L-force catalogue

Automation systems
Drive solutions

Controls
Inverters
Motors
Gearboxes
Engineering Tools

Motors: MD three-phase AC motors

Gearboxes: GKR bevel gearboxes

Lenze
As easy as that.

Contents of the L-force catalogue

Selected portfolio

Additional portfolio

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.

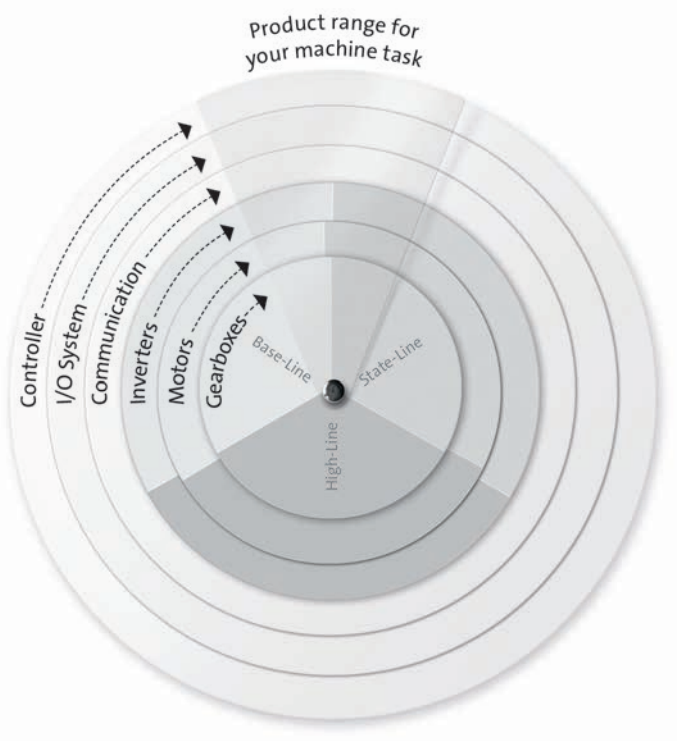
A matter of principle: the right products for every application.

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.

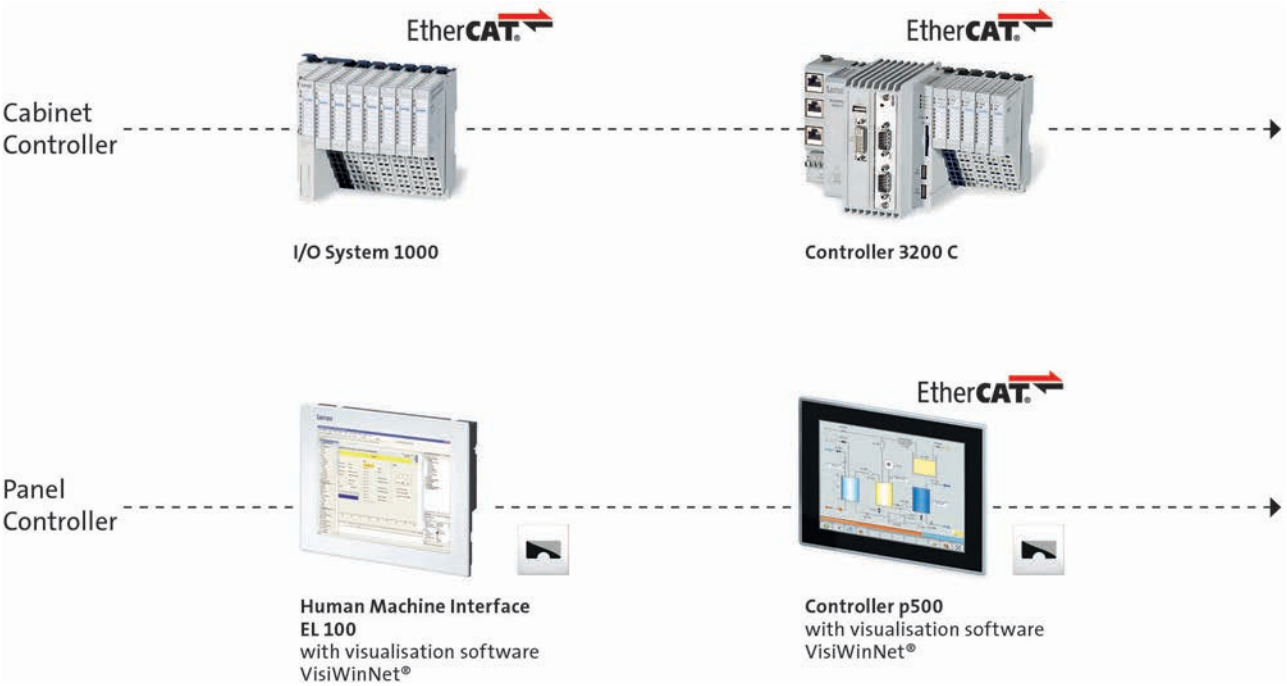
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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!

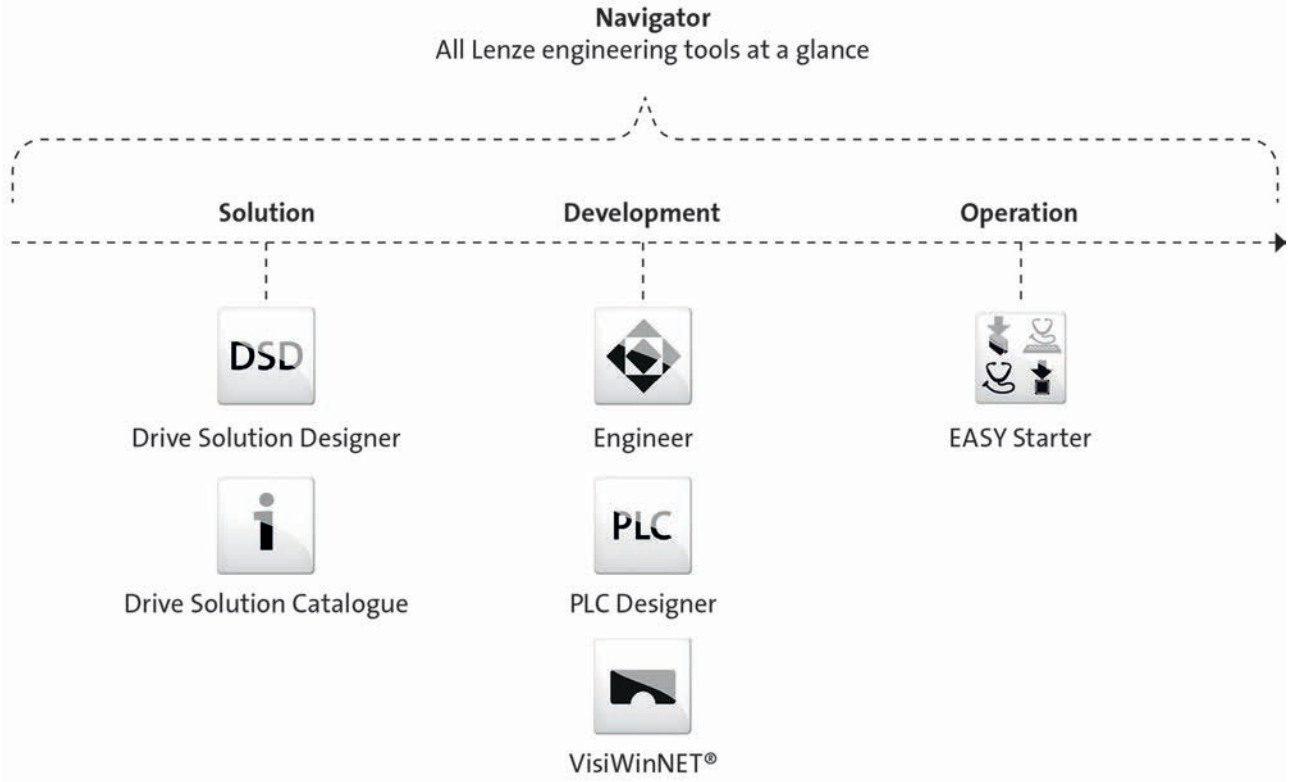


L-force product portfolio

Controls

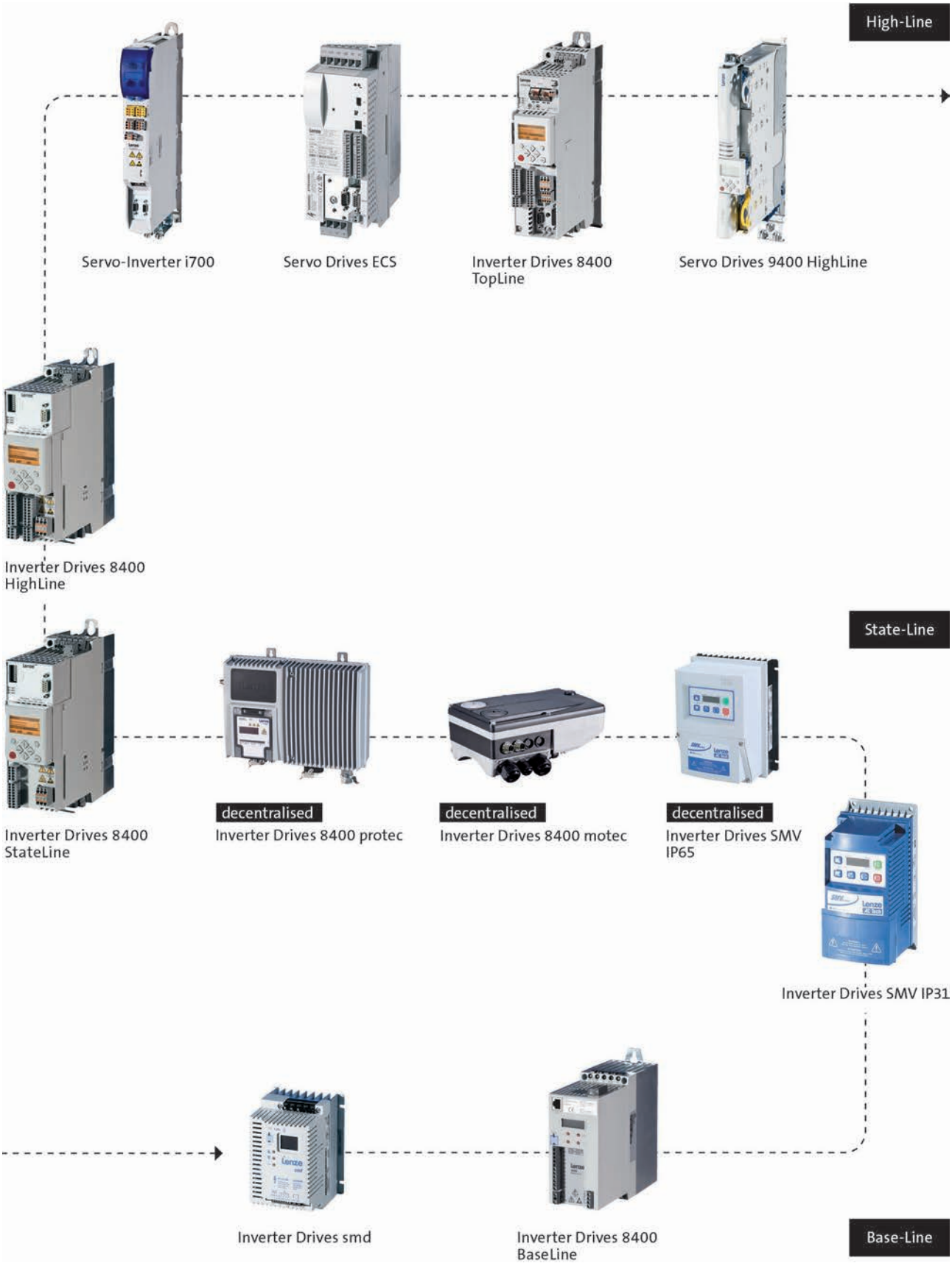


Engineering Tools



L-force product portfolio

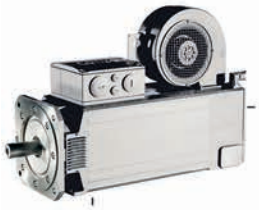
Inverters



L-force product portfolio

Motors

High-Line



MQA asynchronous servo motors

SDSGS synchronous servo motors

MDXKS synchronous servo motors

Synchronous servo motors MCS

Asynchronous servo motors MCA

Asynchronous servo motors SDSGA

State-Line

MF three-phase AC motors

MH three-phase AC motors

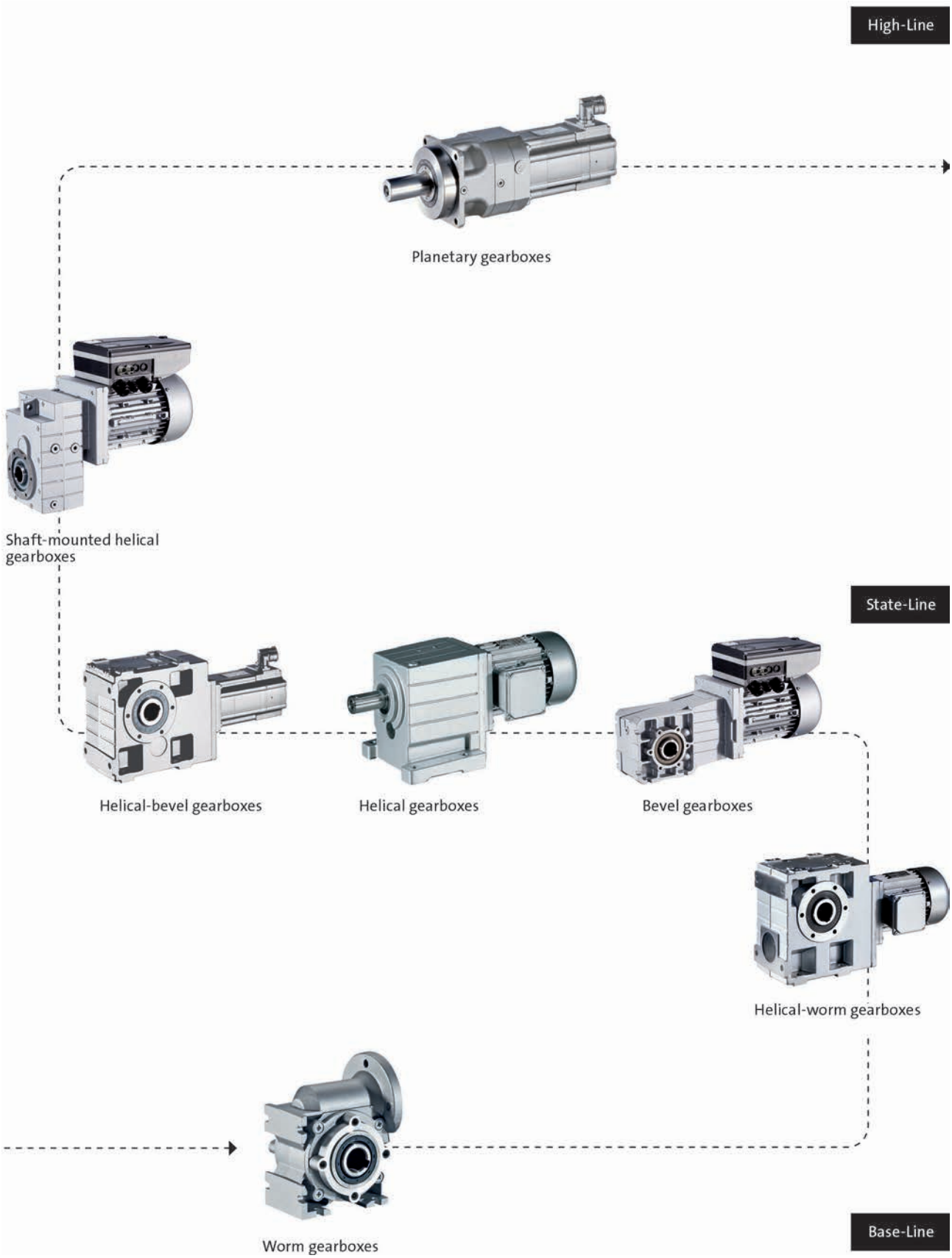
MD three-phase AC motors

Basic MD/MH three-phase AC motors

Base-Line

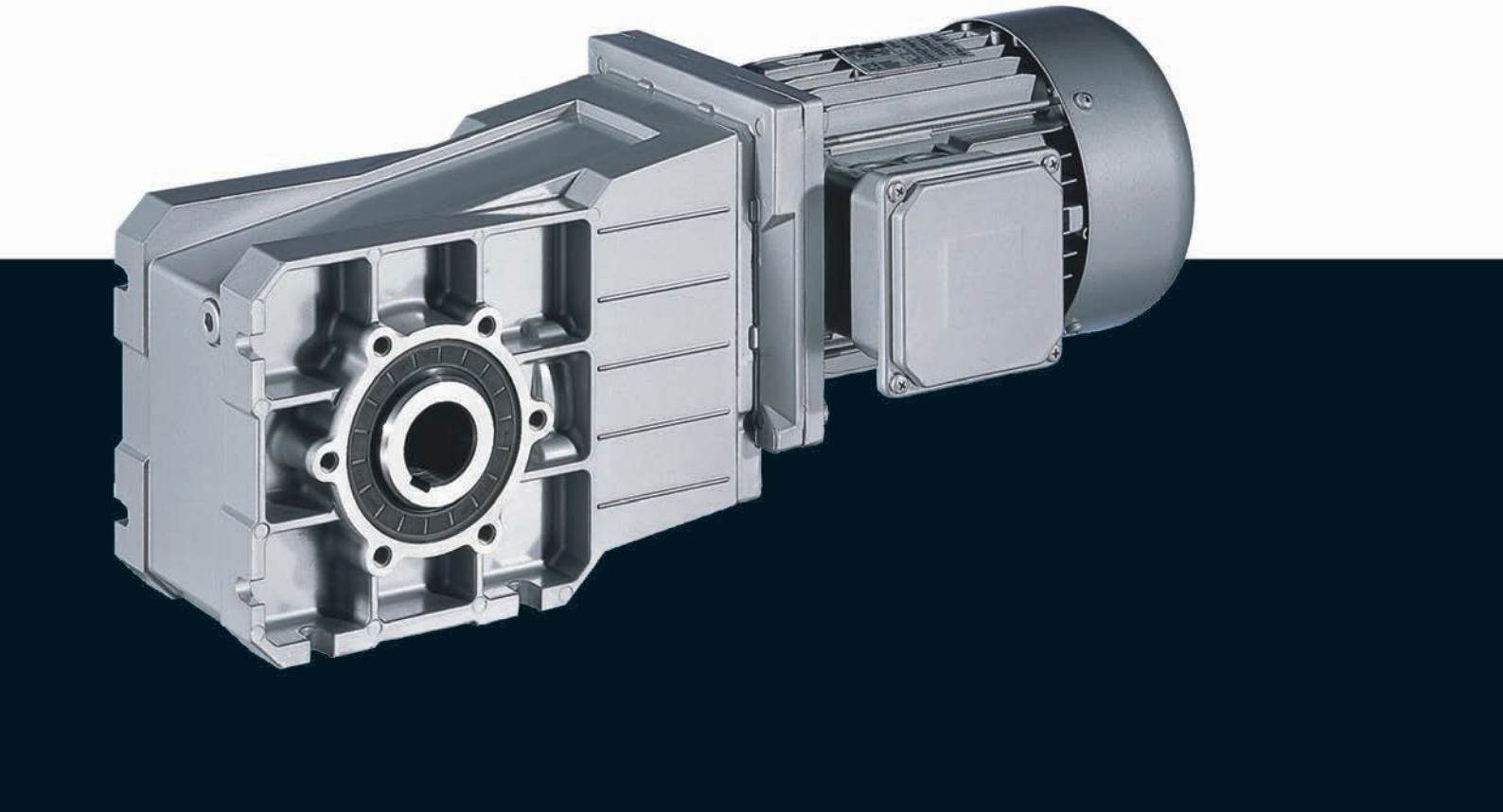
L-force product portfolio

Gearboxes



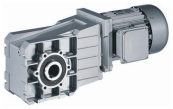
GKR bevel gearboxes

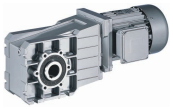
0.06 ... 7.5 kW



GKR bevel gearboxes

Contents

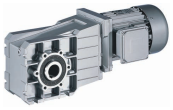




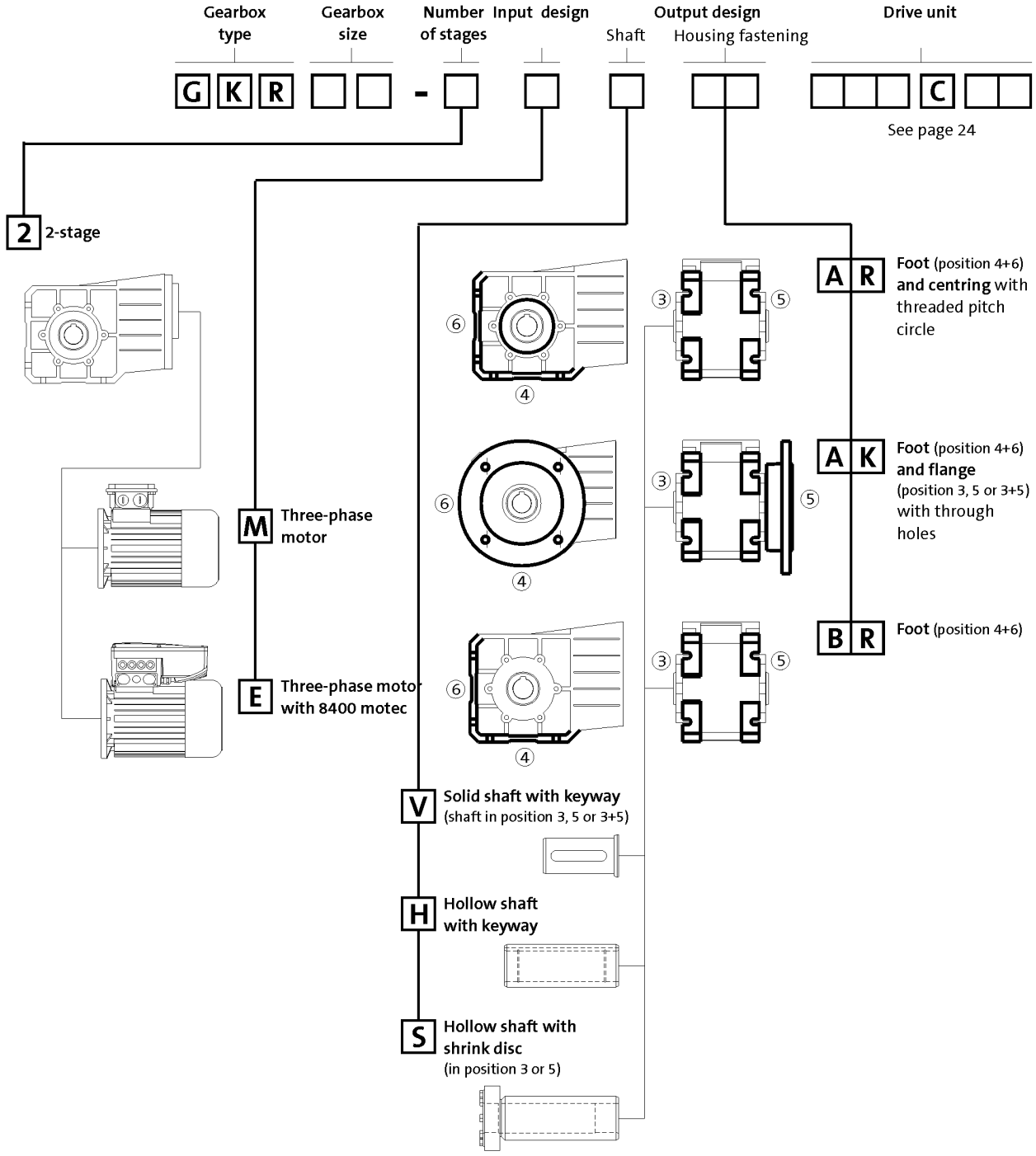
List of abbreviations

$\eta_{c=1}$		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	[kgcm²]	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



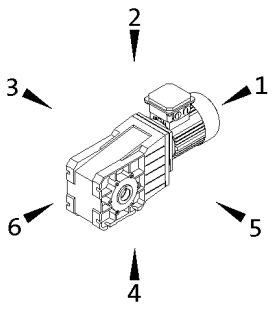
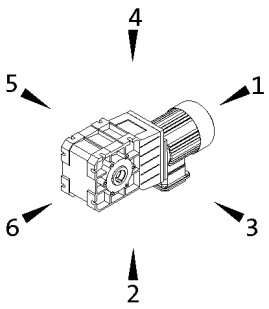
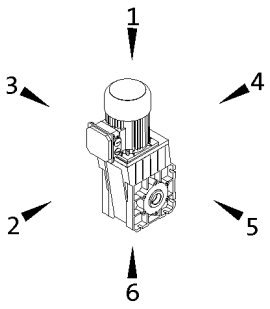
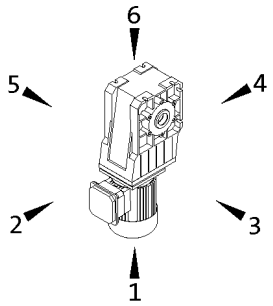
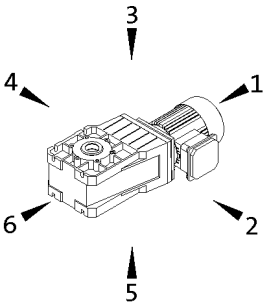
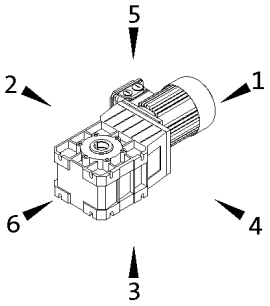
Product key



	Output design			
	V	H	S	K
	d x l [mm]	d [mm]	d [mm]	Øa2 [mm]
GKR03-2	20x40	18/20	20	110/120
GKR04-2	20x40	20/25	20	120/160
GKR05-2	30x60	30/35	30/35	160/200
GKR06-2	35x70	40/45	40	200/250

Product key

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

A	B	C
		
D	**E**	**F**
		

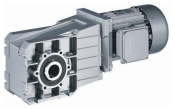
Hollow shaft: 0
Solid shaft: 3, 5, 8 (3+5)
Hollow shaft with shrink disc: 3, 5

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

Gearbox designs

Basic versions	
Motor efficiency	Standard efficiency Increased efficiency (IE2)
Surface and corrosion protection	No OKS (unpainted, aluminium housing) OKS-S (paint: RAL 7012)
Lubricant	CLP 460 (mineral)
Ventilation	Breather elements for GKR06

Options	
Surface and corrosion protection	OKS-G (primer: grey) OKS-S (special paint according to RAL) OKS-M (special paint according to RAL) OKS-L (special paint according to RAL)
Lubricant	CLP HC 320 (synthetic) CLP HC 220 USDA H1 (synthetic)
Shaft sealing rings	Driven shaft: Viton
Accessories	Rubber buffer for torque plate (GKR 03/04 only) Torque plate on threaded pitch circle Housing foot torque plate (GKR05/06 only) 2nd output shaft end Shrink disc cover Hoseproof hollow shaft cover Mounting set for hollow shaft circlip
Nameplate	Metal nameplate (supplied loose) Adhesive nameplate (supplied loose)



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.

For maximum efficiency

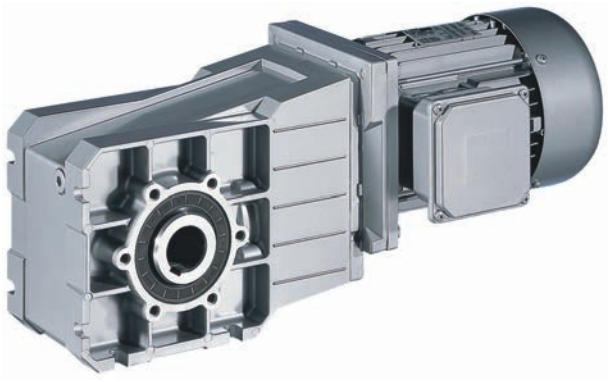
Our bevel gearboxes are a showpiece for lightweight engineering. They are also highly efficient and are equipped with wear free teeth. Together with three-phase AC motors and servo motors, they form and efficient and compact drive unit. They are available as a 2-stage version with a torque of up to 450 Nm and a ratio of up to i=76.

Inverters for motor-proximity installation

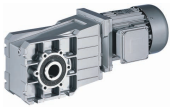
The Drive Package with decentralised Inverter Drives 8400 motec covers a power range up to 7.5 kW.

Designs

- 2-stage gearbox
- Hollow shaft with keyway or shrink disc
- Solid shaft with keyway
- Foot or flange mounting
- Torque plate, including rubber buffer
- With MD three-phase AC motors (efficiency classes IE1) power range 0.06 ... 7.5 kW

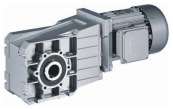


Bevel geared motor GKR05-2M HBR 090-32



Functions and features

Gearbox type	GKR
Housing	
Design	Cuboid
Material	Aluminium / cast iron
Solid shaft	
Design	with keyway to DIN 6885
Tolerance	m6 (d > 50 mm) k6 (d ≤ 50 mm)
Material	Tempered steel C45 or 42CrMo4
Hollow shaft	
Design	H: with keyway S: smooth
Tolerance	Bore H7
Material	Tempered steel C45
Toothed parts	
Design	Optimised tooth flanks and profile geometry Ground tooth flanks
Material	Case-hardened steel
Shaft-hub joint	
	1st stage/prestage/helical (bevel) gearbox: Friction-type connection Output stage (= 2nd, 3rd or 4th stage): Friction-type or positive-fit connection
Shaft sealing rings	
Design	With dust lip
Material	NB / FP
Bearing	
Design	Ball bearing / tapered-roller bearing depending on size and design
Lubricants	
Standard	DIN 51502
Quantities	corresponding to mounting position (see operating instructions)
Mechanical efficiency	
1-stage gearboxes [$\eta_{c=1}$]	
2-stage gearboxes [$\eta_{c=1}$]	0.96
3-stage gearboxes [$\eta_{c=1}$]	
4-stage gearboxes [$\eta_{c=1}$]	
Notes	



Functions and features

Lubricants

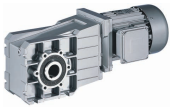
Lenze gearboxes and geared motors are ready for operation on delivery and are filled with lubricants specific to both the drive and the design. The mounting position and design specified in the order are key factors in choosing the volume of lubricant.

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

Lubricant table

Mode	CLP 460	CLP HC 320	CLP HC 220 USDA H1
Ambient temperature [°C]	0 ... +40	-25 ... +50	-20 ... +40
Specification	Mineral based oil with additives	Synthetic-based oil (synthetic hydrocarbon / poly-alpha-olefin oil)	
Note			For food processing industry
Changing interval	16000 operating hours not later than after three years (oil temperature 70...80 °C)	25000 operating hours not later than after three years (oil temperature 70...80 °C)	16000 operating hours not later than after three years (oil temperature 70...80 °C)
Fuchs	Fuchs Renolin CLP 460	Fuchs Renolin Unisyn CLP 320	bremer & leguil Cassida Fluid GL 220
Klüber	Klüberoil GEM1-460 N	Klübersynth GEM4-320 N	Klüberoil 4 UH1-220 N
Shell	Shell Omala 460	Shell Omala Oil HD 320	

► Please contact your Lenze office if you are operating at ambient temperatures in areas up to < -20 °C > or up to +40°C.



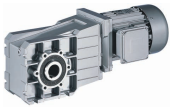
Functions and features

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)	• Dependent on subsequent top coat applied	• 1K priming coat (grey) • Zinc-coated screws • Rust-free breather elements Optional measures • Stainless steel nameplate
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating as per corrosivity category C1 (in line with EN 12944-2) • Zinc-coated screws • Rust-free breather elements Optional measures • Stainless steel nameplate
OKS-M (medium)	• Internal installation in non-heated buildings • Covered, protected external installation • Air humidity up to 95%	• Surface coating as per corrosivity category C2 (in line with EN 12944-2) • Zinc-coated screws • Rust-free breather elements Optional measures • Stainless steel shaft • Stainless steel nameplate • Rust-free shrink disc (on request)
OKS-L (high)	• External installation • Air humidity above 95% • Chemical industry plants • Food industry	• Surface coating as per corrosivity category C3 (in line with EN 12944-2) • Blower cover and B end shield additionally primed • Cable glands with gaskets • Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request) • All screws/screw plugs zinc-coated • Stainless breather elements • Threaded holes that are not used are closed by means of plastic plugs Optional measures • Sealed recesses on motor (on request) • Stainless steel shaft • Stainless steel nameplate • Rust-free shrink disc (on request) • Additional priming coat on cast iron fan • Oil expansion tank and torque plates painted separately and supplied loose

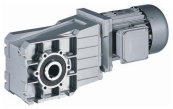


Functions and features

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 1K priming coat	
OKS-S (small)	C1	Dipping primed gearbox 2K-PUR top coat	Standard: RAL 7012 Optional: RAL Classic
OKS-M (medium)	C2	Dipping primed gearbox 1K priming coat 2K-PUR top coat	Standard: RAL 7012 Optional: RAL Classic
OKS-L (high)	C3	Dipping primed gearbox 2K-EP priming coat 2K-PUR top coat	Standard: RAL 7012 Optional: RAL Classic

► The gearboxes GKR 03 ... 06 have an aluminium housing, therefore a dipping primer is dispensed with in the case of these gearboxes.

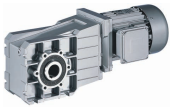


Functions and features

Ventilation

Gearboxes without ventilation
No ventilation is required for gearboxes GKR03 ... 05.

Gearboxes with ventilation
Gearbox GKR06 is supplied with a breather element as standard.

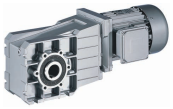


Dimensioning

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 °C for gearboxes,
  T_{amb} = 40 °C for motors (in accordance with EN 60034)
- Site altitude < = 1000 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.



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):

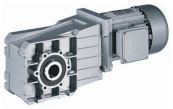
Motor frame size	Mounting position A, B, E, F	Mounting position C, D
063 ... 100	3000 r/min	3000 r/min
112 ... 132	3000 r/min	1500 r/min
160 ... 225	2000 r/min	1500 r/min

- 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

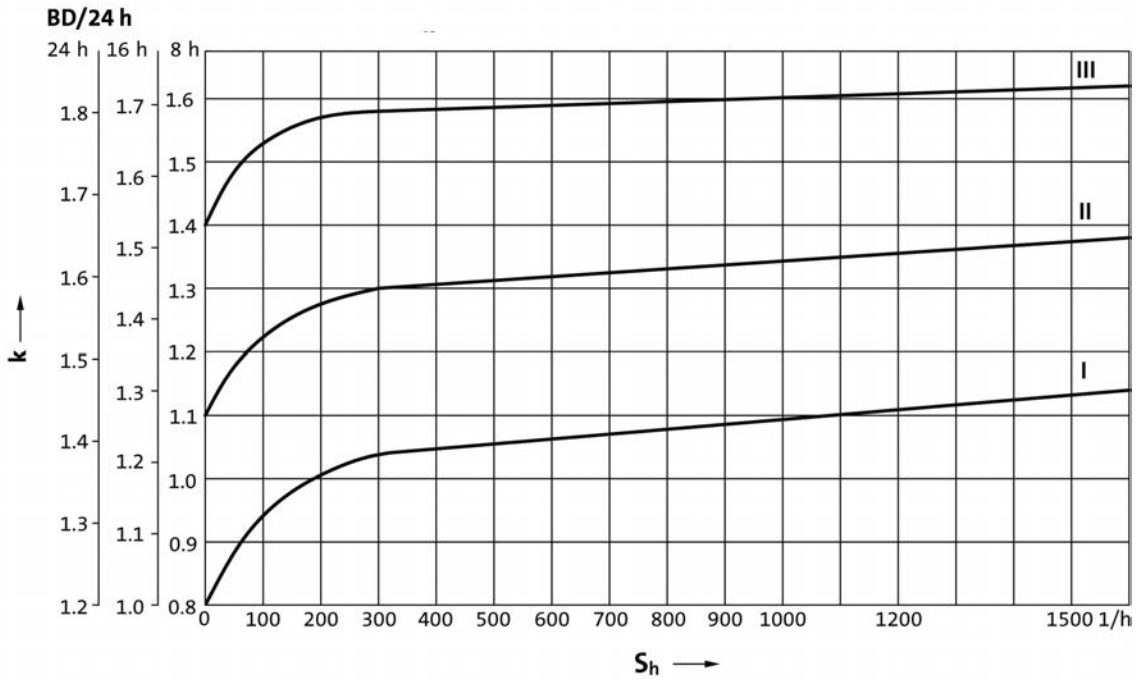
Load capacity and application factor

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

Application factor k

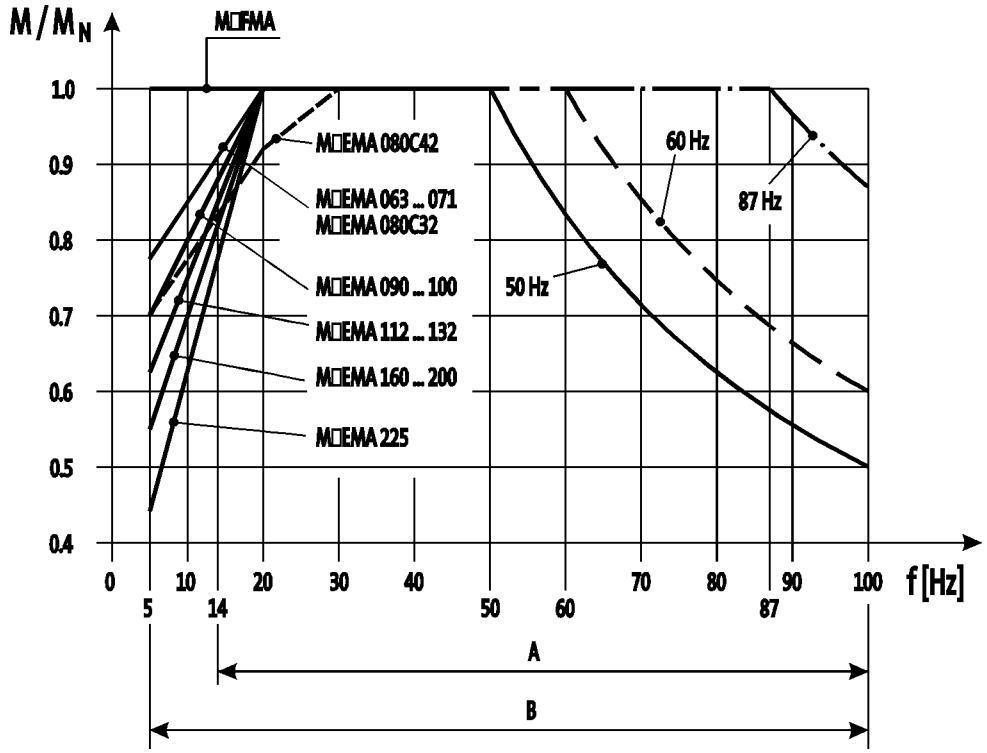


Dimensioning

Torque derating at low motor frequencies

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

Torque characteristics

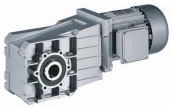


A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

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.



