 481    |        | 541    | 576    |
|                | GSS07   | 524    |        | 584    | 619    |

# GSS helical-worm gearboxes

## Technical data



|                |         | 100C32 | 112C22 | 132C12<br>132C22 | 160C22 | 160C32 |
|----------------|---------|--------|--------|------------------|--------|--------|
| g              |         | 194    | 218    | 258              | 310    |        |
| g <sub>1</sub> | MHEMAXX | 166    | 176    | 195              | 210    |        |
|                | MHEMABR | 147    | 158    | 187              | 210    |        |
| k <sub>1</sub> | MHEMAXX | 324    | 363    | 403              | 457.5  | 501.5  |
| k <sub>2</sub> |         | 180    | 222    | 265              | 300    |        |
| Δ k            | MHEMABR | 76     | 90     | 109.5            | 105    |        |
|                | MHFMAXX | 109    | 102    | 115              | 149    |        |
|                | MHFMABR | 170    | 183    | 201.5            | 179    |        |
|                |         | k      |        |                  |        |        |
| GSS05          |         | 551    |        |                  |        |        |
| GSS06          |         | 591    | 636    | 684              |        |        |
| GSS07          |         | 634    | 679    | 727              | 786    | 830    |

|       | a  | h <sup>1)</sup> | h <sub>1</sub> | k <sub>8</sub> | o   | p <sup>1)</sup> | q     |
|-------|----|-----------------|----------------|----------------|-----|-----------------|-------|
| GSS04 | 20 | 100             | 71             | 41             | 181 | 171             | 91    |
| GSS05 | 23 | 125             | 80             | 40             | 212 | 205             | 103.5 |
| GSS06 | 26 | 150             | 100            | 49             | 255 | 250             | 121.5 |
| GSS07 | 33 | 190             | 120            | 65.5           | 305 | 310             | 155.5 |

|       | d  | d <sub>1</sub> | l   | l <sub>1</sub> | u   | t    | i <sub>2</sub> | o <sub>1</sub> <sup>1)</sup> | a <sub>2</sub> | b <sub>2</sub> | c <sub>2</sub> | e <sub>2</sub> | f <sub>2</sub> | s <sub>2</sub> |
|-------|----|----------------|-----|----------------|-----|------|----------------|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|       | H7 |                |     |                | JS9 | +0,2 |                |                              |                | j7             |                |                |                |                |
| GSS04 | 25 | 45             | 115 | 100            | 8   | 28.3 | 33.5           | 148.5                        | 160            | 110            | 10             | 130            | 3.5            | 4 x 9          |
|       | 30 | 45             | 115 | 100            | 8   | 33.3 | 33.5           | 148.5                        |                |                |                |                |                |                |
| GSS05 | 30 | 50             | 140 | 124            | 8   | 33.3 | 33             | 173.5                        | 200            | 130            | 12             | 165            | 4              | 4 x 11         |
|       | 35 | 50             | 140 | 124            | 10  | 38.3 | 33             | 173.5                        |                |                |                |                |                |                |
| GSS06 | 40 | 65             | 160 | 140            | 12  | 43.3 | 42             | 201.5                        | 200            | 130            | 12             | 165            | 3.5            | 4 x 11         |
|       | 45 | 65             | 160 | 140            | 14  | 48.8 | 41             | 201.5                        | 250            | 180            | 15             | 215            | 4              | 4 x 14         |
| GSS07 | 50 | 75             | 200 | 175            | 14  | 53.8 | 55             | 255.5                        | 250            | 180            | 15             | 215            | 4              | 4 x 14         |
|       | 55 | 75             | 200 | 175            | 16  | 59.3 | 55             | 255.5                        | 300            | 230            | 17             | 265            | 4              | 4 x 14         |

<sup>1)</sup> k<sub>2</sub> !

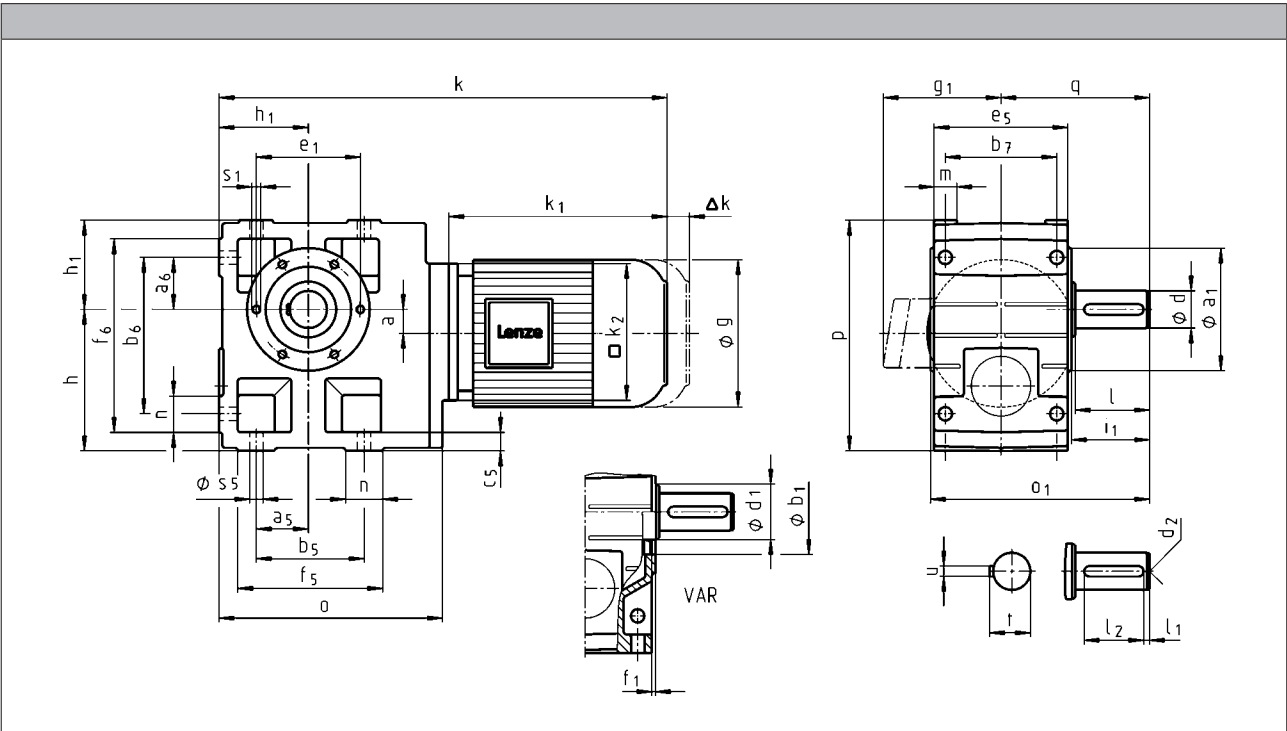
# GSS helical-worm gearboxes

Technical data



## Dimensions

GSS□□-2M V□R



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    |        | 176    | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    |        | 137    | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  |        | 274    | 309    |
| k <sub>2</sub> |         | 145    |        | 180    |        |
| $\Delta k$     | MHEMABR | 73     |        | 68     | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    |        | 181    | 170    |
|                |         | k      |        |        |        |
| GSS04          |         | 420    |        | 479    |        |
| GSS05          |         | 441    |        | 501    | 536    |
| GSS06          |         | 481    |        | 541    | 576    |
| GSS07          |         | 524    |        | 584    | 619    |

# GSS helical-worm gearboxes

## Technical data



|                |         | 100C32 | 112C22 | 132C12<br>132C22 | 160C22 | 160C32 |
|----------------|---------|--------|--------|------------------|--------|--------|
| g              |         | 194    | 218    | 258              | 310    |        |
| g <sub>1</sub> | MHEMAXX | 166    | 176    | 195              | 210    |        |
|                | MHEMABR | 147    | 158    | 187              | 210    |        |
| k <sub>1</sub> | MHEMAXX | 324    | 363    | 403              | 457.5  | 501.5  |
| k <sub>2</sub> |         | 180    | 222    | 265              | 300    |        |
| Δ k            | MHEMABR | 76     | 90     | 109.5            | 105    |        |
|                | MHFMAXX | 109    | 102    | 115              | 149    |        |
|                | MHFMABR | 170    | 183    | 201.5            | 179    |        |
|                |         | k      |        |                  |        |        |
| GSS05          |         | 551    |        |                  |        |        |
| GSS06          |         | 591    | 636    | 684              |        |        |
| GSS07          |         | 634    | 679    | 727              | 786    | 830    |

|       | a  | h <sup>1)</sup> | h <sub>1</sub> | o   | p <sup>1)</sup> | q     |
|-------|----|-----------------|----------------|-----|-----------------|-------|
| GSS04 | 20 | 100             | 71             | 181 | 171             | 107.5 |
| GSS05 | 23 | 125             | 80             | 212 | 205             | 130   |
| GSS06 | 26 | 150             | 100            | 255 | 250             | 160   |
| GSS07 | 33 | 190             | 120            | 305 | 310             | 200   |

|       | d  | d <sub>1</sub> | d <sub>2</sub> | l   | l <sub>1</sub> | l <sub>2</sub> | u  | t    | i <sub>1</sub> | o <sub>1</sub> <sup>1)</sup> | a <sub>1</sub> | b <sub>1</sub> | e <sub>1</sub> | f <sub>1</sub> | s <sub>1</sub> |
|-------|----|----------------|----------------|-----|----------------|----------------|----|------|----------------|------------------------------|----------------|----------------|----------------|----------------|----------------|
|       | k6 |                |                |     |                |                |    |      |                |                              |                | H7             |                |                |                |
| GSS04 | 25 | 45             | M10            | 50  | 6              | 40             | 8  | 28   | 52.5           | 162.5                        | 104            | 75             | 90             | 3              | M6x12          |
| GSS05 | 30 | 45             | M10            | 60  | 6              | 45             | 8  | 33   | 64             | 196.5                        | 118            | 80             | 100            | 4              | M8x15          |
| GSS06 | 40 | 65             | M16            | 80  | 7              | 63             | 12 | 43   | 85             | 235.5                        | 140            | 100            | 120            | 4              | M10x16         |
| GSS07 | 50 | 75             | M16            | 100 | 8              | 80             | 14 | 53.5 | 105            | 295.5                        | 165            | 115            | 140            | 5              | M12x18         |

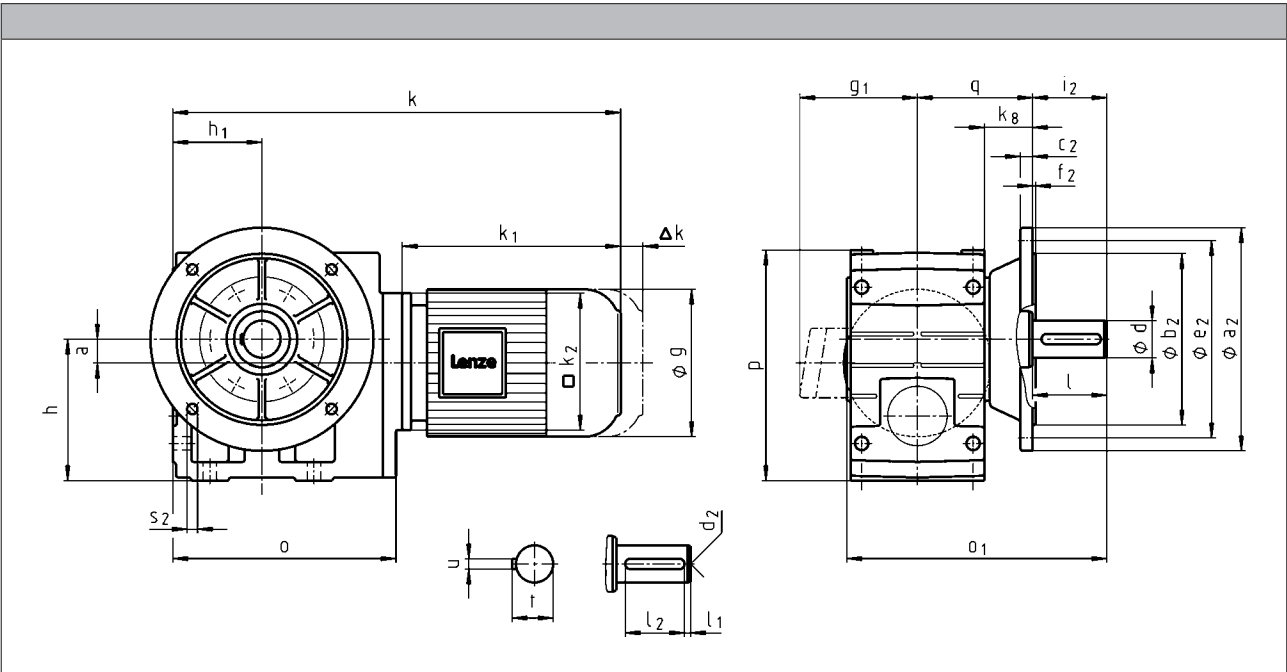
|       | a <sub>5</sub> | a <sub>6</sub> | b <sub>5</sub> | b <sub>6</sub> | b <sub>7</sub> | c <sub>5</sub> | e <sub>5</sub> | f <sub>5</sub> | f <sub>6</sub> | m  | n  | s <sub>5</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----------------|
| GSS04 | 45             | 45             | 90             | 119            | 85             | 14             | 100            | 112            | 141            | 20 | 22 | 9              |
| GSS05 | 47.5           | 47.5           | 95             | 140            | 105            | 17             | 115            | 124            | 169            | 21 | 29 | 11             |
| GSS06 | 60             | 60             | 120            | 170            | 120            | 20             | 145            | 156            | 206            | 23 | 36 | 14             |
| GSS07 | 70             | 70             | 140            | 210            | 150            | 25             | 180            | 185            | 255            | 28 | 45 | 18             |

<sup>1)</sup> k<sub>2</sub> !



Dimensions

GSS□□-2M VAK



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    |        | 194    |
| g <sub>1</sub> | MHEMAXX | 150    |        | 157    | 166    |
|                | MHEMABR | 132    | 137    |        | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    |        | 309    |
| k <sub>2</sub> |         | 145    |        | 180    |        |
| $\Delta k$     | MHEMABR | 73     | 68     |        | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    | 181    |        | 170    |
|                |         | k      |        |        |        |
| GSS04          |         | 420    | 479    |        |        |
| GSS05          |         | 441    | 501    |        | 536    |
| GSS06          |         | 481    | 541    |        | 576    |
| GSS07          |         | 524    | 584    |        | 619    |

# GSS helical-worm gearboxes

## Technical data



|                |         | 100C32 | 112C22 | 132C12<br>132C22 | 160C22 | 160C32 |
|----------------|---------|--------|--------|------------------|--------|--------|
| g              |         | 194    | 218    | 258              | 310    |        |
| g <sub>1</sub> | MHEMAXX | 166    | 176    | 195              | 210    |        |
|                | MHEMABR | 147    | 158    | 187              | 210    |        |
| k <sub>1</sub> | MHEMAXX | 324    | 363    | 403              | 457.5  | 501.5  |
| k <sub>2</sub> |         | 180    | 222    | 265              | 300    |        |
| Δ k            | MHEMABR | 76     | 90     | 109.5            | 105    |        |
|                | MHFMAXX | 109    | 102    | 115              | 149    |        |
|                | MHFMABR | 170    | 183    | 201.5            | 179    |        |
|                |         | k      |        |                  |        |        |
| GSS05          |         | 551    |        |                  |        |        |
| GSS06          |         | 591    | 636    | 684              |        |        |
| GSS07          |         | 634    | 679    | 727              | 786    | 830    |

|       | a  | h <sup>1)</sup> | h <sub>1</sub> | k <sub>8</sub> | o   | p <sup>1)</sup> | q     |
|-------|----|-----------------|----------------|----------------|-----|-----------------|-------|
| GSS04 | 20 | 100             | 71             | 41             | 181 | 171             | 91    |
| GSS05 | 23 | 125             | 80             | 40             | 212 | 205             | 103.5 |
| GSS06 | 26 | 150             | 100            | 49             | 255 | 250             | 121.5 |
| GSS07 | 33 | 190             | 120            | 65.5           | 305 | 310             | 155.5 |

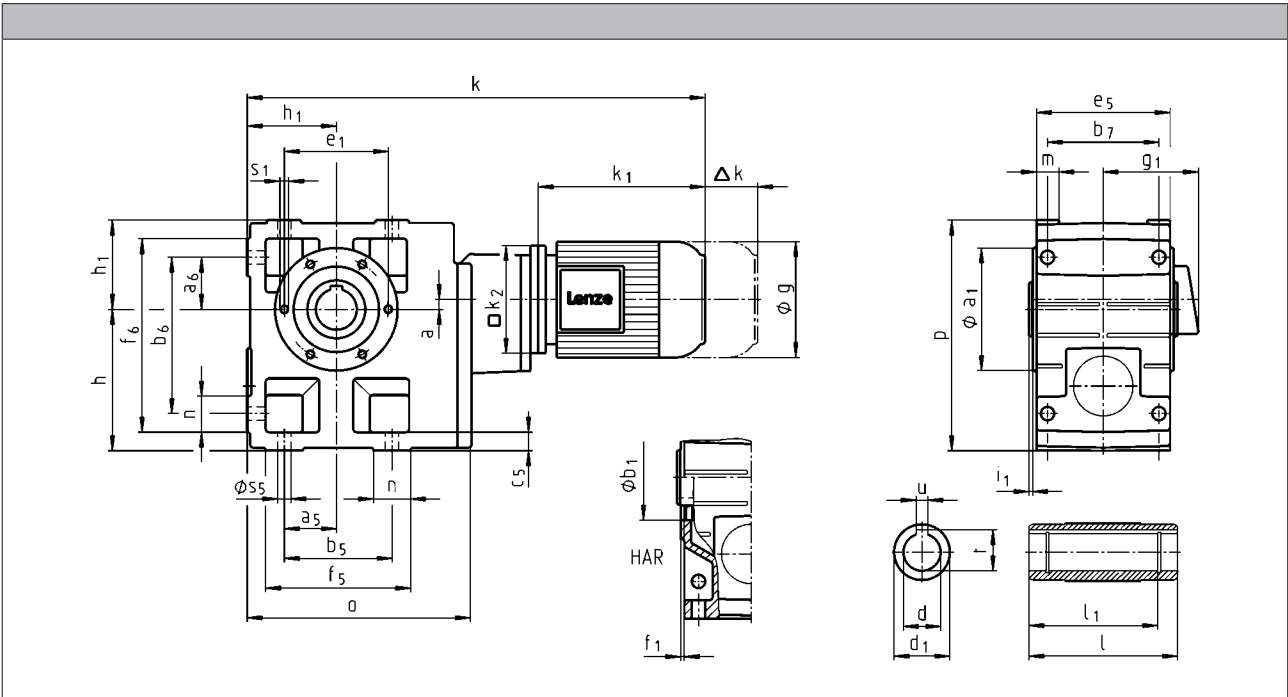
|       | d  | d <sub>2</sub> | l   | l <sub>1</sub> | l <sub>2</sub> | u  | t    | i <sub>2</sub> | o <sub>1</sub> <sup>1)</sup> | a <sub>2</sub> | b <sub>2</sub> | c <sub>2</sub> | e <sub>2</sub> | f <sub>2</sub> | s <sub>2</sub>   |
|-------|----|----------------|-----|----------------|----------------|----|------|----------------|------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|
|       | k6 |                |     |                |                |    |      |                |                              |                | j7             |                |                |                |                  |
| GSS04 | 25 | M10            | 50  | 6              | 40             | 8  | 28   | 50             | 195.5                        | 160            | 110            | 10             | 130            | 3.5            | 4 x 9            |
| GSS05 | 30 | M10            | 60  | 6              | 45             | 8  | 33   | 60             | 229.5                        | 200            | 130            | 12             | 165            | 4              | 4 x 11           |
| GSS06 | 40 | M16            | 80  | 7              | 63             | 12 | 43   | 80             | 276.5                        | 250            | 180            | 15             | 215            | 4              | 4 x 14           |
| GSS07 | 50 | M16            | 100 | 8              | 80             | 14 | 53.5 | 100            | 350.5                        | 250<br>300     | 180<br>230     | 15<br>17       | 215<br>265     | 4<br>4         | 4 x 14<br>4 x 14 |

<sup>1)</sup> k<sub>2</sub> !



Dimensions

GSS□□-3M H□R



# GSS helical-worm gearboxes

## Technical data



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    |        | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    | 137    |        | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    |        | 309    |
| k <sub>2</sub> |         | 145    | 180    |        |        |
| Δ k            | MHEMABR | 73     | 68     |        | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    | 181    |        | 170    |
|                |         | k      |        |        |        |
| GSS06          |         | 575    | 634    |        |        |
| GSS07          |         | 629    | 688    |        | 723    |

|       | a  | h   | h <sub>1</sub> | o   | p   |
|-------|----|-----|----------------|-----|-----|
| GSS06 | 10 | 150 | 100            | 252 | 250 |
| GSS07 | 12 | 190 | 120            | 299 | 310 |

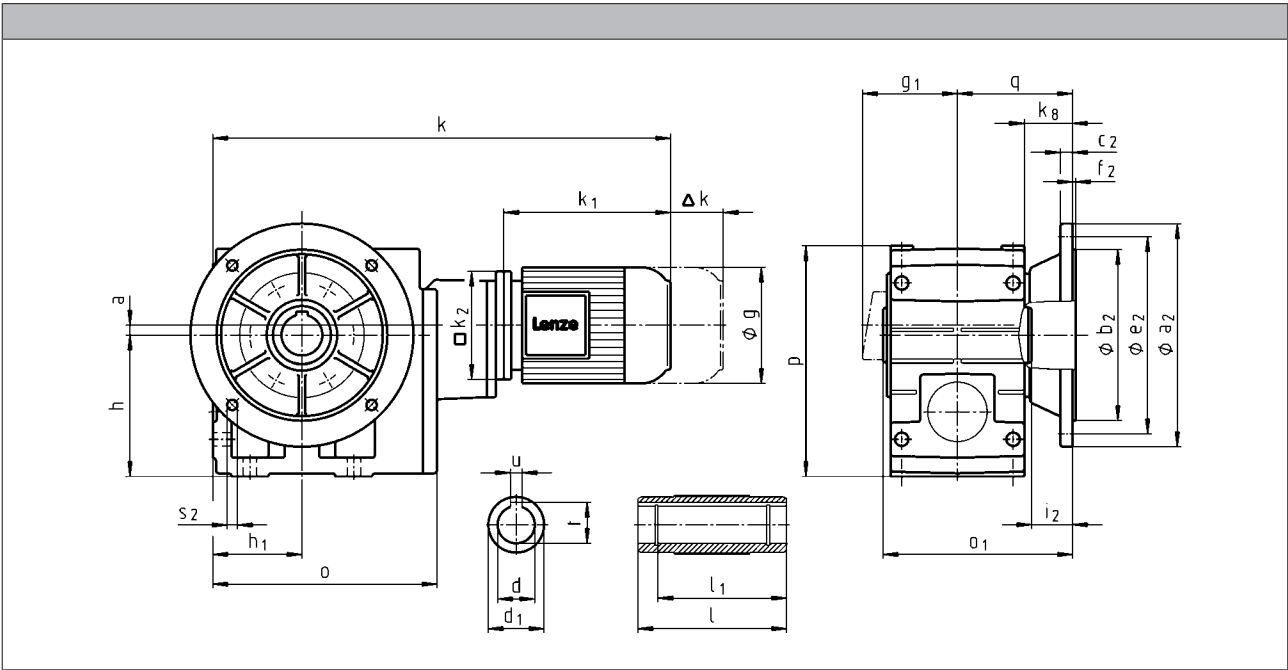
|       | d  | d <sub>1</sub> | l   | l <sub>1</sub> | u   | t    | i <sub>1</sub> | a <sub>1</sub> | b <sub>1</sub> | e <sub>1</sub> | f <sub>1</sub> | s <sub>1</sub> |
|-------|----|----------------|-----|----------------|-----|------|----------------|----------------|----------------|----------------|----------------|----------------|
|       | H7 |                |     |                | JS9 | +0,2 |                |                | H7             |                |                |                |
| GSS06 | 40 | 65             | 160 | 140            | 12  | 43.3 | 5              | 140            | 100            | 120            | 4              | M10x16         |
|       | 45 | 65             | 160 | 140            | 14  | 48.8 | 5              |                |                |                |                |                |
| GSS07 | 50 | 75             | 200 | 175            | 14  | 53.8 | 5              | 165            | 115            | 140            | 5              | M12x18         |
|       | 55 | 75             | 200 | 175            | 16  | 59.3 | 5              |                |                |                |                |                |

|       | a <sub>5</sub> | a <sub>6</sub> | b <sub>5</sub> | b <sub>6</sub> | b <sub>7</sub> | c <sub>5</sub> | e <sub>5</sub> | f <sub>5</sub> | f <sub>6</sub> | m  | n  | s <sub>5</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----------------|
| GSS06 | 60             | 60             | 120            | 170            | 120            | 20             | 145            | 156            | 206            | 23 | 36 | 14             |
| GSS07 | 70             | 70             | 140            | 210            | 150            | 25             | 180            | 185            | 255            | 28 | 45 | 18             |



Dimensions

GSS□□-3M HAK



# GSS helical-worm gearboxes

## Technical data



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    |        | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    | 137    |        | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    |        | 309    |
| k <sub>2</sub> |         | 145    | 180    |        |        |
| Δ k            | MHEMABR | 73     | 68     |        | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    | 181    |        | 170    |
|                |         | k      |        |        |        |
| GSS06          |         | 575    | 634    |        |        |
| GSS07          |         | 629    | 688    |        | 723    |

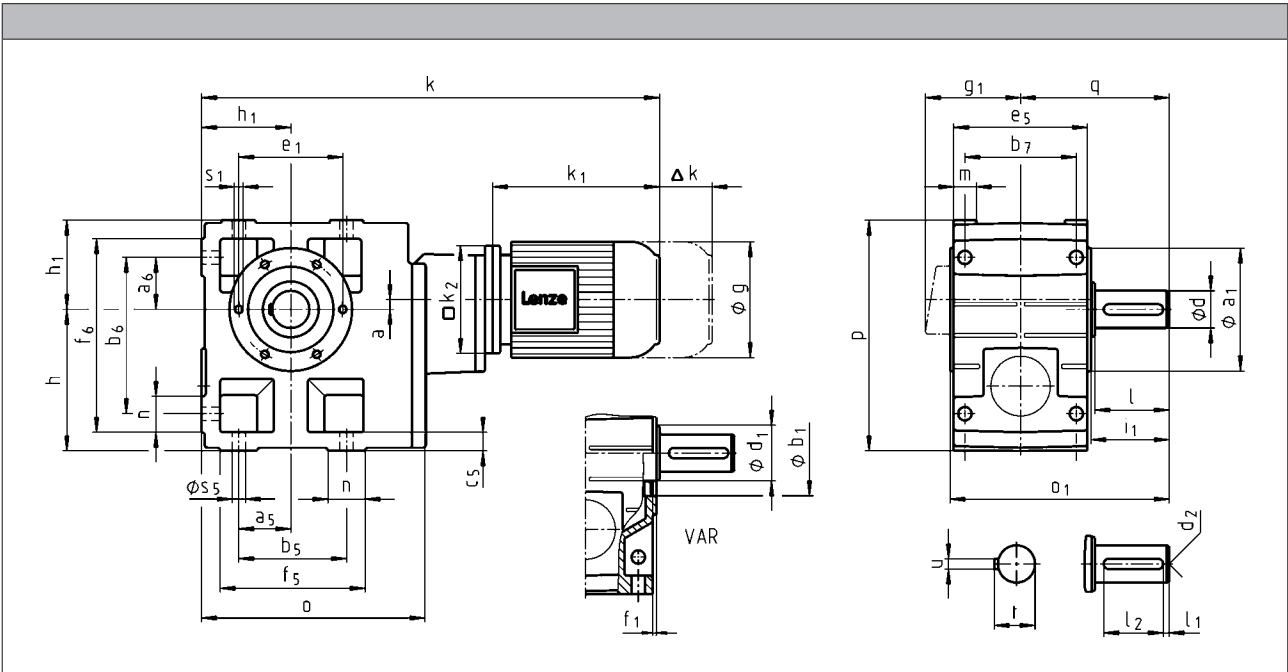
|       | a  | h   | h <sub>1</sub> | k <sub>8</sub> | o   | p   | q     |
|-------|----|-----|----------------|----------------|-----|-----|-------|
| GSS06 | 10 | 150 | 100            | 49             | 252 | 250 | 121.5 |
| GSS07 | 12 | 190 | 120            | 65.5           | 299 | 310 | 155.5 |

|       | d  | d <sub>1</sub> | l   | l <sub>1</sub> | u   | t    | i <sub>2</sub> | o <sub>1</sub> | a <sub>2</sub> | b <sub>2</sub> | c <sub>2</sub> | e <sub>2</sub> | f <sub>2</sub> | s <sub>2</sub> |
|-------|----|----------------|-----|----------------|-----|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|       | H7 |                |     |                | JS9 | +0,2 |                |                |                | j7             |                |                |                |                |
| GSS06 | 40 | 65             | 160 | 140            | 12  | 43.3 | 42             | 201.5          | 200            | 130            | 12             | 165            | 3.5            | 4 x 11         |
|       | 45 | 65             | 160 | 140            | 14  | 48.8 | 41             | 201.5          | 250            | 180            | 15             | 215            | 4              | 4 x 14         |
| GSS07 | 50 | 75             | 200 | 175            | 14  | 53.8 | 55             | 255.5          | 250            | 180            | 15             | 215            | 4              | 4 x 14         |
|       | 55 | 75             | 200 | 175            | 16  | 59.3 | 55             | 255.5          | 300            | 230            | 17             | 265            | 4              | 4 x 14         |



Dimensions

GSS□□-3M V□R



# GSS helical-worm gearboxes

## Technical data



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    |        | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    | 137    |        | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    |        | 309    |
| k <sub>2</sub> |         | 145    | 180    |        |        |
| Δ k            | MHEMABR | 73     | 68     |        | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    | 181    |        | 170    |
|                |         | k      |        |        |        |
| GSS06          |         | 575    | 634    |        |        |
| GSS07          |         | 629    | 688    |        | 723    |

|       | a  | h   | h <sub>1</sub> | o   | p   | q   |
|-------|----|-----|----------------|-----|-----|-----|
| GSS06 | 10 | 150 | 100            | 252 | 250 | 160 |
| GSS07 | 12 | 190 | 120            | 299 | 310 | 200 |

