L-force catalogue

Automation systems
Drive solutions

Controls
Inverters
Motors
Gearboxes
Engineering Tools

Motors: MH three-phase AC motors

Gearboxes: GFL shaft-mounted helical 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.

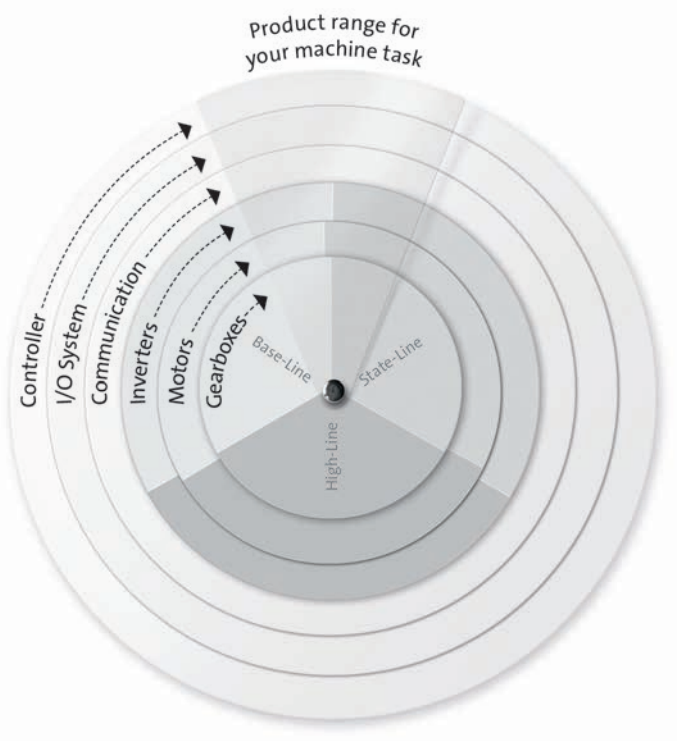
A matter of principle: the right products for every application.

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.

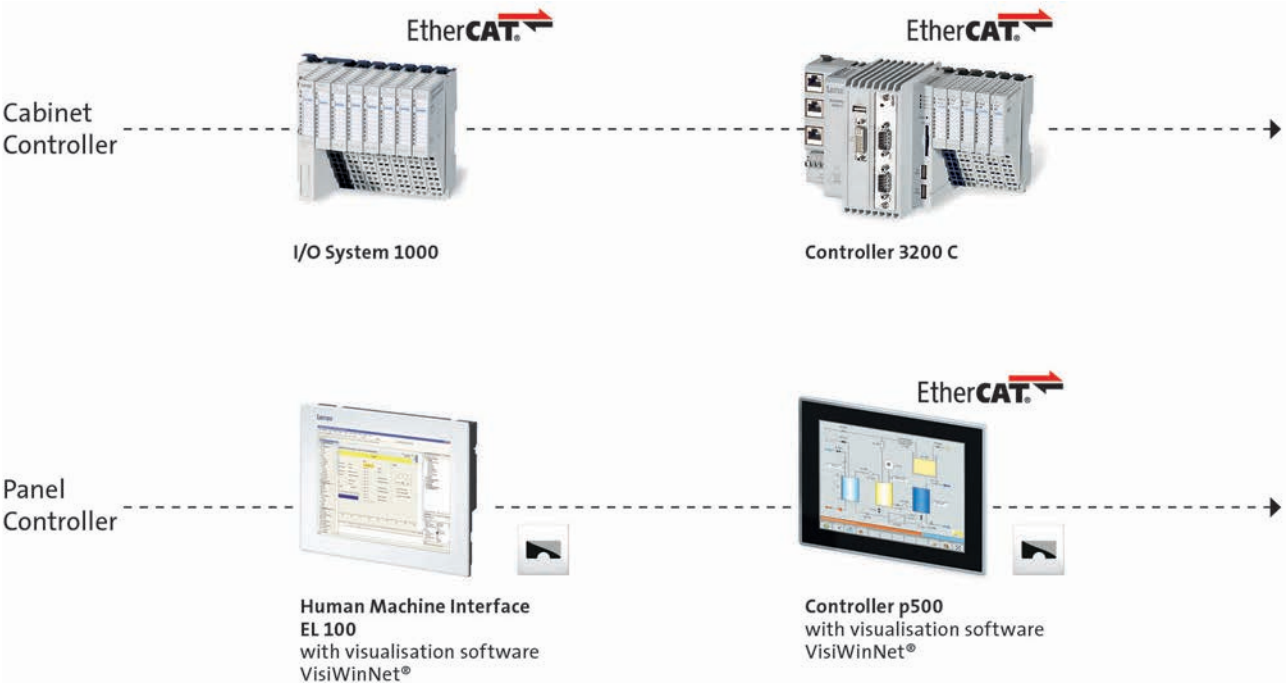
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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!

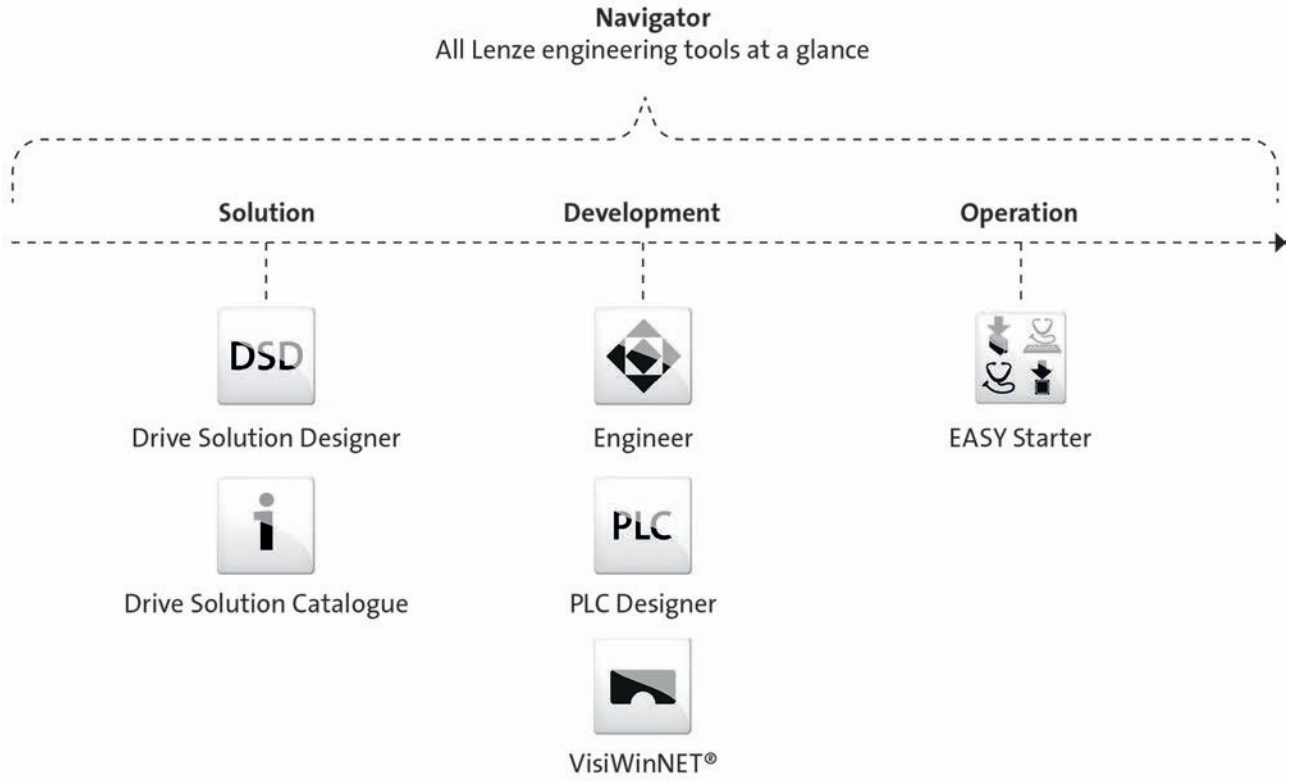


L-force product portfolio

Controls

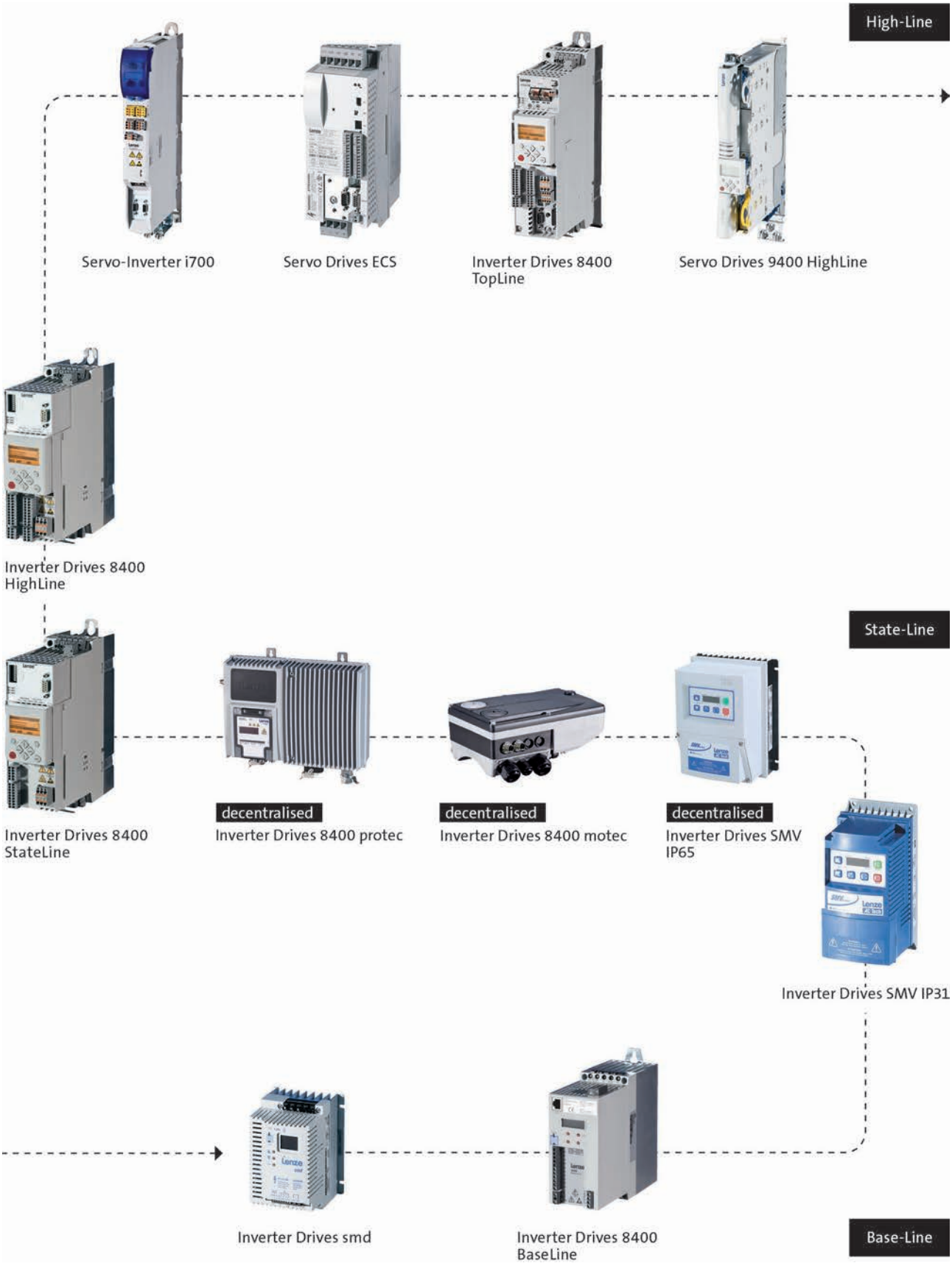


Engineering Tools



L-force product portfolio

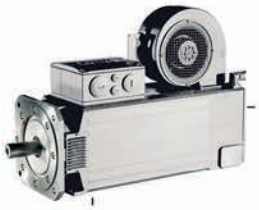
Inverters



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

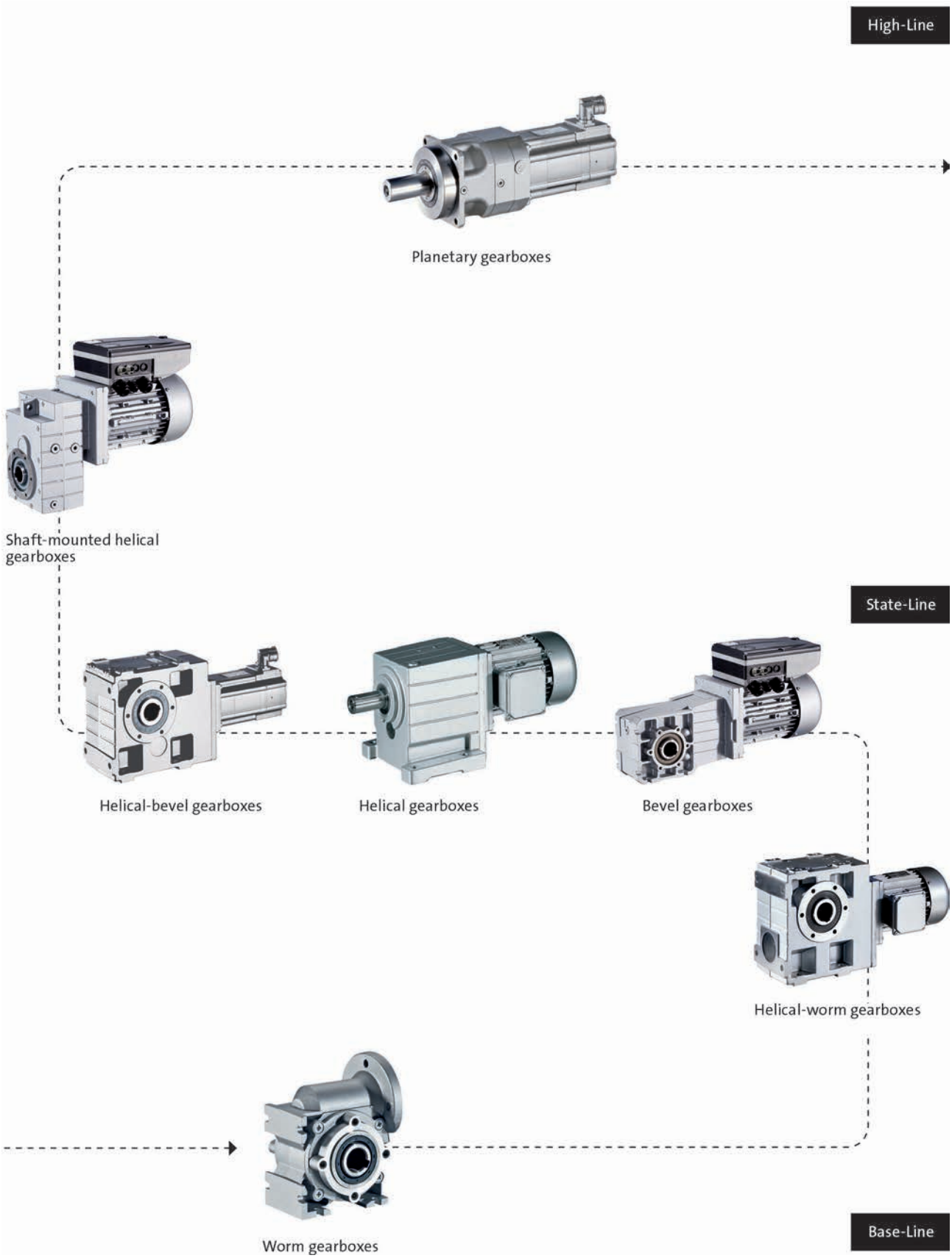
MD three-phase AC motors

Basic MD/MH three-phase AC motors

Base-Line

L-force product portfolio

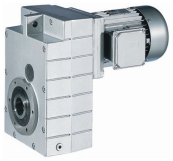
Gearboxes



GFL shaft-mounted helical gearboxes

0.75 to 45 kW

GFL shaft-mounted helical gearboxes



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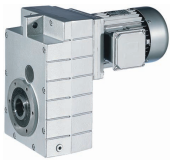
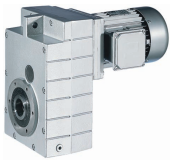


List of abbreviations

$\eta_{c=1}$		Efficiency
c		Load capacity
f_N	[Hz]	Rated frequency
$F_{ax,max}$	[N]	Max. axial force
$F_{rad,max}$	[N]	Max. radial force
H_{max}	[m]	Site altitude
i		Ratio
J	[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



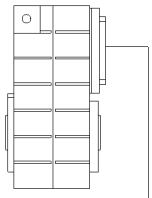
Product key

Gearbox type | Gearbox size | Number of stages | Input design | Shaft | Output design: Housing fastening | Drive unit

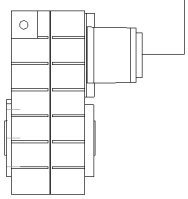
G F L [ ] [ ] - [ ] [ ] [ ] [ ] [ ] [ ] [ ] C [ ] [ ]

See page 24

2 2-stage



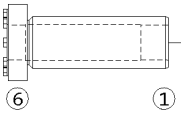
3 3-stage



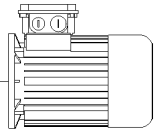
V Solid shaft with keyway

H Hollow shaft with keyway

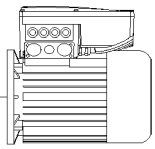
S Hollow shaft with shrink disc (in position 6 or 1)



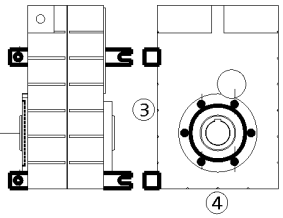
M Three-phase motor



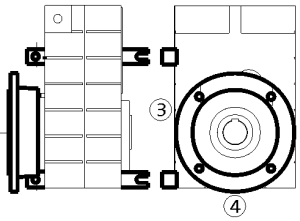
E Three-phase motor with 8400 motec



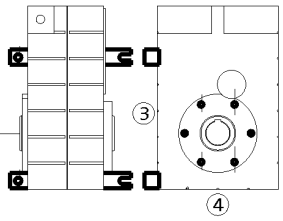
A R Foot (position 3 or 4) **and centring** with threaded pitch circle



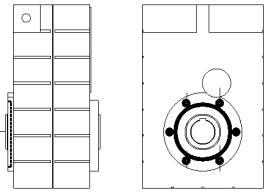
A K Foot (position 3 or 4) **and flange** with through holes



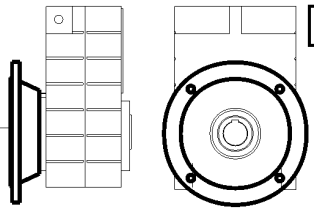
B R Foot (position 3 or 4) and threaded pitch circle



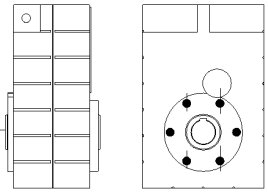
C R Centring with threaded pitch circle



C K Flange with through holes

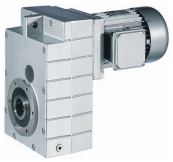


D R Threaded pitch circle



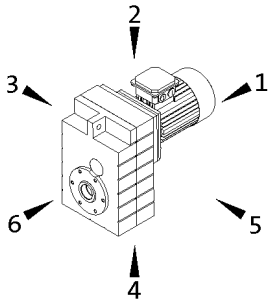
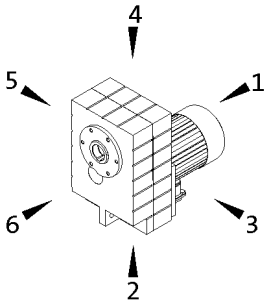
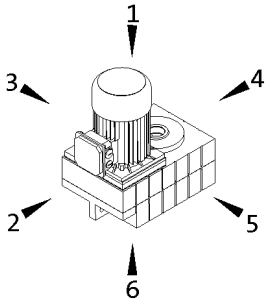
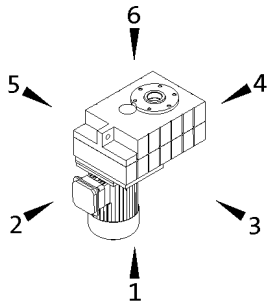
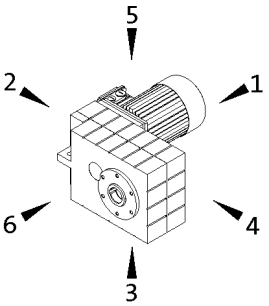
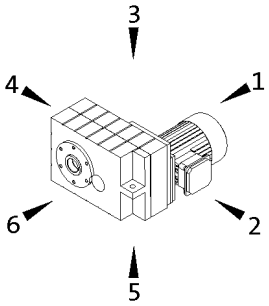
	Output design			
	V	H	S	K
	d x l [mm]	d [mm]	d [mm]	Øa2 [mm]
GFL04-2[2)]	25x50	25/30	25/30	160
GFL05-2/3	30x60	30/35	35	200
GFL06-2/3	40x80	40/45	40	200[1)]/250
GFL07-2/3	50x100	50/55	50	250/300
GFL09-2/3	60x120	60/70	65	350
GFL11-2/3	80x160	70/80	80	400/450
GFL14-2/3	100x200	100	100	450

[1)] Only in the case of H and S type of output
[2)] Output H version not possible with motor size 090



Product key

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

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

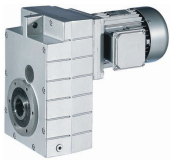
Hollow shaft: 0
Solid shaft: 6
Hollow shaft with shrink disc: 1, 6

Without foot: 0
Foot: 3, 4
Terminal box / motec: 2, 3, 4, 5

Gearbox designs

Basic versions	
Motor efficiency	Standard efficiency Increased efficiency (IE2)
Surface and corrosion protection	OKS-G (primer: grey) OKS-S (paint: RAL 7012)
Lubricant	CLP 460 (mineral)
Ventilation	Oil control plugs for GFL05 to 14 Breather elements for GFL06 ... 14

Options	
Surface and corrosion protection	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
Ventilation	Breather elements for GFL05 Compensation reservoir for GFL09 to 14-2 in mounting position C
Accessories	Rubber buffer for torque plate Shrink disc 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.

Designs

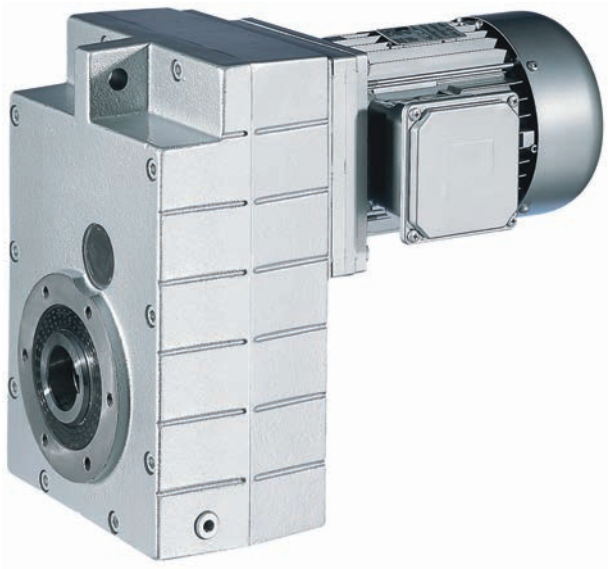
- 2-stage and 3-stage gearboxes
- Hollow shaft with keyway or shrink disc
- Solid shaft with keyway
- Foot or flange mounting
- Torque plate, including rubber buffer
- With MH three-phase AC motors (efficiency classes IE2) power range 0.75 ... 45 kW

Compact and powerful

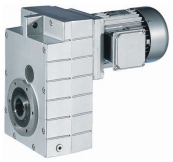
In combination with three-phase AC motors, our shaft-mounted helical gearboxes form a compact and effective drive unit. The low level of backlash of the gear teeth ensures highest precision. In addition, they can also distribute the power output and torque via an output shaft on both sides. The gearboxes are available in 2- and 3-stage versions with a torque of up to 11,615 Nm and a ratio of up to i=856.

Inverters for motor-proximity installation

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

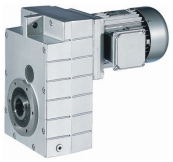


Shaft-mounted helical geared motor GFL07-2M HCR 100-32



Functions and features

Gearbox type	GFL
Housing	
Design	Cuboid
Material	Aluminium / cast iron
Solid shaft	
Design	with keyway to DIN 6885
Tolerance	k6 (d ≤ 50 mm) m6 (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 part	
Design	Ground tooth flanks Optimised tooth flank geometry
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
Schmierstoffe	
Standard	DIN 51502
Quantities	corresponding to mounting position (see operating instructions)
Mechanical efficiency	
1-stage gearboxes [$\eta_{c=1}$]	
2-stage gearboxes [$\eta_{c=1}$]	0.97
3-stage gearboxes [$\eta_{c=1}$]	0.95
4-stage gearboxes [$\eta_{c=1}$]	
Notes	



Functions and features

Lubricants

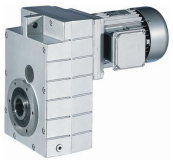
Lenze gearboxes and geared motors are ready for operation on delivery and are filled with lubricants specific to both the drive and the design. The mounting position and design specified in the order are key factors in choosing the volume of lubricant.

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 to 80 °C)	25000 operating hours not later than after three years (oil temperature 70 to 80 °C)	16000 operating hours not later than after three years (oil temperature 70 to 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 S2 G 460	Shell Omala S4 GX HD 320	

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



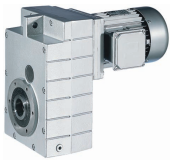
Functions and features

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).

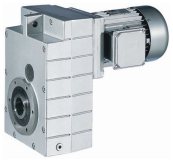
Surface and corrosion protection system	Applications	Measures
	Catalogue text	Catalogue text
OKS-G (primed)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey) • Zinc-coated screws • Rust-free breather elements Optional measures • Stainless steel nameplate
OKS-S (small)	• Standard 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 2K PUR 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 2K PUR priming coat 2K-PUR top coat	Standard: RAL 7012 Optional: RAL Classic
OKS-L (high)	C3	Dipping primed gearbox 2K PUR priming coat 2K-PUR top coat	Standard: RAL 7012 Optional: RAL Classic



Functions and features

Ventilation

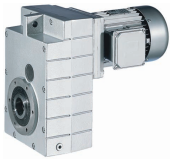
Non-ventilated gearboxes
No ventilation is required for the GFL04 gearbox.

Gearboxes that may optionally be equipped with ventilation
Special measures are not usually required when using the GFL05 gearbox. In borderline cases, e.g. at input speeds > 2000 rpm, we recommend the use of breather elements, which we can supply if required.

Ventilated gearboxes
The gearboxes GFL06 to 14 are supplied with breather elements as standard.

Special measures for mounting position C (motor on top)
We recommend that an oil compensation reservoir is always used with gearbox sizes G□□09 to 14 in this mounting position. This reservoir can be purchased as an option. For illustrations and measures, please refer to the Accessories chapter.

This is not required at higher ratios or low input speeds. Please contact Lenze for confirmation in this case.



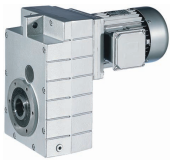
Dimensioning

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 sales office
- 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:

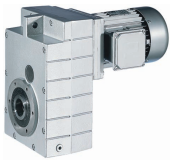
Motor frame size	Mounting position A, B, E, F	Mounting position C, D
063 ... 100	4000 r/min	3000 r/min
112 ... 132	4000 r/min	2000 r/min
160 ... 225	3000 r/min	1500 r/min

- or if you are using the following gearbox type, size and ratio combinations at an input speed of $n_1 > 1500$ r/min:

Gearbox type	Gearbox size	Ratio i
GFL shaft-mounted helical gearbox	07, 09, 11, 14	≤ 16

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

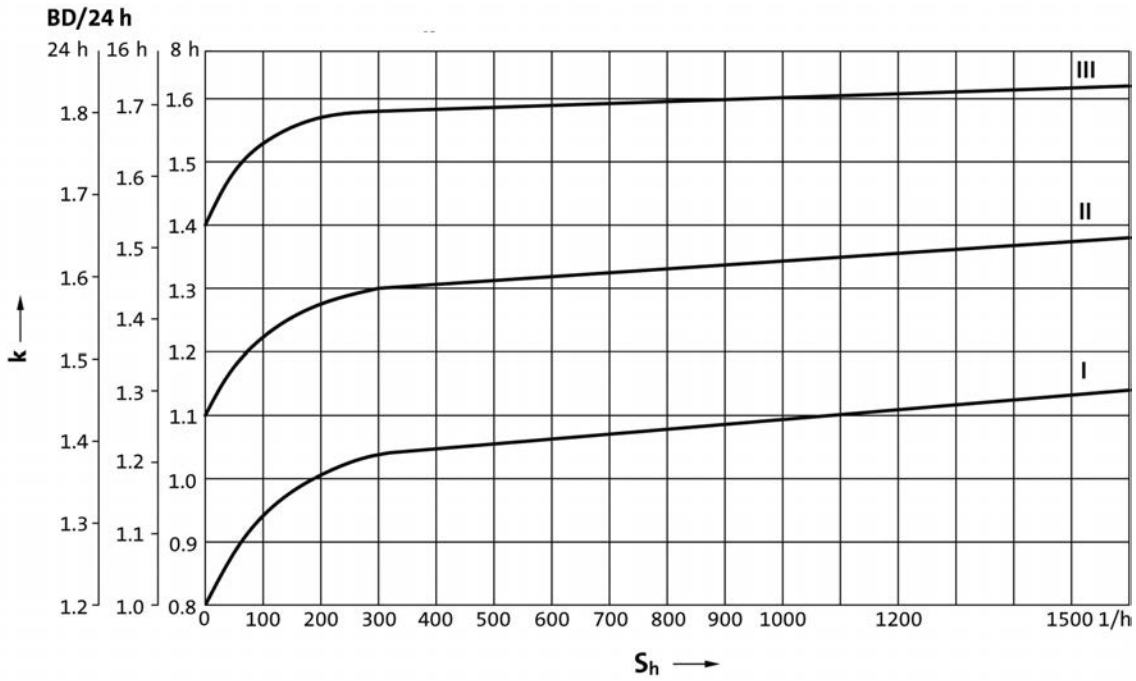
Load capacity and application factor

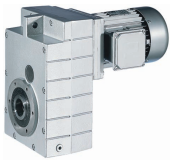
Load capacity c of gearbox
Rated value for the load capacity of Lenze geared motors.
- c is the ratio of the permissible rated torque of the gearbox to the rated torque supplied by the drive component (e.g. the built-in Lenze motor).
- The value of c must always be greater than the value of the application 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



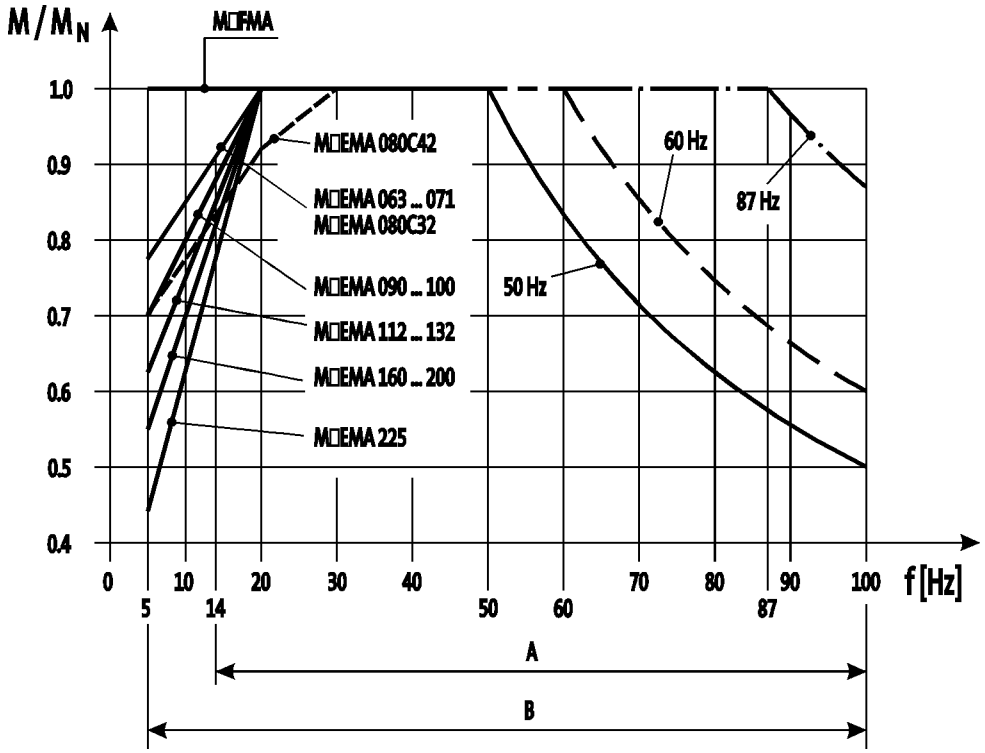


Dimensioning

Torque derating at low motor frequencies

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

Torque characteristics

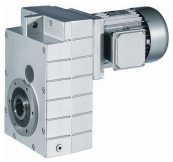


A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

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. They are used only to provide basic orientation.
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

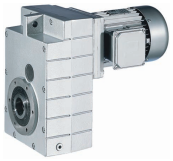
Output torque M_2 (constant for all listed frequencies)

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

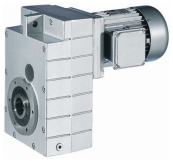
Notes on the selection tables

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 : 230 V or 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

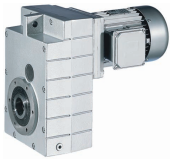
We want to be sure that you receive the correct products in good time.

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)

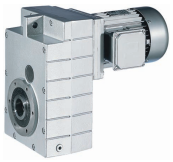
Street/P.O. Box _____ Desired delivery date _____

P.O. Box, City _____ Dispatching notes _____

Invoice recipient (if different)

Street/P.O. Box _____

Postal code, City _____



Ordering details checklist

Customer No.

Job No.