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		
f_N	50 Hz			60 Hz					
	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [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

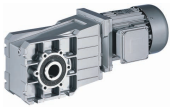
Output torque M_2 (constant for all listed frequencies)

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

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



Dimensioning

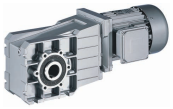
Notes on the selection tables

Motor voltages

The power values and torques indicated in the selection tables relate to the following motor voltages:
- 50 Hz : Δ 230 V / Y 400 V
- 60 Hz : Δ 265 V / Y 460 V
- 87 Hz : Δ 400 V

Operation at 87 Hz

In 87 Hz operation, the three-phase AC motor (which is designed for a voltage of Δ 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.



Notes on ordering

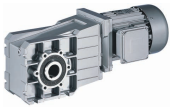
We want to be sure that you receive the correct products in good time.

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.



Ordering details checklist

☐ **Offer**

Page __ of __

☐ **Order**

Customer No.

Job No.

Fax No. _____

Sender

Company

Made out by (name)

Street/P.O. Box

Department

P.O. Box, City

Telephone No.

Date Signature

Delivery address (if different)

Street/P.O. Box

Desired delivery date

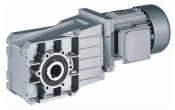
P.O. Box, City

Dispatching notes

Invoice recipient (if different)

Street/P.O. Box

Postal code, City



Ordering details checklist

Customer No.

Job No.

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Quantity

Efficiency class ☐ Standard efficiency ☐ High efficiency (IE2)

Rated frequency ☐ 50 Hz ☐ 60 Hz ☐ 87 Hz

Ratio i

GKR ☐☐ – 2 ☐ M ☐ E ☐ V ☐ H ☐ S ☐ A ☐ B ☐ R ☐ K

Motor frame size ☐☐☐C☐☐

Hollow shaft d = ☐ mm

Flange a_2 = ☐ mm

Mounting position A B C D E F

Position of system blocks

Shaft/shrink disc: 0 3 4 8

Flange: 0 3 5 8

Terminal box: 2 3 4 5

Surface and corrosion protection ☐ Without OKS (unpainted)

Options

Special lubricants ☐ CLP HC 320 (synthetic) ☐ CLP HC 220 USDA H1 (for the food industry)

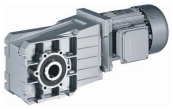
Surface and corrosion protection ☐ OKS-S small) ☐ OKS-M (medium) ☐ OKS-L (high) ☐ OKS-G (primed) ☐

Accessories

- ☐ Rubber buffer for torque support (only GKR03/04)
- ☐ Torque support for housing foot (only GKR05/06)
- ☐ Torque support for threaded pitch circle
- ☐ 2nd output shaft end
- ☐ Mounting set for hollow-shaft circlip
- ☐ Shrink disc cover
- ☐ Hollow shaft cover, hoseproof

Shaft sealing rings ☐ Viton

6.8



Ordering details checklist

Three-phase AC motors options

Customer No. ☐☐☐☐☐☐☐☐

Job No. ☐☐☐☐☐☐☐☐☐☐

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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 ☐

Blower

☐ 1~ ☐ 3~

☐ Terminal box with plug-in connector ICN

Terminal box position 2 ☐ 3 ☐ 4 ☐ 5 ☐

Spring-applied brake

Brake version: ☐ Standard ☐ Longlife

Brake size ☐

Characteristic torque ☐ Nm

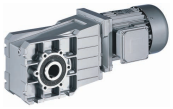
Rated voltage AC ☐ DC ☐ ☐ V

Rectifier: Only in the case of AC supply voltage

- ☐ Half-wave rectifier
- ☐ Bridge rectifier
- ☐ Bridge/half-wave rectifier (overexcitation)
- ☐ Bridge/half-wave rectifier (holding current reduction)

Brake options: Manual release lever in position 2 ☐ 3 ☐ 4 ☐ 5 ☐

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



Ordering details checklist

Three-phase AC motors options

Customer No. ☐☐☐☐☐☐☐☐

Job No. ☐☐☐☐☐☐☐☐☐☐

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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)

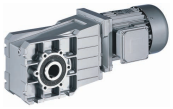
☐ Protection cover

☐ 2nd shaft end

☐ Handwheel

☐ Increased centrifugal mass

☐ 2nd nameplate (adhesive nameplate/metal nameplate)



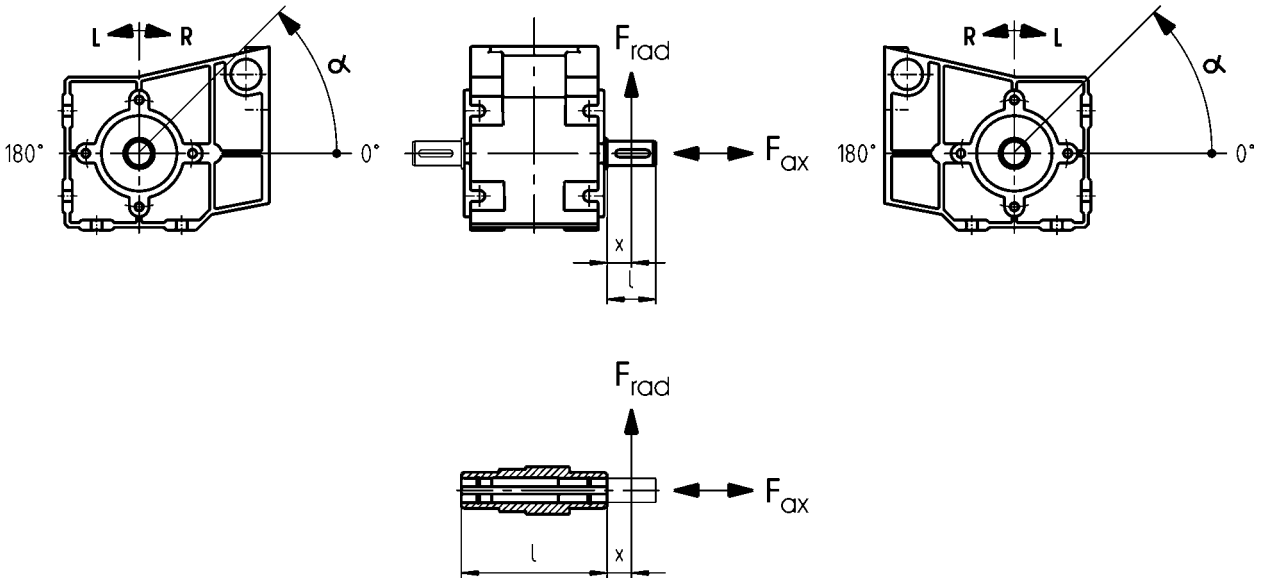
Permissible radial and axial forces at output

Permissible radial force
$F_{rad,per} = \min(f_w \times f_\alpha \times F_{rad,max}$; $f_w \times F_{rad,max}$ at $n_2 \leq 16$ r/min)

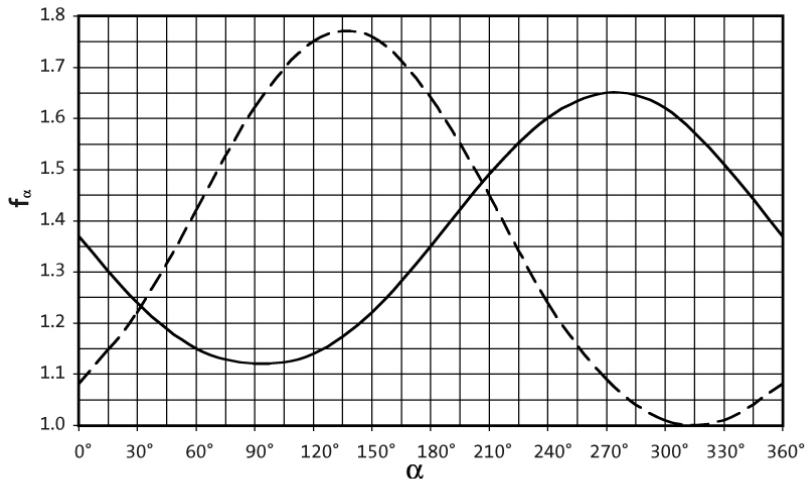
Permissible axial force
$F_{ax,per} = F_{ax,max}$ if $F_{rad} = 0$

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

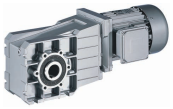
Application of forces



Effective direction factor f_α at output shaft

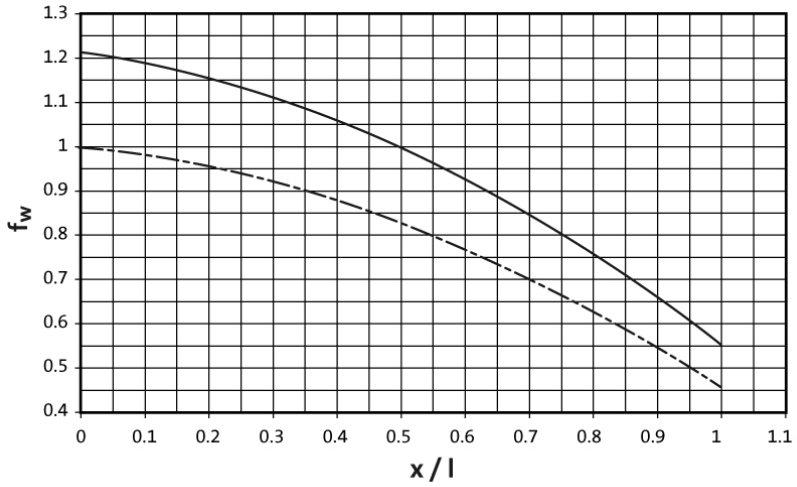


——— Direction of rotation L
— — — Direction of rotation R



Permissible radial and axial forces at output

Additional load factor f_w at output shaft



——— Solid shaft (V□□) — · — Hollow shaft (H□□)

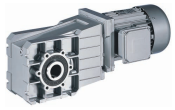
GKR□□-2□ H□□

Size	n_2 [r/min]									
Gearbox	1000	630	400	250	160	100	63	40	25	≤16

	Max. radial force, Hollow shaft									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	900	1200	2200	2500	2800	3000	3000	3000	3000	3000
GKR04	1000	2200	2550	3000	3300	3600	3600	3600	3600	3600
GKR05	1500	2250	3800	4500	5100	6200	7400	7800	7800	7800
GKR06	3000	3800	5000	5200	5500	7000	9000	10000	10000	10000

	Max. axial force, Hollow shaft									
	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	600	800	1000	1100	1250	1400	1400	1400	1400	1400
GKR04	700	1000	1275	1500	1650	1800	1800	1800	1800	1800
GKR05	1100	1500	1900	2200	2500	3100	3700	3900	3900	3900
GKR06	1500	2000	2500	2600	2750	3500	4500	5000	5000	5000

- 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□□).



Permissible radial and axial forces at output

GKR□□-2□ V□R

Size	n_2 [r/min]									
Gearbox	1000	630	400	250	160	100	63	40	25	≤16

	Max. radial force, Solid shaft without flange									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	900	1200	1800	2100	2400	2800	3000	3000	3000	3000
GKR04	1000	1800	2100	2500	2700	3000	3000	3000	3000	3000
GKR05	1500	2350	3000	3600	4500	5000	6000	6500	6500	6500
GKR06	2000	2800	4000	4200	4500	5600	7300	8600	9000	9000

	Max. axial force, Solid shaft without flange									
	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	600	800	1000	1100	1250	1400	1400	1400	1400	1400
GKR04	700	1000	1275	1500	1650	1800	1800	1800	1800	1800
GKR05	1100	1520	1900	2200	2500	3100	3700	3900	3900	3900
GKR06	1500	2000	2500	2600	2750	3500	4500	5000	5000	5000

GKR□□-2□ V□K

Size	n_2 [r/min]									
Gearbox	1000	630	400	250	160	100	63	40	25	≤16

	Max. radial force, Solid shaft with flange									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	900	1200	1800	2100	2400	2800	3000	3000	3000	3000
GKR04	1000	1800	2100	2500	2700	3000	3000	3000	3000	3000
GKR05	2400	3600	5200	6000	6500	6500	6500	6500	6500	6500
GKR06	3000	4000	5500	6200	7000	9000	9000	9000	9000	9000

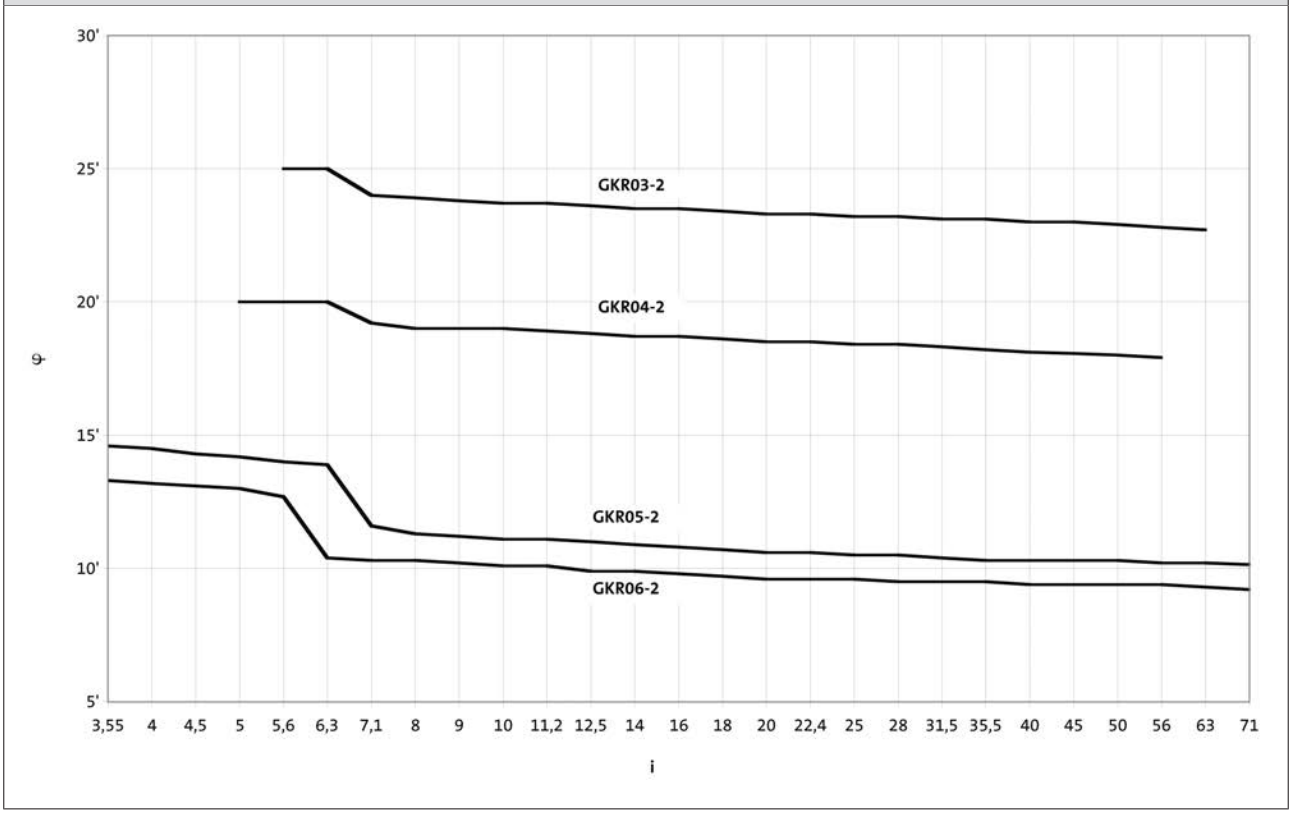
	Max. axial force, Solid shaft with flange									
	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$	$F_{ax,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
GKR03	600	800	1000	1100	1250	1400	1400	1400	1400	1400
GKR04	700	1000	1275	1500	1650	1800	1800	1800	1800	1800
GKR05	1100	1500	1900	2200	2500	3100	3700	3900	3900	3900
GKR06	1500	2000	2500	2600	2750	3500	4500	5000	5000	5000

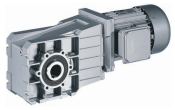
► Application of force F_{rad}: centre of shaft journal (x = l/2)
► $F_{ax,max}$ only valid with F_{rad} = 0

Output backlash in angular minutes

► Backlash ϕ depending on ratio i

GKR03...06-2





Moments of inertia

GKR□□-2

► Moment of inertia (J) depending on ratio i

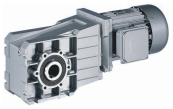
Gearbox			GKR03
5.411	J	[kgcm²]	0.307
6.222	J	[kgcm²]	0.276
7.111	J	[kgcm²]	0.196
8.178	J	[kgcm²]	0.178
9.101	J	[kgcm²]	0.134
10.466	J	[kgcm²]	0.123
11.640	J	[kgcm²]	0.086
13.386	J	[kgcm²]	0.079
15.111	J	[kgcm²]	0.059
17.378	J	[kgcm²]	0.055
19.365	J	[kgcm²]	0.038
22.270	J	[kgcm²]	0.054
25.051	J	[kgcm²]	0.025
28.808	J	[kgcm²]	0.023
32.593	J	[kgcm²]	0.016
37.481	J	[kgcm²]	0.015
42.222	J	[kgcm²]	0.010
48.556	J	[kgcm²]	0.009
53.889	J	[kgcm²]	0.006
61.972	J	[kgcm²]	0.006

Gearbox			GKR04
5.185	J	[kgcm²]	0.813
5.963	J	[kgcm²]	0.723
7.111	J	[kgcm²]	0.446
8.178	J	[kgcm²]	0.410
9.101	J	[kgcm²]	3.270
10.466	J	[kgcm²]	0.300
11.449	J	[kgcm²]	0.260
12.698	J	[kgcm²]	1.990
14.603	J	[kgcm²]	0.181
15.556	J	[kgcm²]	1.470
17.889	J	[kgcm²]	0.135
19.556	J	[kgcm²]	0.096
22.489	J	[kgcm²]	0.090
25.185	J	[kgcm²]	0.065
28.963	J	[kgcm²]	0.060
31.919	J	[kgcm²]	0.042
36.707	J	[kgcm²]	0.040
40.000	J	[kgcm²]	0.029
46.000	J	[kgcm²]	0.027
52.698	J	[kgcm²]	0.017
60.603	J	[kgcm²]	0.017

Gearbox			GKR05
3.565	J	[kgcm²]	4.950
4.889	J	[kgcm²]	2.793
6.257	J	[kgcm²]	1.791
6.883	J	[kgcm²]	2.572
7.817	J	[kgcm²]	2.316
9.440	J	[kgcm²]	1.531
10.720	J	[kgcm²]	1.396
12.081	J	[kgcm²]	1.021
13.216	J	[kgcm²]	0.874
13.719	J	[kgcm²]	0.938
15.008	J	[kgcm²]	0.805
16.857	J	[kgcm²]	0.597
19.143	J	[kgcm²]	0.554
20.650	J	[kgcm²]	0.439
23.450	J	[kgcm²]	0.411
26.878	J	[kgcm²]	0.270
30.522	J	[kgcm²]	0.253
33.433	J	[kgcm²]	0.191
37.967	J	[kgcm²]	0.180
43.267	J	[kgcm²]	0.118
49.133	J	[kgcm²]	0.112
52.510	J	[kgcm²]	0.085
59.630	J	[kgcm²]	0.081
67.113	J	[kgcm²]	0.054
76.213	J	[kgcm²]	0.051

Gearbox			GKR06
3.431	J	[kgcm²]	9.576
4.706	J	[kgcm²]	5.607
6.022	J	[kgcm²]	3.658
6.481	J	[kgcm²]	5.112
7.146	J	[kgcm²]	4.539
8.889	J	[kgcm²]	3.233
9.800	J	[kgcm²]	2.929
11.376	J	[kgcm²]	2.209
12.444	J	[kgcm²]	1.890
13.720	J	[kgcm²]	1.734
15.873	J	[kgcm²]	1.321
17.500	J	[kgcm²]	1.225
19.444	J	[kgcm²]	0.991
21.438	J	[kgcm²]	0.928
25.309	J	[kgcm²]	0.632
27.903	J	[kgcm²]	0.594
31.481	J	[kgcm²]	0.457
34.708	J	[kgcm²]	0.432
40.741	J	[kgcm²]	0.284
44.917	J	[kgcm²]	0.270
49.444	J	[kgcm²]	0.207
54.513	J	[kgcm²]	0.197
62.500	J	[kgcm²]	0.134
68.906	J	[kgcm²]	0.127

► 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.



Weights

GKR□□-2M HAR / HBR

			063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11 071C13 071C31	071C32
GKR03	m	[kg]	7		7			7			8
GKR04	m	[kg]		9			9			11	
GKR05	m	[kg]							14	16	15
GKR06	m	[kg]							22	24	23

			071C33	071C42	080C11	080C13	080C31	080C32 080C33 080C42	090C11 090C31	090C32	100C12
GKR03	m	[kg]		9							
GKR04	m	[kg]	11		15	16	15	16	23	21	
GKR05	m	[kg]	16		20	21	20	21	27	25	34
GKR06	m	[kg]	24		28	29	28	29	36	34	43

			100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR05	m	[kg]	31	34	31				
GKR06	m	[kg]	40	43	40	51	48	58	55

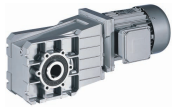
GKR□□-2M HAK

			063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11	071C13 071C31
GKR03	m	[kg]	7		7			7			
GKR04	m	[kg]		9			9		10	11	12
GKR05	m	[kg]							15	17	
GKR06	m	[kg]							23	25	

			071C32	071C33	071C42	080C11	080C13	080C31	080C32 080C33 080C42	090C11 090C31	090C32
GKR03	m	[kg]	9		9						
GKR04	m	[kg]	11	12		16	17	16	17	23	21
GKR05	m	[kg]	16	17		21	22	21	22	28	26
GKR06	m	[kg]	24	25		29	30	29	30	37	35

			100C12	100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR05	m	[kg]	35	32	35	32				
GKR06	m	[kg]	44	41	44	41	52	49	59	56

► 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.



Weights

GKR□□-2M VAR / VBR

			063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11	071C13 071C31
GKR03	m	[kg]	7		7			7			
GKR04	m	[kg]		9			9		10	11	12
GKR05	m	[kg]							15	17	
GKR06	m	[kg]							24	25	26

			071C32	071C33	071C42	080C11	080C13	080C31	080C32 080C33 080C42	090C11 090C31	090C32
GKR03	m	[kg]	9		9						
GKR04	m	[kg]	11	12		16	17	16	17	23	21
GKR05	m	[kg]	16	17		21	22	21	22	28	26
GKR06	m	[kg]	25	26		29	30	29	30	38	36

			100C12	100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR05	m	[kg]	35	32	35	32				
GKR06	m	[kg]	45	42	45	42	53	50	60	57

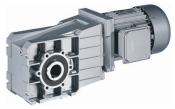
GKR□□-2M VAK

			063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11	071C13 071C31
GKR03	m	[kg]	7		7			7	8		
GKR04	m	[kg]		10			9		10	12	
GKR05	m	[kg]							16	18	
GKR06	m	[kg]							25	26	27

			071C32	071C33	071C42	080C11	080C13	080C31	080C32 080C33 080C42	090C11 090C31	090C32
GKR03	m	[kg]	9		10						
GKR04	m	[kg]	12			16	17	16	17	24	22
GKR05	m	[kg]	17	18		22	23	22	23	29	27
GKR06	m	[kg]	26	27		30	31	30	31	39	37

			100C12	100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR05	m	[kg]	36	33	36	33				
GKR06	m	[kg]	46	43	46	43	54	51	61	58

► 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.



Weights

GKR□□-2M SAR / SBR

			063C11	063C12	063C31	063C32	063C42	071C11	071C13 071C31	071C32	071C33	071C42	080C11	080C13
GKR03	m	[kg]		7		7				9		9		
GKR04	m	[kg]	9				10	11	12	11	12		16	17
GKR05	m	[kg]					14	16	17	16	17		20	21
GKR06	m	[kg]					23	25		24	25		29	30

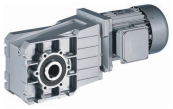
			080C31	080C32 080C33 080C42	090C11 090C31	090C32	100C12	100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR04	m	[kg]	16	17	23	21								
GKR05	m	[kg]	20	21	28	26	35	32	35	32				
GKR06	m	[kg]	29	30	37	35	44	41	44	41	52	49	59	56

GKR□□-2M SAK

			063C11	063C12	063C31	063C32	063C42	071C11	071C13 071C31	071C32	071C33	071C42	080C11	080C13
GKR03	m	[kg]		7		7	8			9		10		
GKR04	m	[kg]	10		9	10				12			16	17
GKR05	m	[kg]					15	17	18	17	18		21	22
GKR06	m	[kg]					24	26		25	26		30	31

			080C31	080C32 080C33 080C42	090C11 090C31	090C32	100C12	100C31	100C32	100C41	112C22	112C31	112C32	112C41
GKR04	m	[kg]	16	17	24	22								
GKR05	m	[kg]	21	22	29	27	36	33	36	33				
GKR06	m	[kg]	30	31	38	36	45	42	45	42	53	50	60	57

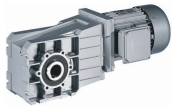
► Weights with oil filling for mounting position A; all values are approximate.
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.



Selection tables

50 Hz, 60 Hz: P_N = 0.06 kW

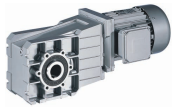
n_N	1425 r/min				1735 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	64	8.5	5.3					22.270	GKR03-2M □□□063C02	66
	57	9.6	4.7		69	7.9	5.7	25.051	GKR03-2M □□□063C02	66
	50	11	4.1		60	9.0	5.0	28.808	GKR03-2M □□□063C02	66
	44	12	3.6		53	10	4.4	32.593	GKR03-2M □□□063C02	66
	38	14	3.1		46	12	3.8	37.481	GKR03-2M □□□063C02	66
	34	16	2.8		41	13	3.4	42.222	GKR03-2M □□□063C02	66
	29	19	2.4		36	15	3.0	48.556	GKR03-2M □□□063C02	66
	26	21	2.2		32	17	2.7	53.889	GKR03-2M □□□063C02	66
	23	24	1.9		28	19	2.3	61.972	GKR03-2M □□□063C02	66



Selection tables

50 Hz, 60 Hz: P_N = 0.09 kW

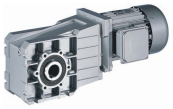
n_N	1375 r/min				1695 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	103	7.9	5.7					13.386	GKR03-2M □□□063C22	66
	91	9.0	5.0		111	7.3	5.9	15.111	GKR03-2M □□□063C22	66
	79	10	4.4		96	8.4	5.2	17.378	GKR03-2M □□□063C22	66
	71	11	3.9		87	9.3	4.6	19.365	GKR03-2M □□□063C22	66
	62	13	3.4		75	11	4.0	22.270	GKR03-2M □□□063C22	66
	55	15	3.0		67	12	3.7	25.051	GKR03-2M □□□063C22	66
	48	17	2.6		58	14	3.2	28.808	GKR03-2M □□□063C22	66
	42	19	2.3		51	16	2.9	32.593	GKR03-2M □□□063C22	66
	37	22	2.0		45	18	2.5	37.481	GKR03-2M □□□063C22	66
	33	25	1.8		40	20	2.2	42.222	GKR03-2M □□□063C22	66
	28	29	1.6		35	23	1.9	48.556	GKR03-2M □□□063C22	66
	26	32	1.4		31	26	1.7	53.889	GKR03-2M □□□063C22	66
	22	37	1.2		27	30	1.5	61.972	GKR03-2M □□□063C22	66



Selection tables

50 Hz, 60 Hz: P_N = 0.12 kW

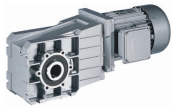
n_N	1425 r/min				1735 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	136	8.0	5.6		165	6.6	6.5	10.466	GKR03-2M □□□063C12	66
	124	8.7	5.4		151	7.2	6.2	11.449	GKR04-2M □□□063C12	66
	122	8.9	5.1		148	7.3	5.9	11.640	GKR03-2M □□□063C12	66
	112	9.7	5.0		136	8.0	5.8	12.698	GKR04-2M □□□063C12	66
	107	10	4.4		129	8.4	5.1	13.386	GKR03-2M □□□063C12	66
	98	11	5.0		118	9.2	5.8	14.603	GKR04-2M □□□063C12	66
	94	12	3.9		114	9.5	4.5	15.111	GKR03-2M □□□063C12	66
	82	13	3.4		99	11	3.9	17.378	GKR03-2M □□□063C12	66
	74	15	3.0		89	12	3.5	19.365	GKR03-2M □□□063C12	66
	73	15	5.5		88	12	6.4	19.556	GKR04-2M □□□063C12	66
	64	17	2.6		78	14	3.1	22.270	GKR03-2M □□□063C12	66
	63	17	5.2		77	14	6.1	22.489	GKR04-2M □□□063C12	66
	57	19	2.4		69	16	2.9	25.051	GKR03-2M □□□063C12	66
	57	19	4.6		69	16	5.6	25.185	GKR04-2M □□□063C12	66
	50	22	2.0		60	18	2.5	28.808	GKR03-2M □□□063C12	66
	49	22	4.1		60	18	5.0	28.963	GKR04-2M □□□063C12	66
	45	24	3.7		54	20	4.5	31.919	GKR04-2M □□□063C12	66
	44	25	1.8		53	20	2.2	32.593	GKR03-2M □□□063C12	66
	39	28	3.2		47	23	3.9	36.707	GKR04-2M □□□063C12	66
	38	29	1.6		46	24	1.9	37.481	GKR03-2M □□□063C12	66
	36	31	2.9		43	25	3.6	40.000	GKR04-2M □□□063C12	66
	34	32	1.4		41	26	1.7	42.222	GKR03-2M □□□063C12	66
	31	35	2.6		38	29	3.1	46.000	GKR04-2M □□□063C12	66
	29	37	1.2		36	30	1.5	48.556	GKR03-2M □□□063C12	66
	27	40	1.7		33	33	2.1	52.698	GKR04-2M □□□063C12	66
	26	41	1.1		32	34	1.3	53.889	GKR03-2M □□□063C12	66
	24	46	1.7		29	38	2.1	60.603	GKR04-2M □□□063C12	66
	23	47	1.0		28	39	1.2	61.972	GKR03-2M □□□063C12	66



Selection tables

50 Hz, 60 Hz: P_N = 0.18 kW

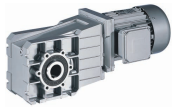
n_N	2740 r/min				3370 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	239	6.8	5.6		292	5.5	6.5	11.449	GKR04-2M □□□063C11	66
	216	7.6	5.2		263	6.2	6.0	12.698	GKR04-2M □□□063C11	66
	188	8.7	5.2		229	7.1	6.0	14.603	GKR04-2M □□□063C11	66
	140	12	5.8		171	9.5	6.6	19.556	GKR04-2M □□□063C11	66
	122	13	5.5		149	11	6.3	22.489	GKR04-2M □□□063C11	66
	109	15	5.5		133	12	6.3	25.185	GKR04-2M □□□063C11	66
	95	17	4.8		115	14	5.6	28.963	GKR04-2M □□□063C11	66
	86	19	4.4		105	15	5.0	31.919	GKR04-2M □□□063C11	66
	75	22	3.8		91	18	4.4	36.707	GKR04-2M □□□063C11	66
	69	24	3.5		84	19	4.0	40.000	GKR04-2M □□□063C11	66
	60	27	3.3		73	22	3.9	46.000	GKR04-2M □□□063C11	66
	52	31	2.2		63	26	2.6	52.698	GKR04-2M □□□063C11	66
	45	36	2.2		55	29	2.6	60.603	GKR04-2M □□□063C11	66



Selection tables

50 Hz, 60 Hz: P_N = 0.18 kW

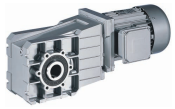
n_N	1365 r/min				1695 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	219	7.4	5.4		268	6.0	6.5	6.222	GKR03-2M □□□063C32	66
	192	8.5	5.1		234	6.9	6.0	7.111	GKR03-2M □□□063C32	66
	167	9.8	4.5		204	7.9	5.4	8.178	GKR03-2M □□□063C32	66
	150	11	4.1		183	8.8	4.9	9.101	GKR03-2M □□□063C32	66
	130	13	3.6		159	10	4.3	10.466	GKR03-2M □□□063C32	66
	119	14	3.4		145	11	4.1	11.449	GKR04-2M □□□063C32	66
	117	14	3.2		143	11	3.9	11.640	GKR03-2M □□□063C32	66
	108	15	3.2		131	12	3.8	12.698	GKR04-2M □□□063C32	66
	102	16	2.8		124	13	3.4	13.386	GKR03-2M □□□063C32	66
	94	17	3.2		114	14	3.8	14.603	GKR04-2M □□□063C32	66
	90	18	2.5		110	15	3.0	15.111	GKR03-2M □□□063C32	66
	79	21	2.2		96	17	2.6	17.378	GKR03-2M □□□063C32	66
	71	23	1.9		86	19	2.3	19.365	GKR03-2M □□□063C32	66
	70	23	3.5		85	19	4.2	19.556	GKR04-2M □□□063C32	66
	61	27	1.7		75	21	2.0	22.270	GKR03-2M □□□063C32	66
	61	27	3.3		74	22	4.0	22.489	GKR04-2M □□□063C32	66
	55	30	1.5		67	24	1.9	25.051	GKR03-2M □□□063C32	66
	54	30	2.9		66	24	3.6	25.185	GKR04-2M □□□063C32	66
	47	34	1.3		58	28	1.6	28.808	GKR03-2M □□□063C32	66
	47	35	2.6		58	28	3.2	28.963	GKR04-2M □□□063C32	66
	43	38	2.4		52	31	2.9	31.919	GKR04-2M □□□063C32	66
	42	39	1.2		51	31	1.4	32.593	GKR03-2M □□□063C32	66
	37	44	2.0		45	35	2.5	36.707	GKR04-2M □□□063C32	66
	36	45	1.0		44	36	1.2	37.481	GKR03-2M □□□063C32	66
	34	48	1.9		42	39	2.3	40.000	GKR04-2M □□□063C32	66
	32	51	0.9		39	41	1.1	42.222	GKR03-2M □□□063C32	66
	30	55	1.6		36	44	2.0	46.000	GKR04-2M □□□063C32	66
					35	47	1.0	48.556	GKR03-2M □□□063C32	66
	26	63	1.1		32	51	1.4	52.698	GKR04-2M □□□063C32	66
					31	52	0.9	53.889	GKR03-2M □□□063C32	66
	23	73	1.1		28	58	1.4	60.603	GKR04-2M □□□063C32	66



Selection tables

50 Hz, 60 Hz: P_N = 0.18 kW

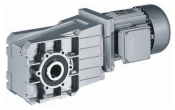
n_N	930 r/min				1140 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	179	9.1	5.4		218	7.4	6.6	5.185	GKR04-2M □□□071C13	66
	156	10	5.4		190	8.5	6.6	5.963	GKR04-2M □□□071C13	66
	131	12	5.4		159	10	6.6	7.111	GKR04-2M □□□071C13	66
	114	14	5.4		138	12	6.6	8.178	GKR04-2M □□□071C13	66
	102	16	5.3		124	13	6.5	9.101	GKR04-2M □□□071C13	66
	89	18	4.8		108	15	5.9	10.466	GKR04-2M □□□071C13	66
	81	20	4.5		99	16	5.5	11.449	GKR04-2M □□□071C13	66
	73	22	4.0		89	18	4.9	12.698	GKR04-2M □□□071C13	66
	70	23	5.4		86	19	6.6	13.216	GKR05-2M □□□071C13	66
	64	26	3.5		77	21	4.3	14.603	GKR04-2M □□□071C13	66
	62	26	5.4		75	21	6.6	15.008	GKR05-2M □□□071C13	66
	60	27	3.3		73	22	4.0	15.556	GKR04-2M □□□071C13	66
	52	31	2.9		63	26	3.5	17.889	GKR04-2M □□□071C13	66
	48	34	2.6		58	28	3.2	19.556	GKR04-2M □□□071C13	66
	41	39	2.3		50	32	2.8	22.489	GKR04-2M □□□071C13	66
	37	44	2.0		45	36	2.5	25.185	GKR04-2M □□□071C13	66
	32	51	1.8		39	41	2.2	28.963	GKR04-2M □□□071C13	66
	31	54	4.5		37	44	5.5	30.522	GKR05-2M □□□071C13	66
	29	56	1.6		35	46	2.0	31.919	GKR04-2M □□□071C13	66
	25	64	1.4		31	53	1.7	36.707	GKR04-2M □□□071C13	66
	23	70	1.3		28	57	1.6	40.000	GKR04-2M □□□071C13	66
	22	76	3.2		26	62	3.9	43.267	GKR05-2M □□□071C13	66
	20	81	1.1		25	66	1.4	46.000	GKR04-2M □□□071C13	66
	19	86	2.8		23	70	3.4	49.133	GKR05-2M □□□071C13	66
	18	92	2.6		22	75	3.2	52.510	GKR05-2M □□□071C13	66
	17	96	3.8		21	78	4.6	54.513	GKR06-2M □□□071C13	66
	16	105	2.3		19	85	2.8	59.630	GKR05-2M □□□071C13	66
	15	110	3.0		18	90	3.7	62.500	GKR06-2M □□□071C13	66
	14	118	1.5		17	96	1.9	67.112	GKR05-2M □□□071C13	66
	14	121	3.0		16	99	3.7	68.906	GKR06-2M □□□071C13	66
	12	134	1.5		15	109	1.9	76.213	GKR05-2M □□□071C13	66