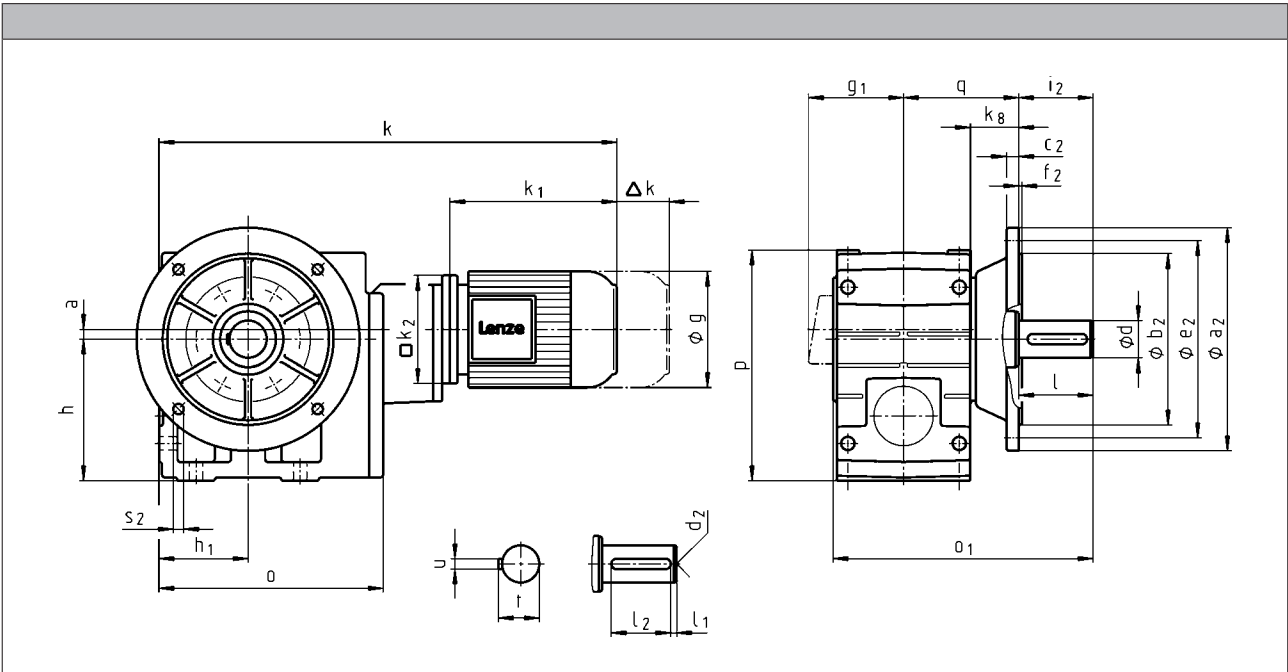
|       | d  | d <sub>1</sub> | d <sub>2</sub> | l   | l <sub>1</sub> | l <sub>2</sub> | u  | t    | i <sub>1</sub> | o <sub>1</sub> | a <sub>1</sub> | b <sub>1</sub> | e <sub>1</sub> | f <sub>1</sub> | s <sub>1</sub> |
|-------|----|----------------|----------------|-----|----------------|----------------|----|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|       | k6 |                |                |     |                |                |    |      |                |                |                | H7             |                |                |                |
| GSS06 | 40 | 65             | M16            | 80  | 7              | 63             | 12 | 43   | 85             | 235.5          | 140            | 100            | 120            | 4              | M10x16         |
| GSS07 | 50 | 75             | M16            | 100 | 8              | 80             | 14 | 53.5 | 105            | 295.5          | 165            | 115            | 140            | 5              | M12x18         |

|       | a <sub>5</sub> | a <sub>6</sub> | b <sub>5</sub> | b <sub>6</sub> | b <sub>7</sub> | c <sub>5</sub> | e <sub>5</sub> | f <sub>5</sub> | f <sub>6</sub> | m  | n  | s <sub>5</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----------------|
| GSS06 | 60             | 60             | 120            | 170            | 120            | 20             | 145            | 156            | 206            | 23 | 36 | 14             |
| GSS07 | 70             | 70             | 140            | 210            | 150            | 25             | 180            | 185            | 255            | 28 | 45 | 18             |



Dimensions

GSS□□-3M VAK



# GSS helical-worm gearboxes

## Technical data



|                |         | 080C32 | 090C12 | 090C32 | 100C12 |
|----------------|---------|--------|--------|--------|--------|
| g              |         | 156    | 176    |        | 194    |
| g <sub>1</sub> | MHEMAXX | 150    | 152    | 157    | 166    |
|                | MHEMABR | 132    | 137    |        | 147    |
| k <sub>1</sub> | MHEMAXX | 224.5  | 274    |        | 309    |
| k <sub>2</sub> |         | 145    | 180    |        |        |
| Δ k            | MHEMABR | 73     | 68     |        | 76     |
|                | MHFMAXX |        | 128    |        | 109    |
|                | MHFMABR | 183    | 181    |        | 170    |
|                |         | k      |        |        |        |
| GSS06          |         | 575    | 634    |        |        |
| GSS07          |         | 629    | 688    |        | 723    |

|       | a  | h   | h <sub>1</sub> | k <sub>8</sub> | o   | p   | q     |
|-------|----|-----|----------------|----------------|-----|-----|-------|
| GSS06 | 10 | 150 | 100            | 49             | 252 | 250 | 121.5 |
| GSS07 | 12 | 190 | 120            | 65.5           | 299 | 310 | 155.5 |

|       | d  | d <sub>2</sub> | l   | l <sub>1</sub> | l <sub>2</sub> | u  | t    | i <sub>2</sub> | o <sub>1</sub> | a <sub>2</sub> | b <sub>2</sub> | c <sub>2</sub> | e <sub>2</sub> | f <sub>2</sub> | s <sub>2</sub>   |
|-------|----|----------------|-----|----------------|----------------|----|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|
|       | k6 |                |     |                |                |    |      |                |                |                | j7             |                |                |                |                  |
| GSS06 | 40 | M16            | 80  | 7              | 63             | 12 | 43   | 80             | 276.5          | 250            | 180            | 15             | 215            | 4              | 4 x 14           |
| GSS07 | 50 | M16            | 100 | 8              | 80             | 14 | 53.5 | 100            | 350.5          | 250<br>300     | 180<br>230     | 15<br>17       | 215<br>265     | 4<br>4         | 4 x 14<br>4 x 14 |

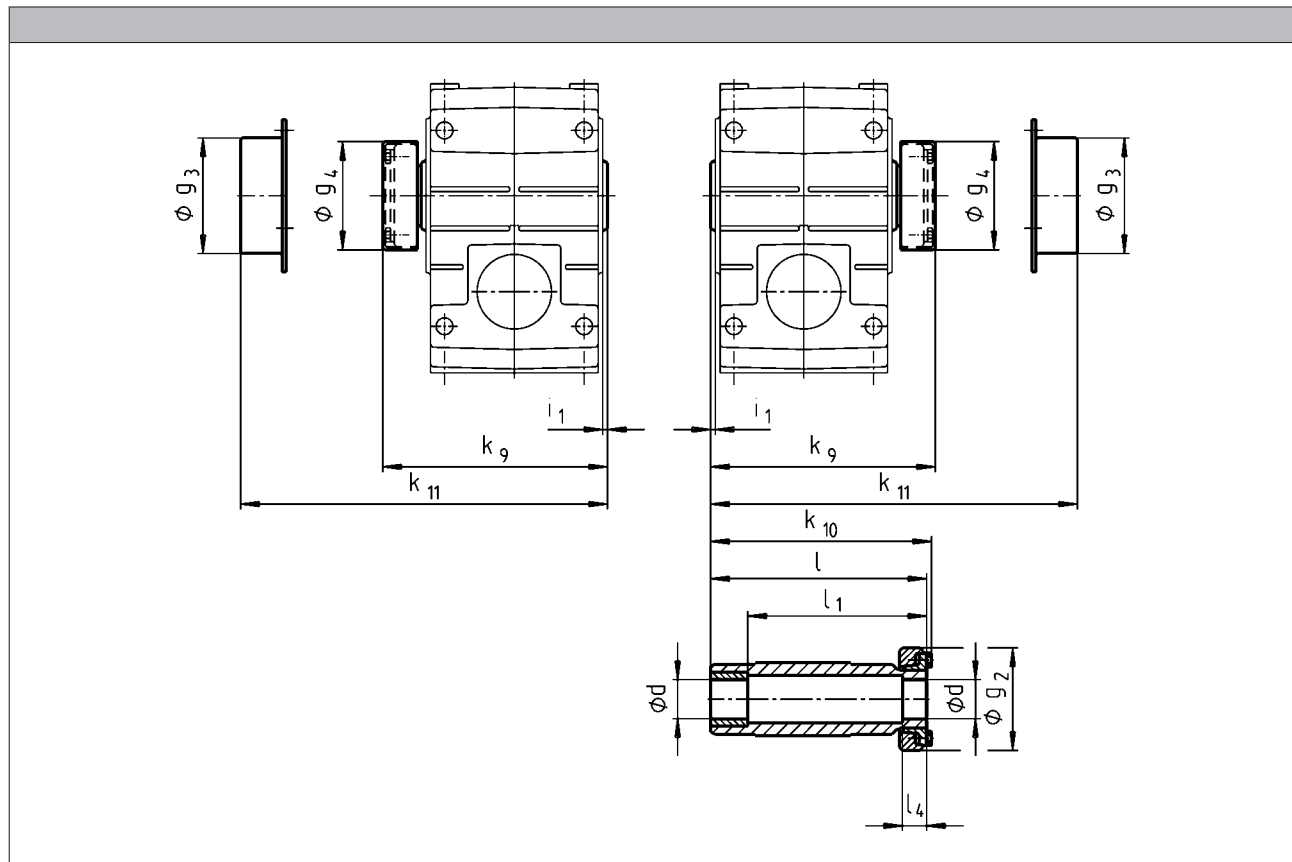
# GSS helical-worm gearboxes

Technical data





### Hollow shaft with shrink disc

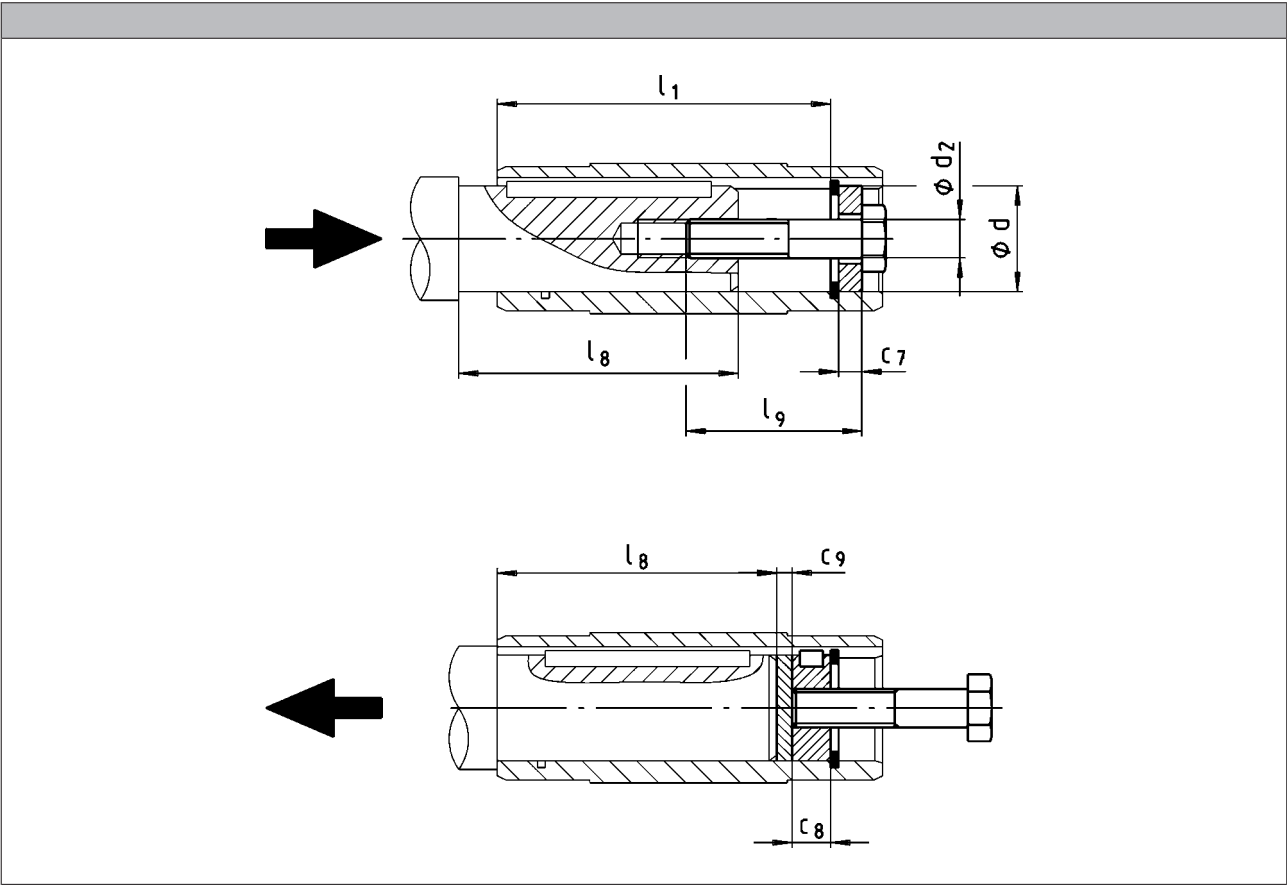


|       | d  | g <sub>2</sub> | g <sub>3</sub> | g <sub>4</sub> | i <sub>1</sub> | k <sub>9</sub> | k <sub>10</sub> | k <sub>11</sub> | l   | l <sub>1</sub> | l <sub>4</sub> |
|-------|----|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----|----------------|----------------|
|       | h6 |                |                |                |                |                |                 |                 |     |                |                |
| GSS04 | 25 | 72             | 79             | 76             | 2.5            | 150            | 148             | 154             | 142 | 122            | 26             |
| GSS05 | 30 | 80             | 90             | 84             | 4.0            | 176            | 174             | 179             | 168 | 148            | 28             |
| GSS06 | 35 | 90             | 100            | 94             | 5.0            | 202            | 200             | 204             | 194 | 164            | 30             |
| GSS07 | 40 | 110            | 124            | 116            |                | 241            | 238             | 244             | 232 | 192            | 26             |

- Output flange and hollow shaft with shrink disc (output version SAK) are not possible in the same location. For additional dimensions see output version H□□.
- Ensure that the strength of the machine shaft material is adequate in shrink disc designs.  
When using typical steels, e.g. C45, 42CrMo4, the torques listed in the selection tables can be used without restriction.  
Please consult us if you wish to use material that is considerably weaker. Medium surface roughness R<sub>z</sub> must not exceed 15 µm (turning is sufficient).



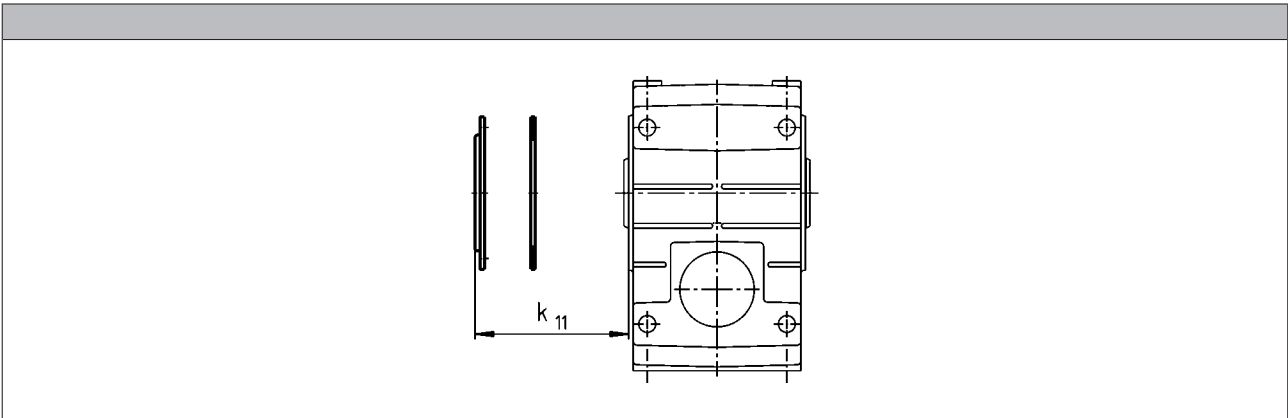
Mounting set for hollow shaft circlip:  
Proposed design for auxiliary tools



|       | d  | l <sub>1</sub> | d <sub>2</sub> | l <sub>9</sub> | c <sub>7</sub> | c <sub>8</sub> | c <sub>9</sub> | l <sub>g, max</sub> |
|-------|----|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|
|       | H7 |                |                |                |                |                |                |                     |
| GSS04 | 25 | 100            | M10            | 40             | 5              | 10             | 3              | 85                  |
|       | 30 |                |                |                | 6              |                |                |                     |
| GSS05 | 30 | 124            | M12            | 50             | 7              | 12             | 4              | 107                 |
|       | 35 |                |                |                | 8              |                |                |                     |
| GSS06 | 40 | 140            | M16            | 60             | 9              | 16             | 5              | 118                 |
|       | 45 |                |                |                | 10             |                |                |                     |
| GSS07 | 50 | 175            | M20            | 80             | 11             | 20             |                | 148                 |
|       | 55 |                |                |                |                |                |                |                     |



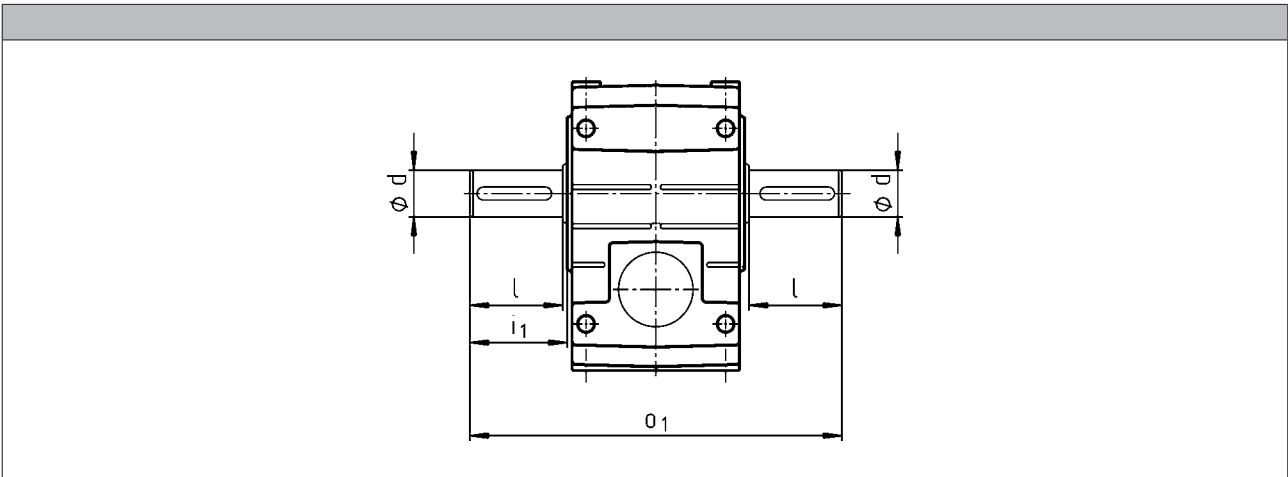
Hoseproof hollow shaft cover



► Cover including gasket

|       | $k_{11}$<br>[mm] |
|-------|------------------|
| GSS04 | 9                |
| GSS05 | 10               |
| GSS06 | 11               |
| GSS07 |                  |

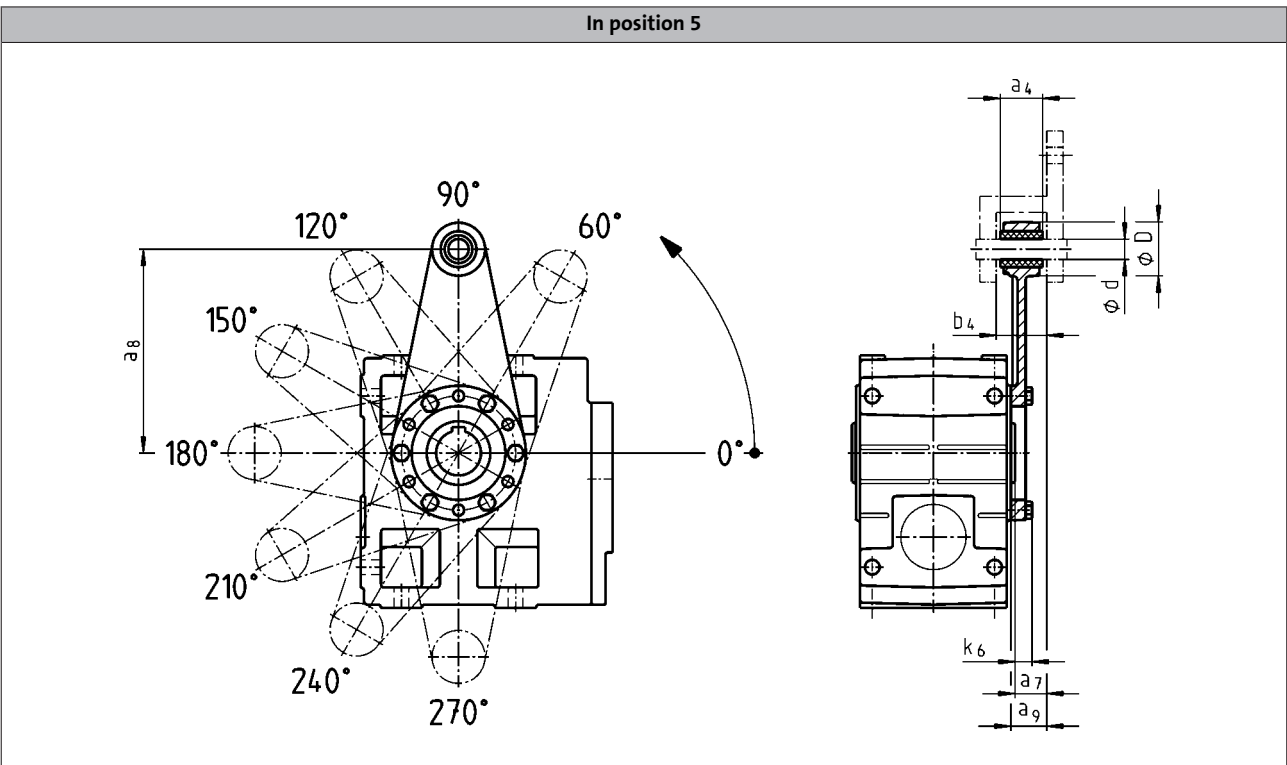
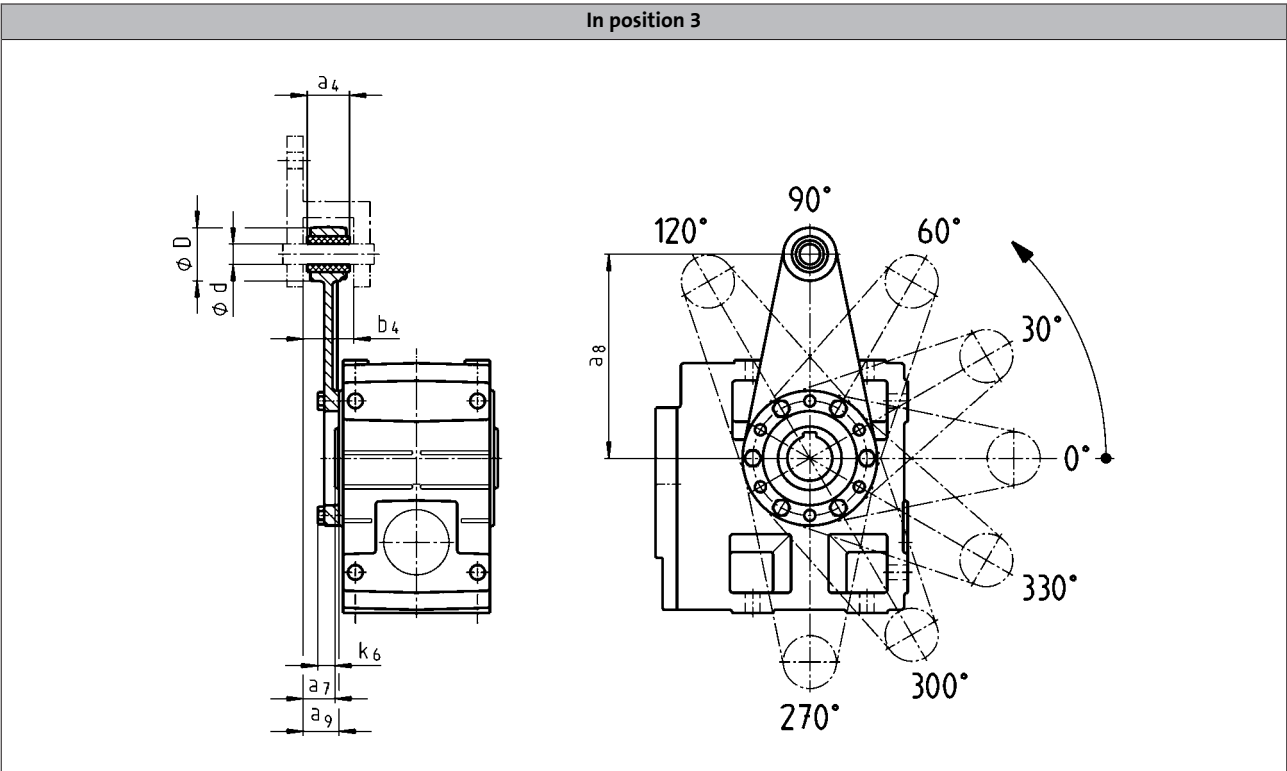
Gearboxes with 2nd output shaft end



|       | d  | l   | $i_1$ | $o_1$ |
|-------|----|-----|-------|-------|
|       | k6 |     |       |       |
| GSS04 | 25 | 50  | 52.5  | 215   |
| GSS05 | 30 | 60  | 64.0  | 260   |
| GSS06 | 40 | 80  | 85.0  | 320   |
| GSS07 | 50 | 100 | 105.0 | 400   |



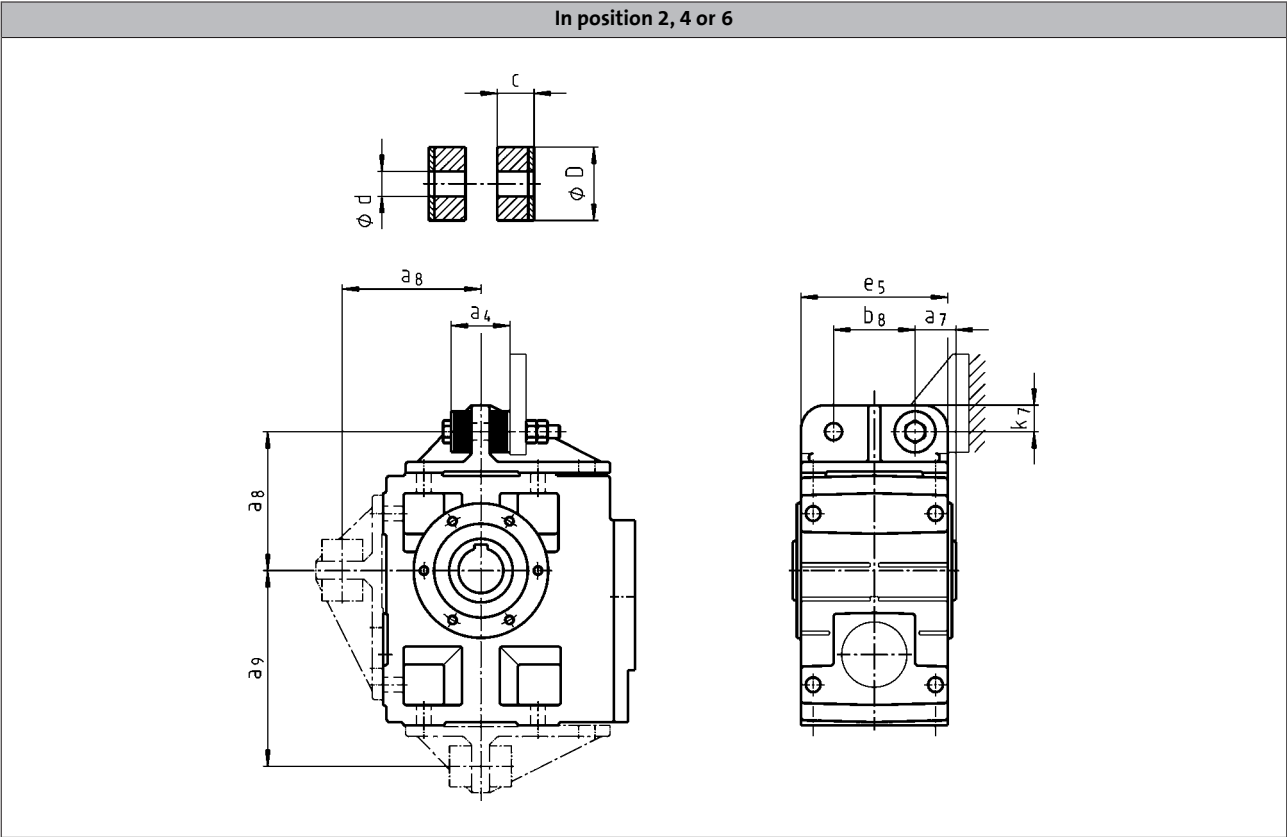
Torque plate on threaded pitch circle



|       | a <sub>4</sub> | a <sub>7</sub> | a <sub>8</sub> | a <sub>9</sub> | b <sub>4</sub> | d  | D  | k <sub>6</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|----|----|----------------|
| GSS04 | 30             | 24.0           | 130            | 26.5           | 34.5           | 12 | 35 | 16             |
| GSS05 | 34             | 23.5           | 160            | 27.5           | 38.5           | 16 | 45 | 15             |
| GSS06 | 40             | 28.0           | 200            | 33.0           | 44.5           | 20 | 50 | 18             |
| GSS07 | 46             | 32.5           | 250            | 37.5           | 50.5           | 25 | 65 | 21             |



Torque plate at housing foot



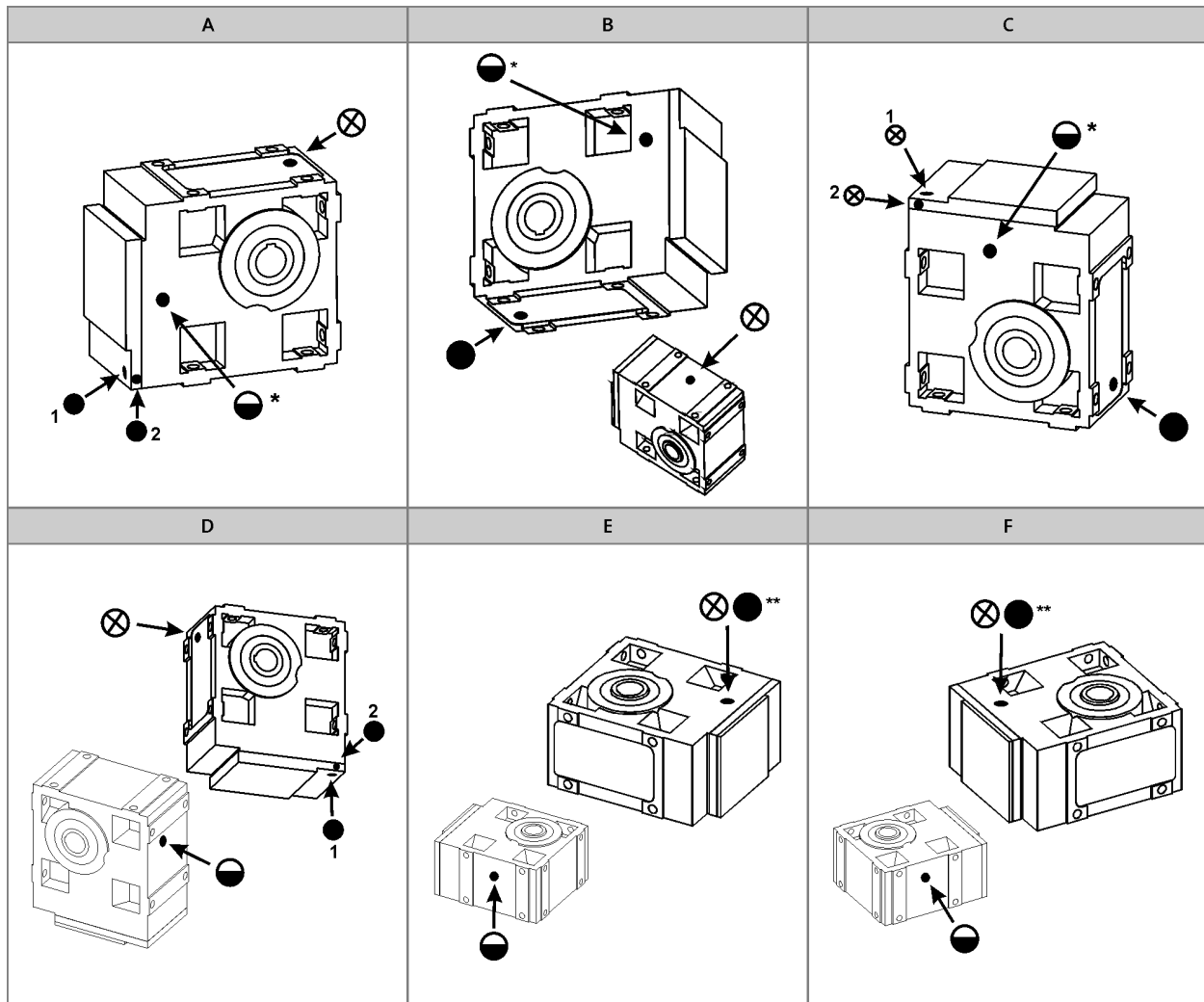
|       | a <sub>4</sub> | a <sub>7</sub> | a <sub>8</sub> | a <sub>9</sub> | b <sub>8</sub> | c    | d  | D  | e <sub>5</sub> | k <sub>7</sub> |
|-------|----------------|----------------|----------------|----------------|----------------|------|----|----|----------------|----------------|
| GSS04 | 41             | 27.5           | 106            | 135.0          | 60             | 14.5 | 11 | 30 | 100            | 20             |
| GSS05 | 45             | 35.0           | 115            | 160.0          | 70             | 15.0 | 13 | 40 | 127            | 25             |
| GSS06 | 72             | 40.0           | 145            | 195.0          | 80             | 27.0 | 17 | 50 | 145            | 28             |
| GSS07 | 78             | 50.0           | 170            | 240.0          | 100            | 28.0 | 21 | 60 | 180            | 35             |