Page __

Quantity

Efficiency class ☐ Standard efficiency ☐ High efficiency (IE2)

Rated frequency ☐ 50 Hz ☐ 60 Hz ☐ 87 Hz

Ratio i

GFL ☐☐ – ☐ 2 / 3 ☐ M / E ☐ V / H / S ☐ A / B / C / D ☐ 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			Foot			Terminal box			
0	6	1	0	3	4	2	3	4	5
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Surface and corrosion protection ☐ OKS-S colour: RAL 7012 ☐ OKS-G (primed)

Options

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

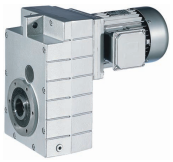
Surface and corrosion protection ☐ OKS-S (small) ☐ OKS-M (medium) ☐ OKS-L (high) ☐ OKS-G (primed)

Accessories ☐ Rubber buffer for torque support ☐ Mounting set for hollow-shaft circlip ☐ Hollow shaft cover, hoseproof

Shaft sealing rings ☐ Viton

Breathing ☐ Breather elements for GFL05 ☐ Compensation reservoir in mounting position for GFL09 ... 14-2

6.6



Ordering details checklist

Three-phase AC motors options

Customer No. ☐☐☐☐☐☐☐☐

Job No. ☐☐☐☐☐☐☐☐☐☐

Page __

Motor connection

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

Cable entry: only with M□□MAXX/LL063 ... 132 or terminal box with plug-in connector in position ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

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

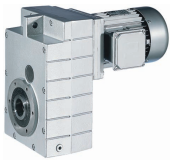
Rated voltage: AC ☐ DC ☐ ☐ V

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. ☐☐☐☐☐☐☐☐☐☐

Page __

Speed/position encoder

Resolver	☐ RS1				
Incremental encoder HTL	☐ IG128-24V-H	☐ IG512-24V-H	☐ IG1024-24V-H	☐ IG2048-24V-H	
Incremental encoder TTL		☐ IG512-5V-T	☐ IG1024-5V-T	☐ IG2048-5V-T	
Feedback with ICN connector	☐ IG128-24V-H not possible with plug-in connector!				

Motor protection

☐ PTC ☐ KTY 83-110 ☐ KTY 84-130

Approval

☐ UL/CSA approval: cURus ☐ CCC ☐ China Energy Label

Further options

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

☐ Δ; 400V-50Hz; 460V-60Hz

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

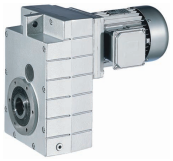
☐ Protection cover

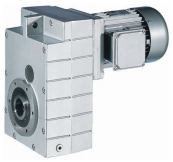
☐ 2nd shaft end

☐ Handwheel

☐ Increased centrifugal mass

☐ 2nd nameplate (adhesive nameplate/metal nameplate)





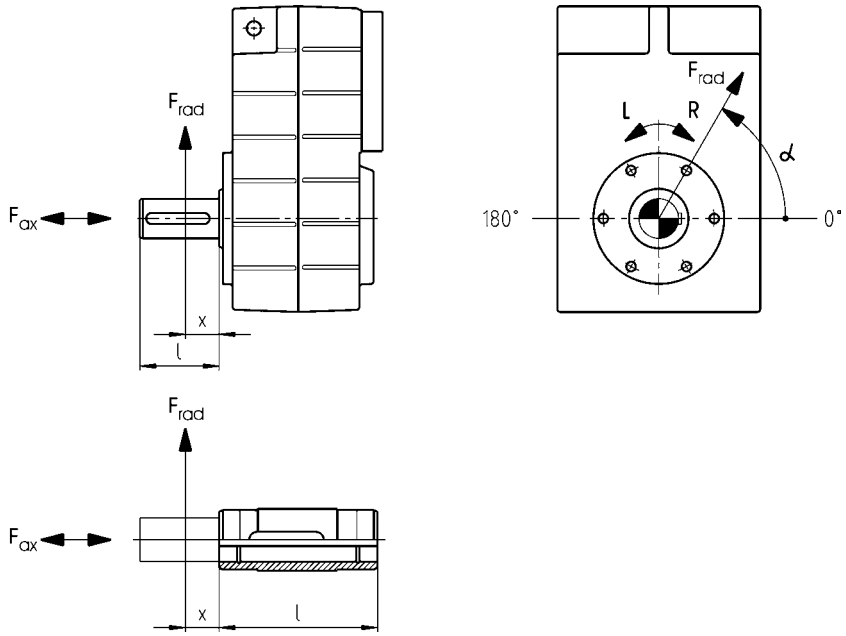
Permissible radial and axial forces at output

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)

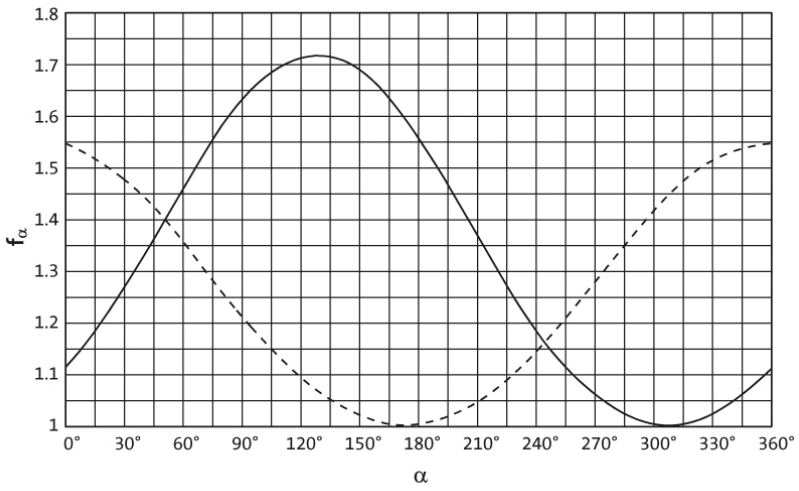
Permissible axial force
$F_{ax,per} = F_{ax,max}$ if $F_{rad} = 0$

If F_{rad} **and** $F_{ax} \neq 0$, please contact your Lenze sales office.

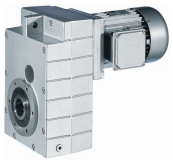
Application of forces



Effective direction factor f_α at output shaft

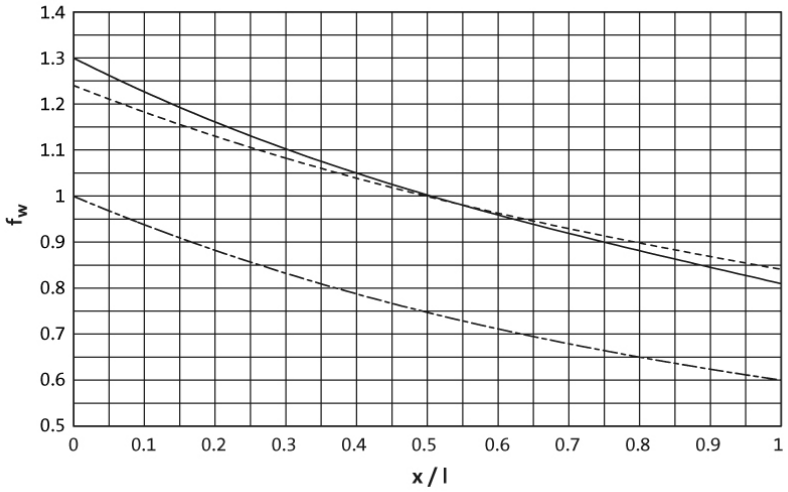


——— Direction of rotation R
— — — Direction of rotation L



Permissible radial and axial forces at output

Additional load factor f_w at output shaft



——— Solid shaft (V□□)
— · — Hollow shaft (H□□)
— — — Solid shaft with flange (V□K)

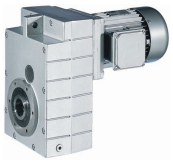
GFL□□-2/3□ H□□

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]
GFL04	2100	2700	2800	3200	3800	4600	5500	6300	7000	7000
GFL05	1800	2400	3000	3400	4100	5000	6000	7100	8000	8000
GFL06	2400	3300	4300	4700	5000	6600	8500	10800	12000	12000
GFL07	2200	3400	4500	5100	6400	7900	9300	11500	15000	16000
GFL09			5000	6000	7200	10500	13000	15000	22000	24000
GFL11			7300	8700	10000	14200	19000	23000	27000	30000
GFL14			8000	9000	9500	11500	14000	18000	30000	45000

	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]
GFL04	1300	1700	2200	2600	3200	4200	5300	5500	5500	5500
GFL05	1600	2200	2800	3600	4200	5900	6600	6600	6600	6600
GFL06	2400	3200	4000	5200	6000	8500	10000	10000	10000	10000
GFL07	2000	2700	3400	4700	6000	8500	12000	14000	14000	14000
GFL09			3100	4200	5800	10000	13500	17000	21000	21000
GFL11			4700	6000	7500	14000	19000	25000	27000	27000
GFL14			4000	5000	6200	7500	11000	17500	31000	35000

- 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

GFL□□-2/3□ V□R

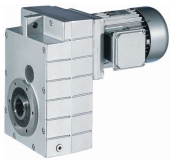
Size	n_2 [r/min]									
Gearbox	1000	630	400	250	160	100	63	40	25	≤16

	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]
GFL04	1650	2100	2300	2700	3200	3600	3600	3600	3600	3600
GFL05	1400	1900	2400	2700	3200	4000	4800	5800	6200	6200
GFL06	1850	2500	3200	3600	3900	5100	6500	8400	9000	9000
GFL07	1650	2600	3200	3600	3900	5100	6500	8400	9000	9000
GFL09 [1]			3800	4400	5500	8000	10000	12000	18000	18000
GFL11 [1]			5500	6300	7300	11200	14500	17400	20500	23000
GFL14			47000	54000	62000	65000	65000	65000	65000	65000

	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]
GFL04	1300	1700	2200	2600	3200	4200	5300	5500	5500	5500
GFL05	1600	2200	2800	3600	4200	5900	6600	6600	6600	6600
GFL06	2400	3200	4000	5200	6000	8500	10000	10000	10000	10000
GFL07	2000	2700	3400	4700	6000	8500	12000	14000	14000	14000
GFL09 [1]			3100	4200	5800	10000	13500	17000	21000	21000
GFL11 [1]			4700	6000	7500	14000	19000	25000	27000	27000
GFL14			25000	27000	29000	32000	35000	35000	35000	35000

[1] Reinforced output shaft bearings are available on request for V□R versions.

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



Permissible radial and axial forces at output

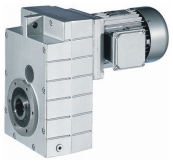
GFL□□-2/3□ V□K

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]
GFL04	2300	2800	3200	3700	4400	4600	4600	4600	4600	4600
GFL05	2900	3700	4300	5100	5900	6800	7000	7000	7000	7000
GFL06	4000	5000	6100	7000	7800	9600	10000	10000	10000	10000
GFL07	4000	5200	6400	7400	8900	10500	12000	13000	14000	14000
GFL09			7800	9000	10500	14000	15000	15000	15000	15000
GFL11			12500	14500	17000	21500	26000	30000	30000	30000
GFL14			18000	20000	23000	27500	32000	38000	43000	43000

	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]
GFL04	1300	1700	2200	2600	3200	4200	4400	4400	4400	4400
GFL05	1800	2400	3100	3900	4800	6400	6600	6600	6600	6600
GFL06	2500	3400	4300	5500	6500	8500	10000	10000	10000	10000
GFL07	3600	4800	6100	6500	7000	9500	11500	11500	11500	11500
GFL09			6100	6500	7000	9500	11500	11500	11500	11500
GFL11			6800	8500	10500	17000	22000	27000	27000	27000
GFL14			6000	8000	10000	13000	19000	26000	35000	35000

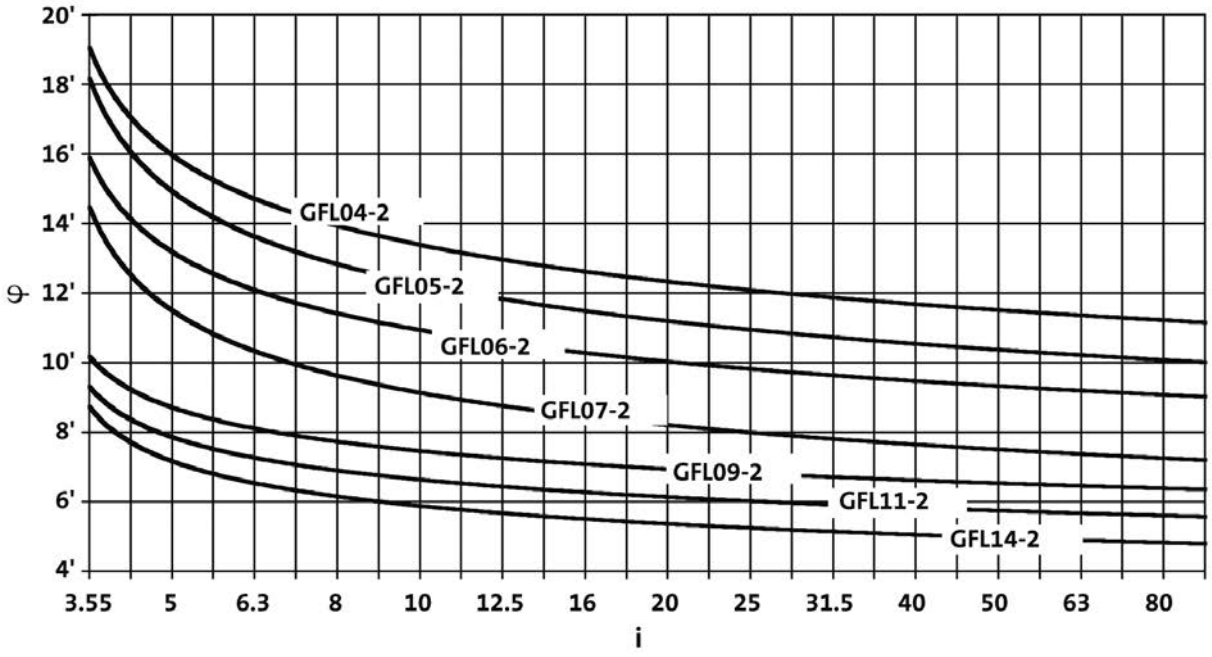
- Application of force F_{rad}: centre of shaft journal (x = l/2)
- $F_{ax,max}$ only valid with F_{rad} = 0



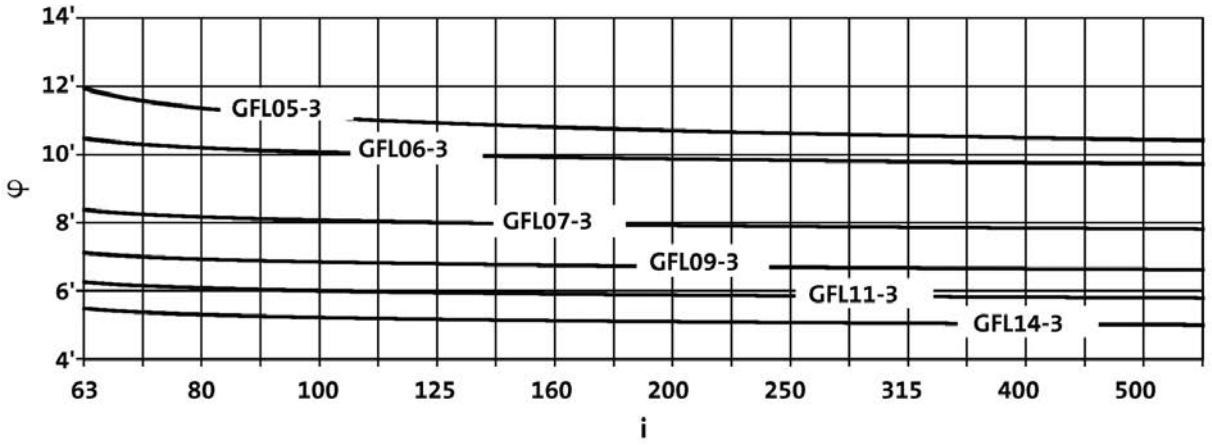
Output backlash in angular minutes

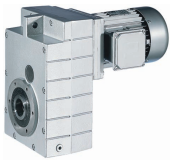
► Backlash ϕ depending on ratio i

GFL04 to 14-2



GFL05 to 14-3





Moments of inertia

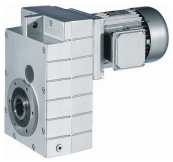
GFL□□-2

► Moment of inertia (J) depending on ratio i

Gearbox			GFL04
3.659	J	[kgcm²]	1.510
5.018	J	[kgcm²]	0.858
5.833	J	[kgcm²]	0.925
6.422	J	[kgcm²]	0.555
7.025	J	[kgcm²]	0.473
8.379	J	[kgcm²]	0.666
9.333	J	[kgcm²]	0.613
10.238	J	[kgcm²]	0.366
11.491	J	[kgcm²]	0.410
12.800	J	[kgcm²]	0.382
14.706	J	[kgcm²]	0.282
16.087	J	[kgcm²]	0.245
17.920	J	[kgcm²]	0.230
20.519	J	[kgcm²]	0.171
22.857	J	[kgcm²]	0.163
25.136	J	[kgcm²]	0.129
28.000	J	[kgcm²]	0.123
31.600	J	[kgcm²]	0.086
35.200	J	[kgcm²]	0.082
40.697	J	[kgcm²]	0.058
45.333	J	[kgcm²]	0.056
51.579	J	[kgcm²]	0.038
57.455	J	[kgcm²]	0.037
64.636	J	[kgcm²]	0.026
72.000	J	[kgcm²]	0.025
85.156	J	[kgcm²]	0.016
94.857	J	[kgcm²]	0.015

Gearbox			GFL05
3.333	J	[kgcm²]	1.677
4.571	J	[kgcm²]	2.133
5.133	J	[kgcm²]	2.372
5.667	J	[kgcm²]	2.329
6.400	J	[kgcm²]	0.822
7.040	J	[kgcm²]	1.470
7.771	J	[kgcm²]	1.450
9.010	J	[kgcm²]	0.951
9.946	J	[kgcm²]	0.885
11.360	J	[kgcm²]	1.082
12.800	J	[kgcm²]	1.012
14.538	J	[kgcm²]	0.746
15.904	J	[kgcm²]	0.603
17.920	J	[kgcm²]	0.609
20.286	J	[kgcm²]	0.428
22.857	J	[kgcm²]	0.434
24.850	J	[kgcm²]	0.345
28.000	J	[kgcm²]	0.331
32.344	J	[kgcm²]	0.204
36.444	J	[kgcm²]	0.195
40.233	J	[kgcm²]	0.148
45.333	J	[kgcm²]	0.142
52.067	J	[kgcm²]	0.093
58.667	J	[kgcm²]	0.090
63.190	J	[kgcm²]	0.068
71.200	J	[kgcm²]	0.064
80.763	J	[kgcm²]	0.043
91.000	J	[kgcm²]	0.042

► 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.



Moments of inertia

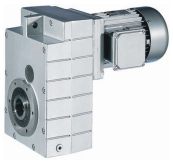
GFL□□-2

► Moment of inertia (J) depending on ratio i

Gearbox			GFL06
3.675	J	[kgcm²]	7.755
5.211	J	[kgcm²]	6.636
5.750	J	[kgcm²]	6.044
6.450	J	[kgcm²]	3.651
7.147	J	[kgcm²]	4.044
8.400	J	[kgcm²]	4.264
9.463	J	[kgcm²]	3.879
10.092	J	[kgcm²]	2.520
11.520	J	[kgcm²]	1.730
12.978	J	[kgcm²]	2.610
14.743	J	[kgcm²]	1.950
16.128	J	[kgcm²]	1.680
18.169	J	[kgcm²]	1.570
20.571	J	[kgcm²]	1.190
23.175	J	[kgcm²]	1.130
25.200	J	[kgcm²]	0.904
28.389	J	[kgcm²]	0.861
32.800	J	[kgcm²]	0.581
36.951	J	[kgcm²]	0.556
40.800	J	[kgcm²]	0.425
45.963	J	[kgcm²]	0.407
52.800	J	[kgcm²]	0.264
59.481	J	[kgcm²]	0.251
64.080	J	[kgcm²]	0.193
72.189	J	[kgcm²]	0.187
81.000	J	[kgcm²]	0.125
91.250	J	[kgcm²]	0.121

Gearbox			GFL07
3.350	J	[kgcm²]	19.570
4.643	J	[kgcm²]	11.988
5.159	J	[kgcm²]	11.120
5.695	J	[kgcm²]	18.094
6.400	J	[kgcm²]	9.831
7.150	J	[kgcm²]	11.878
8.324	J	[kgcm²]	13.113
9.379	J	[kgcm²]	12.037
9.714	J	[kgcm²]	8.030
11.538	J	[kgcm²]	8.520
13.000	J	[kgcm²]	7.970
14.200	J	[kgcm²]	6.350
15.904	J	[kgcm²]	5.270
17.920	J	[kgcm²]	4.980
20.286	J	[kgcm²]	3.470
22.857	J	[kgcm²]	3.268
24.850	J	[kgcm²]	2.645
28.000	J	[kgcm²]	2.525
32.344	J	[kgcm²]	1.690
36.444	J	[kgcm²]	1.610
39.642	J	[kgcm²]	1.250
44.667	J	[kgcm²]	1.200
52.067	J	[kgcm²]	0.783
58.667	J	[kgcm²]	0.753
63.190	J	[kgcm²]	0.573
71.200	J	[kgcm²]	0.555
79.875	J	[kgcm²]	0.366
90.000	J	[kgcm²]	0.358

► 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.



Moments of inertia

GFL□□-2

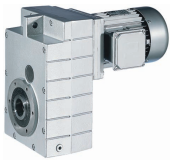
► Moment of inertia (J) depending on ratio i

Gearbox			GFL09
6.864	J	[kgcm²]	41.300
7.466	J	[kgcm²]	38.700
9.010	J	[kgcm²]	26.800
9.799	J	[kgcm²]	25.300
11.167	J	[kgcm²]	19.500
12.307	J	[kgcm²]	27.600
14.333	J	[kgcm²]	20.000
16.333	J	[kgcm²]	15.500
18.407	J	[kgcm²]	14.600
19.667	J	[kgcm²]	12.100
22.164	J	[kgcm²]	11.300
24.111	J	[kgcm²]	9.040
27.173	J	[kgcm²]	8.630
32.667	J	[kgcm²]	5.430
36.815	J	[kgcm²]	5.210
39.667	J	[kgcm²]	4.070
44.704	J	[kgcm²]	3.920
51.333	J	[kgcm²]	2.590
57.852	J	[kgcm²]	2.500
62.300	J	[kgcm²]	1.890
70.211	J	[kgcm²]	1.830
78.750	J	[kgcm²]	1.250
88.750	J	[kgcm²]	1.210

Gearbox			GFL11
6.864	J	[kgcm²]	124.000
7.466	J	[kgcm²]	116.000
9.010	J	[kgcm²]	79.600
9.799	J	[kgcm²]	74.800
10.720	J	[kgcm²]	65.000
12.480	J	[kgcm²]	81.500
14.538	J	[kgcm²]	58.400
15.904	J	[kgcm²]	51.300
17.920	J	[kgcm²]	48.300
20.286	J	[kgcm²]	36.100
22.857	J	[kgcm²]	34.300
24.850	J	[kgcm²]	26.900
28.000	J	[kgcm²]	25.700
32.739	J	[kgcm²]	17.100
36.889	J	[kgcm²]	16.500
40.233	J	[kgcm²]	12.600
45.333	J	[kgcm²]	12.200
52.067	J	[kgcm²]	8.080
58.667	J	[kgcm²]	7.810
63.190	J	[kgcm²]	5.900
71.200	J	[kgcm²]	5.720
79.875	J	[kgcm²]	3.870
90.000	J	[kgcm²]	3.760

Gearbox			GFL14
7.150	J	[kgcm²]	344.000
7.777	J	[kgcm²]	321.000
8.800	J	[kgcm²]	247.000
9.571	J	[kgcm²]	232.000
11.538	J	[kgcm²]	242.000
13.000	J	[kgcm²]	225.000
14.200	J	[kgcm²]	625.000
15.620	J	[kgcm²]	156.000
17.600	J	[kgcm²]	146.000
19.948	J	[kgcm²]	111.000
22.476	J	[kgcm²]	105.000
24.456	J	[kgcm²]	83.200
27.556	J	[kgcm²]	79.400
32.344	J	[kgcm²]	52.900
36.444	J	[kgcm²]	50.700
39.642	J	[kgcm²]	38.000
44.667	J	[kgcm²]	36.600
52.067	J	[kgcm²]	24.600
58.667	J	[kgcm²]	23.800
63.190	J	[kgcm²]	18.000
71.200	J	[kgcm²]	17.400
79.875	J	[kgcm²]	11.800
90.000	J	[kgcm²]	11.500

► 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.



Moments of inertia

GFL□□-3

► Moment of inertia (J) depending on ratio i

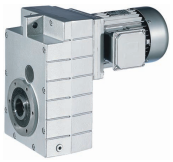
Gearbox			GFL05
61.653	J	[kgcm²]	0.202
78.639	J	[kgcm²]	0.145
90.123	J	[kgcm²]	0.197
101.547	J	[kgcm²]	0.196
114.952	J	[kgcm²]	0.142
129.524	J	[kgcm²]	0.141
140.817	J	[kgcm²]	0.109
158.667	J	[kgcm²]	0.109
177.027	J	[kgcm²]	0.073
199.467	J	[kgcm²]	0.073
227.989	J	[kgcm²]	0.051
256.889	J	[kgcm²]	0.050
288.948	J	[kgcm²]	0.033
325.576	J	[kgcm²]	0.033
362.100	J	[kgcm²]	0.023
408.000	J	[kgcm²]	0.023
477.052	J	[kgcm²]	0.014
537.524	J	[kgcm²]	0.014

Gearbox			GFL06
66.213	J	[kgcm²]	0.292
72.000	J	[kgcm²]	0.264
81.111	J	[kgcm²]	0.259
88.200	J	[kgcm²]	0.190
99.361	J	[kgcm²]	0.187
116.571	J	[kgcm²]	0.091
131.323	J	[kgcm²]	0.208
144.320	J	[kgcm²]	0.110
162.583	J	[kgcm²]	0.109
179.520	J	[kgcm²]	0.102
202.237	J	[kgcm²]	0.101
231.200	J	[kgcm²]	0.068
260.457	J	[kgcm²]	0.067
293.018	J	[kgcm²]	0.044
299.200	J	[kgcm²]	0.064
367.200	J	[kgcm²]	0.030
413.667	J	[kgcm²]	0.030
475.200	J	[kgcm²]	0.029
535.333	J	[kgcm²]	0.028
576.720	J	[kgcm²]	0.028
649.700	J	[kgcm²]	0.028
759.806	J	[kgcm²]	0.017
855.954	J	[kgcm²]	0.017

Gearbox			GFL07
65.306	J	[kgcm²]	0.790
72.452	J	[kgcm²]	0.894
81.636	J	[kgcm²]	0.880
92.413	J	[kgcm²]	0.609
104.127	J	[kgcm²]	0.601
113.206	J	[kgcm²]	0.448
127.556	J	[kgcm²]	0.442
147.347	J	[kgcm²]	0.275
166.025	J	[kgcm²]	0.271
183.285	J	[kgcm²]	0.194
206.519	J	[kgcm²]	0.192
224.636	J	[kgcm²]	0.180
253.111	J	[kgcm²]	0.179
290.706	J	[kgcm²]	0.112
327.556	J	[kgcm²]	0.111
352.811	J	[kgcm²]	0.081
397.533	J	[kgcm²]	0.080
430.222	J	[kgcm²]	0.104
522.133	J	[kgcm²]	0.075
562.391	J	[kgcm²]	0.073
633.680	J	[kgcm²]	0.073
718.786	J	[kgcm²]	0.047
809.900	J	[kgcm²]	0.046

Gearbox			GFL09
63.326	J	[kgcm²]	2.344
73.173	J	[kgcm²]	2.472
82.465	J	[kgcm²]	2.428
93.333	J	[kgcm²]	1.679
105.185	J	[kgcm²]	1.651
114.333	J	[kgcm²]	1.230
128.852	J	[kgcm²]	1.212
148.815	J	[kgcm²]	0.773
167.712	J	[kgcm²]	0.762
185.111	J	[kgcm²]	0.548
208.617	J	[kgcm²]	0.541
224.778	J	[kgcm²]	0.505
253.321	J	[kgcm²]	0.500
290.889	J	[kgcm²]	0.313
327.827	J	[kgcm²]	0.310
353.033	J	[kgcm²]	0.226
397.863	J	[kgcm²]	0.224
424.247	J	[kgcm²]	0.286
514.881	J	[kgcm²]	0.208
554.470	J	[kgcm²]	0.201
624.879	J	[kgcm²]	0.200
700.875	J	[kgcm²]	0.130
789.875	J	[kgcm²]	0.129

► 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.



Moments of inertia

GFL□□-3

► Moment of inertia (J) depending on ratio i

Gearbox			GFL11
65.306	J	[kgcm²]	6.967
73.335	J	[kgcm²]	7.844
82.631	J	[kgcm²]	7.707
93.540	J	[kgcm²]	5.050
105.397	J	[kgcm²]	4.965
114.586	J	[kgcm²]	3.712
129.111	J	[kgcm²]	3.656
149.144	J	[kgcm²]	2.299
168.049	J	[kgcm²]	2.265
182.792	J	[kgcm²]	1.661
205.963	J	[kgcm²]	1.639
224.636	J	[kgcm²]	1.515
253.111	J	[kgcm²]	1.501
267.259	J	[kgcm²]	1.865
327.556	J	[kgcm²]	1.373
358.077	J	[kgcm²]	0.679
403.467	J	[kgcm²]	0.673
430.222	J	[kgcm²]	0.853
522.133	J	[kgcm²]	0.623
562.391	J	[kgcm²]	0.599
633.680	J	[kgcm²]	0.596
710.888	J	[kgcm²]	0.385
801.000	J	[kgcm²]	0.384

Gearbox			GFL14
64.296	J	[kgcm²]	26.316
68.708	J	[kgcm²]	19.862
77.418	J	[kgcm²]	19.381
85.037	J	[kgcm²]	21.590
104.889	J	[kgcm²]	9.324
114.126	J	[kgcm²]	8.318
128.593	J	[kgcm²]	8.144
136.889	J	[kgcm²]	16.779
156.148	J	[kgcm²]	5.917
170.074	J	[kgcm²]	6.962
202.074	J	[kgcm²]	3.692
224.636	J	[kgcm²]	4.742
253.111	J	[kgcm²]	4.697
273.778	J	[kgcm²]	5.759
332.444	J	[kgcm²]	4.300
352.811	J	[kgcm²]	2.163
397.533	J	[kgcm²]	2.145
430.222	J	[kgcm²]	2.727
522.133	J	[kgcm²]	1.984
562.391	J	[kgcm²]	1.910
633.680	J	[kgcm²]	1.903
710.888	J	[kgcm²]	1.259
801.000	J	[kgcm²]	1.254

► The moments of inertia relate to the drive shaft of the gearbox.
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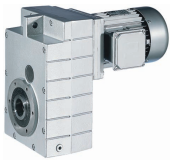


Weights

GFL□□-2M HCR / HDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	18							
GFL05	m	[kg]	31	37	39	45	47			
GFL06	m	[kg]	45	51	53	59	62	74	97	104
GFL07	m	[kg]	71	77	79	85	87	100	123	130
GFL09	m	[kg]		123	125	131	134	146	170	177
GFL11	m	[kg]				217	219	231	253	260
GFL14	m	[kg]						373	394	401

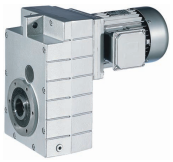
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	173	188					
GFL09	m	[kg]	220	235	286	291	311		
GFL11	m	[kg]	303	318	369	374	394	594	614
GFL14	m	[kg]	444	459	510	515	535	732	752

GFL□□-2M HAR / HBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	19							
GFL05	m	[kg]	32	38	40	46	49			
GFL06	m	[kg]	47	54	56	62	64	77	99	106
GFL07	m	[kg]	75	81	83	89	91	104	127	134
GFL09	m	[kg]		130	132	138	141	153	177	184
GFL11	m	[kg]				231	233	245	267	274
GFL14	m	[kg]						396	417	424

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	177	192					
GFL09	m	[kg]	227	242	293	298	318		
GFL11	m	[kg]	317	332	383	388	408	608	628
GFL14	m	[kg]	467	482	533	538	558	755	775

► 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

GFL□□-2M HAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	22							
GFL05	m	[kg]	36	42	44	50	53			
GFL06	m	[kg]	54	61	63	69	71	84	106	113
GFL07	m	[kg]	86	92	94	100	102	115	138	145
GFL09	m	[kg]		146	148	154	157	169	193	200
GFL11	m	[kg]				255	257	269	291	298
GFL14	m	[kg]						429	450	457

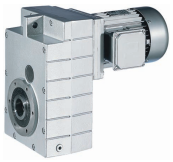
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	188	203					
GFL09	m	[kg]	243	258	309	314	334		
GFL11	m	[kg]	341	356	407	412	432	632	652
GFL14	m	[kg]	500	515	566	571	591	788	808

GFL□□-2M HCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	21							
GFL05	m	[kg]	35	41	43	49	51			
GFL06	m	[kg]	52	58	60	66	69	81	104	111
GFL07	m	[kg]	82	88	90	96	98	111	134	141
GFL09	m	[kg]		139	141	147	150	162	186	193
GFL11	m	[kg]				241	243	255	277	284
GFL14	m	[kg]						406	427	434

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	184	199					
GFL09	m	[kg]	236	251	302	307	327		
GFL11	m	[kg]	327	342	393	398	418	618	638
GFL14	m	[kg]	477	492	543	548	568	765	785

► 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

GFL□□-2M VCR / VDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	19	24	26					
GFL05	m	[kg]	32	38	40	46	48			
GFL06	m	[kg]	47	54	56	62	64	77	99	106
GFL07	m	[kg]	76	82	84	90	92	105	128	135
GFL09	m	[kg]		131	133	139	142	154	178	185
GFL11	m	[kg]				233	235	247	269	276
GFL14	m	[kg]						406	427	434

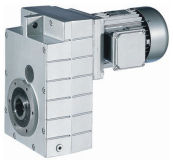
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	178	193					
GFL09	m	[kg]	228	243	294	299	319		
GFL11	m	[kg]	319	334	385	390	410	610	630
GFL14	m	[kg]	477	492	543	548	568	765	785

GFL□□-2M VAR / VBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	20	25	27					
GFL05	m	[kg]	33	39	41	47	50			
GFL06	m	[kg]	50	56	58	64	67	79	102	109
GFL07	m	[kg]	80	86	88	94	96	109	132	139
GFL09	m	[kg]		138	140	146	149	161	185	192
GFL11	m	[kg]				247	249	261	283	290
GFL14	m	[kg]						429	450	457

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	182	197					
GFL09	m	[kg]	235	250	301	306	326		
GFL11	m	[kg]	333	348	399	404	424	624	644
GFL14	m	[kg]	500	515	566	571	591	788	808

► 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

GFL□□-2M VAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	22	28	30					
GFL05	m	[kg]	37	43	45	51	54			
GFL06	m	[kg]	57	63	65	71	74	86	109	116
GFL07	m	[kg]	91	97	99	105	107	120	143	150
GFL09	m	[kg]		154	156	162	165	177	201	208
GFL11	m	[kg]				271	273	285	307	314
GFL14	m	[kg]						462	483	490

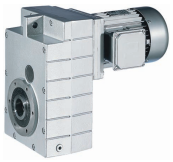
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	193	208					
GFL09	m	[kg]	251	266	317	322	342		
GFL11	m	[kg]	357	372	423	428	448	648	668
GFL14	m	[kg]	533	548	599	604	624	821	841