Selection tables

50 Hz, 60 Hz: P_N = 0.25 kW

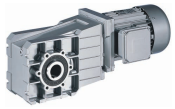
n_N	2710 r/min				3390 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	237	9.6	4.0		289	7.7	4.7	11.449	GKR04-2M □□□063C31	66
	213	11	3.8		261	8.5	4.4	12.698	GKR04-2M □□□063C31	66
	186	12	3.8		227	9.8	4.4	14.603	GKR04-2M □□□063C31	66
	139	16	4.1		169	13	4.8	19.556	GKR04-2M □□□063C31	66
	121	19	3.9		147	15	4.6	22.489	GKR04-2M □□□063C31	66
	108	21	3.9		131	17	4.5	25.185	GKR04-2M □□□063C31	66
	94	24	3.5		114	19	4.0	28.963	GKR04-2M □□□063C31	66
	85	27	3.1		104	21	3.6	31.919	GKR04-2M □□□063C31	66
	74	31	2.7		90	25	3.2	36.707	GKR04-2M □□□063C31	66
	68	33	2.5		83	27	2.9	40.000	GKR04-2M □□□063C31	66
	59	38	2.3		72	31	2.8	46.000	GKR04-2M □□□063C31	66
	51	44	1.6		63	35	1.9	52.698	GKR04-2M □□□063C31	66
	45	51	1.6		55	41	1.9	60.603	GKR04-2M □□□063C31	66



Selection tables

50 Hz, 60 Hz: P_N = 0.25 kW

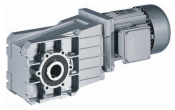
n_N	1370 r/min				1680 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	264	8.6	4.5		322	7.0	5.4	5.185	GKR04-2M □□□063C42	66
	253	9.0	4.4		309	7.3	5.2	5.411	GKR03-2M □□□063C42	66
	230	9.9	4.5		280	8.1	5.4	5.963	GKR04-2M □□□063C42	66
	220	10	3.9		268	8.4	4.6	6.222	GKR03-2M □□□063C42	66
	193	12	3.7		235	9.6	4.3	7.111	GKR03-2M □□□063C42	66
	193	12	4.5		235	9.6	5.4	7.111	GKR04-2M □□□063C42	66
	168	14	3.3		204	11	3.9	8.178	GKR03-2M □□□063C42	66
	168	14	4.5		204	11	5.4	8.178	GKR04-2M □□□063C42	66
	151	15	3.0		184	12	3.5	9.101	GKR03-2M □□□063C42	66
	151	15	5.2		184	12	6.2	9.101	GKR04-2M □□□063C42	66
	131	17	2.6		160	14	3.1	10.466	GKR03-2M □□□063C42	66
	131	17	5.1		160	14	6.0	10.466	GKR04-2M □□□063C42	66
	120	19	4.7		146	15	5.6	11.449	GKR04-2M □□□063C42	66
	118	19	2.3		144	16	2.8	11.640	GKR03-2M □□□063C42	66
	108	21	4.3		132	17	5.1	12.698	GKR04-2M □□□063C42	66
	104	22	4.5		126	18	5.4	13.216	GKR05-2M □□□063C42	66
	102	22	2.0		125	18	2.4	13.386	GKR03-2M □□□063C42	66
	94	24	3.7		114	20	4.4	14.603	GKR04-2M □□□063C42	66
	91	25	4.5		111	20	5.4	15.008	GKR05-2M □□□063C42	66
	91	25	1.8		111	20	2.1	15.111	GKR03-2M □□□063C42	66
	88	26	3.5		107	21	4.1	15.556	GKR04-2M □□□063C42	66
	79	29	1.6		96	23	1.8	17.378	GKR03-2M □□□063C42	66
	77	30	3.0		93	24	3.6	17.889	GKR04-2M □□□063C42	66
	71	32	1.4		86	26	1.7	19.365	GKR03-2M □□□063C42	66
	70	32	2.8		85	26	3.3	19.556	GKR04-2M □□□063C42	66
	62	37	1.2		75	30	1.4	22.270	GKR03-2M □□□063C42	66
	61	37	2.4		74	30	2.9	22.489	GKR04-2M □□□063C42	66
	55	41	1.1		67	34	1.3	25.051	GKR03-2M □□□063C42	66
	54	42	2.2		66	34	2.6	25.185	GKR04-2M □□□063C42	66
	48	48	0.9		58	39	1.2	28.808	GKR03-2M □□□063C42	66
	47	48	1.9		58	39	2.3	28.963	GKR04-2M □□□063C42	66
	45	51	4.3		55	41	5.3	30.522	GKR05-2M □□□063C42	66
	43	53	1.7		52	43	2.1	31.919	GKR04-2M □□□063C42	66
	42	54	0.8		51	44	1.0	32.593	GKR03-2M □□□063C42	66
	37	61	1.5		46	50	1.8	36.707	GKR04-2M □□□063C42	66
					45	51	0.9	37.481	GKR03-2M □□□063C42	66
	34	66	1.2		42	54	1.5	40.000	GKR04-2M □□□063C42	66
	30	76	1.2		36	62	1.4	46.000	GKR04-2M □□□063C42	66
	28	81	3.0		34	66	3.6	49.133	GKR05-2M □□□063C42	66
	28	82	3.2		34	67	3.9	49.444	GKR06-2M □□□063C42	66



Selection tables

50 Hz, 60 Hz: P_N = 0.25 kW

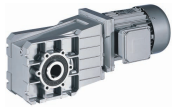
n_N	1370 r/min				1680 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	26	87	2.8		32	71	3.4	52.510	GKR05-2M □□□063C42	66
	25	90	3.2		31	74	3.9	54.513	GKR06-2M □□□063C42	66
	23	99	2.4		28	81	3.0	59.630	GKR05-2M □□□063C42	66
	22	103	2.6		27	84	3.2	62.500	GKR06-2M □□□063C42	66
	20	111	1.4		25	91	1.7	67.112	GKR05-2M □□□063C42	66
	20	114	2.6		24	93	3.2	68.906	GKR06-2M □□□063C42	66
	18	126	1.4		22	103	1.7	76.213	GKR05-2M □□□063C42	66



Selection tables

50 Hz, 60 Hz: P_N = 0.25 kW

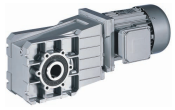
n_N	930 r/min				1140 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	179	13	3.9		218	10	4.7	5.185	GKR04-2M □□□071C33	66
	156	15	3.9		190	12	4.7	5.963	GKR04-2M □□□071C33	66
	131	17	3.9		159	14	4.7	7.111	GKR04-2M □□□071C33	66
	114	20	3.9		138	16	4.7	8.178	GKR04-2M □□□071C33	66
	102	22	3.8		124	18	4.7	9.101	GKR04-2M □□□071C33	66
	89	26	3.5		108	21	4.3	10.466	GKR04-2M □□□071C33	66
	81	28	3.2		99	23	4.0	11.449	GKR04-2M □□□071C33	66
	73	31	2.9		89	25	3.6	12.698	GKR04-2M □□□071C33	66
	70	32	3.9		86	26	4.7	13.216	GKR05-2M □□□071C33	66
	64	36	2.5		77	29	3.1	14.603	GKR04-2M □□□071C33	66
	62	37	3.9		75	30	4.7	15.008	GKR05-2M □□□071C33	66
	60	38	2.4		73	31	2.9	15.556	GKR04-2M □□□071C33	66
	52	44	2.1		63	36	2.5	17.889	GKR04-2M □□□071C33	66
	48	48	1.9		58	39	2.3	19.556	GKR04-2M □□□071C33	66
	41	55	1.6		50	45	2.0	22.489	GKR04-2M □□□071C33	66
	37	61	1.5		45	50	1.8	25.185	GKR04-2M □□□071C33	66
	32	71	1.3		39	58	1.6	28.963	GKR04-2M □□□071C33	66
	31	74	3.2		37	61	4.0	30.522	GKR05-2M □□□071C33	66
	29	78	1.2		35	64	1.4	31.919	GKR04-2M □□□071C33	66
	28	82	2.9		34	67	3.6	33.433	GKR05-2M □□□071C33	66
	25	90	1.0		31	73	1.2	36.707	GKR04-2M □□□071C33	66
	25	93	2.6		30	76	3.2	37.967	GKR05-2M □□□071C33	66
	23	98	0.9		28	80	1.1	40.000	GKR04-2M □□□071C33	66
	23	99	3.1		28	81	3.8	40.741	GKR06-2M □□□071C33	66
	22	106	2.3		26	86	2.8	43.267	GKR05-2M □□□071C33	66
	21	110	3.1		25	89	3.8	44.917	GKR06-2M □□□071C33	66
	20	112	0.8		25	92	1.0	46.000	GKR04-2M □□□071C33	66
	19	120	2.0		23	98	2.5	49.133	GKR05-2M □□□071C33	66
	19	121	2.7		23	98	3.3	49.444	GKR06-2M □□□071C33	66
	18	128	1.9		22	104	2.3	52.510	GKR05-2M □□□071C33	66
	17	133	2.7		21	108	3.3	54.513	GKR06-2M □□□071C33	66
	16	145	1.7		19	119	2.0	59.630	GKR05-2M □□□071C33	66
	15	152	2.2		18	124	2.7	62.500	GKR06-2M □□□071C33	66
	14	164	1.1		17	134	1.3	67.112	GKR05-2M □□□071C33	66
	14	168	2.2		16	137	2.7	68.906	GKR06-2M □□□071C33	66
	12	186	1.1		15	152	1.3	76.213	GKR05-2M □□□071C33	66



Selection tables

50 Hz, 60 Hz: P_N = 0.37 kW

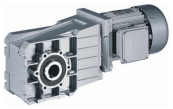
n_N	2720 r/min				3360 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	260	13	5.6		317	10	6.5	10.466	GKR04-2M □□□071C11	66
	238	14	5.2		290	11	6.0	11.449	GKR04-2M □□□071C11	66
	214	16	4.7		262	13	5.4	12.698	GKR04-2M □□□071C11	66
	186	18	4.1		227	15	4.7	14.603	GKR04-2M □□□071C11	66
	175	19	3.8		213	16	4.4	15.556	GKR04-2M □□□071C11	66
	152	22	3.3		186	18	3.8	17.889	GKR04-2M □□□071C11	66
	139	24	3.1		170	20	3.5	19.556	GKR04-2M □□□071C11	66
	121	28	2.7		148	22	3.1	22.489	GKR04-2M □□□071C11	66
	108	31	2.7		132	25	3.1	25.185	GKR04-2M □□□071C11	66
	94	36	2.3		115	29	2.7	28.963	GKR04-2M □□□071C11	66
	89	38	5.9		109	30	6.8	30.522	GKR05-2M □□□071C11	66
	85	39	2.1		104	32	2.5	31.919	GKR04-2M □□□071C11	66
	74	45	1.9		90	37	2.1	36.707	GKR04-2M □□□071C11	66
	68	49	1.7		83	40	2.0	40.000	GKR04-2M □□□071C11	66
	59	57	1.6		72	46	1.9	46.000	GKR04-2M □□□071C11	66
	55	61	4.0		68	49	4.7	49.133	GKR05-2M □□□071C11	66
	52	65	3.7		63	52	4.4	52.510	GKR05-2M □□□071C11	66
	50	67	5.4		62	54	6.4	54.513	GKR06-2M □□□071C11	66
	46	74	3.3		56	60	3.9	59.630	GKR05-2M □□□071C11	66
	44	77	4.3		53	62	5.1	62.500	GKR06-2M □□□071C11	66
	41	83	2.2		50	67	2.6	67.112	GKR05-2M □□□071C11	66
	40	85	4.3		48	69	5.1	68.906	GKR06-2M □□□071C11	66
	36	94	2.2		44	76	2.6	76.213	GKR05-2M □□□071C11	66



Selection tables

50 Hz, 60 Hz: P_N = 0.37 kW

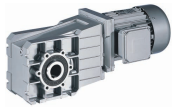
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	272	12	4.0		330	10	4.6	5.185	GKR04-2M □□□071C32	66
	261	13	3.1		316	11	3.6	5.411	GKR03-2M □□□071C32	66
	237	14	4.0		287	12	4.6	5.963	GKR04-2M □□□071C32	66
	227	15	2.7		275	12	3.2	6.222	GKR03-2M □□□071C32	66
	198	17	2.5		241	14	3.0	7.111	GKR03-2M □□□071C32	66
	198	17	4.0		241	14	4.6	7.111	GKR04-2M □□□071C32	66
	172	19	2.3		209	16	2.7	8.178	GKR03-2M □□□071C32	66
	172	19	4.0		209	16	4.6	8.178	GKR04-2M □□□071C32	66
	155	22	2.1		188	18	2.4	9.101	GKR03-2M □□□071C32	66
	155	22	3.9		188	18	4.5	9.101	GKR04-2M □□□071C32	66
	135	25	1.8		163	20	2.1	10.466	GKR03-2M □□□071C32	66
	135	25	3.6		163	20	4.1	10.466	GKR04-2M □□□071C32	66
	123	27	3.3		149	22	3.8	11.449	GKR04-2M □□□071C32	66
	121	28	1.6		147	23	1.9	11.640	GKR03-2M □□□071C32	66
	111	30	3.0		135	25	3.5	12.698	GKR04-2M □□□071C32	66
	107	31	4.0		129	26	4.6	13.216	GKR05-2M □□□071C32	66
	105	32	1.4		128	26	1.6	13.386	GKR03-2M □□□071C32	66
	97	35	2.6		117	28	3.0	14.603	GKR04-2M □□□071C32	66
	94	36	4.0		114	29	4.6	15.008	GKR05-2M □□□071C32	66
	93	36	1.3		113	29	1.5	15.111	GKR03-2M □□□071C32	66
	91	37	2.4		110	30	2.8	15.556	GKR04-2M □□□071C32	66
	81	41	1.1		98	34	1.3	17.378	GKR03-2M □□□071C32	66
	79	43	2.1		96	35	2.5	17.889	GKR04-2M □□□071C32	66
	73	46	1.0		88	38	1.1	19.365	GKR03-2M □□□071C32	66
	72	47	1.9		87	38	2.3	19.556	GKR04-2M □□□071C32	66
	63	53	0.8		77	43	1.0	22.270	GKR03-2M □□□071C32	66
	63	54	1.7		76	44	2.0	22.489	GKR04-2M □□□071C32	66
					69	49	0.9	25.051	GKR03-2M □□□071C32	66
	56	60	1.5		68	49	1.8	25.185	GKR04-2M □□□071C32	66
					60	56	0.8	28.808	GKR03-2M □□□071C32	66
	49	69	1.3		59	57	1.6	28.963	GKR04-2M □□□071C32	66
	46	73	3.3		56	60	4.0	30.522	GKR05-2M □□□071C32	66
	44	76	1.2		54	62	1.4	31.919	GKR04-2M □□□071C32	66
	42	80	3.0		51	65	3.7	33.433	GKR05-2M □□□071C32	66
	38	87	1.0		47	72	1.3	36.707	GKR04-2M □□□071C32	66
	37	90	2.7		45	74	3.2	37.967	GKR05-2M □□□071C32	66
	35	95	0.9		43	78	1.2	40.000	GKR04-2M □□□071C32	66
	35	97	3.2		42	80	3.9	40.741	GKR06-2M □□□071C32	66
	33	103	2.3		40	84	2.8	43.267	GKR05-2M □□□071C32	66
	31	107	3.2		38	88	3.9	44.917	GKR06-2M □□□071C32	66



Selection tables

50 Hz, 60 Hz: P_N = 0.37 kW

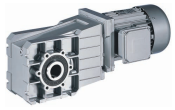
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	31	110	0.8		37	90	1.0	46.000	GKR04-2M □□□071C32	66
	29	117	2.1		35	96	2.5	49.133	GKR05-2M □□□071C32	66
	29	118	2.8		35	96	3.4	49.444	GKR06-2M □□□071C32	66
	27	125	1.9		33	102	2.3	52.510	GKR05-2M □□□071C32	66
	26	130	2.8		32	106	3.4	54.513	GKR06-2M □□□071C32	66
	24	142	1.7		29	116	2.1	59.630	GKR05-2M □□□071C32	66
	23	149	2.2		27	122	2.7	62.500	GKR06-2M □□□071C32	66
	21	160	1.1		26	131	1.4	67.112	GKR05-2M □□□071C32	66
	21	164	2.2		25	134	2.7	68.906	GKR06-2M □□□071C32	66
	19	181	1.1		23	149	1.4	76.213	GKR05-2M □□□071C32	66



Selection tables

50 Hz, 60 Hz: P_N = 0.37 kW

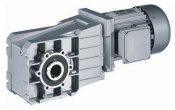
n_N	950 r/min				1160 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	183	18	3.8		222	15	4.6	5.185	GKR04-2M □□□080C13	66
	159	21	3.4		193	17	4.2	5.963	GKR04-2M □□□080C13	66
	152	22	5.7		184	18	6.9	6.257	GKR05-2M □□□080C13	66
	134	25	3.1		162	21	3.8	7.111	GKR04-2M □□□080C13	66
	116	29	2.8		141	24	3.4	8.178	GKR04-2M □□□080C13	66
	104	32	2.6		126	26	3.2	9.101	GKR04-2M □□□080C13	66
	91	37	2.4		110	30	2.9	10.466	GKR04-2M □□□080C13	66
	83	40	2.2		100	33	2.7	11.449	GKR04-2M □□□080C13	66
	75	45	2.0		91	37	2.4	12.698	GKR04-2M □□□080C13	66
	72	47	4.6		87	38	5.6	13.216	GKR05-2M □□□080C13	66
	65	52	1.7		79	42	2.1	14.603	GKR04-2M □□□080C13	66
	63	53	4.2		77	43	5.1	15.008	GKR05-2M □□□080C13	66
	61	55	1.6		74	45	2.0	15.556	GKR04-2M □□□080C13	66
	53	63	1.4		64	52	1.7	17.889	GKR04-2M □□□080C13	66
	49	69	1.3		59	57	1.6	19.556	GKR04-2M □□□080C13	66
	42	79	1.1		51	65	1.4	22.489	GKR04-2M □□□080C13	66
	41	83	2.9		49	68	3.5	23.450	GKR05-2M □□□080C13	66
	38	89	1.0		46	73	1.2	25.185	GKR04-2M □□□080C13	66
	35	95	2.5		43	78	3.1	26.878	GKR05-2M □□□080C13	66
	33	102	0.9		40	84	1.1	28.963	GKR04-2M □□□080C13	66
	31	108	2.2		38	88	2.7	30.522	GKR05-2M □□□080C13	66
	30	111	4.0		37	91	4.8	31.481	GKR06-2M □□□080C13	66
	28	118	2.0		34	97	2.5	33.433	GKR05-2M □□□080C13	66
	25	134	1.8		30	110	2.2	37.967	GKR05-2M □□□080C13	66
	23	144	3.1		28	118	3.8	40.741	GKR06-2M □□□080C13	66
	22	153	1.6		27	125	1.9	43.267	GKR05-2M □□□080C13	66
	21	159	2.8		26	130	3.5	44.917	GKR06-2M □□□080C13	66
	19	174	1.4		23	142	1.7	49.133	GKR05-2M □□□080C13	66
	19	175	2.6		23	143	3.1	49.444	GKR06-2M □□□080C13	66
	18	186	1.3		22	152	1.6	52.510	GKR05-2M □□□080C13	66
	17	193	2.3		21	158	2.9	54.513	GKR06-2M □□□080C13	66
	16	211	1.1		19	173	1.4	59.630	GKR05-2M □□□080C13	66
	15	221	1.7		18	181	2.1	62.500	GKR06-2M □□□080C13	66
	14	243	1.7		17	199	2.1	68.906	GKR06-2M □□□080C13	66



Selection tables

50 Hz, 60 Hz: P_N = 0.55 kW

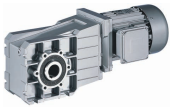
n_N	2630 r/min				3240 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	507	9.8	4.1		623	8.0	4.7	5.185	GKR04-2M □□□071C31	66
	441	11	4.1		542	9.2	4.7	5.963	GKR04-2M □□□071C31	66
	370	13	4.1		454	11	4.7	7.111	GKR04-2M □□□071C31	66
	322	16	4.1		395	13	4.7	8.178	GKR04-2M □□□071C31	66
	289	17	4.1		355	14	4.7	9.101	GKR04-2M □□□071C31	66
	251	20	3.7		309	16	4.2	10.466	GKR04-2M □□□071C31	66
	230	22	3.4		282	18	3.9	11.449	GKR04-2M □□□071C31	66
	207	24	3.1		254	20	3.6	12.698	GKR04-2M □□□071C31	66
	199	25	4.1		244	20	4.7	13.216	GKR05-2M □□□071C31	66
	180	28	2.7		221	22	3.1	14.603	GKR04-2M □□□071C31	66
	175	28	4.1		215	23	4.7	15.008	GKR05-2M □□□071C31	66
	169	30	2.5		208	24	2.9	15.556	GKR04-2M □□□071C31	66
	147	34	2.2		181	28	2.5	17.889	GKR04-2M □□□071C31	66
	135	37	2.0		165	30	2.3	19.556	GKR04-2M □□□071C31	66
	117	43	1.7		144	35	2.0	22.489	GKR04-2M □□□071C31	66
	104	48	1.8		128	39	2.0	25.185	GKR04-2M □□□071C31	66
	91	55	1.5		112	45	1.8	28.963	GKR04-2M □□□071C31	66
	86	58	3.9		106	47	4.5	30.522	GKR05-2M □□□071C31	66
	82	61	1.4		101	49	1.6	31.919	GKR04-2M □□□071C31	66
	72	70	1.2		88	57	1.4	36.707	GKR04-2M □□□071C31	66
	69	72	3.1		85	58	3.6	37.967	GKR05-2M □□□071C31	66
	66	76	1.1		81	62	1.3	40.000	GKR04-2M □□□071C31	66
	61	82	2.9		75	67	3.5	43.267	GKR05-2M □□□071C31	66
	57	87	1.0		70	71	1.2	46.000	GKR04-2M □□□071C31	66
	54	93	2.6		66	76	3.1	49.133	GKR05-2M □□□071C31	66
	50	100	2.4		62	81	2.9	52.510	GKR05-2M □□□071C31	66
	48	103	3.5		59	84	4.2	54.513	GKR06-2M □□□071C31	66
	44	113	2.1		54	92	2.5	59.630	GKR05-2M □□□071C31	66
	42	119	2.8		52	96	3.4	62.500	GKR06-2M □□□071C31	66
	39	127	1.4		48	103	1.7	67.112	GKR05-2M □□□071C31	66
	38	131	2.8		47	106	3.4	68.906	GKR06-2M □□□071C31	66
	35	145	1.4		43	117	1.7	76.213	GKR05-2M □□□071C31	66



Selection tables

50 Hz, 60 Hz: P_N = 0.55 kW

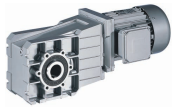
n_N	1405 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	394	13	5.1		482	10	6.0	3.565	GKR05-2M □□□071C42	66
	271	18	3.7		329	15	4.4	5.185	GKR04-2M □□□071C42	66
	260	19	2.0		315	16	2.4	5.411	GKR03-2M □□□071C42	66
	236	21	3.4		286	17	4.0	5.963	GKR04-2M □□□071C42	66
	226	22	1.8		274	18	2.1	6.222	GKR03-2M □□□071C42	66
	225	22	4.5		273	18	5.3	6.257	GKR05-2M □□□071C42	66
	198	25	1.7		240	21	2.0	7.111	GKR03-2M □□□071C42	66
	198	25	3.1		240	21	3.6	7.111	GKR04-2M □□□071C42	66
	172	29	1.5		209	24	1.8	8.178	GKR03-2M □□□071C42	66
	172	29	2.8		209	24	3.3	8.178	GKR04-2M □□□071C42	66
	154	32	1.4		187	26	1.6	9.101	GKR03-2M □□□071C42	66
	154	32	2.6		187	26	3.1	9.101	GKR04-2M □□□071C42	66
	134	37	1.2		163	30	1.4	10.466	GKR03-2M □□□071C42	66
	134	37	2.4		163	30	2.8	10.466	GKR04-2M □□□071C42	66
	123	41	2.2		149	33	2.6	11.449	GKR04-2M □□□071C42	66
	121	41	1.1		147	34	1.3	11.640	GKR03-2M □□□071C42	66
	111	45	2.0		134	37	2.3	12.698	GKR04-2M □□□071C42	66
	106	47	4.5		129	38	5.3	13.216	GKR05-2M □□□071C42	66
	105	48	0.9		127	39	1.1	13.386	GKR03-2M □□□071C42	66
	96	52	1.7		117	42	2.0	14.603	GKR04-2M □□□071C42	66
	94	53	4.2		114	44	4.9	15.008	GKR05-2M □□□071C42	66
	93	54	0.8		113	44	1.0	15.111	GKR03-2M □□□071C42	66
	90	55	1.6		110	45	1.9	15.556	GKR04-2M □□□071C42	66
					99	50	0.9	17.378	GKR03-2M □□□071C42	66
	79	64	1.4		95	52	1.7	17.889	GKR04-2M □□□071C42	66
	72	69	1.3		87	57	1.5	19.556	GKR04-2M □□□071C42	66
	63	80	1.1		76	65	1.3	22.489	GKR04-2M □□□071C42	66
	60	83	2.9		73	68	3.4	23.450	GKR05-2M □□□071C42	66
	56	89	1.0		68	73	1.2	25.185	GKR04-2M □□□071C42	66
	52	95	2.5		63	78	3.1	26.878	GKR05-2M □□□071C42	66
	49	103	0.9		59	84	1.1	28.963	GKR04-2M □□□071C42	66
	46	108	2.2		56	89	2.7	30.522	GKR05-2M □□□071C42	66
	45	112	3.2		54	91	3.9	31.481	GKR06-2M □□□071C42	66
	42	119	2.0		51	97	2.5	33.433	GKR05-2M □□□071C42	66
	41	123	3.2		49	101	3.9	34.708	GKR06-2M □□□071C42	66
	37	135	1.8		45	110	2.2	37.967	GKR05-2M □□□071C42	66
	35	145	2.9		42	118	3.5	40.741	GKR06-2M □□□071C42	66
	33	154	1.6		39	126	1.9	43.267	GKR05-2M □□□071C42	66
	31	160	2.8		38	130	3.5	44.917	GKR06-2M □□□071C42	66
	29	174	1.4		35	143	1.7	49.133	GKR05-2M □□□071C42	66



Selection tables

50 Hz, 60 Hz: P_N = 0.55 kW

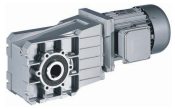
n_N	1405 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	28	176	2.4		35	143	2.9	49.444	GKR06-2M □□□071C42	66
	27	186	1.3		33	152	1.6	52.510	GKR05-2M □□□071C42	66
	26	194	2.3		32	158	2.8	54.513	GKR06-2M □□□071C42	66
	24	212	1.1		29	173	1.4	59.630	GKR05-2M □□□071C42	66
	23	222	1.4		27	181	1.7	62.500	GKR06-2M □□□071C42	66
	20	245	1.4		25	200	1.7	68.906	GKR06-2M □□□071C42	66



Selection tables

50 Hz, 60 Hz: P_N = 0.55 kW

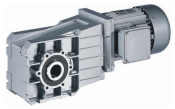
n_N	930 r/min				1140 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	261	19	4.2		320	16	5.2	3.565	GKR05-2M □□□080C33	66
	179	28	2.5		218	23	3.0	5.185	GKR04-2M □□□080C33	66
	156	32	2.3		190	26	2.8	5.963	GKR04-2M □□□080C33	66
	149	34	3.7		181	27	4.6	6.257	GKR05-2M □□□080C33	66
	131	38	2.0		159	31	2.5	7.111	GKR04-2M □□□080C33	66
	114	44	1.8		138	36	2.3	8.178	GKR04-2M □□□080C33	66
	102	49	1.7		124	40	2.1	9.101	GKR04-2M □□□080C33	66
	89	56	1.6		108	46	1.9	10.466	GKR04-2M □□□080C33	66
	81	61	1.5		99	50	1.8	11.449	GKR04-2M □□□080C33	66
	77	65	3.2		94	53	3.9	12.081	GKR05-2M □□□080C33	66
	73	68	1.3		89	56	1.6	12.698	GKR04-2M □□□080C33	66
	70	71	3.0		86	58	3.7	13.216	GKR05-2M □□□080C33	66
	68	74	2.9		82	60	3.6	13.719	GKR05-2M □□□080C33	66
	64	78	1.1		77	64	1.4	14.603	GKR04-2M □□□080C33	66
	62	81	2.8		75	66	3.4	15.008	GKR05-2M □□□080C33	66
	60	83	1.1		73	68	1.3	15.556	GKR04-2M □□□080C33	66
	55	90	2.7		67	74	3.3	16.857	GKR05-2M □□□080C33	66
	52	96	0.9		63	78	1.1	17.889	GKR04-2M □□□080C33	66
	49	103	2.3		59	84	2.9	19.143	GKR05-2M □□□080C33	66
	48	105	0.9		58	86	1.1	19.556	GKR04-2M □□□080C33	66
	45	111	2.2		55	90	2.7	20.650	GKR05-2M □□□080C33	66
	40	126	1.9		48	103	2.3	23.450	GKR05-2M □□□080C33	66
	37	136	3.1		45	111	3.8	25.309	GKR06-2M □□□080C33	66
	35	144	1.7		42	118	2.0	26.878	GKR05-2M □□□080C33	66
	33	150	3.0		41	122	3.7	27.903	GKR06-2M □□□080C33	66
	31	164	1.5		37	134	1.8	30.522	GKR05-2M □□□080C33	66
	30	169	2.6		36	138	3.2	31.481	GKR06-2M □□□080C33	66
	28	179	1.3		34	146	1.6	33.433	GKR05-2M □□□080C33	66
	27	186	2.4		33	152	3.0	34.708	GKR06-2M □□□080C33	66
	25	204	1.2		30	166	1.4	37.967	GKR05-2M □□□080C33	66
	23	219	2.1		28	178	2.5	40.741	GKR06-2M □□□080C33	66
	22	232	1.0		26	189	1.3	43.267	GKR05-2M □□□080C33	66
	21	241	1.9		25	197	2.3	44.917	GKR06-2M □□□080C33	66
	19	264	0.9		23	215	1.1	49.133	GKR05-2M □□□080C33	66
	19	265	1.7		23	216	2.1	49.444	GKR06-2M □□□080C33	66
	18	282	0.9		22	230	1.0	52.510	GKR05-2M □□□080C33	66
	17	292	1.5		21	239	1.9	54.513	GKR06-2M □□□080C33	66
	15	335	1.1		18	274	1.4	62.500	GKR06-2M □□□080C33	66
	14	370	1.1		16	302	1.4	68.906	GKR06-2M □□□080C33	66



Selection tables

50 Hz, 60 Hz: P_N = 0.75 kW

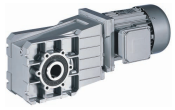
n_N	2720 r/min				3380 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	525	13	4.4		640	10	5.0	5.185	GKR04-2M □□□080C11	66
	456	15	4.0		557	12	4.6	5.963	GKR04-2M □□□080C11	66
	383	18	3.6		467	14	4.1	7.111	GKR04-2M □□□080C11	66
	333	20	3.3		406	16	3.8	8.178	GKR04-2M □□□080C11	66
	299	23	3.0		365	18	3.5	9.101	GKR04-2M □□□080C11	66
	260	26	2.8		317	21	3.2	10.466	GKR04-2M □□□080C11	66
	238	29	2.6		290	23	3.0	11.449	GKR04-2M □□□080C11	66
	214	32	2.3		262	26	2.7	12.698	GKR04-2M □□□080C11	66
	206	33	5.3		251	27	6.1	13.216	GKR05-2M □□□080C11	66
	186	37	2.0		227	29	2.3	14.603	GKR04-2M □□□080C11	66
	181	38	4.9		221	30	5.6	15.008	GKR05-2M □□□080C11	66
	175	39	1.9		213	31	2.2	15.556	GKR04-2M □□□080C11	66
	152	45	1.6		186	36	1.9	17.889	GKR04-2M □□□080C11	66
	139	49	1.5		170	39	1.7	19.556	GKR04-2M □□□080C11	66
	121	56	1.3		148	45	1.5	22.489	GKR04-2M □□□080C11	66
	108	63	1.3		132	51	1.5	25.185	GKR04-2M □□□080C11	66
	94	72	1.2		115	58	1.3	28.963	GKR04-2M □□□080C11	66
	89	76	2.9		109	61	3.4	30.522	GKR05-2M □□□080C11	66
	86	79	5.2		106	63	6.0	31.481	GKR06-2M □□□080C11	66
	81	84	2.7		99	67	3.1	33.433	GKR05-2M □□□080C11	66
	72	95	2.4		87	76	2.7	37.967	GKR05-2M □□□080C11	66
	63	108	2.2		77	87	2.6	43.267	GKR05-2M □□□080C11	66
	55	123	2.0		68	99	2.3	49.133	GKR05-2M □□□080C11	66
	52	131	1.8		63	106	2.2	52.510	GKR05-2M □□□080C11	66
	50	136	3.3		62	110	3.9	54.513	GKR06-2M □□□080C11	66
	46	149	1.6		56	120	1.9	59.630	GKR05-2M □□□080C11	66
	44	156	2.4		53	126	2.9	62.500	GKR06-2M □□□080C11	66
	40	172	2.4		48	139	2.9	68.906	GKR06-2M □□□080C11	66



Selection tables

50 Hz, 60 Hz: P_N = 0.75 kW

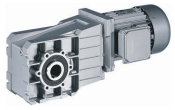
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	396	17	4.7		482	14	5.5	3.565	GKR05-2M □□□080C32	66
	272	25	2.8		330	21	3.2	5.185	GKR04-2M □□□080C32	66
	237	29	2.5		287	24	2.9	5.963	GKR04-2M □□□080C32	66
	225	30	4.1		273	25	4.8	6.257	GKR05-2M □□□080C32	66
	198	34	2.3		241	28	2.6	7.111	GKR04-2M □□□080C32	66
	172	39	2.1		209	32	2.4	8.178	GKR04-2M □□□080C32	66
	155	44	1.9		188	36	2.2	9.101	GKR04-2M □□□080C32	66
	135	51	1.8		163	41	2.0	10.466	GKR04-2M □□□080C32	66
	123	55	1.6		149	45	1.9	11.449	GKR04-2M □□□080C32	66
	111	61	1.5		135	50	1.7	12.698	GKR04-2M □□□080C32	66
	107	64	3.4		129	52	3.9	13.216	GKR05-2M □□□080C32	66
	97	70	1.3		117	58	1.5	14.603	GKR04-2M □□□080C32	66
	94	72	3.1		114	59	3.6	15.008	GKR05-2M □□□080C32	66
	91	75	1.2		110	62	1.4	15.556	GKR04-2M □□□080C32	66
	84	81	3.0		101	67	3.4	16.857	GKR05-2M □□□080C32	66
	79	86	1.0		96	71	1.2	17.889	GKR04-2M □□□080C32	66
	74	92	2.6		89	76	3.0	19.143	GKR05-2M □□□080C32	66
	72	94	1.0		87	77	1.1	19.556	GKR04-2M □□□080C32	66
	68	100	2.4		83	82	2.8	20.650	GKR05-2M □□□080C32	66
	63	109	0.8		76	89	1.0	22.489	GKR04-2M □□□080C32	66
	60	113	2.1		73	93	2.5	23.450	GKR05-2M □□□080C32	66
	53	130	1.9		64	106	2.3	26.878	GKR05-2M □□□080C32	66
	51	135	3.3		61	110	4.1	27.903	GKR06-2M □□□080C32	66
	46	147	1.6		56	121	2.0	30.522	GKR05-2M □□□080C32	66
	45	152	2.9		54	125	3.5	31.481	GKR06-2M □□□080C32	66
	42	161	1.5		51	132	1.8	33.433	GKR05-2M □□□080C32	66
	41	167	2.7		49	137	3.3	34.708	GKR06-2M □□□080C32	66
	37	183	1.3		45	150	1.6	37.967	GKR05-2M □□□080C32	66
	35	197	2.3		42	161	2.8	40.741	GKR06-2M □□□080C32	66
	33	209	1.1		40	171	1.4	43.267	GKR05-2M □□□080C32	66
	31	217	2.1		38	178	2.5	44.917	GKR06-2M □□□080C32	66
	29	237	1.0		35	194	1.2	49.133	GKR05-2M □□□080C32	66
	29	239	1.9		35	196	2.3	49.444	GKR06-2M □□□080C32	66
	27	253	0.9		33	208	1.2	52.510	GKR05-2M □□□080C32	66
	26	263	1.7		32	216	2.1	54.513	GKR06-2M □□□080C32	66
	24	288	0.8		29	236	1.0	59.630	GKR05-2M □□□080C32	66
	23	302	1.3		27	247	1.5	62.500	GKR06-2M □□□080C32	66
	21	333	1.3		25	273	1.5	68.906	GKR06-2M □□□080C32	66