### Ventilations

Position of ventilation, sealing elements and oil level check

GSS05...07-2



A ... F Mounting position

⊗ Ventilation / Oil filler plug

● Oil drain plug

○ Oil control plug

\* On both sides

\*\* On opposite side

Item 1 standard

Item 2 only with:

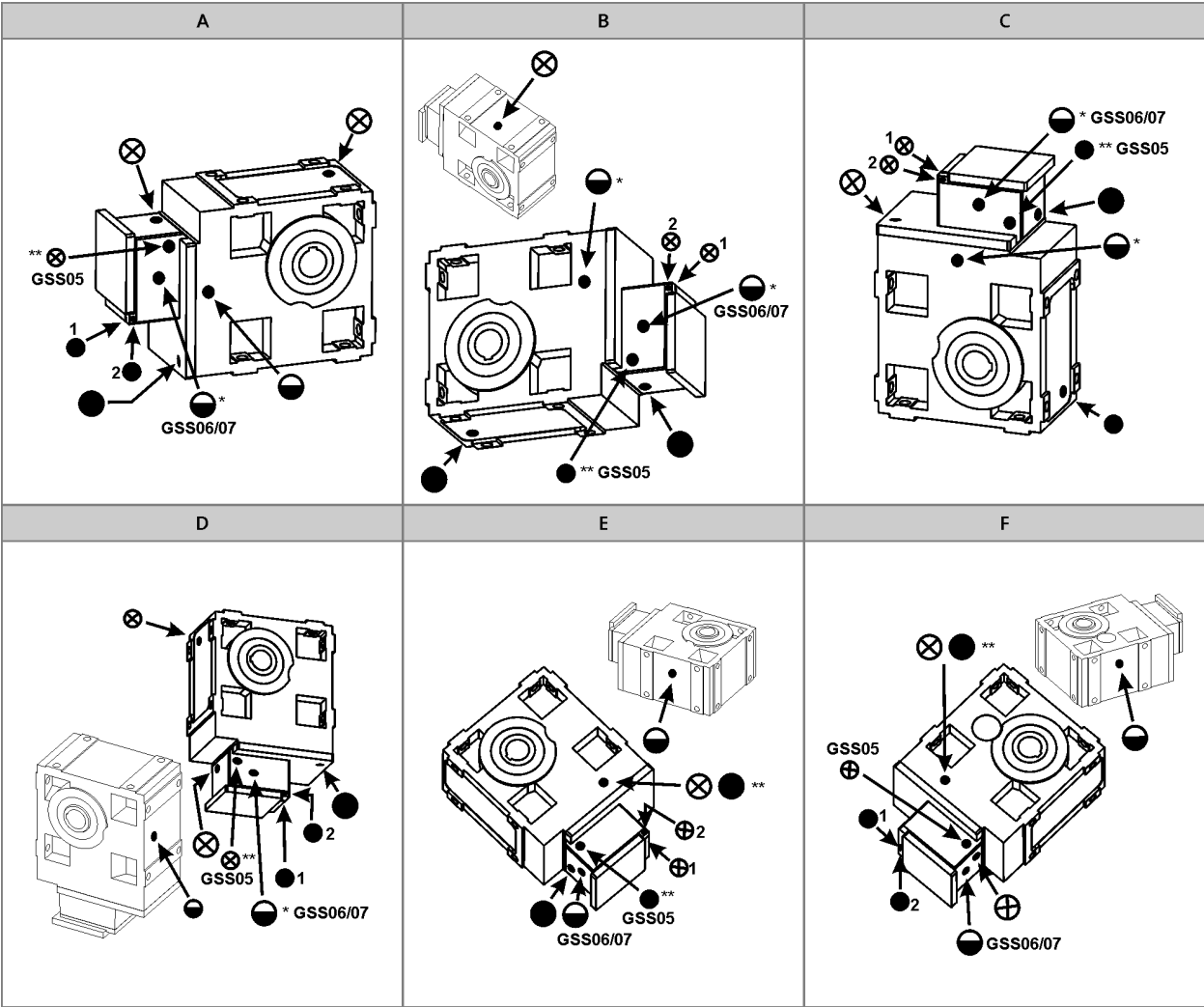
- GSS05-2M □□□ 090C□□
- GSS05-2M □□□ 100C□□
- GSS06-2M □□□ 112C□□
- GSS07-2M □□□ 160C□□



Ventilations

Position of ventilation, sealing elements and oil level check

GSS05...07-3



A ... F Mounting position

⊗ Ventilation / Oil filler plug

● Oil drain plug

○ Oil control plug

\* On both sides

\*\* On opposite side

Item 1 standard

Item 2 only on:

- GSS07-3M □□□ 090C□□
- GSS07-3M □□□ 100C□□

# GSS helical-worm gearboxes

Accessories



# GSS helical-worm gearboxes

## Accessories

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# GSS helical-worm gearboxes

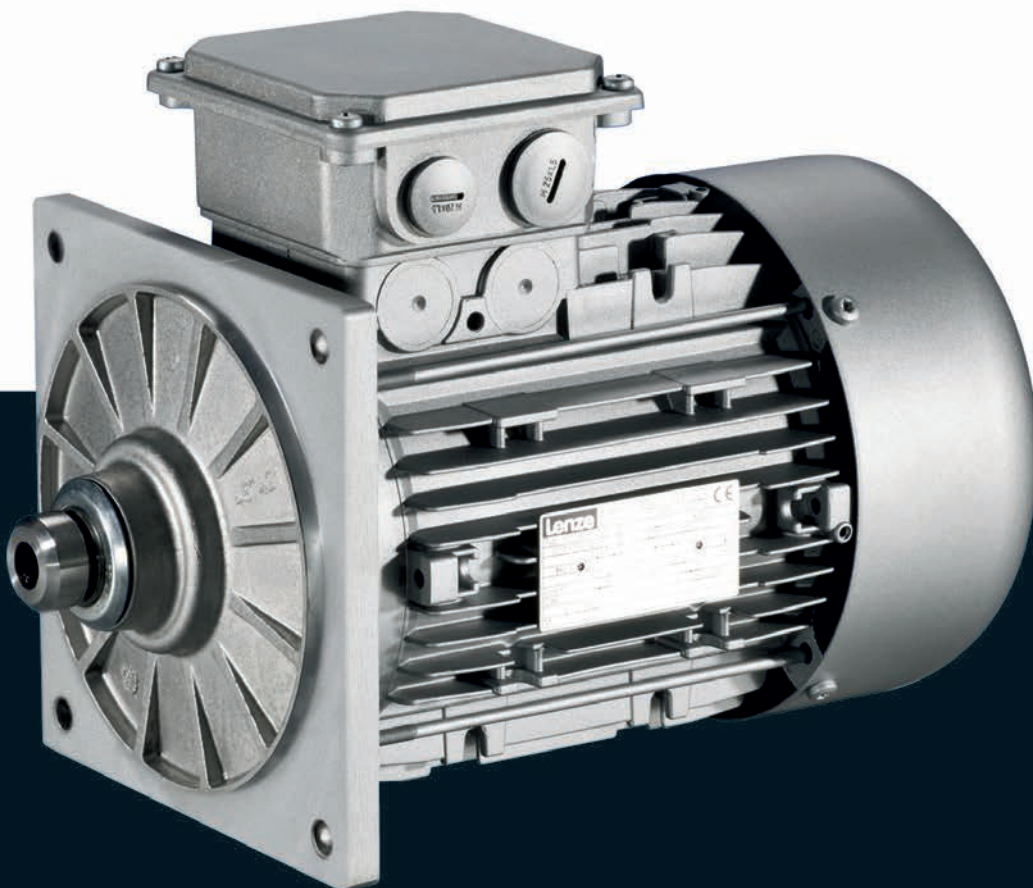
Accessories



Motors

# MH three-phase AC motors

0.75 to 45 kW





# MH three-phase AC motors

## Contents



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# MH three-phase AC motors

## General information



### List of abbreviations

|                |                      |                          |
|----------------|----------------------|--------------------------|
| $\eta_{100\%}$ | [%]                  | Efficiency               |
| $\eta_{75\%}$  | [%]                  | Efficiency               |
| $\eta_{50\%}$  | [%]                  | Efficiency               |
| $\cos \phi$    |                      | Power factor             |
| $I_N$          | [A]                  | Rated current            |
| $I_{\max}$     | [A]                  | Max. current consumption |
| $J$            | [kgcm <sup>2</sup> ] | Moment of inertia        |
| $m$            | [kg]                 | Mass                     |
| $M_a$          | [Nm]                 | Starting torque          |
| $M_b$          | [Nm]                 | Stalling torque          |
| $M_{\max}$     | [Nm]                 | Max. torque              |
| $M_N$          | [Nm]                 | Rated torque             |
| $n_N$          | [r/min]              | Rated speed              |
| $P_N$          | [kW]                 | Rated power              |
| $P_{\max}$     | [kW]                 | Max. power input         |

|                 |     |                    |
|-----------------|-----|--------------------|
| $U_{\max}$      | [V] | Max. mains voltage |
| $U_{\min}$      | [V] | Min. mains voltage |
| $U_{N, \Delta}$ | [V] | Rated voltage      |
| $U_{N, Y}$      | [V] | Rated voltage      |

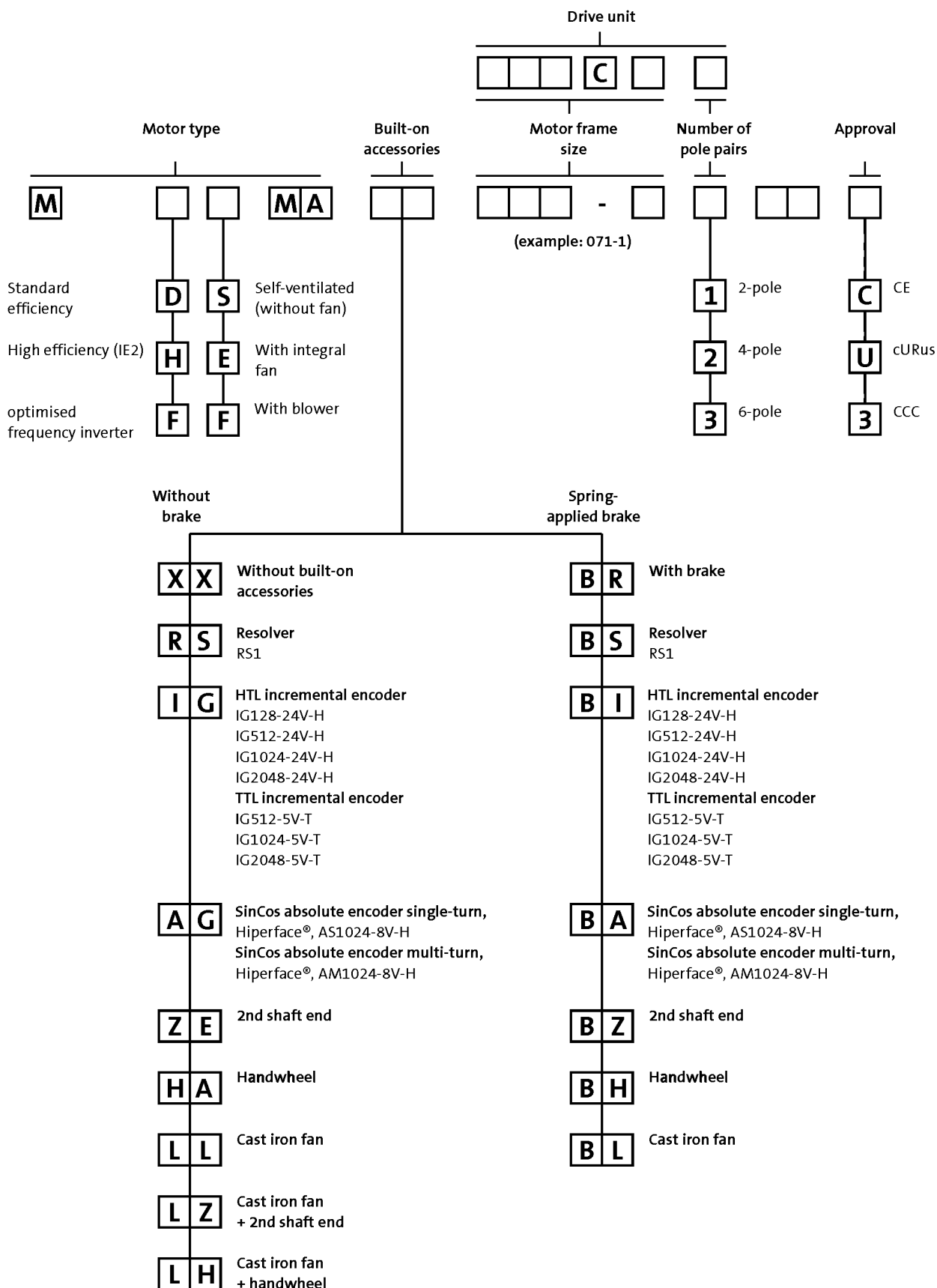
|          |                                                                                 |
|----------|---------------------------------------------------------------------------------|
| CE       | Communauté Européenne                                                           |
| CSA      | Canadian Standards Association                                                  |
| DIN      | Deutsches Institut für Normung e.V.                                             |
| EMC      | Electromagnetic compatibility                                                   |
| EN       | European standard                                                               |
| IEC      | International Electrotechnical Commission                                       |
| IM       | International Mounting Code                                                     |
| IP       | International Protection Code                                                   |
| NEMA     | National Electrical Manufacturers Association                                   |
| UL       | Underwriters Laboratory Listed Product                                          |
| UR       | Underwriters Laboratory Recognized Product                                      |
| VDE      | Verband deutscher Elektrotechniker (Association of German Electrical Engineers) |
| CCC      | China Compulsory Certificate                                                    |
| GOST     | Certificate for Russian Federation                                              |
| cURus    | Combined certification marks of UL for the USA and Canada                       |
| UkrSEPRO | Certificate for Ukraine                                                         |

# MH three-phase AC motors

## General information



## Product key



# MH three-phase AC motors

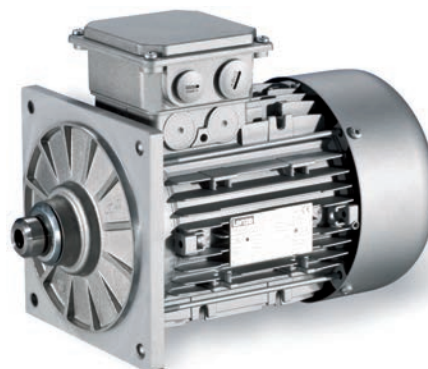
## General information



## Product information

Special motors have been designed for direct attachment to Lenze gearboxes.

These motors are attached to the gearbox without the use of a clutch. Torque transmission between the toothing and the motor shaft is friction-locked via a tapered connection here. This motor design means that the geared motors only require a small installation space.



L-force MH three-phase AC motors are available in a power range from 0.75 to 45 kW and comply with efficiency class IE2 (high efficiency) as per IEC 60034-30.

Since almost all IE2 motors are designed with the same dimensions as the standard efficiency motors, it is easy to switch between the two.

The energy efficiency of the L-force MH three-phase AC motors has been approved by Underwriters Laboratories (UL) as an independent third-party.

### Basic versions

- The thermal sensors integrated as standard allow for permanent temperature monitoring and are coordinated to the motor winding's temperature class F (155°C).
- The motors of the basic version are adapted to ambient conditions by enclosure IP55.
- In tough operating conditions, the surface and corrosion protection system is provided to reliably protect the motor from corrosive media.

### Options

- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach  $10 \times 10^6$  switching cycles.
- A resolver and various incremental and absolute value encoders can be fitted for speed and position detection.
- For fast commissioning, the motors are also available with connectors for the power connection, brake, blower and feedback.
- Instead of an integral fan, the motor can optionally be equipped with a blower. No torque reduction is then necessary, even at speeds below 20 Hz.
- For drive tasks in decentralised applications, the motor can be ordered with the motec inverter connected to the terminal box.
- The motors are available with cURus, GOST-R, CCC and UkrSepr approval.
- Smooth start/braking is possible by increasing the motor's centrifugal mass with a cast iron fan.
- The motor can be equipped with a handwheel for manual setup or emergency operations.
- To protect the fan from falling objects, the fan cover can be equipped with a protection cover.
- A 2nd shaft end is available for further modifications.

# MH three-phase AC motors

## General information



### Functions and features

| Size                             | 080                                                                                                                                      | 090 | 100 |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| <b>Motor</b>                     |                                                                                                                                          |     |     |
| <b>Spring-applied brake</b>      |                                                                                                                                          |     |     |
| Design                           | Standard or LongLife design<br>Reduced, standard or increased braking torque<br>With rectifier<br>With manual release lever<br>Low noise |     |     |
| <b>Feedback</b>                  |                                                                                                                                          |     |     |
| Design                           | Resolver<br>Incremental encoder<br>Absolute value encoder (multi-turn)                                                                   |     |     |
| <b>Thermal sensor</b>            |                                                                                                                                          |     |     |
| Thermal contact                  | TKO                                                                                                                                      |     |     |
| Thermal detector                 | KTY83-110<br>KTY84-130                                                                                                                   |     |     |
| PTC thermistor                   | PTC                                                                                                                                      |     |     |
| <b>Motor connection</b>          |                                                                                                                                          |     |     |
| Power connection                 | Terminal box<br>ICN connector<br>HAN10E connector<br>HAN modular connector                                                               |     |     |
| Brake connection                 | Terminal box<br>ICN connector<br>HAN modular connector<br>HAN10E connector                                                               |     |     |
| Blower connection                | Terminal box<br>ICN connector                                                                                                            |     |     |
| Feedback connection              | Terminal box<br>ICN connector                                                                                                            |     |     |
| Temperature sensor connection    | Terminal box<br>TKO or PTC at connector in the power connection<br>KTY at connector in the feedback connection                           |     |     |
| <b>Shaft bearings</b>            |                                                                                                                                          |     |     |
| Position of the locating bearing | Standard motors (B3, B5, B14): side B<br>Motors for gearbox direct mounting: side A                                                      |     |     |
| Bearing type                     | Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates                                         |     |     |
| <b>Colour</b>                    |                                                                                                                                          |     |     |
|                                  | Not coated<br>Primed<br>Paint in various corrosion-protection designs in accordance with RAL colours                                     |     |     |
| <b>Further options</b>           |                                                                                                                                          |     |     |
|                                  | Protection cover<br>Increased centrifugal mass<br>Handwheel<br>2nd shaft end                                                             |     |     |

# MH three-phase AC motors

## General information



### Functions and features

| Size                             | 112                                                                                                                          | 132                                                    | 160                                   |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------|
| <b>Motor</b>                     |                                                                                                                              |                                                        |                                       |
| <b>Spring-applied brake</b>      |                                                                                                                              |                                                        |                                       |
| Design                           | Standard design<br>Reduced, standard or increased braking torque<br>With rectifier<br>With manual release lever<br>Low noise |                                                        |                                       |
| <b>Feedback</b>                  |                                                                                                                              |                                                        |                                       |
| Design                           | Resolver<br>Incremental encoder<br>Absolute value encoder (multi-turn)                                                       |                                                        |                                       |
| <b>Thermal sensor</b>            |                                                                                                                              |                                                        |                                       |
| Thermal contact                  | TKO                                                                                                                          |                                                        |                                       |
| Thermal detector                 | KTY83-110<br>KTY84-130                                                                                                       |                                                        |                                       |
| PTC thermistor                   | PTC                                                                                                                          |                                                        |                                       |
| <b>Motor connection</b>          |                                                                                                                              |                                                        |                                       |
| Power connection                 | Terminal box<br>ICN connector<br>HAN10E connector<br>HAN modular connector                                                   | Terminal box<br>ICN connector<br>HAN modular connector | Terminal box<br>HAN modular connector |
| Brake connection                 | Terminal box<br>ICN connector<br>HAN modular connector<br>HAN10E connector                                                   | Terminal box<br>ICN connector<br>HAN modular connector | Terminal box<br>HAN modular connector |
| Blower connection                | Terminal box<br>ICN connector                                                                                                |                                                        |                                       |
| Feedback connection              | Terminal box<br>ICN connector                                                                                                |                                                        |                                       |
| Temperature sensor connection    | Terminal box<br>TKO or PTC at connector in the power connection<br>KTY at connector in the feedback connection               |                                                        |                                       |
| <b>Shaft bearings</b>            |                                                                                                                              |                                                        |                                       |
| Position of the locating bearing | Standard motors (B3, B5, B14): side B<br>Motors for gearbox direct mounting: side A                                          |                                                        |                                       |
| Bearing type                     | Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates                             |                                                        |                                       |
| <b>Colour</b>                    |                                                                                                                              |                                                        |                                       |
|                                  | Not coated<br>Primed<br>Paint in various corrosion-protection designs in accordance with RAL colours                         |                                                        |                                       |
| <b>Further options</b>           |                                                                                                                              |                                                        |                                       |
|                                  | Protection cover<br>Increased centrifugal mass<br>Handwheel<br>2nd shaft end                                                 | Protection cover                                       |                                       |

# MH three-phase AC motors

## General information



### Functions and features

| Size                             | 180                                                                                                                          | 200 | 225       |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----|-----------|
| <b>Motor</b>                     |                                                                                                                              |     |           |
| <b>Spring-applied brake</b>      |                                                                                                                              |     |           |
| Design                           | Standard design<br>Reduced, standard or increased braking torque<br>With rectifier<br>With manual release lever<br>Low noise |     |           |
| <b>Feedback</b>                  |                                                                                                                              |     |           |
| Design                           | Resolver<br>Incremental encoder<br>Absolute value encoder (multi-turn)                                                       |     |           |
| <b>Thermal sensor</b>            |                                                                                                                              |     |           |
| Thermal contact                  | TKO                                                                                                                          |     |           |
| Thermal detector                 | KTY83-110<br>KTY84-130                                                                                                       |     |           |
| PTC thermistor                   | PTC                                                                                                                          |     |           |
| <b>Motor connection</b>          |                                                                                                                              |     |           |
| Power connection                 | Terminal box                                                                                                                 |     |           |
| Brake connection                 | Terminal box                                                                                                                 |     |           |
| Blower connection                | Terminal box<br>ICN connector                                                                                                |     |           |
| Feedback connection              | Terminal box<br>ICN connector                                                                                                |     |           |
| Temperature sensor connection    | Terminal box                                                                                                                 |     |           |
| <b>Shaft bearings</b>            |                                                                                                                              |     |           |
| Position of the locating bearing | Standard motors (B3, B5, B14): side B<br>Motors for gearbox direct mounting: side A                                          |     | Drive end |
| Bearing type                     | Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates                             |     |           |
| <b>Colour</b>                    |                                                                                                                              |     |           |
|                                  | Not coated<br>Primed<br>Paint in various corrosion-protection designs in accordance with RAL colours                         |     |           |
| <b>Further options</b>           |                                                                                                                              |     |           |

# MH three-phase AC motors

## General information



## Functions and features

### Surface and corrosion protection

For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

Various surface coatings ensure that the motors operate reliably even at high air humidity, in outdoor installation or in the presence of atmospheric impurities. Any colour from the RAL Classic collection can be chosen for the top coat. The three-phase AC motors are also available unpainted (no surface and corrosion protection).

| Surface and corrosion protection system | Applications                                                                                                                                                                      | Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OKS-G (primed)                          | <ul style="list-style-type: none"> <li>Dependent on subsequent top coat applied</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>2K PUR priming coat (grey)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| OKS-S (small)                           | <ul style="list-style-type: none"> <li>Standard applications</li> <li>Internal installation in heated buildings</li> <li>Air humidity up to 90%</li> </ul>                        | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C1 (in line with EN 12944-2)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                          |
| OKS-M (medium)                          | <ul style="list-style-type: none"> <li>Internal installation in non-heated buildings</li> <li>Covered, protected external installation</li> <li>Air humidity up to 95%</li> </ul> | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C2 (in line with EN 12944-2)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                          |
| OKS-L (high)                            | <ul style="list-style-type: none"> <li>External installation</li> <li>Air humidity above 95%</li> <li>Chemical industry plants</li> <li>Food industry</li> </ul>                  | <ul style="list-style-type: none"> <li>Surface coating as per corrosivity category C3 (in line with EN 12944-2)</li> <li>Blower cover and B end shield additionally primed</li> <li>Screws zinc-coated</li> <li>Cable glands with gaskets</li> <li>Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request)</li> </ul> <p>Optional measures:</p> <ul style="list-style-type: none"> <li>Motor recesses sealed off (on request)</li> </ul> |

### Structure of surface coating

| Surface and corrosion protection system | Corrosivity category | Surface coating                        | Colour                                      |
|-----------------------------------------|----------------------|----------------------------------------|---------------------------------------------|
|                                         | DIN EN ISO 12944-2   | Structure                              |                                             |
| Without OKS (uncoated)                  |                      |                                        |                                             |
| OKS-G (primed)                          |                      | 2K PUR priming coat                    |                                             |
| OKS-S (small)                           | C1                   | 2K-PUR top coat                        | Standard: RAL 7012<br>Optional: RAL Classic |
| OKS-M (medium)                          | C2                   | 2K PUR priming coat<br>2K-PUR top coat |                                             |
| OKS-L (high)                            | C3                   |                                        |                                             |

# MH three-phase AC motors

## General information



### Motor – inverter assignment

Rated frequency 50/60 Hz

- Decentralised inverter 8400 motec (E84DVB)
- Inverter Drives 8400 (E84AV)

| Rated power    | Product key   |                   |  |
|----------------|---------------|-------------------|--|
|                | Motor         | Inverter          |  |
| P <sub>N</sub> |               |                   |  |
| [kW]           |               |                   |  |
| 0.75           | MH□□□□□080-32 | E84DVB□7514S□□□2□ |  |
| 1.10           | MH□□□□□090-12 | E84DVB□1124S□□□2□ |  |
| 1.50           | MH□□□□□090-32 | E84DVB□1524S□□□2□ |  |
| 2.20           | MH□□□□□100-12 | E84DVB□2224S□□□2□ |  |
| 3.00           | MH□□□□□100-32 | E84DVB□3024S□□□2□ |  |
| 4.00           | MH□□□□□112-22 | E84DVB□4024S□□□2□ |  |
| 5.50           | MH□□□□□132-12 | E84DVB□5524S□□□2□ |  |
| 7.50           | MH□□□□□132-22 | E84DVB□7524S□□□2□ |  |
| 11.0           | MH□□□□□160-22 |                   |  |
| 15.0           | MH□□□□□160-32 |                   |  |
| 18.5           | MH□□□□□180-12 |                   |  |
| 22.0           | MH□□□□□180-32 |                   |  |
| 30.0           | MH□□□□□180-42 |                   |  |
| 37.0           | MH□□□□□225-12 |                   |  |
| 45.0           | MH□□□□□225-22 |                   |  |

# MH three-phase AC motors

## General information



### Motor – inverter assignment

Rated frequency 87 Hz

- Decentralised inverter 8400 motec (E84DVB)
- Inverter Drives 8400 (E84AV)

| Rated power    | Product key   |                   |  |
|----------------|---------------|-------------------|--|
|                | Motor         | Inverter          |  |
| P <sub>N</sub> |               |                   |  |
| [kW]           |               |                   |  |
| 1.35           | MH□□□□□080-32 | E84DVB□1524S□□□2□ |  |
| 2.00           | MH□□□□□090-12 | E84DVB□2224S□□□2□ |  |
| 2.70           | MH□□□□□090-32 | E84DVB□3024S□□□2□ |  |
| 3.90           | MH□□□□□100-12 | E84DVB□4024S□□□2□ |  |
| 5.40           | MH□□□□□100-32 | E84DVB□5524S□□□2□ |  |
| 7.10           | MH□□□□□112-22 | E84DVB□7524S□□□2□ |  |
| 9.70           | MH□□□□□132-12 |                   |  |
| 13.2           | MH□□□□□132-22 |                   |  |
| 19.4           | MH□□□□□160-22 |                   |  |
| 26.4           | MH□□□□□160-32 |                   |  |
| 32.5           | MH□□□□□180-12 |                   |  |

# MH three-phase AC motors

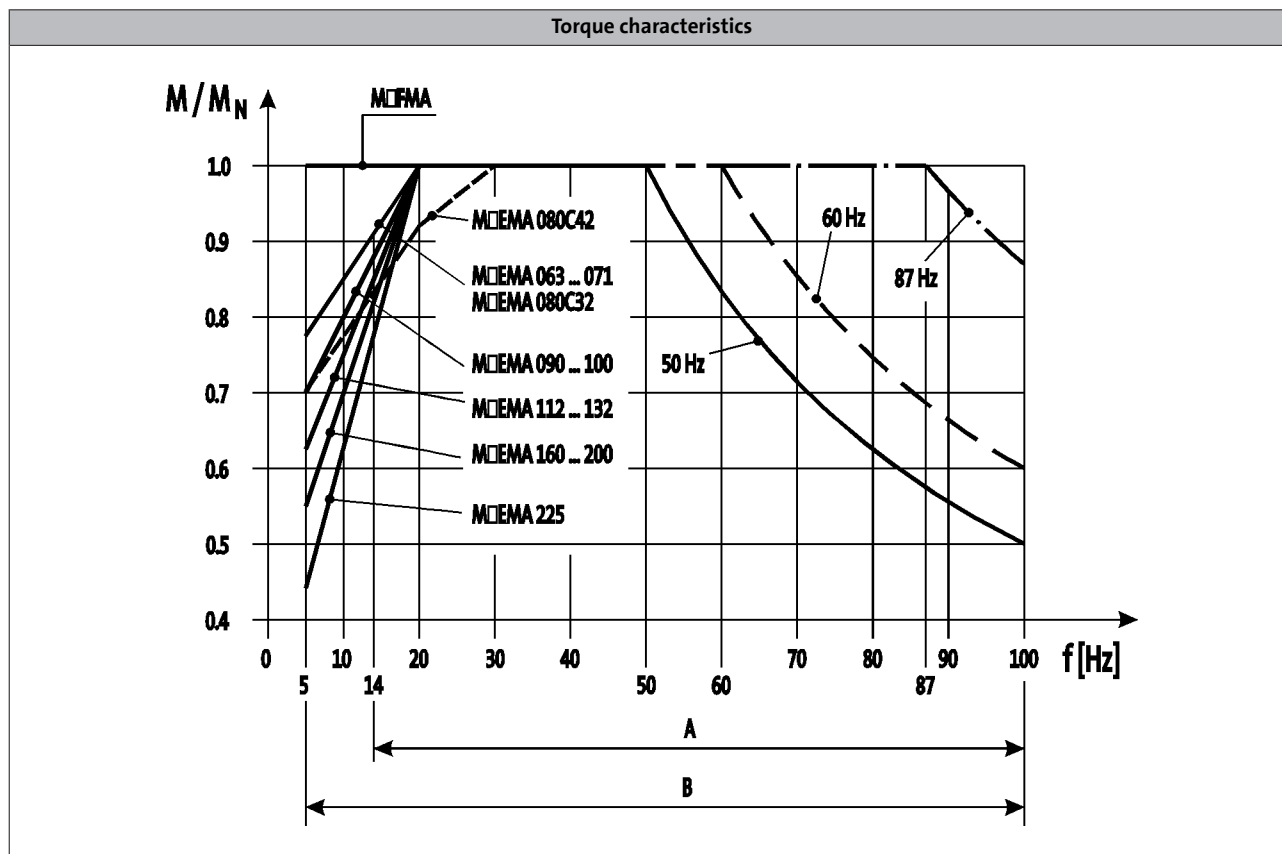
## General information



## Dimensioning

### Torque derating at low motor frequencies

Motor size-dependent torque reduction, taking into account the thermal response during operation on the inverter.