GFL□□-2M VCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	21	27	29					
GFL05	m	[kg]	36	42	44	50	52			
GFL06	m	[kg]	54	61	63	69	71	84	106	113
GFL07	m	[kg]	87	93	95	101	103	116	139	146
GFL09	m	[kg]		147	149	155	158	170	194	201
GFL11	m	[kg]				257	259	271	293	300
GFL14	m	[kg]						439	460	467

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	189	204					
GFL09	m	[kg]	244	259	310	315	335		
GFL11	m	[kg]	343	358	409	414	434	634	654
GFL14	m	[kg]	510	525	576	581	601	798	818

► 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

GFL□□-2M SCR / SDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	19	24	26					
GFL05	m	[kg]	32	38	40	46	48			
GFL06	m	[kg]	46	52	54	60	63	75	98	105
GFL07	m	[kg]	72	78	80	86	89	102	124	131
GFL09	m	[kg]		126	128	134	137	149	173	180
GFL11	m	[kg]				222	224	236	258	265
GFL14	m	[kg]						384	405	412

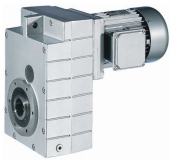
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	174	189					
GFL09	m	[kg]	223	238	289	294	314		
GFL11	m	[kg]	308	323	374	379	399	599	619
GFL14	m	[kg]	455	470	521	526	546	743	763

GFL□□-2M SAR / SBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL04	m	[kg]	22	28	30					
GFL05	m	[kg]	33	39	41	47	50			
GFL06	m	[kg]	48	55	57	63	65	78	100	107
GFL07	m	[kg]	76	82	84	90	93	106	128	135
GFL09	m	[kg]		133	135	141	144	156	180	187
GFL11	m	[kg]				236	238	250	272	279
GFL14	m	[kg]						407	428	435

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	178	193					
GFL09	m	[kg]	230	245	296	301	321		
GFL11	m	[kg]	322	337	388	393	413	613	633
GFL14	m	[kg]	478	493	544	549	569	766	786

► 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

GFL□□-2M SAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL05	m	[kg]	37	43	45	51	54			
GFL06	m	[kg]	55	62	64	70	72	85	107	114
GFL07	m	[kg]	87	93	95	101	104	117	139	146
GFL09	m	[kg]		149	151	157	160	172	196	203
GFL11	m	[kg]				260	262	274	296	303
GFL14	m	[kg]						440	461	468

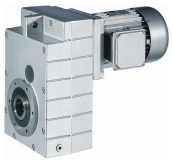
			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	189	204					
GFL09	m	[kg]	246	261	312	317	337		
GFL11	m	[kg]	346	361	412	417	437	637	657
GFL14	m	[kg]	511	526	577	582	602	799	819

GFL□□-2M SCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22
GFL05	m	[kg]	36	42	44	50	52			
GFL06	m	[kg]	53	59	61	67	70	82	105	112
GFL07	m	[kg]	83	89	91	97	100	113	135	142
GFL09	m	[kg]		142	144	150	153	165	189	196
GFL11	m	[kg]				246	248	260	282	289
GFL14	m	[kg]						417	438	445

			160C22	160C32	180C12	180C32	180C42	225C12	225C22
GFL07	m	[kg]	185	200					
GFL09	m	[kg]	239	254	305	310	330		
GFL11	m	[kg]	332	347	398	403	423	623	643
GFL14	m	[kg]	488	503	554	559	579	776	796

► 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

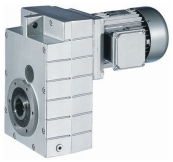
GFL□□-3M HCR / HDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	49	54								
GFL07	m	[kg]	79	85	87	93						
GFL09	m	[kg]	130	136	138	144	147	160				
GFL11	m	[kg]	223	229	231	237	240	253	276	283		
GFL14	m	[kg]		386	388	394	396	409	432	439	482	497

GFL□□-3M HAR / HBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	51	57								
GFL07	m	[kg]	83	89	91	97						
GFL09	m	[kg]	137	143	145	151	154	167				
GFL11	m	[kg]	237	243	245	251	254	267	290	297		
GFL14	m	[kg]		409	411	417	419	432	455	462	505	520

► 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

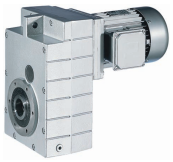
GFL□□-3M HAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	58	64								
GFL07	m	[kg]	94	100	102	108						
GFL09	m	[kg]	153	159	161	167	170	183				
GFL11	m	[kg]	261	267	269	275	278	291	314	321		
GFL14	m	[kg]		442	444	450	452	465	488	495	538	553

GFL□□-3M HCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	56	61								
GFL07	m	[kg]	90	96	98	104						
GFL09	m	[kg]	146	152	154	160	163	176				
GFL11	m	[kg]	247	253	255	261	264	277	300	307		
GFL14	m	[kg]		419	421	427	429	442	465	472	515	530

► 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

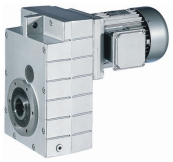
GFL□□-3M VCR / VDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	51	57								
GFL07	m	[kg]	84	90	92	98						
GFL09	m	[kg]	138	144	146	152	155	168				
GFL11	m	[kg]	239	245	247	253	256	269	292	299		
GFL14	m	[kg]		419	421	427	429	442	465	472	515	530

GFL□□-3M VAR / VBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	54	59								
GFL07	m	[kg]	88	94	96	102						
GFL09	m	[kg]	145	151	153	159	162	175				
GFL11	m	[kg]	253	259	261	267	270	283	306	313		
GFL14	m	[kg]		442	444	450	452	465	488	495	538	553

► 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

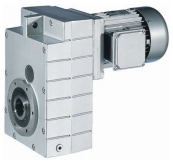
GFL□□-3M VAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	61	66								
GFL07	m	[kg]	99	105	107	113						
GFL09	m	[kg]	161	167	169	175	178	191				
GFL11	m	[kg]	277	283	285	291	294	307	330	337		
GFL14	m	[kg]		475	477	483	485	498	521	528	571	586

GFL□□-3M VCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	58	64								
GFL07	m	[kg]	95	101	103	109						
GFL09	m	[kg]	154	160	162	168	171	184				
GFL11	m	[kg]	263	269	271	277	280	293	316	323		
GFL14	m	[kg]		452	454	460	462	475	498	505	548	563

► 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

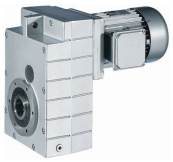
GFL□□-3M SCR / SDR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	50	55								
GFL07	m	[kg]	80	86	88	94						
GFL09	m	[kg]	133	139	141	147	150	163				
GFL11	m	[kg]	228	234	236	242	245	258	281	288		
GFL14	m	[kg]		397	399	405	407	420	443	450	493	508

GFL□□-3M SAR / SBR

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	52	58								
GFL07	m	[kg]	84	90	92	98						
GFL09	m	[kg]	140	146	148	154	157	170				
GFL11	m	[kg]	242	248	250	256	259	272	295	302		
GFL14	m	[kg]		420	422	428	430	443	466	473	516	531

► 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

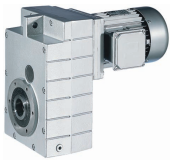
GFL□□-3M SAK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	59	65								
GFL07	m	[kg]	95	101	103	109						
GFL09	m	[kg]	156	162	164	170	173	186				
GFL11	m	[kg]	266	272	274	280	283	296	319	326		
GFL14	m	[kg]		453	455	461	463	476	499	506	549	564

GFL□□-3M SCK

			080C32	090C12	090C32	100C12	100C32	112C22	132C12	132C22	160C22	160C32
GFL06	m	[kg]	57	62								
GFL07	m	[kg]	91	97	99	105						
GFL09	m	[kg]	149	155	157	163	166	179				
GFL11	m	[kg]	252	258	260	266	269	282	305	312		
GFL14	m	[kg]		430	432	438	440	453	476	483	526	541

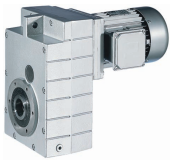
► Weights with oil filling for mounting position A; all values are approximate.
The weights relate to the basic version. Bear in mind that additional weights may be needed, e.g. for motor options.



Selection tables

50 Hz, 60 Hz: P_N = 0.75 kW

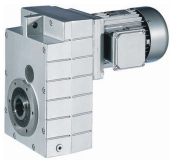
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	385	18	4.2		467	15	4.8	3.659	GFL04-2M □□□080C32	78
	281	25	4.2		341	20	4.8	5.018	GFL04-2M □□□080C32	78
	242	29	4.2		293	24	4.8	5.833	GFL04-2M □□□080C32	78
	220	32	3.6		266	26	4.1	6.422	GFL04-2M □□□080C32	78
	201	35	3.3		243	28	3.8	7.025	GFL04-2M □□□080C32	78
	168	41	4.2		204	34	4.8	8.379	GFL04-2M □□□080C32	78
	151	46	3.6		183	38	4.2	9.333	GFL04-2M □□□080C32	78
	138	50	3.2		167	41	3.7	10.238	GFL04-2M □□□080C32	78
	123	57	3.2		149	46	3.7	11.491	GFL04-2M □□□080C32	78
	110	63	2.6		134	52	3.1	12.800	GFL04-2M □□□080C32	78
	96	72	2.5		116	59	2.9	14.706	GFL04-2M □□□080C32	78
	88	79	2.3		106	65	2.7	16.087	GFL04-2M □□□080C32	78
	79	88	1.9		95	72	2.2	17.920	GFL04-2M □□□080C32	78
	69	101	1.8		83	83	2.1	20.519	GFL04-2M □□□080C32	78
	62	113	1.5		75	92	1.7	22.857	GFL04-2M □□□080C32	78
	62	113	2.8		75	92	3.2	22.857	GFL05-2M □□□080C32	78
	57	122	2.8		69	100	3.4	24.850	GFL05-2M □□□080C32	78
	56	124	1.5		68	102	1.8	25.136	GFL04-2M □□□080C32	78
	50	138	1.2		61	113	1.5	28.000	GFL04-2M □□□080C32	78
	50	138	2.3		61	113	2.8	28.000	GFL05-2M □□□080C32	78
	45	156	1.2		54	128	1.4	31.600	GFL04-2M □□□080C32	78
	44	159	2.2		53	131	2.6	32.344	GFL05-2M □□□080C32	78
	40	173	1.0		49	142	1.2	35.200	GFL04-2M □□□080C32	78
	39	180	1.8		47	147	2.1	36.444	GFL05-2M □□□080C32	78
	35	198	1.7		43	163	2.1	40.233	GFL05-2M □□□080C32	78
	35	201	0.9		42	164	1.1	40.697	GFL04-2M □□□080C32	78
	35	201	2.9		42	165	3.5	40.800	GFL06-2M □□□080C32	78
	31	223	1.4		38	183	1.7	45.333	GFL05-2M □□□080C32	78
	31	227	2.7		37	186	3.3	45.963	GFL06-2M □□□080C32	78
	27	257	1.2		33	210	1.5	52.067	GFL05-2M □□□080C32	78
	27	257	2.9		33	210	3.5	52.067	GFL07-2M □□□080C32	78
	27	260	2.5		32	213	3.1	52.800	GFL06-2M □□□080C32	78
	24	289	1.1		29	237	1.4	58.667	GFL05-2M □□□080C32	78
	24	289	2.9		29	237	3.5	58.667	GFL07-2M □□□080C32	78
	24	293	2.1		29	240	2.6	59.481	GFL06-2M □□□080C32	78
	22	311	0.9		27	255	1.1	63.190	GFL05-2M □□□080C32	78
	22	311	2.5		27	255	3.1	63.190	GFL07-2M □□□080C32	78
	22	316	1.8		27	259	2.2	64.080	GFL06-2M □□□080C32	78
	22	317	2.8		26	260	3.4	65.306	GFL07-3M □□□080C32	86
	21	321	1.5		26	263	1.9	66.213	GFL06-3M □□□080C32	86



Selection tables

50 Hz, 60 Hz: P_N = 0.75 kW

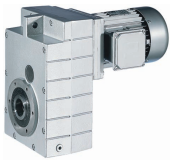
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	20	351	0.9		24	288	1.1	71.200	GFL05-2M □□□080C32	78
	20	351	2.5		24	288	3.1	71.200	GFL07-2M □□□080C32	78
	20	350	1.4		24	287	1.7	72.000	GFL06-3M □□□080C32	86
	20	356	1.7		24	292	2.1	72.189	GFL06-2M □□□080C32	78
	20	352	2.5		24	288	3.0	72.452	GFL07-3M □□□080C32	86
	18	394	2.0		21	323	2.5	79.875	GFL07-2M □□□080C32	78
	17	399	1.1		21	327	1.3	81.000	GFL06-2M □□□080C32	78
	17	394	1.3		21	323	1.5	81.111	GFL06-3M □□□080C32	86
	17	396	2.5		21	325	3.0	81.636	GFL07-3M □□□080C32	86
	16	428	1.1		19	351	1.4	88.200	GFL06-3M □□□080C32	86
	16	444	2.0		19	364	2.5	90.000	GFL07-2M □□□080C32	78
	16	450	1.1		19	369	1.3	91.250	GFL06-2M □□□080C32	78
	15	449	2.1		19	368	2.6	92.413	GFL07-3M □□□080C32	86
	14	482	1.1		17	395	1.4	99.361	GFL06-3M □□□080C32	86
	14	505	2.1		16	414	2.6	104.127	GFL07-3M □□□080C32	86
	13	550	1.9		15	450	2.3	113.206	GFL07-3M □□□080C32	86
	12	566	0.9		15	464	1.1	116.571	GFL06-3M □□□080C32	86
	11	619	1.9		13	508	2.3	127.556	GFL07-3M □□□080C32	86
	11	637	0.9		13	523	1.1	131.323	GFL06-3M □□□080C32	86
	9.6	715	1.6		12	586	1.9	147.347	GFL07-3M □□□080C32	86
	9.5	722	2.8		12	592	3.5	148.815	GFL09-3M □□□080C32	86
	8.5	806	1.5		10	661	1.9	166.025	GFL07-3M □□□080C32	86
	8.4	814	2.8		10	667	3.5	167.712	GFL09-3M □□□080C32	86
	7.7	890	1.4		9.3	729	1.7	183.285	GFL07-3M □□□080C32	86
	7.6	899	2.5		9.2	737	3.0	185.111	GFL09-3M □□□080C32	86
	6.8	1002	1.2		8.3	822	1.5	206.519	GFL07-3M □□□080C32	86
	6.8	1013	2.5		8.2	830	3.0	208.617	GFL09-3M □□□080C32	86
	6.3	1090	1.2		7.6	894	1.5	224.636	GFL07-3M □□□080C32	86
	6.3	1091	2.2		7.6	894	2.7	224.778	GFL09-3M □□□080C32	86
	5.6	1229	1.0		6.8	1007	1.2	253.111	GFL07-3M □□□080C32	86
	5.6	1230	2.2		6.8	1008	2.7	253.321	GFL09-3M □□□080C32	86
	4.9	1411	1.0		5.9	1157	1.2	290.706	GFL07-3M □□□080C32	86
	4.9	1412	1.9		5.9	1158	2.3	290.889	GFL09-3M □□□080C32	86
	4.3	1591	1.9		5.2	1305	2.3	327.827	GFL09-3M □□□080C32	86
	4.0	1713	0.8		4.9	1404	1.0	352.811	GFL07-3M □□□080C32	86
	4.0	1714	1.6		4.8	1405	2.0	353.033	GFL09-3M □□□080C32	86
	3.9	1738	2.5		4.8	1425	3.1	358.077	GFL11-3M □□□080C32	86
	3.5	1931	1.6		4.3	1583	2.0	397.863	GFL09-3M □□□080C32	86
	3.5	1959	2.5		4.2	1606	3.1	403.467	GFL11-3M □□□080C32	86
	3.3	2059	1.3		4.0	1688	1.6	424.247	GFL09-3M □□□080C32	86



Selection tables

50 Hz, 60 Hz: P_N = 0.75 kW

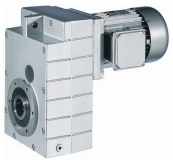
n_N	1410 r/min				1720 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	3.3	2088	2.8		4.0	1712	3.5	430.222	GFL11-3M □□□080C32	86
	2.7	2499	1.1		3.3	2049	1.3	514.881	GFL09-3M □□□080C32	86
	2.7	2535	2.3		3.3	2078	2.9	522.133	GFL11-3M □□□080C32	86
	2.5	2730	1.9		3.0	2238	2.4	562.391	GFL11-3M □□□080C32	86
	2.2	3076	1.9		2.7	2522	2.3	633.680	GFL11-3M □□□080C32	86
	2.0	3451	1.5		2.4	2829	1.9	710.888	GFL11-3M □□□080C32	86
	1.8	3888	1.5		2.1	3187	1.8	801.000	GFL11-3M □□□080C32	86



Selection tables

50 Hz, 60 Hz: P_N = 1.1 kW

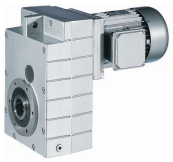
n_N	1430 r/min				1740 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	391	26	4.2		473	21	4.8	3.659	GFL04-2M □□□090C12	82
	313	33	5.2		378	27	6.0	4.571	GFL05-2M □□□090C12	78
	285	36	3.1		345	29	3.6	5.018	GFL04-2M □□□090C12	82
	245	42	3.7		297	34	4.3	5.833	GFL04-2M □□□090C12	82
	223	46	2.5		269	38	2.8	6.422	GFL04-2M □□□090C12	82
	204	50	2.3		246	41	2.6	7.025	GFL04-2M □□□090C12	82
	171	60	3.0		207	49	3.5	8.379	GFL04-2M □□□090C12	82
	153	67	2.5		185	55	2.9	9.333	GFL04-2M □□□090C12	82
	140	73	2.2		169	60	2.5	10.238	GFL04-2M □□□090C12	82
	124	82	2.2		151	67	2.6	11.491	GFL04-2M □□□090C12	82
	112	91	1.8		135	75	2.1	12.800	GFL04-2M □□□090C12	82
	112	91	3.1		135	75	3.6	12.800	GFL05-2M □□□090C12	78
	98	104	2.9		119	85	3.4	14.538	GFL05-2M □□□090C12	78
	97	105	1.7		118	86	2.0	14.706	GFL04-2M □□□090C12	82
	90	113	2.7		109	93	3.2	15.904	GFL05-2M □□□090C12	78
	89	115	1.6		108	94	1.8	16.087	GFL04-2M □□□090C12	82
	80	128	1.3		97	105	1.5	17.920	GFL04-2M □□□090C12	82
	80	128	2.4		97	105	2.8	17.920	GFL05-2M □□□090C12	78
	71	145	2.3		85	119	2.7	20.286	GFL05-2M □□□090C12	78
	70	146	1.3		84	120	1.4	20.519	GFL04-2M □□□090C12	82
	63	163	1.0		76	134	1.2	22.857	GFL04-2M □□□090C12	82
	63	163	1.9		76	134	2.2	22.857	GFL05-2M □□□090C12	78
	58	177	1.9		70	146	2.4	24.850	GFL05-2M □□□090C12	78
	57	179	1.0		69	147	1.2	25.136	GFL04-2M □□□090C12	82
	51	200	0.8		62	164	1.0	28.000	GFL04-2M □□□090C12	82
	51	200	1.6		62	164	1.9	28.000	GFL05-2M □□□090C12	78
	50	202	3.0		61	166	3.7	28.389	GFL06-2M □□□090C12	78
	44	231	1.5		54	189	1.8	32.344	GFL05-2M □□□090C12	78
	44	234	2.7		53	192	3.3	32.800	GFL06-2M □□□090C12	78
	39	260	1.2		48	213	1.5	36.444	GFL05-2M □□□090C12	78
	39	263	2.3		47	216	2.8	36.951	GFL06-2M □□□090C12	78
	36	287	1.2		43	236	1.5	40.233	GFL05-2M □□□090C12	78
	35	291	2.3		42	239	2.7	40.800	GFL06-2M □□□090C12	78
	32	323	1.0		38	266	1.2	45.333	GFL05-2M □□□090C12	78
	31	328	1.9		38	269	2.3	45.963	GFL06-2M □□□090C12	78
	27	376	1.8		33	309	2.1	52.800	GFL06-2M □□□090C12	78
	24	418	3.0		30	344	3.7	58.667	GFL07-2M □□□090C12	78
	24	424	1.5		29	348	1.8	59.481	GFL06-2M □□□090C12	78
	23	450	2.8		27	370	3.4	63.190	GFL07-2M □□□090C12	78
	22	457	1.3		27	375	1.5	64.080	GFL06-2M □□□090C12	78



Selection tables

50 Hz, 60 Hz: P_N = 1.1 kW

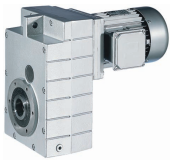
n_N	1430 r/min				1740 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	22	458	1.9		27	377	2.3	65.306	GFL07-3M □□□090C12	86
	22	465	1.1		26	382	1.3	66.213	GFL06-3M □□□090C12	86
	20	507	2.5		24	417	3.1	71.200	GFL07-2M □□□090C12	78
	20	505	1.0		24	415	1.2	72.000	GFL06-3M □□□090C12	86
	20	514	1.2		24	423	1.5	72.189	GFL06-2M □□□090C12	78
	20	509	1.7		24	418	2.1	72.452	GFL07-3M □□□090C12	86
	20	514	3.0		24	422	3.6	73.173	GFL09-3M □□□090C12	86
	18	561	2.7		22	461	3.3	78.750	GFL09-2M □□□090C12	78
	18	569	1.5		22	468	1.8	79.875	GFL07-2M □□□090C12	78
	18	569	0.9		21	468	1.1	81.111	GFL06-3M □□□090C12	86
	18	573	1.7		21	471	2.1	81.636	GFL07-3M □□□090C12	86
	17	579	3.0		21	476	3.6	82.465	GFL09-3M □□□090C12	86
	16	633	2.7		20	520	3.3	88.750	GFL09-2M □□□090C12	78
	16	641	1.5		19	527	1.8	90.000	GFL07-2M □□□090C12	78
	16	649	1.5		19	533	1.8	92.413	GFL07-3M □□□090C12	86
	15	655	2.6		19	538	3.1	93.333	GFL09-3M □□□090C12	86
	14	731	1.5		17	601	1.8	104.127	GFL07-3M □□□090C12	86
	14	738	2.6		16	607	3.1	105.185	GFL09-3M □□□090C12	86
	13	795	1.3		15	653	1.6	113.206	GFL07-3M □□□090C12	86
	13	803	2.3		15	660	2.8	114.333	GFL09-3M □□□090C12	86
	11	895	1.3		14	736	1.6	127.556	GFL07-3M □□□090C12	86
	11	905	2.3		13	743	2.8	128.852	GFL09-3M □□□090C12	86
	9.7	1034	1.1		12	850	1.3	147.347	GFL07-3M □□□090C12	86
	9.6	1045	2.0		12	859	2.4	148.815	GFL09-3M □□□090C12	86
	8.6	1165	1.1		10	958	1.3	166.025	GFL07-3M □□□090C12	86
	8.5	1177	2.0		10	968	2.4	167.712	GFL09-3M □□□090C12	86
	7.8	1287	1.0		9.4	1057	1.2	183.285	GFL07-3M □□□090C12	86
	7.7	1299	1.7		9.4	1068	2.1	185.111	GFL09-3M □□□090C12	86
	6.9	1450	0.9		8.4	1191	1.0	206.519	GFL07-3M □□□090C12	86
	6.9	1464	1.7		8.3	1204	2.1	208.617	GFL09-3M □□□090C12	86
	6.4	1577	0.9		7.7	1296	1.0	224.636	GFL07-3M □□□090C12	86
	6.4	1577	2.9		7.7	1296	3.5	224.636	GFL11-3M □□□090C12	86
	6.4	1578	1.5		7.7	1297	1.9	224.778	GFL09-3M □□□090C12	86
	5.7	1777	2.9		6.8	1460	3.5	253.111	GFL11-3M □□□090C12	86
	5.7	1778	1.5		6.8	1461	1.9	253.321	GFL09-3M □□□090C12	86
	5.4	1876	2.7		6.5	1542	3.3	267.259	GFL11-3M □□□090C12	86
	4.9	2042	1.3		6.0	1678	1.6	290.889	GFL09-3M □□□090C12	86
	4.4	2299	2.4		5.3	1890	2.9	327.556	GFL11-3M □□□090C12	86
	4.4	2301	1.3		5.3	1891	1.6	327.827	GFL09-3M □□□090C12	86
	4.1	2478	1.1		4.9	2037	1.4	353.033	GFL09-3M □□□090C12	86



Selection tables

50 Hz, 60 Hz: P_N = 1.1 kW

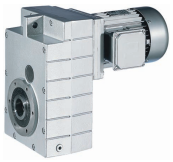
n_N	1430 r/min				1740 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	4.0	2514	2.1		4.8	2066	2.6	358.077	GFL11-3M □□□090C12	86
	3.6	2793	1.1		4.4	2295	1.4	397.863	GFL09-3M □□□090C12	86
	3.5	2832	2.1		4.3	2328	2.6	403.467	GFL11-3M □□□090C12	86
	3.4	2978	0.9		4.1	2448	1.1	424.247	GFL09-3M □□□090C12	86
	3.3	3020	2.0		4.0	2482	2.4	430.222	GFL11-3M □□□090C12	86
	2.7	3665	1.6		3.3	3012	2.0	522.133	GFL11-3M □□□090C12	86
	2.7	3665	2.9		3.3	3012	3.5	522.133	GFL14-3M □□□090C12	86
	2.5	3948	1.3		3.1	3245	1.6	562.391	GFL11-3M □□□090C12	86
	2.5	3948	2.3		3.1	3245	2.8	562.391	GFL14-3M □□□090C12	86
	2.3	4448	1.3		2.7	3656	1.6	633.680	GFL11-3M □□□090C12	86
	2.3	4448	2.2		2.7	3656	2.7	633.680	GFL14-3M □□□090C12	86
	2.0	4990	1.1		2.4	4101	1.3	710.888	GFL11-3M □□□090C12	86
	2.0	4990	1.8		2.4	4101	2.2	710.888	GFL14-3M □□□090C12	86
	1.8	5623	1.0		2.2	4621	1.3	801.000	GFL11-3M □□□090C12	86
	1.8	5623	1.7		2.2	4621	2.1	801.000	GFL14-3M □□□090C12	86



Selection tables

50 Hz, 60 Hz: P_N = 1.5 kW

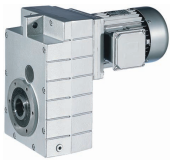
n_N	1435 r/min				1745 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	392	35	3.1		474	29	3.6	3.659	GFL04-2M □□□090C32	82
	314	44	3.8		380	36	4.4	4.571	GFL05-2M □□□090C32	78
	286	49	2.3		346	40	2.6	5.018	GFL04-2M □□□090C32	82
	246	56	2.7		297	46	3.1	5.833	GFL04-2M □□□090C32	82
	224	62	2.8		271	51	3.2	6.400	GFL05-2M □□□090C32	78
	223	62	1.8		270	51	2.1	6.422	GFL04-2M □□□090C32	82
	204	68	1.7		247	56	1.9	7.025	GFL04-2M □□□090C32	82
	171	81	2.2		207	67	2.5	8.379	GFL04-2M □□□090C32	82
	159	87	3.0		193	72	3.5	9.010	GFL05-2M □□□090C32	78
	154	90	1.8		186	74	2.1	9.333	GFL04-2M □□□090C32	82
	144	96	2.9		174	79	3.3	9.946	GFL05-2M □□□090C32	78
	140	99	1.6		170	82	1.9	10.238	GFL04-2M □□□090C32	82
	126	110	2.5		153	90	2.9	11.360	GFL05-2M □□□090C32	78
	125	111	1.6		151	92	1.9	11.491	GFL04-2M □□□090C32	82
	112	124	1.3		136	102	1.5	12.800	GFL04-2M □□□090C32	82
	112	124	2.3		136	102	2.7	12.800	GFL05-2M □□□090C32	78
	99	141	2.1		119	116	2.5	14.538	GFL05-2M □□□090C32	78
	98	142	1.3		118	117	1.5	14.706	GFL04-2M □□□090C32	82
	90	154	2.0		109	127	2.3	15.904	GFL05-2M □□□090C32	78
	89	156	1.2		108	128	1.4	16.087	GFL04-2M □□□090C32	82
	80	174	1.0		97	143	1.1	17.920	GFL04-2M □□□090C32	82
	80	174	1.8		97	143	2.1	17.920	GFL05-2M □□□090C32	78
	71	196	1.7		86	162	2.0	20.286	GFL05-2M □□□090C32	78
	70	199	0.9		85	163	1.1	20.519	GFL04-2M □□□090C32	82
	70	199	3.2		84	164	3.7	20.571	GFL06-2M □□□090C32	78
	63	221	1.4		76	182	1.6	22.857	GFL05-2M □□□090C32	78
	62	224	2.7		75	185	3.1	23.175	GFL06-2M □□□090C32	78
	58	241	1.4		70	198	1.7	24.850	GFL05-2M □□□090C32	78
	57	244	2.7		69	201	3.2	25.200	GFL06-2M □□□090C32	78
	51	271	1.2		62	223	1.4	28.000	GFL05-2M □□□090C32	78
	51	275	2.2		61	226	2.7	28.389	GFL06-2M □□□090C32	78
	44	313	1.1		54	258	1.3	32.344	GFL05-2M □□□090C32	78
	44	318	2.0		53	261	2.5	32.800	GFL06-2M □□□090C32	78
	39	353	0.9		48	290	1.1	36.444	GFL05-2M □□□090C32	78
	39	358	1.7		47	294	2.1	36.951	GFL06-2M □□□090C32	78
	36	384	2.9		44	316	3.6	39.642	GFL07-2M □□□090C32	78
	36	390	0.9		43	320	1.1	40.233	GFL05-2M □□□090C32	78
	35	395	1.7		43	325	2.0	40.800	GFL06-2M □□□090C32	78
	32	433	2.9		39	356	3.5	44.667	GFL07-2M □□□090C32	78
	31	445	1.4		38	366	1.7	45.963	GFL06-2M □□□090C32	78



Selection tables

50 Hz, 60 Hz: P_N = 1.5 kW

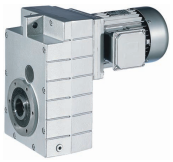
n_N	1435 r/min				1745 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	28	497	2.9		34	409	3.6	51.333	GFL09-2M □□□090C32	78
	28	504	2.4		33	415	3.0	52.067	GFL07-2M □□□090C32	78
	27	511	1.3		33	421	1.6	52.800	GFL06-2M □□□090C32	78
	25	560	2.9		30	461	3.6	57.852	GFL09-2M □□□090C32	78
	25	568	2.2		30	467	2.7	58.667	GFL07-2M □□□090C32	78
	24	576	1.1		29	474	1.3	59.481	GFL06-2M □□□090C32	78
	23	603	2.6		28	496	3.1	62.300	GFL09-2M □□□090C32	78
	23	612	2.0		28	503	2.5	63.190	GFL07-2M □□□090C32	78
	23	604	2.5		27	497	3.0	63.326	GFL09-3M □□□090C32	86
	22	621	0.9		27	510	1.1	64.080	GFL06-2M □□□090C32	78
	22	623	1.4		27	512	1.7	65.306	GFL07-3M □□□090C32	86
	20	680	2.6		25	559	3.1	70.211	GFL09-2M □□□090C32	78
	20	690	1.9		24	567	2.3	71.200	GFL07-2M □□□090C32	78
	20	699	0.9		24	575	1.1	72.189	GFL06-2M □□□090C32	78
	20	691	1.3		24	568	1.5	72.452	GFL07-3M □□□090C32	86
	20	698	2.2		24	574	2.6	73.173	GFL09-3M □□□090C32	86
	18	763	2.0		22	627	2.4	78.750	GFL09-2M □□□090C32	78
	18	774	1.1		22	636	1.3	79.875	GFL07-2M □□□090C32	78
	18	779	1.3		21	640	1.5	81.636	GFL07-3M □□□090C32	86
	17	787	2.2		21	647	2.6	82.465	GFL09-3M □□□090C32	86
	16	860	2.0		20	707	2.4	88.750	GFL09-2M □□□090C32	78
	16	872	1.1		19	717	1.3	90.000	GFL07-2M □□□090C32	78
	16	882	1.1		19	725	1.3	92.413	GFL07-3M □□□090C32	86
	15	890	1.9		19	732	2.3	93.333	GFL09-3M □□□090C32	86
	14	993	1.1		17	817	1.3	104.127	GFL07-3M □□□090C32	86
	14	1003	1.9		17	825	2.3	105.185	GFL09-3M □□□090C32	86
	13	1080	1.0		15	888	1.2	113.206	GFL07-3M □□□090C32	86
	13	1091	1.7		15	897	2.1	114.333	GFL09-3M □□□090C32	86
	11	1217	1.0		14	1001	1.2	127.556	GFL07-3M □□□090C32	86
	11	1229	1.7		14	1011	2.1	128.852	GFL09-3M □□□090C32	86
	9.7	1406	0.8		12	1156	1.0	147.347	GFL07-3M □□□090C32	86
	9.6	1420	1.4		12	1167	1.8	148.815	GFL09-3M □□□090C32	86
	9.6	1423	2.7		12	1170	3.3	149.144	GFL11-3M □□□090C32	86
	8.6	1600	1.4		10	1316	1.8	167.712	GFL09-3M □□□090C32	86
	8.5	1603	2.7		10	1318	3.3	168.049	GFL11-3M □□□090C32	86
	7.9	1744	2.4		9.5	1434	3.0	182.792	GFL11-3M □□□090C32	86
	7.8	1766	1.3		9.4	1452	1.5	185.111	GFL09-3M □□□090C32	86
	7.1	1928	2.9		8.6	1585	3.6	202.074	GFL14-3M □□□090C32	86
	7.0	1965	2.4		8.4	1616	3.0	205.963	GFL11-3M □□□090C32	86
	6.9	1990	1.3		8.3	1637	1.5	208.617	GFL09-3M □□□090C32	86