Selection tables

50 Hz, 60 Hz: P_N = 1.1 kW

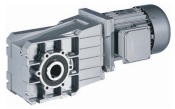
n_N	2720 r/min				3370 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	763	13	5.1		945	11	5.9	3.565	GKR05-2M □□□080C31	66
	525	19	3.0		640	15	3.4	5.185	GKR04-2M □□□080C31	66
	456	22	2.7		557	18	3.1	5.963	GKR04-2M □□□080C31	66
	435	23	4.5		531	19	5.1	6.257	GKR05-2M □□□080C31	66
	383	26	2.4		467	21	2.8	7.111	GKR04-2M □□□080C31	66
	333	30	2.2		406	24	2.6	8.178	GKR04-2M □□□080C31	66
	299	33	2.1		365	27	2.4	9.101	GKR04-2M □□□080C31	66
	260	38	1.9		317	31	2.2	10.466	GKR04-2M □□□080C31	66
	238	42	1.8		290	34	2.0	11.449	GKR04-2M □□□080C31	66
	214	47	1.6		262	38	1.8	12.698	GKR04-2M □□□080C31	66
	206	48	3.6		251	39	4.2	13.216	GKR05-2M □□□080C31	66
	186	54	1.4		227	43	1.6	14.603	GKR04-2M □□□080C31	66
	181	55	3.3		221	44	3.8	15.008	GKR05-2M □□□080C31	66
	175	57	1.3		213	46	1.5	15.556	GKR04-2M □□□080C31	66
	161	62	3.2		197	50	3.7	16.857	GKR05-2M □□□080C31	66
	152	66	1.1		186	53	1.3	17.889	GKR04-2M □□□080C31	66
	142	70	2.8		173	57	3.2	19.143	GKR05-2M □□□080C31	66
	139	72	1.0		170	58	1.2	19.556	GKR04-2M □□□080C31	66
	132	76	2.6		161	61	3.0	20.650	GKR05-2M □□□080C31	66
	121	83	0.9		148	67	1.0	22.489	GKR04-2M □□□080C31	66
	116	86	2.3		142	69	2.6	23.450	GKR05-2M □□□080C31	66
	108	92	0.9		132	75	1.0	25.185	GKR04-2M □□□080C31	66
	101	99	2.3		124	80	2.6	26.878	GKR05-2M □□□080C31	66
	98	102	4.1		119	83	4.7	27.903	GKR06-2M □□□080C31	66
	89	112	2.0		109	90	2.3	30.522	GKR05-2M □□□080C31	66
	86	116	3.6		106	93	4.1	31.481	GKR06-2M □□□080C31	66
	81	123	1.8		99	99	2.1	33.433	GKR05-2M □□□080C31	66
	72	139	1.6		87	112	1.9	37.967	GKR05-2M □□□080C31	66
	67	149	3.0		82	121	3.6	40.741	GKR06-2M □□□080C31	66
	63	159	1.5		77	128	1.8	43.267	GKR05-2M □□□080C31	66
	61	165	2.7		74	133	3.3	44.917	GKR06-2M □□□080C31	66
	55	180	1.3		68	145	1.6	49.133	GKR05-2M □□□080C31	66
	55	181	2.5		67	146	3.0	49.444	GKR06-2M □□□080C31	66
	52	193	1.2		63	155	1.5	52.510	GKR05-2M □□□080C31	66
	50	200	2.2		62	161	2.7	54.513	GKR06-2M □□□080C31	66
	46	219	1.1		56	177	1.3	59.630	GKR05-2M □□□080C31	66
	44	229	1.6		53	185	2.0	62.500	GKR06-2M □□□080C31	66
	40	253	1.6		48	204	2.0	68.906	GKR06-2M □□□080C31	66



Selection tables

50 Hz, 60 Hz: P_N = 1.1 kW

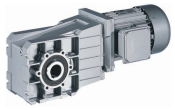
n_N	1390 r/min				1705 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	390	26	4.5		474	21	5.3	3.565	GKR05-2M □□□080C42	66
	268	37	1.8		326	30	2.2	5.185	GKR04-2M □□□080C42	66
	233	43	1.7		283	35	2.0	5.963	GKR04-2M □□□080C42	66
	222	45	3.5		270	37	4.1	6.257	GKR05-2M □□□080C42	66
	196	51	1.5		238	42	1.8	7.111	GKR04-2M □□□080C42	66
	170	59	1.4		207	48	1.6	8.178	GKR04-2M □□□080C42	66
	153	65	1.3		186	53	1.5	9.101	GKR04-2M □□□080C42	66
	147	68	2.8		179	55	3.3	9.440	GKR05-2M □□□080C42	66
	133	75	1.2		162	61	1.4	10.466	GKR04-2M □□□080C42	66
	130	77	2.6		158	63	3.1	10.720	GKR05-2M □□□080C42	66
	121	82	1.1		148	67	1.3	11.449	GKR04-2M □□□080C42	66
	115	87	2.4		140	71	2.8	12.081	GKR05-2M □□□080C42	66
	110	91	1.0		133	74	1.2	12.698	GKR04-2M □□□080C42	66
	105	95	2.3		128	77	2.7	13.216	GKR05-2M □□□080C42	66
	101	98	2.2		123	80	2.6	13.719	GKR05-2M □□□080C42	66
	95	105	0.9		116	85	1.0	14.603	GKR04-2M □□□080C42	66
	93	108	2.1		113	88	2.4	15.008	GKR05-2M □□□080C42	66
	89	112	0.8		110	91	0.9	15.556	GKR04-2M □□□080C42	66
	83	121	2.0		100	99	2.3	16.857	GKR05-2M □□□080C42	66
	73	137	1.7		88	112	2.1	19.143	GKR05-2M □□□080C42	66
	72	140	3.2		87	114	3.8	19.444	GKR06-2M □□□080C42	66
	67	148	1.6		82	121	1.9	20.650	GKR05-2M □□□080C42	66
	65	154	2.9		79	125	3.4	21.438	GKR06-2M □□□080C42	66
	59	168	1.4		72	137	1.7	23.450	GKR05-2M □□□080C42	66
	55	182	2.5		67	148	3.0	25.309	GKR06-2M □□□080C42	66
	52	193	1.2		63	157	1.5	26.878	GKR05-2M □□□080C42	66
	50	200	2.2		61	163	2.8	27.903	GKR06-2M □□□080C42	66
	46	219	1.1		55	179	1.3	30.522	GKR05-2M □□□080C42	66
	44	226	2.0		54	184	2.4	31.481	GKR06-2M □□□080C42	66
	42	240	1.0		51	196	1.2	33.433	GKR05-2M □□□080C42	66
	40	249	1.8		49	203	2.2	34.708	GKR06-2M □□□080C42	66
	37	273	0.9		45	222	1.1	37.967	GKR05-2M □□□080C42	66
	34	292	1.5		42	238	1.9	40.741	GKR06-2M □□□080C42	66
	31	322	1.4		38	263	1.7	44.917	GKR06-2M □□□080C42	66
	28	355	1.3		34	289	1.6	49.444	GKR06-2M □□□080C42	66
	25	391	1.1		31	319	1.4	54.513	GKR06-2M □□□080C42	66



Selection tables

50 Hz, 60 Hz: P_N = 1.5 kW

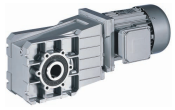
n_N	2710 r/min				3310 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	523	26	2.2		638	21	2.5	5.185	GKR04-2M □□□090C11	66
	455	30	2.0		555	25	2.3	5.963	GKR04-2M □□□090C11	66
	433	31	4.1		529	26	4.6	6.257	GKR05-2M □□□090C11	66
	381	36	1.8		466	29	2.0	7.111	GKR04-2M □□□090C11	66
	331	41	1.6		405	34	1.9	8.178	GKR04-2M □□□090C11	66
	298	46	1.5		364	37	1.7	9.101	GKR04-2M □□□090C11	66
	259	53	1.4		316	43	1.6	10.466	GKR04-2M □□□090C11	66
	253	54	3.1		309	44	3.5	10.720	GKR05-2M □□□090C11	66
	237	57	1.3		289	47	1.5	11.449	GKR04-2M □□□090C11	66
	224	61	2.8		274	50	3.2	12.081	GKR05-2M □□□090C11	66
	213	64	1.2		261	52	1.3	12.698	GKR04-2M □□□090C11	66
	205	66	2.6		251	54	3.0	13.216	GKR05-2M □□□090C11	66
	198	69	2.6		241	56	3.0	13.719	GKR05-2M □□□090C11	66
	186	73	1.0		227	60	1.2	14.603	GKR04-2M □□□090C11	66
	181	75	2.4		221	62	2.8	15.008	GKR05-2M □□□090C11	66
	174	78	0.9		213	64	1.1	15.556	GKR04-2M □□□090C11	66
	161	85	2.3		196	69	2.7	16.857	GKR05-2M □□□090C11	66
	151	90	0.8		185	74	0.9	17.889	GKR04-2M □□□090C11	66
	142	96	2.0		173	79	2.3	19.143	GKR05-2M □□□090C11	66
	131	104	1.9		160	85	2.2	20.650	GKR05-2M □□□090C11	66
	116	118	1.7		141	96	1.9	23.450	GKR05-2M □□□090C11	66
	101	135	1.7		123	111	1.9	26.878	GKR05-2M □□□090C11	66
	97	140	3.0		119	115	3.4	27.903	GKR06-2M □□□090C11	66
	89	153	1.5		108	125	1.7	30.522	GKR05-2M □□□090C11	66
	86	158	2.7		105	129	3.0	31.481	GKR06-2M □□□090C11	66
	81	168	1.3		99	137	1.5	33.433	GKR05-2M □□□090C11	66
	78	174	2.4		95	143	2.8	34.708	GKR06-2M □□□090C11	66
	71	191	1.2		87	156	1.3	37.967	GKR05-2M □□□090C11	66
	67	205	2.2		81	167	2.6	40.741	GKR06-2M □□□090C11	66
	60	226	2.0		74	185	2.4	44.917	GKR06-2M □□□090C11	66
	55	248	1.8		67	203	2.1	49.444	GKR06-2M □□□090C11	66
	50	274	1.6		61	224	1.9	54.513	GKR06-2M □□□090C11	66



Selection tables

50 Hz, 60 Hz: P_N = 1.5 kW

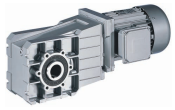
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	391	34	4.0		476	28	4.7	3.565	GKR05-2M □□□090C32	66
	285	47	3.1		347	39	3.6	4.889	GKR05-2M □□□090C32	66
	269	50	1.4		327	41	1.6	5.185	GKR04-2M □□□090C32	66
	234	58	1.3		284	47	1.5	5.963	GKR04-2M □□□090C32	66
	223	60	2.6		271	50	3.0	6.257	GKR05-2M □□□090C32	66
	203	66	2.7		246	54	3.1	6.883	GKR05-2M □□□090C32	66
	196	69	1.1		238	56	1.3	7.111	GKR04-2M □□□090C32	66
	179	75	2.5		217	62	2.9	7.817	GKR05-2M □□□090C32	66
	171	79	1.0		207	65	1.2	8.178	GKR04-2M □□□090C32	66
	153	88	1.0		186	72	1.1	9.101	GKR04-2M □□□090C32	66
	148	91	2.1		180	75	2.4	9.440	GKR05-2M □□□090C32	66
	133	101	0.9		162	83	1.0	10.466	GKR04-2M □□□090C32	66
	130	103	2.0		158	85	2.3	10.720	GKR05-2M □□□090C32	66
	122	110	0.8		150	91	0.9	11.449	GKR04-2M □□□090C32	66
	116	117	1.8		140	96	2.1	12.081	GKR05-2M □□□090C32	66
	106	128	1.7		128	105	2.0	13.216	GKR05-2M □□□090C32	66
	102	132	1.6		124	109	1.9	13.719	GKR05-2M □□□090C32	66
	102	132	3.2		124	109	3.8	13.720	GKR06-2M □□□090C32	66
	93	145	1.5		113	119	1.8	15.008	GKR05-2M □□□090C32	66
	88	153	2.9		107	126	3.4	15.873	GKR06-2M □□□090C32	66
	83	163	1.5		101	133	1.7	16.857	GKR05-2M □□□090C32	66
	80	169	2.7		97	138	3.1	17.500	GKR06-2M □□□090C32	66
	73	185	1.3		89	151	1.5	19.143	GKR05-2M □□□090C32	66
	72	188	2.4		87	154	2.8	19.444	GKR06-2M □□□090C32	66
	68	199	1.2		82	163	1.4	20.650	GKR05-2M □□□090C32	66
	65	207	2.2		79	170	2.5	21.438	GKR06-2M □□□090C32	66
	60	226	1.1		72	186	1.2	23.450	GKR05-2M □□□090C32	66
	55	244	1.8		67	200	2.2	25.309	GKR06-2M □□□090C32	66
	52	259	0.9		63	213	1.1	26.878	GKR05-2M □□□090C32	66
	50	269	1.7		61	221	2.0	27.903	GKR06-2M □□□090C32	66
	46	295	0.8		56	241	1.0	30.522	GKR05-2M □□□090C32	66
	44	304	1.5		54	249	1.8	31.481	GKR06-2M □□□090C32	66
	40	335	1.3		49	275	1.6	34.708	GKR06-2M □□□090C32	66
	34	393	1.1		42	322	1.4	40.741	GKR06-2M □□□090C32	66
	31	434	1.0		38	355	1.3	44.917	GKR06-2M □□□090C32	66
	28	477	0.9		34	391	1.2	49.444	GKR06-2M □□□090C32	66
	26	526	0.9		32	431	1.0	54.513	GKR06-2M □□□090C32	66



Selection tables

50 Hz, 60 Hz: P_N = 2.2 kW

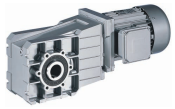
n_N	2730 r/min				3320 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	766	26	4.3		934	21	4.9	3.565	GKR05-2M □□□090C31	66
	527	38	1.5		642	31	1.7	5.185	GKR04-2M □□□090C31	66
	458	44	1.4		558	36	1.5	5.963	GKR04-2M □□□090C31	66
	436	46	2.8		532	38	3.2	6.257	GKR05-2M □□□090C31	66
	397	50	2.9		484	41	3.3	6.883	GKR05-2M □□□090C31	66
	384	52	1.2		468	43	1.4	7.111	GKR04-2M □□□090C31	66
	349	57	2.7		426	47	3.1	7.817	GKR05-2M □□□090C31	66
	334	60	1.1		407	49	1.3	8.178	GKR04-2M □□□090C31	66
	300	67	1.0		366	55	1.2	9.101	GKR04-2M □□□090C31	66
	289	69	2.3		353	57	2.6	9.440	GKR05-2M □□□090C31	66
	261	77	0.9		318	63	1.1	10.466	GKR04-2M □□□090C31	66
	255	78	2.1		311	64	2.4	10.720	GKR05-2M □□□090C31	66
	239	84	0.9		291	69	1.0	11.449	GKR04-2M □□□090C31	66
	226	88	1.9		276	73	2.2	12.081	GKR05-2M □□□090C31	66
	207	97	1.8		252	79	2.1	13.216	GKR05-2M □□□090C31	66
	199	100	1.8		243	82	2.0	13.719	GKR05-2M □□□090C31	66
	182	110	1.7		222	90	1.9	15.008	GKR05-2M □□□090C31	66
	172	116	3.2		210	95	3.6	15.873	GKR06-2M □□□090C31	66
	162	123	1.6		198	101	1.8	16.857	GKR05-2M □□□090C31	66
	156	128	2.9		190	105	3.3	17.500	GKR06-2M □□□090C31	66
	143	140	1.4		174	115	1.6	19.143	GKR05-2M □□□090C31	66
	140	142	2.6		171	117	3.0	19.444	GKR06-2M □□□090C31	66
	132	151	1.3		161	124	1.5	20.650	GKR05-2M □□□090C31	66
	127	157	2.4		155	129	2.7	21.438	GKR06-2M □□□090C31	66
	116	171	1.1		142	141	1.3	23.450	GKR05-2M □□□090C31	66
	108	185	2.3		132	152	2.6	25.309	GKR06-2M □□□090C31	66
	102	197	1.1		124	162	1.3	26.878	GKR05-2M □□□090C31	66
	98	204	2.1		119	168	2.3	27.903	GKR06-2M □□□090C31	66
	89	223	1.0		109	183	1.1	30.522	GKR05-2M □□□090C31	66
	87	230	1.8		106	189	2.1	31.481	GKR06-2M □□□090C31	66
	82	244	0.9		100	201	1.0	33.433	GKR05-2M □□□090C31	66
	79	254	1.7		96	209	1.9	34.708	GKR06-2M □□□090C31	66
	72	278	0.8		87	228	0.9	37.967	GKR05-2M □□□090C31	66
	67	298	1.5		82	245	1.8	40.741	GKR06-2M □□□090C31	66
	61	328	1.4		74	270	1.6	44.917	GKR06-2M □□□090C31	66
	55	361	1.2		67	297	1.5	49.444	GKR06-2M □□□090C31	66
	50	399	1.1		61	328	1.3	54.513	GKR06-2M □□□090C31	66



Selection tables

50 Hz, 60 Hz: P_N = 2.2 kW

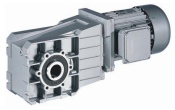
n_N	1440 r/min				1745 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	404	49	2.8		488	41	3.2	3.565	GKR05-2M □□□100C12	66
	295	68	2.2		356	56	2.5	4.889	GKR05-2M □□□100C12	66
	230	87	1.8		278	72	2.1	6.257	GKR05-2M □□□100C12	66
	209	95	1.9		253	79	2.2	6.883	GKR05-2M □□□100C12	66
	184	108	1.7		223	89	2.0	7.817	GKR05-2M □□□100C12	66
	153	131	1.5		184	108	1.7	9.440	GKR05-2M □□□100C12	66
	147	136	2.8		178	112	3.3	9.800	GKR06-2M □□□100C12	66
	134	149	1.4		162	123	1.6	10.720	GKR05-2M □□□100C12	66
	127	158	2.8		153	130	3.2	11.376	GKR06-2M □□□100C12	66
	119	167	1.2		144	138	1.4	12.081	GKR05-2M □□□100C12	66
	116	172	2.6		140	142	3.0	12.444	GKR06-2M □□□100C12	66
	109	183	1.2		132	151	1.3	13.216	GKR05-2M □□□100C12	66
	105	190	1.1		127	157	1.3	13.719	GKR05-2M □□□100C12	66
	105	190	2.2		127	157	2.6	13.720	GKR06-2M □□□100C12	66
	96	208	1.1		116	172	1.2	15.008	GKR05-2M □□□100C12	66
	91	220	2.0		110	182	2.4	15.873	GKR06-2M □□□100C12	66
	85	234	1.0		103	193	1.2	16.857	GKR05-2M □□□100C12	66
	82	243	1.9		99	200	2.1	17.500	GKR06-2M □□□100C12	66
	75	265	0.9		91	219	1.0	19.143	GKR05-2M □□□100C12	66
	74	270	1.7		90	222	1.9	19.444	GKR06-2M □□□100C12	66
	70	286	0.8		85	236	1.0	20.650	GKR05-2M □□□100C12	66
	67	297	1.5		81	245	1.7	21.438	GKR06-2M □□□100C12	66
	57	351	1.3		69	289	1.6	25.309	GKR06-2M □□□100C12	66
	52	387	1.2		62	319	1.4	27.903	GKR06-2M □□□100C12	66
	46	436	1.0		55	360	1.2	31.481	GKR06-2M □□□100C12	66
	42	481	0.9		50	397	1.1	34.708	GKR06-2M □□□100C12	66



Selection tables

50 Hz, 60 Hz: P_N = 3.0 kW

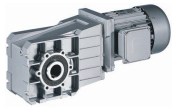
n_N	2890 r/min				3510 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	811	34	3.3		979	28	3.8	3.565	GKR05-2M □□□100C31	66
	591	46	2.6		714	38	2.9	4.889	GKR05-2M □□□100C31	66
	462	59	2.1		558	49	2.4	6.257	GKR05-2M □□□100C31	66
	420	65	2.2		507	53	2.5	6.883	GKR05-2M □□□100C31	66
	370	74	2.0		447	61	2.3	7.817	GKR05-2M □□□100C31	66
	306	89	1.7		370	73	2.0	9.440	GKR05-2M □□□100C31	66
	270	101	1.6		326	83	1.8	10.720	GKR05-2M □□□100C31	66
	254	107	3.3		307	88	3.7	11.376	GKR06-2M □□□100C31	66
	239	114	1.5		289	94	1.7	12.081	GKR05-2M □□□100C31	66
	232	117	3.1		280	96	3.5	12.444	GKR06-2M □□□100C31	66
	219	124	1.4		264	102	1.6	13.216	GKR05-2M □□□100C31	66
	211	129	1.3		254	106	1.5	13.719	GKR05-2M □□□100C31	66
	211	129	2.7		254	106	3.0	13.720	GKR06-2M □□□100C31	66
	193	141	1.3		233	116	1.4	15.008	GKR05-2M □□□100C31	66
	182	149	2.4		220	123	2.8	15.873	GKR06-2M □□□100C31	66
	171	159	1.2		207	131	1.4	16.857	GKR05-2M □□□100C31	66
	165	165	2.2		199	136	2.5	17.500	GKR06-2M □□□100C31	66
	151	180	1.1		182	148	1.2	19.143	GKR05-2M □□□100C31	66
	149	183	2.0		180	151	2.2	19.444	GKR06-2M □□□100C31	66
	140	194	1.0		169	160	1.1	20.650	GKR05-2M □□□100C31	66
	135	202	1.8		163	166	2.0	21.438	GKR06-2M □□□100C31	66
	123	221	0.9		149	182	1.0	23.450	GKR05-2M □□□100C31	66
	114	238	1.7		138	196	2.0	25.309	GKR06-2M □□□100C31	66
	104	263	1.6		125	216	1.8	27.903	GKR06-2M □□□100C31	66
	92	296	1.4		111	244	1.6	31.481	GKR06-2M □□□100C31	66
	83	327	1.3		101	269	1.4	34.708	GKR06-2M □□□100C31	66



Selection tables

50 Hz, 60 Hz: P_N = 3.0 kW

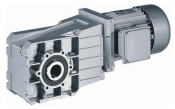
n_N	1430 r/min				1740 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	417	65	3.1		504	54	3.5	3.431	GKR06-2M □□□100C32	66
	401	68	2.0		485	56	2.4	3.565	GKR05-2M □□□100C32	66
	304	90	2.8		368	74	3.2	4.706	GKR06-2M □□□100C32	66
	293	93	1.6		354	76	1.8	4.889	GKR05-2M □□□100C32	66
	237	115	2.4		287	94	2.8	6.022	GKR06-2M □□□100C32	66
	229	119	1.3		277	98	1.5	6.257	GKR05-2M □□□100C32	66
	221	123	2.8		267	101	3.3	6.481	GKR06-2M □□□100C32	66
	208	131	1.4		251	108	1.6	6.883	GKR05-2M □□□100C32	66
	200	136	2.6		242	112	3.0	7.146	GKR06-2M □□□100C32	66
	183	149	1.3		221	122	1.5	7.817	GKR05-2M □□□100C32	66
	161	169	2.4		195	139	2.8	8.889	GKR06-2M □□□100C32	66
	152	180	1.1		183	148	1.2	9.440	GKR05-2M □□□100C32	66
	146	187	2.1		177	153	2.4	9.800	GKR06-2M □□□100C32	66
	133	204	1.0		161	168	1.2	10.720	GKR05-2M □□□100C32	66
	126	217	2.0		152	178	2.3	11.376	GKR06-2M □□□100C32	66
	118	230	0.9		143	189	1.0	12.081	GKR05-2M □□□100C32	66
	115	237	1.9		139	195	2.2	12.444	GKR06-2M □□□100C32	66
	108	252	0.9		131	207	1.0	13.216	GKR05-2M □□□100C32	66
	104	261	0.8		127	215	1.0	13.719	GKR05-2M □□□100C32	66
	104	261	1.6		126	215	1.9	13.720	GKR06-2M □□□100C32	66
	90	302	1.5		109	248	1.7	15.873	GKR06-2M □□□100C32	66
	82	333	1.4		99	274	1.6	17.500	GKR06-2M □□□100C32	66
	74	370	1.2		89	304	1.4	19.444	GKR06-2M □□□100C32	66
	67	408	1.1		81	335	1.3	21.438	GKR06-2M □□□100C32	66
	57	482	0.9		68	396	1.1	25.309	GKR06-2M □□□100C32	66
	51	531	0.8		62	436	1.0	27.903	GKR06-2M □□□100C32	66



Selection tables

50 Hz, 60 Hz: P_N = 4.0 kW

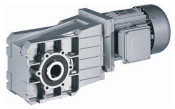
n_N	2840 r/min				3440 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	797	46	2.4		965	38	2.8	3.565	GKR05-2M □□□100C41	66
	581	62	1.9		704	52	2.2	4.889	GKR05-2M □□□100C41	66
	472	77	2.9		571	64	3.3	6.022	GKR06-2M □□□100C41	66
	454	80	1.6		550	66	1.8	6.257	GKR05-2M □□□100C41	66
	413	88	1.6		500	73	1.9	6.883	GKR05-2M □□□100C41	66
	397	91	3.1		481	75	3.5	7.146	GKR06-2M □□□100C41	66
	363	100	1.5		440	82	1.7	7.817	GKR05-2M □□□100C41	66
	320	114	2.9		387	94	3.3	8.889	GKR06-2M □□□100C41	66
	301	121	1.3		364	100	1.5	9.440	GKR05-2M □□□100C41	66
	290	125	2.5		351	103	2.8	9.800	GKR06-2M □□□100C41	66
	265	137	1.2		321	113	1.4	10.720	GKR05-2M □□□100C41	66
	250	145	2.4		302	120	2.8	11.376	GKR06-2M □□□100C41	66
	235	154	1.1		285	127	1.2	12.081	GKR05-2M □□□100C41	66
	228	159	2.3		276	131	2.6	12.444	GKR06-2M □□□100C41	66
	215	169	1.0		260	139	1.2	13.216	GKR05-2M □□□100C41	66
	207	175	1.0		251	145	1.1	13.719	GKR05-2M □□□100C41	66
	207	175	2.0		251	145	2.2	13.720	GKR06-2M □□□100C41	66
	189	192	0.9		229	158	1.1	15.008	GKR05-2M □□□100C41	66
	179	203	1.8		217	167	2.0	15.873	GKR06-2M □□□100C41	66
	169	215	0.9		204	178	1.0	16.857	GKR05-2M □□□100C41	66
	162	224	1.6		197	185	1.8	17.500	GKR06-2M □□□100C41	66
	146	248	1.5		177	205	1.7	19.444	GKR06-2M □□□100C41	66
	133	274	1.3		161	226	1.5	21.438	GKR06-2M □□□100C41	66
	112	323	1.3		136	267	1.5	25.309	GKR06-2M □□□100C41	66
	102	357	1.2		123	294	1.3	27.903	GKR06-2M □□□100C41	66
	90	402	1.0		109	332	1.2	31.481	GKR06-2M □□□100C41	66
	82	443	0.9		99	366	1.1	34.708	GKR06-2M □□□100C41	66



Selection tables

50 Hz, 60 Hz: P_N = 4.0 kW

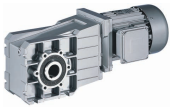
n_N	1450 r/min				1755 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	423	86	2.3		510	71	2.7	3.431	GKR06-2M □□□112C22	66
	308	118	2.1		372	97	2.4	4.706	GKR06-2M □□□112C22	66
	241	151	1.9		291	125	2.1	6.022	GKR06-2M □□□112C22	66
	224	162	2.2		270	134	2.5	6.481	GKR06-2M □□□112C22	66
	203	179	1.9		245	148	2.2	7.146	GKR06-2M □□□112C22	66
	163	222	1.8		197	184	2.1	8.889	GKR06-2M □□□112C22	66
	148	245	1.6		179	203	1.8	9.800	GKR06-2M □□□112C22	66
	128	285	1.5		154	235	1.8	11.376	GKR06-2M □□□112C22	66
	117	311	1.4		141	257	1.7	12.444	GKR06-2M □□□112C22	66
	106	343	1.2		128	284	1.4	13.720	GKR06-2M □□□112C22	66
	91	397	1.1		110	328	1.3	15.873	GKR06-2M □□□112C22	66
	83	438	1.0		100	362	1.2	17.500	GKR06-2M □□□112C22	66
	75	487	0.9		90	402	1.1	19.444	GKR06-2M □□□112C22	66
	68	537	0.8		82	443	1.0	21.438	GKR06-2M □□□112C22	66



Selection tables

50 Hz, 60 Hz: P_N = 5.5 kW

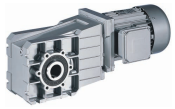
n_N	2900 r/min				3510 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	845	59	2.7		1020	49	3.1	3.431	GKR06-2M □□□112C31	66
	616	81	2.5		744	67	2.8	4.706	GKR06-2M □□□112C31	66
	482	104	2.2		581	86	2.5	6.022	GKR06-2M □□□112C31	66
	447	112	2.5		540	92	2.9	6.481	GKR06-2M □□□112C31	66
	406	123	2.3		490	102	2.6	7.146	GKR06-2M □□□112C31	66
	326	153	2.1		394	126	2.4	8.889	GKR06-2M □□□112C31	66
	296	169	1.8		357	139	2.1	9.800	GKR06-2M □□□112C31	66
	255	196	1.8		308	162	2.0	11.376	GKR06-2M □□□112C31	66
	233	214	1.7		281	177	1.9	12.444	GKR06-2M □□□112C31	66
	211	236	1.4		255	195	1.6	13.720	GKR06-2M □□□112C31	66
	183	273	1.3		221	226	1.5	15.873	GKR06-2M □□□112C31	66
	166	301	1.2		200	249	1.4	17.500	GKR06-2M □□□112C31	66
	149	335	1.1		180	276	1.2	19.444	GKR06-2M □□□112C31	66
	135	369	1.0		163	305	1.1	21.438	GKR06-2M □□□112C31	66



Selection tables

50 Hz, 60 Hz: P_N = 5.5 kW

n_N	1445 r/min				1750 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	421	118	1.7		509	98	1.9	3.431	GKR06-2M □□□112C32	66
	307	162	1.5		371	134	1.8	4.706	GKR06-2M □□□112C32	66
	240	208	1.3		290	172	1.5	6.022	GKR06-2M □□□112C32	66
	223	224	1.6		269	185	1.8	6.481	GKR06-2M □□□112C32	66
	202	247	1.4		244	204	1.6	7.146	GKR06-2M □□□112C32	66
	163	307	1.3		196	253	1.5	8.889	GKR06-2M □□□112C32	66
	147	338	1.1		178	279	1.3	9.800	GKR06-2M □□□112C32	66
	127	393	1.1		153	324	1.3	11.376	GKR06-2M □□□112C32	66
	116	430	1.0		140	355	1.2	12.444	GKR06-2M □□□112C32	66
	105	474	0.9		127	391	1.0	13.720	GKR06-2M □□□112C32	66
	91	548	0.8		110	453	0.9	15.873	GKR06-2M □□□112C32	66



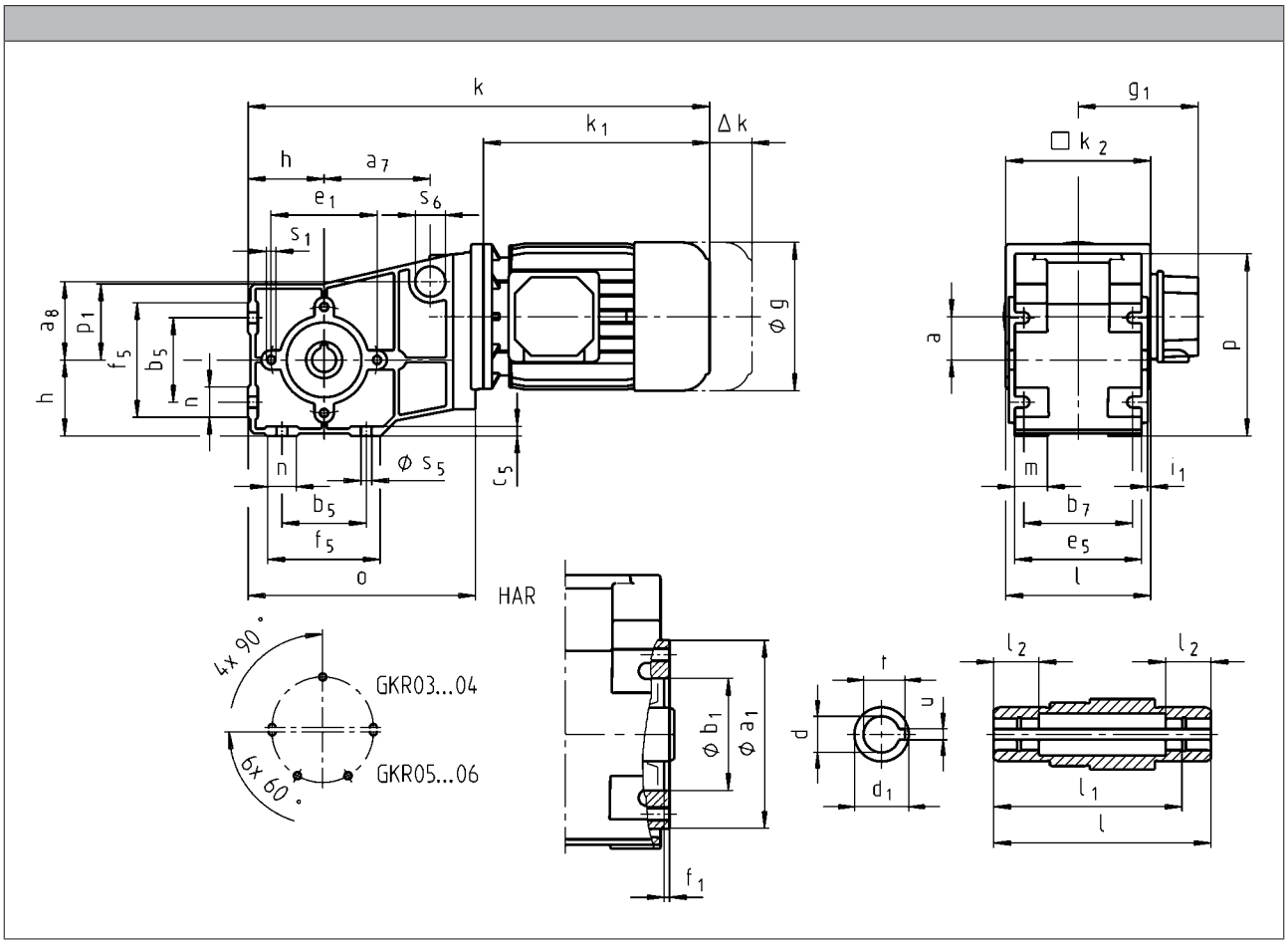
Selection tables

50 Hz, 60 Hz: P_N = 7.5 kW

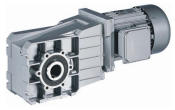
n_N	2890 r/min				3500 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	842	81	2.0		1017	67	2.3	3.431	GKR06-2M □□□112C41	66
	614	111	1.8		742	91	2.1	4.706	GKR06-2M □□□112C41	66
	480	142	1.6		580	117	1.8	6.022	GKR06-2M □□□112C41	66
	446	153	1.8		539	126	2.1	6.481	GKR06-2M □□□112C41	66
	404	168	1.7		488	139	1.9	7.146	GKR06-2M □□□112C41	66
	325	209	1.6		393	173	1.8	8.889	GKR06-2M □□□112C41	66
	295	231	1.3		356	191	1.5	9.800	GKR06-2M □□□112C41	66
	254	268	1.3		307	221	1.5	11.376	GKR06-2M □□□112C41	66
	232	293	1.2		280	242	1.4	12.444	GKR06-2M □□□112C41	66
	211	323	1.1		254	267	1.2	13.720	GKR06-2M □□□112C41	66
	182	374	1.0		220	309	1.1	15.873	GKR06-2M □□□112C41	66
	165	412	0.9		199	340	1.0	17.500	GKR06-2M □□□112C41	66

Dimensions

GKR□□-2M H□R



		063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11 071C13 071C31
g		123							139
g_1	MDEMAXX MDSMAXX	100							109
	MDEMABR MDSMABR	107							118
k_1	MDEMAXX MDSMAXX	156	187		156	187			207
k_2		100	120		100	120			
Δ k	MDEMABR MDSMABR	71	40		71	40			52
	MDFMAXX		128			128			
	MDFMABR		170			170			165
		k							
GKR03		301		332	301		332		
GKR04			383			383			403
GKR05								436	456
GKR06								488	508



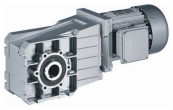
		071C32	071C33	071C42	080C11 080C13 080C31 080C32 080C33 080C42	090C11 090C31	090C32	100C12 100C31 100C32 100C41	112C22 112C31	112C32 112C41
g		139			156	176		194	218	
g_1	MDEMAXX MDSMAXX	109			150	157		166	176	
	MDEMABR MDSMABR	118			132	137		147	158	
k_1	MDEMAXX MDSMAXX	207			224.5	274	248	309	319	363
k_2		120			145	180			222	
Δ k	MDEMABR MDSMABR	52			73	68		76	90	
	MDFMAXX	128						109	102	
	MDFMABR	165			183	181		170	183	
		k								
GKR03		352		352						
GKR04		403			425	485	459			
GKR05		456			479	538	512	573		
GKR06		508			530	590	564	625	641	685

	a	a_7	a_8	h	o	p[1]	p_1	s_6
GKR03	29	66	39	50	142	117	48	25
GKR04	36	88	65	63	189	151	63	25
GKR05	40			80	250.5	181	82	
GKR06	51			100	307	226	100	

	d[2]	d_1	l[1]	l_1	l_2	u	t[3]	i_1	a_1	b_1	e_1	f_1	s_1
	H7					JS9	+0,2			J7			
GKR03	18 20	30 30	100 100	85 85	22 22	6 6	20.8 22.8	2.5 2.5	85	55	70	2.5	M6x12
GKR04	20 25	30 35	120 120	105 105	25 25	6 8	22.8 27	2.5 2.5	104	62	88	3	M8x16
GKR05	30 35	50 50	143 143	127 127	25 25	8 10	33.3 38.3	4 4	116	80	100	4	M8x15
GKR06	40 45	65 65	170 170	150 150	30 30	12 14	43.3 48.8	5 5	140	100	120	4	M10x22