A = Operation with integral fan and brake

B = Operation with integral fan and brake control "Holding current reduction"

- The motor specifications stated in this catalogue for inverter operation apply to operation with a Lenze inverter. If you are uncertain, get in touch with the manufacturer of the inverter to ask whether the device is capable of driving the motor with the stated specifications (e.g. setting range, base frequency).

**You can use the Drive Solution Designer for precise drive dimensioning.**

The Drive Solution Designer helps you to carry out a fast and high-quality drive dimensioning.

The software includes well-founded and proven knowledge on drive applications and electro-mechanical drive components.

Please contact your Lenze sales office.

# MH three-phase AC motors

## General information

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# MH three-phase AC motors

## Technical data



### Standards and operating conditions

|                                                           |                      |         |                                                                     |
|-----------------------------------------------------------|----------------------|---------|---------------------------------------------------------------------|
| Enclosure                                                 |                      |         | IP55                                                                |
| EN 60529                                                  |                      |         |                                                                     |
| Energy efficiency class                                   |                      |         | IE2                                                                 |
| IEC 60034-30                                              |                      |         |                                                                     |
| IEC 60034-2-1                                             |                      |         | Methodology for measuring efficiency                                |
| Approval                                                  |                      |         | cURus/UL Energy-verified <sup>1)</sup><br>CCC<br>GOST-R<br>UkrSepro |
| Class                                                     |                      |         |                                                                     |
| Temperature class                                         |                      |         | B                                                                   |
| IEC/EN 60034-1; utilisation                               |                      |         |                                                                     |
| IEC/EN 60034-1; insulation system (enamel-insulated wire) |                      |         | F                                                                   |
| Min. ambient operating temperature                        |                      |         | -20                                                                 |
|                                                           | T <sub>opr,min</sub> | [°C]    |                                                                     |
| Max. ambient operating temperature                        |                      |         | 40                                                                  |
|                                                           | T <sub>opr,max</sub> | [°C]    |                                                                     |
| With power reduction                                      | T <sub>opr,max</sub> | [°C]    | 60                                                                  |
| Site altitude                                             |                      |         | 4 000                                                               |
| Amsl                                                      | H <sub>max</sub>     | [m]     |                                                                     |
| Max. speed                                                |                      |         | 4 500                                                               |
|                                                           | n <sub>max</sub>     | [r/min] |                                                                     |

<sup>1)</sup> Motor frame size 225, in preparation.

- In the European Union, the ErP Directive stipulates minimum efficiency levels for three-phase AC motors. Geared three-phase AC motors that do not conform with this Directive do not meet CE requirements and must not be marketed in the European Economic Area. For further information about the ErP Directive and the Lenze products to which it relates, please refer to the brochure entitled "International efficiency directives for three-phase AC motors".

# MH three-phase AC motors

## Technical data



### Rated data for 50 Hz

#### 4-pole motors

|               | P <sub>N</sub> | n <sub>N</sub> | U <sub>N, Δ</sub> <sup>2)</sup> | I <sub>N, Δ</sub> | U <sub>N, Y</sub> | I <sub>N, Y</sub> | I <sub>a</sub> /I <sub>N</sub> |
|---------------|----------------|----------------|---------------------------------|-------------------|-------------------|-------------------|--------------------------------|
|               |                |                | ± 10 %                          |                   | ± 10 %            |                   |                                |
|               | [kW]           | [r/min]        | [V]                             | [A]               | [V]               | [A]               |                                |
| MH□□□□□080-32 | 0.75           | 1410           | 230                             | 3.10              | 400               | 1.80              | 5.00                           |
| MH□□□□□090-12 | 1.10           | 1430           | 230                             | 4.60              | 400               | 2.70              | 5.40                           |
| MH□□□□□090-32 | 1.50           | 1435           | 230                             | 5.80              | 400               | 3.30              | 6.30                           |
| MH□□□□□100-12 | 2.20           | 1445           | 230                             | 8.60              | 400               | 5.00              | 6.00                           |
| MH□□□□□100-32 | 3.00           | 1445           | 230                             | 12.1              | 400               | 7.00              | 6.50                           |
| MH□□□□□112-22 | 4.00           | 1455           | 230                             | 14.5              | 400               | 8.40              | 6.00                           |
| MH□□□□□132-12 | 5.50           | 1470           | 230<br>400 <sup>3)</sup>        | 20.6<br>11.9      | 400               | 11.9              | 6.10                           |
| MH□□□□□132-22 | 7.50           | 1460           | 230<br>400 <sup>3)</sup>        | 27.0<br>15.6      | 400               | 15.6              | 8.50                           |
| MH□□□□□160-22 | 11.0           | 1470           | 230<br>400 <sup>3)</sup>        | 37.7<br>21.8      | 400               | 21.8              | 8.00                           |
| MH□□□□□160-32 | 15.0           | 1470           | 230<br>400 <sup>3)</sup>        | 50.3<br>29.1      | 400               | 29.1              | 8.20                           |
| MH□□□□□180-12 | 18.5           | 1475           | 230<br>400 <sup>3)</sup>        | 58.8<br>34.0      | 400               | 34.0              | 8.40                           |
| MH□□□□□180-32 | 22.0           | 1470           | 230<br>400 <sup>3)</sup>        | 68.9<br>39.8      | 400               | 39.8              | 7.80                           |
| MH□□□□□180-42 | 30.0           | 1465           | 230<br>400 <sup>3)</sup>        | 93.8<br>53.9      | 400               | 53.9              | 7.00                           |
| MH□□□□□225-12 | 37.0           | 1483           | 230<br>400 <sup>3)</sup>        | 113<br>65.0       | 400               | 65.0              | 7.50                           |
| MH□□□□□225-22 | 45.0           | 1480           | 230<br>400 <sup>3)</sup>        | 137<br>79.0       | 400               | 79.0              | 7.60                           |

|               | M <sub>N</sub> | M <sub>a</sub> | M <sub>b</sub> | cos φ | η <sub>50 %</sub> | η <sub>75 %</sub> | η <sub>100 %</sub> | J <sup>1)</sup>      | m <sup>1)</sup> |
|---------------|----------------|----------------|----------------|-------|-------------------|-------------------|--------------------|----------------------|-----------------|
|               | [Nm]           | [Nm]           | [Nm]           |       | [%]               | [%]               | [%]                | [kgcm <sup>2</sup> ] | [kg]            |
| MH□□□□□080-32 | 5.08           | 12.0           | 12.1           | 0.84  | 74.9              | 79.6              | 79.6               | 28.0                 | 11.0            |
| MH□□□□□090-12 | 7.35           | 20.3           | 24.2           | 0.76  | 77.4              | 81.6              | 82.0               | 32.0                 | 16.0            |
| MH□□□□□090-32 | 10.0           | 33.0           | 34.0           | 0.76  | 82.2              | 83.4              | 82.8               | 36.0                 | 18.0            |
| MH□□□□□100-12 | 14.5           | 48.0           | 55.0           | 0.80  | 85.4              | 86.7              | 86.3               | 61.0                 | 24.0            |
| MH□□□□□100-32 | 19.8           | 67.0           | 76.0           | 0.73  | 83.8              | 85.6              | 85.5               | 66.0                 | 26.5            |
| MH□□□□□112-22 | 26.3           | 81.0           | 100            | 0.80  | 86.3              | 88.2              | 88.3               | 135                  | 38.0            |
| MH□□□□□132-12 | 35.7           | 90.0           | 108            | 0.77  | 88.2              | 89.3              | 89.2               | 290                  | 59.0            |
| MH□□□□□132-22 | 49.1           | 110            | 175            | 0.79  | 87.6              | 88.9              | 88.7               | 336                  | 66.0            |
| MH□□□□□160-22 | 71.5           | 164            | 243            | 0.82  | 89.4              | 90.0              | 89.8               | 570                  | 109             |
| MH□□□□□160-32 | 97.4           | 224            | 292            | 0.82  | 90.2              | 90.8              | 90.6               | 760                  | 124             |
| MH□□□□□180-12 | 120            | 359            | 371            | 0.86  | 90.8              | 91.4              | 91.2               | 1390                 | 175             |
| MH□□□□□180-32 | 143            | 400            | 372            | 0.87  | 91.4              | 92.0              | 91.6               | 1440                 | 180             |
| MH□□□□□180-42 | 196            | 469            | 528            | 0.87  | 91.9              | 92.5              | 92.3               | 1850                 | 200             |
| MH□□□□□225-12 | 238            | 620            | 620            | 0.87  | 94.0              | 94.6              | 94.3               | 4610                 | 395             |
| MH□□□□□225-22 | 290            | 698            | 669            | 0.88  | 93.7              | 94.5              | 94.3               | 5300                 | 415             |

<sup>1)</sup> Without accessories

<sup>2)</sup> Operation at 87 Hz is possible with 4-pole motors whose rated data at 50 Hz displays the voltage values Δ 230 V.  
With motor frame sizes 132-12 to 225-22, the required voltage must also be specified in your order.

<sup>3)</sup> Star/delta start-up possible at 400 V.

# MH three-phase AC motors

## Technical data



### Rated data for 60 Hz

#### 4-pole motors

- The motors are designed for an operation at 265/460 V but are also able to be operated at 230 V, 60 Hz. The same technical data apply, the starting torque is a bit lower.
- The motors have a service factor of 1.15 at 60 Hz. The service factor indicates the permissible overload during operation within the mains voltage fluctuations.

|               | P <sub>N</sub> | n <sub>N</sub> | U <sub>N, Δ</sub> <sup>2)</sup> | I <sub>N, Δ</sub> | U <sub>N, Y</sub> | I <sub>N, Y</sub> | I <sub>a</sub> /I <sub>N</sub> |
|---------------|----------------|----------------|---------------------------------|-------------------|-------------------|-------------------|--------------------------------|
|               |                |                | ± 10 %                          |                   | ± 10 %            |                   |                                |
|               | [kW]           | [r/min]        | [V]                             | [A]               | [V]               | [A]               |                                |
| MH□□□□□080-32 | 0.75           | 1720           | 265                             | 2.80              | 460               | 1.60              | 5.80                           |
| MH□□□□□090-12 | 1.10           | 1740           | 265                             | 4.00              | 460               | 2.30              | 6.50                           |
| MH□□□□□090-32 | 1.50           | 1745           | 265                             | 5.10              | 460               | 3.00              | 7.20                           |
| MH□□□□□100-12 | 2.20           | 1750           | 265                             | 7.70              | 460               | 4.40              | 6.90                           |
| MH□□□□□100-32 | 3.00           | 1755           | 265                             | 10.6              | 460               | 6.10              | 7.70                           |
| MH□□□□□112-22 | 4.00           | 1760           | 265                             | 12.8              | 460               | 7.40              | 7.00                           |
| MH□□□□□132-12 | 5.50           | 1775           | 265<br>460 <sup>3)</sup>        | 18.0<br>10.4      | 460               | 10.4              | 7.10                           |
| MH□□□□□132-22 | 7.50           | 1765           | 265<br>460 <sup>3)</sup>        | 24.2<br>14.0      | 460               | 14.0              | 9.70                           |
| MH□□□□□160-22 | 11.0           | 1775           | 265<br>460 <sup>3)</sup>        | 32.5<br>18.7      | 460               | 18.7              | 9.40                           |
| MH□□□□□160-32 | 15.0           | 1775           | 265<br>460 <sup>3)</sup>        | 44.1<br>24.5      | 460               | 24.5              | 9.80                           |
| MH□□□□□180-12 | 18.5           | 1775           | 265<br>460 <sup>3)</sup>        | 51.1<br>29.4      | 460               | 29.4              | 9.70                           |
| MH□□□□□180-32 | 22.0           | 1775           | 265<br>460 <sup>3)</sup>        | 59.7<br>34.4      | 460               | 34.4              | 9.00                           |
| MH□□□□□180-42 | 30.0           | 1770           | 265<br>460 <sup>3)</sup>        | 80.7<br>46.5      | 460               | 46.5              | 8.10                           |
| MH□□□□□225-12 | 37.0           | 1787           | 265<br>460 <sup>3)</sup>        | 92.5<br>53.4      | 460               | 53.4              | 8.70                           |
| MH□□□□□225-22 | 45.0           | 1784           | 265<br>460 <sup>3)</sup>        | 111<br>64.2       | 460               | 64.2              | 8.80                           |

|               | M <sub>N</sub> | M <sub>a</sub> | M <sub>b</sub> | cos φ | η <sub>50 %</sub> | η <sub>75 %</sub> | η <sub>100 %</sub> | J <sup>1)</sup>      | m <sup>1)</sup> |
|---------------|----------------|----------------|----------------|-------|-------------------|-------------------|--------------------|----------------------|-----------------|
|               | [Nm]           | [Nm]           | [Nm]           |       | [%]               | [%]               | [%]                | [kgcm <sup>2</sup> ] | [kg]            |
| MH□□□□□080-32 | 4.16           | 9.37           | 9.89           | 0.82  | 77.9              | 81.5              | 82.5               | 28.0                 | 11.0            |
| MH□□□□□090-12 | 6.04           | 17.0           | 20.0           | 0.71  | 79.3              | 83.0              | 84.0               | 32.0                 | 16.0            |
| MH□□□□□090-32 | 8.21           | 27.0           | 28.0           | 0.75  | 79.3              | 83.0              | 84.0               | 36.0                 | 18.0            |
| MH□□□□□100-12 | 12.0           | 40.0           | 47.0           | 0.78  | 82.6              | 86.5              | 87.5               | 61.0                 | 24.0            |
| MH□□□□□100-32 | 16.3           | 55.0           | 64.0           | 0.71  | 84.2              | 86.6              | 87.5               | 66.0                 | 26.5            |
| MH□□□□□112-22 | 21.7           | 69.0           | 84.0           | 0.79  | 84.2              | 86.6              | 87.5               | 135                  | 38.0            |
| MH□□□□□132-12 | 29.6           | 74.0           | 92.0           | 0.77  | 86.1              | 88.6              | 89.5               | 290                  | 59.0            |
| MH□□□□□132-22 | 40.6           | 92.0           | 147            | 0.79  | 86.1              | 88.6              | 89.5               | 336                  | 66.0            |
| MH□□□□□160-22 | 59.2           | 148            | 231            | 0.81  | 89.3              | 90.9              | 91.0               | 570                  | 109             |
| MH□□□□□160-32 | 80.7           | 210            | 274            | 0.81  | 89.3              | 90.9              | 91.0               | 760                  | 124             |
| MH□□□□□180-12 | 99.5           | 338            | 348            | 0.86  | 90.6              | 92.3              | 92.4               | 1390                 | 175             |
| MH□□□□□180-32 | 118            | 379            | 355            | 0.87  | 90.6              | 92.3              | 92.4               | 1440                 | 180             |
| MH□□□□□180-42 | 162            | 440            | 505            | 0.87  | 92.0              | 92.9              | 93.0               | 1850                 | 200             |
| MH□□□□□225-12 | 198            | 590            | 590            | 0.87  | 92.0              | 92.9              | 93.0               | 4610                 | 395             |
| MH□□□□□225-22 | 241            | 660            | 635            | 0.88  | 92.6              | 93.5              | 93.6               | 5300                 | 415             |

<sup>1)</sup> Without accessories

<sup>2)</sup> Operation at 87 Hz is possible with 4-pole motors whose rated data at 60 Hz displays the voltage values Δ 265 V.  
With motor frame sizes 132-12 to 225-22, the required voltage must also be specified in your order.

<sup>3)</sup> Star/delta start-up possible at 460 V.

# MH three-phase AC motors

## Technical data



### Rated data for 87 Hz

#### 4-pole motors

|               | P <sub>N</sub> | n <sub>N</sub> | M <sub>N</sub> | M <sub>max</sub> | U <sub>N, Δ</sub> | I <sub>N, Δ</sub> | cos φ | η <sub>50 %</sub> | η <sub>75 %</sub> | η <sub>100 %</sub> | J <sup>1)</sup>      | m <sup>1)</sup> |
|---------------|----------------|----------------|----------------|------------------|-------------------|-------------------|-------|-------------------|-------------------|--------------------|----------------------|-----------------|
|               |                |                |                |                  | ± 10 %            |                   |       |                   |                   |                    |                      |                 |
|               | [kW]           | [r/min]        | [Nm]           | [Nm]             | [V]               | [A]               |       | [%]               | [%]               | [%]                | [kgcm <sup>2</sup> ] | [kg]            |
| MH□□□□□080-32 | 1.35           | 2520           | 5.12           | 20.0             | 400               | 3.10              | 0.84  | 77.3              | 81.6              | 83.5               | 28.0                 | 11.0            |
| MH□□□□□090-12 | 2.00           | 2540           | 7.52           | 30.0             | 400               | 4.60              | 0.78  | 80.4              | 84.9              | 86.5               | 32.0                 | 16.0            |
| MH□□□□□090-32 | 2.70           | 2545           | 10.1           | 40.0             | 400               | 5.80              | 0.76  | 82.3              | 85.5              | 86.0               | 36.0                 | 18.0            |
| MH□□□□□100-12 | 3.90           | 2555           | 14.6           | 60.0             | 400               | 8.60              | 0.83  | 85.7              | 89.6              | 90.0               | 61.0                 | 24.0            |
| MH□□□□□100-32 | 5.40           | 2555           | 20.2           | 80.0             | 400               | 12.1              | 0.76  | 84.7              | 87.9              | 88.5               | 66.0                 | 26.5            |
| MH□□□□□112-22 | 7.10           | 2565           | 26.4           | 106              | 400               | 14.5              | 0.83  | 87.4              | 90.2              | 90.9               | 135                  | 38.0            |
| MH□□□□□132-12 | 9.70           | 2580           | 35.9           | 144              | 400               | 20.6              | 0.82  | 88.2              | 91.4              | 91.8               | 290                  | 59.0            |
| MH□□□□□132-22 | 13.2           | 2570           | 49.1           | 196              | 400               | 27.0              | 0.82  | 88.2              | 90.1              | 90.7               | 336                  | 66.0            |
| MH□□□□□160-22 | 19.4           | 2580           | 71.8           | 287              | 400               | 37.7              | 0.81  | 90.6              | 91.0              | 91.6               | 570                  | 109             |
| MH□□□□□160-32 | 26.4           | 2580           | 97.7           | 391              | 400               | 50.3              | 0.81  | 91.4              | 91.0              | 91.6               | 760                  | 124             |
| MH□□□□□180-12 | 32.5           | 2585           | 120            | 480              | 400               | 58.8              | 0.86  | 92.0              | 92.2              | 92.8               | 1390                 | 175             |
| MH□□□□□180-32 | 38.7           | 2580           | 143            | 573              | 400               | 68.9              | 0.87  | 92.1              | 92.9              | 93.4               | 1440                 | 180             |
| MH□□□□□180-42 | 52.7           | 2575           | 196            | 782              | 400               | 92.6              | 0.87  | 92.6              | 92.7              | 93.2               | 1850                 | 200             |
| MH□□□□□225-12 | 64.0           | 2593           | 236            | 920              | 400               | 113               | 0.87  | 93.0              | 94.4              | 94.8               | 4610                 | 395             |
| MH□□□□□225-22 | 78.0           | 2590           | 288            | 1150             | 400               | 137               | 0.85  | 93.5              | 94.3              | 94.7               | 5300                 | 415             |

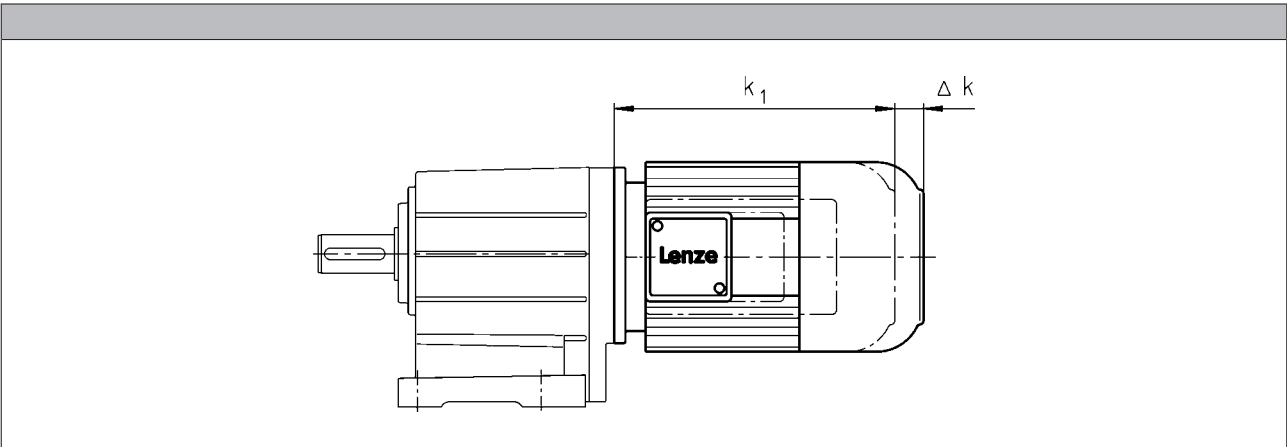
<sup>1)</sup> Without accessories

# MH three-phase AC motors

Technical data



## Dimensions, self-ventilated (4-pole)



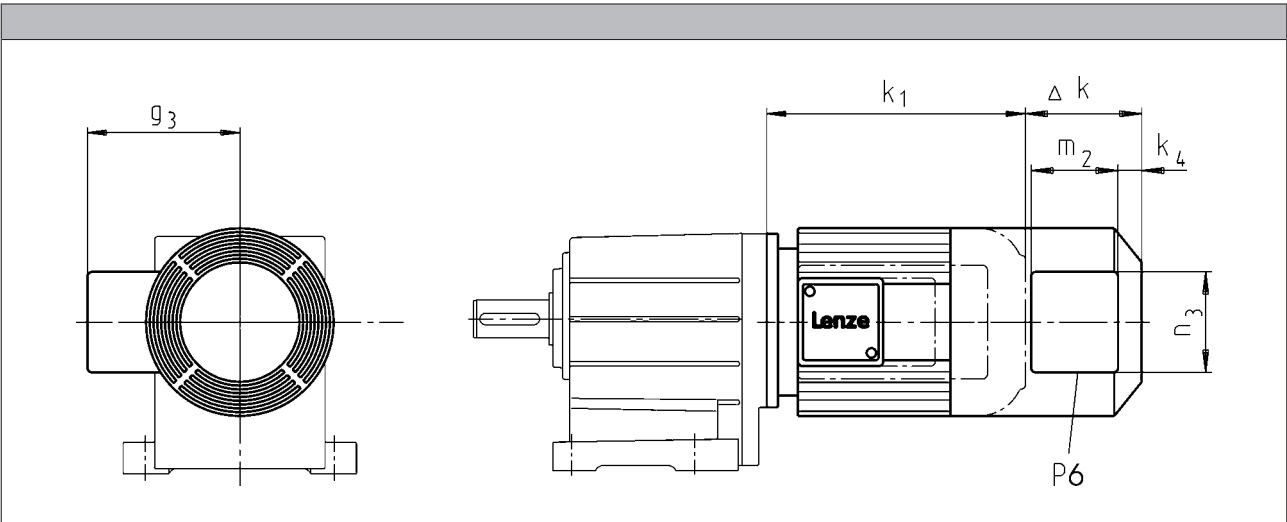
| Motor type       |         |         |                               |                                          |
|------------------|---------|---------|-------------------------------|------------------------------------------|
|                  | MHEMAXX | MHEMABR | MHEMABS<br>MHEMABI<br>MHEMABA | MHEMALL<br>MHEMARS<br>MHEMAIG<br>MHEMAAG |
| Motor frame size |         |         |                               |                                          |
|                  | Δ k     | Δ k     | Δ k                           | Δ k                                      |
|                  | [mm]    | [mm]    | [mm]                          | [mm]                                     |
| 080-32           | 0       | 73      | 111                           | 111                                      |
| 090-12           |         | 68      | 105                           | 87                                       |
| 090-32           |         |         |                               |                                          |
| 100-12           |         | 76      | 101                           | 81                                       |
| 100-32           |         |         |                               |                                          |
| 112-22           |         | 90      | 120                           | 80                                       |
| 132-12           |         | 110     | 125                           | 103                                      |
| 132-22           |         |         |                               |                                          |
| 160-22           |         | 105     | 191                           | 83                                       |
| 160-32           |         |         |                               |                                          |
| 180-12           |         | 113     | 192                           | 79                                       |
| 180-32           |         |         |                               |                                          |
| 180-42           |         |         | 193                           | 80                                       |
| 225-12           |         |         |                               |                                          |
| 225-22           |         |         |                               |                                          |

# MH three-phase AC motors

Technical data



## Dimensions, forced ventilated (4-pole)



| Motor type       |        |         |                               |                               |                |                |                |                |                |
|------------------|--------|---------|-------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|
|                  | MHFMXX | MHFMABR | MHFMABS<br>MHFMABI<br>MHFMABA | MHFMARS<br>MHFMAIG<br>MHFMAAG |                |                |                |                |                |
| Motor frame size |        |         |                               |                               |                |                |                |                |                |
|                  | Δ k    | Δ k     | Δ k                           | Δ k                           | k <sub>4</sub> | g <sub>3</sub> | m <sub>2</sub> | n <sub>3</sub> | P <sub>6</sub> |
|                  | [mm]   | [mm]    | [mm]                          | [mm]                          | [mm]           | [mm]           | [mm]           | [mm]           | [mm]           |
| 080-32           | 128    | 183     | 183                           | 128                           | 13             | 132            | 96             | 106            | 1xM16x1.5      |
| 090-12<br>090-32 |        | 181     | 181                           |                               | 22             | 141            | 95             | 105            |                |
| 100-12<br>100-32 |        | 109     | 170                           |                               |                | 170            |                |                |                |
| 112-22           | 102    | 183     | 183                           | 183                           |                | 162            |                |                |                |
| 132-12<br>132-22 | 115    | 202     | 202                           | 202                           | 32             | 182            |                |                |                |
| 160-22<br>160-32 | 149    | 179     | 237                           | 224                           | 31             | 209            | 96             | 106            |                |
| 180-12<br>180-32 |        | 215     | 275                           | 215                           |                |                |                |                |                |
| 180-42           |        |         | 260                           |                               |                |                |                |                |                |
| 225-12<br>225-22 | 213    | 213     | 213                           | 213                           |                |                |                |                |                |

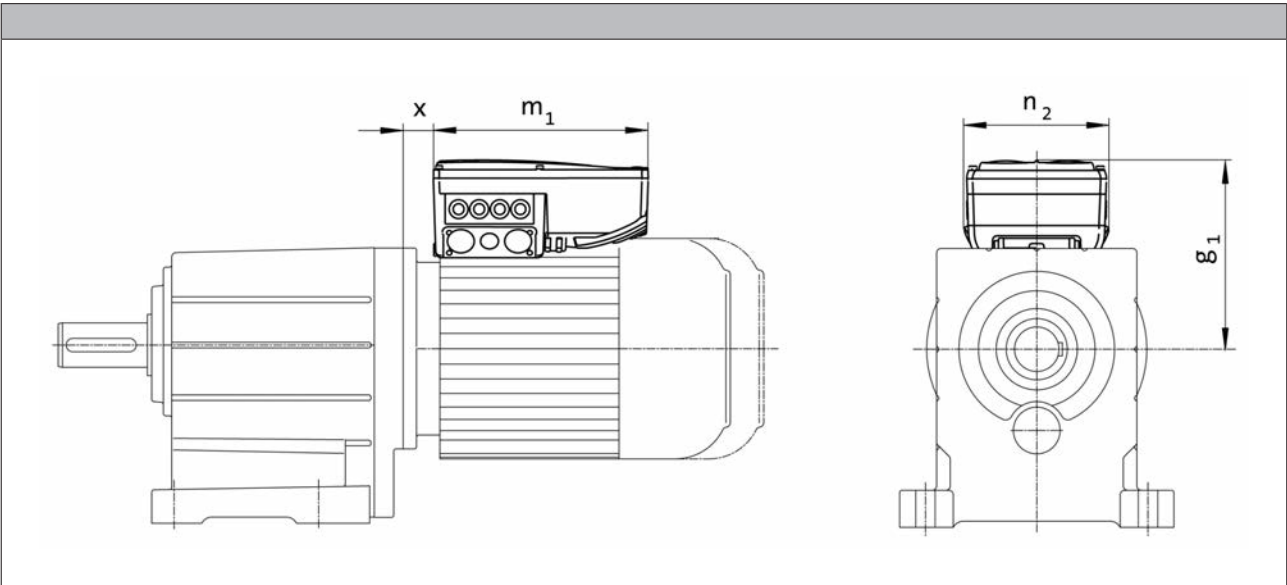
# MH three-phase AC motors

Technical data



## Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz



| Product key   |                   |                       |                       |                       |                   |
|---------------|-------------------|-----------------------|-----------------------|-----------------------|-------------------|
| Motor         | Inverter          |                       |                       |                       |                   |
|               |                   | g <sub>1</sub> , 50Hz | m <sub>1</sub> , 50Hz | n <sub>2</sub> , 50Hz | x <sub>50Hz</sub> |
|               |                   | [mm]                  | [mm]                  | [mm]                  | [mm]              |
| MH□□□□□080-32 | E84DVB□7514S□□□2□ | 172                   | 241                   | 161                   | 25.5              |
| MH□□□□□090-12 | E84DVB□1124S□□□2□ | 177                   |                       |                       | 28.8              |
| MH□□□□□090-32 | E84DVB□1524S□□□2□ |                       |                       |                       |                   |
| MH□□□□□100-12 | E84DVB□2224S□□□2□ | 217                   | 260                   | 176                   | 29.6              |
| MH□□□□□100-32 | E84DVB□3024S□□□2□ | 282                   |                       |                       |                   |
| MH□□□□□112-22 | E84DVB□4024S□□□2□ | 282                   | 325                   | 195                   | 19.0              |
| MH□□□□□132-12 | E84DVB□5524S□□□2□ | 301                   |                       |                       | 34.5              |
| MH□□□□□132-22 | E84DVB□7524S□□□2□ |                       |                       |                       |                   |

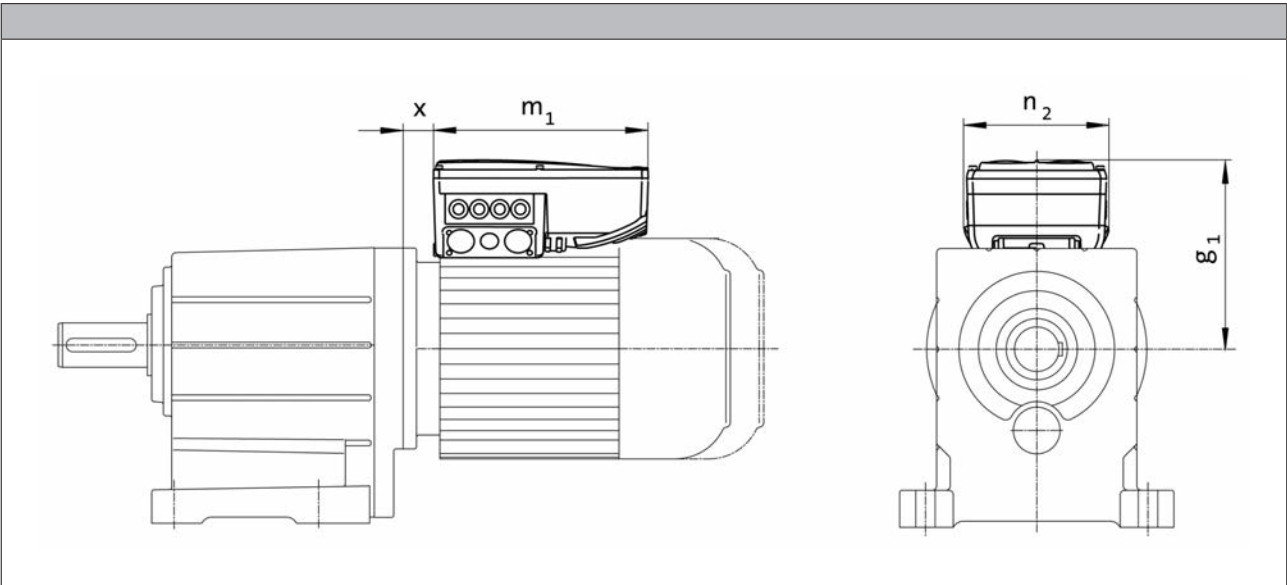
# MH three-phase AC motors

Technical data



## Dimensions, 8400 motec inverter

Rated frequency 87 Hz



| Product key  |                   |                       |                       |                       |                   |
|--------------|-------------------|-----------------------|-----------------------|-----------------------|-------------------|
| Motor        | Inverter          |                       |                       |                       |                   |
|              |                   | g <sub>1</sub> , 87Hz | m <sub>1</sub> , 87Hz | n <sub>2</sub> , 87Hz | x <sub>87Hz</sub> |
|              |                   | [mm]                  | [mm]                  | [mm]                  | [mm]              |
| MH□□□□080-32 | E84DVB□1524S□□□2□ | 172                   | 241                   | 161                   | 25.5              |
| MH□□□□090-12 | E84DVB□2224S□□□2□ | 206                   | 260                   | 176                   | 27.8              |
| MH□□□□090-32 | E84DVB□3024S□□□2□ | 272                   | 325                   | 195                   | 17.1              |
| MH□□□□100-12 | E84DVB□4024S□□□2□ | 272                   |                       |                       | 19.0              |
| MH□□□□100-32 | E84DVB□5524S□□□2□ | 272                   |                       |                       |                   |
| MH□□□□112-22 | E84DVB□7524S□□□2□ | 282                   |                       |                       |                   |

# MH three-phase AC motors

## Accessories



### Spring-applied brake

Three-phase AC motors can be fitted with a spring-applied brake. This is activated after the supply voltage is switched off (closed-circuit principle). For optimum adjustment of the brake motor to the application, a range of braking torques and control modes is available for every motor frame size. For applications with very high operating frequencies the brake is also available in a LongLife version, with reinforced mechanical brake components.