Selection tables

50 Hz, 60 Hz: P_N = 1.5 kW

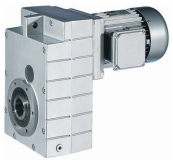
n_N	1435 r/min				1745 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	6.4	2143	2.1		7.7	1762	2.6	224.636	GFL11-3M □□□090C32	86
	6.4	2144	1.1		7.7	1763	1.4	224.778	GFL09-3M □□□090C32	86
	5.7	2415	2.1		6.9	1986	2.6	253.111	GFL11-3M □□□090C32	86
	5.7	2417	1.1		6.9	1987	1.4	253.321	GFL09-3M □□□090C32	86
	5.4	2549	2.0		6.5	2097	2.4	267.259	GFL11-3M □□□090C32	86
	4.9	2775	1.0		6.0	2282	1.2	290.889	GFL09-3M □□□090C32	86
	4.4	3125	1.8		5.3	2570	2.1	327.556	GFL11-3M □□□090C32	86
	4.4	3127	1.0		5.3	2572	1.2	327.827	GFL09-3M □□□090C32	86
	4.1	3366	2.6		4.9	2768	3.1	352.811	GFL14-3M □□□090C32	86
	4.1	3368	0.8		4.9	2769	1.0	353.033	GFL09-3M □□□090C32	86
	4.0	3416	1.5		4.9	2809	1.9	358.077	GFL11-3M □□□090C32	86
	3.6	3792	2.6		4.4	3119	3.1	397.533	GFL14-3M □□□090C32	86
	3.6	3795	0.8		4.4	3121	1.0	397.863	GFL09-3M □□□090C32	86
	3.6	3849	1.5		4.3	3165	1.9	403.467	GFL11-3M □□□090C32	86
	3.3	4104	1.4		4.0	3375	1.8	430.222	GFL11-3M □□□090C32	86
	3.3	4104	2.6		4.0	3375	3.1	430.222	GFL14-3M □□□090C32	86
	2.8	4981	1.2		3.3	4096	1.5	522.133	GFL11-3M □□□090C32	86
	2.8	4981	2.1		3.3	4096	2.6	522.133	GFL14-3M □□□090C32	86
	2.6	5365	1.0		3.1	4412	1.2	562.391	GFL11-3M □□□090C32	86
	2.6	5365	1.7		3.1	4412	2.0	562.391	GFL14-3M □□□090C32	86
	2.3	6045	1.0		2.7	4971	1.2	633.680	GFL11-3M □□□090C32	86
	2.3	6045	1.6		2.7	4971	2.0	633.680	GFL14-3M □□□090C32	86
	2.0	6781	1.3		2.5	5577	1.6	710.888	GFL14-3M □□□090C32	86
	1.8	7641	1.3		2.2	6284	1.6	801.000	GFL14-3M □□□090C32	86



Selection tables

50 Hz, 60 Hz: P_N = 2.2 kW

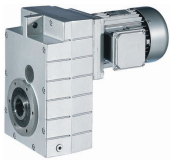
n_N	1445 r/min				1750 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	434	47	3.5		524	39	4.1	3.333	GFL05-2M □□□100C12	78
	316	64	2.6		382	53	3.0	4.571	GFL05-2M □□□100C12	78
	282	72	3.1		340	60	3.5	5.133	GFL05-2M □□□100C12	78
	255	80	2.9		308	66	3.3	5.667	GFL05-2M □□□100C12	78
	226	90	1.9		273	75	2.2	6.400	GFL05-2M □□□100C12	78
	205	99	2.5		248	82	2.9	7.040	GFL05-2M □□□100C12	78
	186	110	2.4		225	91	2.7	7.771	GFL05-2M □□□100C12	78
	160	127	2.1		194	105	2.4	9.010	GFL05-2M □□□100C12	78
	145	140	2.0		176	116	2.3	9.946	GFL05-2M □□□100C12	78
	143	142	3.2		173	118	3.7	10.092	GFL06-2M □□□100C12	78
	127	160	1.7		154	132	2.0	11.360	GFL05-2M □□□100C12	78
	113	181	1.6		136	149	1.8	12.800	GFL05-2M □□□100C12	78
	111	183	3.2		135	151	3.7	12.978	GFL06-2M □□□100C12	78
	99	205	1.5		120	169	1.7	14.538	GFL05-2M □□□100C12	78
	98	208	3.1		118	172	3.5	14.743	GFL06-2M □□□100C12	78
	91	224	1.4		110	185	1.6	15.904	GFL05-2M □□□100C12	78
	90	227	2.8		108	188	3.2	16.128	GFL06-2M □□□100C12	78
	81	253	1.2		97	209	1.4	17.920	GFL05-2M □□□100C12	78
	80	256	2.3		96	212	2.7	18.169	GFL06-2M □□□100C12	78
	71	286	1.2		86	236	1.3	20.286	GFL05-2M □□□100C12	78
	70	290	2.2		85	240	2.6	20.571	GFL06-2M □□□100C12	78
	63	322	1.0		76	266	1.1	22.857	GFL05-2M □□□100C12	78
	62	327	1.8		75	270	2.1	23.175	GFL06-2M □□□100C12	78
	58	351	1.0		70	289	1.2	24.850	GFL05-2M □□□100C12	78
	57	355	1.8		69	294	2.2	25.200	GFL06-2M □□□100C12	78
	52	395	3.1		62	326	3.8	28.000	GFL07-2M □□□100C12	78
	51	400	1.5		62	331	1.8	28.389	GFL06-2M □□□100C12	78
	45	456	3.0		54	377	3.6	32.344	GFL07-2M □□□100C12	78
	44	463	1.4		53	382	1.7	32.800	GFL06-2M □□□100C12	78
	40	514	2.4		48	424	2.9	36.444	GFL07-2M □□□100C12	78
	39	521	1.2		47	430	1.4	36.951	GFL06-2M □□□100C12	78
	37	559	2.5		44	462	3.0	39.642	GFL07-2M □□□100C12	78
	35	576	1.1		43	475	1.4	40.800	GFL06-2M □□□100C12	78
	32	630	2.0		39	520	2.4	44.667	GFL07-2M □□□100C12	78
	31	648	0.9		38	535	1.1	45.963	GFL06-2M □□□100C12	78
	28	724	2.8		34	598	3.4	51.333	GFL09-2M □□□100C12	78
	28	734	1.8		34	606	2.2	52.067	GFL07-2M □□□100C12	78
	25	816	2.8		30	674	3.4	57.852	GFL09-2M □□□100C12	78
	25	828	1.5		30	683	1.9	58.667	GFL07-2M □□□100C12	78
	23	879	2.3		28	726	2.8	62.300	GFL09-2M □□□100C12	78



Selection tables

50 Hz, 60 Hz: P_N = 2.2 kW

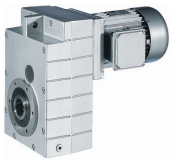
n_N	1445 r/min				1750 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	23	891	1.4		28	736	1.7	63.190	GFL07-2M □□□100C12	78
	23	891	2.9		28	736	3.5	63.190	GFL11-2M □□□100C12	78
	23	880	1.7		28	727	2.1	63.326	GFL09-3M □□□100C12	86
	22	907	1.0		27	749	1.2	65.306	GFL07-3M □□□100C12	86
	22	907	3.2		27	749	3.9	65.306	GFL11-3M □□□100C12	86
	21	990	2.3		25	818	2.8	70.211	GFL09-2M □□□100C12	78
	20	1004	1.3		25	829	1.5	71.200	GFL07-2M □□□100C12	78
	20	1004	2.9		25	829	3.5	71.200	GFL11-2M □□□100C12	78
	20	1007	0.9		24	831	1.0	72.452	GFL07-3M □□□100C12	86
	20	1017	1.5		24	839	1.8	73.173	GFL09-3M □□□100C12	86
	20	1019	2.8		24	841	3.4	73.335	GFL11-3M □□□100C12	86
	18	1111	1.5		22	917	1.8	78.750	GFL09-2M □□□100C12	78
	18	1127	2.3		22	930	2.8	79.875	GFL11-2M □□□100C12	78
	18	1134	0.9		21	937	1.0	81.636	GFL07-3M □□□100C12	86
	18	1146	1.5		21	946	1.8	82.465	GFL09-3M □□□100C12	86
	18	1148	2.8		21	948	3.4	82.631	GFL11-3M □□□100C12	86
	16	1252	1.4		20	1034	1.7	88.750	GFL09-2M □□□100C12	78
	16	1270	2.3		19	1048	2.8	90.000	GFL11-2M □□□100C12	78
	16	1297	1.3		19	1071	1.6	93.333	GFL09-3M □□□100C12	86
	15	1300	2.5		19	1073	3.0	93.540	GFL11-3M □□□100C12	86
	14	1461	1.3		17	1207	1.6	105.185	GFL09-3M □□□100C12	86
	14	1464	2.5		17	1209	3.0	105.397	GFL11-3M □□□100C12	86
	13	1589	1.2		15	1312	1.4	114.333	GFL09-3M □□□100C12	86
	13	1592	2.2		15	1315	2.7	114.586	GFL11-3M □□□100C12	86
	11	1790	1.2		14	1478	1.4	128.852	GFL09-3M □□□100C12	86
	11	1794	2.2		14	1481	2.7	129.111	GFL11-3M □□□100C12	86
	9.7	2068	1.0		12	1707	1.2	148.815	GFL09-3M □□□100C12	86
	9.7	2072	1.9		12	1711	2.3	149.144	GFL11-3M □□□100C12	86
	8.6	2330	1.0		10	1924	1.2	167.712	GFL09-3M □□□100C12	86
	8.6	2335	1.9		10	1928	2.3	168.049	GFL11-3M □□□100C12	86
	7.9	2540	1.7		9.6	2097	2.0	182.792	GFL11-3M □□□100C12	86
	7.8	2572	0.9		9.4	2124	1.1	185.111	GFL09-3M □□□100C12	86
	7.2	2808	2.8		8.6	2318	3.4	202.074	GFL14-3M □□□100C12	86
	7.0	2862	1.7		8.5	2363	2.0	205.963	GFL11-3M □□□100C12	86
	6.9	2899	0.9		8.4	2393	1.1	208.617	GFL09-3M □□□100C12	86
	6.4	3121	1.4		7.8	2577	1.8	224.636	GFL11-3M □□□100C12	86
	6.4	3121	2.8		7.8	2577	3.4	224.636	GFL14-3M □□□100C12	86
	5.7	3517	1.4		6.9	2904	1.8	253.111	GFL11-3M □□□100C12	86
	5.7	3517	2.8		6.9	2904	3.4	253.111	GFL14-3M □□□100C12	86
	5.4	3713	1.4		6.5	3066	1.7	267.259	GFL11-3M □□□100C12	86



Selection tables

50 Hz, 60 Hz: P_N = 2.2 kW

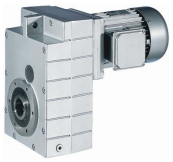
n_N	1445 r/min				1750 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	5.3	3804	2.6		6.4	3141	3.1	273.778	GFL14-3M □□□100C12	86
	4.4	4551	1.2		5.3	3758	1.5	327.556	GFL11-3M □□□100C12	86
	4.4	4619	2.3		5.3	3814	2.8	332.444	GFL14-3M □□□100C12	86
	4.1	4902	2.1		5.0	4048	2.6	352.811	GFL14-3M □□□100C12	86
	4.0	4975	1.1		4.9	4108	1.3	358.077	GFL11-3M □□□100C12	86
	3.6	5523	2.1		4.4	4561	2.5	397.533	GFL14-3M □□□100C12	86
	3.6	5606	1.1		4.3	4629	1.3	403.467	GFL11-3M □□□100C12	86
	3.4	5978	1.0		4.1	4936	1.2	430.222	GFL11-3M □□□100C12	86
	3.4	5978	1.8		4.1	4936	2.1	430.222	GFL14-3M □□□100C12	86
	2.8	7255	0.8		3.3	5990	1.0	522.133	GFL11-3M □□□100C12	86
	2.8	7255	1.5		3.3	5990	1.8	522.133	GFL14-3M □□□100C12	86
	2.6	7814	1.2		3.1	6452	1.4	562.391	GFL14-3M □□□100C12	86
	2.3	8805	1.1		2.8	7270	1.3	633.680	GFL14-3M □□□100C12	86
	2.0	9877	0.9		2.5	8156	1.1	710.888	GFL14-3M □□□100C12	86
	1.8	11129	0.9		2.2	9190	1.1	801.000	GFL14-3M □□□100C12	86



Selection tables

50 Hz, 60 Hz: P_N = 3.0 kW

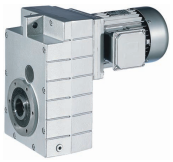
n_N	1445 r/min				1755 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	434	64	2.6		524	53	3.0	3.333	GFL05-2M □□□100C32	78
	316	88	1.9		382	72	2.2	4.571	GFL05-2M □□□100C32	78
	282	99	2.3		340	81	2.6	5.133	GFL05-2M □□□100C32	78
	255	109	2.1		308	90	2.5	5.667	GFL05-2M □□□100C32	78
	226	123	1.4		273	101	1.6	6.400	GFL05-2M □□□100C32	78
	224	124	2.8		271	102	3.3	6.450	GFL06-2M □□□100C32	78
	205	135	1.8		248	111	2.1	7.040	GFL05-2M □□□100C32	78
	202	137	3.2		244	113	3.6	7.147	GFL06-2M □□□100C32	78
	186	149	1.7		225	123	2.0	7.771	GFL05-2M □□□100C32	78
	160	173	1.5		194	143	1.8	9.010	GFL05-2M □□□100C32	78
	153	182	3.2		184	150	3.7	9.463	GFL06-2M □□□100C32	78
	145	191	1.4		176	158	1.7	9.946	GFL05-2M □□□100C32	78
	143	194	2.4		173	160	2.7	10.092	GFL06-2M □□□100C32	78
	127	219	1.3		154	180	1.5	11.360	GFL05-2M □□□100C32	78
	125	222	2.9		152	182	3.3	11.520	GFL06-2M □□□100C32	78
	113	246	1.2		136	203	1.3	12.800	GFL05-2M □□□100C32	78
	111	250	2.4		135	206	2.7	12.978	GFL06-2M □□□100C32	78
	99	280	1.1		120	230	1.2	14.538	GFL05-2M □□□100C32	78
	98	284	2.3		118	233	2.6	14.743	GFL06-2M □□□100C32	78
	91	306	1.0		110	252	1.2	15.904	GFL05-2M □□□100C32	78
	90	310	2.1		108	255	2.4	16.128	GFL06-2M □□□100C32	78
	81	345	0.9		97	284	1.0	17.920	GFL05-2M □□□100C32	78
	80	349	1.7		96	288	2.0	18.169	GFL06-2M □□□100C32	78
	71	390	0.9		86	321	1.0	20.286	GFL05-2M □□□100C32	78
	71	390	3.2		86	321	3.7	20.286	GFL07-2M □□□100C32	78
	70	396	1.6		85	326	1.9	20.571	GFL06-2M □□□100C32	78
	63	440	2.8		76	362	3.3	22.857	GFL07-2M □□□100C32	78
	62	446	1.4		75	367	1.6	23.175	GFL06-2M □□□100C32	78
	58	478	2.8		70	394	3.4	24.850	GFL07-2M □□□100C32	78
	57	485	1.3		69	399	1.6	25.200	GFL06-2M □□□100C32	78
	52	539	2.3		62	443	2.8	28.000	GFL07-2M □□□100C32	78
	51	546	1.1		62	450	1.4	28.389	GFL06-2M □□□100C32	78
	45	622	2.2		54	512	2.7	32.344	GFL07-2M □□□100C32	78
	44	628	3.0		53	517	3.6	32.667	GFL09-2M □□□100C32	78
	44	631	1.0		53	519	1.2	32.800	GFL06-2M □□□100C32	78
	40	701	1.8		48	577	2.2	36.444	GFL07-2M □□□100C32	78
	39	708	3.0		47	583	3.6	36.815	GFL09-2M □□□100C32	78
	39	711	0.9		47	585	1.0	36.951	GFL06-2M □□□100C32	78
	37	763	1.8		44	628	2.2	39.642	GFL07-2M □□□100C32	78
	36	763	2.5		44	628	3.1	39.667	GFL09-2M □□□100C32	78



Selection tables

50 Hz, 60 Hz: P_N = 3.0 kW

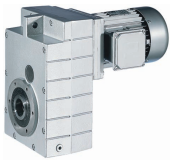
n_N	1445 r/min				1755 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	35	785	0.8		43	646	1.0	40.800	GFL06-2M □□□100C32	78
	32	859	1.5		39	707	1.8	44.667	GFL07-2M □□□100C32	78
	32	860	2.5		39	708	3.1	44.704	GFL09-2M □□□100C32	78
	28	987	2.0		34	813	2.5	51.333	GFL09-2M □□□100C32	78
	28	1002	1.3		34	825	1.6	52.067	GFL07-2M □□□100C32	78
	28	1002	2.5		34	825	3.1	52.067	GFL11-2M □□□100C32	78
	25	1113	2.0		30	916	2.5	57.852	GFL09-2M □□□100C32	78
	25	1128	1.1		30	929	1.4	58.667	GFL07-2M □□□100C32	78
	25	1128	2.5		30	929	3.1	58.667	GFL11-2M □□□100C32	78
	23	1198	1.7		28	987	2.1	62.300	GFL09-2M □□□100C32	78
	23	1215	1.0		28	1001	1.2	63.190	GFL07-2M □□□100C32	78
	23	1215	2.1		28	1001	2.6	63.190	GFL11-2M □□□100C32	78
	23	1200	1.3		28	988	1.5	63.326	GFL09-3M □□□100C32	86
	22	1237	2.3		27	1019	2.8	65.306	GFL11-3M □□□100C32	86
	21	1351	1.7		25	1112	2.1	70.211	GFL09-2M □□□100C32	78
	20	1370	0.9		25	1128	1.1	71.200	GFL07-2M □□□100C32	78
	20	1370	2.1		25	1128	2.6	71.200	GFL11-2M □□□100C32	78
	20	1386	1.1		24	1142	1.3	73.173	GFL09-3M □□□100C32	86
	20	1389	2.1		24	1144	2.5	73.335	GFL11-3M □□□100C32	86
	18	1515	1.1		22	1247	1.3	78.750	GFL09-2M □□□100C32	78
	18	1536	1.7		22	1265	2.1	79.875	GFL11-2M □□□100C32	78
	18	1562	1.1		21	1286	1.3	82.465	GFL09-3M □□□100C32	86
	18	1566	2.1		21	1289	2.5	82.631	GFL11-3M □□□100C32	86
	16	1707	1.0		20	1406	1.3	88.750	GFL09-2M □□□100C32	78
	16	1731	1.7		19	1425	2.1	90.000	GFL11-2M □□□100C32	78
	16	1768	1.0		19	1456	1.2	93.333	GFL09-3M □□□100C32	86
	15	1772	1.8		19	1459	2.2	93.540	GFL11-3M □□□100C32	86
	14	1987	3.0		17	1636	3.6	104.889	GFL14-3M □□□100C32	86
	14	1993	1.0		17	1641	1.2	105.185	GFL09-3M □□□100C32	86
	14	1997	1.8		17	1644	2.2	105.397	GFL11-3M □□□100C32	86
	13	2162	3.0		15	1780	3.6	114.126	GFL14-3M □□□100C32	86
	13	2166	0.9		15	1784	1.0	114.333	GFL09-3M □□□100C32	86
	13	2171	1.6		15	1788	2.0	114.586	GFL11-3M □□□100C32	86
	11	2436	3.0		14	2006	3.6	128.593	GFL14-3M □□□100C32	86
	11	2441	0.9		14	2010	1.0	128.852	GFL09-3M □□□100C32	86
	11	2446	1.6		14	2014	2.0	129.111	GFL11-3M □□□100C32	86
	9.7	2826	1.4		12	2327	1.7	149.144	GFL11-3M □□□100C32	86
	9.3	2958	2.5		11	2436	3.1	156.148	GFL14-3M □□□100C32	86
	8.6	3184	1.4		10	2622	1.7	168.049	GFL11-3M □□□100C32	86
	8.5	3222	2.6		10	2653	3.2	170.074	GFL14-3M □□□100C32	86



Selection tables

50 Hz, 60 Hz: P_N = 3.0 kW

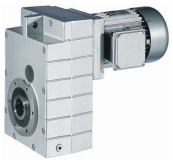
n_N	1445 r/min				1755 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	7.9	3463	1.2		9.6	2852	1.5	182.792	GFL11-3M □□□100C32	86
	7.2	3829	2.0		8.6	3152	2.5	202.074	GFL14-3M □□□100C32	86
	7.0	3902	1.2		8.5	3213	1.5	205.963	GFL11-3M □□□100C32	86
	6.4	4256	1.1		7.8	3504	1.3	224.636	GFL11-3M □□□100C32	86
	6.4	4256	2.1		7.8	3504	2.5	224.636	GFL14-3M □□□100C32	86
	5.7	4796	1.1		6.9	3949	1.3	253.111	GFL11-3M □□□100C32	86
	5.7	4796	2.1		6.9	3949	2.5	253.111	GFL14-3M □□□100C32	86
	5.4	5064	1.0		6.5	4169	1.2	267.259	GFL11-3M □□□100C32	86
	5.3	5187	1.9		6.4	4271	2.3	273.778	GFL14-3M □□□100C32	86
	4.4	6206	0.9		5.3	5110	1.1	327.556	GFL11-3M □□□100C32	86
	4.4	6299	1.7		5.3	5186	2.0	332.444	GFL14-3M □□□100C32	86
	4.1	6685	1.6		5.0	5504	1.9	352.811	GFL14-3M □□□100C32	86
	3.6	7532	1.5		4.4	6202	1.9	397.533	GFL14-3M □□□100C32	86
	3.4	8151	1.3		4.1	6711	1.6	430.222	GFL14-3M □□□100C32	86
	2.8	9893	1.1		3.3	8145	1.3	522.133	GFL14-3M □□□100C32	86
	2.6	10655	0.8		3.1	8773	1.0	562.391	GFL14-3M □□□100C32	86
	2.3	12006	0.8		2.8	9885	1.0	633.680	GFL14-3M □□□100C32	86



Selection tables

50 Hz, 60 Hz: P_N = 4.0 kW

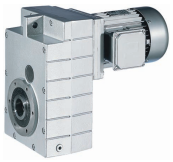
n_N	1455 r/min				1760 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	396	94	3.4		478	77	3.9	3.675	GFL06-2M □□□112C22	78
	313	118	4.2		378	98	4.8	4.643	GFL07-2M □□□112C22	78
	279	133	3.2		337	110	3.7	5.211	GFL06-2M □□□112C22	78
	253	146	3.0		305	121	3.5	5.750	GFL06-2M □□□112C22	78
	226	164	2.1		272	136	2.5	6.450	GFL06-2M □□□112C22	78
	204	182	2.4		246	150	2.7	7.147	GFL06-2M □□□112C22	78
	173	214	2.8		209	177	3.2	8.400	GFL06-2M □□□112C22	78
	154	241	2.4		186	199	2.8	9.463	GFL06-2M □□□112C22	78
	144	257	1.8		174	213	2.0	10.092	GFL06-2M □□□112C22	78
	126	293	2.2		152	243	2.5	11.520	GFL06-2M □□□112C22	78
	112	331	1.8		135	273	2.1	12.978	GFL06-2M □□□112C22	78
	103	362	3.2		124	299	3.6	14.200	GFL07-2M □□□112C22	78
	99	376	1.7		119	310	2.0	14.743	GFL06-2M □□□112C22	78
	92	405	2.9		110	335	3.3	15.904	GFL07-2M □□□112C22	78
	90	411	1.6		109	340	1.8	16.128	GFL06-2M □□□112C22	78
	81	456	2.6		98	377	3.0	17.920	GFL07-2M □□□112C22	78
	80	463	1.3		97	383	1.5	18.169	GFL06-2M □□□112C22	78
	72	517	2.4		87	427	2.8	20.286	GFL07-2M □□□112C22	78
	71	524	1.2		85	433	1.4	20.571	GFL06-2M □□□112C22	78
	64	582	2.1		77	481	2.4	22.857	GFL07-2M □□□112C22	78
	63	590	1.0		76	488	1.2	23.175	GFL06-2M □□□112C22	78
	59	633	2.1		71	523	2.6	24.850	GFL07-2M □□□112C22	78
	58	642	1.0		70	531	1.2	25.200	GFL06-2M □□□112C22	78
	52	713	1.7		63	590	2.1	28.000	GFL07-2M □□□112C22	78
	51	723	0.8		62	598	1.0	28.389	GFL06-2M □□□112C22	78
	45	824	1.7		54	681	2.0	32.344	GFL07-2M □□□112C22	78
	45	832	2.6		54	688	3.1	32.667	GFL09-2M □□□112C22	78
	40	928	1.3		48	767	1.6	36.444	GFL07-2M □□□112C22	78
	40	938	2.6		48	775	3.1	36.815	GFL09-2M □□□112C22	78
	37	1010	1.4		44	835	1.7	39.642	GFL07-2M □□□112C22	78
	37	1010	2.2		44	835	2.6	39.667	GFL09-2M □□□112C22	78
	36	1025	2.7		44	847	3.3	40.233	GFL11-2M □□□112C22	78
	33	1138	1.1		39	941	1.3	44.667	GFL07-2M □□□112C22	78
	33	1139	2.2		39	941	2.6	44.704	GFL09-2M □□□112C22	78
	32	1155	2.7		39	955	3.3	45.333	GFL11-2M □□□112C22	78
	28	1307	1.8		34	1081	2.1	51.333	GFL09-2M □□□112C22	78
	28	1326	2.2		34	1096	2.6	52.067	GFL11-2M □□□112C22	78
	28	1326	2.7		34	1096	3.3	52.067	GFL14-2M □□□112C22	78
	25	1474	1.8		30	1218	2.1	57.852	GFL09-2M □□□112C22	78
	25	1494	2.2		30	1235	2.6	58.667	GFL11-2M □□□112C22	78



Selection tables

50 Hz, 60 Hz: P_N = 4.0 kW

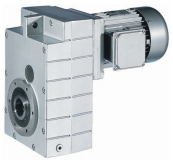
n_N	1455 r/min				1760 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	25	1494	2.7		30	1235	3.3	58.667	GFL14-2M □□□112C22	78
	23	1587	1.5		28	1312	1.8	62.300	GFL09-2M □□□112C22	78
	23	1609	1.8		28	1331	2.2	63.190	GFL11-2M □□□112C22	78
	23	1609	2.3		28	1331	2.7	63.190	GFL14-2M □□□112C22	78
	23	1589	1.0		28	1313	1.1	63.326	GFL09-3M □□□112C22	86
	22	1638	1.8		27	1355	2.1	65.306	GFL11-3M □□□112C22	86
	21	1724	3.1		26	1425	3.8	68.708	GFL14-3M □□□112C22	86
	21	1788	1.4		25	1478	1.7	70.211	GFL09-2M □□□112C22	78
	20	1814	1.8		25	1499	2.2	71.200	GFL11-2M □□□112C22	78
	20	1814	2.3		25	1499	2.7	71.200	GFL14-2M □□□112C22	78
	20	1836	0.8		24	1518	1.0	73.173	GFL09-3M □□□112C22	86
	20	1840	1.6		24	1521	1.9	73.335	GFL11-3M □□□112C22	86
	19	1942	3.1		23	1606	3.8	77.418	GFL14-3M □□□112C22	86
	18	2034	1.5		22	1682	1.8	79.875	GFL11-2M □□□112C22	78
	18	2034	1.8		22	1682	2.2	79.875	GFL14-2M □□□112C22	78
	18	2069	0.8		21	1710	1.0	82.465	GFL09-3M □□□112C22	86
	18	2073	1.6		21	1714	1.9	82.631	GFL11-3M □□□112C22	86
	17	2133	2.9		21	1764	3.6	85.037	GFL14-3M □□□112C22	86
	16	2292	1.5		20	1895	1.8	90.000	GFL11-2M □□□112C22	78
	16	2292	1.8		20	1895	2.2	90.000	GFL14-2M □□□112C22	78
	16	2347	1.4		19	1940	1.7	93.540	GFL11-3M □□□112C22	86
	14	2632	2.6		17	2175	3.1	104.889	GFL14-3M □□□112C22	86
	14	2644	1.4		17	2186	1.7	105.397	GFL11-3M □□□112C22	86
	13	2863	2.3		15	2367	2.8	114.126	GFL14-3M □□□112C22	86
	13	2875	1.2		15	2377	1.5	114.586	GFL11-3M □□□112C22	86
	11	3226	2.3		14	2667	2.8	128.593	GFL14-3M □□□112C22	86
	11	3239	1.2		14	2678	1.5	129.111	GFL11-3M □□□112C22	86
	11	3434	2.1		13	2839	2.6	136.889	GFL14-3M □□□112C22	86
	9.8	3742	1.0		12	3093	1.3	149.144	GFL11-3M □□□112C22	86
	9.3	3918	2.1		11	3239	2.5	156.148	GFL14-3M □□□112C22	86
	8.7	4216	1.0		10	3485	1.3	168.049	GFL11-3M □□□112C22	86
	8.6	4267	2.0		10	3527	2.4	170.074	GFL14-3M □□□112C22	86
	8.0	4586	0.9		9.6	3791	1.1	182.792	GFL11-3M □□□112C22	86
	7.2	5070	1.8		8.7	4191	2.1	202.074	GFL14-3M □□□112C22	86
	7.1	5167	0.9		8.5	4272	1.1	205.963	GFL11-3M □□□112C22	86
	6.5	5636	0.8		7.8	4659	1.0	224.636	GFL11-3M □□□112C22	86
	6.5	5636	1.6		7.8	4659	1.9	224.636	GFL14-3M □□□112C22	86
	5.8	6350	0.8		6.9	5250	1.0	253.111	GFL11-3M □□□112C22	86
	5.8	6350	1.6		6.9	5250	1.9	253.111	GFL14-3M □□□112C22	86
	5.3	6869	1.4		6.4	5678	1.7	273.778	GFL14-3M □□□112C22	86



Selection tables

50 Hz, 60 Hz: P_N = 4.0 kW

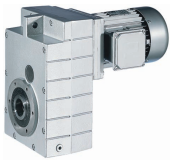
n_N	1455 r/min				1760 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	4.4	8341	1.3		5.3	6895	1.5	332.444	GFL14-3M □□□112C22	86
	4.1	8852	1.2		5.0	7318	1.4	352.811	GFL14-3M □□□112C22	86
	3.7	9974	1.2		4.4	8245	1.4	397.533	GFL14-3M □□□112C22	86
	3.4	10794	1.0		4.1	8923	1.2	430.222	GFL14-3M □□□112C22	86
	2.8	13100	0.8		3.4	10830	1.0	522.133	GFL14-3M □□□112C22	86



Selection tables

50 Hz, 60 Hz: P_N = 5.5 kW

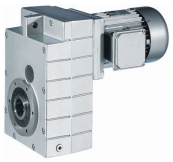
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	400	127	2.7		482	106	3.0	3.675	GFL06-2M□□□132C12	78
	317	161	4.1		381	133	4.6	4.643	GFL07-2M □□□132C12	78
	282	181	2.3		340	150	2.7	5.211	GFL06-2M□□□132C12	78
	256	199	2.2		308	165	2.5	5.750	GFL06-2M□□□132C12	78
	230	222	3.0		277	184	3.4	6.400	GFL07-2M □□□132C12	78
	228	224	1.6		274	185	1.8	6.450	GFL06-2M□□□132C12	78
	206	248	1.7		248	205	2.0	7.147	GFL06-2M□□□132C12	78
	175	291	2.1		211	241	2.4	8.400	GFL06-2M□□□132C12	78
	157	325	3.1		189	269	3.5	9.379	GFL07-2M □□□132C12	78
	155	328	1.8		187	272	2.0	9.463	GFL06-2M□□□132C12	78
	151	337	2.9		182	279	3.3	9.714	GFL07-2M □□□132C12	78
	146	350	1.3		175	290	1.5	10.092	GFL06-2M□□□132C12	78
	128	399	1.6		154	331	1.8	11.520	GFL06-2M□□□132C12	78
	127	400	2.7		154	331	3.1	11.537	GFL07-2M □□□132C12	78
	113	450	1.3		136	373	1.5	12.978	GFL06-2M□□□132C12	78
	113	451	2.4		136	373	2.8	13.000	GFL07-2M □□□132C12	78
	104	492	2.3		125	408	2.7	14.200	GFL07-2M □□□132C12	78
	100	511	1.3		120	423	1.4	14.743	GFL06-2M□□□132C12	78
	92	551	2.1		111	457	2.4	15.904	GFL07-2M □□□132C12	78
	91	559	1.1		110	463	1.3	16.128	GFL06-2M□□□132C12	78
	82	621	1.9		99	514	2.2	17.920	GFL07-2M □□□132C12	78
	81	630	1.0		97	522	1.1	18.169	GFL06-2M□□□132C12	78
	73	703	1.8		87	582	2.0	20.286	GFL07-2M □□□132C12	78
	72	713	0.9		86	591	1.0	20.571	GFL06-2M□□□132C12	78
	64	792	1.6		77	656	1.8	22.857	GFL07-2M □□□132C12	78
	59	861	1.6		71	713	1.9	24.850	GFL07-2M □□□132C12	78
	54	942	2.9		65	780	3.5	27.173	GFL09-2M □□□132C12	78
	53	971	1.3		63	804	1.5	28.000	GFL07-2M □□□132C12	78
	45	1121	1.2		55	929	1.5	32.344	GFL07-2M □□□132C12	78
	45	1132	2.6		54	938	3.2	32.667	GFL09-2M □□□132C12	78
	40	1263	1.0		49	1046	1.2	36.444	GFL07-2M □□□132C12	78
	40	1276	2.4		48	1057	2.9	36.815	GFL09-2M □□□132C12	78
	37	1375	2.3		45	1139	2.7	39.667	GFL09-2M □□□132C12	78
	33	1550	2.0		40	1283	2.4	44.704	GFL09-2M □□□132C12	78
	32	1571	3.1		39	1301	3.8	45.333	GFL11-2M □□□132C12	78
	28	1805	2.9		34	1495	3.5	52.067	GFL11-2M □□□132C12	78
	25	2034	2.6		30	1684	3.1	58.667	GFL11-2M □□□132C12	78
	23	2190	2.5		28	1814	3.1	63.190	GFL11-2M □□□132C12	78
	23	2195	2.6		28	1818	3.1	64.296	GFL14-3M □□□132C12	86
	23	2230	1.3		27	1847	1.6	65.306	GFL11-3M □□□132C12	86