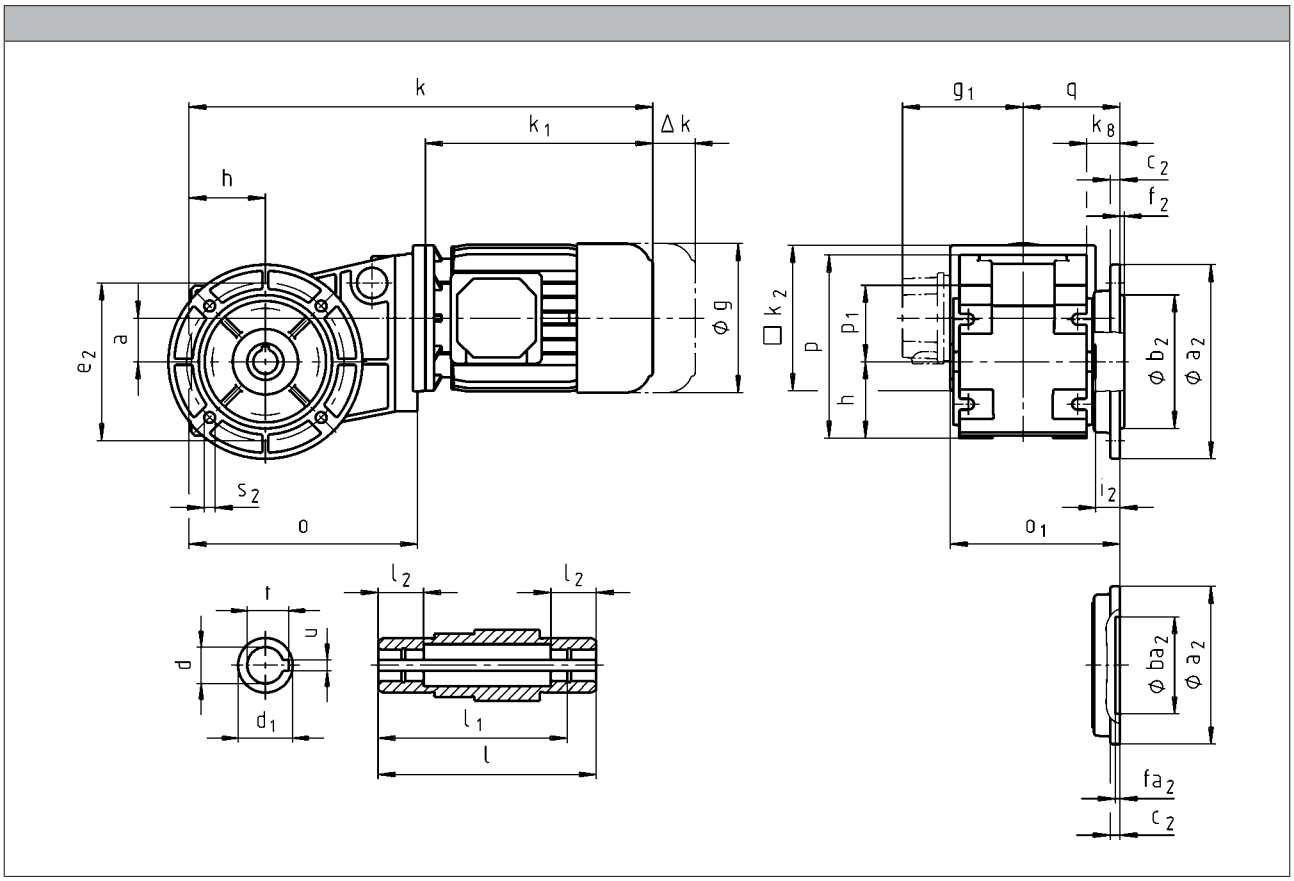
	b_5	b_7	c_5	e_5	f_5	m	n	s_5
GKR03	60	75	7	90	80	22	20	6.6
GKR04	70	90	8	105	95	28	25	9
GKR05	100	100	11	115	138	27	48	9
GKR06	120	125	12	145	164	32	53	11

[1] k_2 !
[2] l_2 !
[3] d = 25 mm > DIN 6885/3

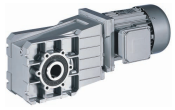


Dimensions

GKR□□-2M HAK



		063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11 071C13 071C31
g		123							139
g_1	MDEMAXX MDSMAXX	100							109
	MDEMABR MDSMABR	107							118
k_1	MDEMAXX MDSMAXX	156	187		156	187			207
k_2		100	120		100	120			
Δ k	MDEMABR MDSMABR	71	40		71	40			52
	MDFMAXX		128			128			
	MDFMABR		170			170			165
		k							
GKR03		301		332	301		332		
GKR04			383			383			403
GKR05								436	456
GKR06								488	508

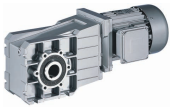


		071C32	071C33	071C42	080C11 080C13 080C31 080C32 080C33 080C42	090C11 090C31	090C32	100C12 100C31 100C32 100C41	112C22 112C31	112C32 112C41
g		139			156	176		194	218	
g_1	MDEMAXX MDSMAXX	109			150	157		166	176	
	MDEMABR MDSMABR	118			132	137		147	158	
k_1	MDEMAXX MDSMAXX	207			224.5	274	248	309	319	363
k_2		120			145	180			222	
Δ k	MDEMABR MDSMABR	52			73	68		76	90	
	MDFMAXX	128						109	102	
	MDFMABR	165			183	181		170	183	
		k								
GKR03		352		352						
GKR04		403			425	485	459			
GKR05		456			479	538	512	573		
GKR06		508			530	590	564	625	641	685

	a	h	k_8	o	p[1]	p_1	q
GKR03	29	50	35	142	117	48	80
GKR04	36	63	28	189	151	63	80
GKR05	40	80	47.5	250.5	181	82	105
GKR06	51	100	54	307	226	100	126.5

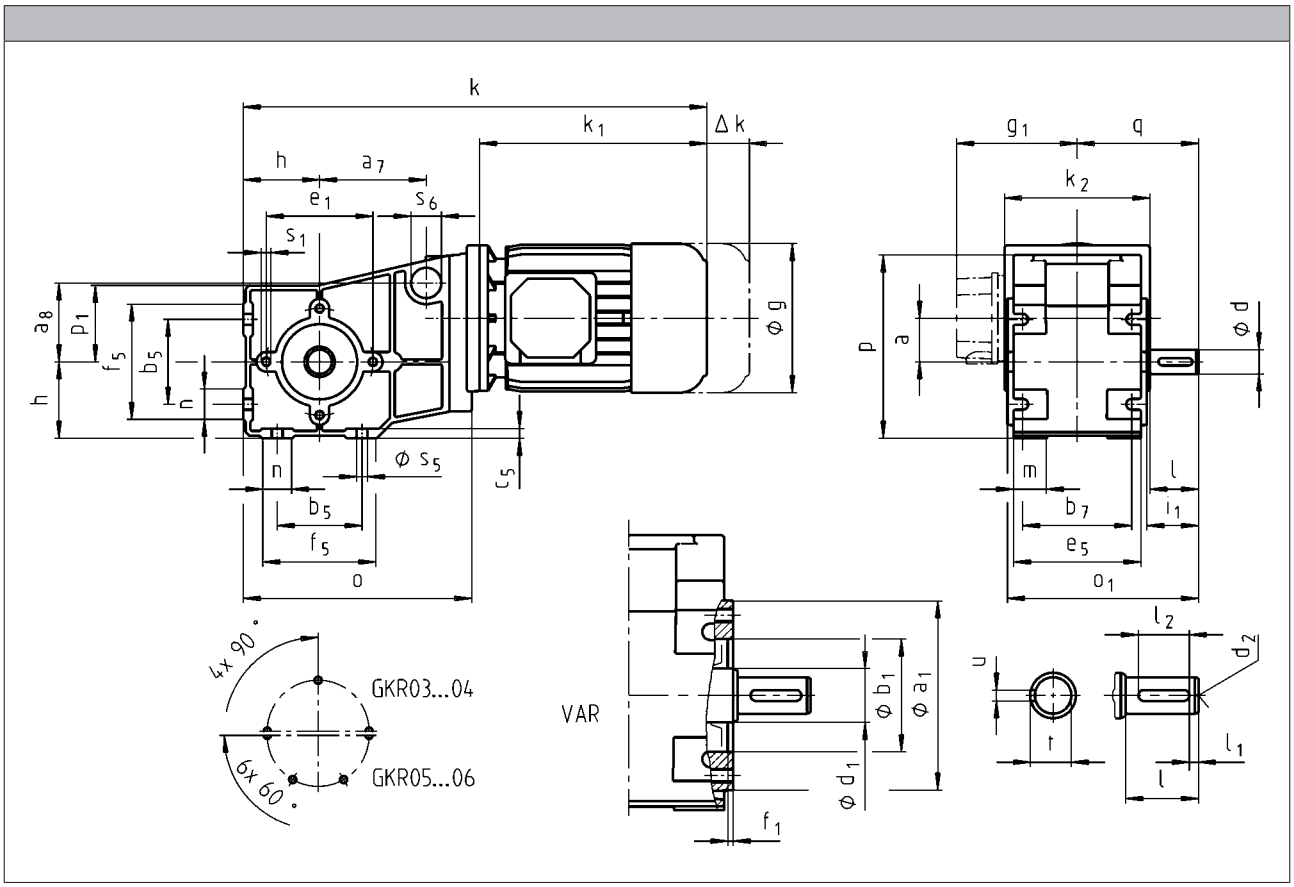
	d[2]	d_1	l	l_1	l_2	u	t[3]	i_2	o_1[1]	a_2	b_2	ba_2	c_2	e_2	f_2	fa_2	s_2
	H7					JS9	+0,2				j7	H7					
GKR03	18 20	30 30	100 100	85 85	22 22	6 6	20.8 22.8	30 30	130 130	120 110	80 -	- 60	8 8	100 87	3 -	- 4	7 9
GKR04	20 25	30 35	120 120	105 105	25 25	6 8	22.8 27	20 20	140 140	120 160	80 110		8 8	100 130	3 3.5		7 9
GKR05	30 35	50 50	143 143	127 127	25 25	8 10	33.3 38.3	33.5 33.5	176.5 176.5	160 200	110 130		12 12	130 165	3.5 3.5		9 11
GKR06	40 45	65 65	170 170	150 150	30 30	12 14	43.3 48.8	41.5 41.5	211.5 211.5	200 250	130 180		12 12	165 215	3.5 4		11 14

[1] k_2 !
[2] l_2 !
[3] d = 25 mm > DIN 6885/3

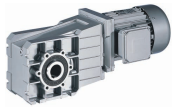


Dimensions

GKR□□-2M V□R



		063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11 071C13 071C31
g		123							139
g_1	MDEMAXX MDSMAXX	100							109
	MDEMABR MDSMABR	107							118
k_1	MDEMAXX MDSMAXX	156	187		156	187			207
k_2		100	120		100	120			
Δ k	MDEMABR MDSMABR	71	40		71	40			52
	MDFMAXX		128			128			
	MDFMABR		170			170			165
		k							
GKR03		301		332	301		332		
GKR04			383			383			403
GKR05								436	456
GKR06								488	508



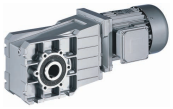
		071C32	071C33	071C42	080C11 080C13 080C31 080C32 080C33 080C42	090C11 090C31	090C32	100C12 100C31 100C32 100C41	112C22 112C31	112C32 112C41
g		139			156	176		194	218	
g_1	MDEMAXX MDSMAXX	109			150	157		166	176	
	MDEMABR MDSMABR	118			132	137		147	158	
k_1	MDEMAXX MDSMAXX	207			224.5	274	248	309	319	363
k_2		120			145	180			222	
Δ k	MDEMABR MDSMABR	52			73	68		76	90	
	MDFMAXX	128						109	102	
	MDFMABR	165			183	181		170	183	
		k								
GKR03		352		352						
GKR04		403			425	485	459			
GKR05		456			479	538	512	573		
GKR06		508			530	590	564	625	641	685

	a	a_7	a_8	h	o	p[1)]	p_1	q	s_6
GKR03	29	66	39	50	142	117	48	90	25
GKR04	36	88	65	63	189	151	63	100	25
GKR05	40			80	250.5	181	82	131.5	
GKR06	51			100	307	226	100	155	

	d	d_1	d_2	l	l_1	l_2	u	t	i_1	o_1[1)]	a_1	b_1	e_1	f_1	s_1
	k6											J7			
GKR03	20	30	M6	40	5	28	6	22.5	42.5	137.5	85	55	70	2.5	M6x12
GKR04	20	30	M6	40	5	28	6	22.5	42.5	158	104	62	88	3	M8x16
GKR05	30	50	M10	60	6	45	8	33	64	199	116	80	100	4	M8x15
GKR06	35	65	M12	70	7	56	10	38	75	235	140	100	120	4	M10x22

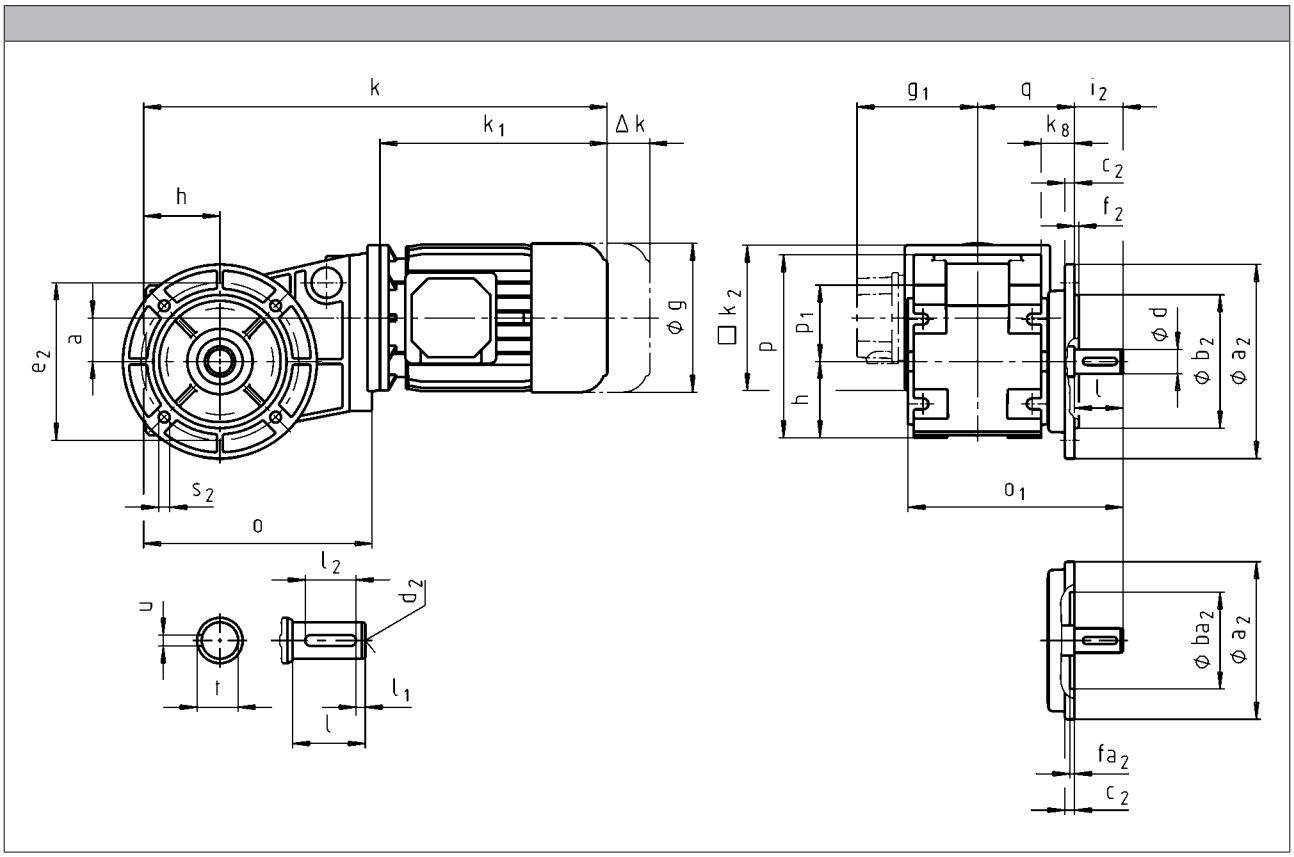
	b_5	b_7	c_5	e_5	f_5	m	n	s_5
GKR03	60	75	7	90	80	22	20	6.6
GKR04	70	90	8	105	95	28	25	9
GKR05	100	100	11	115	138	27	48	9
GKR06	120	125	12	145	164	32	53	11

[1)] k_2 !

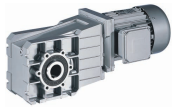


Dimensions

GKR□□-2M VAK



		063C02	063C11	063C12	063C22	063C31	063C32	063C42	071C11 071C13 071C31
g		123							139
g_1	MDEMAXX MDSMAXX	100							109
	MDEMABR MDSMABR	107							118
k_1	MDEMAXX MDSMAXX	156	187		156	187			207
k_2		100	120		100	120			
Δ k	MDEMABR MDSMABR	71	40		71	40			52
	MDFMAXX		128			128			
	MDFMABR		170			170			165
		k							
GKR03		301		332	301		332		
GKR04			383			383			403
GKR05								436	456
GKR06								488	508

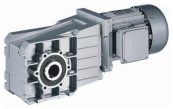


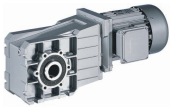
		071C32	071C33	071C42	080C11 080C13 080C31 080C32 080C33 080C42	090C11 090C31	090C32	100C12 100C31 100C32 100C41	112C22 112C31	112C32 112C41
g		139			156	176		194	218	
g_1	MDEMAXX MDSMAXX	109			150	157		166	176	
	MDEMABR MDSMABR	118			132	137		147	158	
k_1	MDEMAXX MDSMAXX	207			224.5	274	248	309	319	363
k_2		120			145	180			222	
Δ k	MDEMABR MDSMABR	52			73	68		76	90	
	MDFMAXX	128						109	102	
	MDFMABR	165			183	181		170	183	
		k								
GKR03		352		352						
GKR04		403			425	485	459			
GKR05		456			479	538	512	573		
GKR06		508			530	590	564	625	641	685

	a	h	k_8	o	p[1)]	p_1	q
GKR03	29	50	35	142	117	48	80
GKR04	36	63	28	189	151	63	80.5
GKR05	40	80	47.5	250.5	181	82	105
GKR06	51	100	54	307	226	100	126.5

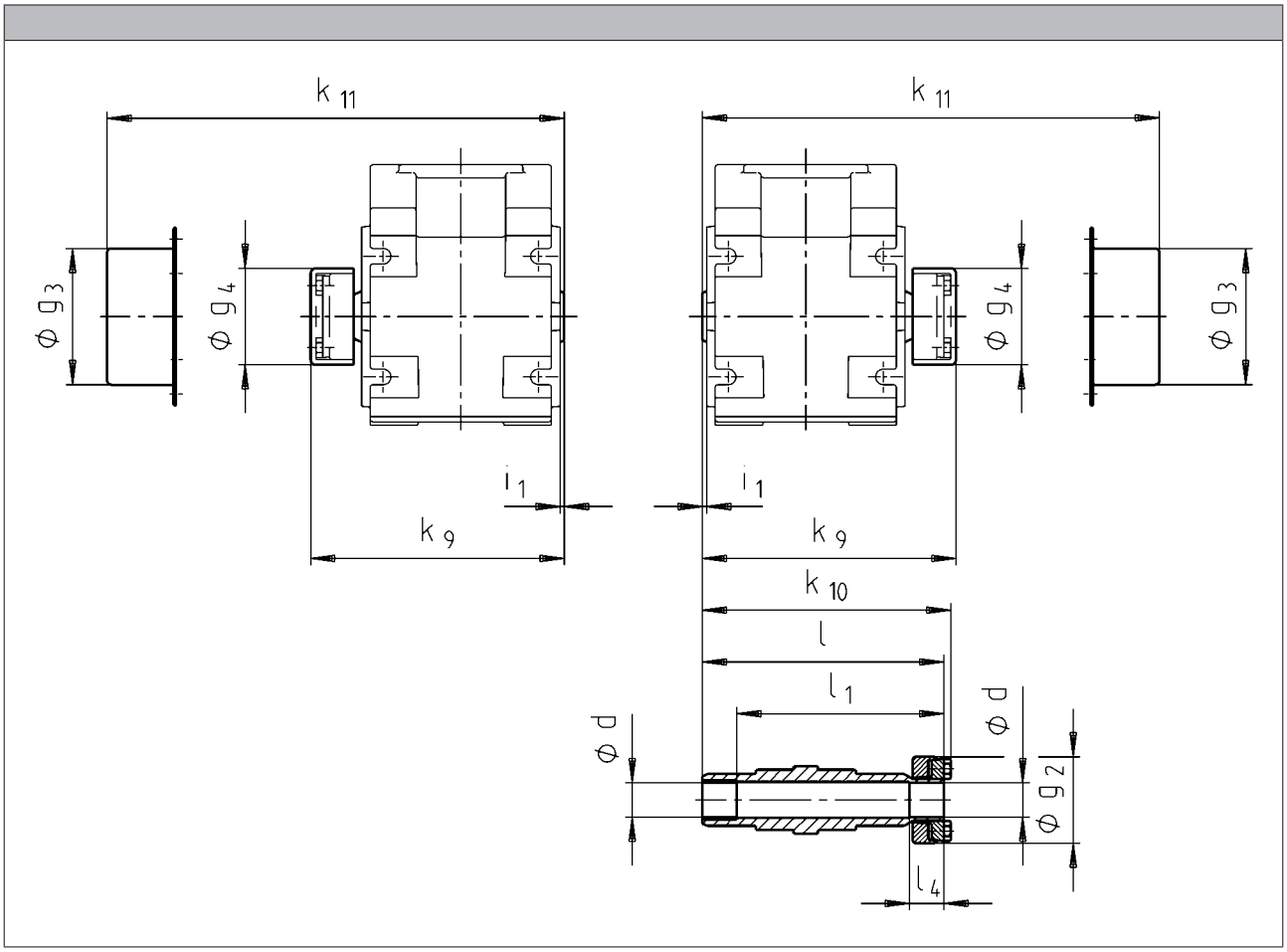
	d	d_2	l	l_1	l_2	u	t	i_2	o_1[1)]	a_2	b_2	ba_2	c_2	e_2	f_2	fa_2	s_2
	k6										j7	H7					
GKR03	20	M6	40	5	28	6	22.5	40	167.5	120 110	80 -	- 60	8 8	100 87	3 -	- 4	7 9
GKR04	20	M6	40	5	28	6	22.5	40	178	120 160	80 110		8 8	100 130	3 3.5		7 9
GKR05	30	M10	60	6	45	8	33	60	232.5	160 200	110 130		12 12	130 165	3.5 3.5		9 11
GKR06	35	M12	70	7	56	10	38	70	276.5	200 250	130 180		12 12	165 215	3.5 4		11 14

[1)] k_2 !





Hollow shaft with shrink disc

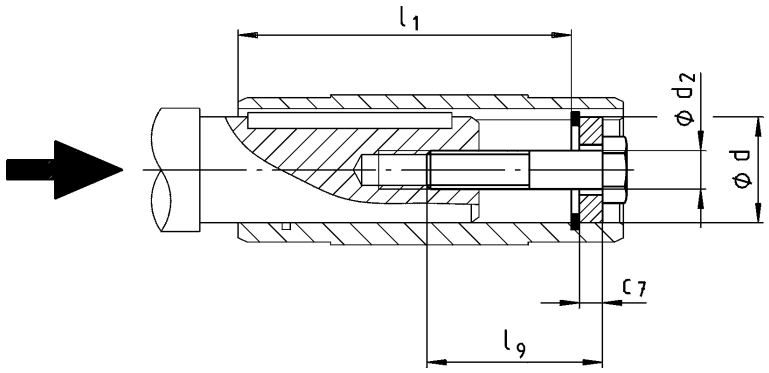


	d [1]	g_2	g_3	g_4	i_1	k_9	k_{10}	k_{11}	l	l_1	l_4
	h6										
GKR03	20	50	65	54	2.5	126	124	138	120	100	20
GKR04						146	144	158	144	120	
GKR05	30 35	80	90	84	4.0	176	177	182	171	151	28
GKR06	40	90	100	94	5.0	202	210	214	204	174	30

[1] Machine shaft design.

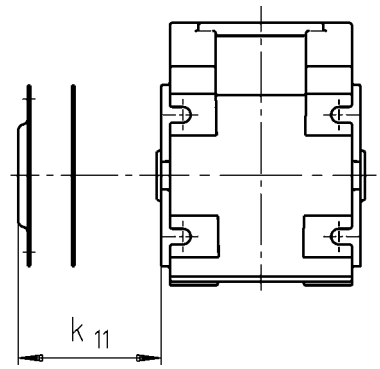
- ► Output flange and hollow shaft with shrink disc (output version SAK) are not possible in the same location. For additional dimensions see output version H□□.
- ► Ensure that the strength of the machine shaft material is adequate in shrink disc designs.
  When using typical steels, e.g. C45, 42CrMo4, 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 Rz must not exceed 15 µm (turning is sufficient).

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



	d	l_1	d_2	l_9	c_7
	H7				
GKR03	18 20	85	M6	40	4
GKR04	20 25	105			
			M10		5
GKR05	30 35	127			6
			M12	50	7
GKR06	40 45	150	M16	60	8
					9

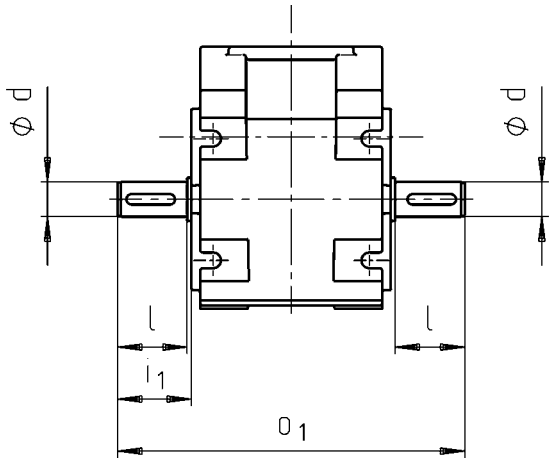
Hoseproof hollow shaft cover



► Cover including gasket

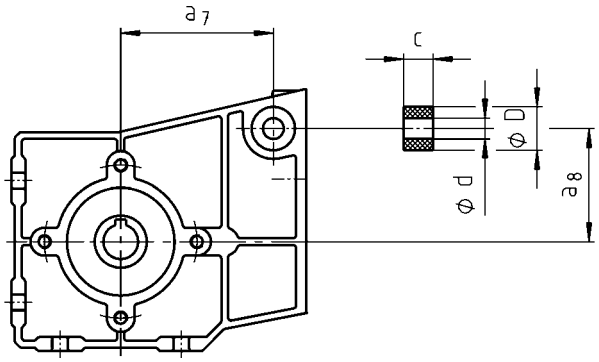
	k_{11}
	[mm]
GKR03	9
GKR04	
GKR05	10
GKR06	11

Gearboxes with 2nd output shaft end



	d	l	i_1	o_1
	k6			
	[mm]	[mm]	[mm]	[mm]
GKR03	20	40	42.5	180
GKR04				200
GKR05	30	60	64.0	263
GKR06	35	70	75.0	310

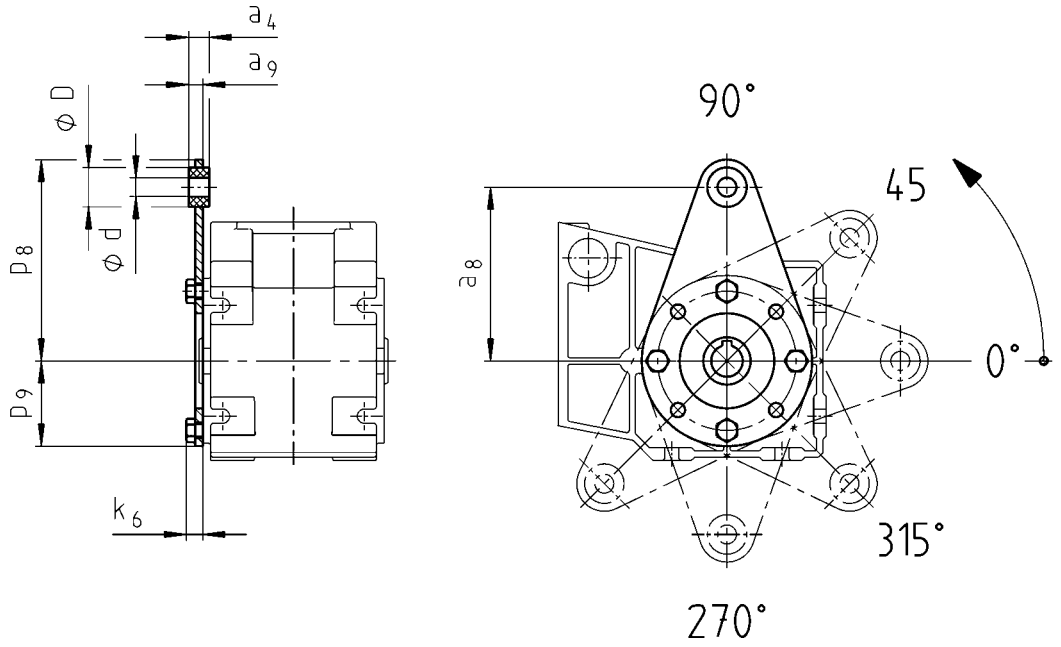
Rubber buffer for torque plate



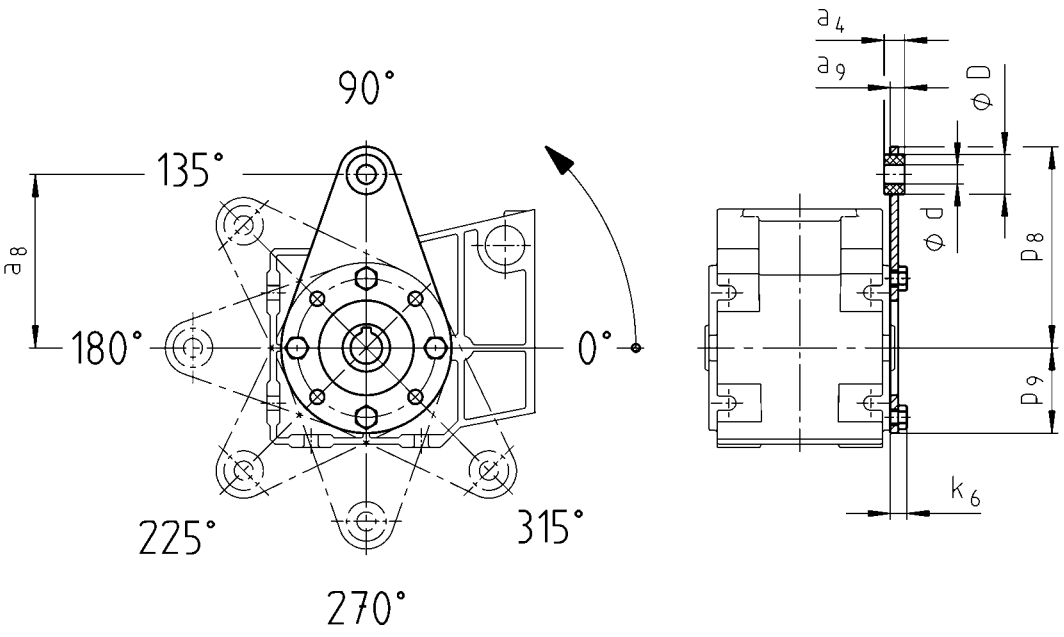
	d	D	c	a_7	a_8
GKR03	10	25	13.0	66.0	39
GKR04				88.0	65

Torque plate on threaded pitch circle

In position 3



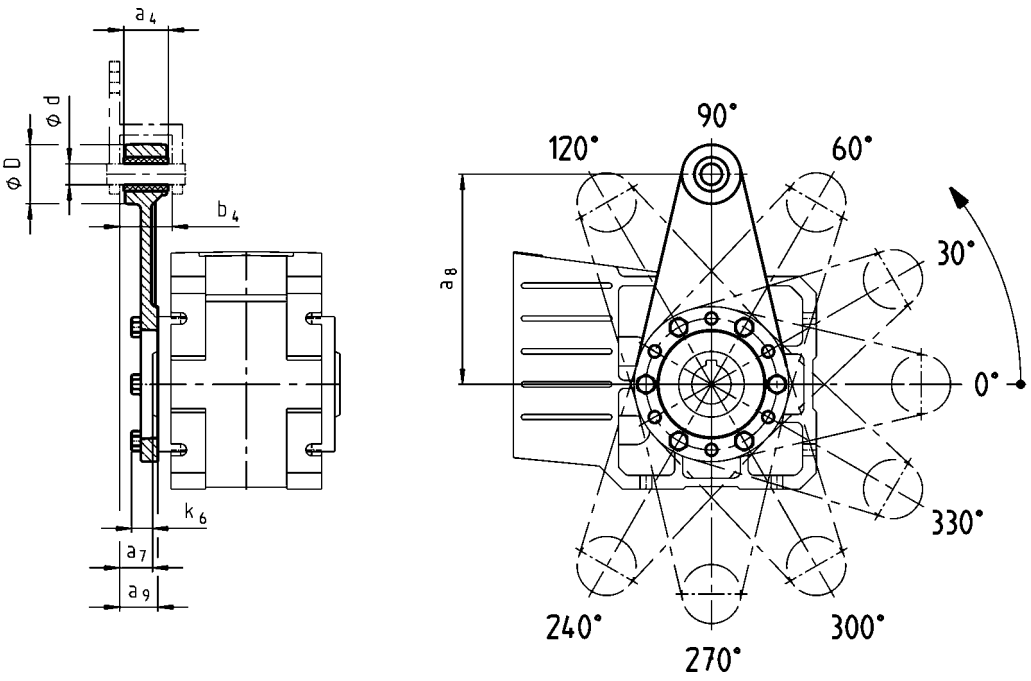
In position 5



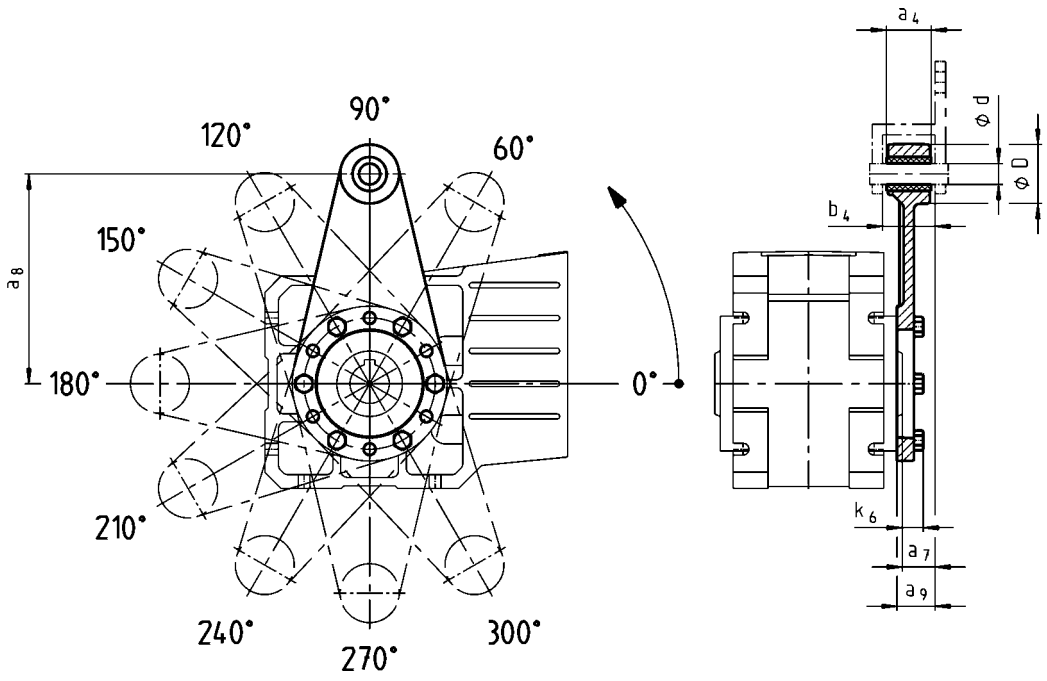
	a_4	a_8	a_9	d	D	k_6	p_8	p_9
GKR03	12	100	8.0	8	20	9	115	42
GKR04	13	110	9.0	10	25	11	128	54

Torque plate on threaded pitch circle

In position 3



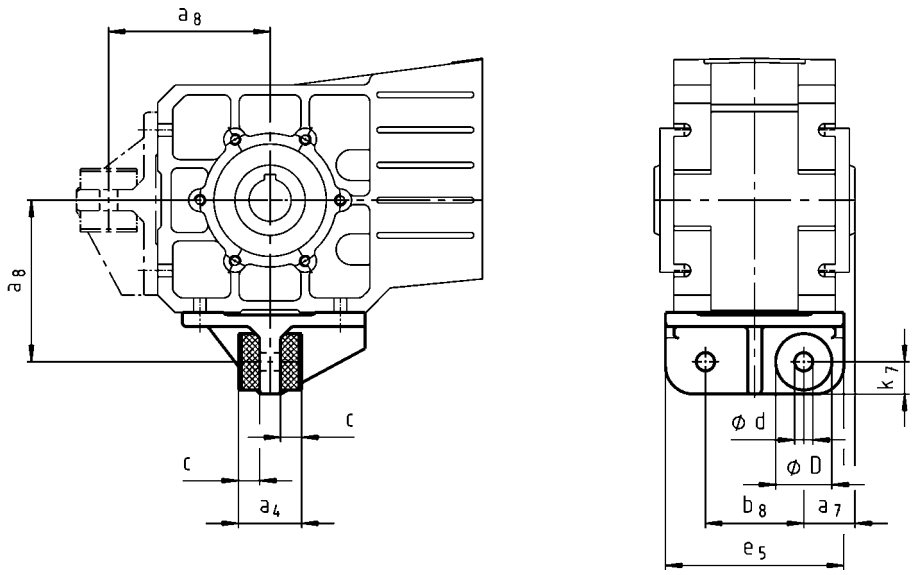
In position 5



	a_4	a_7	a_8	a_9	b_4	d	D	k_6
GKR05	34	23.5	160	27.5	38.5	16	45	15
GKR06	40	28.0	200	33.0	44.5	20	50	18