#### Features

##### Versions

- **Standard**
  - 1 x 10<sup>6</sup> repeating switching cycles
  - 1 x 10<sup>6</sup> reversing switching cycles
- **LongLife**
  - 10 x 10<sup>6</sup> repeating switching cycles
  - 15 x 10<sup>6</sup> reversing switching cycles

##### Control

- DC supply
- AC supply via rectifier in the terminal box

##### Enclosure

- Without manual release IP55
- With manual release IP54

##### Friction lining

- Non-asbestos, low wearing

##### Options

- Manual release
- UL/CSA approval
- Noise-reduced

#### Assignment of 4-pole motors and brakes

| Design           | Standard |                | LongLife       |                |
|------------------|----------|----------------|----------------|----------------|
|                  | Standard |                | LongLife       |                |
| Motor frame size | Size     | Rated torque   | Size           | Rated torque   |
|                  | Brake    |                | Brake          |                |
|                  |          | M <sub>k</sub> |                | M <sub>k</sub> |
|                  |          | [Nm]           |                | [Nm]           |
| 080-32           | 08       | 3.50           | 08             | 8.00           |
|                  | 08       | 8.00           |                | 7.00           |
|                  | 10       | 7.00           |                |                |
| 090-12<br>090-32 | 08       | 3.50           | 08             | 8.00           |
|                  | 08       | 8.00           |                | 7.00           |
|                  | 10       | 16.0           |                | 16.0           |
|                  | 10       | 23.0           |                |                |
| 100-12           | 10       | 7.00           | 10<br>12<br>12 |                |
|                  | 10       | 16.0           |                | 16.0           |
|                  | 12       | 14.0           |                | 14.0           |
|                  | 12       | 32.0           |                | 32.0           |
| 100-32           | 10       | 7.00           |                |                |
|                  | 10       | 16.0           |                |                |
|                  | 12       | 14.0           |                |                |
|                  | 12       | 32.0           |                |                |
|                  | 12       | 46.0           |                |                |

# MH three-phase AC motors

Accessories



## Spring-applied brake

Assignment of 4-pole motors and brakes

| Design           | Standard |              | LongLife |              |
|------------------|----------|--------------|----------|--------------|
| Motor frame size | Size     | Rated torque | Size     | Rated torque |
|                  | Brake    |              | Brake    |              |
|                  |          | $M_k$        |          | $M_k$        |
|                  |          | [Nm]         |          | [Nm]         |
| 112-22           | 12       | 14.0         |          |              |
|                  | 12       | 32.0         |          |              |
|                  | 14       | 35.0         |          |              |
|                  | 14       | 60.0         |          |              |
| 132-12           | 14       | 35.0         |          |              |
|                  | 14       | 60.0         |          |              |
|                  | 16       | 60.0         |          |              |
|                  | 16       | 80.0         |          |              |
| 132-22           | 14       | 35.0         |          |              |
|                  | 14       | 60.0         |          |              |
|                  | 16       | 60.0         |          |              |
|                  | 16       | 80.0         |          |              |
|                  | 16       | 100          |          |              |
| 160-22           | 16       | 60.0         |          |              |
|                  | 16       | 80.0         |          |              |
|                  | 18       | 80.0         |          |              |
|                  | 18       | 150          |          |              |
| 160-32           | 18       | 80.0         |          |              |
|                  | 18       | 150          |          |              |
|                  | 18       | 200          |          |              |
| 180-12           | 18       | 80.0         |          |              |
|                  | 18       | 150          |          |              |
|                  | 20       | 145          |          |              |
|                  | 20       | 260          |          |              |
| 180-32           | 18       | 80.0         |          |              |
|                  | 18       | 150          |          |              |
|                  | 20       | 145          |          |              |
|                  | 20       | 260          |          |              |
|                  | 20       | 315          |          |              |
| 200-32           | 18       | 80.0         |          |              |
|                  | 18       | 150          |          |              |
|                  | 20       | 145          |          |              |
|                  | 20       | 260          |          |              |
|                  | 20       | 315          |          |              |
| 225-12           | 25       | 265          |          |              |
|                  | 25       | 400          |          |              |
|                  | 25       | 490          |          |              |
|                  | 25       | 600          |          |              |
| 225-22           | 25       | 265          |          |              |
|                  | 25       | 400          |          |              |
|                  | 25       | 490          |          |              |
|                  | 25       | 600          |          |              |



### Spring-applied brake

#### Direct connection without rectifier

If the brake is activated directly without a rectifier, a freewheeling diode or a spark suppressor is required to protect against induction peaks.

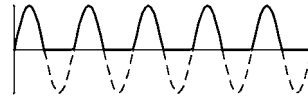
- Supply voltages
  - DC 24 V
  - DC 180 V
  - DC 205 V

#### Connection via mains voltage with brake rectifier

If the brake is not directly supplied with DC voltage, a rectifier is required. This is included in the scope of supply and is located in the terminal box of the motor. The rectifier converts the AC voltage of the connection into DC voltage. The following rectifiers are available:

##### Half-wave rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage = 2.22
- Approved by UL/CSA
- Supply voltages
  - AC 230 V
  - AC 400 V
  - AC 460 V



##### Bridge rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage = 1.11
- Supply voltage
  - AC 230 V



##### Bridge/half-wave rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage
  - up to overexcitation time = 1.11
  - beyond overexcitation time = 2.22



##### Supply voltages:

- AC 230 V
- AC 400 V



### Spring-applied brake

#### Connection via mains voltage with brake rectifier

##### Bridge/half-wave rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage  
up to overexcitation time = 1.11  
beyond overexcitation time = 2.22



##### Supply voltages:

- AC 230 V
- AC 400 V

During the switching operation the bridge/half-wave rectifier functions as a bridge rectifier for the overexcitation time  $t_{ij}$  and then as a half-wave rectifier. This combination optimises the performance of the brake – depending on the assignment of brake coil voltage and supply voltage:

- **Short-time overexcitation of the brake coil**

Activating the brake coil for the overexcitation time  $t_{ij}$  with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.

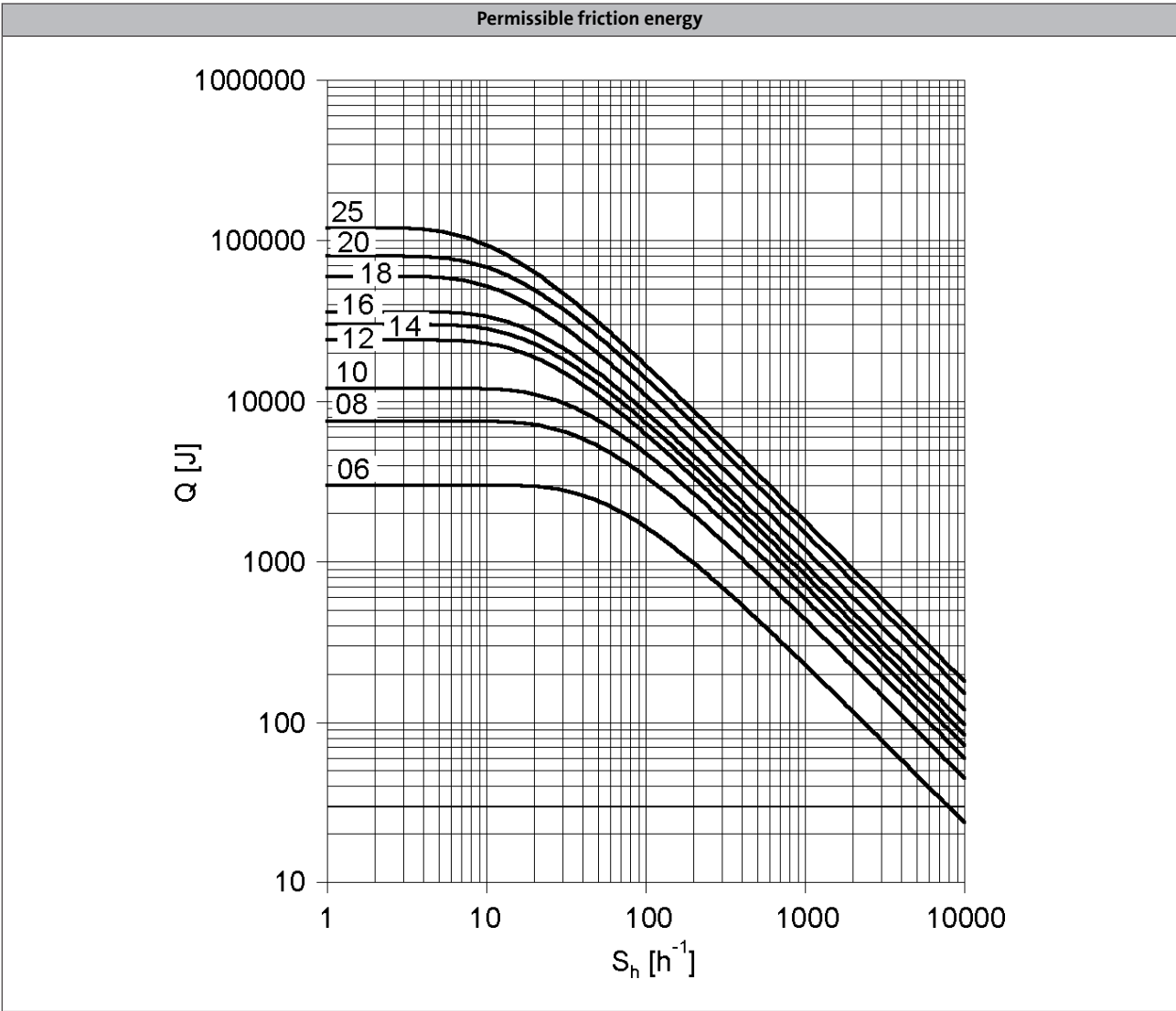
These features make this activation version particularly suitable for lifting applications. It is therefore only available in combination with a brake with increased braking torque.

- **Holding current reduction (cold brake)**

By reducing the holding current, the bridge/half-wave rectifier is able to reduce the power input to the open brake. As the brake heats up less, this type of activation is known as "cold brake".



Spring-applied brake



$Q$  =Switching energy per switching cycle  
 $S_h$  =Operating frequency  
Brake size = 06 to 25

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with reduced braking torque

- Please enquire for braking torques and maximum switching work values not listed here.

| Size                                  |                 |                      | 06    | 08    | 10    | 12                 | 14                 | 16                 | 18                 | 20                 | 25                 |
|---------------------------------------|-----------------|----------------------|-------|-------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Power input</b>                    |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | P <sub>in</sub> | [kW]                 | 0.020 | 0.025 | 0.030 | 0.040              | 0.050              | 0.055              | 0.085              | 0.10               | 0.11               |
| <b>Braking torque</b>                 |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
| 100                                   | M <sub>B</sub>  | [Nm]                 | 2.50  | 3.50  | 7.00  | 14.0               | 35.0               | 60.0               | 80.0               | 145                | 265                |
| 1000                                  | M <sub>B</sub>  | [Nm]                 | 2.30  | 3.10  | 6.10  | 12.0               | 30.0               | 50.0               | 65.0               | 115                | 203                |
| 1200                                  | M <sub>B</sub>  | [Nm]                 | 2.30  | 3.10  | 6.00  | 12.0               | 29.0               | 48.0               | 63.0               | 112                | 199                |
| 1500                                  | M <sub>B</sub>  | [Nm]                 | 2.20  | 3.00  | 5.80  | 11.0               | 28.0               | 47.0               | 61.0               | 109 <sup>1)</sup>  | 193 <sup>1)</sup>  |
| 1800                                  | M <sub>B</sub>  | [Nm]                 | 2.10  | 2.90  | 5.70  | 11.0               | 28.0               | 46.0               | 60.0 <sup>1)</sup> |                    |                    |
| 3000                                  | M <sub>B</sub>  | [Nm]                 | 2.00  | 2.80  | 5.30  | 10.0               | 26.0 <sup>1)</sup> | 43.0 <sup>1)</sup> |                    |                    |                    |
| 3600                                  | M <sub>B</sub>  | [Nm]                 | 2.00  | 2.70  | 5.20  | 10.0 <sup>1)</sup> |                    |                    |                    |                    |                    |
| <b>Maximum switching energy</b>       |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
| 100                                   | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1000                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1200                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1500                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 24.0 <sup>1)</sup> | 36.0 <sup>1)</sup> |
| 1800                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 36.0 <sup>1)</sup> |                    |                    |
| 3000                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 18.0 <sup>1)</sup> | 11.0 <sup>1)</sup> |                    |                    |                    |
| 3600                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 7.00 <sup>1)</sup> |                    |                    |                    |                    |                    |
| <b>Transition operating frequency</b> |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | S <sub>hü</sub> | [1/h]                | 79.0  | 50.0  | 40.0  | 30.0               | 28.0               | 27.0               | 20.0               | 19.0               | 15.0               |
| <b>Moment of inertia</b>              |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | J               | [kgcm <sup>2</sup> ] | 0.015 | 0.061 | 0.20  | 0.45               | 0.63               | 1.50               | 2.90               | 7.30               | 20.0               |
| <b>Mass</b>                           |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | m               | [kg]                 | 0.90  | 1.50  | 2.60  | 4.20               | 5.80               | 8.70               | 12.6               | 19.5               | 31.0               |

<sup>1)</sup> In the region of the load limit the value for friction energy Q<sub>BW</sub> can be reduced to 40 %.

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with reduced braking torque

- Activation via half-wave or bridge rectifier

| Size               |          |      | 06   | 08   | 10   | 12   | 14   | 16   | 18   | 20   | 25   |
|--------------------|----------|------|------|------|------|------|------|------|------|------|------|
| Friction energy    |          |      |      |      |      |      |      |      |      |      |      |
|                    | $Q_{BW}$ | [MJ] | 113  | 210  | 264  | 706  | 761  | 966  | 1542 | 2322 | 3522 |
| Delay time         |          |      |      |      |      |      |      |      |      |      |      |
| Engaging           | $t_{11}$ | [ms] | 11.0 | 14.0 | 20.0 | 21.0 | 37.0 | 53.0 | 32.0 | 47.0 | 264  |
| Rise time          |          |      |      |      |      |      |      |      |      |      |      |
| Braking torque     | $t_{12}$ | [ms] | 13.0 | 10.0 | 17.0 | 19.0 | 22.0 | 30.0 | 20.0 | 100  | 120  |
| Engagement time    |          |      |      |      |      |      |      |      |      |      |      |
|                    | $t_1$    | [ms] | 24.0 |      | 37.0 | 40.0 | 59.0 | 83.0 | 52.0 | 147  | 384  |
| Disengagement time |          |      |      |      |      |      |      |      |      |      |      |
|                    | $t_2$    | [ms] | 35.0 | 37.0 | 57.0 | 65.0 | 148  | 169  | 230  | 207  | 269  |

- Activation via bridge/half-wave rectifier

| Design              |               |      | Holding current reduction (cold brake) |      |      |      |      |      |      |      |      |
|---------------------|---------------|------|----------------------------------------|------|------|------|------|------|------|------|------|
| Size                |               |      | 06                                     | 08   | 10   | 12   | 14   | 16   | 18   | 20   | 25   |
| Friction energy     |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $Q_{BW}$      | [MJ] | 113                                    | 210  | 264  | 706  | 761  | 966  | 1542 | 2322 | 3522 |
| Overexcitation time |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_{\bar{u}}$ | [ms] | 300                                    |      |      |      |      |      | 1300 |      |      |
| Min. rest time      |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t$           | [ms] | 900                                    |      |      |      |      |      | 3900 |      |      |
| Delay time          |               |      |                                        |      |      |      |      |      |      |      |      |
| Engaging            | $t_{11}$      | [ms] | 12.0                                   | 22.0 | 35.0 | 49.0 | 61.0 | 114  | 83.0 | 126  | 304  |
| Rise time           |               |      |                                        |      |      |      |      |      |      |      |      |
| Braking torque      | $t_{12}$      | [ms] | 14.0                                   | 16.0 | 30.0 | 45.0 | 37.0 | 65.0 | 52.0 | 269  | 138  |
| Engagement time     |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_1$         | [ms] | 26.0                                   | 38.0 | 66.0 | 93.0 | 97.0 | 180  | 134  | 395  | 443  |
| Disengagement time  |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_2$         | [ms] | 35.0                                   | 37.0 | 57.0 | 65.0 | 148  | 169  | 230  | 207  | 269  |

- The brake response and application times are guide values. The engagement time is 10 times longer with AC-side switching. With the maximum air gap the disengagement time  $t_2$  – depending on the brake and control – is up to 4 times longer than the disengagement time with the rated air gap.

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with standard braking torque

- Please enquire for braking torques and maximum switching work values not listed here.

| Size                                  |                 |                      | 06    | 08    | 10    | 12                 | 14                 | 16                 | 18                 | 20                 | 25                 |
|---------------------------------------|-----------------|----------------------|-------|-------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Power input</b>                    |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | P <sub>in</sub> | [kW]                 | 0.020 | 0.025 | 0.030 | 0.040              | 0.050              | 0.055              | 0.085              | 0.10               | 0.11               |
| <b>Braking torque</b>                 |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
| 100                                   | M <sub>B</sub>  | [Nm]                 | 4.00  | 8.00  | 16.0  | 32.0               | 60.0               | 80.0               | 150                | 260                | 400                |
| 1000                                  | M <sub>B</sub>  | [Nm]                 | 3.70  | 7.20  | 14.0  | 27.0               | 51.0               | 66.0               | 121                | 206                | 307                |
| 1200                                  | M <sub>B</sub>  | [Nm]                 | 3.60  | 7.00  | 14.0  | 27.0               | 50.0               | 65.0               | 118                | 201                | 300                |
| 1500                                  | M <sub>B</sub>  | [Nm]                 | 3.50  | 6.80  | 13.0  | 26.0               | 48.0               | 63.0               | 115                | 195 <sup>1)</sup>  | 291 <sup>1)</sup>  |
| 1800                                  | M <sub>B</sub>  | [Nm]                 | 3.40  | 6.70  | 13.0  | 26.0               | 47.0               | 61.0               | 112 <sup>1)</sup>  |                    |                    |
| 3000                                  | M <sub>B</sub>  | [Nm]                 | 3.20  | 6.30  | 12.0  | 24.0               | 44.0 <sup>1)</sup> | 57.0 <sup>1)</sup> |                    |                    |                    |
| 3600                                  | M <sub>B</sub>  | [Nm]                 | 3.20  | 6.10  | 12.0  | 23.0 <sup>1)</sup> |                    |                    |                    |                    |                    |
| <b>Maximum switching energy</b>       |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
| 100                                   | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1000                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1200                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 80.0               | 120                |
| 1500                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 60.0               | 24.0 <sup>1)</sup> | 36.0 <sup>1)</sup> |
| 1800                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 30.0               | 36.0               | 36.0 <sup>1)</sup> |                    |                    |
| 3000                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 24.0               | 18.0 <sup>1)</sup> | 11.0 <sup>1)</sup> |                    |                    |                    |
| 3600                                  | Q <sub>E</sub>  | [KJ]                 | 3.00  | 7.50  | 12.0  | 7.00 <sup>1)</sup> |                    |                    |                    |                    |                    |
| <b>Transition operating frequency</b> |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | S <sub>hü</sub> | [1/h]                | 79.0  | 50.0  | 40.0  | 30.0               | 28.0               | 27.0               | 20.0               | 19.0               | 15.0               |
| <b>Moment of inertia</b>              |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | J               | [kgcm <sup>2</sup> ] | 0.015 | 0.061 | 0.20  | 0.45               | 0.63               | 1.50               | 2.90               | 7.30               | 20.0               |
| <b>Mass</b>                           |                 |                      |       |       |       |                    |                    |                    |                    |                    |                    |
|                                       | m               | [kg]                 | 0.90  | 1.50  | 2.60  | 4.20               | 5.80               | 8.70               | 12.6               | 19.5               | 31.0               |

<sup>1)</sup> In the region of the load limit the value for friction energy Q<sub>BW</sub> can be reduced to 40 %.

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with standard braking torque

- Activation via half-wave or bridge rectifier

| Size               |          |      | 06   | 08   | 10   | 12   | 14   | 16   | 18   | 20   | 25   |
|--------------------|----------|------|------|------|------|------|------|------|------|------|------|
| Friction energy    |          |      |      |      |      |      |      |      |      |      |      |
|                    | $Q_{BW}$ | [MJ] | 85.0 | 158  | 264  | 530  | 571  | 966  | 1542 | 2322 | 3522 |
| Delay time         |          |      |      |      |      |      |      |      |      |      |      |
| Engaging           | $t_{11}$ | [ms] | 15.0 |      | 28.0 |      | 17.0 | 27.0 | 33.0 | 65.0 | 110  |
| Rise time          |          |      |      |      |      |      |      |      |      |      |      |
| Braking torque     | $t_{12}$ | [ms] | 13.0 | 16.0 | 19.0 | 25.0 |      | 30.0 | 45.0 | 100  | 120  |
| Engagement time    |          |      |      |      |      |      |      |      |      |      |      |
|                    | $t_1$    | [ms] | 28.0 | 31.0 | 47.0 | 53.0 | 42.0 | 57.0 | 78.0 | 165  | 230  |
| Disengagement time |          |      |      |      |      |      |      |      |      |      |      |
|                    | $t_2$    | [ms] | 45.0 | 57.0 | 76.0 | 115  | 210  | 220  | 270  | 340  | 390  |

- Activation via bridge/half-wave rectifier

| Design              |               |      | Holding current reduction (cold brake) |      |      |      |      |      |      |      |      |
|---------------------|---------------|------|----------------------------------------|------|------|------|------|------|------|------|------|
| Size                |               |      | 06                                     | 08   | 10   | 12   | 14   | 16   | 18   | 20   | 25   |
| Friction energy     |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $Q_{BW}$      | [MJ] | 85.0                                   | 158  | 264  | 530  | 571  | 966  | 1542 | 2322 | 3522 |
| Overexcitation time |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_{\bar{u}}$ | [ms] |                                        | 300  |      |      |      |      | 1300 |      |      |
| Min. rest time      |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t$           | [ms] |                                        | 900  |      |      |      |      | 3900 |      |      |
| Delay time          |               |      |                                        |      |      |      |      |      |      |      |      |
| Engaging            | $t_{11}$      | [ms] | 16.0                                   | 25.0 | 31.0 | 48.0 | 33.0 | 58.0 | 80.0 | 102  | 154  |
| Rise time           |               |      |                                        |      |      |      |      |      |      |      |      |
| Braking torque      | $t_{12}$      | [ms] | 14.0                                   | 27.0 | 21.0 | 43.0 | 49.0 | 64.0 | 109  | 157  | 168  |
| Engagement time     |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_1$         | [ms] | 30.0                                   | 52.0 |      | 90.0 | 82.0 | 122  | 189  | 259  | 322  |
| Disengagement time  |               |      |                                        |      |      |      |      |      |      |      |      |
|                     | $t_2$         | [ms] | 45.0                                   | 57.0 | 76.0 | 115  | 210  | 220  | 270  | 340  | 390  |

- The brake response and application times are guide values. The engagement time is 10 times longer with AC-side switching. With the maximum air gap the disengagement time  $t_2$  – depending on the brake and control – is up to 4 times longer than the disengagement time with the rated air gap.

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with increased braking torque

- Please enquire for braking torques and maximum switching work values not listed here.

| Size                                  |          |                      | 10    | 12                 | 14                 | 16                 | 16                 | 18                 | 20                 | 20                 | 25                 | 25                 |
|---------------------------------------|----------|----------------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Power input</b>                    |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
|                                       | $P_{in}$ | [kW]                 | 0.030 | 0.040              | 0.050              | 0.055              | 0.055              | 0.085              | 0.10               | 0.10               | 0.11               | 0.11               |
| <b>Braking torque</b>                 |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| 100                                   | $M_B$    | [Nm]                 | 23.0  | 46.0               | 75.0               | 100                | 125                | 200                | 315                | 400                | 490                | 600                |
| 1000                                  | $M_B$    | [Nm]                 | 20.0  | 39.0               | 64.0               | 83.0               | 103                | 162                | 249                | 317                | 376                | 461                |
| 1200                                  | $M_B$    | [Nm]                 | 20.0  | 39.0               | 62.0               | 81.0               | 101                | 158                | 244                | 309                | 367                | 449                |
| 1500                                  | $M_B$    | [Nm]                 | 19.0  | 38.0               | 60.0               | 78.0               | 98.0               | 153                | 237 <sup>1)</sup>  | 300 <sup>1)</sup>  | 356 <sup>1)</sup>  | 436 <sup>1)</sup>  |
| 1800                                  | $M_B$    | [Nm]                 | 19.0  | 37.0               | 59.0               | 77.0               | 96.0               | 150 <sup>1)</sup>  |                    |                    |                    |                    |
| 3000                                  | $M_B$    | [Nm]                 | 17.0  | 34.0               | 55.0 <sup>1)</sup> | 71.0 <sup>1)</sup> | 89.0 <sup>1)</sup> |                    |                    |                    |                    |                    |
| 3600                                  | $M_B$    | [Nm]                 | 17.0  | 33.0 <sup>1)</sup> |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>Maximum switching energy</b>       |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| 100                                   | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 30.0               | 36.0               | 36.0               | 60.0               | 80.0               | 80.0               | 120                | 120                |
| 1000                                  | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 30.0               | 36.0               | 36.0               | 60.0               | 80.0               | 80.0               | 120                | 120                |
| 1200                                  | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 30.0               | 36.0               | 36.0               | 60.0               | 80.0               | 80.0               | 120                | 120                |
| 1500                                  | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 30.0               | 36.0               | 36.0               | 60.0               | 24.0 <sup>1)</sup> | 24.0 <sup>1)</sup> | 36.0 <sup>1)</sup> | 36.0 <sup>1)</sup> |
| 1800                                  | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 30.0               | 36.0               | 36.0               | 36.0 <sup>1)</sup> |                    |                    |                    |                    |
| 3000                                  | $Q_E$    | [KJ]                 | 12.0  | 24.0               | 18.0 <sup>1)</sup> | 11.0 <sup>1)</sup> | 11.0 <sup>1)</sup> |                    |                    |                    |                    |                    |
| 3600                                  | $Q_E$    | [KJ]                 | 12.0  | 7.00 <sup>1)</sup> |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>Transition operating frequency</b> |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
|                                       | $S_{hü}$ | [1/h]                | 40.0  | 30.0               | 28.0               | 27.0               | 27.0               | 20.0               | 19.0               | 19.0               | 15.0               | 15.0               |
| <b>Moment of inertia</b>              |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
|                                       | J        | [kgcm <sup>2</sup> ] | 0.20  | 0.45               | 0.63               | 1.50               | 1.50               | 2.90               | 7.30               | 7.30               | 20.0               | 20.0               |
| <b>Mass</b>                           |          |                      |       |                    |                    |                    |                    |                    |                    |                    |                    |                    |
|                                       | m        | [kg]                 | 2.60  | 4.20               | 5.80               | 8.70               | 8.70               | 12.6               | 19.5               | 19.5               | 31.0               | 31.0               |

<sup>1)</sup> In the region of the load limit the value for friction energy  $Q_{BW}$  can be reduced to 40 %.