Selection tables

50 Hz, 60 Hz: P_N = 5.5 kW

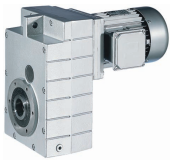
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	21	2346	2.3		26	1943	2.8	68.708	GFL14-3M □□□132C12	86
	21	2468	2.3		25	2044	2.7	71.200	GFL11-2M □□□132C12	78
	20	2504	1.1		24	2074	1.4	73.335	GFL11-3M □□□132C12	86
	19	2643	2.3		23	2189	2.8	77.418	GFL14-3M □□□132C12	86
	18	2769	2.5		22	2293	3.1	79.875	GFL14-2M □□□132C12	78
	18	2821	1.1		21	2337	1.4	82.631	GFL11-3M □□□132C12	86
	17	2904	2.2		21	2405	2.6	85.037	GFL14-3M □□□132C12	86
	16	3120	2.5		20	2584	3.1	90.000	GFL14-2M □□□132C12	78
	16	3194	1.0		19	2645	1.2	93.540	GFL11-3M □□□132C12	86
	14	3581	1.9		17	2966	2.3	104.889	GFL14-3M □□□132C12	86
	14	3599	1.0		17	2980	1.2	105.397	GFL11-3M □□□132C12	86
	13	3897	1.7		16	3227	2.1	114.126	GFL14-3M □□□132C12	86
	13	3913	0.9		15	3240	1.1	114.586	GFL11-3M □□□132C12	86
	11	4391	1.7		14	3636	2.1	128.593	GFL14-3M □□□132C12	86
	11	4408	0.9		14	3651	1.1	129.111	GFL11-3M □□□132C12	86
	11	4674	1.6		13	3871	1.9	136.889	GFL14-3M □□□132C12	86
	9.4	5332	1.5		11	4416	1.9	156.148	GFL14-3M □□□132C12	86
	8.6	5807	1.4		10	4809	1.7	170.074	GFL14-3M □□□132C12	86
	6.5	7670	1.1		7.9	6352	1.4	224.636	GFL14-3M □□□132C12	86
	5.8	8642	1.1		7.0	7157	1.4	253.111	GFL14-3M □□□132C12	86
	5.4	9348	1.0		6.5	7742	1.3	273.778	GFL14-3M □□□132C12	86
	4.4	11351	0.9		5.3	9401	1.1	332.444	GFL14-3M □□□132C12	86



Selection tables

50 Hz, 60 Hz: P_N = 7.5 kW

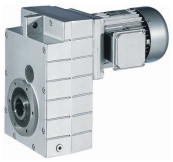
n_N	1460 r/min				1765 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	397	175	1.9		479	145	2.2	3.675	GFL06-2M□□□132C22	78
	315	221	3.0		379	183	3.4	4.643	GFL07-2M □□□132C22	78
	280	248	1.7		338	205	2.0	5.211	GFL06-2M□□□132C22	78
	254	274	1.6		306	226	1.8	5.750	GFL06-2M□□□132C22	78
	228	305	2.2		275	252	2.5	6.400	GFL07-2M □□□132C22	78
	226	307	1.1		273	254	1.3	6.450	GFL06-2M□□□132C22	78
	204	340	1.3		246	281	1.5	7.147	GFL06-2M□□□132C22	78
	204	340	2.7		246	281	3.1	7.150	GFL07-2M □□□132C22	78
	175	396	2.5		211	328	2.9	8.324	GFL07-2M □□□132C22	78
	174	400	1.5		210	331	1.7	8.400	GFL06-2M□□□132C22	78
	156	446	2.2		188	369	2.6	9.379	GFL07-2M □□□132C22	78
	154	450	1.3		186	373	1.5	9.463	GFL06-2M□□□132C22	78
	150	462	2.1		181	382	2.4	9.714	GFL07-2M □□□132C22	78
	145	480	1.0		174	397	1.1	10.092	GFL06-2M□□□132C22	78
	127	548	1.2		153	454	1.3	11.520	GFL06-2M□□□132C22	78
	127	549	2.0		153	454	2.3	11.537	GFL07-2M □□□132C22	78
	113	618	1.0		136	511	1.1	12.978	GFL06-2M□□□132C22	78
	112	619	1.8		135	512	2.0	13.000	GFL07-2M □□□132C22	78
	103	676	1.7		124	559	1.9	14.200	GFL07-2M □□□132C22	78
	99	702	0.9		119	580	1.0	14.743	GFL06-2M□□□132C22	78
	92	757	1.6		111	626	1.8	15.904	GFL07-2M □□□132C22	78
	91	768	0.8		109	635	1.0	16.128	GFL06-2M□□□132C22	78
	89	777	3.2		108	643	3.6	16.333	GFL09-2M □□□132C22	78
	82	853	1.4		98	706	1.6	17.920	GFL07-2M □□□132C22	78
	79	876	2.8		96	725	3.2	18.407	GFL09-2M □□□132C22	78
	74	936	2.7		90	774	3.1	19.667	GFL09-2M □□□132C22	78
	72	965	1.3		87	799	1.5	20.286	GFL07-2M □□□132C22	78
	66	1055	2.5		79	873	2.8	22.164	GFL09-2M □□□132C22	78
	64	1088	1.1		77	900	1.3	22.857	GFL07-2M □□□132C22	78
	61	1148	2.4		73	949	2.9	24.111	GFL09-2M □□□132C22	78
	59	1183	1.1		71	978	1.4	24.850	GFL07-2M □□□132C22	78
	54	1293	2.1		65	1070	2.6	27.173	GFL09-2M □□□132C22	78
	52	1333	0.9		63	1102	1.1	28.000	GFL07-2M □□□132C22	78
	52	1333	3.2		63	1102	3.9	28.000	GFL11-2M □□□132C22	78
	45	1539	0.9		55	1273	1.1	32.344	GFL07-2M □□□132C22	78
	45	1555	1.9		54	1286	2.3	32.667	GFL09-2M □□□132C22	78
	45	1558	3.0		54	1289	3.6	32.739	GFL11-2M □□□132C22	78
	40	1752	1.7		48	1449	2.1	36.815	GFL09-2M □□□132C22	78
	40	1756	2.6		48	1452	3.2	36.889	GFL11-2M □□□132C22	78
	37	1888	1.6		44	1562	2.0	39.667	GFL09-2M □□□132C22	78



Selection tables

50 Hz, 60 Hz: P_N = 7.5 kW

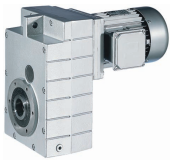
n_N	1460 r/min				1765 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	36	1915	2.5		44	1584	3.1	40.233	GFL11-2M □□□132C22	78
	33	2128	1.4		39	1760	1.7	44.704	GFL09-2M □□□132C22	78
	32	2158	2.3		39	1785	2.7	45.333	GFL11-2M □□□132C22	78
	28	2478	2.1		34	2050	2.6	52.067	GFL11-2M □□□132C22	78
	28	2478	3.1		34	2050	3.7	52.067	GFL14-2M □□□132C22	78
	25	2792	1.9		30	2310	2.3	58.667	GFL11-2M □□□132C22	78
	25	2792	3.1		30	2310	3.7	58.667	GFL14-2M □□□132C22	78
	23	3007	1.8		28	2488	2.2	63.190	GFL11-2M □□□132C22	78
	23	3007	2.6		28	2488	3.1	63.190	GFL14-2M □□□132C22	78
	23	3014	1.9		27	2493	2.2	64.296	GFL14-3M □□□132C22	86
	22	3062	0.9		27	2533	1.1	65.306	GFL11-3M □□□132C22	86
	21	3221	1.7		26	2664	2.0	68.708	GFL14-3M □□□132C22	86
	21	3389	1.6		25	2803	2.0	71.200	GFL11-2M □□□132C22	78
	21	3389	2.6		25	2803	3.1	71.200	GFL14-2M □□□132C22	78
	20	3438	0.8		24	2844	1.0	73.335	GFL11-3M □□□132C22	86
	19	3629	1.7		23	3002	2.0	77.418	GFL14-3M □□□132C22	86
	18	3802	1.8		22	3145	2.2	79.875	GFL14-2M □□□132C22	78
	18	3874	0.8		21	3204	1.0	82.631	GFL11-3M □□□132C22	86
	17	3987	1.6		21	3298	1.9	85.037	GFL14-3M □□□132C22	86
	16	4283	1.8		20	3543	2.2	90.000	GFL14-2M □□□132C22	78
	14	4917	1.4		17	4067	1.7	104.889	GFL14-3M □□□132C22	86
	13	5350	1.3		15	4426	1.5	114.126	GFL14-3M □□□132C22	86
	11	6028	1.3		14	4987	1.5	128.593	GFL14-3M □□□132C22	86
	11	6417	1.1		13	5308	1.4	136.889	GFL14-3M □□□132C22	86
	9.4	7320	1.1		11	6055	1.4	156.148	GFL14-3M □□□132C22	86
	8.6	7973	1.1		10	6595	1.3	170.074	GFL14-3M □□□132C22	86
	6.5	10531	0.8		7.8	8711	1.0	224.636	GFL14-3M □□□132C22	86
	5.8	11866	0.8		7.0	9815	1.0	253.111	GFL14-3M □□□132C22	86



Selection tables

50 Hz, 60 Hz: P_N = 11.0 kW

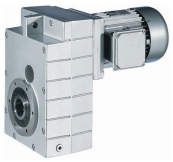
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	439	232	2.8		528	192	3.1	3.350	GFL07-2M □□□160C22	78
	317	322	2.0		381	267	2.3	4.643	GFL07-2M □□□160C22	78
	285	358	2.4		343	296	2.7	5.159	GFL07-2M □□□160C22	78
	258	395	2.3		311	327	2.6	5.695	GFL07-2M □□□160C22	78
	230	444	1.5		277	367	1.7	6.400	GFL07-2M □□□160C22	78
	206	496	1.9		248	411	2.1	7.150	GFL07-2M □□□160C22	78
	177	577	1.7		213	478	2.0	8.324	GFL07-2M □□□160C22	78
	157	650	1.5		189	539	1.8	9.379	GFL07-2M □□□160C22	78
	151	673	1.4		182	558	1.6	9.714	GFL07-2M □□□160C22	78
	132	774	3.0		159	641	3.4	11.167	GFL09-2M □□□160C22	78
	127	800	1.4		154	662	1.5	11.537	GFL07-2M □□□160C22	78
	119	853	2.6		144	707	3.0	12.307	GFL09-2M □□□160C22	78
	113	901	1.2		136	746	1.4	13.000	GFL07-2M □□□160C22	78
	104	984	1.2		125	815	1.3	14.200	GFL07-2M □□□160C22	78
	103	994	2.4		124	823	2.7	14.333	GFL09-2M □□□160C22	78
	92	1103	1.1		111	913	1.2	15.904	GFL07-2M □□□160C22	78
	90	1132	2.2		108	938	2.5	16.333	GFL09-2M □□□160C22	78
	82	1242	1.0		99	1029	1.1	17.920	GFL07-2M □□□160C22	78
	82	1242	3.0		99	1029	3.5	17.920	GFL11-2M □□□160C22	78
	80	1276	1.9		96	1057	2.2	18.407	GFL09-2M □□□160C22	78
	75	1363	1.9		90	1129	2.1	19.667	GFL09-2M □□□160C22	78
	73	1406	2.9		87	1165	3.3	20.286	GFL11-2M □□□160C22	78
	66	1537	1.7		80	1273	1.9	22.164	GFL09-2M □□□160C22	78
	64	1585	2.5		77	1312	2.9	22.857	GFL11-2M □□□160C22	78
	61	1672	1.6		73	1384	2.0	24.111	GFL09-2M □□□160C22	78
	59	1723	2.5		71	1427	3.0	24.850	GFL11-2M □□□160C22	78
	54	1884	1.5		65	1560	1.8	27.173	GFL09-2M □□□160C22	78
	53	1941	2.2		63	1608	2.7	28.000	GFL11-2M □□□160C22	78
	45	2270	2.0		54	1880	2.4	32.739	GFL11-2M □□□160C22	78
	40	2557	1.8		48	2118	2.2	36.889	GFL11-2M □□□160C22	78
	37	2789	1.8		44	2310	2.1	40.233	GFL11-2M □□□160C22	78
	32	3143	1.6		39	2603	1.9	45.333	GFL11-2M □□□160C22	78
	28	3610	2.8		34	2989	3.4	52.067	GFL14-2M □□□160C22	78
	25	4067	2.8		30	3368	3.4	58.667	GFL14-2M □□□160C22	78
	23	4381	2.3		28	3628	2.7	63.190	GFL14-2M □□□160C22	78
	23	4391	1.3		28	3636	1.5	64.296	GFL14-3M □□□160C22	86
	21	4692	1.2		26	3886	1.4	68.708	GFL14-3M □□□160C22	86
	21	4936	2.2		25	4088	2.6	71.200	GFL14-2M □□□160C22	78
	19	5287	1.2		23	4378	1.4	77.418	GFL14-3M □□□160C22	86
	17	5807	1.1		21	4809	1.3	85.037	GFL14-3M □□□160C22	86



Selection tables

50 Hz, 60 Hz: P_N = 15.0 kW

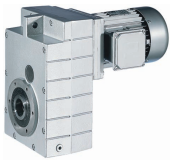
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	439	317	2.0		528	262	2.3	3.350	GFL07-2M □□□160C32	78
	317	439	1.5		381	364	1.7	4.643	GFL07-2M □□□160C32	78
	285	488	1.7		343	404	2.0	5.159	GFL07-2M □□□160C32	78
	258	538	1.7		311	446	1.9	5.695	GFL07-2M □□□160C32	78
	230	605	1.1		277	501	1.2	6.400	GFL07-2M □□□160C32	78
	214	649	3.2		258	537	3.7	6.864	GFL09-2M □□□160C32	78
	206	676	1.4		248	560	1.6	7.150	GFL07-2M □□□160C32	78
	197	706	3.1		237	585	3.5	7.466	GFL09-2M □□□160C32	78
	177	787	1.3		213	652	1.4	8.324	GFL07-2M □□□160C32	78
	163	852	2.6		197	705	3.0	9.010	GFL09-2M □□□160C32	78
	157	887	1.1		189	734	1.3	9.379	GFL07-2M □□□160C32	78
	151	918	1.1		182	761	1.2	9.714	GFL07-2M □□□160C32	78
	150	926	2.5		181	767	2.8	9.799	GFL09-2M □□□160C32	78
	132	1056	2.2		159	874	2.5	11.167	GFL09-2M □□□160C32	78
	127	1091	1.0		154	903	1.1	11.537	GFL07-2M □□□160C32	78
	119	1163	1.9		144	964	2.2	12.307	GFL09-2M □□□160C32	78
	118	1180	2.9		142	977	3.4	12.480	GFL11-2M □□□160C32	78
	113	1229	0.9		136	1018	1.0	13.000	GFL07-2M □□□160C32	78
	104	1342	0.9		125	1112	1.0	14.200	GFL07-2M □□□160C32	78
	103	1355	1.8		124	1122	2.0	14.333	GFL09-2M □□□160C32	78
	101	1374	2.7		122	1138	3.1	14.538	GFL11-2M □□□160C32	78
	92	1504	2.5		111	1245	2.9	15.904	GFL11-2M □□□160C32	78
	90	1544	1.6		108	1279	1.8	16.333	GFL09-2M □□□160C32	78
	82	1694	2.2		99	1403	2.6	17.920	GFL11-2M □□□160C32	78
	80	1740	1.4		96	1441	1.6	18.407	GFL09-2M □□□160C32	78
	75	1859	1.4		90	1540	1.6	19.667	GFL09-2M □□□160C32	78
	73	1918	2.1		87	1588	2.4	20.286	GFL11-2M □□□160C32	78
	66	2095	1.2		80	1735	1.4	22.164	GFL09-2M □□□160C32	78
	64	2161	1.9		77	1790	2.1	22.857	GFL11-2M □□□160C32	78
	61	2279	1.2		73	1888	1.4	24.111	GFL09-2M □□□160C32	78
	59	2349	1.8		71	1946	2.2	24.850	GFL11-2M □□□160C32	78
	54	2569	1.1		65	2128	1.3	27.173	GFL09-2M □□□160C32	78
	53	2647	1.6		63	2192	1.9	28.000	GFL11-2M □□□160C32	78
	45	3058	3.1		55	2532	3.7	32.344	GFL14-2M □□□160C32	78
	45	3095	1.5		54	2563	1.8	32.739	GFL11-2M □□□160C32	78
	40	3445	3.1		49	2853	3.7	36.444	GFL14-2M □□□160C32	78
	40	3487	1.3		48	2888	1.6	36.889	GFL11-2M □□□160C32	78
	37	3748	2.6		45	3104	3.1	39.642	GFL14-2M □□□160C32	78
	37	3804	1.3		44	3150	1.5	40.233	GFL11-2M □□□160C32	78
	33	4223	2.6		40	3497	3.1	44.667	GFL14-2M □□□160C32	78



Selection tables

50 Hz, 60 Hz: P_N = 15.0 kW

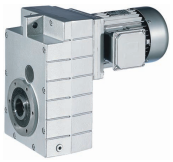
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	32	4286	1.1		39	3549	1.4	45.333	GFL11-2M □□□160C32	78
	28	4922	2.0		34	4077	2.5	52.067	GFL14-2M □□□160C32	78
	25	5546	2.0		30	4593	2.5	58.667	GFL14-2M □□□160C32	78
	23	5974	1.7		28	4947	2.0	63.190	GFL14-2M □□□160C32	78
	23	5987	0.9		28	4959	1.1	64.296	GFL14-3M □□□160C32	86
	21	6398	0.8		26	5299	1.0	68.708	GFL14-3M □□□160C32	86
	21	6731	1.6		25	5575	1.9	71.200	GFL14-2M □□□160C32	78
	19	7209	0.8		23	5971	1.0	77.418	GFL14-3M □□□160C32	86



Selection tables

50 Hz, 60 Hz: P_N = 18.5 kW

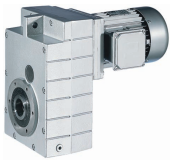
n_N	1475 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	215	798	2.6		259	663	3.0	6.864	GFL09-2M □□□180C12	78
	198	868	2.5		238	721	2.8	7.466	GFL09-2M □□□180C12	78
	164	1047	2.1		197	870	2.4	9.010	GFL09-2M □□□180C12	78
	151	1139	2.0		181	946	2.3	9.799	GFL09-2M □□□180C12	78
	138	1246	3.1		166	1035	3.5	10.720	GFL11-2M □□□180C12	78
	132	1298	1.8		159	1078	2.0	11.167	GFL09-2M □□□180C12	78
	120	1430	1.6		144	1188	1.8	12.307	GFL09-2M □□□180C12	78
	118	1450	2.4		142	1205	2.7	12.480	GFL11-2M □□□180C12	78
	103	1666	1.4		124	1384	1.6	14.333	GFL09-2M □□□180C12	78
	102	1689	2.2		122	1404	2.5	14.538	GFL11-2M □□□180C12	78
	93	1848	2.1		112	1536	2.3	15.904	GFL11-2M □□□180C12	78
	90	1898	1.3		109	1577	1.5	16.333	GFL09-2M □□□180C12	78
	82	2082	1.8		99	1730	2.1	17.920	GFL11-2M □□□180C12	78
	80	2139	1.2		96	1778	1.3	18.407	GFL09-2M □□□180C12	78
	75	2285	1.1		90	1899	1.3	19.667	GFL09-2M □□□180C12	78
	73	2357	1.7		88	1959	2.0	20.286	GFL11-2M □□□180C12	78
	67	2576	1.0		80	2140	1.2	22.164	GFL09-2M □□□180C12	78
	65	2656	1.5		78	2207	1.7	22.857	GFL11-2M □□□180C12	78
	61	2802	1.0		74	2328	1.2	24.111	GFL09-2M □□□180C12	78
	60	2842	3.1		73	2362	3.8	24.456	GFL14-2M □□□180C12	78
	59	2888	1.5		71	2400	1.8	24.850	GFL11-2M □□□180C12	78
	54	3158	0.9		65	2624	1.1	27.173	GFL09-2M □□□180C12	78
	54	3202	3.1		64	2661	3.8	27.556	GFL14-2M □□□180C12	78
	53	3254	1.3		63	2704	1.6	28.000	GFL11-2M □□□180C12	78
	46	3759	2.5		55	3123	3.0	32.344	GFL14-2M □□□180C12	78
	45	3804	1.2		54	3161	1.5	32.739	GFL11-2M □□□180C12	78
	41	4235	2.5		49	3519	3.0	36.444	GFL14-2M □□□180C12	78
	40	4287	1.1		48	3562	1.3	36.889	GFL11-2M □□□180C12	78
	37	4607	2.1		45	3828	2.6	39.642	GFL14-2M □□□180C12	78
	37	4675	1.0		44	3885	1.3	40.233	GFL11-2M □□□180C12	78
	33	5190	2.1		40	4313	2.6	44.667	GFL14-2M □□□180C12	78
	33	5268	0.9		39	4378	1.1	45.333	GFL11-2M □□□180C12	78
	28	6050	1.7		34	5028	2.0	52.067	GFL14-2M □□□180C12	78
	25	6817	1.7		30	5665	2.0	58.667	GFL14-2M □□□180C12	78
	23	7343	1.4		28	6102	1.6	63.190	GFL14-2M □□□180C12	78
	21	8274	1.3		25	6875	1.5	71.200	GFL14-2M □□□180C12	78



Selection tables

50 Hz, 60 Hz: P_N = 22.0 kW

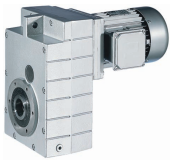
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	214	952	2.2		258	788	2.5	6.864	GFL09-2M □□□180C32	78
	214	952	3.1		258	788	3.5	6.864	GFL11-2M □□□180C32	78
	197	1035	2.1		237	857	2.4	7.466	GFL09-2M □□□180C32	78
	197	1035	3.1		237	857	3.5	7.466	GFL11-2M □□□180C32	78
	167	1220	3.2		201	1011	3.6	8.800	GFL14-2M □□□180C32	78
	163	1249	1.8		197	1035	2.0	9.010	GFL09-2M □□□180C32	78
	163	1249	2.9		197	1035	3.3	9.010	GFL11-2M □□□180C32	78
	154	1327	3.2		185	1099	3.6	9.571	GFL14-2M □□□180C32	78
	150	1359	1.7		181	1125	1.9	9.799	GFL09-2M □□□180C32	78
	150	1359	2.8		181	1125	3.2	9.799	GFL11-2M □□□180C32	78
	137	1486	2.6		165	1231	2.9	10.720	GFL11-2M □□□180C32	78
	132	1548	1.5		159	1282	1.7	11.167	GFL09-2M □□□180C32	78
	119	1706	1.3		144	1413	1.5	12.307	GFL09-2M □□□180C32	78
	118	1730	2.0		142	1433	2.3	12.480	GFL11-2M □□□180C32	78
	104	1969	3.2		125	1631	3.6	14.200	GFL14-2M □□□180C32	78
	103	1987	1.2		124	1646	1.4	14.333	GFL09-2M □□□180C32	78
	101	2016	1.8		122	1669	2.1	14.538	GFL11-2M □□□180C32	78
	94	2166	3.1		113	1794	3.5	15.620	GFL14-2M □□□180C32	78
	92	2205	1.7		111	1826	2.0	15.904	GFL11-2M □□□180C32	78
	90	2265	1.1		108	1876	1.2	16.333	GFL09-2M □□□180C32	78
	84	2440	3.1		101	2021	3.5	17.600	GFL14-2M □□□180C32	78
	82	2485	1.5		99	2058	1.7	17.920	GFL11-2M □□□180C32	78
	80	2552	1.0		96	2114	1.1	18.407	GFL09-2M □□□180C32	78
	75	2727	0.9		90	2258	1.1	19.667	GFL09-2M □□□180C32	78
	74	2766	2.9		89	2291	3.3	19.948	GFL14-2M □□□180C32	78
	73	2813	1.4		87	2329	1.6	20.286	GFL11-2M □□□180C32	78
	66	3073	0.8		80	2545	1.0	22.164	GFL09-2M □□□180C32	78
	65	3117	2.9		79	2581	3.3	22.476	GFL14-2M □□□180C32	78
	64	3169	1.3		77	2625	1.5	22.857	GFL11-2M □□□180C32	78
	61	3343	0.8		73	2769	1.0	24.111	GFL09-2M □□□180C32	78
	60	3391	2.6		72	2808	3.2	24.456	GFL14-2M □□□180C32	78
	59	3446	1.2		71	2854	1.5	24.850	GFL11-2M □□□180C32	78
	53	3821	2.6		64	3164	3.2	27.556	GFL14-2M □□□180C32	78
	53	3882	1.1		63	3215	1.3	28.000	GFL11-2M □□□180C32	78
	45	4485	2.1		55	3714	2.5	32.344	GFL14-2M □□□180C32	78
	45	4540	1.0		54	3760	1.2	32.739	GFL11-2M □□□180C32	78
	40	5053	2.1		49	4185	2.5	36.444	GFL14-2M □□□180C32	78
	40	5115	0.9		48	4236	1.1	36.889	GFL11-2M □□□180C32	78
	37	5497	1.8		45	4552	2.1	39.642	GFL14-2M □□□180C32	78
	37	5579	0.9		44	4620	1.1	40.233	GFL11-2M □□□180C32	78



Selection tables

50 Hz, 60 Hz: P_N = 22.0 kW

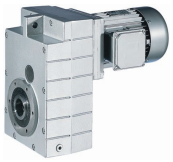
n_N	1470 r/min				1775 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	33	6193	1.8		40	5129	2.1	44.667	GFL14-2M □□□180C32	78
	28	7220	1.4		34	5979	1.7	52.067	GFL14-2M □□□180C32	78
	25	8135	1.4		30	6737	1.7	58.667	GFL14-2M □□□180C32	78
	23	8762	1.1		28	7256	1.4	63.190	GFL14-2M □□□180C32	78
	21	9873	1.1		25	8176	1.3	71.200	GFL14-2M □□□180C32	78



Selection tables

50 Hz, 60 Hz: P_N = 30.0 kW

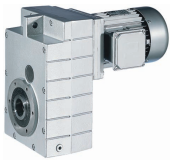
n_N	1465 r/min				1770 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	213	1302	1.6		257	1078	1.8	6.864	GFL09-2M □□□180C42	78
	213	1302	2.3		257	1078	2.6	6.864	GFL11-2M □□□180C42	78
	196	1416	1.5		236	1172	1.7	7.466	GFL09-2M □□□180C42	78
	196	1416	2.3		236	1172	2.6	7.466	GFL11-2M □□□180C42	78
	167	1670	2.3		201	1382	2.6	8.800	GFL14-2M □□□180C42	78
	163	1709	1.3		196	1415	1.5	9.010	GFL09-2M □□□180C42	78
	163	1709	2.1		196	1415	2.4	9.010	GFL11-2M □□□180C42	78
	153	1816	2.3		184	1503	2.6	9.571	GFL14-2M □□□180C42	78
	150	1859	1.2		180	1539	1.4	9.799	GFL09-2M □□□180C42	78
	150	1859	2.0		180	1539	2.3	9.799	GFL11-2M □□□180C42	78
	137	2034	1.9		165	1683	2.1	10.720	GFL11-2M □□□180C42	78
	131	2119	1.1		158	1754	1.2	11.167	GFL09-2M □□□180C42	78
	119	2335	1.0		143	1933	1.1	12.307	GFL09-2M □□□180C42	78
	117	2368	1.5		141	1960	1.7	12.480	GFL11-2M □□□180C42	78
	103	2694	2.3		124	2230	2.6	14.200	GFL14-2M □□□180C42	78
	102	2719	0.9		123	2251	1.0	14.333	GFL09-2M □□□180C42	78
	101	2758	1.3		121	2283	1.5	14.538	GFL11-2M □□□180C42	78
	94	2964	2.3		113	2453	2.6	15.620	GFL14-2M □□□180C42	78
	92	3017	1.3		111	2497	1.4	15.904	GFL11-2M □□□180C42	78
	83	3339	2.3		100	2764	2.6	17.600	GFL14-2M □□□180C42	78
	82	3400	1.1		99	2814	1.3	17.920	GFL11-2M □□□180C42	78
	73	3785	2.1		89	3132	2.4	19.948	GFL14-2M □□□180C42	78
	72	3849	1.1		87	3186	1.2	20.286	GFL11-2M □□□180C42	78
	65	4264	2.1		79	3530	2.4	22.476	GFL14-2M □□□180C42	78
	64	4337	0.9		77	3589	1.1	22.857	GFL11-2M □□□180C42	78
	60	4640	1.9		72	3840	2.3	24.456	GFL14-2M □□□180C42	78
	59	4715	0.9		71	3902	1.1	24.850	GFL11-2M □□□180C42	78
	53	5228	1.9		64	4327	2.3	27.556	GFL14-2M □□□180C42	78
	52	5312	0.8		63	4397	1.0	28.000	GFL11-2M □□□180C42	78
	45	6137	1.5		55	5079	1.8	32.344	GFL14-2M □□□180C42	78
	40	6914	1.5		48	5723	1.8	36.444	GFL14-2M □□□180C42	78
	37	7521	1.3		45	6225	1.6	39.642	GFL14-2M □□□180C42	78
	33	8474	1.3		40	7014	1.6	44.667	GFL14-2M □□□180C42	78
	28	9878	1.0		34	8176	1.2	52.067	GFL14-2M □□□180C42	78
	25	11131	1.0		30	9213	1.2	58.667	GFL14-2M □□□180C42	78
	23	11989	0.8		28	9923	1.0	63.190	GFL14-2M □□□180C42	78



Selection tables

50 Hz, 60 Hz: P_N = 37.0 kW

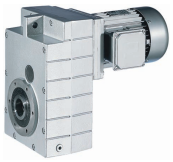
n_N	1483 r/min				1787 r/min			i		
f_N	50 Hz				60 Hz					
	n_2 [r/min]	M_2 [Nm]	c		n_2 [r/min]	M_2 [Nm]	c			
	216	1587	2.1		260	1317	2.4	6.864	GFL11-2M □□□225C12	78
	199	1726	2.0		239	1432	2.3	7.466	GFL11-2M □□□225C12	78
	169	2034	3.2		203	1688	3.6	8.800	GFL14-2M □□□225C12	78
	165	2083	1.8		198	1728	2.0	9.010	GFL11-2M □□□225C12	78
	155	2212	3.2		186	1836	3.6	9.571	GFL14-2M □□□225C12	78
	151	2265	1.7		182	1880	1.9	9.799	GFL11-2M □□□225C12	78
	138	2478	1.5		166	2056	1.8	10.720	GFL11-2M □□□225C12	78
	129	2667	3.1		155	2213	3.5	11.537	GFL14-2M □□□225C12	78
	119	2885	1.2		143	2394	1.4	12.480	GFL11-2M □□□225C12	78
	114	3005	2.8		137	2494	3.2	13.000	GFL14-2M □□□225C12	78
	104	3282	2.7		126	2724	3.1	14.200	GFL14-2M □□□225C12	78
	102	3361	1.1		123	2789	1.3	14.538	GFL11-2M □□□225C12	78
	95	3611	2.5		114	2996	2.9	15.620	GFL14-2M □□□225C12	78
	93	3676	1.0		112	3051	1.2	15.904	GFL11-2M □□□225C12	78
	84	4068	2.3		101	3376	2.6	17.600	GFL14-2M □□□225C12	78
	83	4142	0.9		100	3438	1.0	17.920	GFL11-2M □□□225C12	78
	74	4611	2.1		89	3827	2.4	19.948	GFL14-2M □□□225C12	78
	73	4689	0.9		88	3891	1.0	20.286	GFL11-2M □□□225C12	78
	66	5195	1.9		79	4312	2.2	22.476	GFL14-2M □□□225C12	78
	61	5653	1.8		73	4691	2.2	24.456	GFL14-2M □□□225C12	78
	54	6370	1.6		65	5286	2.0	27.556	GFL14-2M □□□225C12	78
	46	7477	1.5		55	6205	1.8	32.344	GFL14-2M □□□225C12	78
	41	8424	1.3		49	6991	1.6	36.444	GFL14-2M □□□225C12	78



Selection tables

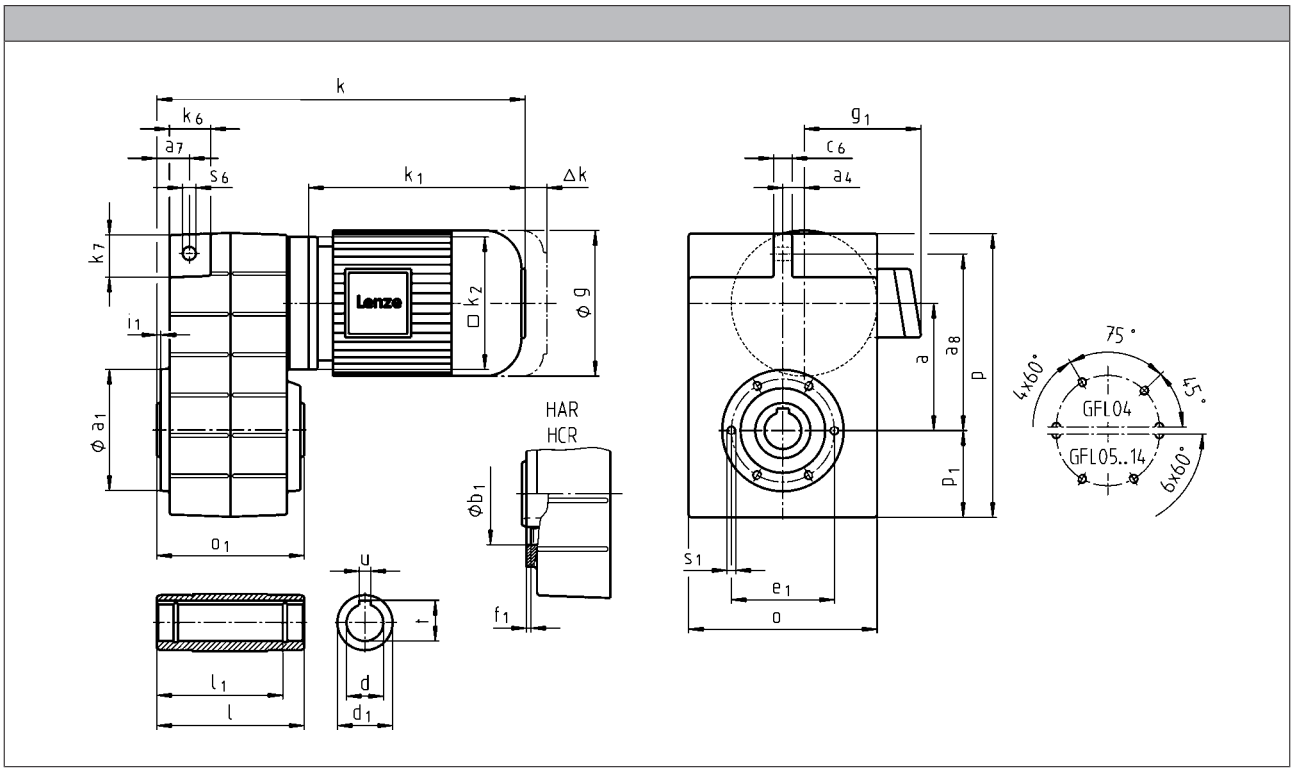
50 Hz, 60 Hz: P_N = 45.0 kW

n_N	1480 r/min				1784 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			
	216	1934	1.7		259	1604	2.0	6.864	GFL11-2M □□□225C22	78
	207	2014	2.7		249	1671	3.1	7.150	GFL14-2M □□□225C22	78
	198	2103	1.7		238	1745	1.9	7.466	GFL11-2M □□□225C22	78
	190	2191	2.7		229	1817	3.1	7.777	GFL14-2M □□□225C22	78
	168	2479	2.6		202	2057	3.0	8.800	GFL14-2M □□□225C22	78
	164	2538	1.5		198	2106	1.7	9.010	GFL11-2M □□□225C22	78
	155	2696	2.6		186	2237	3.0	9.571	GFL14-2M □□□225C22	78
	151	2761	1.4		182	2290	1.6	9.799	GFL11-2M □□□225C22	78
	138	3020	1.3		166	2505	1.4	10.720	GFL11-2M □□□225C22	78
	128	3250	2.5		155	2696	2.9	11.537	GFL14-2M □□□225C22	78
	119	3516	1.0		143	2917	1.1	12.480	GFL11-2M □□□225C22	78
	114	3662	2.3		137	3038	2.6	13.000	GFL14-2M □□□225C22	78
	104	4000	2.2		125	3319	2.5	14.200	GFL14-2M □□□225C22	78
	102	4095	0.9		122	3398	1.0	14.538	GFL11-2M □□□225C22	78
	95	4400	2.1		114	3650	2.4	15.620	GFL14-2M □□□225C22	78
	93	4480	0.8		112	3717	1.0	15.904	GFL11-2M □□□225C22	78
	84	4958	1.9		101	4113	2.1	17.600	GFL14-2M □□□225C22	78
	74	5619	1.7		89	4662	2.0	19.948	GFL14-2M □□□225C22	78
	66	6332	1.6		79	5253	1.8	22.476	GFL14-2M □□□225C22	78
	61	6889	1.5		73	5715	1.8	24.456	GFL14-2M □□□225C22	78
	54	7763	1.4		65	6440	1.6	27.556	GFL14-2M □□□225C22	78
	46	9112	1.2		55	7559	1.5	32.344	GFL14-2M □□□225C22	78
	41	10267	1.1		49	8517	1.3	36.444	GFL14-2M □□□225C22	78