Torque plate at housing foot

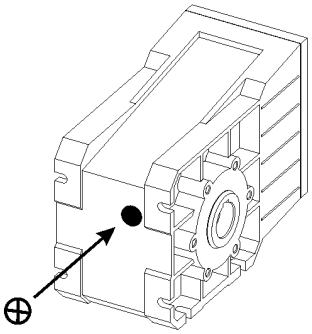
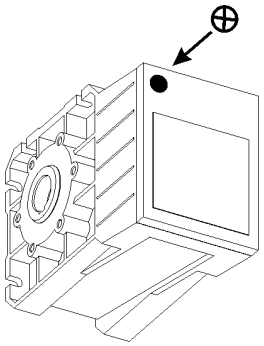
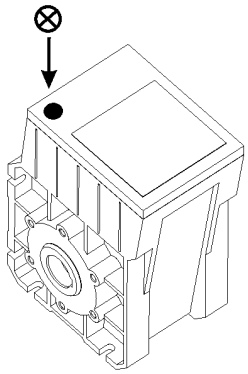
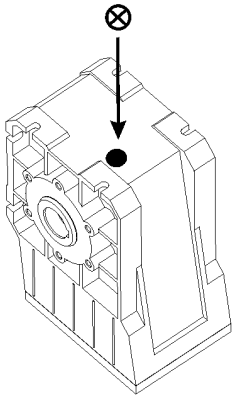
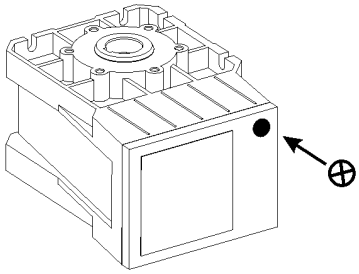
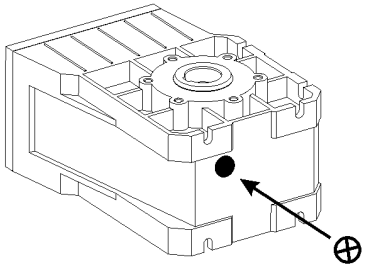
In position 4 or 6



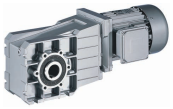
	a_4	a_7	a_8	b_8	c	d	D	e_5	k_7
GKR05	45	36.5	115	70	15.0	13	40	127	25
GKR06	72	45.0	145	80	27.0	17	50	145	30

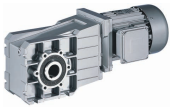
Ventilation position

GKR06

A	B	C
		
D	**E**	**F**
		

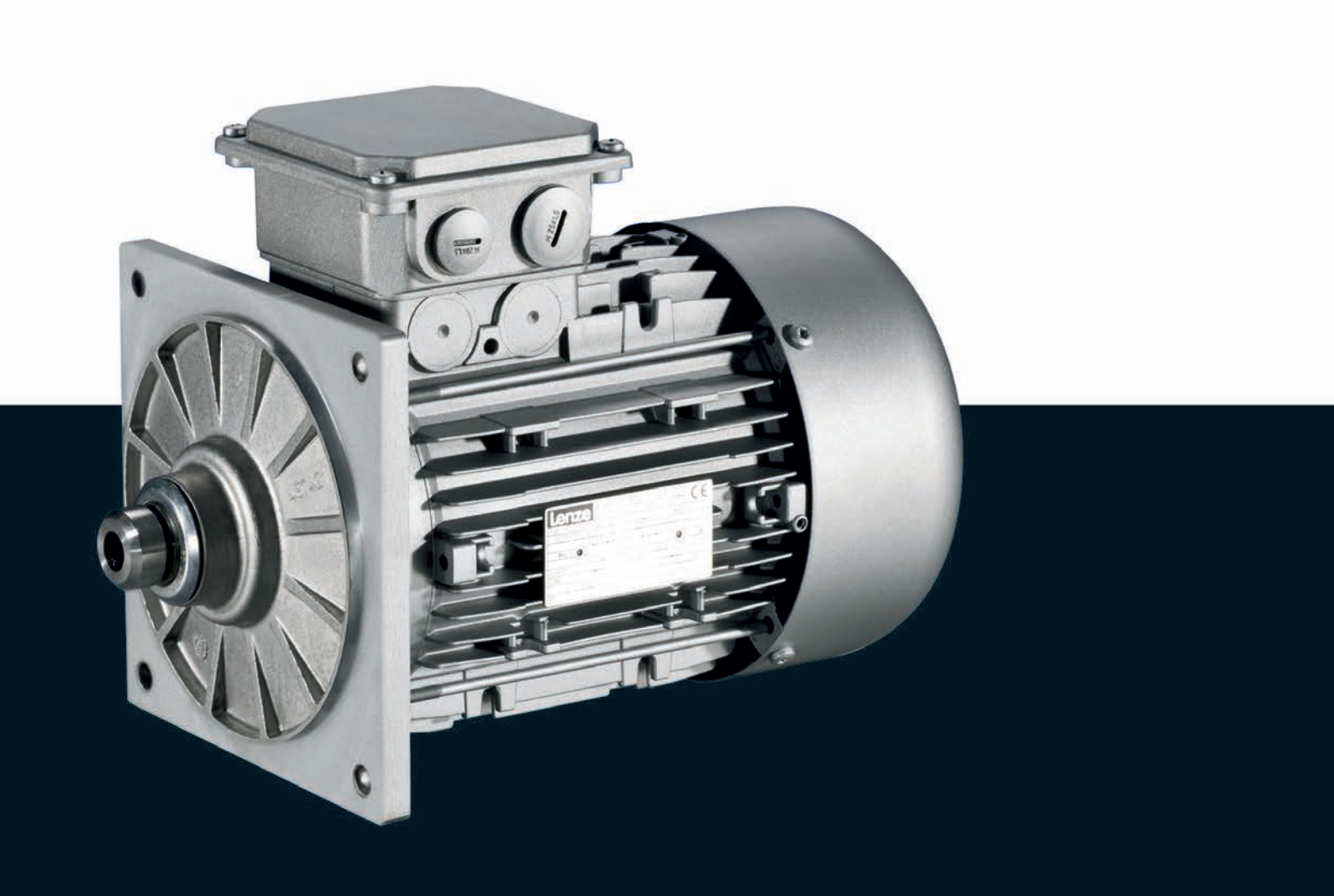
⊗ Ventilation





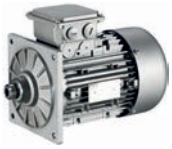
MD three-phase AC motors

0.06 to 45 kW



MD three-phase AC motors

Contents



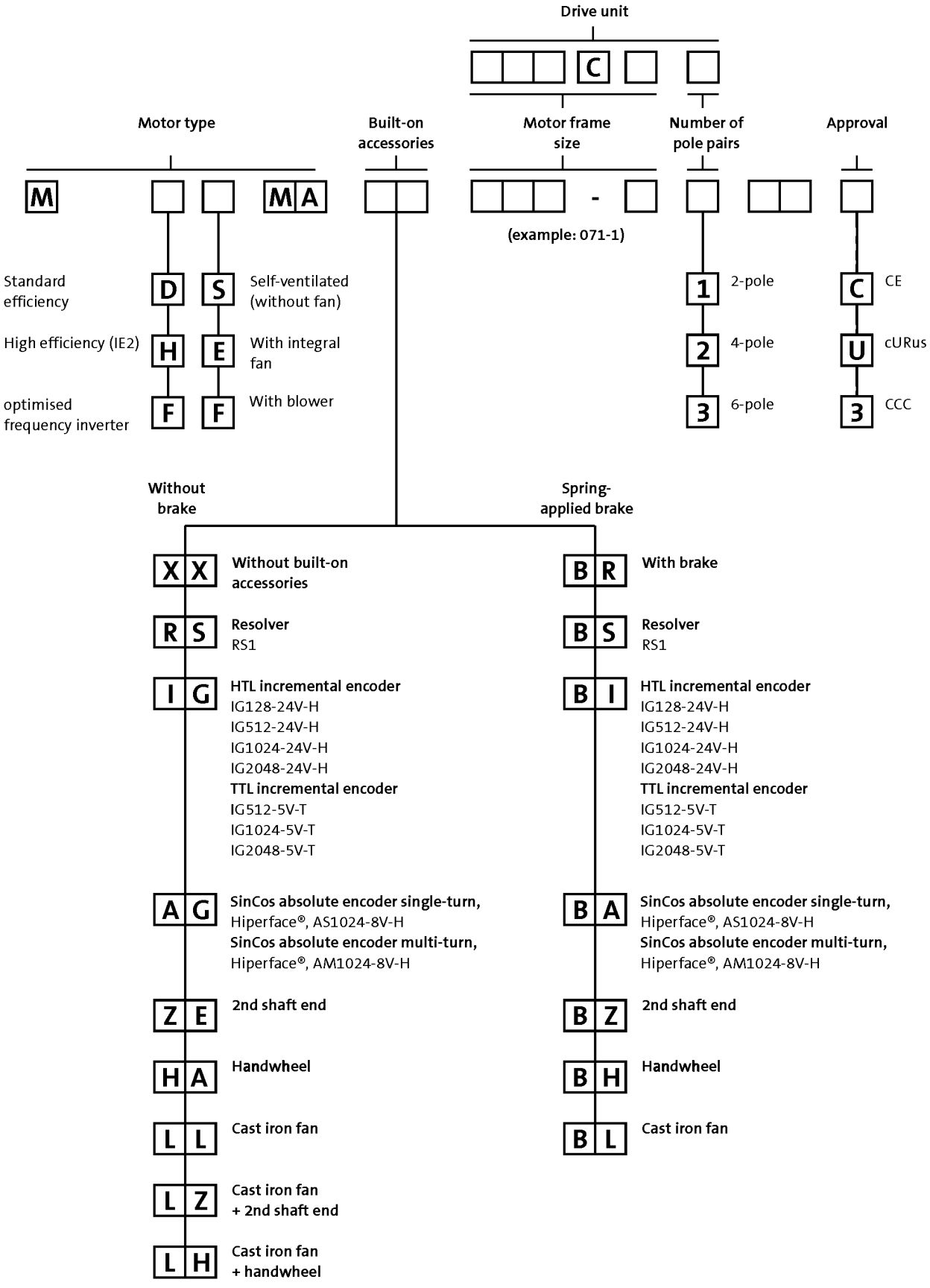
List of abbreviations

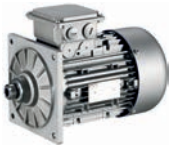
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
cos ϕ		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_N	[r/min]	Rated speed
P_N	[kW]	Rated power
P_{max}	[kW]	Max. power input

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

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

Product key

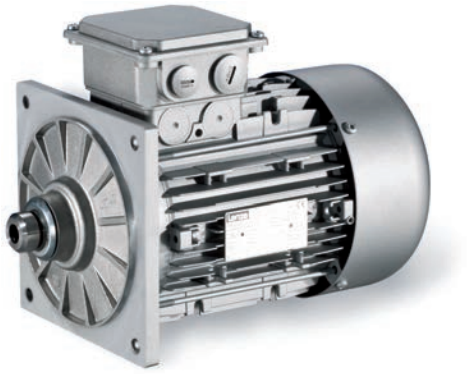

Drive unit
C
Motor type
Built-on accessories
Motor frame size
Number of pole pairs
Approval
M
M A
-
(example: 071-1)
Standard efficiency
D
S
Self-ventilated (without fan)
High efficiency (IE2)
H
E
With integral fan
optimised frequency inverter
F
F
With blower
1
2-pole
2
4-pole
3
6-pole
C
CE
U
cURus
3
CCC
Without brake
Spring-applied brake
X X
Without built-on accessories
R S
Resolver
RS1
I G
HTL incremental encoder
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
TTL incremental encoder
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
A G
SinCos absolute encoder single-turn,
Hiperface®, AS1024-8V-H
SinCos absolute encoder multi-turn,
Hiperface®, AM1024-8V-H
Z E
2nd shaft end
H A
Handwheel
L L
Cast iron fan
L Z
Cast iron fan
+ 2nd shaft end
L H
Cast iron fan
+ handwheel
B R
With brake
B S
Resolver
RS1
B I
HTL incremental encoder
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
TTL incremental encoder
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
B A
SinCos absolute encoder single-turn,
Hiperface®, AS1024-8V-H
SinCos absolute encoder multi-turn,
Hiperface®, AM1024-8V-H
B Z
2nd shaft end
B H
Handwheel
B L
Cast iron fan



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 MD three-phase AC motors are available in a power range from 0.06 to 45 kW and comply with efficiency class 4IE1 (standard efficiency) as per IEC 60034-30.

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 x 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 UkrSepro 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.

Functions and features

Size				
Motor	063	071	080	090
Spring-applied brake				
Design	Standard or LongLife design Reduced or standard braking torque With rectifier With manual release lever Low noise		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback				
Design	Resolver [1] Incremental encoder [1] Absolute value encoder (multi-turn) [1]			
Thermal sensor				
Thermal contact	TKO			
Thermal detector	KTY83-110 KTY84-130			
PTC thermistor	PTC			
Motor connection				
Power connection	Terminal box ICN connector HAN10E connector HAN modular connector			
Brake connection	Terminal box ICN connector HAN modular connector HAN10E connector			
Blower connection	Terminal box ICN connector			
Feedback connection	Terminal box ICN connector			
Temperature sensor connection	Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection			
Shaft bearings				
Position of the locating bearing	Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A			
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates			
Colour				
	Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours			
Further options				
	Protection cover	Protection cover Increased centrifugal mass Handwheel [1] 2nd shaft end		

[1] With 2-pole motors not available.

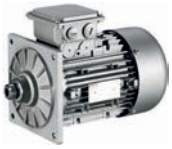
Functions and features

Size			
Motor	100	112	132
Spring-applied brake			
Design	Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback			
Design	Resolver [1)] Incremental encoder [1)] Absolute value encoder (multi-turn) [1)]		
Thermal sensor			
Thermal contact	TKO		
Thermal detector	KTY83-110 KTY84-130		
PTC thermistor	PTC		
Motor connection			
Power connection	Terminal box ICN connector HAN10E connector HAN modular connector		Terminal box ICN connector HAN modular connector
Brake connection	Terminal box ICN connector HAN modular connector HAN10E connector		Terminal box ICN connector HAN modular connector
Blower connection	Terminal box ICN connector		
Feedback connection	Terminal box ICN connector		
Temperature sensor connection	Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection		
Shaft bearings			
Position of the locating bearing	Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour			
	Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		
Further options			
	Protection cover Increased centrifugal mass Handwheel [1)] 2nd shaft end		

[1)] With 2-pole motors not available.

Functions and features

Size			
Motor	160	180	225
Spring-applied brake			
Design	Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise		
Feedback			
Design	Resolver Incremental encoder Absolute value encoder (multi-turn)		
Thermal sensor			
Thermal contact	TKO		
Thermal detector	KTY83-110 KTY84-130		
PTC thermistor	PTC		
Motor connection			
Power connection	Terminal box HAN modular connector	Terminal box	
Brake connection	Terminal box HAN modular connector	Terminal box	
Blower connection	Terminal box ICN connector		
Feedback connection	Terminal box ICN connector		
Temperature sensor connection	Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection	Terminal box	
Shaft bearings			
Position of the locating bearing	Standard motors (B3, B5, B14): side B 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		
Colour			
	Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		
Further options			
	Protection cover		



Functions and features

Surface and corrosion protection

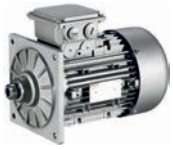
For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

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)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey)
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating as per corrosivity category C1 (in line with EN 12944-2)
OKS-M (medium)	• Internal installation in non-heated buildings • Covered, protected external installation • Air humidity up to 95%	• Surface coating as per corrosivity category C2 (in line with EN 12944-2)
OKS-L (high)	• External installation • Air humidity above 95% • Chemical industry plants • Food industry	• Surface coating as per corrosivity category C3 (in line with EN 12944-2) • Blower cover and B end shield additionally primed • Screws zinc-coated • Cable glands with gaskets • Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request) Optional measures: • Motor recesses sealed off (on request)

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 Optional: RAL Classic
OKS-M (medium)	C2	2K PUR priming coat 2K-PUR top coat	
OKS-L (high)	C3		

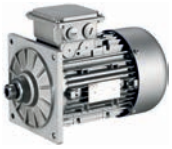


Motor – inverter assignment

Rated frequency 50/60 Hz

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

Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.12	MD□□□□□063-12		
0.18	MD□□□□□063-32		
0.25	MD□□□□□063-42		
0.37	MD□□□□□071-32	E84DVB□3714S□□□2□	
0.55	MD□□□□□071-42	E84DVB□5514S□□□2□	
0.75	MD□□□□□080-32	E84DVB□7514S□□□2□	
1.10	MD□□□□□080-42	E84DVB□1124S□□□2□	
1.50	MD□□□□□090-32	E84DVB□1524S□□□2□	
2.20	MD□□□□□100-12	E84DVB□2224S□□□2□	
3.00	MD□□□□□100-32	E84DVB□3024S□□□2□	
4.00	MD□□□□□112-22	E84DVB□4024S□□□2□	
5.50	MD□□□□□112-32	E84DVB□5524S□□□2□	
7.50	MD□□□□□132-22	E84DVB□7524S□□□2□	
11.0	MD□□□□□160-22		
15.0	MD□□□□□160-32		
18.5	MD□□□□□180-12		
22.0	MD□□□□□180-32		
30.0	MD□□□□□180-42		
37.0	MD□□□□□225-12		
45.0	MD□□□□□225-22		

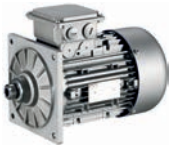


Motor – inverter assignment

Rated frequency 87 Hz

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

Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.21	MD□□□□□063-12		
0.33	MD□□□□□063-32	E84DVB□5514S□□□2□	
0.45	MD□□□□□063-42		
0.66	MD□□□□□071-32	E84DVB□7514S□□□2□	
1.00	MD□□□□□071-42	E84DVB□1124S□□□2□	
1.35	MD□□□□□080-32	E84DVB□1524S□□□2□	
2.00	MD□□□□□080-42	E84DVB□2224S□□□2□	
2.70	MD□□□□□090-32	E84DVB□3024S□□□2□	
3.90	MD□□□□□100-12	E84DVB□4024S□□□2□	
5.40	MD□□□□□100-32	E84DVB□5524S□□□2□	
7.10	MD□□□□□112-22	E84DVB□7524S□□□2□	
9.70	MD□□□□□112-32		
13.2	MD□□□□□132-22		
19.3	MD□□□□□160-22		
26.4	MD□□□□□160-32		
32.4	MD□□□□□180-12		
38.7	MD□□□□□180-32		

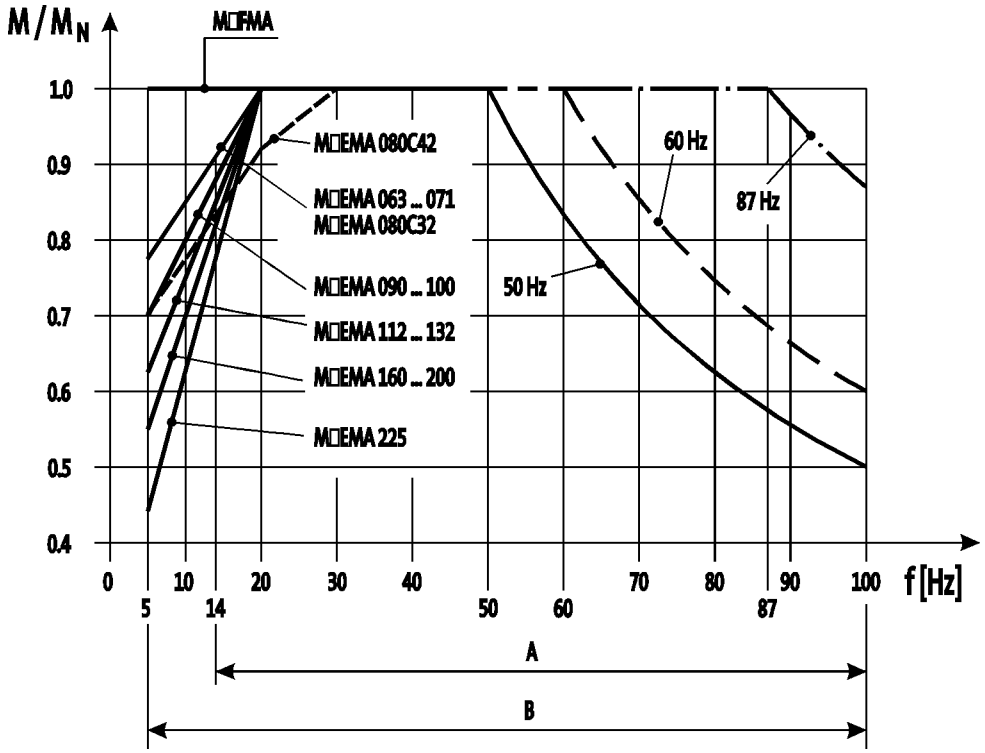


Dimensioning

Torque derating at low motor frequencies

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

Torque characteristics



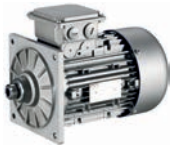
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

► 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.

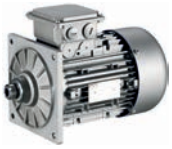


Standards and operating conditions

Enclosure			
EN 60529			IP55
Energy efficiency class			
IEC 60034-30			IE1 [1]
IEC 60034-2-1			Methodology for measuring efficiency
Approval			
Class			cURus [2] CCC GOST-R UkrSepro
Temperature class			
IEC/EN 60034-1; utilisation			B
IEC/EN 60034-1; insulation system (enamel-insulated wire)			F
Min. ambient operating temperature			
	$T_{opr,min}$	[°C]	-20
Max. ambient operating temperature			
	$T_{opr,max}$	[°C]	40
With power reduction	$T_{opr,max}$	[°C]	60
Site altitude			
Amsl	H_{max}	[m]	4000
Max. speed			
	n_{max}	[r/min]	4500

[1] Only applies to 4-pole motors.
[2] 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".



Rated data for 50 Hz

2-pole motors

	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-11	0.18	2740	230	0.80	400	0.46	4.30
MD□□□□□063-31	0.25	2710	230	1.10	400	0.60	3.70
MD□□□□□071-11	0.37	2720	230	1.50	400	0.90	4.40
MD□□□□□071-31	0.55	2630	230	2.40	400	1.40	3.80
MD□□□□□080-11	0.75	2720	230	3.10	400	1.80	4.70
MD□□□□□080-31	1.10	2720	230	4.50	400	2.60	4.70
MD□□□□□090-11	1.50	2710	230	5.50	400	3.20	4.50
MD□□□□□090-31	2.20	2730	230	8.30	400	4.80	3.70
MD□□□□□100-31	3.00	2890	230	10.2	400	5.90	7.00
MD□□□□□100-41	4.00	2840	230	14.2	400	8.30	6.60
MD□□□□□112-31	5.50	2900	400 [2]	11.5			6.00
MD□□□□□112-41	7.50	2890	400 [2]	16.5			6.00
MD□□□□□132-21	9.00	2890	400 [2]	17.0			6.50

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-11	0.63	1.50	1.50	0.88	66.5	66.0	1.70	3.90
MD□□□□□063-31	0.90	1.90	2.00	0.89	67.0	66.0	1.70	3.80
MD□□□□□071-11	1.29	3.10	2.90	0.92	71.0	69.0	5.10	6.00
MD□□□□□071-31	2.00	3.80	4.20	0.93	70.0	63.0	5.10	6.50
MD□□□□□080-11	2.65	5.40	6.50	0.89	70.0	70.0	9.70	10.0
MD□□□□□080-31	3.90	7.50	8.50	0.89	75.0	73.0	9.70	10.0
MD□□□□□090-11	5.20	10.1	10.4	0.95	76.5	75.0	35.0	17.0
MD□□□□□090-31	7.60	16.4	15.5	0.90	77.0	76.0	35.0	17.0
MD□□□□□100-31	9.90	19.0	27.0	0.90	83.0	82.0	32.6	21.0
MD□□□□□100-41	13.6	24.0	29.0	0.91	77.0	78.0	32.6	21.0
MD□□□□□112-31	18.1	46.0	49.0	0.83	86.0	86.0	53.8	28.0
MD□□□□□112-41	24.8	71.0	77.0	0.78	87.0	87.0	70.0	35.0
MD□□□□□132-21	29.8	72.0	72.0	0.92	88.0	88.0	205	68.0

[1] Without accessories
[2] Star/delta start-up possible at 400 V.

Rated data for 50 Hz

4-pole motors

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-02	0.060	1425	230	0.42	400	0.24	3.50
MD□□□□□063-22	0.090	1375	230	0.48	400	0.28	2.90
MD□□□□□063-12	0.12	1425	230	0.85	400	0.49	3.10
MD□□□□□063-32	0.18	1365	230	1.00	400	0.58	2.70
MD□□□□□063-42	0.25	1370	230	1.40	400	0.82	2.90
MD□□□□□071-32	0.37	1410	230	1.60	400	0.95	3.30
MD□□□□□071-42	0.55	1405	230	2.40	400	1.40	3.50
MD□□□□□080-32	0.75	1410	230	3.30	400	1.90	4.60
MD□□□□□080-42	1.10	1390	230	4.80	400	2.80	4.40
MD□□□□□090-32	1.50	1410	230	6.60	400	3.80	4.80
MD□□□□□100-12	2.20	1440	230	9.20	400	5.30	6.00
MD□□□□□100-32	3.00	1430	230	12.5	400	7.20	4.60
MD□□□□□112-22	4.00	1450	230	16.1	400	9.30	6.20
MD□□□□□112-32	5.50	1445	230 400 [3]	21.7 12.5	400	12.5	6.10
MD□□□□□132-22	7.50	1455	230 400 [3]	28.6 16.5	400	16.5	5.90
MD□□□□□132-32	9.20	1450	230 400 [3]	34.1 19.7	400	19.7	5.10

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.40	1.30	1.36	0.57	59.0	63.0	3.30	3.90
MD□□□□□063-22	0.63	1.30	1.39	0.71	63.0	65.0	3.30	3.90
MD□□□□□063-12	0.80	2.50	2.64	0.56	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.26	2.50	2.61	0.70	63.0	64.0	3.30	4.10
MD□□□□□063-42	1.74	3.80	4.10	0.67	65.0	66.0	3.70	4.40
MD□□□□□071-32	2.51	4.76	5.81	0.77	73.0	73.0	10.7	5.80
MD□□□□□071-42	3.74	7.85	9.12	0.77	74.0	74.0	12.8	6.40
MD□□□□□080-32	5.10	11.0	12.1	0.80	73.0	74.0	26.0	11.0
MD□□□□□080-42	7.50	16.5	18.4	0.80	77.0	77.0	26.0	11.0
MD□□□□□090-32	10.1	23.7	27.1	0.76	78.0	79.0	28.4	15.0
MD□□□□□100-12	14.6	38.0	44.0	0.73	83.0	84.0	61.0	24.0
MD□□□□□100-32	20.5	43.0	50.0	0.75	83.0	83.0	61.0	24.0
MD□□□□□112-22	26.3	70.0	95.0	0.73	85.0	86.0	107	31.0
MD□□□□□112-32	36.6	95.0	120	0.77	85.0	86.0	135	38.0
MD□□□□□132-22	49.2	100	150	0.76	87.0	88.0	336	66.0
MD□□□□□132-32	60.6	100	150	0.80	88.0	88.0	336	66.0

[1] Without accessories
[2] 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 180-32, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 400 V.

Rated data for 50 Hz

4-pole motors

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□160-22	11.0	1460	230 400 [3]	36.5 21.0	400	21.0	7.00
MD□□□□□160-32	15.0	1460	230 400 [3]	48.4 27.8	400	27.8	7.10
MD□□□□□180-12	18.5	1470	230 400 [3]	57.8 32.8	400	32.8	6.80
MD□□□□□180-32	22.0	1465	230 400 [3]	67.4 38.8	400	38.8	7.30
MD□□□□□180-42	30.0	1465	230 400 [3]	91.1 52.6	400	52.6	7.50
MD□□□□□225-12	37.0	1475	230 400 [3]	114 66.0	400	66.0	6.30
MD□□□□□225-22	45.0	1480	230 400 [3]	137 79.0	400	79.0	7.60

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	71.9	150	204	0.85	89.2	89.0	610	110
MD□□□□□160-32	98.1	214	288	0.87	89.7	90.0	750	130
MD□□□□□180-12	120	260	313	0.90	90.7	90.5	1350	165
MD□□□□□180-32	144	330	360	0.90	91.2	91.0	1550	175
MD□□□□□180-42	196	548	547	0.90	91.6	91.0	1850	200
MD□□□□□225-12	240	504	528	0.88	93.0	93.0	4400	320
MD□□□□□225-22	290	698	669	0.88	94.5	94.3	5300	415

[1] Without accessories
[2] 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 180-32, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 400 V.

Rated data for 50 Hz

6-pole motors

	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□071-13	0.18	930	230	1.10	400	0.60	3.90
MD□□□□□071-33	0.25	930	230	1.80	400	1.10	2.80
MD□□□□□080-13	0.37	950	230	2.20	400	1.30	4.00
MD□□□□□080-33	0.55	930	230	2.90	400	1.70	3.50

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□071-13	1.80	5.00	5.00	0.66	67.0	69.0	12.5	6.50
MD□□□□□071-33	2.50	6.60	6.60	0.66	67.0	68.0	12.5	6.50
MD□□□□□080-13	3.70	10.1	10.7	0.63	68.0	69.0	26.0	11.0
MD□□□□□080-33	5.60	12.2	12.8	0.70	68.0	68.0	26.0	11.0

[1] Without accessories

Rated data for 60 Hz

2-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_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-11	0.18	3370	265	0.72	460	0.41	5.50
MD□□□□□063-31	0.25	3390	265	0.88	460	0.51	4.80
MD□□□□□071-11	0.37	3360	265	1.30	460	0.76	5.50
MD□□□□□071-31	0.55	3240	265	2.10	460	1.20	4.80
MD□□□□□080-11	0.75	3380	265	2.60	460	1.50	5.90
MD□□□□□080-31	1.10	3370	265	3.80	460	2.20	5.90
MD□□□□□090-11	1.50	3310	265	4.80	460	2.80	5.30
MD□□□□□090-31	2.20	3320	265	7.20	460	4.10	4.30
MD□□□□□100-31	3.00	3510	265	8.80	460	5.10	8.10
MD□□□□□100-41	4.00	3440	265	12.4	460	7.10	7.70
MD□□□□□112-31	5.50	3510	460 [2]	9.90			6.90
MD□□□□□112-41	7.50	3500	460 [2]	14.4			6.80
MD□□□□□132-21	9.00	3500	460 [2]	14.8			7.60

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-11	0.51	1.38	1.38	0.84	68.3	67.8	1.70	3.90
MD□□□□□063-31	0.72	1.74	1.84	0.86	71.1	70.0	1.70	3.80
MD□□□□□071-11	1.05	2.85	2.66	0.91	74.4	72.3	5.10	6.00
MD□□□□□071-31	1.62	3.49	3.86	0.90	73.6	66.3	5.10	6.50
MD□□□□□080-11	2.13	4.96	5.97	0.88	74.4	74.4	9.70	10.0
MD□□□□□080-31	3.14	6.89	7.81	0.87	79.2	77.1	9.70	10.0
MD□□□□□090-11	4.31	9.28	9.55	0.94	78.3	76.7	35.0	17.0
MD□□□□□090-31	6.25	15.1	14.2	0.89	78.7	77.7	35.0	17.0
MD□□□□□100-31	8.13	17.4	24.8	0.89	84.5	83.5	32.6	21.0
MD□□□□□100-41	11.3	22.0	26.6	0.90	78.6	79.7	32.6	21.0
MD□□□□□112-31	14.9	42.2	45.0	0.83	87.5	87.5	53.8	28.0
MD□□□□□112-41	20.5	65.2	70.7	0.77	88.5	88.5	70.0	35.0
MD□□□□□132-21	24.7	66.1	66.1	0.91	88.9	88.9	205	68.0

[1] Without accessories
[2] Star/delta start-up possible at 460 V.

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_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-02	0.060	1735	265	0.37	460	0.21	4.40
MD□□□□□063-22	0.090	1695	265	0.43	460	0.25	4.20
MD□□□□□063-12	0.12	1735	265	0.69	460	0.40	4.00
MD□□□□□063-32	0.18	1695	265	0.80	460	0.46	3.60
MD□□□□□063-42	0.25	1680	265	1.30	460	0.75	3.80
MD□□□□□071-32	0.37	1720	265	1.50	460	0.84	3.90
MD□□□□□071-42	0.55	1720	265	2.10	460	1.20	4.10
MD□□□□□080-32	0.75	1720	265	2.90	460	1.70	5.60
MD□□□□□080-42	1.10	1705	265	4.20	460	2.40	5.40
MD□□□□□090-32	1.50	1720	265	5.80	460	3.40	5.70
MD□□□□□100-12	2.20	1745	265	8.10	460	4.70	6.90
MD□□□□□100-32	3.00	1740	265	10.8	460	6.30	5.30
MD□□□□□112-22	4.00	1755	265	14.1	460	8.20	6.90
MD□□□□□112-32	5.50	1750	265 460 [3]	18.9 10.9	460	10.9	6.90
MD□□□□□132-22	7.50	1760	265 460 [3]	25.7 14.8	460	14.8	6.50
MD□□□□□132-32	9.20	1750	265 460 [3]	29.6 17.1	460	17.1	5.70

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.33	1.10	1.36	0.54	60.0	63.0	3.30	3.90
MD□□□□□063-22	0.51	1.10	1.40	0.67	64.9	67.0	3.30	3.90
MD□□□□□063-12	0.66	2.25	2.64	0.55	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.00	2.21	2.56	0.68	65.0	66.0	3.30	4.10
MD□□□□□063-42	1.40	3.71	4.20	0.60	64.0	66.0	3.70	4.40
MD□□□□□071-32	2.05	4.40	5.80	0.74	74.0	75.0	10.7	5.80
MD□□□□□071-42	3.05	7.00	9.00	0.73	76.0	77.0	12.8	6.40
MD□□□□□080-32	4.16	10.3	12.2	0.78	78.0	78.0	26.0	11.0
MD□□□□□080-42	6.16	15.5	18.5	0.78	79.0	80.0	26.0	11.0
MD□□□□□090-32	8.33	22.0	27.0	0.73	79.0	81.0	28.4	15.0
MD□□□□□100-12	12.0	33.0	43.0	0.71	83.0	85.0	61.0	24.0
MD□□□□□100-32	16.5	38.0	48.0	0.73	84.0	85.0	61.0	24.0
MD□□□□□112-22	21.8	57.0	89.0	0.72	85.0	87.0	107	31.0
MD□□□□□112-32	30.0	79.0	114	0.75	87.0	87.0	135	38.0
MD□□□□□132-22	40.7	83.0	137	0.75	88.0	89.0	336	66.0
MD□□□□□132-32	50.2	83.0	137	0.79	88.0	89.0	336	66.0

[1] Without accessories

[2] 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 112-32 to 180-42, the required voltage must also be specified in your order.

[3] Star/delta start-up possible at 460 V.

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_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□160-22	11.0	1770	265 460 [3]	31.7 18.3	460	18.3	7.60
MD□□□□□160-32	15.0	1760	265 460 [3]	40.7 23.5	460	23.5	7.60
MD□□□□□180-12	18.5	1780	265 460 [3]	48.5 28.0	460	28.0	7.20
MD□□□□□180-32	22.0	1760	265 460 [3]	57.2 33.0	460	33.0	7.60
MD□□□□□180-42	30.0	1770	265 460 [3]	78.8 45.5	460	45.5	7.80
MD□□□□□225-12	37.0	1780	265 460 [3]	97.2 56.1	460	56.1	6.50
MD□□□□□225-22	45.0	1784	265 460 [3]	111 64.2	460	64.2	8.80

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	59.5	122	187	0.84	91.1	90.0	610	110
MD□□□□□160-32	81.2	171	265	0.87	92.6	92.0	750	130
MD□□□□□180-12	99.3	203	287	0.90	93.0	92.0	1350	165
MD□□□□□180-32	119	248	331	0.90	94.0	93.0	1550	175
MD□□□□□180-42	162	395	502	0.90	91.8	92.0	1850	200
MD□□□□□225-12	199	358	485	0.88	94.0	94.0	4400	320
MD□□□□□225-22	241	660	635	0.88	93.5	93.6	5300	415

[1] Without accessories
[2] 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 112-32 to 180-42, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 460 V.