- Activation via half-wave or bridge rectifier

| Size               |                 |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|-----------------|------|------|------|------|------|------|------|------|------|------|------|
|                    |                 |      | 10   | 12   | 14   | 16   |      | 18   | 20   |      | 25   |      |
| Friction energy    |                 |      |      |      |      |      |      |      |      |      |      |      |
|                    | Q <sub>BW</sub> | [MJ] | 198  | 353  | 253  | 563  | 241  | 578  | 1596 | 580  | 2465 | 1409 |
| Delay time         |                 |      |      |      |      |      |      |      |      |      |      |      |
| Engaging           | t <sub>11</sub> | [ms] | 10.0 | 16.0 | 11.0 | 22.0 | 17.0 | 24.0 | 46.0 | 17.0 | 77.0 | 38.0 |
| Rise time          |                 |      |      |      |      |      |      |      |      |      |      |      |
| Braking torque     | t <sub>12</sub> | [ms] | 19.0 | 25.0 |      | 30.0 |      | 45.0 | 100  |      | 120  |      |
| Engagement time    |                 |      |      |      |      |      |      |      |      |      |      |      |
|                    | t <sub>1</sub>  | [ms] | 29.0 | 41.0 | 36.0 | 52.0 | 47.0 | 69.0 | 146  | 117  | 197  | 158  |
| Disengagement time |                 |      |      |      |      |      |      |      |      |      |      |      |
|                    | t <sub>2</sub>  | [ms] | 109  | 193  | 308  | 297  | 435  | 356  | 378  | 470  | 451  | 532  |

# MH three-phase AC motors

## Accessories



### Spring-applied brake

#### Rated data with increased braking torque

- Activation via bridge/half-wave rectifier

| Design              |               |      | Holding current reduction (cold brake) |      |      |      |      |      |      |      |      |      |
|---------------------|---------------|------|----------------------------------------|------|------|------|------|------|------|------|------|------|
| Size                |               |      | 10                                     | 12   | 14   | 16   | 18   | 20   | 25   |      |      |      |
| Friction energy     | $Q_{BW}$      | [MJ] | 198                                    | 353  | 253  | 563  | 241  | 578  | 1596 | 580  | 2465 | 1409 |
| Overexcitation time | $t_{\bar{u}}$ | [ms] | 300                                    |      | 1300 |      |      |      |      |      |      |      |
| Min. rest time      | t             | [ms] | 900                                    |      | 3900 |      |      |      |      |      |      |      |
| Delay time          |               |      |                                        |      |      |      |      |      |      |      |      |      |
| Engaging            | $t_{11}$      | [ms] | 24.0                                   | 27.0 | 17.0 | 41.0 | 21.0 | 60.0 | 69.0 | 17.0 | 123  | 85.0 |
| Rise time           |               |      |                                        |      |      |      |      |      |      |      |      |      |
| Braking torque      | $t_{12}$      | [ms] | 44.0                                   | 43.0 | 37.0 | 55.0 | 37.0 | 113  | 148  | 100  | 190  | 270  |
| Engagement time     | $t_1$         | [ms] | 68.0                                   | 70.0 | 54.0 | 97.0 | 57.0 | 173  | 217  | 334  | 313  | 355  |
| Disengagement time  | $t_2$         | [ms] | 109                                    | 193  | 308  | 297  | 435  | 356  | 378  | 470  | 451  | 532  |

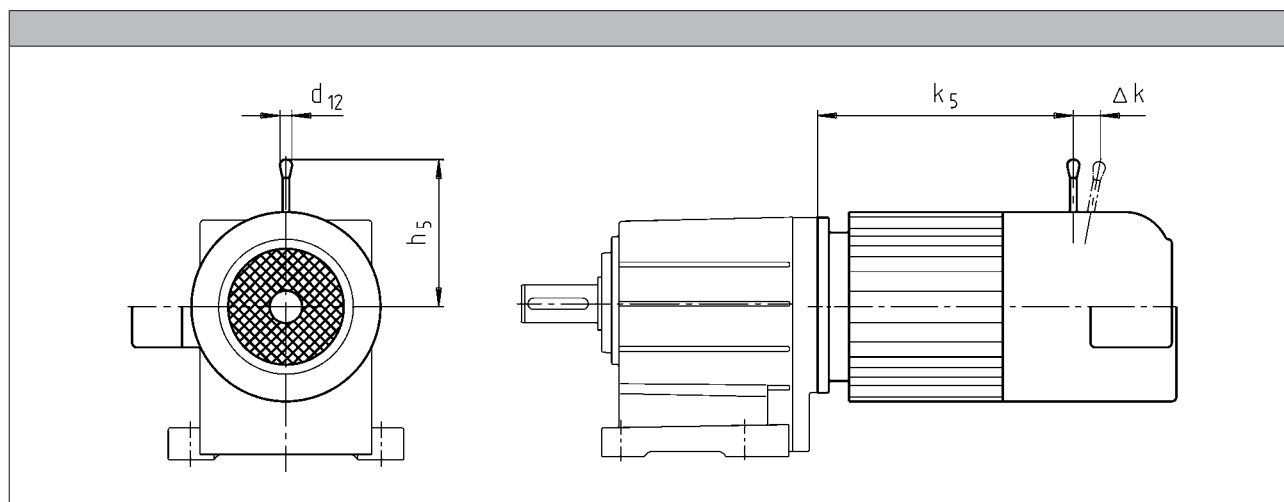
| Design              |               |      | Over-excitation |      |      |      |      |      |      |      |     |     |
|---------------------|---------------|------|-----------------|------|------|------|------|------|------|------|-----|-----|
| Size                |               |      | 10              | 12   | 14   | 16   | 18   | 20   | 25   |      |     |     |
| Friction energy     | $Q_{BW}$      | [MJ] | 264             | 706  | 761  | 966  | 1542 | 2322 | 3522 |      |     |     |
| Overexcitation time | $t_{\bar{u}}$ | [ms] | 300             |      | 1300 |      |      |      |      |      |     |     |
| Min. rest time      | t             | [ms] | 900             |      | 3900 |      |      |      |      |      |     |     |
| Delay time          |               |      |                 |      |      |      |      |      |      |      |     |     |
| Engaging            | $t_{11}$      | [ms] | 29.0            | 54.0 | 31.0 | 70.0 | 46.0 | 86.0 | 103  | 55.0 | 171 | 135 |
| Rise time           |               |      |                 |      |      |      |      |      |      |      |     |     |
| Braking torque      | $t_{12}$      | [ms] | 53.0            | 87.0 | 68.0 | 93.0 | 83.0 | 160  | 222  | 319  | 266 | 430 |
| Engagement time     | $t_1$         | [ms] | 82.0            | 141  | 99.0 | 163  | 129  | 246  | 325  | 374  | 437 | 565 |
| Disengagement time  | $t_2$         | [ms] | 53.0            | 81.0 | 117  | 141  | 168  | 151  | 160  | 167  | 184 | 204 |

- The brake response and application times are guide values. The engagement time is 10 times longer with AC-side switching. With the maximum air gap the disengagement time  $t_2$  – depending on the brake and control – is up to 4 times longer than the disengagement time with the rated air gap.



### Spring-applied brake

#### Manual release lever



| Motor frame size | Size  |                |      |                |                 |
|------------------|-------|----------------|------|----------------|-----------------|
|                  | Brake |                |      |                |                 |
|                  |       | k <sub>5</sub> | Δ k  | h <sub>5</sub> | d <sub>12</sub> |
|                  |       | [mm]           | [mm] | [mm]           | [mm]            |
| 080-32           | 06    | 207            | 29   | 107            | 13.0            |
|                  | 08    | 218            | 27   | 116            | 13.0            |
| 090-12           | 08    | 245            | 27   | 116            | 13.0            |
|                  | 10    | 256            | 28   | 132            | 13.0            |
| 100-12           | 10    | 279            | 28   | 132            | 13.0            |
|                  | 12    | 281            | 37   | 161            | 13.0            |
| 100-32           | 10    | 294            | 28   | 132            | 13.0            |
|                  | 12    | 296            | 37   | 161            | 13.0            |
| 112-22           | 12    | 292            | 37   | 161            | 13.0            |
|                  | 14    | 296            | 41   | 195            | 24.0            |
| 132-12           | 14    | 373            | 41   | 195            | 24.0            |
|                  | 16    | 373            | 55   | 240            | 24.0            |
| 160-22           | 16    | 420            | 55   | 240            | 24.0            |
|                  | 18    | 423            | 59   | 279            | 24.0            |
| 160-32           | 16    | 464            | 55   | 240            | 24.0            |
|                  | 18    | 467            | 59   | 279            | 24.0            |
| 180-12           | 18    | 539            | 59   | 279            | 24.0            |
|                  | 20    | 546            | 74   | 319            | 24.0            |
| 180-42           | 18    | 596            | 59   | 279            | 24.0            |
|                  | 20    | 603            | 74   | 319            | 24.0            |
| 225-12           | 25    | 785            | 103  | 445            | 24.0            |
|                  | 25    | 785            | 103  | 445            | 24.0            |

The following combinations with manual release lever and motor connection in the same position are not possible:

- HAN connector with connection in position 1
- Inverter motec
- Terminal box of motor sizes 080, 090, for brake and retracting (M□□MA BR/BS/BA/BI)

# MH three-phase AC motors

## Accessories



### Resolver

Stator-fed resolver with two stator windings offset by 90° and one rotor winding with transformer winding.

- The three-phase AC motors with resolver cannot be used for speed-dependent safety functions in connection with the SM 301 safety module.

|                                   |              |            |       |              |
|-----------------------------------|--------------|------------|-------|--------------|
| <b>Product key</b>                |              |            |       | RS1          |
| <b>Accuracy</b>                   |              |            |       |              |
|                                   |              |            | [°]   | -10 ... 10   |
| <b>Absolute positioning</b>       |              |            |       |              |
|                                   |              |            |       | 1 revolution |
| <b>Max. input voltage</b>         |              |            |       |              |
| DC                                | $U_{in,max}$ |            | [V]   | 10.0         |
| <b>Max. input frequency</b>       |              |            |       |              |
|                                   | $f_{in,max}$ |            | [kHz] | 4.00         |
| <b>Ratio</b>                      |              |            |       |              |
| Stator / rotor                    |              | $\pm 5 \%$ |       | 0.30         |
| <b>Rotor impedance</b>            |              |            |       |              |
|                                   | $Z_{ro}$     |            | [Ω]   | 51 + j90     |
| <b>Stator impedance</b>           |              |            |       |              |
|                                   | $Z_{so}$     |            | [Ω]   | 102 + j150   |
| <b>Impedance</b>                  |              |            |       |              |
|                                   | $Z_{rs}$     |            | [Ω]   | 44 + j76     |
| <b>Min. insulation resistance</b> |              |            |       |              |
| At DC 500 V                       | R            |            | [MΩ]  | 10.0         |
| <b>Number of pole pairs</b>       |              |            |       |              |
|                                   |              |            |       | 1            |

# MH three-phase AC motors

## Accessories



### Incremental encoder and SinCos absolute value encoder

- The three-phase AC motors with incremental encoders or SinCos absolute value encoders cannot be used for speed-dependent safety functions in connection with the SM 301 safety module.

| Encoder type             |                     |       | HTL incremental    |                            |              |              | TTL incremental                 |             |             | SinCos absolute value |
|--------------------------|---------------------|-------|--------------------|----------------------------|--------------|--------------|---------------------------------|-------------|-------------|-----------------------|
| Product key              |                     |       | IG128-24V-H        | IG512-24V-H                | IG1024-24V-H | IG2048-24V-H | IG512-5V-T                      | IG1024-5V-T | IG2048-5V-T | AM1024-8V-H           |
| Encoder type             |                     |       |                    |                            |              |              |                                 |             |             | Multi-turn            |
| Pulses                   |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          |                     |       | 128                | 512                        | 1024         | 2048         | 512                             | 1024        | 2048        | 1024                  |
| Output signals           |                     |       | HTL                |                            |              |              | TTL                             |             |             | 1 Vss                 |
| Interfaces               |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          |                     |       | A, B track         | A, B, N track and inverted |              |              |                                 |             |             | Hiperface             |
| Absolute revolutions     |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          |                     |       | 0                  |                            |              |              |                                 |             |             | 4096                  |
| Accuracy                 |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          |                     | [°]   | -22.5 ... 22.5     | -2 ... 2                   |              |              |                                 |             |             | -0.8 ... 0.8          |
| Min. input voltage       |                     |       |                    |                            |              |              |                                 |             |             |                       |
| DC                       | U <sub>in,min</sub> | [V]   | 8.00               |                            |              |              | 4.75                            |             |             | 7.00                  |
| Max. input voltage       |                     |       |                    |                            |              |              |                                 |             |             |                       |
| DC                       | U <sub>in,max</sub> | [V]   | 26.0               | 30.0                       |              |              | 5.25                            |             |             | 12.0                  |
| Max. current consumption |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          | I <sub>max</sub>    | [A]   | 0.040              | 0.15                       |              |              |                                 |             |             | 0.080                 |
| Limit frequency          |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          | f <sub>max</sub>    | [kHz] | 30.0               | 160                        |              |              | 300                             |             |             | 200                   |
| Inverter assignment      |                     |       |                    |                            |              |              |                                 |             |             |                       |
|                          |                     |       | E84AVSC<br>E84AVHC | E84AVHC                    |              |              | E84AVTC<br>E94A<br>ECS<br>EVS93 |             |             |                       |

#### Inverters

- Inverter Drives 8400 StateLine (E84AVSC)
- Inverter Drives 8400 HighLine (E84AVHC)
- Inverter Drives 8400 TopLine (E84AVTC)

#### Servo-Inverters

- Servo Drives 9400 (E94A)
- 9300 servo inverters (EVS93)
- Servo Drives ECS

# MH three-phase AC motors

## Accessories



### Blowers

- The use of a blower enables operation below 20 Hz without torque derating.

#### Rated data for 50 Hz

| Size  | Number of phases | Connection method |                  |                  |                  |                  |      |
|-------|------------------|-------------------|------------------|------------------|------------------|------------------|------|
| Motor |                  |                   |                  |                  |                  |                  |      |
|       |                  |                   | U <sub>min</sub> | U <sub>max</sub> | P <sub>max</sub> | I <sub>max</sub> | m    |
|       |                  |                   | [V]              | [V]              | [kW]             | [A]              | [kg] |
| 063   | 1                |                   | 230              | 277              | 0.027            | 0.11             | 2.00 |
|       | 3                | Δ                 | 200              | 303              | 0.028            | 0.12             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.070            |      |
| 071   | 1                |                   | 230              | 277              | 0.027            | 0.10             | 2.10 |
|       | 3                | Δ                 | 200              | 303              | 0.031            | 0.11             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.060            |      |
| 080   | 1                |                   | 230              | 277              | 0.029            | 0.11             | 2.30 |
|       | 3                | Δ                 | 200              | 303              | 0.031            | 0.11             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.060            |      |
| 090   | 1                |                   | 220              | 277              | 0.065            | 0.29             | 2.70 |
|       | 3                | Δ                 | 200              | 303              | 0.091            | 0.38             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.22             |      |
| 100   | 1                |                   | 220              | 277              | 0.066            | 0.28             | 3.00 |
|       | 3                | Δ                 | 200              | 303              | 0.091            | 0.37             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.22             |      |
| 112   | 1                |                   | 220              | 277              | 0.071            | 0.28             | 3.10 |
|       | 3                | Δ                 | 200              | 303              | 0.097            | 0.35             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.20             |      |
| 132   | 1                |                   | 230              | 277              | 0.098            | 0.40             | 4.20 |
|       | 3                | Δ                 | 200              | 303              | 0.12             | 0.58             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.33             |      |
| 160   | 1                |                   | 230              | 277              | 0.25             | 0.97             | 6.20 |
|       | 3                | Δ                 | 200              | 303              |                  | 0.87             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.50             |      |
| 180   | 1                |                   | 230              | 277              |                  | 0.97             | 8.00 |
|       | 3                | Δ                 | 200              | 303              |                  | 0.87             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.50             |      |

# MH three-phase AC motors

## Accessories



### Blowers

#### Rated data for 50 Hz

| Size  | Number of phases | Connection method |                  |                  |                  |                  |      |
|-------|------------------|-------------------|------------------|------------------|------------------|------------------|------|
| Motor |                  |                   |                  |                  |                  |                  |      |
|       |                  |                   | U <sub>min</sub> | U <sub>max</sub> | P <sub>max</sub> | I <sub>max</sub> | m    |
|       |                  |                   | [V]              | [V]              | [kW]             | [A]              | [kg] |
| 200   | 1                |                   | 230              | 277              | 0.25             | 0.97             | 8.00 |
|       | 3                | Δ                 | 200              | 303              |                  | 0.87             |      |
|       |                  | Y                 | 346              | 525              |                  | 0.50             |      |
| 225   | 3                | Δ                 | 200              | 400              | 0.28             | 1.10             | 15.0 |
|       |                  | Y                 | 346              | 525              | 0.17             | 0.35             |      |

#### Rated data for 60 Hz

| Size  | Number of phases | Connection method |                  |                  |                  |                  |      |
|-------|------------------|-------------------|------------------|------------------|------------------|------------------|------|
| Motor |                  |                   |                  |                  |                  |                  |      |
|       |                  |                   | U <sub>min</sub> | U <sub>max</sub> | P <sub>max</sub> | I <sub>max</sub> | m    |
|       |                  |                   | [V]              | [V]              | [kW]             | [A]              | [kg] |
| 063   | 1                |                   | 230              | 277              | 0.032            | 0.12             | 2.00 |
|       | 3                | Δ                 | 220              | 332              | 0.028            | 0.10             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.060            |      |
| 071   | 1                |                   | 230              | 277              | 0.033            | 0.12             | 2.10 |
|       | 3                | Δ                 | 220              | 332              | 0.029            | 0.10             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.060            |      |
| 080   | 1                |                   | 230              | 277              | 0.037            | 0.14             | 2.30 |
|       | 3                | Δ                 | 220              | 332              | 0.034            | 0.10             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.060            |      |
| 090   | 1                |                   | 220              | 277              | 0.065            | 0.25             | 2.70 |
|       | 3                | Δ                 |                  | 332              | 0.077            | 0.33             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.19             |      |
| 100   | 1                |                   | 220              | 277              | 0.075            | 0.30             | 3.00 |
|       | 3                | Δ                 |                  | 332              | 0.087            | 0.31             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.18             |      |
| 112   | 1                |                   | 220              | 277              | 0.094            | 0.37             | 3.10 |
|       | 3                | Δ                 |                  | 332              | 0.10             | 0.31             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.18             |      |
| 132   | 1                |                   | 230              | 277              | 0.15             | 0.57             | 4.20 |
|       | 3                | Δ                 | 220              | 332              |                  | 0.44             |      |
|       |                  | Y                 | 380              | 575              |                  | 0.25             |      |
| 160   | 3                | Δ                 | 220              | 332              | 0.36             | 0.93             | 6.20 |
| Y     |                  | 380               | 575              | 0.56             |                  |                  |      |
| 180   |                  | Δ                 | 220              | 332              |                  | 0.93             | 8.00 |
|       |                  | Y                 | 380              | 575              |                  | 0.56             |      |
| 200   |                  | Δ                 | 220              | 332              |                  | 0.93             | 8.00 |
|       |                  | Y                 | 380              | 575              |                  | 0.56             |      |
| 225   | Δ                | 220               | 400              | 0.28             | 0.76             | 15.0             |      |
|       | Y                | 380               | 575              | 0.26             | 0.43             |                  |      |

# MH three-phase AC motors

## Accessories



### Temperature monitoring

- The thermal sensors are integrated in the windings. The use of an additional motor protection switch is recommended.

#### TKO thermal contacts

| Function   | Operating temperature | Min. reset temperature | Max. reset temperature | Max. input current  | Max. input voltage        |
|------------|-----------------------|------------------------|------------------------|---------------------|---------------------------|
|            | T                     | $T_{\min}$             | $T_{\max}$             | $I_{\text{in,max}}$ | AC<br>$U_{\text{in,max}}$ |
|            | -5 ... 5<br>[°C]      |                        |                        |                     |                           |
|            | [°C]                  | [°C]                   | [°C]                   | [A]                 | [V]                       |
| NC contact | 150                   | 90.0                   | 135                    | 2.50                | 250                       |

#### PTC thermistor

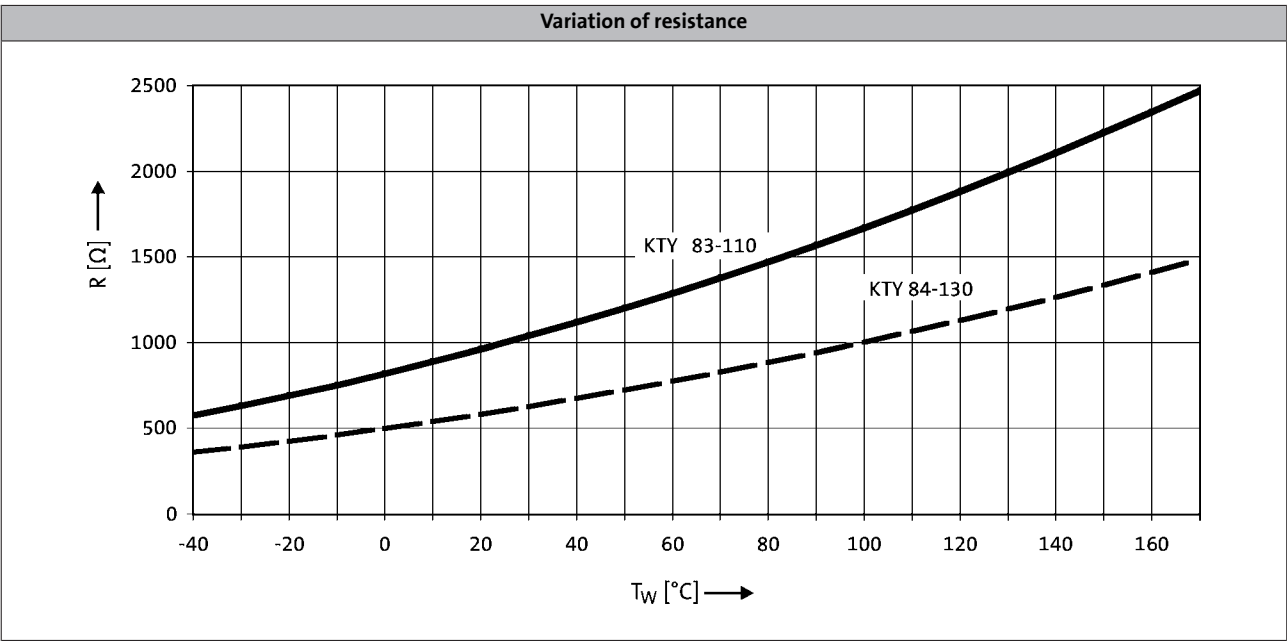
| Function                    | Operating temperature | Rated resistance |        |        | Standard                           |
|-----------------------------|-----------------------|------------------|--------|--------|------------------------------------|
|                             |                       | 155 °C           | -20 °C | 140 °C |                                    |
|                             | T                     | $R_N$            | $R_N$  | $R_N$  |                                    |
|                             | -5 ... 5<br>[°C]      |                  |        |        |                                    |
|                             | [°C]                  | [Ω]              | [Ω]    | [Ω]    |                                    |
| Sudden change in resistance | 150                   | 550              | 30.0   | 250    | DIN 44080<br>DIN VDE 0660 Part 303 |



Temperature monitoring

KTY temperature sensor

|           | Function                     | Rated resistance |                |                | Max. input current  |                     |
|-----------|------------------------------|------------------|----------------|----------------|---------------------|---------------------|
|           |                              | 25 °C            | 150 °C         | 170 °C         | 25 °C               | 170 °C              |
|           |                              | R <sub>N</sub>   | R <sub>N</sub> | R <sub>N</sub> | I <sub>in,max</sub> | I <sub>in,max</sub> |
|           |                              | [Ω]              | [Ω]            | [Ω]            | [A]                 | [A]                 |
| KTY83-110 | Continuous resistance change | 1000             | 2225           | 2471           | 0.010               | 0.002               |
| KTY84-130 | Continuous resistance change | 603              | 1334           | 1482           | 0.010               | 0.002               |



- If the detector is supplied with a measured current of 1 mA, the above relationship between the temperature and the resistance applies.

# MH three-phase AC motors

## Accessories



### Terminal box

The three-phase AC motors are designed for operation at a constant mains frequency and with an inverter.

For 50 Hz operation, the motors are operated in  $\Delta$  configuration at 230 V or in star configuration at 400 V.

For inverter operation, the base frequency has been specified as 87 Hz at a rated voltage of 400 V in  $\Delta$  configuration.

In the standard version, the motors are connected in the terminal box. As an option, the motors are also available with the connectors described on the following pages as long as the permissible ratings are not exceeded.

#### Motor terminal box - built-on accessories assignment: 4-pole / 6-pole motors

| Motor type                           | M□□MAXX      | M□□MARS<br>M□□MAIG<br>M□□MAAG | M□□MAZE<br>M□□MAHA | M□□MALL | M□□MALZ<br>M□□MALH |
|--------------------------------------|--------------|-------------------------------|--------------------|---------|--------------------|
| Motor frame size                     | Terminal box |                               |                    |         |                    |
| 063-02<br>063-22                     | KK1          | KK2                           |                    |         |                    |
| 063-12<br>063-32<br>063-42           | KK1          | KK2                           |                    |         |                    |
| 071-32<br>071-42<br>071-13<br>071-33 | KK1          | KK2                           | KK2                | KK1     | KK1                |
| 080-13<br>080-32<br>080-33<br>080-42 | KK1          | KK2                           | KK2                | KK1     | KK1                |
| 090-12<br>090-32                     | KK1          | KK2                           | KK2                | KK1     | KK1                |
| 100-12<br>100-32                     | KK1          | KK2                           | KK2                | KK2     | KK2                |
| 112-22<br>112-32                     | KK1          | KK2                           | KK2                | KK1     | KK1                |
| 132-12<br>132-22<br>132-32           | KK1          | KK3                           | KK3                | KK1     | KK1                |
| 160-22<br>160-32                     | KK3          | KK3                           |                    |         |                    |
| 180-12<br>180-32<br>180-42<br>180-42 | KK3          | KK3                           |                    |         |                    |
| 225-12<br>225-22                     | KK3          | KK3                           |                    |         |                    |

# MH three-phase AC motors

## Accessories



### Terminal box

Motor terminal box - built-on accessories assignment: 4-pole / 6-pole motors

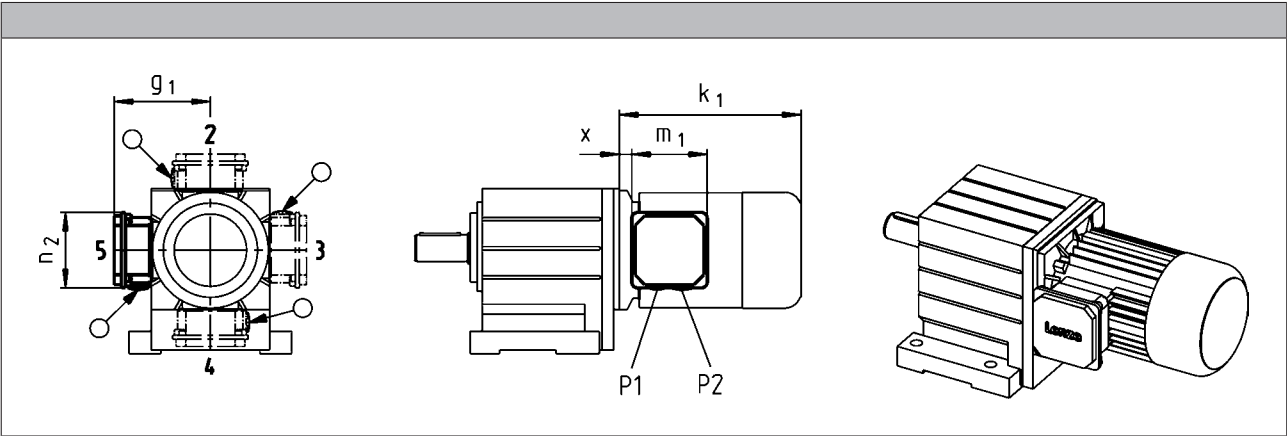
| Motor type                           | M□□MABR      | M□□MABS<br>M□□MABI<br>M□□MABA | M□□MABZ<br>M□□MABH | M□□MABL |
|--------------------------------------|--------------|-------------------------------|--------------------|---------|
| Motor frame size                     | Terminal box |                               |                    |         |
| 063-02<br>063-22                     | KK2          | KK3                           |                    |         |
| 063-12<br>063-32<br>063-42           | KK2          | KK3                           |                    |         |
| 071-32<br>071-42<br>071-13<br>071-33 | KK2          | KK3                           | KK2                | KK2     |
| 080-13<br>080-32<br>080-33<br>080-42 | KK2          | KK3                           | KK2                | KK2     |
| 090-12<br>090-32                     | KK2          | KK3                           | KK2                | KK2     |
| 100-12<br>100-32                     | KK2          | KK3                           | KK2                | KK2     |
| 112-22<br>112-32                     | KK2          | KK3                           | KK2                | KK2     |
| 132-12<br>132-22<br>132-32           | KK3          | KK3                           | KK3                | KK3     |
| 160-22<br>160-32                     | KK3          | KK3                           |                    |         |
| 180-12<br>180-32<br>180-42           | KK3          | KK3                           |                    |         |
| 225-12<br>225-22                     | KK3          | KK3                           |                    |         |



Terminal box

Dimensions of KK1

- For motors with motor terminal box KK1, the connector position can be selected in accordance with the terminal box position.
- If preferred positions are not specified in the order, the cable entry will be positioned as circled on the diagram below.