Dimensions

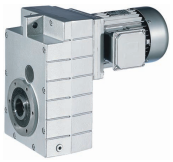
GFL□□-2M H□R



		080C32	090C12	090C32	100C12	100C32	112C22
g		156	176		194		218
g_1	MHEMAXX	150	152	157	166		176
	MHEMABR	132	137		147		158
k_1	MHEMAXX	224.5	274		309	324	363
k_2		145	180				222
Δ k	MHEMABR	73	68		76		90
	MHFMAXX		128		109		102
	MHFMABR	183	181		170		183
		k					
GFL04		354					
GFL05		376	435		470	485	
GFL06		389	448		483	498	543
GFL07		422	481		516	531	576
GFL09			515		550	565	610
GFL11					591	606	651
GFL14							696

GFL shaft-mounted helical gearboxes

Technical data



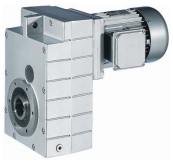
		132C12 132C22	160C22	160C32	180C12 180C32	180C42	225C12 225C22
g		258	310		348		447
g_1	MHEMAXX	195	210		230		346
	MHEMABR	187	210		230		346
k_1	MHEMAXX	403	457.5	501.5	561	618	848
k_2		265	300				
Δ k	MHEMABR	109.5	105		113		
	MHFMAXX	115	149			155	213
	MHFMABR	201.5	179		215		213
		k					
	GFL06	591					
	GFL07	624	684	728			
	GFL09	658	718	762	821	878	
	GFL11	699	759	803	862	919	1149
	GFL14	744	804	848	907	964	1194

	a	a_4	a_7	a_8	c_6	k_6	k_7	o[1]	p[1]	p_1	s_6
GFL04	90.5	12.5	22.5	128	14	32	35	148	214	69	12.5
GFL05	112.5	18.5	29	155	16	35	38	165	252	78	14
GFL06	140	22	35	195	20	46	46	206	315	98	14
GFL07	173	29	44	240	25	56	56	256	386	118	18
GFL09	220	37.5	50	300	32	70	70	318	486	149	22
GFL11	276.5	50	65	375	40	84	90	395	600	181	26
GFL14	339	65	80	455	50	100	114	490	740	228	32

	d[2]	d_1	l	l_1	u	t	i_1	o_1	a_1	b_1	e_1	f_1	s_1
	H7				JS9	+0,2				H7			
GFL04	25 30	45 45	115 115	100 100	8 8	28.3 33.3	2.5 2.5	115 115	110	75	90	3	M6x12
GFL05	30 35	50 50	140 140	124 124	8 10	33.3 38.3	4 4	140 140	118	80	100	4	M8x14
GFL06	40 45	65 65	160 160	140 140	12 14	43.3 48.8	5 5	160 160	140	100	120	4	M10x16
GFL07	50 55	75 75	200 200	175 175	14 16	53.8 59.3	5 5	200 200	165	115	140	5	M12x18
GFL09	60 70	95 95	240 240	210 210	18 20	64.4 74.9	5 5	240 240	205	145	175	6	M16x24
GFL11	70 80	108 108	290 290	250 250	20 22	74.9 85.4	6 6	290 290	240	170	205	4	M20x32
GFL14	100	135	350	305	28	106.4	7	350	290	170	250	6	M24x35

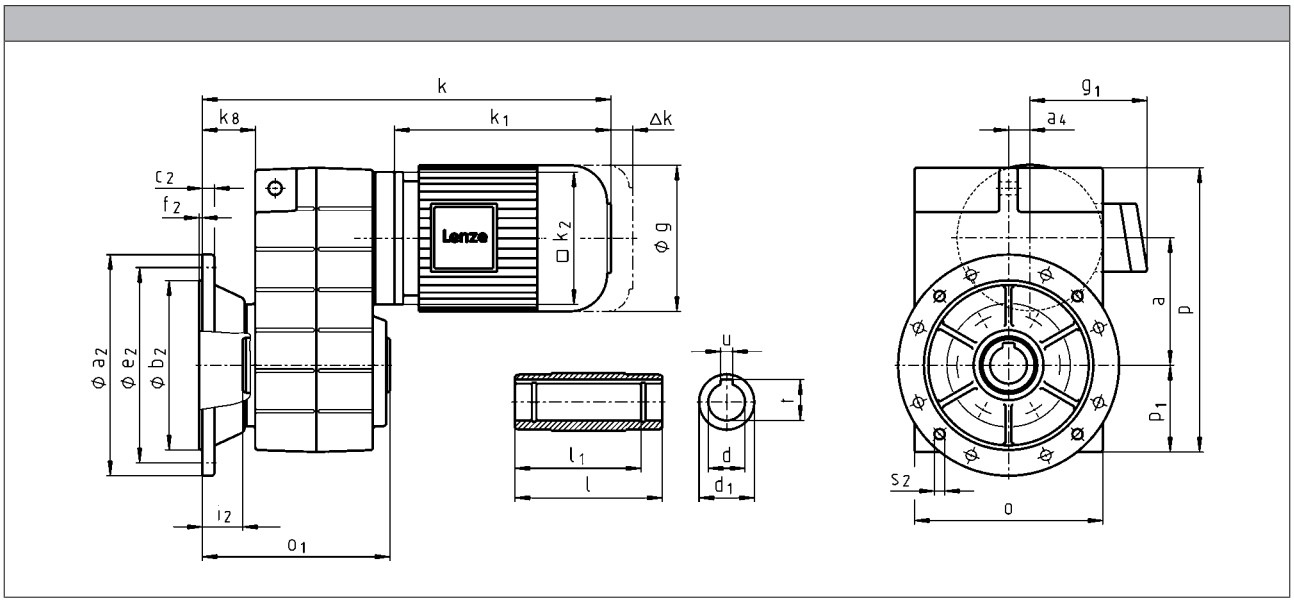
[1] k_2 !

[2] Not suitable for through machine shaft at motor end:
GFL04-2M H□□ 080C□□; d=30
GFL05-2M H□□ 100C□□; d=35
GFL06-2M H□□ 132C□□; d=40/45
GFL07-2M H□□ 160C□□; d=50/55
GFL11-2M H□□ 225C□□; d=80

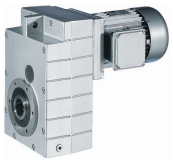


Dimensions

GFL□□-2M HCK



		080C32	090C12	090C32	100C12	100C32	112C22
g		156	176		194		218
g_1	MHEMAXX	150	152	157	166		176
	MHEMABR	132	137		147		158
k_1	MHEMAXX	224.5	274		309	324	363
k_2		145	180				222
Δ k	MHEMABR	73	68		76		90
	MHFMAXX		128		109		102
	MHFMABR	183	181		170		183
		k					
	GFL04	387					
	GFL05	409	468		503	518	
	GFL06	430	489		524	539	584
	GFL07	477	536		571	586	631
	GFL09		575		610	625	670
	GFL11				651	666	711
	GFL14						756



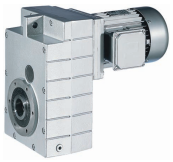
		132C12 132C22	160C22	160C32	180C12 180C32	180C42	225C12 225C22
g		258	310		348		447
g_1	MHEMAXX	195	210		230		346
	MHEMABR	187	210		230		346
k_1	MHEMAXX	403	457.5	501.5	561	618	848
k_2		265	300				
Δ k	MHEMABR	109.5	105		113		
	MHFMAXX	115	149			155	213
	MHFMABR	201.5	179		215		213
		k					
	GFL06	632					
	GFL07	679	739	783			
	GFL09	718	778	822	881	938	
	GFL11	759	819	863	922	979	1209
	GFL14	804	864	908	967	1024	1254

	a	a_4	k_8	o[1)]	p[1)]	p_1
GFL04	90.5	12.5	41.8	148	214	69
GFL05	112.5	18.5	46	165	252	78
GFL06	140	22	55.5	206	315	98
GFL07	173	29	72.5	256	386	118
GFL09	220	37.5	77.5	318	486	149
GFL11	276.5	50	85.5	395	600	181
GFL14	339	65	89.5	490	740	228

	d[2)]	d_1	l	l_1	u	t	i_2	o_1	a_2	b_2	c_2	e_2	f_2	s_2
	H7				JS9	+0,2				j7				
GFL04	25 30	45 45	115 115	100 100	8 8	28.3 33.3	33.5 33.5	148 148	160	110	10	130	3.5	4 x 9
GFL05	30 35	50 50	140 140	124 124	8 10	33.3 38.3	33 33	173 173	200	130	12	165	4	4 x 11
GFL06	40 45	65 65	160 160	140 140	12 14	43.3 48.8	42 41	201 201	250	180	15	215	4	4 x 14
GFL07	50 55	75 75	200 200	175 175	14 16	53.8 59.3	55 55	255 255	250 300	180 230	15 17	215 265	4 4	4 x 14 4 x 14
GFL09	60 70	95 95	240 240	210 210	18 20	64.4 74.9	60 60	300 300	350	250	18	300	4	4 x 17.5
GFL11	70 80	108 108	290 290	250 250	20 22	74.9 85.4	60 60	350 350	400 450	300 350	20 22	350 400	5 5	4 x 17.5 8 x 17.5
GFL14	100	135	350	305	28	106.4	60	410	450	350	22	400	5	8 x 17.5

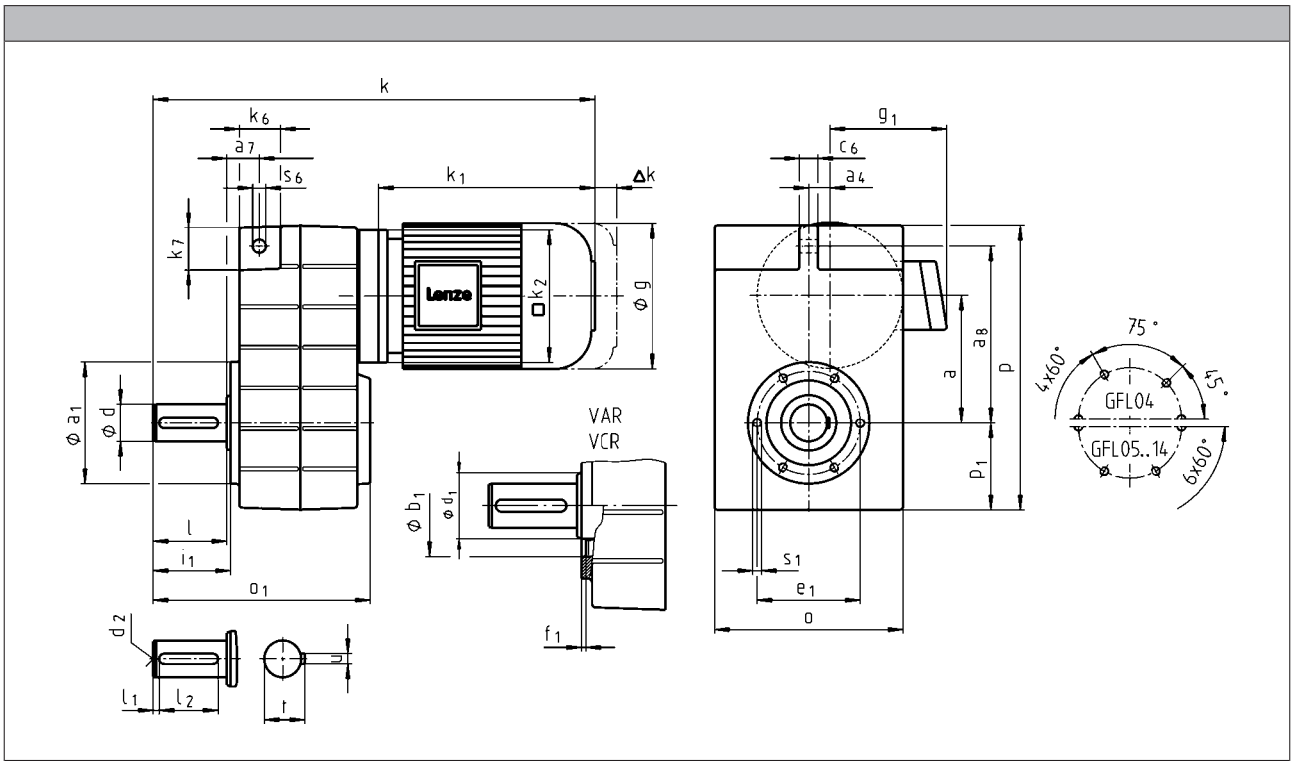
[1)] k_2 !

[2)] Not suitable for through machine shaft at motor end:
GFL04-2M H□□ 080C□□; d=30
GFL05-2M H□□ 100C□□; d=35
GFL06-2M H□□ 132C□□; d=40/45
GFL07-2M H□□ 160C□□; d=50/55
GFL11-2M H□□ 225C□□; d=80

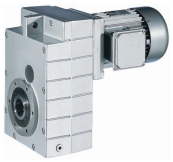


Dimensions

GFL□□-2M V□R



		080C32	090C12	090C32	100C12	100C32	112C22
g		156	176		194		218
g_1	MHEMAXX	150	152	157	166		176
	MHEMABR	132	137		147		158
k_1	MHEMAXX	224.5	274		309	324	363
k_2		145	180				222
Δ k	MHEMABR	73	68		76		90
	MHFMAXX		128		109		102
	MHFMABR	183	181		170		183
		k					
	GFL04	404	464				
	GFL05	436	495		530	545	
	GFL06	469	528		563	578	623
	GFL07	522	581		616	631	676
	GFL09		635		670	685	730
	GFL11				751	766	811
	GFL14						896

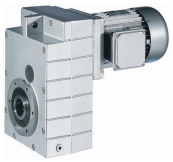


		132C12 132C22	160C22	160C32	180C12 180C32	180C42	225C12 225C22
g		258	310		348		447
g_1	MHEMAXX	195	210		230		346
	MHEMABR	187	210		230		346
k_1	MHEMAXX	403	457.5	501.5	561	618	848
k_2		265	300				
Δ k	MHEMABR	109.5	105		113		
	MHFMAXX	115	149			155	213
	MHFMABR	201.5	179		215		213
		k					
	GFL06	671					
	GFL07	724	784	828			
	GFL09	778	838	882	941	998	
	GFL11	859	919	963	1022	1079	1309
	GFL14	944	1004	1048	1107	1164	1394

	a	a_4	a_7	a_8	c_6	k_6	k_7	o[1)]	p[1)]	p_1	s_6
GFL04	90.5	12.5	22.5	128	14	32	35	148	214	69	12.5
GFL05	112.5	18.5	29	155	16	35	38	165	252	78	14
GFL06	140	22	35	195	20	46	46	206	315	98	14
GFL07	173	29	44	240	25	56	56	256	386	118	18
GFL09	220	37.5	50	300	32	70	70	318	486	149	22
GFL11	276.5	50	65	375	40	84	90	395	600	181	26
GFL14	339	65	80	455	50	100	114	490	740	228	32

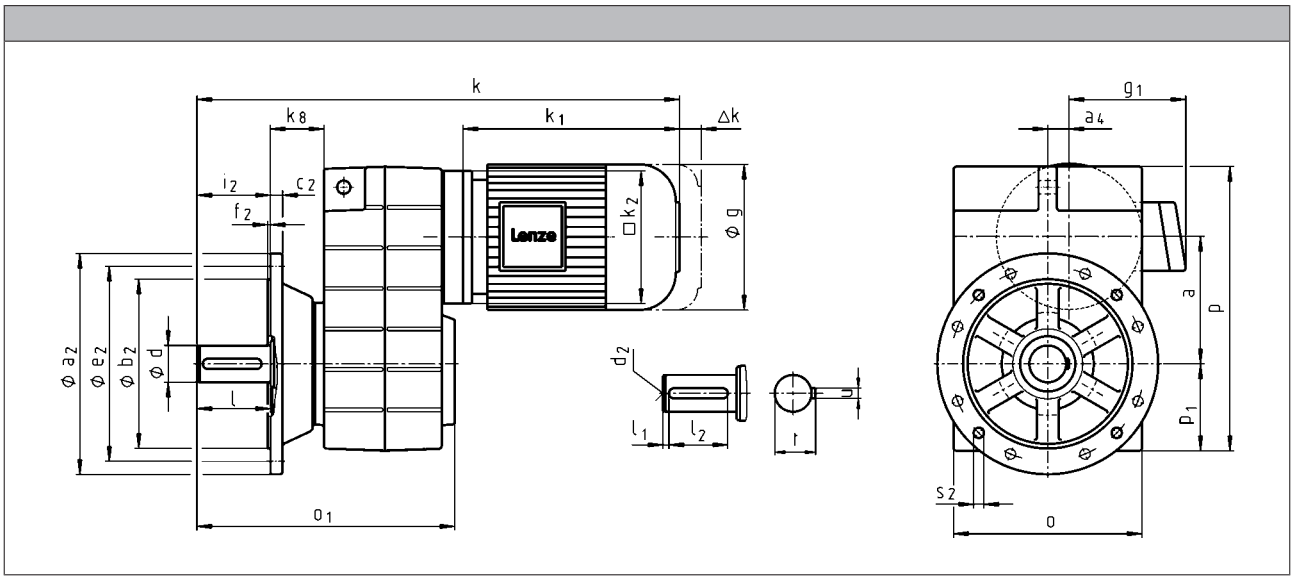
	d	d	d_1	d_2	l	l_1	l_2	u	t	o_1	a_1	b_1	e_1	f_1	s_1
	k6	m6										H7			
GFL04	25		45	M10	50	6	40	8	28	162.5	110	75	90	3	M6x12
GFL05	30		45	M10	60	6	45	8	33	196.5	118	80	100	4	M8x14
GFL06	40		65	M16	80	7	63	12	43	235.5	140	100	120	4	M10x16
GFL07	50		75	M16	100	8	80	14	53.5	295.5	165	115	140	5	M12x18
GFL09		60	95	M20	120	8	100	18	64	355.5	205	145	175	6	M16x24
GFL11		80	108	M20	160	15	125	22	85	444.5	240	170	205	4	M20x32
GFL14		100	135	M24	200	18	160	28	106	543.5	290	170	250	6	M24x35

[1)] k_2 !

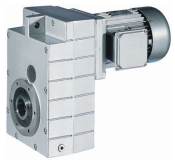


Dimensions

GFL□□-2M VCK



		080C32	090C12	090C32	100C12	100C32	112C22
g		156	176		194		218
g_1	MHEMAXX	150	152	157	166		176
	MHEMABR	132	137		147		158
k_1	MHEMAXX	224.5	274		309	324	363
k_2		145	180				222
Δ k	MHEMABR	73	68		76		90
	MHFMAXX		128		109		102
	MHFMABR	183	181		170		183
		k					
GFL04		437	497				
GFL05		469	528		563	578	
GFL06		510	569		604	619	664
GFL07		577	636		671	686	731
GFL09			695		730	745	790
GFL11					811	826	871
GFL14							956

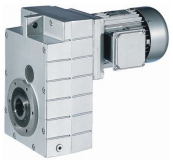


		132C12 132C22	160C22	160C32	180C12 180C32	180C42	225C12 225C22
g		258	310		348		447
g_1	MHEMAXX	195	210		230		346
	MHEMABR	187	210		230		346
k_1	MHEMAXX	403	457.5	501.5	561	618	848
k_2		265	300				
Δ k	MHEMABR	109.5	105		113		
	MHFMAXX	115	149			155	213
	MHFMABR	201.5	179		215		213
		k					
	GFL06	712					
	GFL07	779	839	883			
	GFL09	838	898	942	1001	1058	
	GFL11	919	979	1023	1082	1139	1369
	GFL14	1004	1064	1108	1167	1224	1454

	a	a_4	k_8	o[1)]	p[1)]	p_1
GFL04	90.5	12.5	41.8	148	214	69
GFL05	112.5	18.5	46	165	252	78
GFL06	140	22	55.5	206	315	98
GFL07	173	29	72.5	256	386	118
GFL09	220	37.5	77.5	318	486	149
GFL11	276.5	50	85.5	395	600	181
GFL14	339	65	89.5	490	740	228

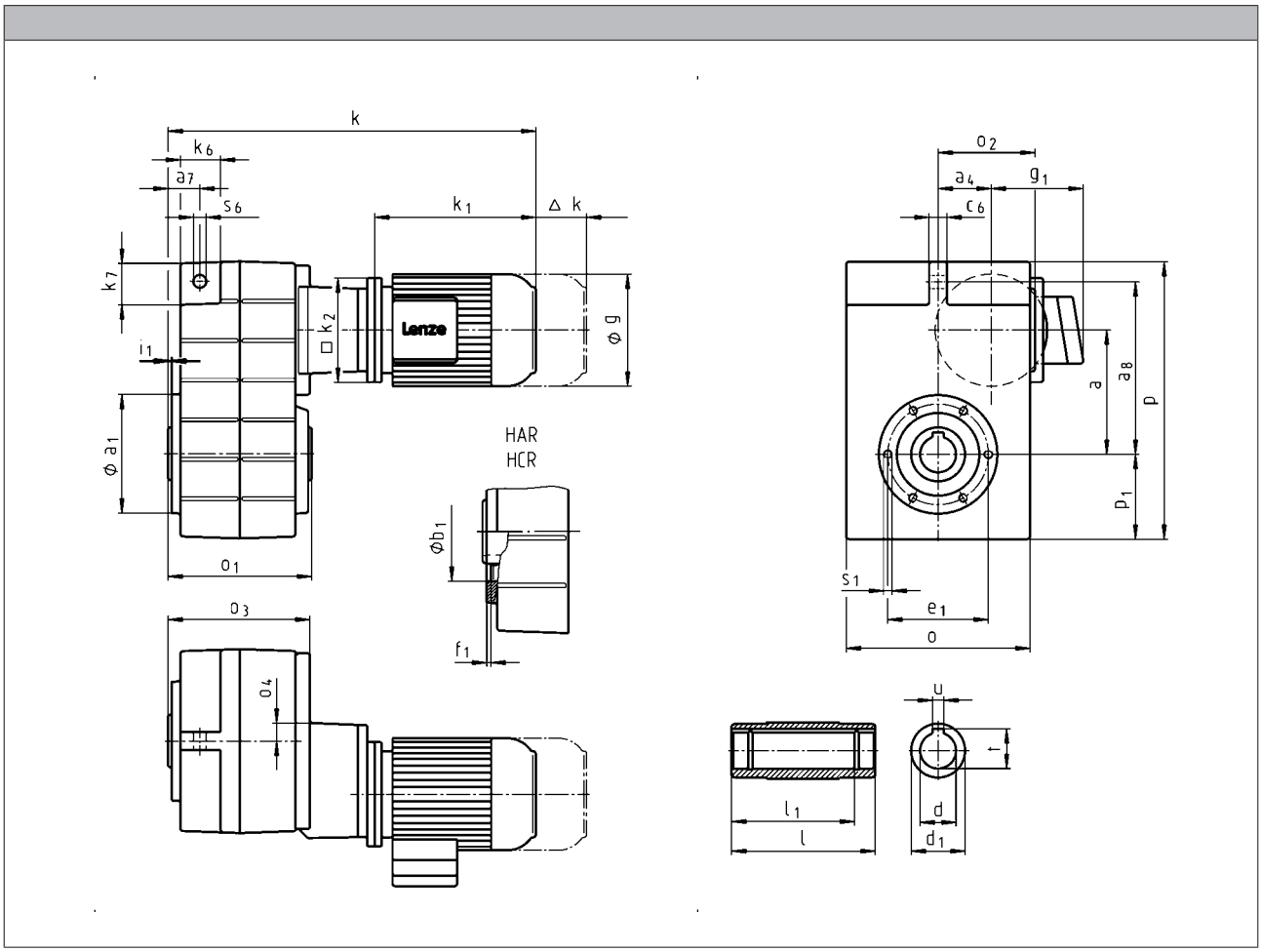
	d	d	d_1	d_2	l	l_1	l_2	u	t	i_2	o_1	a_2	b_2	c_2	e_2	f_2	s_2
	k6	m6											j7				
GFL04	25		45	M10	50	6	40	8	28	50	195.5	160	110	10	130	3.5	4 x 9
GFL05	30		45	M10	60	6	45	8	33	60	229.5	200	130	12	165	4	4 x 11
GFL06	40		65	M16	80	7	63	12	43	80	276.5	250	180	15	215	4	4 x 14
GFL07	50		75	M16	100	8	80	14	53.5	100	350.5	250 300	180 230	15 17	215 265	4 4	4 x 14 4 x 14
GFL09		60	95	M20	120	8	100	18	64	120	415.5	350	250	18	300	4	4 x 17.5
GFL11		80	108	M20	160	15	125	22	85	160	504.5	400 450	300 350	20 22	350 400	5 5	4 x 17.5 8 x 17.5
GFL14		100	135	M24	200	18	160	28	106	200	603.5	450	350	22	400	5	8 x 17.5

[1)] k_2 !

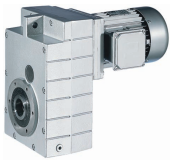


Dimensions

GFL□□-3M H□R



		080C32	090C12	090C32	100C12
g		156	176		194
g_1	MHEMAXX	150	152	157	166
	MHEMABR	132	137		147
k_1	MHEMAXX	224.5	274		309
k_2		145	180		
Δ k	MHEMABR	73	68		76
	MHFMAXX		128		109
	MHFMABR	183	181		170
		k			
	GFL06	482	542		
	GFL07	526	586		621
	GFL09	578	638		673
	GFL11	638	698		733
	GFL14		777		812

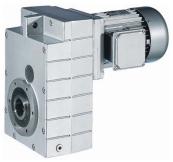


		100C32	112C22	132C12 132C22	160C22	160C32
g		194	218	258	310	
g_1	MHEMAXX	166	176	195	210	
	MHEMABR	147	158	187	210	
k_1	MHEMAXX	324	363	403	457.5	501.5
k_2		180	222	265	300	
Δ k	MHEMABR	76	90	109.5	105	
	MHFMAXX	109	102	115	149	
	MHFMABR	170	183	201.5	179	
		k				
	GFL09	688	733			
	GFL11	748	793	841		
	GFL14	827	872	920	979	1023

	a	a_4	a_7	a_8	c_6	k_6	k_7	o[1)]	o_2	o_3	o_4	p[1)]	p_1	s_6
GFL06	140	58	35	195	20	46	46	206	111	159.5	20.2	315	98	14
GFL07	173	74	44	240	25	56	56	256	135	199	24	386	118	18
GFL09	220	93.5	50	300	32	70	70	318	170	237.5	27	486	149	22
GFL11	276.5	120	65	375	40	84	90	395	216	284.5	33.5	600	181	26
GFL14	339	154	80	455	50	100	114	490	271	339.5	38	740	228	32

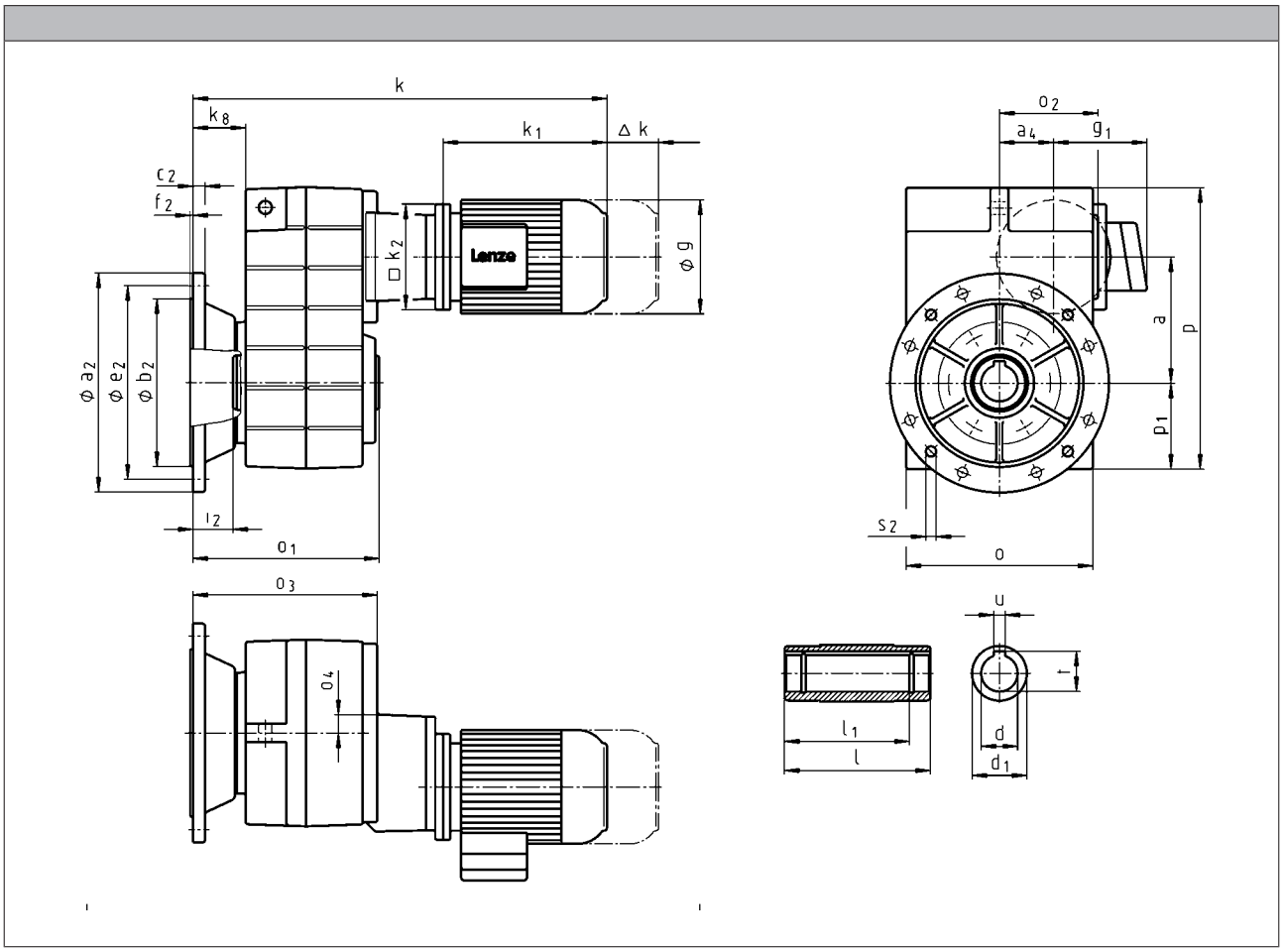
	d	d_1	l	l_1	u	t	i_1	o_1	a_1	b_1	e_1	f_1	s_1
	H7				JS9	+0,2				H7			
GFL06	40 45	65 65	160 160	140 140	12 14	43.3 48.8	5 5	160 160	140	100	120	4	M10x16
GFL07	50 55	75 75	200 200	175 175	14 16	53.8 59.3	5 5	200 200	165	115	140	5	M12x18
GFL09	60 70	95 95	240 240	210 210	18 20	64.4 74.9	5 5	240 240	205	145	175	6	M16x24
GFL11	70 80	108 108	290 290	250 250	20 22	74.9 85.4	6 6	290 290	240	170	205	4	M20x32
GFL14	100	135	350	305	28	106.4	7	350	290	170	250	6	M24x35

[1)] k_2 !