Rated data for 60 Hz

6-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_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□071-13	0.18	1140	265	0.95	460	0.55	4.60
MD□□□□□071-33	0.25	1140	265	1.70	460	1.00	3.40
MD□□□□□080-13	0.37	1160	265	2.00	460	1.20	4.60
MD□□□□□080-33	0.55	1140	265	2.60	460	1.50	4.10

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□071-13	1.47	4.59	4.59	0.62	68.4	70.5	12.5	6.50
MD□□□□□071-33	2.04	6.06	6.06	0.61	69.1	70.1	12.5	6.50
MD□□□□□080-13	3.03	9.28	9.83	0.59	69.5	70.5	26.0	11.0
MD□□□□□080-33	4.56	11.2	11.8	0.66	70.7	70.7	26.0	11.0

[1] Without accessories

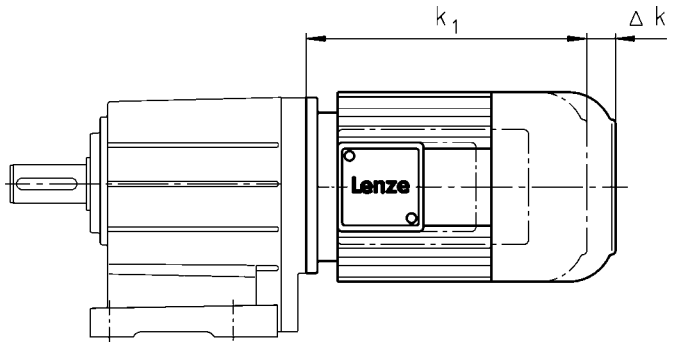
Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1)]	m [1)]
					± 10 %						
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.11	2535	0.40	1.60	400	0.42	0.55	62.0	67.0	3.30	3.90
MD□□□□□063-22	0.16	2485	0.63	2.50	400	0.48	0.67	66.0	70.0	3.30	3.90
MD□□□□□063-12	0.21	2535	0.80	3.20	400	0.85	0.52	61.0	66.0	3.30	4.10
MD□□□□□063-32	0.33	2475	1.26	5.00	400	1.00	0.65	68.0	71.0	3.30	4.10
MD□□□□□063-42	0.45	2480	1.74	7.00	400	1.40	0.63	66.0	73.0	3.70	4.40
MD□□□□□071-32	0.66	2520	2.51	10.0	400	1.60	0.72	76.0	78.0	10.7	5.80
MD□□□□□071-42	1.00	2515	3.74	15.0	400	2.40	0.74	79.0	80.0	12.8	6.40
MD□□□□□080-32	1.35	2520	5.10	20.0	400	3.30	0.80	75.0	77.0	26.0	11.0
MD□□□□□080-42	2.00	2500	7.50	30.0	400	4.80	0.80	81.0	82.0	26.0	11.0
MD□□□□□090-32	2.70	2520	10.1	40.0	400	6.70	0.73	83.0	85.0	28.4	15.0
MD□□□□□100-12	3.90	2550	14.6	60.0	400	9.20	0.71	87.0	88.0	61.0	24.0
MD□□□□□100-32	5.40	2540	20.5	80.0	400	12.5	0.73	87.0	88.0	61.0	24.0
MD□□□□□112-22	7.10	2560	26.3	105	400	16.1	0.71	87.0	88.0	107	31.0
MD□□□□□112-32	9.70	2555	36.6	145	400	21.7	0.75	87.0	89.0	135	38.0
MD□□□□□132-22	13.2	2565	49.2	200	400	28.6	0.75	90.0	90.0	336	66.0
MD□□□□□132-32	16.2	2560	60.6	242	400	34.1	0.79	90.0	91.0	336	66.0
MD□□□□□160-22	19.3	2565	71.9	280	400	36.5	0.85	91.7	90.0	610	110
MD□□□□□160-32	26.4	2565	98.1	390	400	48.4	0.86	91.9	92.0	750	130
MD□□□□□180-12	32.4	2575	120	480	400	57.8	0.89	92.8	92.0	1350	165
MD□□□□□180-32	38.7	2560	144	572	400	67.4	0.89	92.8	92.0	1550	175
MD□□□□□180-42	52.7	2565	196	780	400	91.1	0.89	93.0	93.0	1850	200

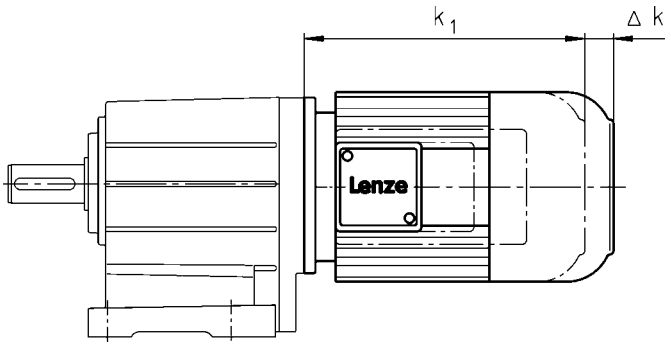
[1)] Without accessories

Dimensions, self-ventilated (2-pole)



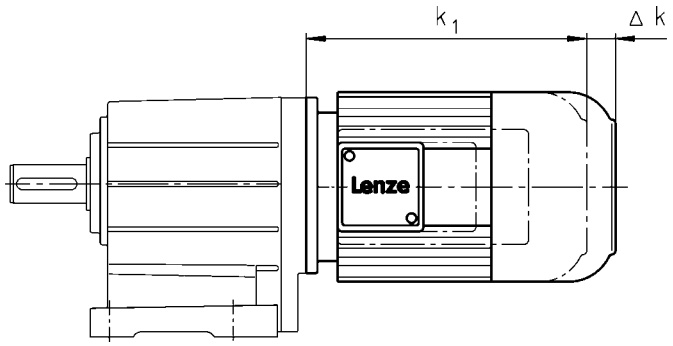
	Motor type			
	MDEMAXX	MDEMABR	MDEMABL	MDEMALL
Motor frame size				
	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]
063-11 063-31	0	40		
071-11 071-31		52	52	0
080-11 080-31		73	73	4
090-11 090-31		68	68	0
100-31 100-41		76	76	76
112-31 112-41		90	90	0
132-21		110	110	

Dimensions, self-ventilated (4-pole)



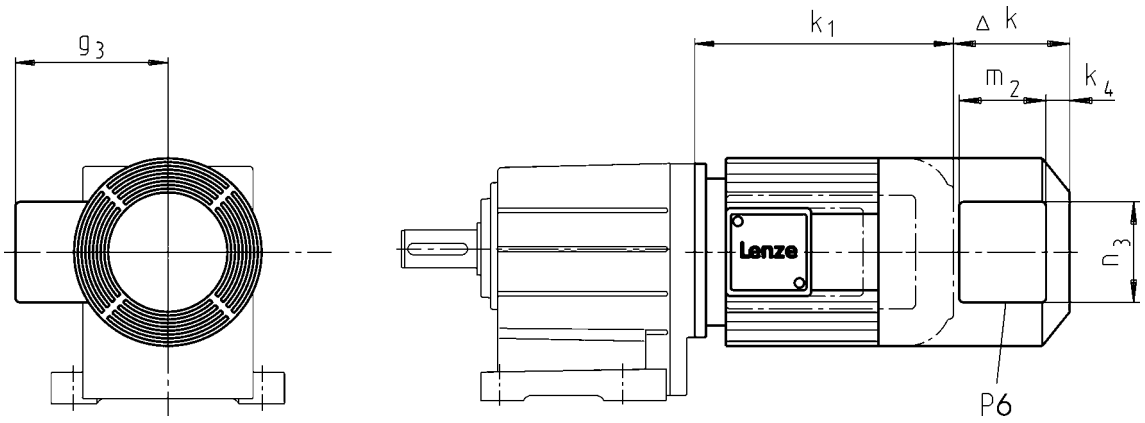
	Motor type					
	MDEMAXX	MDEMABR	MDEMABS MDEMABI MDEMABA	MDEMABL	MDEMARS MDEMAIG MDEMAAG	MDEMALL
Motor frame size						
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-02 063-22	0	71	135		71	
063-12 063-32 063-42		40	103		56	
071-32 071-42		52	96	52	52	0
080-32 080-42		73	111	73	111	4
090-32		68	105	68	87	0
100-12 100-32		76	101	76	81	76
112-22 112-32		90	120	90	80	0
132-22 132-32		110	125	110	103	
160-22 160-32		105	191		83	
180-12 180-32		113	192		79	
180-42						
225-12 225-22			193		80	

Dimensions, self-ventilated (6-pole)



	Motor type					
	MDEMAXX	MDEMABR	MDEMABS MDEMABI MDEMABA	MDEMABL	MDEMARS MDEMAIG MDEMAAG	MDEMALL
Motor frame size						
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-13 071-33	0	52	96	52	52	0
080-13 080-33		73	111	73	111	4

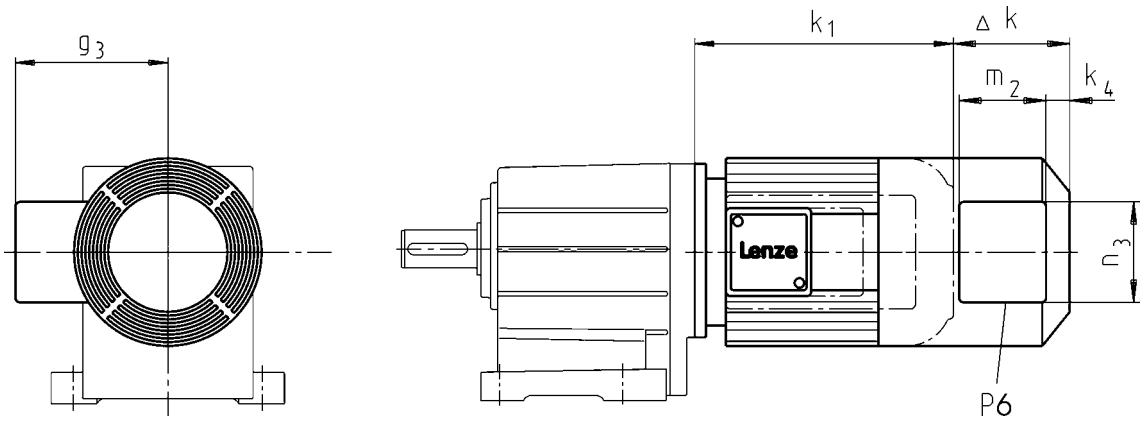
Dimensions, forced ventilated (2-pole)



Motor type							
	MDFMAXX	MDFMABR					

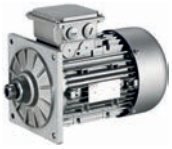
Motor frame size							
	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-11 063-31	128	170	12	115	95	105	1x M16x1.5
071-11 071-31		165		122			
080-11 080-31		183	13	132	96	106	
090-11 090-31		181	22	141	95	105	
100-31 100-41	109	170		150			
112-31 112-41	102	183		162			
132-21	115	202	32	182			

Dimensions, forced ventilated (4-pole)

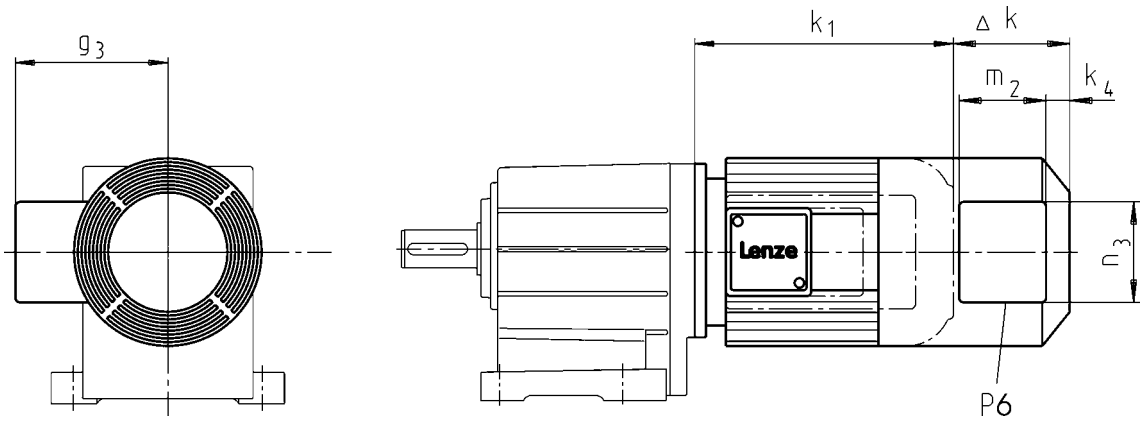


Motor type									
	MDFMAXX	MDFMABR	MDFMABS MDFMABI MDFMABA	MDFMARS MDFMAIG MDFMAAG					

Motor frame size									
	Δ k	Δ k	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-12 063-32 063-42	128	170	170	128	12	115	95	105	1x M16x1.5
071-32 071-42		165	165			122			
080-32 080-42		183	183		13	132	96	106	
090-32		181	181		22	141	95	105	
100-12 100-32	109	170	170	109		150			
112-22 112-32	102	183	183	183		162			
132-22 132-32	115	202	202	202	32	182			
160-22 160-32	149	179	237	224	31	209	96	106	
180-12 180-32		215	275	215					
180-42	155		260						
225-12 225-22	213	213	213	213					



Dimensions, forced ventilated (6-pole)

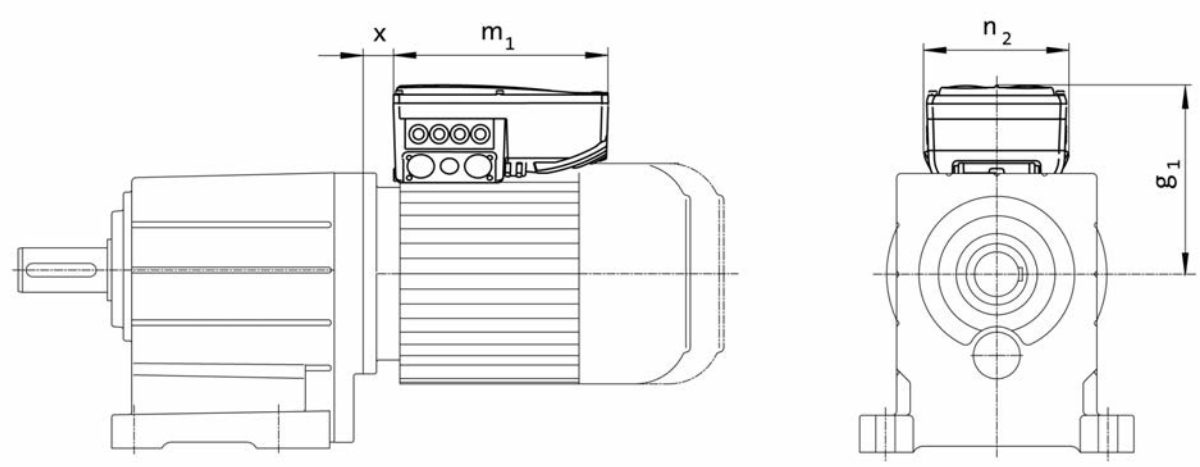


Motor type									
	MDFMAXX	MDFMABR	MDFMABS MDFMABI MDFMABA	MDFMARS MDFMAIG MDFMAAG					

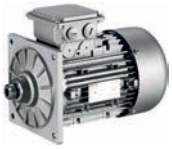
Motor frame size									
	Δ k	Δ k	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-13 071-33	128	165	165	128	12	122	95	105	1x M16x1.5
080-13 080-33		183	183		13	132	96	106	

Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz

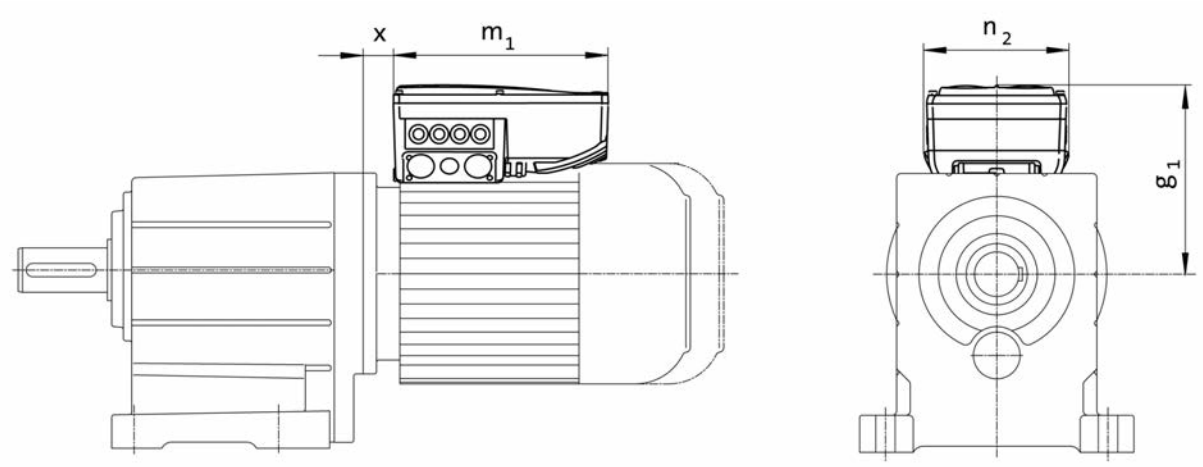


Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□071-32	E84DVB□3714S□□□2□	163	241	161	21.0
MD□□□□□071-42	E84DVB□5514S□□□2□				
MD□□□□□080-32	E84DVB□7514S□□□2□	172			25.5
MD□□□□□080-42	E84DVB□1124S□□□2□				
MD□□□□□090-32	E84DVB□1524S□□□2□	177			28.8
MD□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	29.6
MD□□□□□100-32	E84DVB□3024S□□□2□				
MD□□□□□112-22	E84DVB□4024S□□□2□	282	325	195	19.0
MD□□□□□112-32	E84DVB□5524S□□□2□				
MD□□□□□132-22	E84DVB□7524S□□□2□	301			34.5



Dimensions, 8400 motec inverter

Rated frequency 87 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 87Hz}$	$m_{1,\ 87Hz}$	$n_{2,\ 87Hz}$	x_{87Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□□063-32	E84DVB□3714S□□□2□	154	241	161	18.8
MD□□□□□□063-42	E84DVB□5514S□□□2□				
MD□□□□□□071-32	E84DVB□7514S□□□2□	163			21.0
MD□□□□□□071-42	E84DVB□1124S□□□2□				
MD□□□□□□080-32	E84DVB□1524S□□□2□	172			25.5
MD□□□□□□080-42	E84DVB□2224S□□□2□	201	260	176	24.5
MD□□□□□□090-32	E84DVB□3024S□□□2□	206			27.8
MD□□□□□□100-12	E84DVB□4024S□□□2□	272	325	195	17.1
MD□□□□□□100-32	E84DVB□5524S□□□2□				
MD□□□□□□112-22	E84DVB□7524S□□□2□	282			19.0

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 10^6 repeating switching cycles
  - 1 x 10^6 reversing switching cycles
- **LongLife**
  - 10 x 10^6 repeating switching cycles
  - 15 x 10^6 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	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-02 063-12 063-22 063-32 063-42	06 06	2.50 4.00	06	4.00
071-12 071-32	06 06 08	2.50 4.00 3.50	06 08	4.00 3.50
071-42	06 06 08 08	2.50 4.00 3.50 8.00	06 08 08	4.00 3.50 8.00
080-12 080-32	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
080-42	08 08 10 10	3.50 8.00 7.00 16.0	08 10 10	8.00 7.00 16.0

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]
090-12 090-32	08 08 10 10 10	3.50 8.00 7.00 16.0 23.0	08 10 10	8.00 7.00 16.0
100-12	10 10 12 12	7.00 16.0 14.0 32.0	10 12 12	16.0 14.0 32.0
100-32	10 10 12 12 12	7.00 16.0 14.0 32.0 46.0		
112-22 112-32	12 12 14 14	14.0 32.0 35.0 60.0		
132-12	14 14 16 16	35.0 60.0 60.0 80.0		
132-22 132-32	14 14 16 16 16	35.0 60.0 60.0 80.0 100		
160-22	16 16 18 18	60.0 80.0 80.0 150		
160-32	18 18 18	80.0 150 200		
180-12	18 18 20 20	80.0 150 145 260		
180-32	18 18 20 20 20	80.0 150 145 260 315		
180-42	18 18 20 20 20 20	80.0 150 145 260 315 400		

Spring-applied brake

Assignment of 4-pole motors and brakes

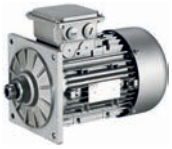
Design	Standard	LongLife

Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
225-12	25 25 25	265 400 490		
225-22	25 25 25 25	265 400 490 600		

Assignment of 2-pole motors and brakes

Design	Standard	LongLife

Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-11 063-31	06 06	2.50 4.00	06 06	2.50 4.00
071-11 071-31	06 06 08	2.50 4.00 3.50	06 08	4.00 3.50
080-11 080-31 090-11	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
090-31	08 08 10 10	3.50 8.00 7.00 16.0	08 10 10	8.00 7.00 16.0
100-31 100-41	12 12	14.0 32.0	12 12	14.0 32.0
112-31 112-41	12 12 14 14	14.0 32.0 35.0 60.0		
132-21	14 16 14 16	35.0 60.0 60.0 80.0		



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

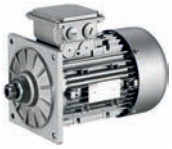
- Ratio of supply voltage to brake coil voltage = 1.11
- Supply voltage
  AC 230 V

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

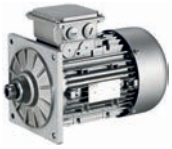
Connection via mains voltage with brake rectifier

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 $t_{ü}$ 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 $t_{ü}$ 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".



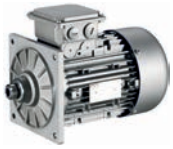
Spring-applied brake

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
Power input											
	P_{in}	[kW]	0.020	0.025	0.030	0.040	0.050	0.055	0.085	0.10	0.11
Braking torque											
100	M_B	[Nm]	2.50	3.50	7.00	14.0	35.0	60.0	80.0	145	265
1000	M_B	[Nm]	2.30	3.10	6.10	12.0	30.0	50.0	65.0	115	203
1200	M_B	[Nm]	2.30	3.10	6.00	12.0	29.0	48.0	63.0	112	199
1500	M_B	[Nm]	2.20	3.00	5.80	11.0	28.0	47.0	61.0	109 [1)]	193 [1)]
1800	M_B	[Nm]	2.10	2.90	5.70	11.0	28.0	46.0	60.0 [1)]		
3000	M_B	[Nm]	2.00	2.80	5.30	10.0	26.0 [1)]	43.0 [1)]			
3600	M_B	[Nm]	2.00	2.70	5.20	10.0 [1)]					
Maximum switching energy											
100	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1000	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1200	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1500	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	24.0 [1)]	36.0 [1)]
1800	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	36.0 [1)]		
3000	Q_E	[KJ]	3.00	7.50	12.0	24.0	18.0 [1)]	11.0 [1)]			
3600	Q_E	[KJ]	3.00	7.50	12.0	7.00 [1)]					
Transition operating frequency											
	$S_{hü}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm²]	0.015	0.061	0.20	0.45	0.63	1.50	2.90	7.30	20.0
Mass											
	m	[kg]	0.90	1.50	2.60	4.20	5.80	8.70	12.6	19.5	31.0

[1)] In the region of the load limit the value for friction energy Q_{BW} can be reduced to 40 %.



Spring-applied brake

Rated data with reduced braking torque

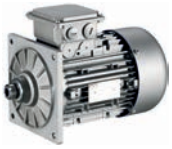
► Activation via half-wave or bridge rectifier

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											
	$t_{ü}$	[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.



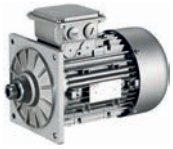
Spring-applied brake

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
Power input											
	P_{in}	[kW]	0.020	0.025	0.030	0.040	0.050	0.055	0.085	0.10	0.11
Braking torque											
100	M_B	[Nm]	4.00	8.00	16.0	32.0	60.0	80.0	150	260	400
1000	M_B	[Nm]	3.70	7.20	14.0	27.0	51.0	66.0	121	206	307
1200	M_B	[Nm]	3.60	7.00	14.0	27.0	50.0	65.0	118	201	300
1500	M_B	[Nm]	3.50	6.80	13.0	26.0	48.0	63.0	115	195 [1)]	291 [1)]
1800	M_B	[Nm]	3.40	6.70	13.0	26.0	47.0	61.0	112 [1)]		
3000	M_B	[Nm]	3.20	6.30	12.0	24.0	44.0 [1)]	57.0 [1)]			
3600	M_B	[Nm]	3.20	6.10	12.0	23.0 [1)]					
Maximum switching energy											
100	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1000	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1200	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1500	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	24.0 [1)]	36.0 [1)]
1800	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	36.0 [1)]		
3000	Q_E	[KJ]	3.00	7.50	12.0	24.0	18.0 [1)]	11.0 [1)]			
3600	Q_E	[KJ]	3.00	7.50	12.0	7.00 [1)]					
Transition operating frequency											
	$S_{hü}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm²]	0.015	0.061	0.20	0.45	0.63	1.50	2.90	7.30	20.0
Mass											
	m	[kg]	0.90	1.50	2.60	4.20	5.80	8.70	12.6	19.5	31.0

[1)] In the region of the load limit the value for friction energy Q_{BW} can be reduced to 40 %.



Spring-applied brake

Rated data with standard braking torque

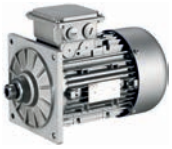
► Activation via half-wave or bridge rectifier

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											
	$t_{ü}$	[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.



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
Power input												
	P_{in}	[kW]	0.030	0.040	0.050	0.055	0.055	0.085	0.10	0.10	0.11	0.11
Braking torque												
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 [1)]	300 [1)]	356 [1)]	436 [1)]
1800	M_B	[Nm]	19.0	37.0	59.0	77.0	96.0	150 [1)]				
3000	M_B	[Nm]	17.0	34.0	55.0 [1)]	71.0 [1)]	89.0 [1)]					
3600	M_B	[Nm]	17.0	33.0 [1)]								
Maximum switching energy												
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 [1)]	24.0 [1)]	36.0 [1)]	36.0 [1)]
1800	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	36.0 [1)]				
3000	Q_E	[KJ]	12.0	24.0	18.0 [1)]	11.0 [1)]	11.0 [1)]					
3600	Q_E	[KJ]	12.0	7.00 [1)]								
Transition operating frequency												
	$S_{hü}$	[1/h]	40.0	30.0	28.0	27.0	27.0	20.0	19.0	19.0	15.0	15.0
Moment of inertia												
	J	[kgcm²]	0.20	0.45	0.63	1.50	1.50	2.90	7.30	7.30	20.0	20.0
Mass												
	m	[kg]	2.60	4.20	5.80	8.70	8.70	12.6	19.5	19.5	31.0	31.0

[1)] 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_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Delay time												
Engaging	t_{11}	[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_{12}	[ms]	19.0	25.0		30.0		45.0	100		120	
Engagement time												
	t_1	[ms]	29.0	41.0	36.0	52.0	47.0	69.0	146	117	197	158
Disengagement time												
	t_2	[ms]	109	193	308	297	435	356	378	470	451	532

Spring-applied brake

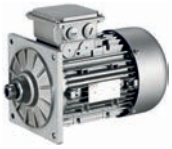
Rated data with increased braking torque

► 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												
	$t_ü$	[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

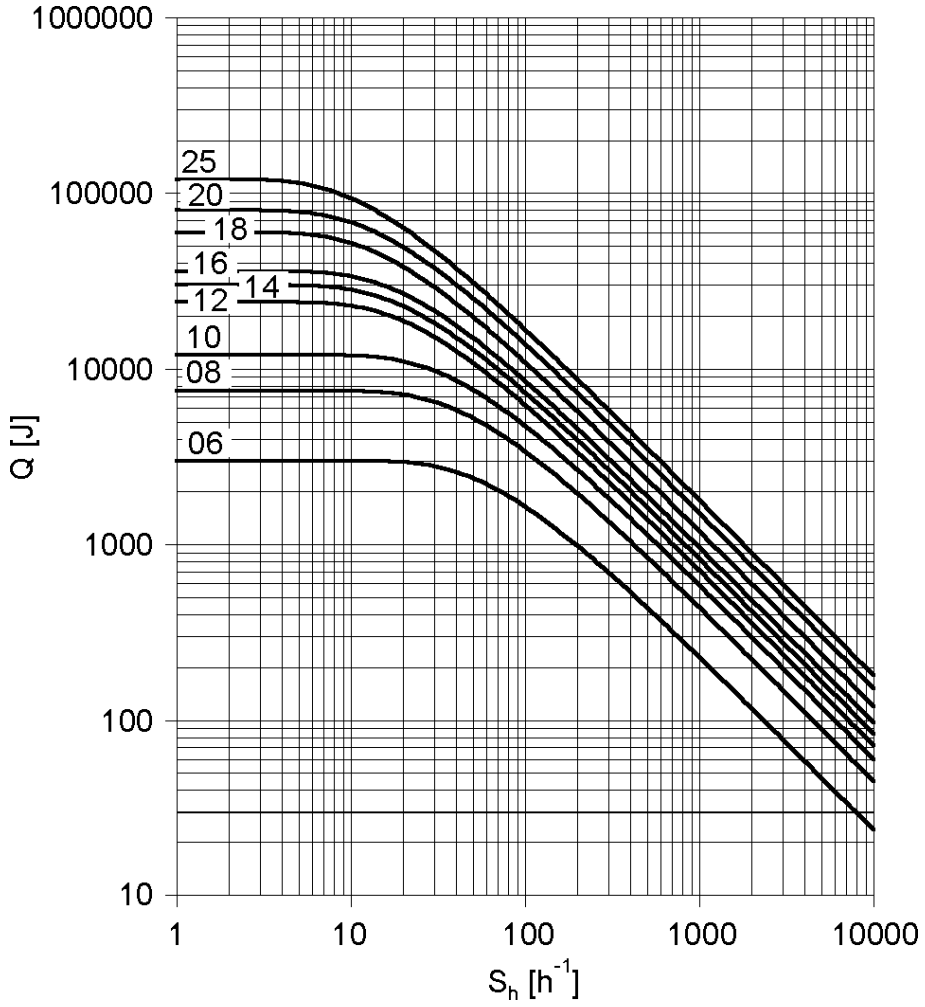
Design			Over-excitation									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time												
	$t_ü$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
Engaging	t_{11}	[ms]	29.0	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

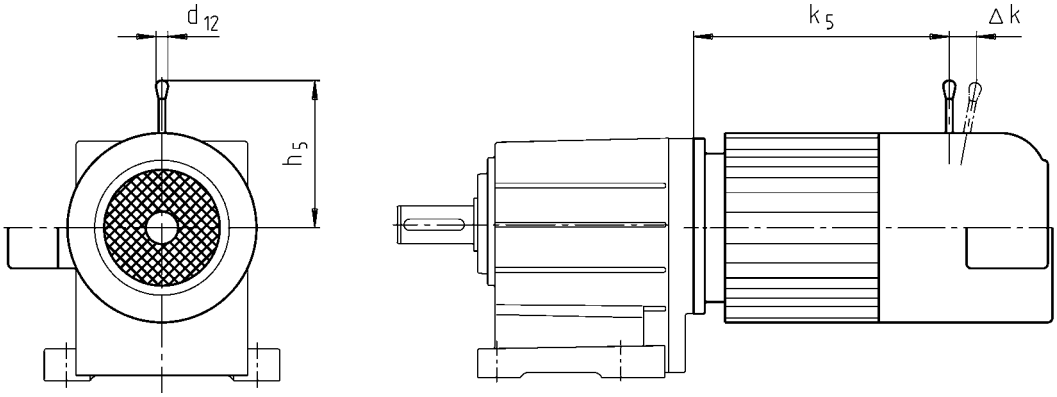
Permissible friction energy



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

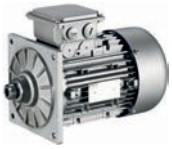
Spring-applied brake

Manual release lever



Motor frame size			Size				
			Brake				
				k_5	Δ k	h_5	d_{12}
				[mm]	[mm]	[mm]	[mm]
	063-02 063-22		06	185	29	107	13.0
063-11 063-31	063-12 063-32 063-42		06	173	29	107	13.0
071-11 071-31	071-32 071-42	071-13 071-33	06 08	186 187	29 27	107 116	13.0 13.0
080-11 080-31	080-32 080-42	080-13 080-33	06 08	207 218	29 27	107 116	13.0 13.0
090-11 090-31	090-32		08 10	245 256	27 28	116 132	13.0 13.0
100-31 100-41	100-12 100-32		10 12	279 281	28 37	132 161	13.0 13.0
112-31	112-22		12 14	292 296	37 41	161 195	13.0 24.0
112-41	112-32		12 14	336 340	37 41	161 195	13.0 24.0
132-21	132-22 132-32		14 16	373 373	41 55	195 240	24.0 24.0
	160-22		16 18	420 423	59 55	279 240	24.0 24.0
	160-32		16 18	464 467	55 59	240 279	24.0 24.0
	180-12 180-32		18 20	539 546	59 74	279 319	24.0 24.0
	180-42		18 20	596 603	59 74	279 319	24.0 24.0
	225-12 225-22		25 25	785 785	103 103	445 445	24.0 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 071, 080, 090 for brake and retracting (M□□MA BR/BS/BA/BI)



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.

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

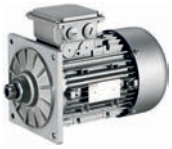
Incremental encoder and SinCos absolute value encoder

► 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	$U_{in,min}$	[V]	8.00				4.75			7.00
Max. input voltage										
DC	$U_{in,max}$	[V]	26.0	30.0			5.25			12.0
Max. current consumption										
	I_{max}	[A]	0.040	0.15						0.080
Limit frequency										
	f_{max}	[kHz]	30.0	160			300			200
Inverter assignment			E84AVSC E84AVHC	E84AVHC			E84AVTC E94A ECS 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



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_{min}	U_{max}	P_{max}	I_{max}	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		
		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	

Blowers

Rated data for 50 Hz

Size	Number of phases	Connection method					
Motor							
			U_{min}	U_{max}	P_{max}	I_{max}	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		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_{min}	U_{max}	P_{max}	I_{max}	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		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	
		Y	380	575		0.56	
225		Δ	220	400	0.28	0.76	15.0
		Y	380	575	0.26	0.43	

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
					AC
	T	T_{min}	T_{max}	$I_{in,max}$	$U_{in,max}$
	-5 ... 5				
	[°C]	[°C]	[°C]	[A]	[V]
NC contact	150	90.0	135	2.50	250

PTC thermistor

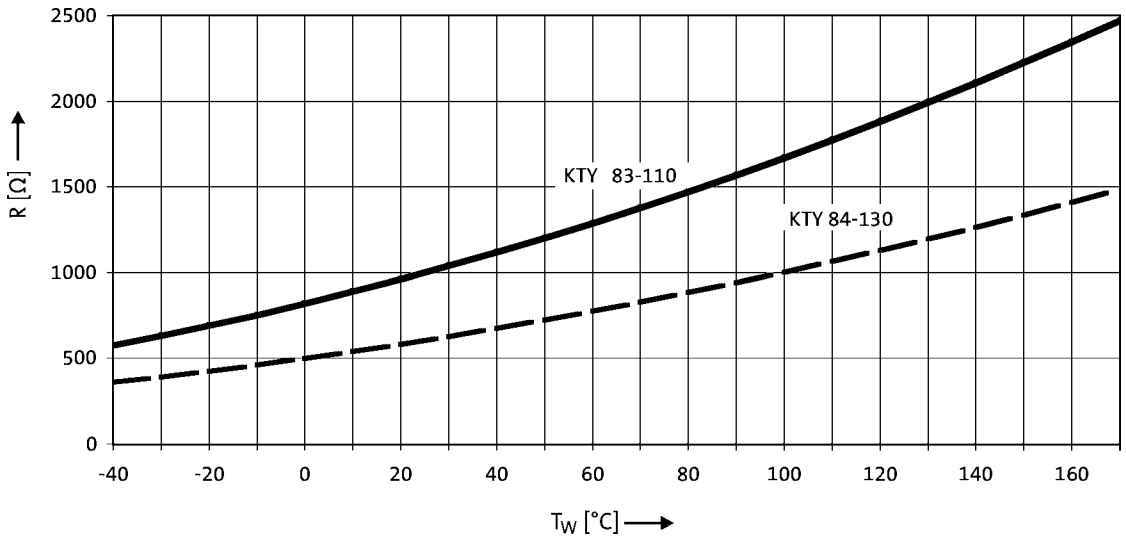
Function	Operating temperature	Rated resistance			Standard
		155 °C	-20 °C	140 °C	
	T	R_N	R_N	R_N	
	-5 ... 5				
	[°C]	[Ω]	[Ω]	[Ω]	
Sudden change in resistance	150	550	30.0	250	DIN 44080 DIN VDE 0660 Part 303

Temperature monitoring

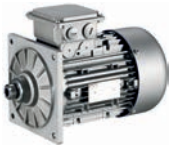
KTY temperature sensor

	Function	Rated resistance			Max. input current	
		25 °C	150 °C	170 °C	25 °C	170 °C
		R_N	R_N	R_N	$I_{in,max}$	$I_{in,max}$
		[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

Variation of resistance



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



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 Δconfiguration 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 Δconfiguration.