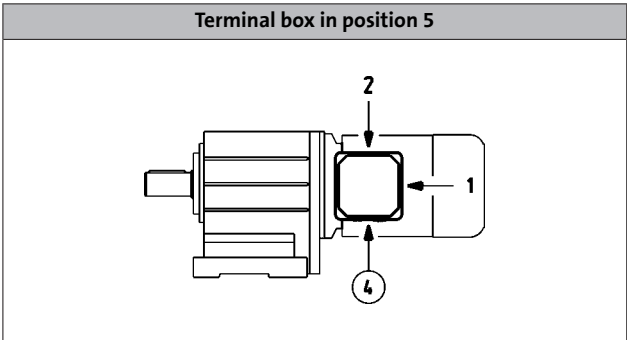
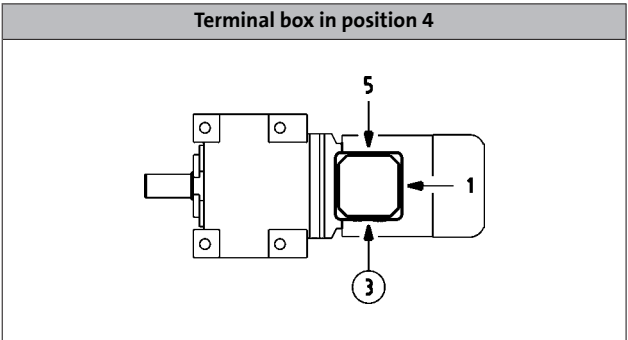
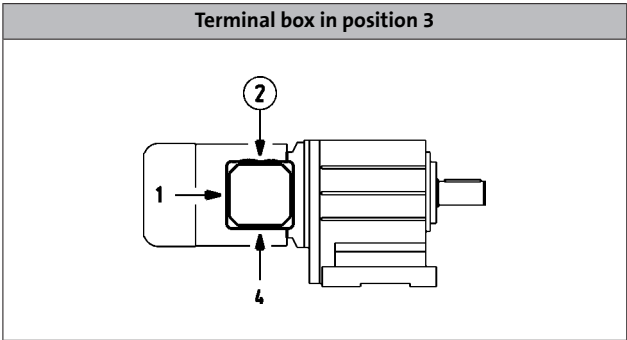
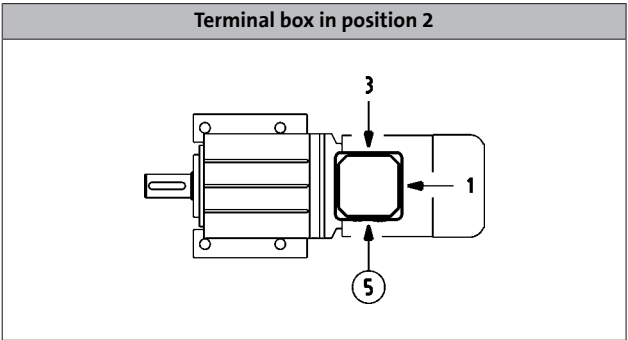
| Size  |                  |                   |                            |                            |                                  |                    |
|-------|------------------|-------------------|----------------------------|----------------------------|----------------------------------|--------------------|
| Motor |                  |                   |                            |                            |                                  |                    |
|       | x                | g <sub>1</sub>    | m <sub>1</sub>             | n <sub>2</sub>             | P <sub>1</sub>                   | P <sub>2</sub>     |
|       | [mm]             | [mm]              | [mm]                       | [mm]                       | [mm]                             | [mm]               |
| 063   | 21               | 100               | 75.0<br>93.0 <sup>1)</sup> | 75.0<br>93.0 <sup>1)</sup> | M16x1.5<br>M20x1.5 <sup>1)</sup> | M20x1.5<br>M20x1.5 |
| 071   | 12 <sup>1)</sup> | 117 <sup>1)</sup> |                            |                            |                                  |                    |
|       | 24               | 109               | 115                        | 115                        | M20x1.5                          | M25x1.5            |
| 080   | 15 <sup>1)</sup> | 126 <sup>1)</sup> |                            |                            |                                  |                    |
| 090   | 14               | 150               |                            |                            |                                  |                    |
| 100   | 19               | 157               |                            |                            |                                  |                    |
| 112   | 20               | 166               |                            |                            |                                  |                    |
| 132   | 22               | 176               |                            |                            |                                  |                    |
|       | 33               | 195               | 122                        | 122                        | M32x1.5                          | M32x1.5            |

<sup>1)</sup> UL/CSA approval: cURus



Terminal box

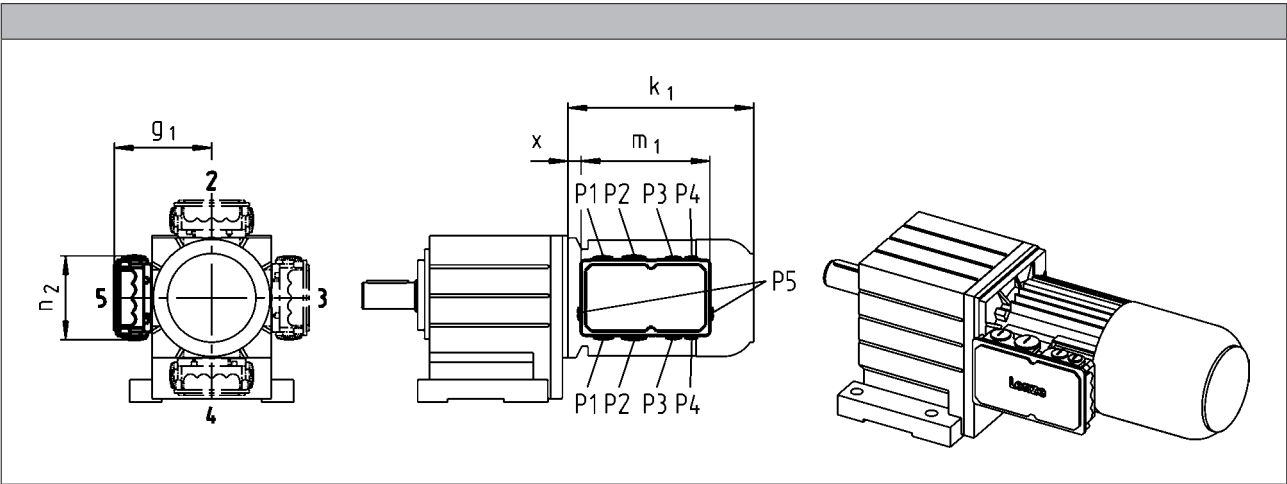
Cable entry position when using KK1





Terminal box

Dimensions of KK2

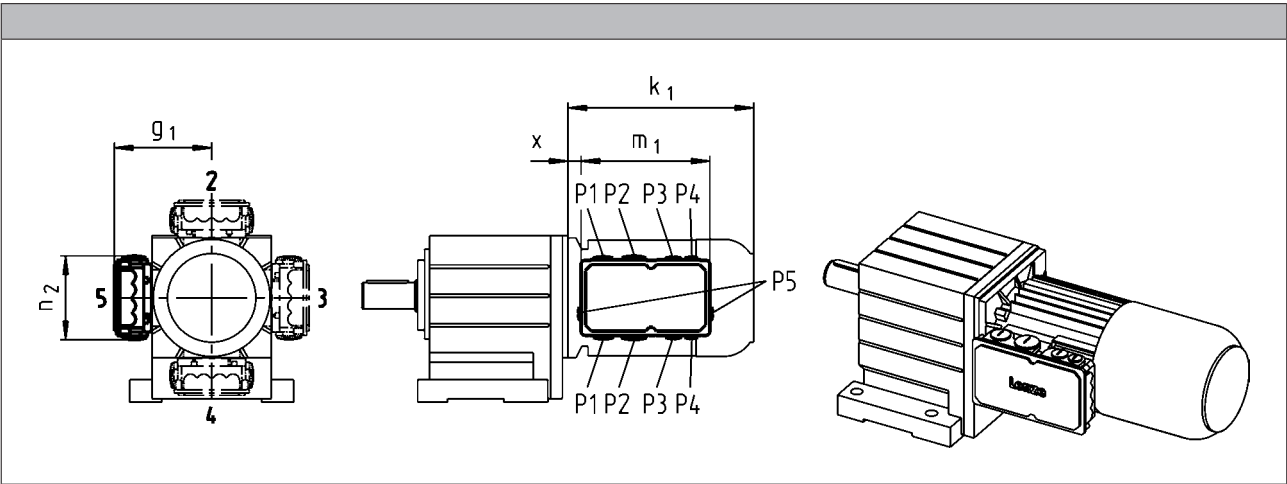


| Size  |      |                |                |                |                |                |
|-------|------|----------------|----------------|----------------|----------------|----------------|
| Motor |      |                |                |                |                |                |
|       | x    | g <sub>1</sub> | m <sub>1</sub> | n <sub>2</sub> | P <sub>1</sub> | P <sub>2</sub> |
|       | [mm] | [mm]           | [mm]           | [mm]           | [mm]           | [mm]           |
| 063   | 13   | 107            | 136            | 103            | M16x1.5        | M20x1.5        |
| 071   | 15   | 118            |                |                |                |                |
| 080   | 17   | 132            |                |                |                |                |
| 090   | 22   | 137            | 152            | 121            | M20x1.5        | M25x1.5        |
| 100   | 23   | 147            |                |                |                |                |
| 112   | 25   | 158            |                |                |                |                |



Terminal box

Dimensions of KK3



| Size  |      |                |                |                |                |                       |                       |                |                |
|-------|------|----------------|----------------|----------------|----------------|-----------------------|-----------------------|----------------|----------------|
| Motor |      |                |                |                |                |                       |                       |                |                |
|       | x    | g <sub>1</sub> | m <sub>1</sub> | n <sub>2</sub> | P <sub>1</sub> | P <sub>2</sub>        | P <sub>3</sub>        | P <sub>4</sub> | P <sub>5</sub> |
|       | [mm] | [mm]           | [mm]           | [mm]           | [mm]           | [mm]                  | [mm]                  | [mm]           | [mm]           |
| 063   | 2    | 124            | 195            | 125            | M25x1.5        | M32x1.5               | M20x1.5               | M20x1.5        |                |
| 071   | 5    | 133            |                |                |                |                       |                       |                |                |
| 080   | 15   | 142            |                |                |                |                       |                       |                |                |
| 090   | 20   | 147            |                |                |                |                       |                       |                |                |
| 100   | 21   | 158            |                |                |                |                       |                       |                |                |
| 112   | 23   | 168            |                |                |                |                       |                       |                |                |
| 132   | 38   | 187            | 226            | 127            | M50x1.5        | M16x1.5               | M16x1.5               | M16x1.5        |                |
| 160   | 35   | 210            |                |                |                |                       |                       |                |                |
| 180   | 73   | 230            |                |                |                |                       |                       |                |                |
| 225   | 95   | 346            | 354            | 205            |                | M63x1.5 <sup>1)</sup> | M50x1.5 <sup>1)</sup> |                | M16x1.5        |

<sup>1)</sup> Cable entry only possible at one position.  
Terminal box position 2: cable entry at position 5.  
Terminal box position 3: cable entry at position 2.  
Terminal box position 4: cable entry at position 3.  
Terminal box position 5: cable entry at position 4.

# MH three-phase AC motors

## Accessories

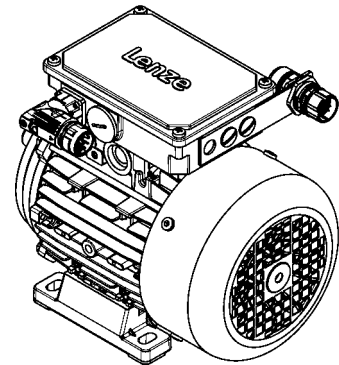


### Plug connectors

ICN, HAN and M12 connectors (only for IG128-24V-H incremental encoder) are available for the three-phase AC motors.

### ICN connector

A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



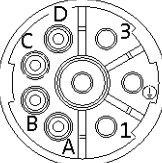
### Connection for power, brake and temperature monitoring

The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As this connector is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and must be checked before commissioning.

#### ► ICN 6-pole

| Pin assignment |             |               |  |
|----------------|-------------|---------------|---------------------------------------------------------------------------------------|
| Contact        | Designation | Meaning       |                                                                                       |
| 1              | BD1 / BA1   | Brake +/AC    |                                                                                       |
| 2              | BD2 / BA2   | Brake /AC     |                                                                                       |
| PE             | PE          | PE conductor  |                                                                                       |
| 4              | U           | Phase U power |                                                                                       |
| 5              | V           | Phase V power |                                                                                       |
| 6              | W           | Phase W power |                                                                                       |

#### ► ICN 8-pole

| Pin assignment |                |                               |  |
|----------------|----------------|-------------------------------|---------------------------------------------------------------------------------------|
| Contact        | Designation    | Meaning                       |                                                                                       |
| 1              | U              | Phase U power                 |                                                                                       |
| PE             | PE             | PE conductor                  |                                                                                       |
| 3              | V              | Phase V power                 |                                                                                       |
| 4              | W              | Phase W power                 |                                                                                       |
| A              | TB1 / TP1 / R1 | Thermal sensor: TKO/PTC/ +KTY |                                                                                       |
| B              | TB2 / TP2 / R2 | Thermal sensor: TKO/PTC/-KTY  |                                                                                       |
| C              | BD1 / BA1      | Brake +/AC                    | 6.11                                                                                  |
| D              | BD2 / BA2      | Brake /AC                     |                                                                                       |

# MH three-phase AC motors

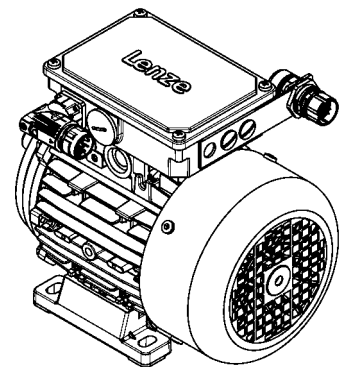
## Accessories



### ICN connector

#### Feedback connection

All encoder systems (apart from IG128-24V-H) are also available with an ICN connector fixed to the motor terminal box for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing mating connectors can therefore continue to be used without difficulty.

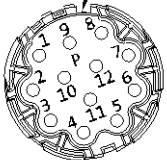


#### ► Resolver

| Pin assignment |             |                              |  |
|----------------|-------------|------------------------------|--|
| Contact        | Designation | Meaning                      |  |
| 1              | +Ref        | Transformer windings         |  |
| 2              | -Ref        |                              |  |
| 3              | +VCC ETS    | Supply: Electronic nameplate |  |
| 4              | +COS        | Cosine stator windings       |  |
| 5              | -COS        |                              |  |
| 6              | +SIN        | Sine stator windings         |  |
| 7              | -SIN        |                              |  |
| 8              |             | Not assigned                 |  |
| 9              |             |                              |  |
| 10             |             |                              |  |
| 11             | +KTY        | KTY temperature sensor       |  |
| 12             | -KTY        |                              |  |

#### ► Hiperface incremental encoder and SinCos absolute value encoder

| Pin assignment |                 |                           |
|----------------|-----------------|---------------------------|
| Contact        | Designation     | Meaning                   |
| 1              | B               | Track B/+SIN              |
| 2              | A <sup>-</sup>  | Track A inverse/-COS      |
| 3              | A               | Track A/+COS              |
| 4              | +U <sub>B</sub> | Supply +                  |
| 5              | GND             | Mass                      |
| 6              | Z <sup>-</sup>  | Zero track inverse/-RS485 |
| 7              | Z               | Zero track/+RS485         |
| 8              |                 | Not assigned              |
| 9              | B <sup>-</sup>  | Track B inverse/-SIN      |
| 10             |                 | Not assigned              |
| 11             | +KTY            | KTY temperature sensor    |
| 12             | -KTY            |                           |



# MH three-phase AC motors

## Accessories



### ICN connector

Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

| Motor type                           | M□□MAXX                         | M□□MARS<br>M□□MAIG<br>M□□MAAG | M□□MAZE<br>M□□MAHA | M□□MALL | M□□MALZ<br>M□□MALH |
|--------------------------------------|---------------------------------|-------------------------------|--------------------|---------|--------------------|
| Motor frame size                     | Terminal box with ICN connector |                               |                    |         |                    |
| 063-02<br>063-22                     | KK1                             | KK2                           |                    |         |                    |
| 063-12<br>063-32<br>063-42           | KK1                             | KK2                           |                    |         |                    |
| 071-32<br>071-42<br>071-13<br>071-33 | KK1                             | KK2                           | KK2                | KK1     | KK1                |
| 080-13<br>080-32<br>080-33<br>080-42 | KK1                             | KK2                           | KK2                | KK1     | KK1                |
| 090-12<br>090-32                     | KK1                             | KK2                           | KK2                | KK1     | KK1                |
| 100-12<br>100-32                     | KK1                             | KK2                           | KK2                | KK2     | KK2                |
| 112-22<br>112-32                     | KK1                             | KK2                           | KK2                | KK1     | KK1                |
| 132-12<br>132-22<br>132-32           | KK1                             | KK3                           | KK3                | KK1     | KK1                |

# MH three-phase AC motors

## Accessories



### ICN connector

Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

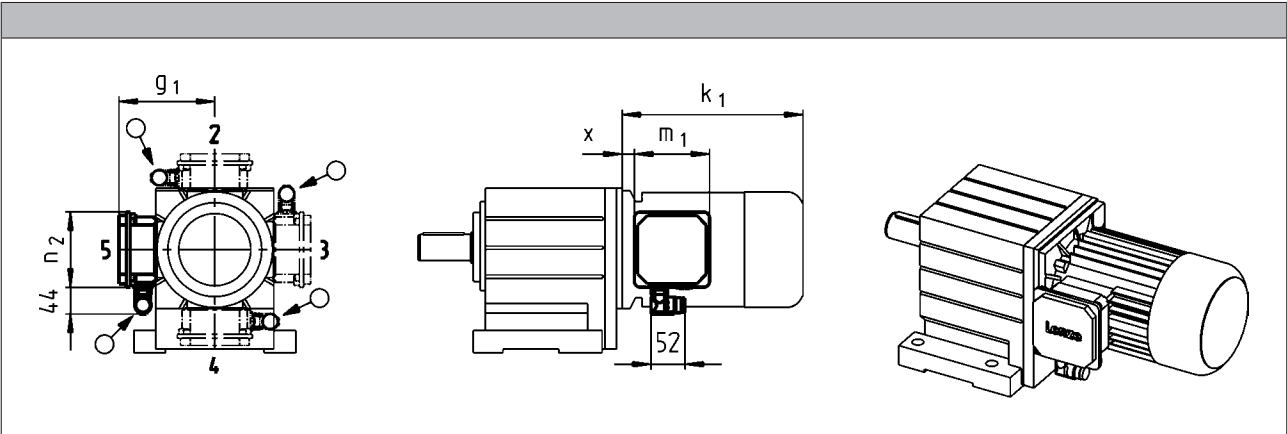
| Motor type                           | M□□MABR                         | M□□MABS<br>M□□MABI<br>M□□MABA | M□□MABZ<br>M□□MABH | M□□MABL |
|--------------------------------------|---------------------------------|-------------------------------|--------------------|---------|
| Motor frame size                     | Terminal box with ICN connector |                               |                    |         |
| 063-02<br>063-22                     | KK2                             | KK2                           |                    |         |
| 063-12<br>063-32<br>063-42           | KK2                             | KK2                           |                    |         |
| 071-32<br>071-42<br>071-13<br>071-33 | KK2                             | KK2                           | KK2                | KK2     |
| 080-13<br>080-32<br>080-33<br>080-42 | KK2                             | KK2                           | KK2                | KK2     |
| 090-12<br>090-32                     | KK2                             | KK2                           | KK2                | KK2     |
| 100-12<br>100-32                     | KK2                             | KK2                           | KK2                | KK2     |
| 112-22<br>112-32                     | KK2                             | KK2                           | KK2                | KK2     |
| 132-12<br>132-22<br>132-32           | KK3                             | KK3                           | KK3                | KK3     |



ICN connector

Dimensions of KK1

- For motors with connectors, the connector position can be selected in accordance with the terminal box position.
- If preferred positions are not specified in the order, the connector will be positioned as circled on the diagram below.

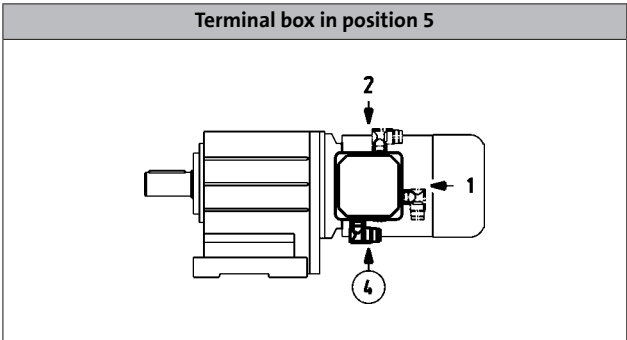
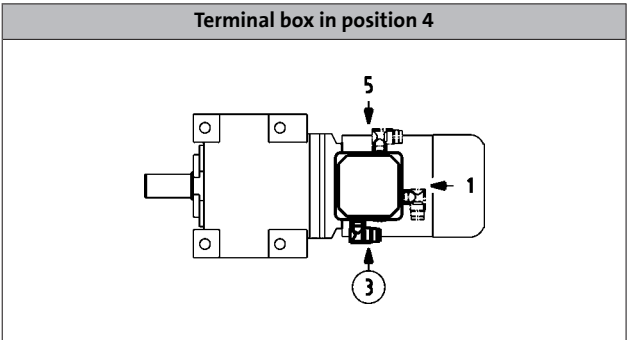
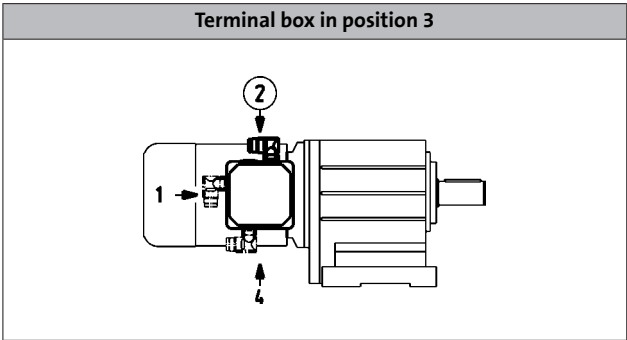
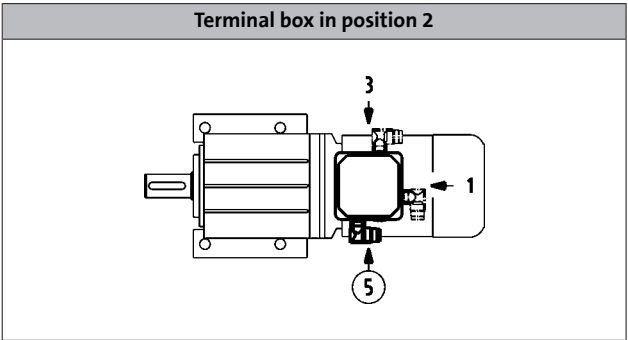


| Size  |      |                |                |                |
|-------|------|----------------|----------------|----------------|
| Motor |      |                |                |                |
|       | x    | g <sub>1</sub> | m <sub>1</sub> | n <sub>2</sub> |
|       | [mm] | [mm]           | [mm]           | [mm]           |
| 063   | 12   | 117            | 93.0           | 93.0           |
| 071   | 15   | 126            |                |                |
| 080   | 14   | 150            |                |                |
| 090   | 19   | 157            | 115            | 115            |
| 100   | 20   | 166            |                |                |
| 112   | 22   | 176            |                |                |
| 132   | 33   | 195            | 122            | 122            |



ICN connector

Connector position when using KK1

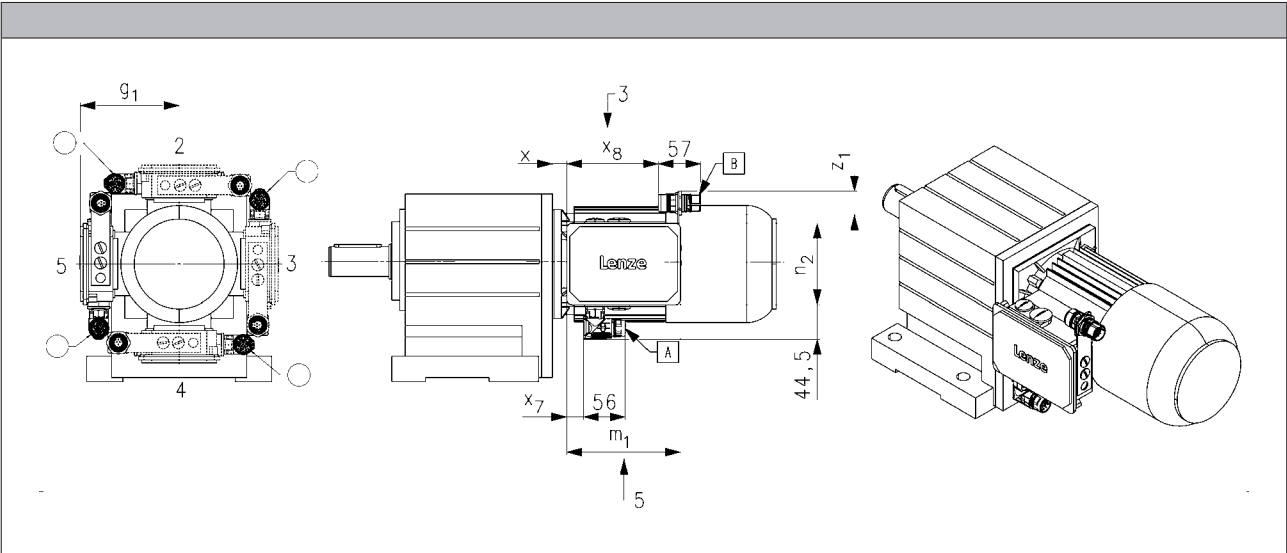




ICN connector

Dimensions of KK2/KK3

- For motors with connectors, the connector position can be selected in accordance with the terminal box position.
- If preferred positions are not specified in the order, the connector will be positioned as circled on the diagram below.

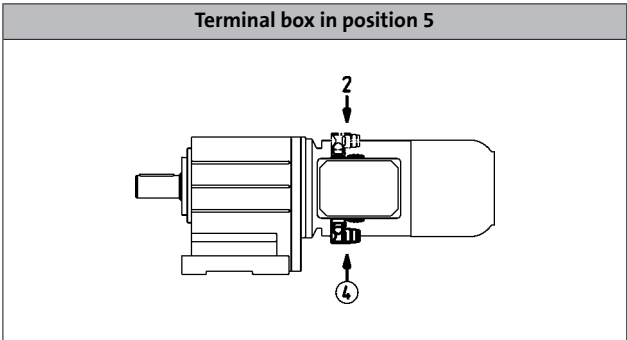
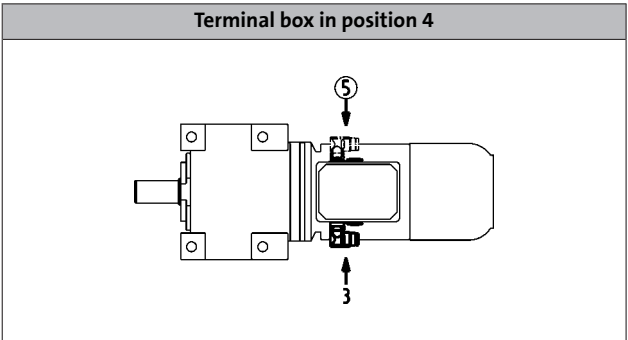
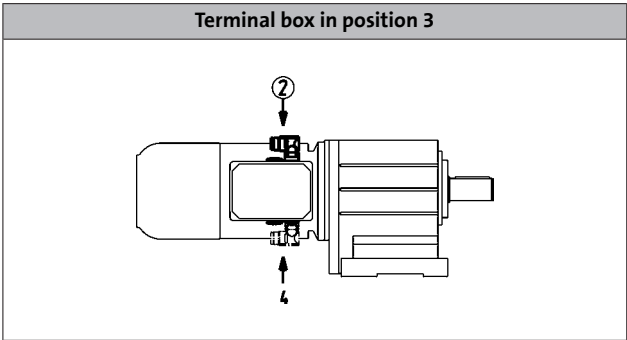
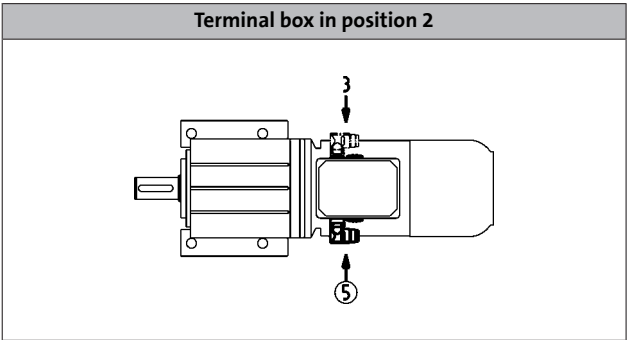


| Size  |      |                |                |                |                |                |                     |
|-------|------|----------------|----------------|----------------|----------------|----------------|---------------------|
| Motor |      |                |                |                |                |                |                     |
|       | x    | g <sub>1</sub> | m <sub>1</sub> | n <sub>2</sub> | x <sub>7</sub> | x <sub>8</sub> | z <sub>1, max</sub> |
|       | [mm] | [mm]           | [mm]           | [mm]           | [mm]           | [mm]           | [mm]                |
| 063   | 13   | 107            | 136            | 103            | 16             | 109            | 43                  |
| 071   | 15   | 118            |                |                |                |                |                     |
| 080   | 17   | 132            | 152            | 121            | 23             | 125            | 41                  |
| 090   | 22   | 137            |                |                |                |                |                     |
| 100   | 23   | 147            |                |                |                |                |                     |
| 112   | 25   | 158            | 195            | 125            | 27             | 166            | 71                  |
| 132   | 38   | 187            |                |                |                |                |                     |



ICN connector

Connector position when using KK2/KK3



# MH three-phase AC motors

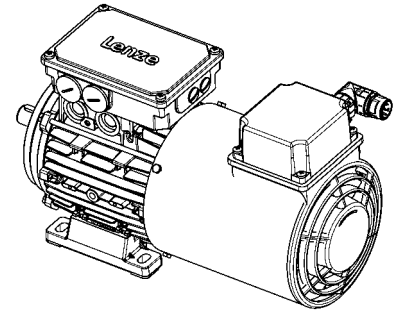
## Accessories



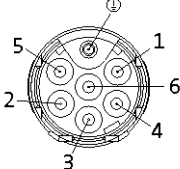
### ICN connector

#### Blower connection

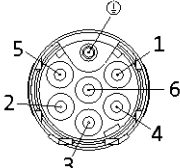
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used without difficulty.



#### ► Blower 1-ph

| Pin assignment |             |              |                                                                                      |
|----------------|-------------|--------------|--------------------------------------------------------------------------------------|
| Contact        | Designation | Meaning      |                                                                                      |
| PE             | PE          | PE conductor |  |
| 1              | U1          | Fan          |                                                                                      |
| 2              | U2          |              |                                                                                      |
| 3              |             | Not assigned |                                                                                      |
| 4              |             |              |                                                                                      |
| 5              |             |              |                                                                                      |
| 6              |             |              |                                                                                      |

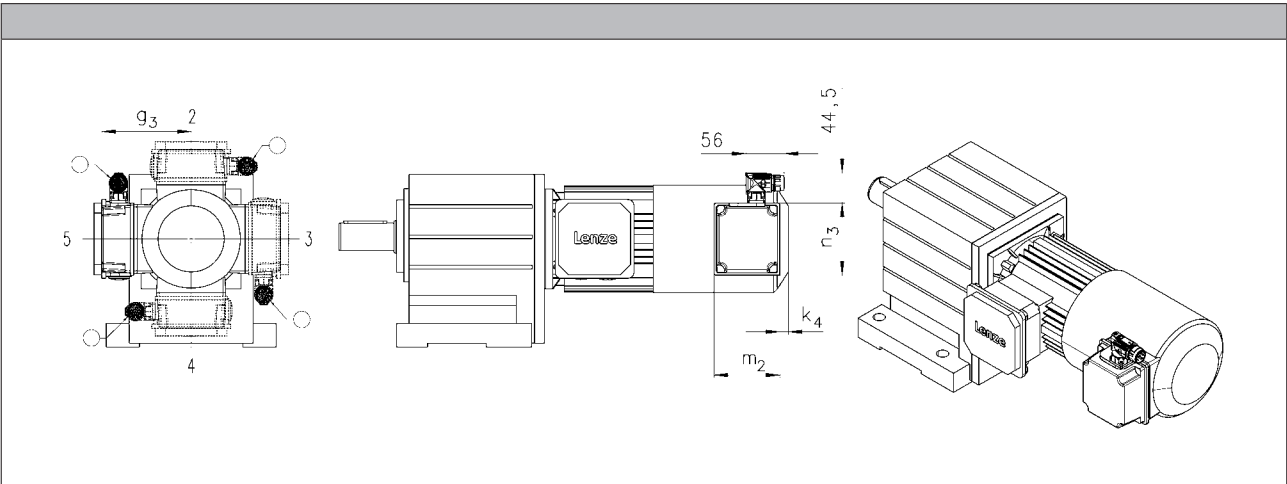
#### ► Blower 3-ph

| Pin assignment |             |               |                                                                                       |
|----------------|-------------|---------------|---------------------------------------------------------------------------------------|
| Contact        | Designation | Meaning       |                                                                                       |
| PE             | PE          | PE conductor  |  |
| 1              | U           | Phase U power |                                                                                       |
| 2              |             | Not assigned  |                                                                                       |
| 3              | V           | Phase V power |                                                                                       |
| 4              |             | Not assigned  |                                                                                       |
| 5              |             |               |                                                                                       |
| 6              | W           | Phase W power |                                                                                       |



ICN connector

Dimensions of blower



| Size  |                |                |                |                |
|-------|----------------|----------------|----------------|----------------|
| Motor |                |                |                |                |
|       | k <sub>4</sub> | g <sub>3</sub> | m <sub>2</sub> | n <sub>3</sub> |
|       | [mm]           | [mm]           | [mm]           | [mm]           |
| 063   | 12             | 115            | 95             | 105            |
| 071   |                | 122            |                |                |
| 080   | 13             | 132            | 96             | 106            |
| 090   | 22             | 141            | 95             | 105            |
| 100   |                | 150            |                |                |
| 112   |                | 162            |                |                |
| 132   |                | 182            |                |                |
| 160   | 31             | 209            | 96             | 106            |
| 180   |                |                |                |                |
| 225   |                |                |                |                |

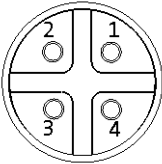
- In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.