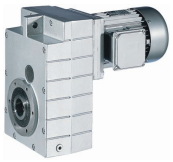


Dimensions

GFL□□-3M HCK



		080C32	090C12	090C32	100C12
g		156	176		194
g_1	MHEMAXX	150	152	157	166
	MHEMABR	132	137		147
k_1	MHEMAXX	224.5	274		309
k_2		145	180		
Δ k	MHEMABR	73	68		76
	MHFMAXX		128		109
	MHFMABR	183	181		170
		k			
GFL06		523	583		
GFL07		581	641		676
GFL09		638	698		733
GFL11		698	758		793
GFL14			837		872

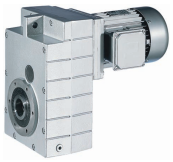


		100C32	112C22	132C12 132C22	160C22	160C32
g		194	218	258	310	
g_1	MHEMAXX	166	176	195	210	
	MHEMABR	147	158	187	210	
k_1	MHEMAXX	324	363	403	457.5	501.5
k_2		180	222	265	300	
Δ k	MHEMABR	76	90	109.5	105	
	MHFMAXX	109	102	115	149	
	MHFMABR	170	183	201.5	179	
		k				
	GFL09	748	793			
	GFL11	808	853	901		
	GFL14	887	932	980	1039	1083

	a	a_4	k_8	o[1)]	o_2	o_3	o_4	p[1)]	p_1
GFL06	140	58	55.5	206	111	200.5	20.2	315	98
GFL07	173	74	72.5	256	135	254	24	386	118
GFL09	220	93.5	77.5	318	170	297.5	27	486	149
GFL11	276.5	120	85.5	395	216	344.5	33.5	600	181
GFL14	339	154	89.5	490	271	399.5	38	740	228

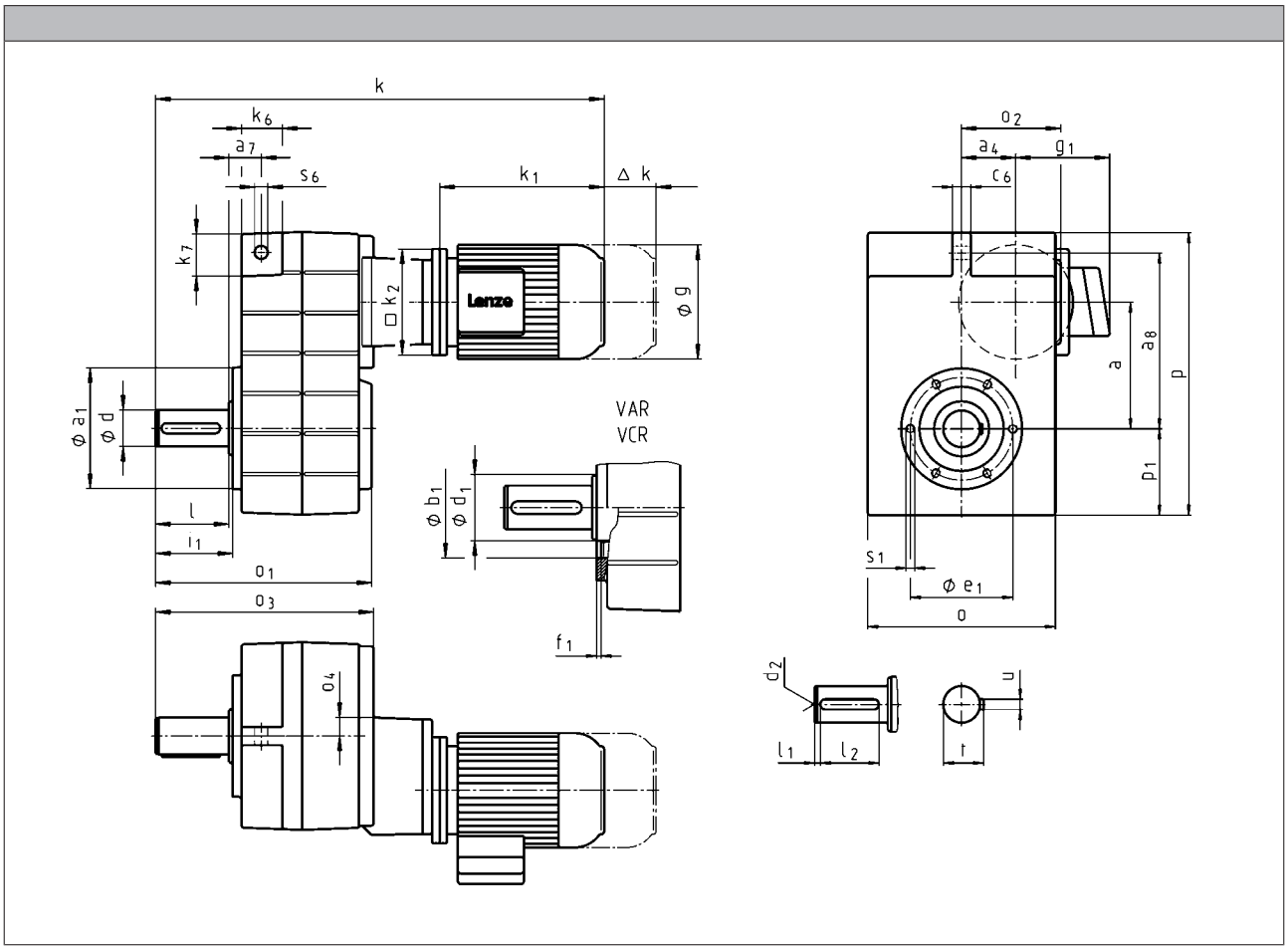
	d	d_1	l	l_1	u	t	i_2	o_1	a_2	b_2	c_2	e_2	f_2	s_2
	H7				JS9	+0,2				j7				
GFL06	40 45	65 65	160 160	140 140	12 14	43.3 48.8	42 41	201 201	250	180	15	215	4	4 x 14
GFL07	50 55	75 75	200 200	175 175	14 16	53.8 59.3	55 55	255 255	250 300	180 230	15 17	215 265	4 4	4 x 14 4 x 14
GFL09	60 70	95 95	240 240	210 210	18 20	64.4 74.9	60 60	300 300	350	250	18	300	4	4 x 17.5
GFL11	70 80	108 108	290 290	250 250	20 22	74.9 85.4	60 60	350 350	400 450	300 350	20 22	350 400	5 5	4 x 17.5 8 x 17.5
GFL14	100	135	350	305	28	106.4	60	410	450	350	22	400	5	8 x 17.5

[1)] k_2 !

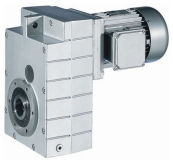


Dimensions

GFL□□-3M V□R



		080C32	090C12	090C32	100C12
g		156	176		194
g_1	MHEMAXX	150	152	157	166
	MHEMABR	132	137		147
k_1	MHEMAXX	224.5	274		309
k_2		145	180		
Δ k	MHEMABR	73	68		76
	MHFMAXX		128		109
	MHFMABR	183	181		170
		k			
GFL06		562	622		
GFL07		626	686		721
GFL09		698	758		793
GFL11		798	858		893
GFL14			977		1012

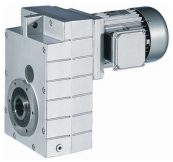


		100C32	112C22	132C12 132C22	160C22	160C32
g		194	218	258	310	
g_1	MHEMAXX	166	176	195	210	
	MHEMABR	147	158	187	210	
k_1	MHEMAXX	324	363	403	457.5	501.5
k_2		180	222	265	300	
Δ k	MHEMABR	76	90	109.5	105	
	MHFMAXX	109	102	115	149	
	MHFMABR	170	183	201.5	179	
		k				
	GFL09	808	853			
	GFL11	908	953	1001		
	GFL14	1027	1072	1120	1179	1223

	a	a_4	a_7	a_8	c_6	k_6	k_7	o[1)]	o_2	o_3	o_4	p[1)]	p_1	s_6
GFL06	140	58	35	195	20	46	46	206	111	239.5	20.2	315	98	14
GFL07	173	74	44	240	25	56	56	256	135	299	24	386	118	18
GFL09	220	93.5	50	300	32	70	70	318	170	357.5	27	486	149	22
GFL11	276.5	120	65	375	40	84	90	395	216	444.5	33.5	600	181	26
GFL14	339	154	80	455	50	100	114	490	271	539.5	38	740	228	32

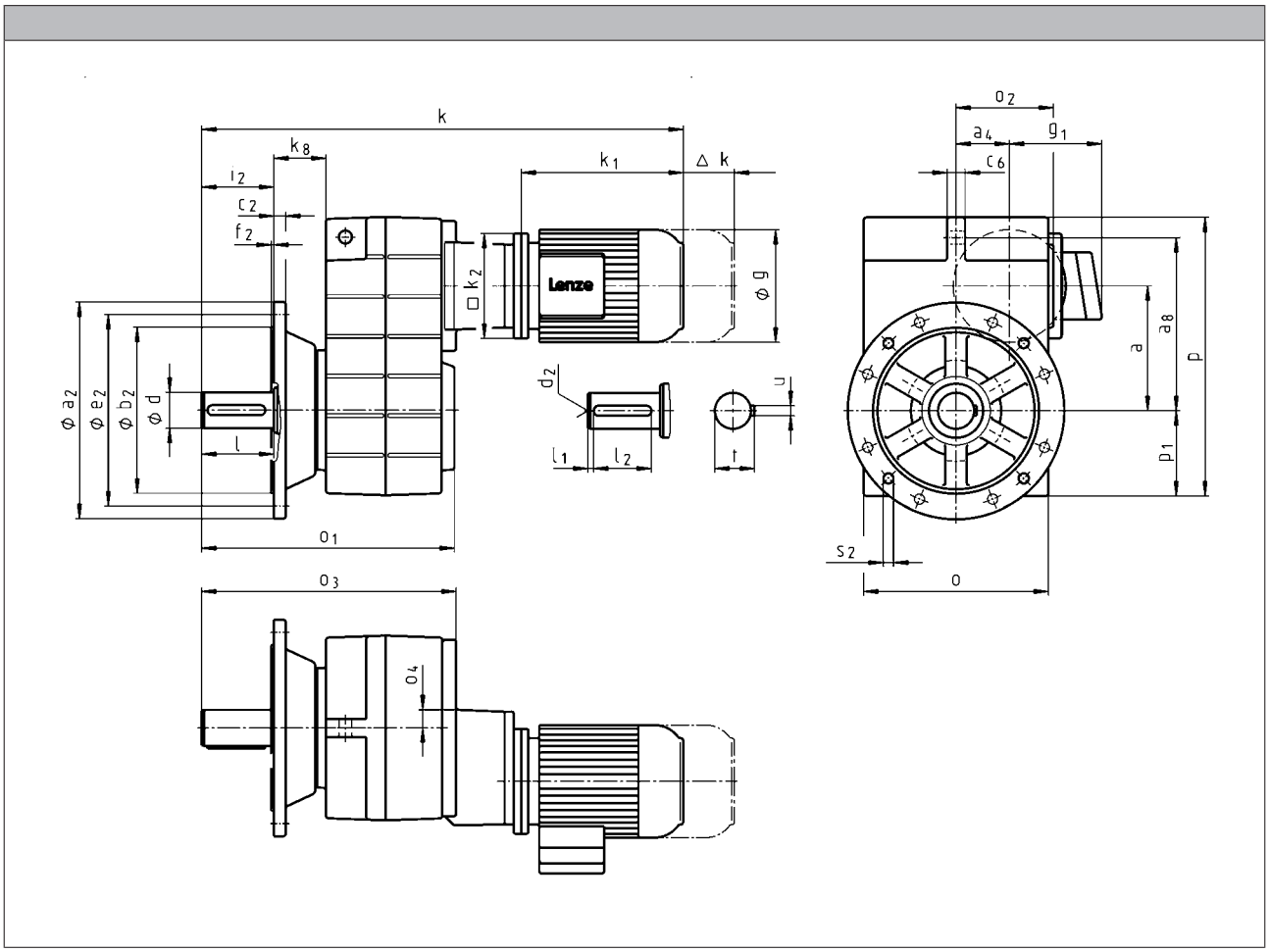
	d	d	d_1	d_2	l	l_1	l_2	u	t	o_1	a_1	b_1	e_1	f_1	s_1
	k6	m6										H7			
GFL06	40		65	M16	80	7	63	12	43	235.5	140	100	120	4	M10x16
GFL07	50		75	M16	100	8	80	14	53.5	295.5	165	115	140	5	M12x18
GFL09		60	95	M20	120	8	100	18	64	355.5	205	145	175	6	M16x24
GFL11		80	108	M20	160	15	125	22	85	444.5	240	170	205	4	M20x32
GFL14		100	135	M24	200	18	160	28	106	543.5	290	170	250	6	M24x35

[1)] k_2 !

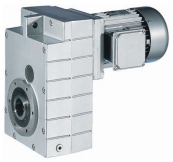


Dimensions

GFL□□-3M VCK



		080C32	090C12	090C32	100C12
g		156	176		194
g_1	MHEMAXX	150	152	157	166
	MHEMABR	132	137		147
k_1	MHEMAXX	224.5	274		309
k_2		145	180		
Δ k	MHEMABR	73	68		76
	MHFMAXX		128		109
	MHFMABR	183	181		170
		k			
GFL06		603	663		
GFL07		681	741		776
GFL09		758	818		853
GFL11		858	918		953
GFL14			1037		1072

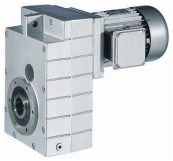


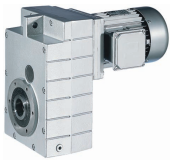
		100C32	112C22	132C12 132C22	160C22	160C32
g		194	218	258	310	
g_1	MHEMAXX	166	176	195	210	
	MHEMABR	147	158	187	210	
k_1	MHEMAXX	324	363	403	457.5	501.5
k_2		180	222	265	300	
Δ k	MHEMABR	76	90	109.5	105	
	MHFMAXX	109	102	115	149	
	MHFMABR	170	183	201.5	179	
		k				
	GFL09	868	913			
	GFL11	968	1013	1061		
	GFL14	1087	1132	1180	1239	1283

	a	**a_4**	**k_8**	**o**[1)]	**o_2**	**o_3**	**o_4**	**p**[1)]	**p_1**
GFL06	140	58	55.5	206	111	280.5	20.2	315	98
GFL07	173	74	72.5	256	135	354	24	386	118
GFL09	220	93.5	77.5	318	170	417.5	27	486	149
GFL11	276.5	120	85.5	395	216	504.5	33.5	600	181
GFL14	339	154	89.5	490	271	599.5	38	740	228

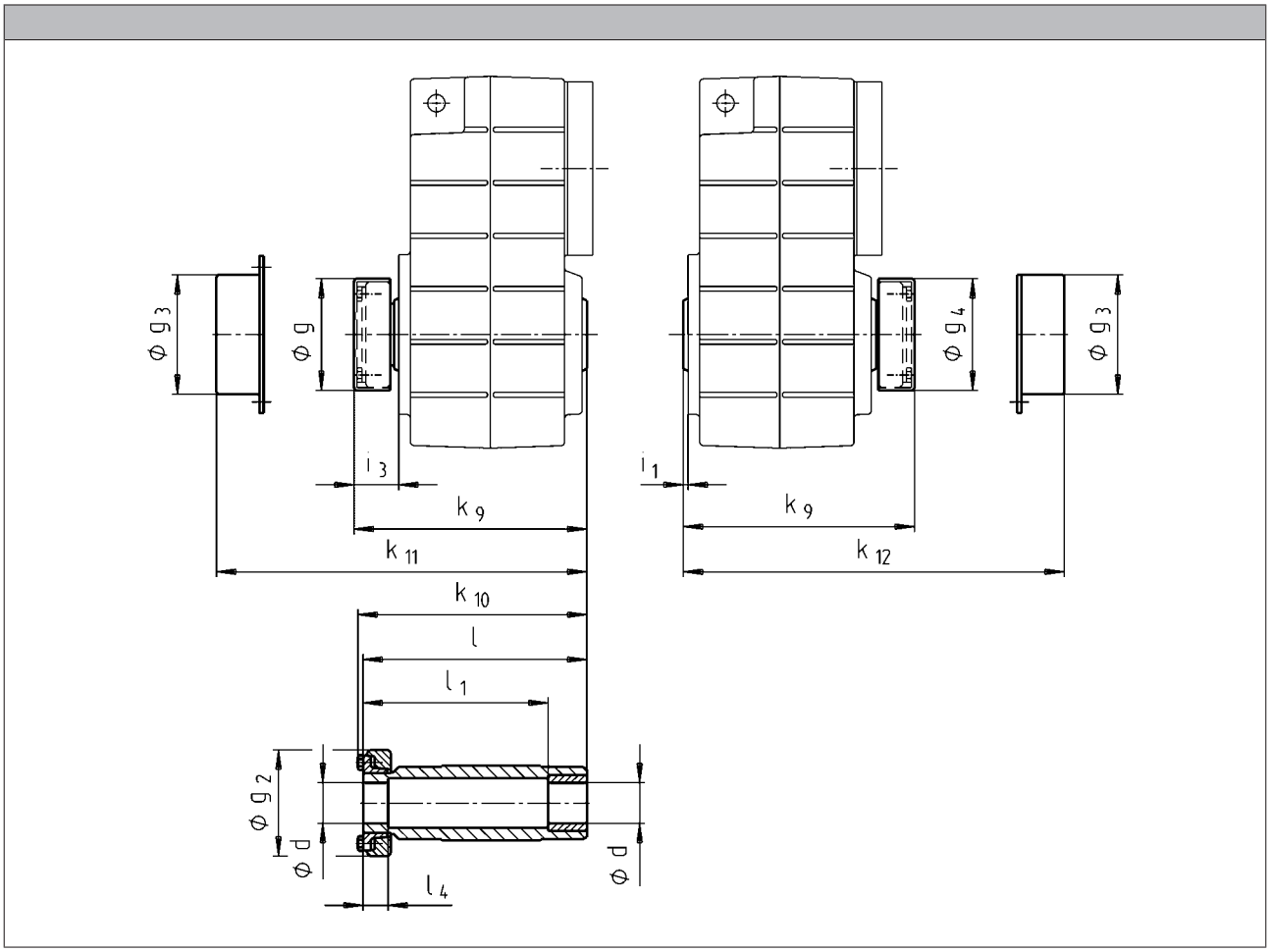
	d	**d**	**d_1**	**d_2**	**l**	**l_1**	**l_2**	**u**	**t**	**i_2**	**o_1**	**a_2**	**b_2**	**c_2**	**e_2**	**f_2**	**s_2**
	k6	m6											j7				
GFL06	40		65	M16	80	7	63	12	43	80	276.5	250	180	15	215	4	4 x 14
GFL07	50		75	M16	100	8	80	14	53.5	100	350.5	250 300	180 230	15 17	215 265	4 4	4 x 14 4 x 14
GFL09		60	95	M20	120	8	100	18	64	120	415.5	350	250	18	300	4	4 x 17.5
GFL11		80	108	M20	160	15	125	22	85	160	504.5	400 450	300 350	20 22	350 400	5 5	4 x 17.5 8 x 17.5
GFL14		100	135	M24	200	18	160	28	106	200	603.5	450	350	22	400	5	8 x 17.5

[1)] k_2 !





Hollow shaft with shrink disc

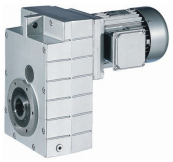


	d [1]	g_2	g_3	g_4	i_1	k_9	k_{10}	k_{11}	k_{12}	l	l_1	l_4
	h6											
GFL04	25 30	72	79	76	2.5	150	148	154	154	142	122	26
GFL04	25 30	72	79	76	2.5	150	148	154	154	142	122	26
GFL05	35	80	90	84	4.0	176	174	179	180	168	148	28
GFL06	40	90	100	94	5.0	202	200	204	205	194	164	30
GFL07	50	110	124	116	5.0	241	238	244	245	232	192	26
GFL09	65	141	159	147	5.0	288	285	287	288	278	228	30
GFL11	80	170	191	176	6.0	347	344	349	350	338	238	42
GFL14	100	215	253	221	7.0	418	415	421	422	407	307	55

[1] Machine shaft design.

► Output flange and hollow shaft with shrink disc (design S□K) is only possible with shrink disc in position 1.

► Not suitable for through machine shaft at motor end:
GFL04-2M S□□ 080C□□; d=30
GFL05-2M S□□ 100C□□; d=35
GFL06-2M S□□ 132C□□; d=40
GFL07-2M S□□ 160C□□; d=50
GFL11-2M S□□ 225C□□; d=80



Hollow shaft with shrink disc

► 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).

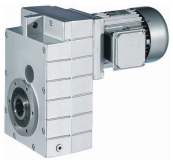
Combination options with shrink disc in position 1 (drive end)

GFL□□-2M

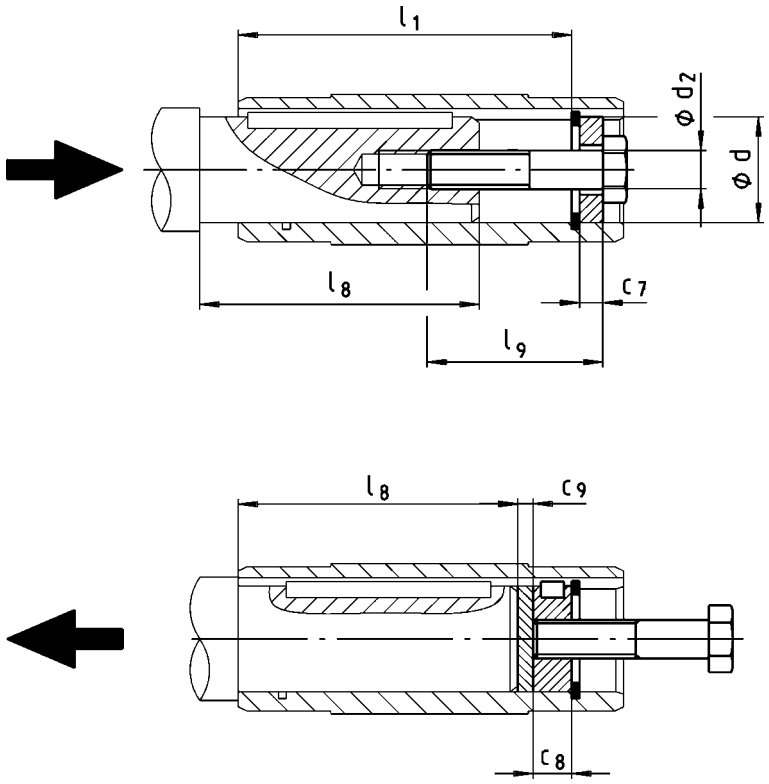
Gearbox	Motor frame size
GFL04	
GFL05	063 [1)] 071 [1)]
GFL06	063 071 080 090 [1)] 100 [1)]
GFL07	080 090 100 112 [1)]
GFL09	090 100 112 132
GFL11	100 112 132 160 180 225
GFL14	112 132 160 180 225

[1)] Only possible without cover

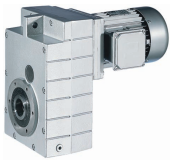
► For geared motors GFL□□-2M/E S... with shrink disc position 1: terminal box position / motec position 4 not possible!



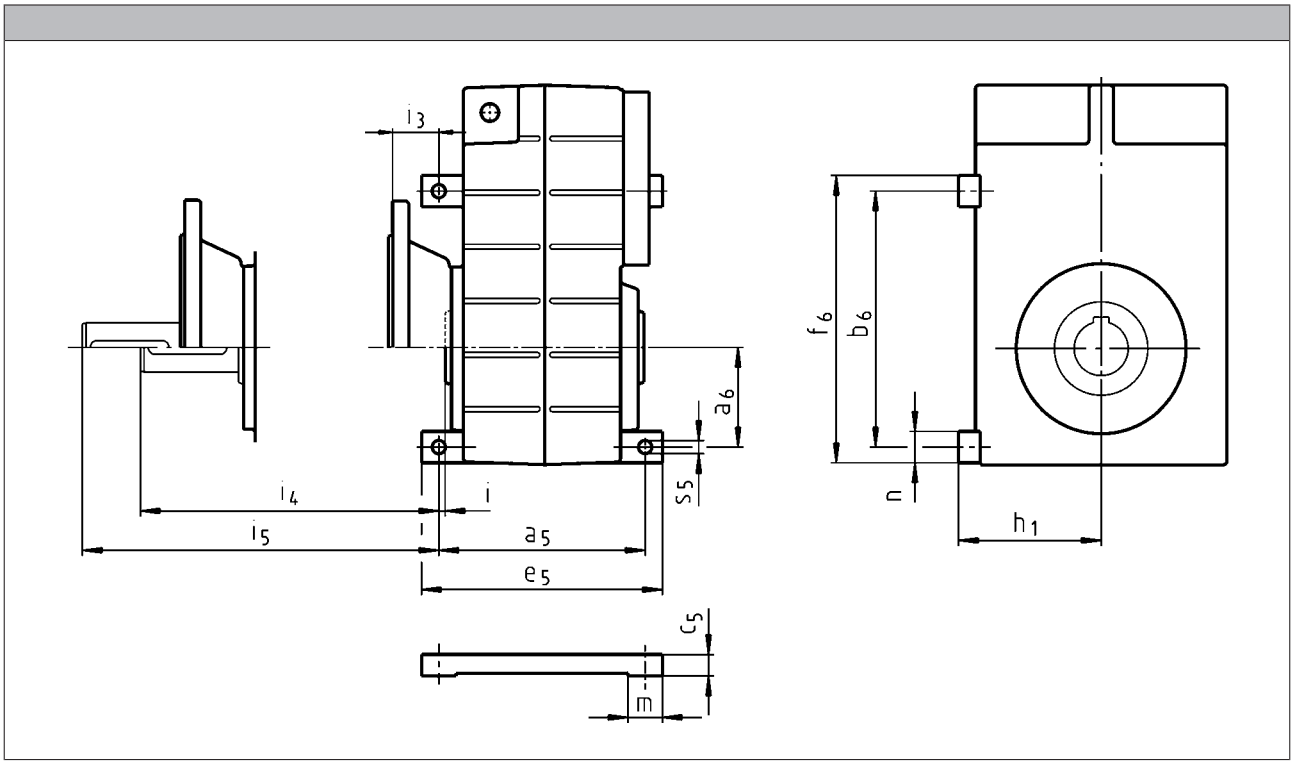
Mounting set for hollow shaft circlip:
Proposed design for auxiliary tools



	d	l_1	d_2	l_9	c_7	c_8	c_9	$l_{8,\,max}$
	H7							
GFL04	25 30	100	M10	40	5	10	3	85
					6			
GFL05	30 35	124						107
			M12	50	7	12		
GFL06	40 45	140	M16	60	8	16	4	118
					9			
GFL07	50 55	175			10		5	148
			M20	80	11	20		
GFL09	60 70	210			13			182
					14			
GFL11	70 80	250					6	221
					16			
GFL14	100	305	M24	100	20	24	8	270

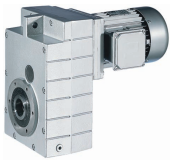


Foot mounting in position 3

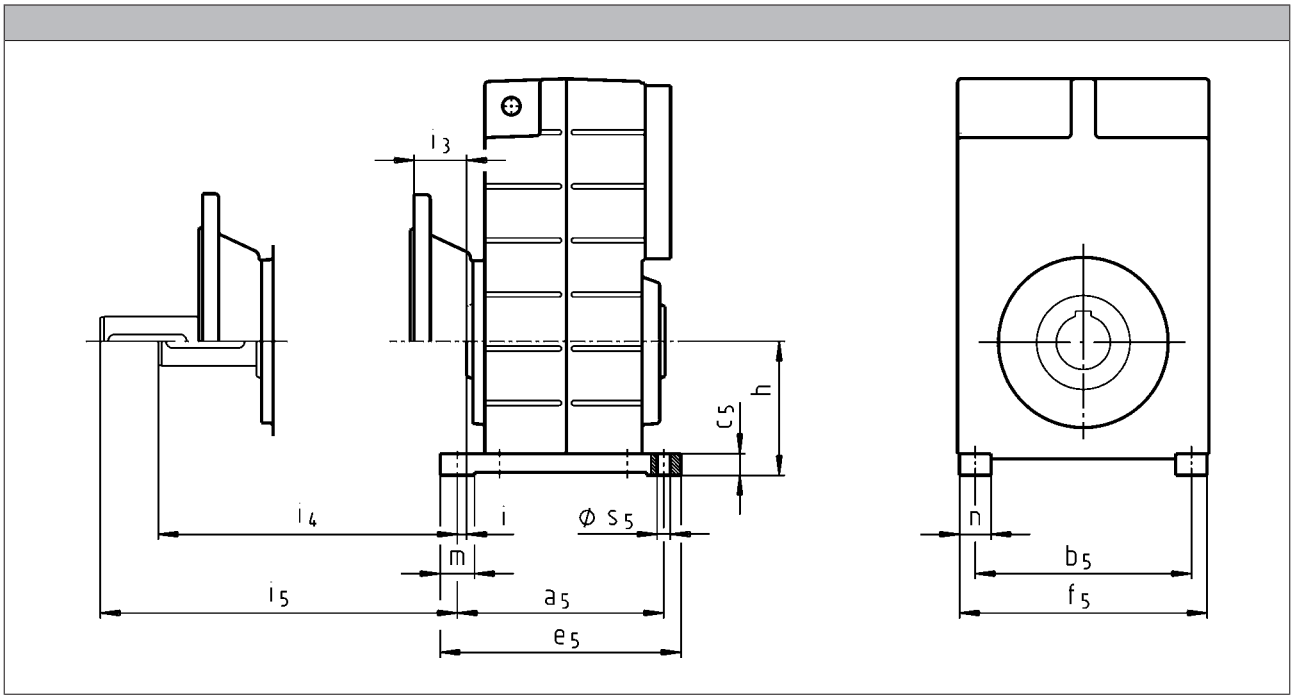


	a_5	a_6	b_6	c_5	e_5	f_6	h_1	i	i_3	i_4	i_5	m	n	s_5
GFL04	130	47	115	18	152	140	90	4.5	28.5	45.5	78.5	22	25	6.6
GFL05	160	65	167	21	185	192	100	2.0	31.0	58.0	91.0	25		9.0
GFL06	175	80	205	27	205	233	125		39.0	78.0	119	30	28	11.0
GFL07	220	100	260	31	255	292	155	3.0	52.0	97.0	152	35	32	13.5
GFL09	260	125	335	36	300	375	190		57.0	117	177	40	40	17.5
GFL11	315	155	435	48	365	485	240			157	217	50	50	22.0
GFL14	375	200	540	57	430	600	295			197	257	55	60	26.0

Foot design is not available for the following combinations:
- GFL04: Motor frame size 090
- GFL05: Motor frame size 090
- GFL05: Motor frame size 100
- GFL06: Motor frame size 112
- GFL06: Motor frame size 132
- GFL07: Motor frame size 160

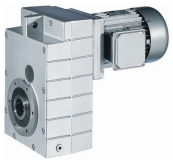


Foot mounting in position 4

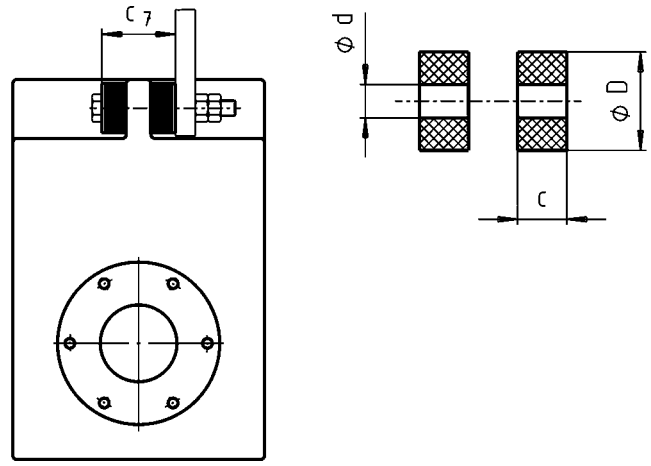


	a_5	b_5	c_5	e_5	f_5	h	i	i_3	i_4	i_5	m	n	s_5
GFL04	130	108	18	152	133.0	85	4.5	28.5	45.5	78.5	22	25	6.6
GFL05	160	140	21	185	165.0	95	2.0	31.0	58.0	91.0	25		9.0
GFL06	175	175	27	205	203.0	120		39.0	78.0	119	30	28	11.0
GFL07	220	220	31	255	252.0	145	3.0	52.0	97.0	152	35	32	13.5
GFL09	260	275	36	300	315.0	180		57.0	117	177	40	40	17.5
GFL11	315	340	48	365	390.0	224			157	217	50	50	22.0
GFL14	375	425	57	430	485.0	278			197	257	55	60	26.0

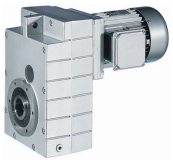
► In mounting positions E and F, the oil check bore hole/oil-sight glass are located between the feet in position 4!