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

Terminal box

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

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

Terminal box

Motor terminal box - built-on accessories assignment: 2-pole motors

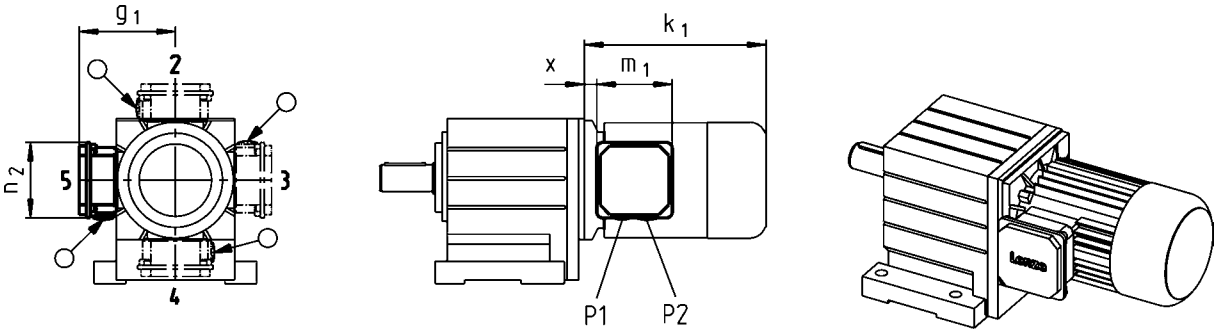
Motor type	M□□MAXX	M□□MAZE	M□□MALL	M□□MALZ
Motor frame size				
	Terminal box			
063-11 063-31	KK1			
071-11 071-31	KK1	KK2	KK1	KK2
080-11 080-31	KK1	KK2	KK1	KK2
090-31 090-11	KK1	KK2	KK1	KK2
100-31 100-41	KK1	KK2	KK1	KK2
112-31 112-41	KK1	KK2	KK1	KK2
132-21	KK1	KK3	KK1	KK3

Motor type	MD□MABR	MD□MABZ	MD□MABL
Motor frame size			
	Terminal box		
063-11 063-31	KK2		
071-11 071-31	KK2	KK2	
080-11 080-31	KK2	KK2	KK2
090-31 090-11	KK2	KK2	KK2
100-31 100-41	KK2	KK2	KK2
112-31 112-41	KK2	KK2	KK2
132-21	KK3	KK3	KK3

Terminal box

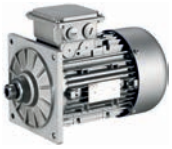
Dimensions of KK1

- ► 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_1	m_1	n_2	P_1	P_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	21 12 [1)]	100 117 [1)]	75.0 93.0 [1)]	75.0 93.0 [1)]	M16x1.5 M20x1.5 [1)]	M20x1.5 M20x1.5
071	24 15 [1)]	109 126 [1)]				
080	14	150	115	115	M20x1.5	M25x1.5
090	19	157				
100	20	166				
112	22	176				
132	33	195	122	122	M32x1.5	M32x1.5

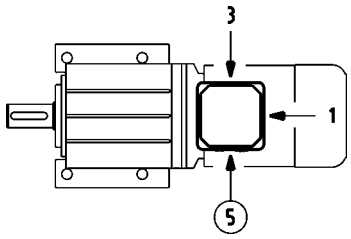
[1)] UL/CSA approval: cURus



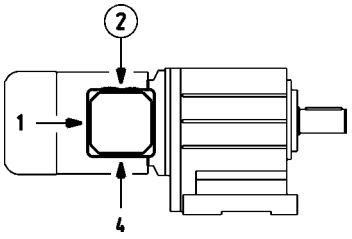
Terminal box

Cable entry position when using KK1

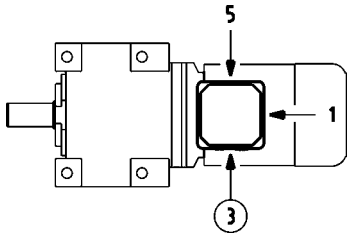
Terminal box in position 2



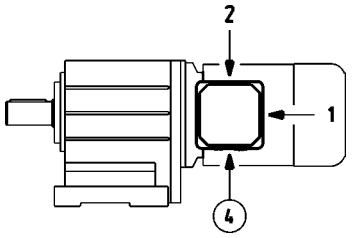
Terminal box in position 3



Terminal box in position 4

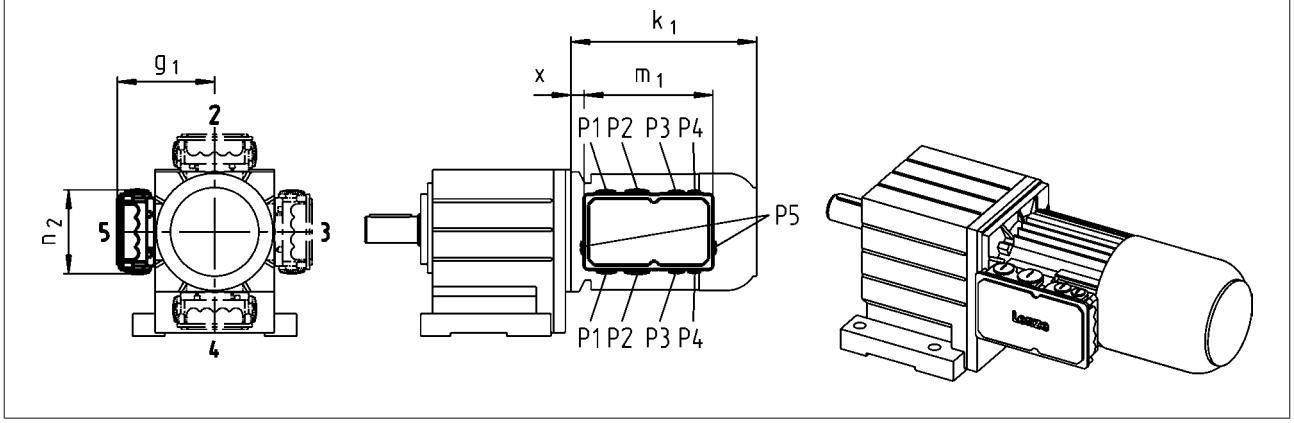


Terminal box in position 5

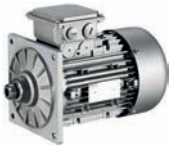


Terminal box

Dimensions of KK2

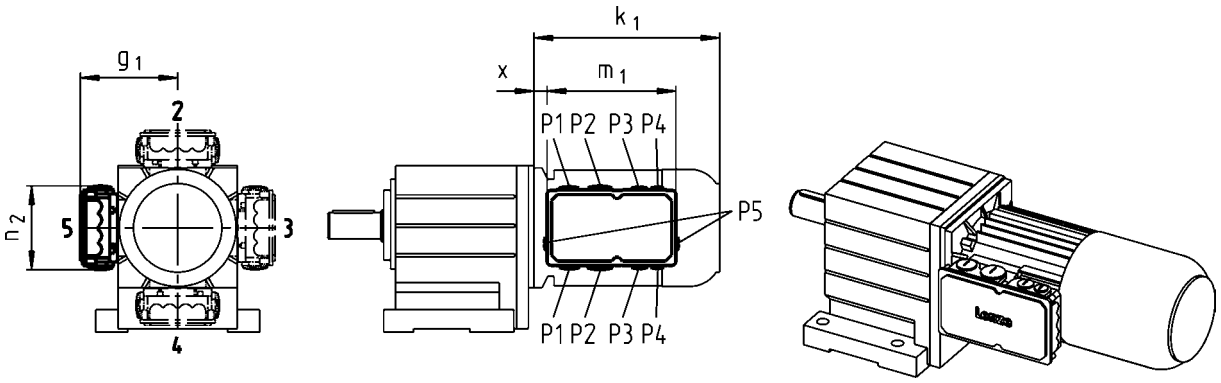


Size						
Motor						
	x	g_1	m_1	n_2	P_1	P_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	M16x1.5	M20x1.5
071	15	118				
080	17	132	152	121	M20x1.5	M25x1.5
090	22	137				
100	23	147				
112	25	158				



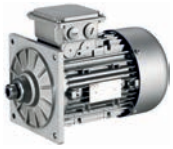
Terminal box

Dimensions of KK3



Size									
Motor									
	x	g_1	m_1	n_2	P_1	P_2	P_3	P_4	P_5
	[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							
160	35	210	226	127	M50x1.5	M16x1.5		M16x1.5	
180	73	230							
225	95	346	354	205		M63x1.5 [1)]	M50x1.5 [1)]		M16x1.5

[1)] 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.

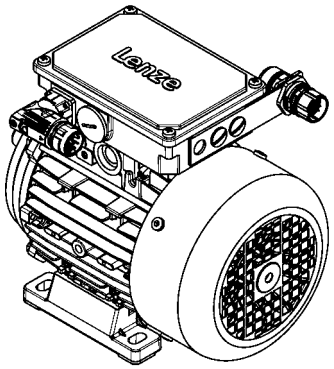


Plug connectors

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

ICN connector

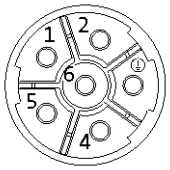
A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



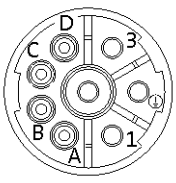
Connection for power, brake and temperature monitoring

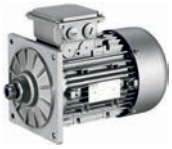
The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As this connector is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and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

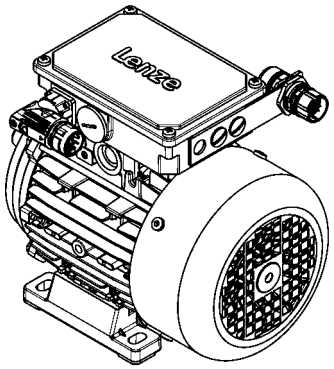
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	V	Phase V power	
4	W	Phase W power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake /AC	



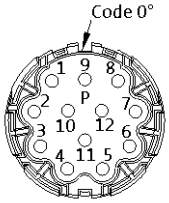
ICN connector

Feedback connection

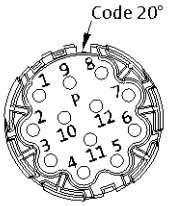
All encoder systems (apart from IG128-24V-H) are also available with an ICN connector fixed to the motor terminal box for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing mating connectors can therefore 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

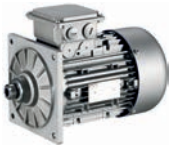
Pin assignment			
Contact	Designation	Meaning	
1	B	Track B/+SIN	
2	A^-	Track A inverse/-COS	
3	A	Track A/+COS	
4	$+U_B$	Supply +	
5	GND	Mass	
6	Z^-	Zero track inverse/-RS485	
7	Z	Zero track/+RS485	
8		Not assigned	
9	B^-	Track B inverse/-SIN	
10		Not assigned	
11	+KTY	KTY temperature sensor	
12	-KTY		

ICN connector

Motor terminal box with ICN connectors - built-on accessories assignment: 2-pole motors

Motor type	M□□MAXX	M□□MAZE	M□□MALL	M□□MALZ
Motor frame size				
	Terminal box with ICN connector			
063-11 063-31	KK1			
071-11 071-31	KK1	KK2	KK1	KK2
080-11 080-31	KK1	KK2	KK1	KK2
090-31 090-11	KK1	KK2	KK1	KK2
100-31 100-41	KK1	KK2	KK1	KK2
112-31 112-41	KK1	KK2	KK1	KK2
132-21	KK1	KK3	KK1	KK3

Motor type	M□□MABR	M□□MABZ	M□□MABL
Motor frame size			
	Terminal box with ICN connector		
063-11 063-31	KK2		
071-11 071-31	KK2	KK2	
080-11 080-31	KK2	KK2	KK2
090-31 090-11	KK2	KK2	KK2
100-31 100-41	KK2	KK2	KK2
112-31 112-41	KK2	KK2	KK2
132-21	KK3	KK3	KK3



ICN connector

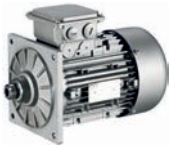
Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

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

ICN connector

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

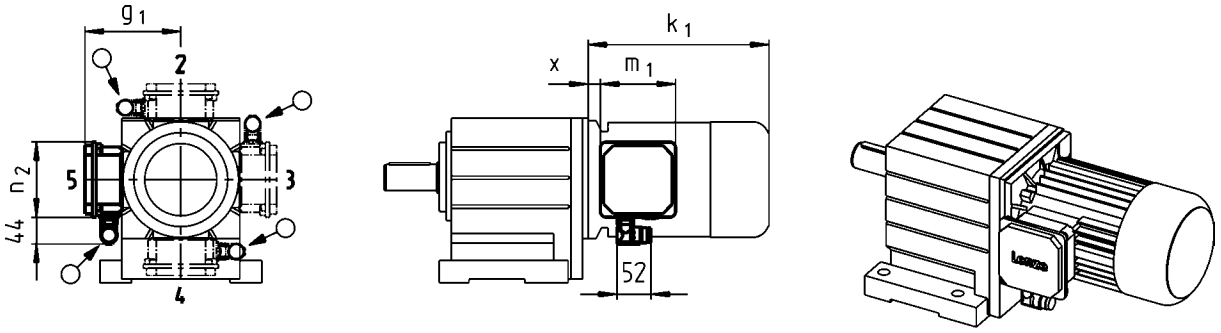
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size				
	Terminal box with ICN connector			
063-02 063-22	KK2	KK2		
063-12 063-32 063-42	KK2	KK2		
071-32 071-42 071-13 071-33	KK2	KK2	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK2	KK2	KK2
090-12 090-32	KK2	KK2	KK2	KK2
100-12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



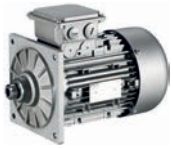
ICN connector

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.



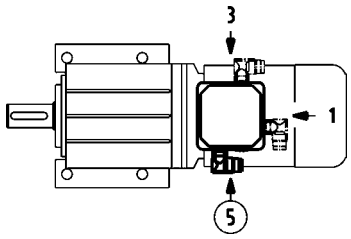
Size				
Motor				
	x	g_1	m_1	n_2
	[mm]	[mm]	[mm]	[mm]
063	12	117	93.0	93.0
071	15	126		
080	14	150	115	115
090	19	157		
100	20	166		
112	22	176		
132	33	195	122	122



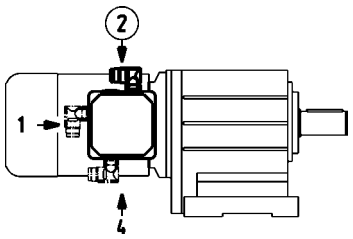
ICN connector

Connector position when using KK1

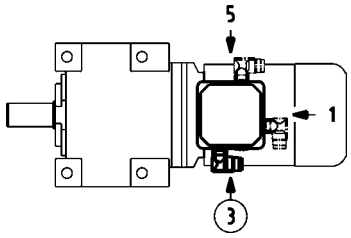
Terminal box in position 2



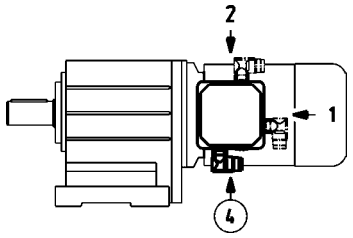
Terminal box in position 3

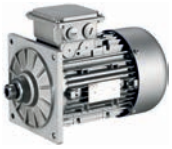


Terminal box in position 4



Terminal box in position 5

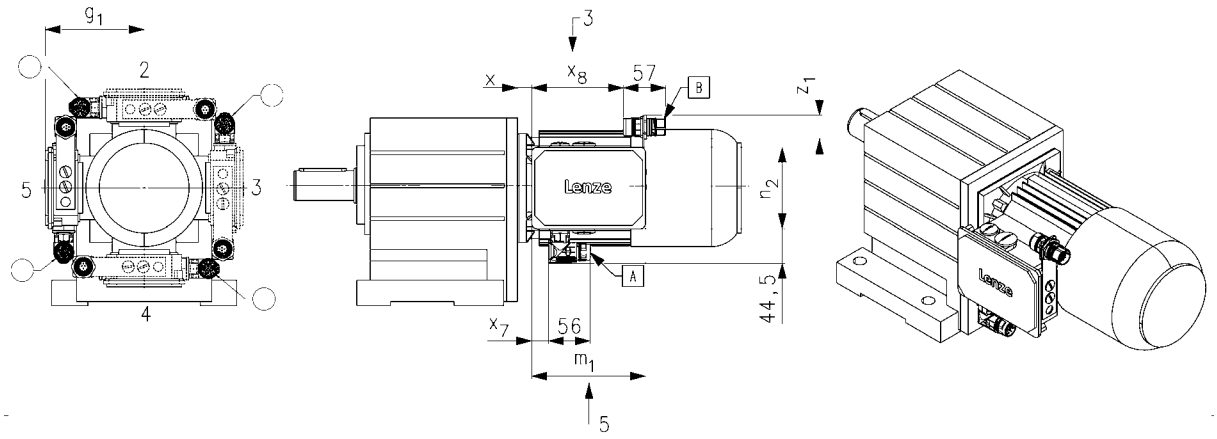




ICN connector

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.

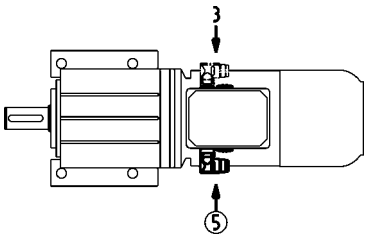


Size							
Motor							
	x	g_1	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	16	109	43
071	15	118					
080	17	132	152	121	23	125	41
090	22	137					
100	23	147					
112	25	158					
132	38	187	195	125	27	166	71

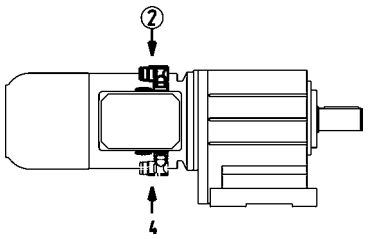
ICN connector

Connector position when using KK2/KK3

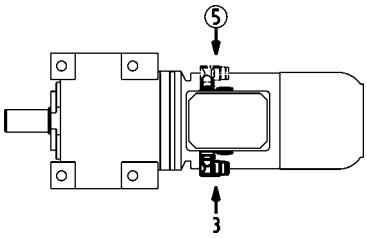
Terminal box in position 2



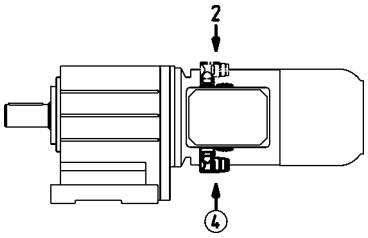
Terminal box in position 3

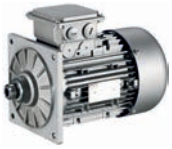


Terminal box in position 4



Terminal box in position 5

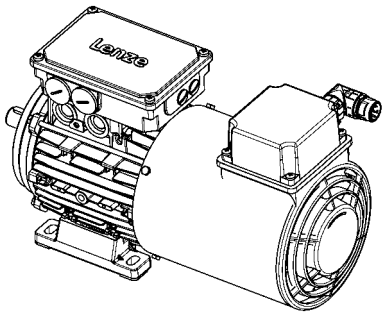




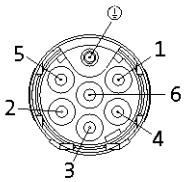
ICN connector

Blower connection

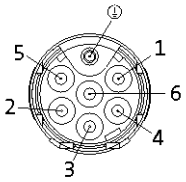
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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



► Blower 1-ph

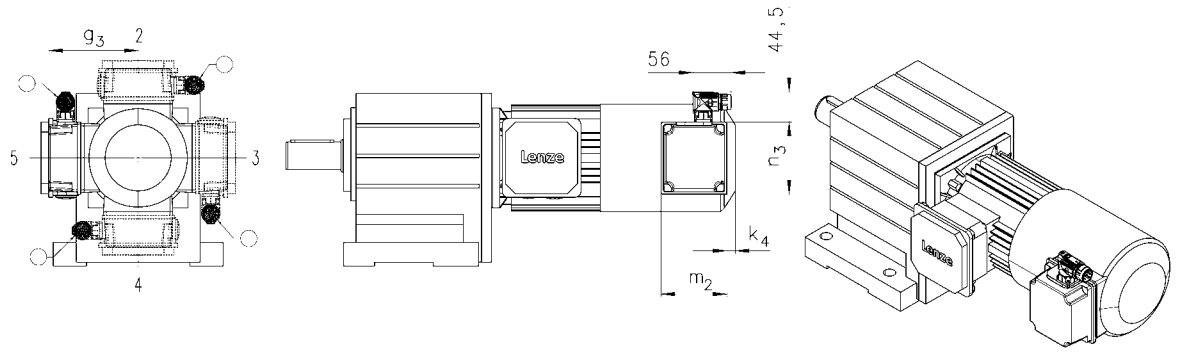
Pin assignment			
Contact	Designation	Meaning	
PE	PE	PE conductor	
1	U1	Fan	
2	U2		
3		Not assigned	
4			
5			
6			

► 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	

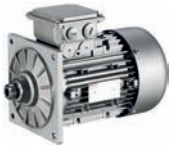
ICN connector

Dimensions of blower



Size				
Motor				
	k_4	g_3	m_2	n_3
	[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	32	182		
160	31	209	96	106
180				
225				

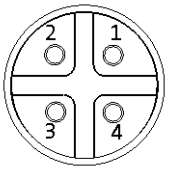
► In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.

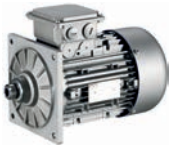


M12 connector

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.

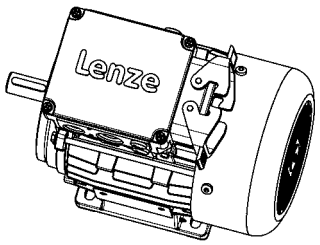
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	



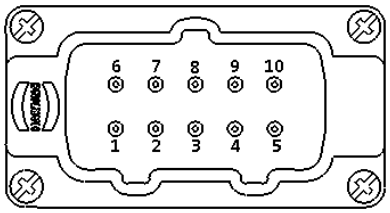
HAN connector

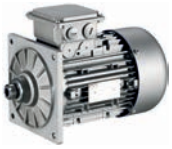
10E

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

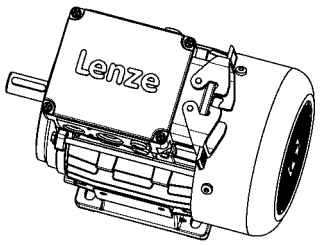




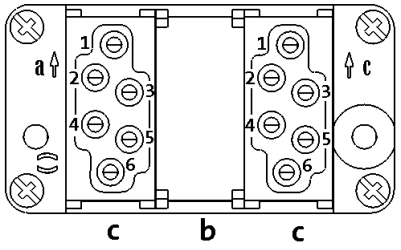
HAN connector

Modular

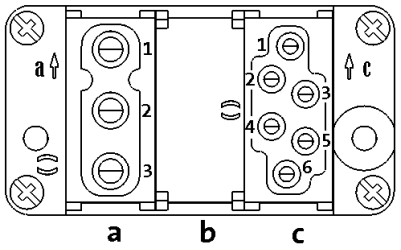
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.



► 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	

HAN connector

Motor terminal box with HAN connectors - built-on accessories assignment: 2-pole motors

Motor type	M□□MAXX M□□MABR	M□□MAZE M□□MABZ	M□□MALL M□□MABL	M□□MALZ
Motor frame size				
	Terminal box with HAN connector			
063-11 063-31	HAN-10E HAN modular			
071-11 071-31	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
080-11 080-31	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
090-31 090-11	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
100-31 100-41	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
112-31 112-41	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
132-21	HAN modular	HAN modular	HAN modular	HAN modular

HAN connector

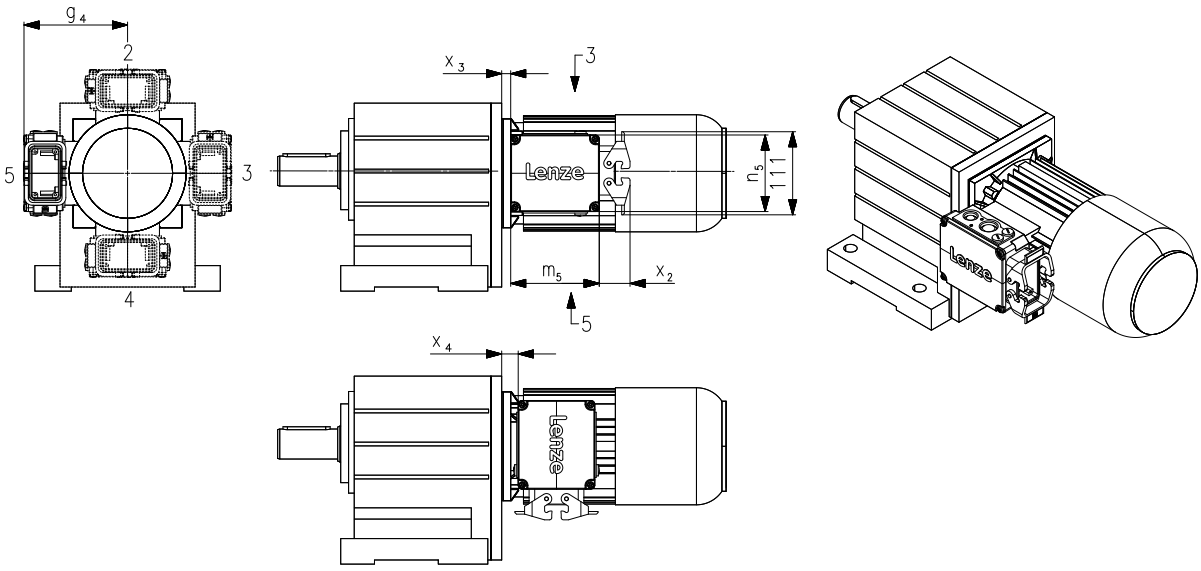
Motor terminal box with HAN connectors - built-on accessories assignment: 4-pole / 6-pole motors

Motor type	M□□MAXX M□□MABR	M□□MAZE M□□MAHA M□□MABZ M□□MABH	M□□MALL M□□MABL	M□□MALZ M□□MALH
Motor frame size				
	Terminal box with HAN connector			
063-02 063-22	HAN-10E HAN modular			
063-12 063-32 063-42	HAN-10E HAN modular			
071-32 071-42 071-13 071-33	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
080-13 080-32 080-33 080-42	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
090-12 090-32	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
100-12 100-32	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
112-22 112-32	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
132-12 132-22 132-32	HAN modular	HAN modular	HAN modular	HAN modular
160-22 160-32	HAN modular			

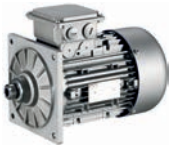
HAN connector

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.



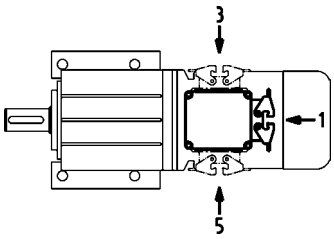
Size			
Motor			
	g_4	x_3	x_4
	[mm]	[mm]	[mm]
063	120	5.00	6.00
071	129	7.00	8.00
080	138	11.0	19.0
090	143	15.0	23.0
100	154	16.0	24.0
112	164	13.5	21.5
132	233	34.5	4.50
160	248	39.0	9.00



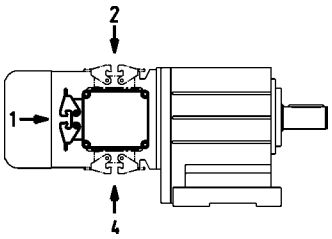
HAN connector

Position of connector

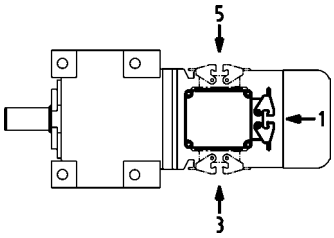
Connector in position 2



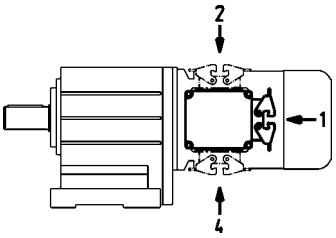
Connector in position 3

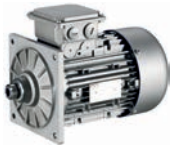


Connector in position 4



Connector in position 5

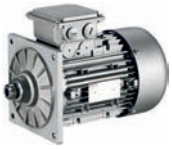




Handwheel

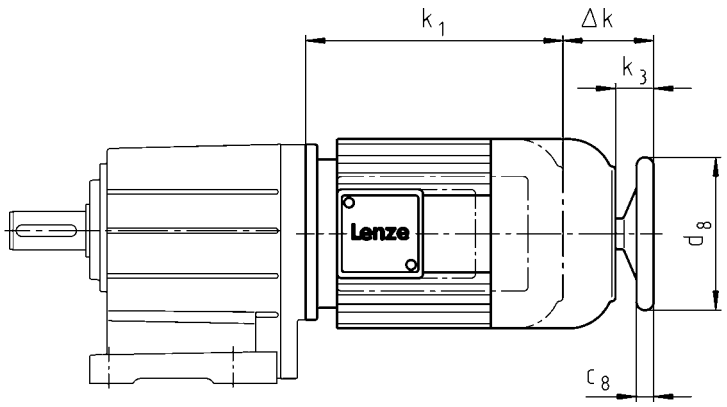
Design	Handwheel made from alloy, smooth wheel surface
Function	Manual operation: • Emergency operation • Setting-up operation for machines/systems
Note	The increased moment of inertia must be taken into account during project planning! For frequent switching operations, in particular if the direction of rotation changes: Please contact Lenze.

Size	Moment of inertia	Mass
Motor	Additional	Additional
	J	m
	[kgcm²]	[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



Handwheel

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



Motor type	
Built-on accessories	M□□MAHA M□□MABH M□□MALH

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

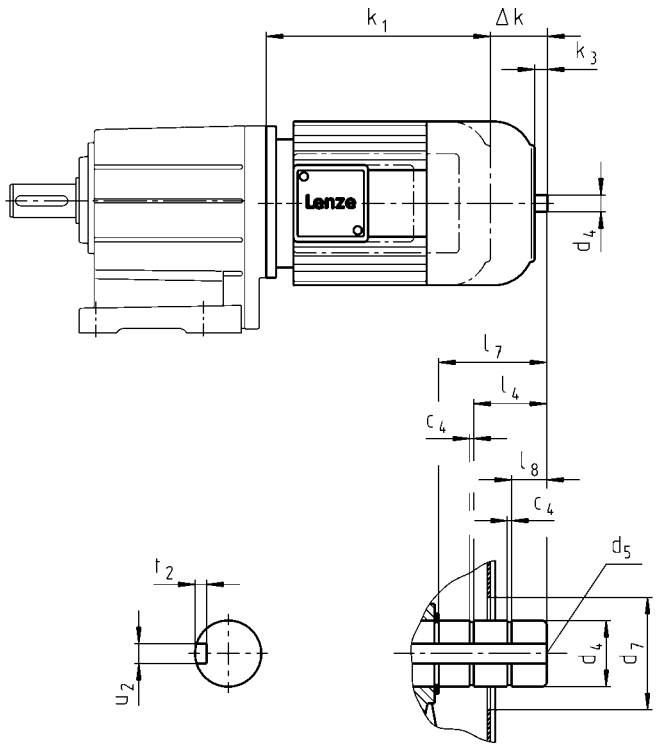
Centrifugal mass

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

	Moment of inertia	**Mass**
Motor frame size	Additional	Additional
	J	m
	[kgcm²]	[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

2nd shaft end

Dimensions, self-ventilated (2-pole)



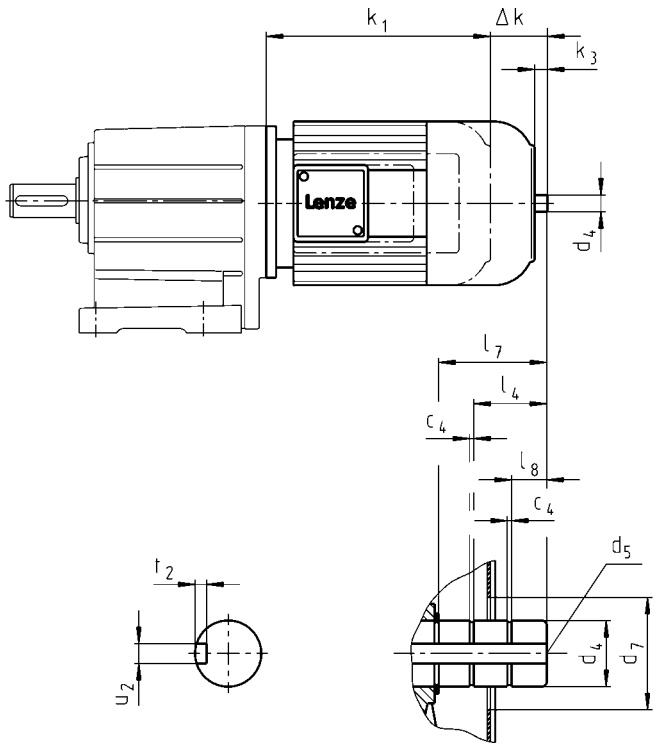
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

Motor frame size												
	Δ k	k_3	c_4	d_4	d_4	d_5	d_7 [1]	l_4	l_7	l_8	u_2	t_2
				h6	j6							
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-11 071-31	47	11.0	1.10	14.0		M5	34.0		19.0	3.00	5.00	3.00
080-11 080-31	68	9.00	1.30	19.0		M6	34.0		19.0	4.50	6.00	3.20
090-11 090-31	57	9.00	1.30		20.0	M6	34.0		19.5	5.50	6.00	3.50
100-31 100-41	71	18.5	1.30		25.0	M10	34.0	17.0	32.5	10.5	8.00	4.00
112-31 112-41	84	16.0	1.30		25.0	M10	34.0	17.0	28.5	7.00	8.00	4.00
132-21	101	24.5	1.60		30.0	M10	48.0	24.5	42.0	8.50	8.00	4.00

[1] During operation, appropriate measures must be taken to make fan cover opening safe.

2nd shaft end

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



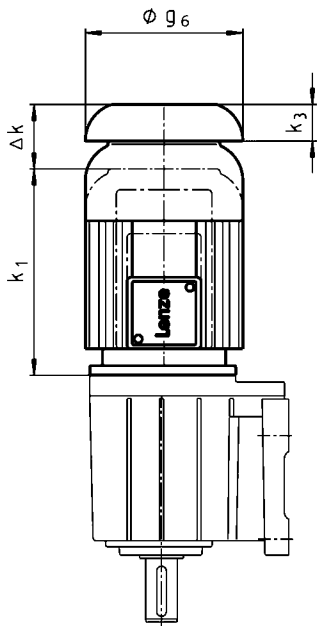
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

Motor frame size												
	Δk	k_3	c_4	d_4	d_4	d_5	d_7 [1]	l_4	l_7	l_8	u_2	t_2
				h6	j6							
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-32 071-42 071-13 071-33	47	11.0	1.10	14.0		M5	34.0		19.0	3.00	5.00	3.00
080-32 080-42 080-13 080-33	68	9.00	1.10	14.0		M5	34.0		19.0	4.50	5.00	3.00
090-12 090-32	57	9.00	1.10	14.0		M5	34.0		19.0	5.00	5.00	3.00
100-12 100-32	71	18.5	1.30		20.0	M6	34.0	17.0	32.5	10.5	6.00	3.50
112-22 112-32	84	16.0	1.30		20.0	M6	34.0	17.0	28.5	7.00	6.00	3.50
132-12 132-22 132-32	101	24.5	1.60		30.0	M10	46.0	24.5	42.0	8.50	8.00	4.00

[1] During operation, appropriate measures must be taken to make fan cover opening safe.

Protection cover

Dimensions, self-ventilated (2-pole)

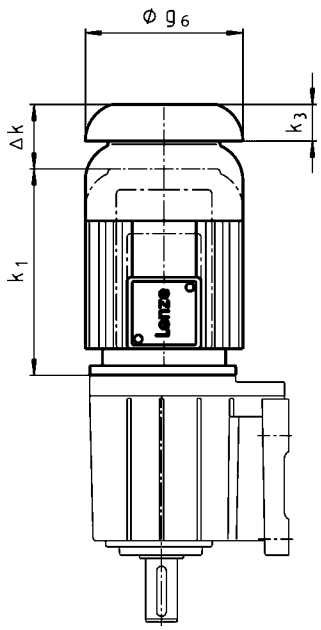


	Motor type					
	M□□MAXX	M□□MABR	M□□MABL	M□□MALL		

Motor frame size						
	Δ k	Δ k	Δ k	Δ k	k_3	g_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-11 063-31	26	66			11.0	123
071-11 071-31	26	78	78	26	12.0	138
080-11 080-31	26	99	99	30	16.0	156
090-11 090-31	26	94	94	26	15.0	176
100-31 100-41	31	107	107	107	17.0	194
112-31 112-41	31	121	121	31	18.0	218
132-21	31	141	141	31	20.0	257

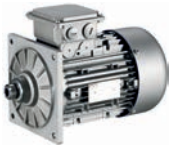
Protection cover

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



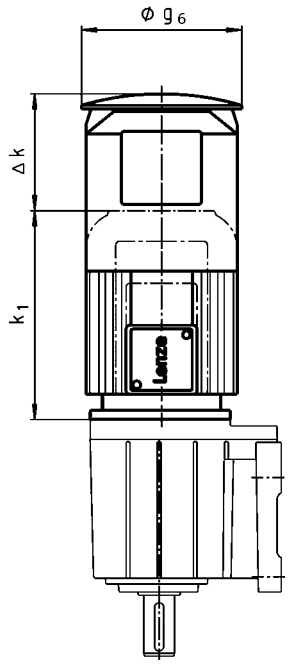
	Motor type							
	M□□MAXX	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABL	M□□MARS M□□MAIG M□□MAAG	M□□MALL		

Motor frame size								
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k	k_3	g_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-02 063-22		97	160		97		11.0	123
063-12 063-32 063-42	26	66	129		82		11.0	123
071-32 071-42 071-13 071-33	26	78	122	78	78	26	12.0	138
080-32 080-42 080-13 080-33	26	99	137	99	127	30	16.0	156
090-12 090-32	26	94	131	94	113	26	15.0	176
100-12 100-32	31	107	132	107	112	107	17.0	194
112-22 112-32	31	121	151	121	111	31	18.0	218
132-12 132-22 132-32	31	141	156	141	134	31	20.0	257
160-22 160-32	37	142	228		120		25.0	310



Protection cover

Dimensions, forced ventilated (2-pole)

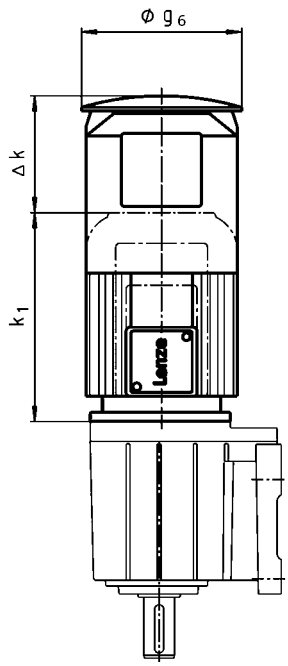


	Motor type		
	M□□MAXX	M□□MABR	

Motor frame size			
	Δ k	Δ k	g_6
	[mm]	[mm]	[mm]
063-11 063-31	169	209	133
071-11 071-31	165	202	150
080-11 080-31	168	224	170
090-11 090-31	157		
100-31 100-41	137	198	210
112-31 112-41	135	216	249
132-21	140	226	300

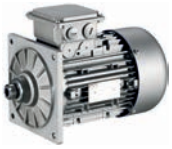
Protection cover

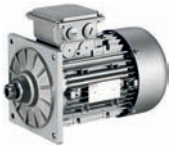
Dimensions, forced ventilated (4/6-pole)

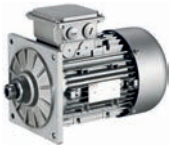


	Motor type			
	M□□MAXX	M□□MABR M□□MABS M□□MABI M□□MABA	M□□MARS M□□MAIG M□□MAAG	

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







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