M12 connector

IG128-24V-H incremental encoder connection

As a standard this incremental encoder is equipped with a connection cable of about 0.5 m length and with a common industry standard M12 connector at its end.

| Pin assignment |                 |          |  |
|----------------|-----------------|----------|-------------------------------------------------------------------------------------|
| Contact        | Designation     | Meaning  |                                                                                     |
| 1              | +U <sub>B</sub> | Supply + |                                                                                     |
| 2              | B               | Track B  |                                                                                     |
| 3              | GND             | Mass     |                                                                                     |
| 4              | A               | Track A  |                                                                                     |

# MH three-phase AC motors

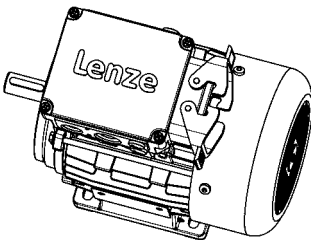
## Accessories



### HAN connector

#### 10E

In the case of the rectangular HAN-10E connectors, all six ends of the three winding phases are taken out to the power contacts. The motor circuit is therefore determined in the mating connector.



| Pin assignment |                              |  |
|----------------|------------------------------|--|
| Contact        | Meaning                      |  |
| 1              | Terminal board: U1           |  |
| 2              | Terminal board: V1           |  |
| 3              | Terminal board: W1           |  |
| 4              | Brake +/-AC                  |  |
| 5              | Brake +/-AC                  |  |
| 6              | Terminal board: W2           |  |
| 7              | Terminal board: U2           |  |
| 8              | Terminal board: V2           |  |
| 9              | Thermal sensor: +KTY/PTC/TKO |  |
| 10             | Thermal sensor: KTY/PTC/TKO  |  |

# MH three-phase AC motors

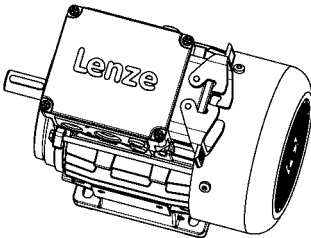
## Accessories



### HAN connector

#### Modular

The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.



► HAN modular 16 A

| Pin assignment |         |                              |  |
|----------------|---------|------------------------------|--|
| Module         | Contact | Meaning                      |  |
| B              |         | Dummy module                 |  |
| C              | 1       | Thermal sensor: +KTY/PTC/TKO |  |
|                | 2       | Brake +/AC                   |  |
|                | 3       | Brake -/AC                   |  |
|                | 4       | Rectifier: Switching contact |  |
|                | 5       |                              |  |
|                | 6       | Thermal sensor: KTY/PTC/TKO  |  |

► HAN modular 40 A

| Pin assignment |         |                              |  |
|----------------|---------|------------------------------|--|
| Module         | Contact | Meaning                      |  |
| A              | 1       | Terminal board: U1           |  |
|                | 2       | Terminal board: V1           |  |
|                | 3       | Terminal board: W1           |  |
| B              |         | Dummy module                 |  |
| C              | 1       | Thermal sensor: +KTY/PTC/TKO |  |
|                | 2       | Brake +/AC                   |  |
|                | 3       | Brake -/AC                   |  |
|                | 4       | Rectifier: Switching contact |  |
|                | 5       |                              |  |
|                | 6       | Thermal sensor: KTY/PTC/TKO  |  |

# MH three-phase AC motors

## Accessories



### HAN connector

Motor terminal box with HAN connectors - built-on accessories assignment: 4-pole / 6-pole motors

| Motor type | M□□MAXX<br>M□□MABR | M□□MAZE<br>M□□MAHA<br>M□□MABZ<br>M□□MABH | M□□MALL<br>M□□MABL | M□□MALZ<br>M□□MALH |
|------------|--------------------|------------------------------------------|--------------------|--------------------|
|------------|--------------------|------------------------------------------|--------------------|--------------------|

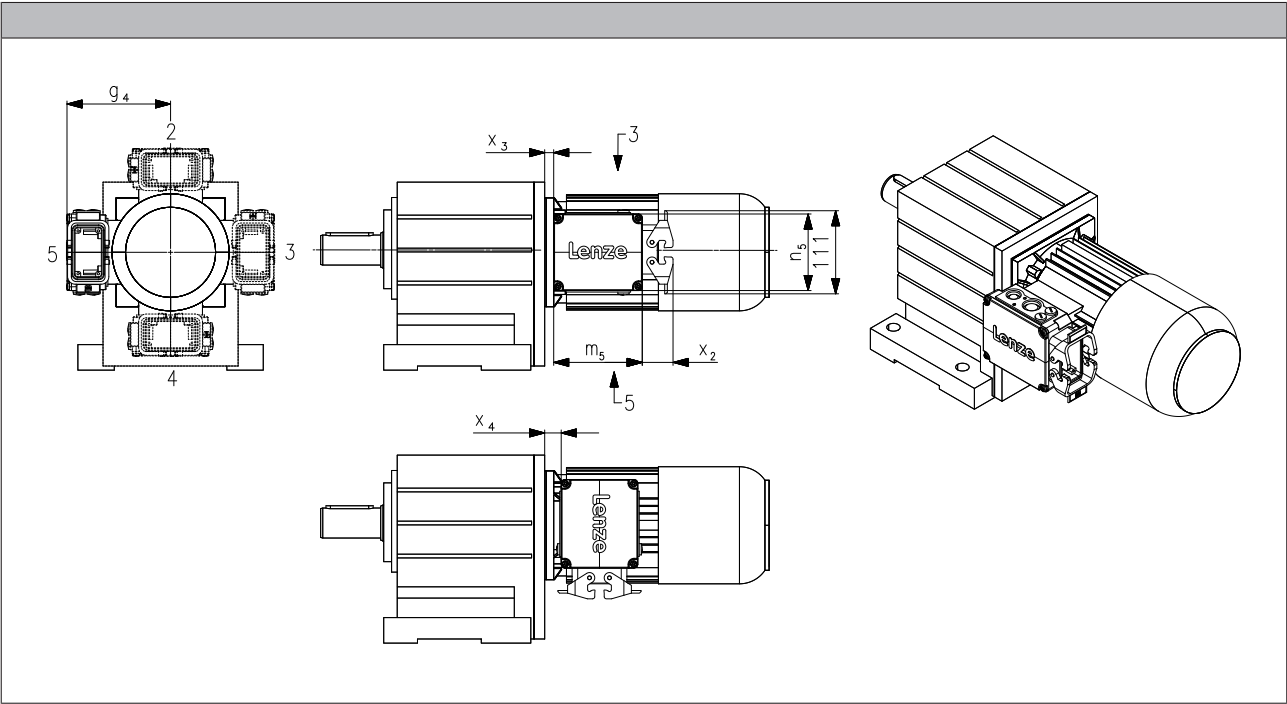
| Motor frame size                     | Terminal box with HAN connector |                        |                        |                        |
|--------------------------------------|---------------------------------|------------------------|------------------------|------------------------|
| 063-02<br>063-22                     | HAN-10E<br>HAN modular          |                        |                        |                        |
| 063-12<br>063-32<br>063-42           | HAN-10E<br>HAN modular          |                        |                        |                        |
| 071-32<br>071-42<br>071-13<br>071-33 | HAN-10E<br>HAN modular          | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular |
| 080-13<br>080-32<br>080-33<br>080-42 | HAN-10E<br>HAN modular          | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular |
| 090-12<br>090-32                     | HAN-10E<br>HAN modular          | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular |
| 100-12<br>100-32                     | HAN-10E<br>HAN modular          | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular |
| 112-22<br>112-32                     | HAN-10E<br>HAN modular          | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular | HAN-10E<br>HAN modular |
| 132-12<br>132-22<br>132-32           | HAN modular                     | HAN modular            | HAN modular            | HAN modular            |
| 160-22<br>160-32                     | HAN modular                     |                        |                        |                        |



HAN connector

Dimensions

- For motors with connectors, the connector position can be selected in accordance with the terminal box position.
- Unless the connector position is specified, it will be supplied in position 1.

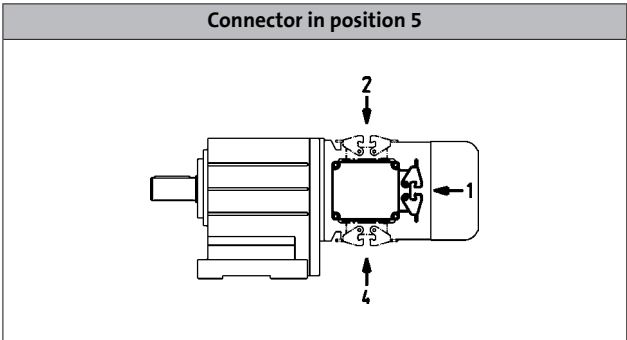
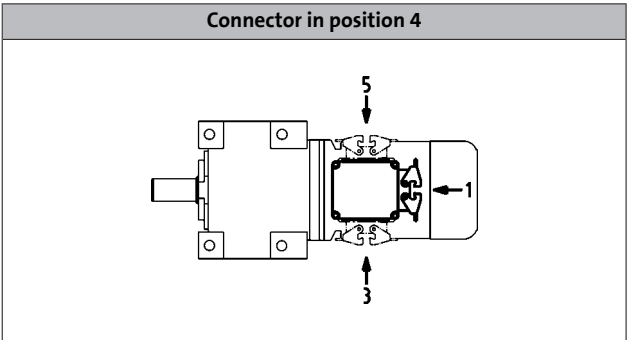
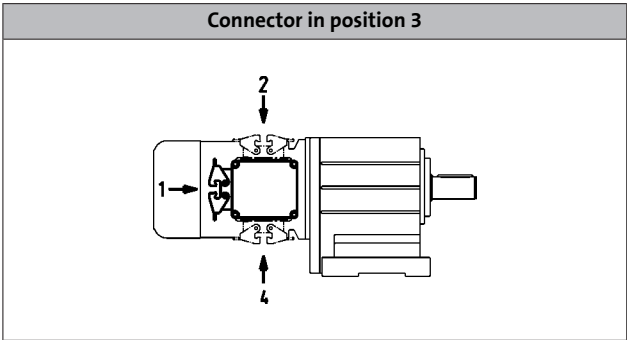
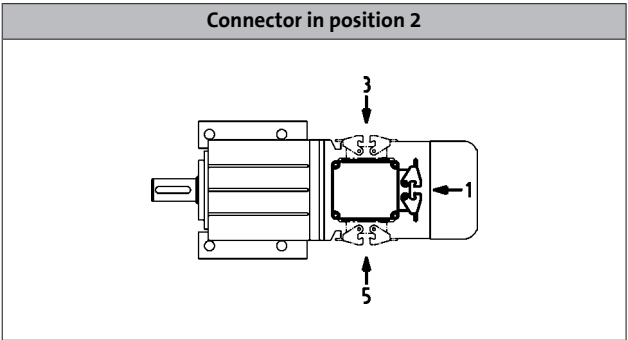


| Size  |                |                |                |
|-------|----------------|----------------|----------------|
| Motor |                |                |                |
|       | g <sub>4</sub> | x <sub>3</sub> | x <sub>4</sub> |
|       | [mm]           | [mm]           | [mm]           |
| 063   | 120            | 5.00           | 6.00           |
| 071   | 129            | 7.00           | 8.00           |
| 080   | 138            | 11.0           | 19.0           |
| 090   | 143            | 15.0           | 23.0           |
| 100   | 154            | 16.0           | 24.0           |
| 112   | 164            | 13.5           | 21.5           |
| 132   | 233            | 34.5           | 4.50           |
| 160   | 248            | 39.0           | 9.00           |



HAN connector

Position of connector



# MH three-phase AC motors

## Accessories



### Handwheel

|          |                                                                                                                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design   | Handwheel made from alloy, smooth wheel surface                                                                                                                                                  |
| Function | Manual operation: <ul style="list-style-type: none"><li>• Emergency operation</li><li>• Setting-up operation for machines/systems</li></ul>                                                      |
| Note     | The increased moment of inertia must be taken into account during project planning! For frequent switching operations, in particular if the direction of rotation changes: Please contact Lenze. |

| Size  | Moment of inertia    | Mass       |
|-------|----------------------|------------|
| Motor | Additional           | Additional |
|       | J                    | m          |
|       | [kgcm <sup>2</sup> ] | [kg]       |
| 071   | 16.0                 | 0.60       |
| 080   | 16.0                 | 0.60       |
| 090   | 16.0                 | 0.60       |
| 100   | 16.0                 | 0.60       |
| 112   | 16.0                 | 0.60       |
| 132   | 139                  | 1.80       |

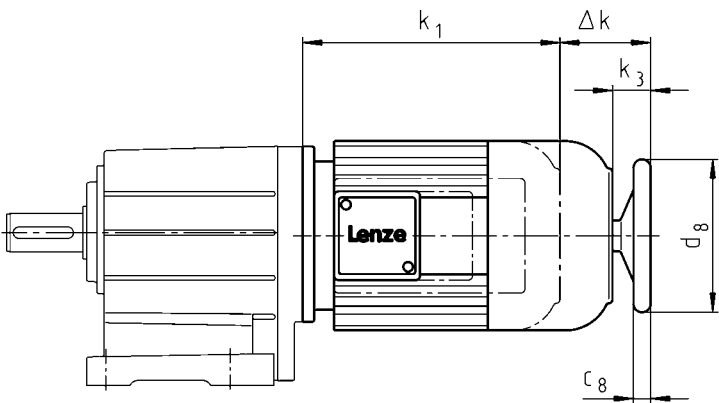
# MH three-phase AC motors

Accessories



## Handwheel

Dimensions, self-ventilated (4/6-pole)



| Motor type           | M□□MAHA<br>M□□MABH<br>M□□MALH |
|----------------------|-------------------------------|
| Built-on accessories |                               |
|                      |                               |

| Motor frame size                     |            |       |       |       |
|--------------------------------------|------------|-------|-------|-------|
|                                      | $\Delta k$ | $k_3$ | $c_8$ | $d_8$ |
|                                      | [mm]       | [mm]  | [mm]  | [mm]  |
| 071-32<br>071-42<br>071-13<br>071-33 | 70         | 34.0  | 18.0  | 160   |
| 080-32<br>080-42<br>080-13<br>080-33 | 91         | 34.0  | 18.0  | 160   |
| 090-12<br>090-32                     | 80         | 32.0  | 18.0  | 160   |
| 100-12<br>100-32                     | 94         | 42.0  | 18.0  | 160   |
| 112-22<br>112-32                     | 107        | 39.0  | 18.0  | 160   |
| 132-12<br>132-22<br>132-32           | 126        | 50.0  | 26.0  | 250   |

# MH three-phase AC motors

## Accessories



### Centrifugal mass

|          |                                                                                                                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note     | The increased moment of inertia must be taken into account during project planning! For frequent switching operations, in particular if the direction of rotation changes: Please contact Lenze. |
| Function | Increased motor centrifugal mass for smooth starting/braking                                                                                                                                     |
| Design   | Integral fan made from cast iron                                                                                                                                                                 |

| Motor frame size | Moment of inertia    | Mass       |
|------------------|----------------------|------------|
|                  | Additional           | Additional |
|                  | J                    | m          |
|                  | [kgcm <sup>2</sup> ] | [kg]       |
| 071              | 18.0                 | 1.20       |
| 080              | 29.0                 | 1.40       |
| 090-□1           | 83.0                 | 2.80       |
| 090-□2           | 55.0                 | 2.00       |
| 100              | 77.0                 | 2.50       |
| 112              | 153                  | 3.80       |
| 132              | 356                  | 6.00       |

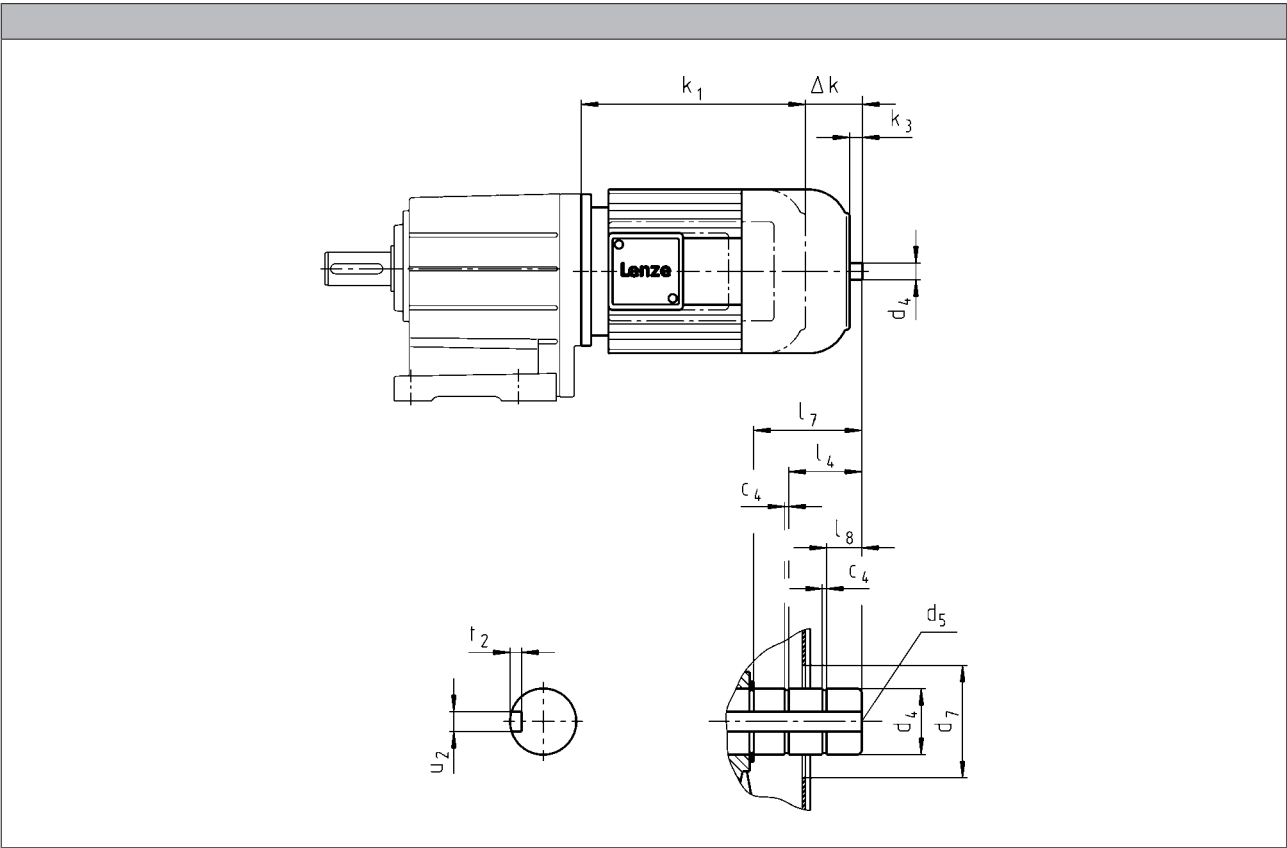
# MH three-phase AC motors

Accessories



## 2nd shaft end

Dimensions, self-ventilated (4/6-pole)



| Motor type           |                               |
|----------------------|-------------------------------|
| Built-on accessories | M□□MAZE<br>M□□MABZ<br>M□□MALZ |

| Motor frame size                     | Δ k  | k <sub>3</sub> | c <sub>4</sub> | d <sub>4</sub> | d <sub>4</sub> | d <sub>5</sub> | d <sub>7</sub> <sup>1)</sup> | l <sub>4</sub> | l <sub>7</sub> | l <sub>8</sub> | u <sub>2</sub> | t <sub>2</sub> |
|--------------------------------------|------|----------------|----------------|----------------|----------------|----------------|------------------------------|----------------|----------------|----------------|----------------|----------------|
|                                      |      |                |                | h6             | j6             |                |                              |                |                |                |                |                |
|                                      | [mm] | [mm]           | [mm]           | [mm]           | [mm]           | [mm]           | [mm]                         | [mm]           | [mm]           | [mm]           | [mm]           | [mm]           |
| 071-32<br>071-42<br>071-13<br>071-33 | 47   | 11.0           | 1.10           | 14.0           |                | M5             | 34.0                         |                | 19.0           | 3.00           | 5.00           | 3.00           |
| 080-32<br>080-42<br>080-13<br>080-33 | 68   | 9.00           | 1.10           | 14.0           |                | M5             | 34.0                         |                | 19.0           | 4.50           | 5.00           | 3.00           |
| 090-12<br>090-32                     | 57   | 9.00           | 1.10           | 14.0           |                | M5             | 34.0                         |                | 19.0           | 5.00           | 5.00           | 3.00           |
| 100-12<br>100-32                     | 71   | 18.5           | 1.30           |                | 20.0           | M6             | 34.0                         | 17.0           | 32.5           | 10.5           | 6.00           | 3.50           |
| 112-22<br>112-32                     | 84   | 16.0           | 1.30           |                | 20.0           | M6             | 34.0                         | 17.0           | 28.5           | 7.00           | 6.00           | 3.50           |
| 132-12<br>132-22<br>132-32           | 101  | 24.5           | 1.60           |                | 30.0           | M10            | 46.0                         | 24.5           | 42.0           | 8.50           | 8.00           | 4.00           |

<sup>1)</sup> During operation, appropriate measures must be taken to make fan cover opening safe.

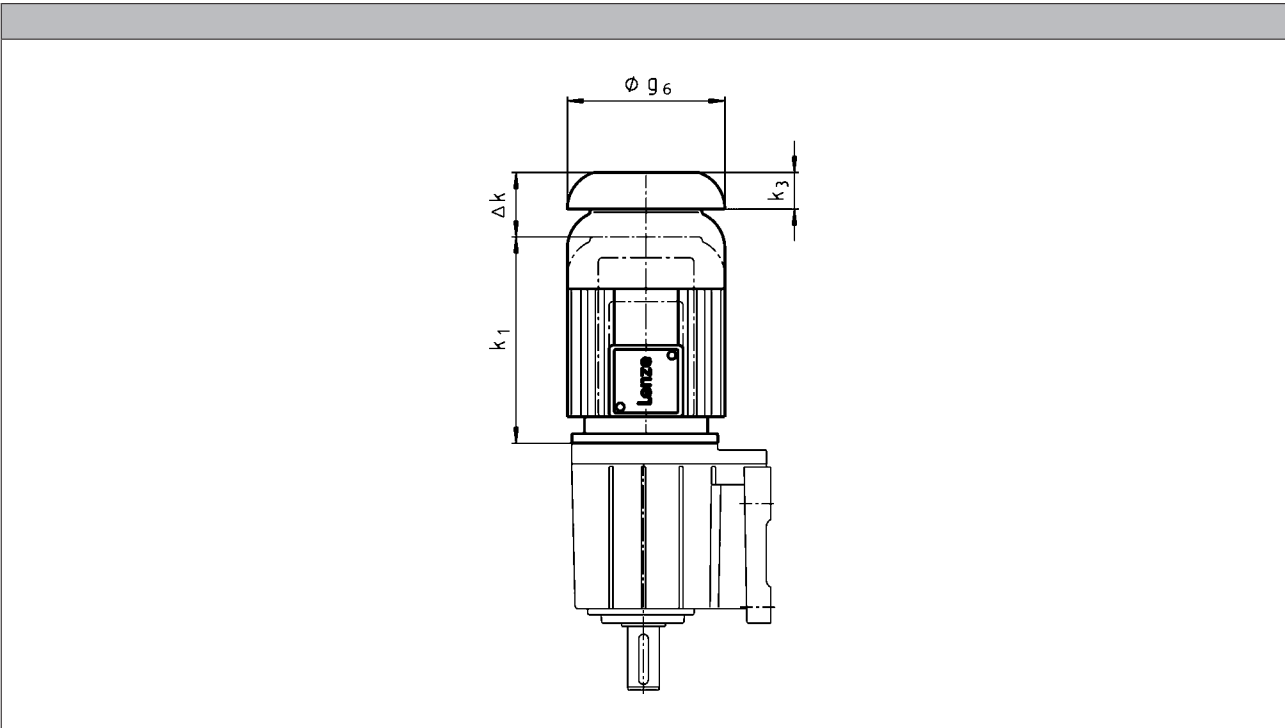
# MH three-phase AC motors

Accessories



## Protection cover

Dimensions, self-ventilated (4/6-pole)

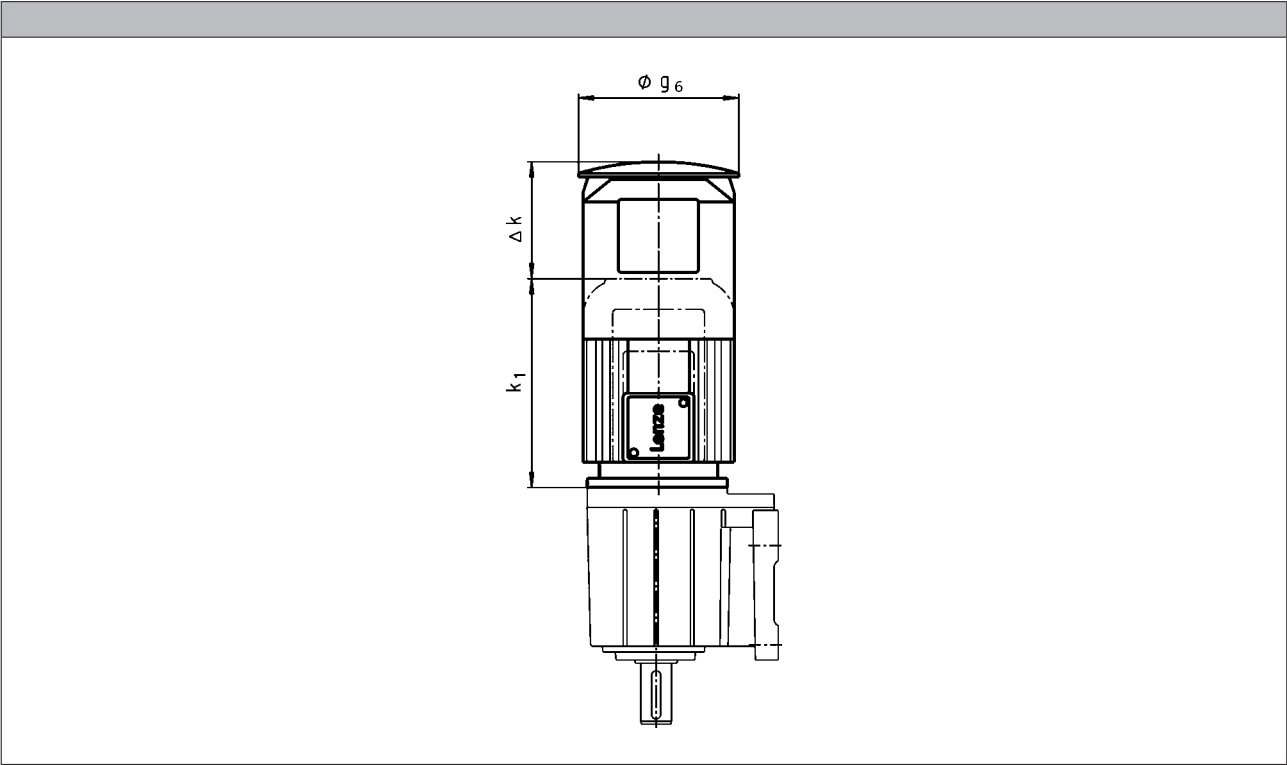


| Motor type                           |         |         |                               |         |                               |         |                |                |
|--------------------------------------|---------|---------|-------------------------------|---------|-------------------------------|---------|----------------|----------------|
|                                      | M□□MAXX | M□□MABR | M□□MABS<br>M□□MABI<br>M□□MABA | M□□MABL | M□□MARS<br>M□□MAIG<br>M□□MAAG | M□□MALL |                |                |
| Motor frame size                     | Δ k     | Δ k     | Δ k                           | Δ k     | Δ k                           | Δ k     | k <sub>3</sub> | g <sub>6</sub> |
|                                      | [mm]    | [mm]    | [mm]                          | [mm]    | [mm]                          | [mm]    | [mm]           | [mm]           |
| 063-02<br>063-22                     |         | 97      | 160                           |         | 97                            |         | 11.0           | 123            |
| 063-12<br>063-32<br>063-42           | 26      | 66      | 129                           |         | 82                            |         | 11.0           | 123            |
| 071-32<br>071-42<br>071-13<br>071-33 | 26      | 78      | 122                           | 78      | 78                            | 26      | 12.0           | 138            |
| 080-32<br>080-42<br>080-13<br>080-33 | 26      | 99      | 137                           | 99      | 127                           | 30      | 16.0           | 156            |
| 090-12<br>090-32                     | 26      | 94      | 131                           | 94      | 113                           | 26      | 15.0           | 176            |
| 100-12<br>100-32                     | 31      | 107     | 132                           | 107     | 112                           | 107     | 17.0           | 194            |
| 112-22<br>112-32                     | 31      | 121     | 151                           | 121     | 111                           | 31      | 18.0           | 218            |
| 132-12<br>132-22<br>132-32           | 31      | 141     | 156                           | 141     | 134                           | 31      | 20.0           | 257            |
| 160-22<br>160-32                     | 37      | 142     | 228                           |         | 120                           |         | 25.0           | 310            |



Protection cover

Dimensions, forced ventilated (4/6-pole)



| Motor type |         |                                          |                               |  |
|------------|---------|------------------------------------------|-------------------------------|--|
|            | M□□MAXX | M□□MABR<br>M□□MABS<br>M□□MABI<br>M□□MABA | M□□MARS<br>M□□MAIG<br>M□□MAAG |  |

| Motor frame size                     |                    |                    |                    |               |
|--------------------------------------|--------------------|--------------------|--------------------|---------------|
|                                      | $\Delta k$<br>[mm] | $\Delta k$<br>[mm] | $\Delta k$<br>[mm] | $g_6$<br>[mm] |
| 063-12<br>063-32<br>063-42           | 169                | 209                | 209                | 133           |
| 071-32<br>071-42<br>071-13<br>071-33 | 165                | 202                | 202                | 150           |
| 080-32<br>080-42<br>080-13<br>080-33 | 168                | 224                | 224                | 170           |
| 090-12<br>090-32                     | 157                | 210                | 210                | 188           |
| 100-12<br>100-32                     | 137                | 198                | 198                | 210           |
| 112-22<br>112-32                     | 135                | 216                | 216                | 249           |
| 132-12<br>132-22<br>132-32           | 140                | 226                | 226                | 300           |
| 160-22<br>160-32                     | 155                | 267                | 267                | 338           |



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