Rubber buffer for torque plate



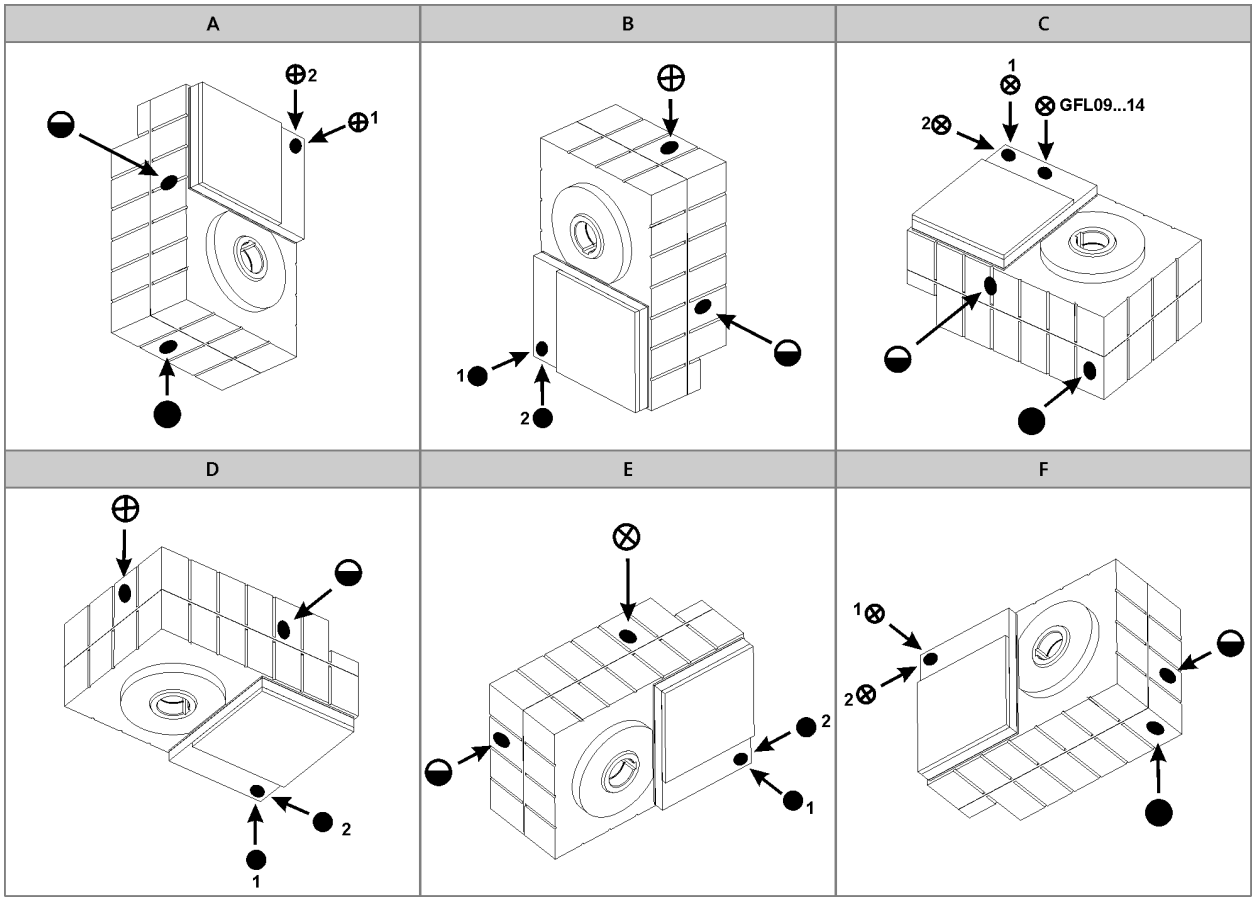
	d	D	c	c_7
GFL04	11	30	14.5	43
GFL05	11	30	14.5	45
GFL06	13	40	15.0	50
GFL07	17	50	27.0	79
GFL09	21	60	28.0	88
GFL11	26	72	29.0	98
GFL14	33	92	30.0	110



Ventilations

Position of ventilation, sealing elements and oil level check

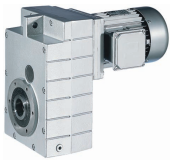
GFL05...14-2



A to F Mounting position
⊗ Ventilation / Oil filler plug
● Oil drain plug
◒ Oil control plug
* On both sides
** On opposite side

Item 1 standard
Item 2 only with:
- GFL05-2M □□□ 090C□□
- GFL05-2M □□□ 100C□□
- GFL06-2M □□□ 112C□□
- GFL07-2M □□□ 160C□□

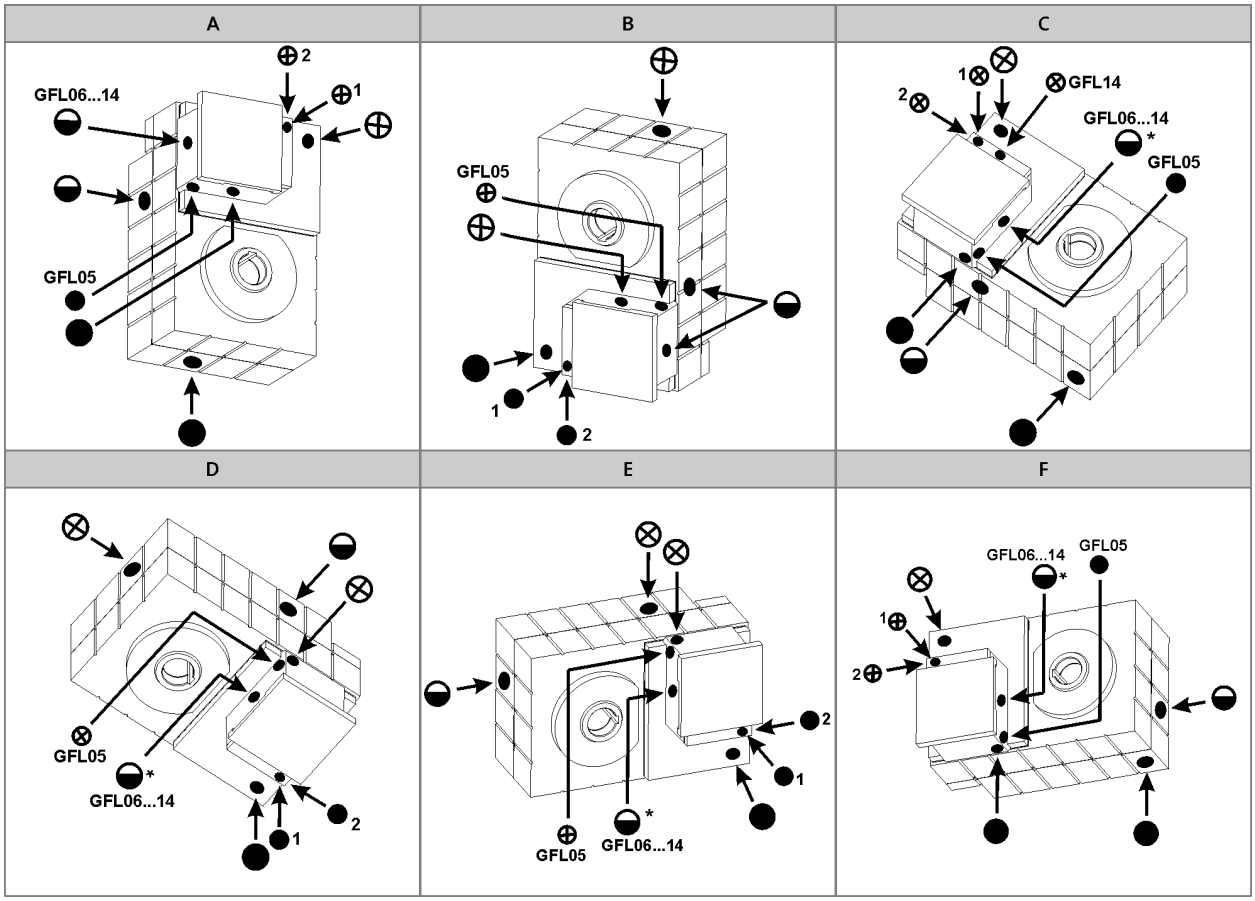
6.6



Ventilations

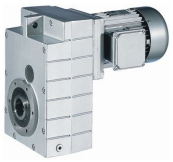
Position of ventilation, sealing elements and oil level check

GFL05...14-3



A to F Mounting position
⊗ Ventilation / Oil filler plug
● Oil drain plug
◒ Oil control plug
* On both sides
** On opposite side

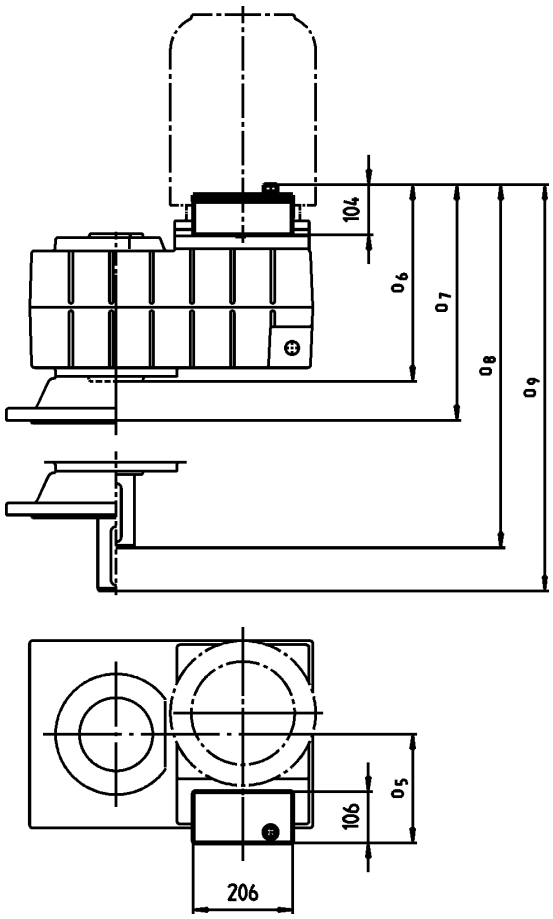
Item 1 standard
Item 2 only with:
- GFL07-3M □□□ 090C□□
- GFL07-3M □□□ 100C□□
- GFL09-3M □□□ 112C□□



Ventilations

Compensation reservoir for mounting position C

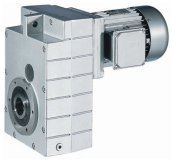
GFL□□-2



Motor	090 100					112				
	o_5	o_6	o_7	o_8	o_9	o_5	o_6	o_7	o_8	o_9
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
GFL09	165	344	405	464	525	187	344	405	464	525
GFL11	154	387	448	547	608	176	391	452	551	612
GFL14						181	446	507	646	707

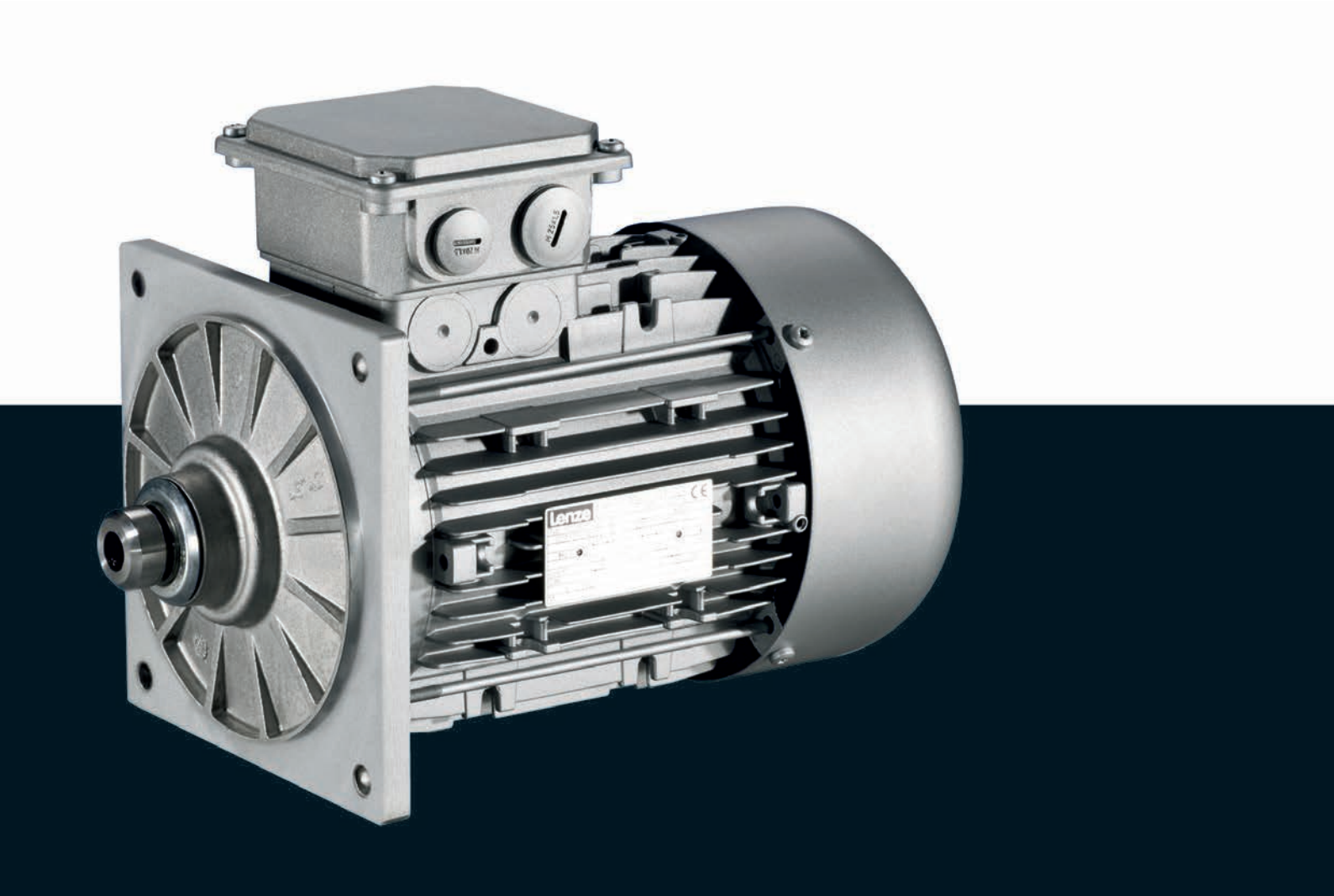
Motor	132					160 180 225				
	o_5	o_6	o_7	o_8	o_9	o_5	o_6	o_7	o_8	o_9
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
GFL09	204	344	405	464	525	219	344	405	464	525
GFL11	200	391	452	551	612	214	391	452	551	612
GFL14	211	446	507	646	707	211	446	507	646	707

- Terminal box position 3 not permitted.
- Foot in position 3 not permitted.



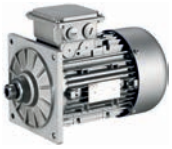
MH three-phase AC motors

0.75 to 45 kW



MH three-phase AC motors

Contents



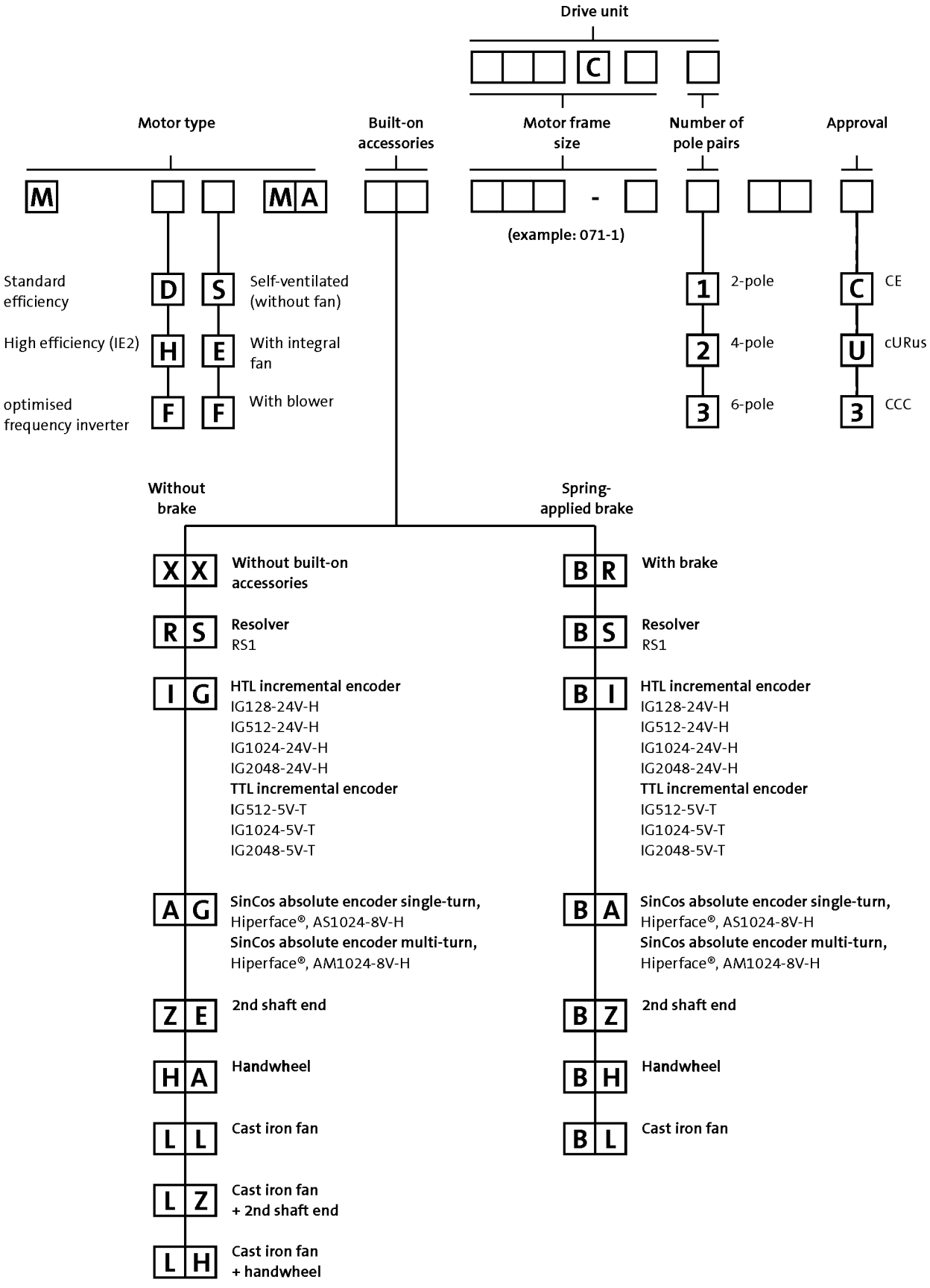
List of abbreviations

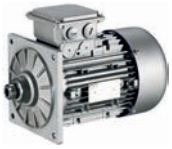
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
cos ϕ		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated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

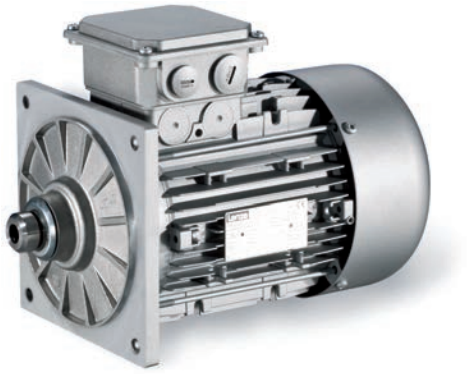

Drive unit
C
Motor type
Built-on accessories
Motor frame size
Number of pole pairs
Approval
M
M A
-
(example: 071-1)
Standard efficiency
D
S
Self-ventilated (without fan)
High efficiency (IE2)
H
E
With integral fan
optimised frequency inverter
F
F
With blower
1
2-pole
2
4-pole
3
6-pole
C
CE
U
cURus
3
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.



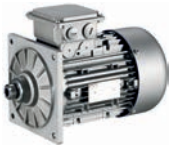
L-force MH three-phase AC motors are available in a power range from 0.75 to 45 kW and comply with efficiency class IE2 (high efficiency) as per IEC 60034-30.
Since almost all IE2 motors are designed with the same dimensions as the standard efficiency motors, it is easy to switch between the two.
The energy efficiency of the L-force MH three-phase AC motors has been approved by Underwriters Laboratories (UL) as an independent third-party.

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

Options
- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach 10 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.

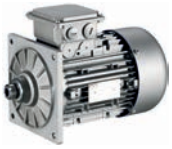
Functions and features

Size			
Motor	080	090	100
Spring-applied brake			
Design	Standard or LongLife 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 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 Increased centrifugal mass Handwheel 2nd shaft end		



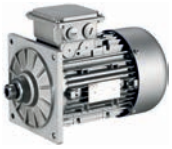
Functions and features

Size			
Motor	112	132	160
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 ICN connector HAN10E connector HAN modular connector	Terminal box ICN connector HAN modular connector	Terminal box HAN modular connector
Brake connection	Terminal box ICN connector HAN modular connector HAN10E connector	Terminal box ICN connector HAN modular connector	Terminal box 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 2nd shaft end		Protection cover



Functions and features

Size			
Motor	180	200	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		
Brake connection	Terminal box		
Blower connection	Terminal box ICN connector		
Feedback connection	Terminal box ICN connector		
Temperature sensor 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			



Functions and features

Surface and corrosion protection

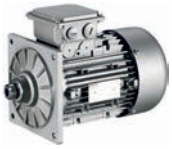
For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

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		

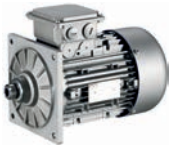


Motor – inverter assignment

Rated frequency 50/60 Hz

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

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

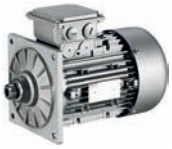


Motor – inverter assignment

Rated frequency 87 Hz

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

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

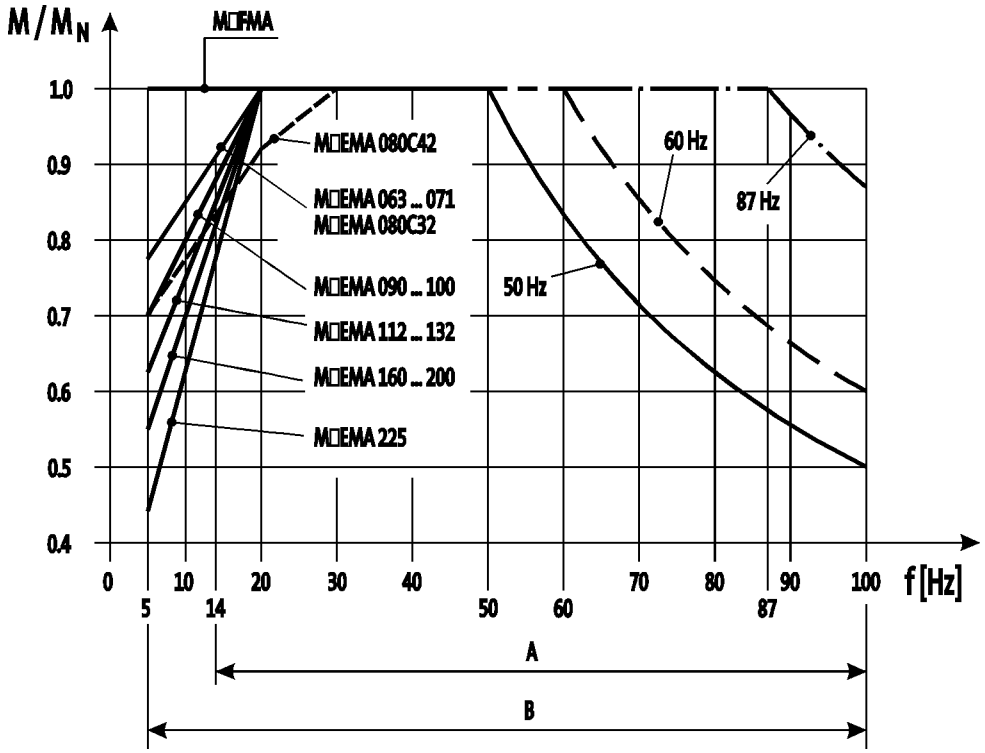


Dimensioning

Torque derating at low motor frequencies

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

Torque characteristics



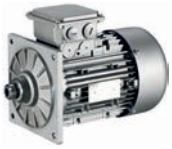
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

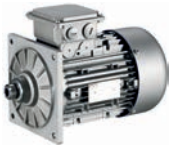
► The motor specifications stated in this catalogue for inverter operation apply to operation with a Lenze inverter. If you are uncertain, get in touch with the manufacturer of the inverter to ask whether the device is capable of driving the motor with the stated specifications (e.g. setting range, base 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			IE2
IEC 60034-2-1			Methodology for measuring efficiency
Approval			
Class			cURus/UL Energy-verified [1)] 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)] 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

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]	
MH□□□□□080-32	0.75	1410	230	3.10	400	1.80	5.00
MH□□□□□090-12	1.10	1430	230	4.60	400	2.70	5.40
MH□□□□□090-32	1.50	1435	230	5.80	400	3.30	6.30
MH□□□□□100-12	2.20	1445	230	8.60	400	5.00	6.00
MH□□□□□100-32	3.00	1445	230	12.1	400	7.00	6.50
MH□□□□□112-22	4.00	1455	230	14.5	400	8.40	6.00
MH□□□□□132-12	5.50	1470	230 400 [3]	20.6 11.9	400	11.9	6.10
MH□□□□□132-22	7.50	1460	230 400 [3]	27.0 15.6	400	15.6	8.50
MH□□□□□160-22	11.0	1470	230 400 [3]	37.7 21.8	400	21.8	8.00
MH□□□□□160-32	15.0	1470	230 400 [3]	50.3 29.1	400	29.1	8.20
MH□□□□□180-12	18.5	1475	230 400 [3]	58.8 34.0	400	34.0	8.40
MH□□□□□180-32	22.0	1470	230 400 [3]	68.9 39.8	400	39.8	7.80
MH□□□□□180-42	30.0	1465	230 400 [3]	93.8 53.9	400	53.9	7.00
MH□□□□□225-12	37.0	1483	230 400 [3]	113 65.0	400	65.0	7.50
MH□□□□□225-22	45.0	1480	230 400 [3]	137 79.0	400	79.0	7.60

	M_N	M_a	M_b	cos ϕ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	5.08	12.0	12.1	0.84	74.9	79.6	79.6	28.0	11.0
MH□□□□□090-12	7.35	20.3	24.2	0.76	77.4	81.6	82.0	32.0	16.0
MH□□□□□090-32	10.0	33.0	34.0	0.76	82.2	83.4	82.8	36.0	18.0
MH□□□□□100-12	14.5	48.0	55.0	0.80	85.4	86.7	86.3	61.0	24.0
MH□□□□□100-32	19.8	67.0	76.0	0.73	83.8	85.6	85.5	66.0	26.5
MH□□□□□112-22	26.3	81.0	100	0.80	86.3	88.2	88.3	135	38.0
MH□□□□□132-12	35.7	90.0	108	0.77	88.2	89.3	89.2	290	59.0
MH□□□□□132-22	49.1	110	175	0.79	87.6	88.9	88.7	336	66.0
MH□□□□□160-22	71.5	164	243	0.82	89.4	90.0	89.8	570	109
MH□□□□□160-32	97.4	224	292	0.82	90.2	90.8	90.6	760	124
MH□□□□□180-12	120	359	371	0.86	90.8	91.4	91.2	1390	175
MH□□□□□180-32	143	400	372	0.87	91.4	92.0	91.6	1440	180
MH□□□□□180-42	196	469	528	0.87	91.9	92.5	92.3	1850	200
MH□□□□□225-12	238	620	620	0.87	94.0	94.6	94.3	4610	395
MH□□□□□225-22	290	698	669	0.88	93.7	94.5	94.3	5300	415

[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 225-22, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 400 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.

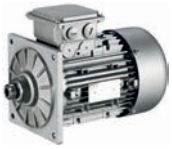
	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MH□□□□□080-32	0.75	1720	265	2.80	460	1.60	5.80
MH□□□□□090-12	1.10	1740	265	4.00	460	2.30	6.50
MH□□□□□090-32	1.50	1745	265	5.10	460	3.00	7.20
MH□□□□□100-12	2.20	1750	265	7.70	460	4.40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

	M_N	M_a	M_b	cos ϕ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	4.16	9.37	9.89	0.82	77.9	81.5	82.5	28.0	11.0
MH□□□□□090-12	6.04	17.0	20.0	0.71	79.3	83.0	84.0	32.0	16.0
MH□□□□□090-32	8.21	27.0	28.0	0.75	79.3	83.0	84.0	36.0	18.0
MH□□□□□100-12	12.0	40.0	47.0	0.78	82.6	86.5	87.5	61.0	24.0
MH□□□□□100-32	16.3	55.0	64.0	0.71	84.2	86.6	87.5	66.0	26.5
MH□□□□□112-22	21.7	69.0	84.0	0.79	84.2	86.6	87.5	135	38.0
MH□□□□□132-12	29.6	74.0	92.0	0.77	86.1	88.6	89.5	290	59.0
MH□□□□□132-22	40.6	92.0	147	0.79	86.1	88.6	89.5	336	66.0
MH□□□□□160-22	59.2	148	231	0.81	89.3	90.9	91.0	570	109
MH□□□□□160-32	80.7	210	274	0.81	89.3	90.9	91.0	760	124
MH□□□□□180-12	99.5	338	348	0.86	90.6	92.3	92.4	1390	175
MH□□□□□180-32	118	379	355	0.87	90.6	92.3	92.4	1440	180
MH□□□□□180-42	162	440	505	0.87	92.0	92.9	93.0	1850	200
MH□□□□□225-12	198	590	590	0.87	92.0	92.9	93.0	4610	395
MH□□□□□225-22	241	660	635	0.88	92.6	93.5	93.6	5300	415

[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 132-12 to 225-22, the required voltage must also be specified in your order.

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



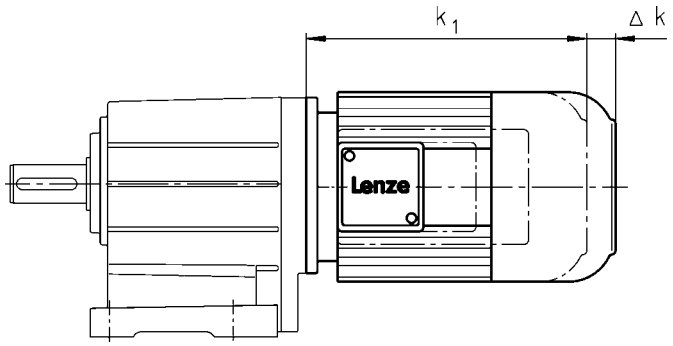
Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos ϕ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
					± 10 %							
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	1.35	2520	5.12	20.0	400	3.10	0.84	77.3	81.6	83.5	28.0	11.0
MH□□□□□090-12	2.00	2540	7.52	30.0	400	4.60	0.78	80.4	84.9	86.5	32.0	16.0
MH□□□□□090-32	2.70	2545	10.1	40.0	400	5.80	0.76	82.3	85.5	86.0	36.0	18.0
MH□□□□□100-12	3.90	2555	14.6	60.0	400	8.60	0.83	85.7	89.6	90.0	61.0	24.0
MH□□□□□100-32	5.40	2555	20.2	80.0	400	12.1	0.76	84.7	87.9	88.5	66.0	26.5
MH□□□□□112-22	7.10	2565	26.4	106	400	14.5	0.83	87.4	90.2	90.9	135	38.0
MH□□□□□132-12	9.70	2580	35.9	144	400	20.6	0.82	88.2	91.4	91.8	290	59.0
MH□□□□□132-22	13.2	2570	49.1	196	400	27.0	0.82	88.2	90.1	90.7	336	66.0
MH□□□□□160-22	19.4	2580	71.8	287	400	37.7	0.81	90.6	91.0	91.6	570	109
MH□□□□□160-32	26.4	2580	97.7	391	400	50.3	0.81	91.4	91.0	91.6	760	124
MH□□□□□180-12	32.5	2585	120	480	400	58.8	0.86	92.0	92.2	92.8	1390	175
MH□□□□□180-32	38.7	2580	143	573	400	68.9	0.87	92.1	92.9	93.4	1440	180
MH□□□□□180-42	52.7	2575	196	782	400	92.6	0.87	92.6	92.7	93.2	1850	200
MH□□□□□225-12	64.0	2593	236	920	400	113	0.87	93.0	94.4	94.8	4610	395
MH□□□□□225-22	78.0	2590	288	1150	400	137	0.85	93.5	94.3	94.7	5300	415

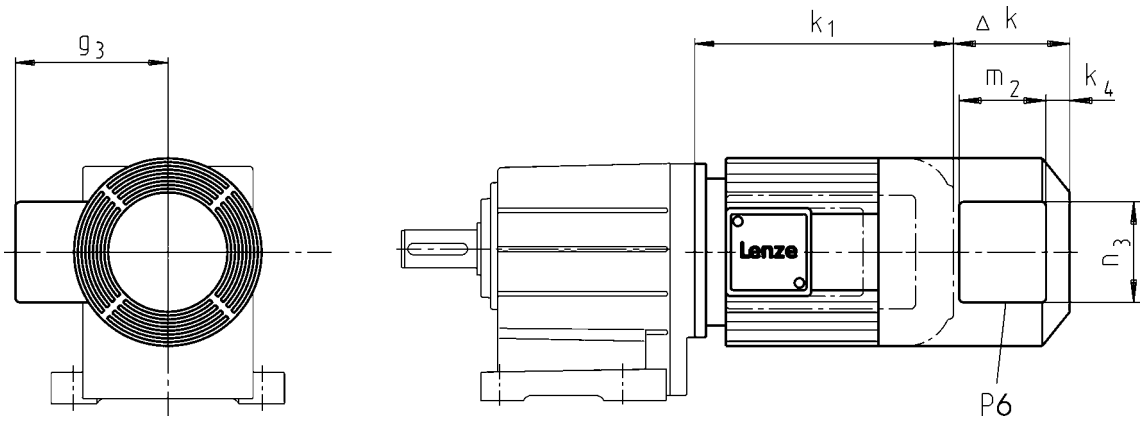
[1] Without accessories

Dimensions, self-ventilated (4-pole)



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

Dimensions, forced ventilated (4-pole)

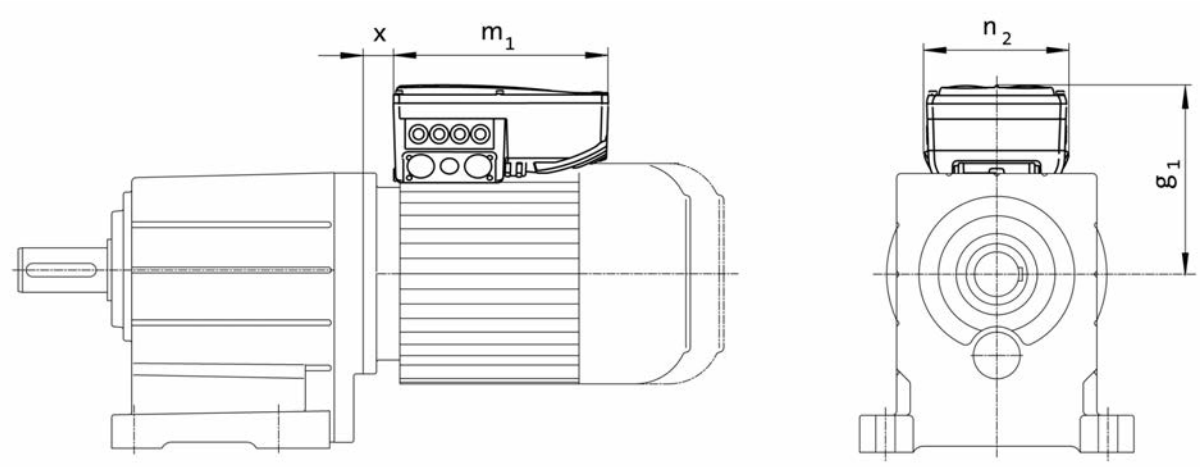


Motor type									
	MHFMAXX	MHFMABR	MHFMABS MHFMABI MHFMABA	MHFMARS MHFMAIG MHFMAAG					

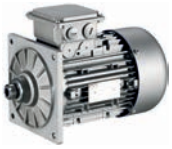
Motor frame size									
	Δ k	Δ k	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080-32	128	183	183	128	13	132	96	106	1x M16x1.5
090-12 090-32		181	181		22	141	95	105	
100-12 100-32	109	170	170	109		150			
112-22	102	183	183	183		162			
132-12 132-22	115	202	202	202	32	182			
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, 8400 motec inverter

Rated frequency 50/60 Hz

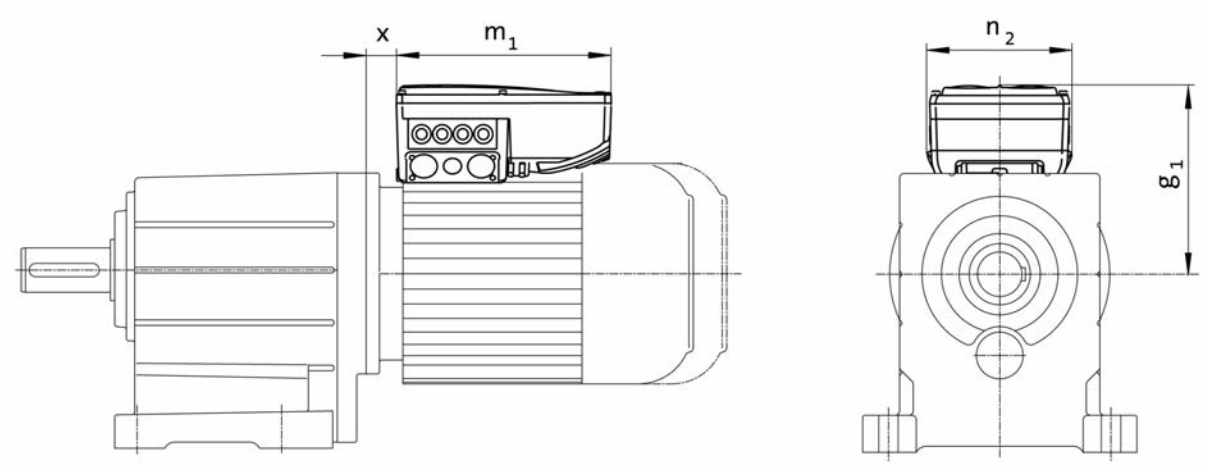


Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MH□□□□□080-32	E84DVB□7514S□□□2□	172	241	161	25.5
MH□□□□□090-12	E84DVB□1124S□□□2□	177			28.8
MH□□□□□090-32	E84DVB□1524S□□□2□				
MH□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	29.6
MH□□□□□100-32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



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]
MH□□□□□080-32	E84DVB□1524S□□□2□	172	241	161	25.5
MH□□□□□090-12	E84DVB□2224S□□□2□	206	260	176	27.8
MH□□□□□090-32	E84DVB□3024S□□□2□				
MH□□□□□100-12	E84DVB□4024S□□□2□	272	325	195	17.1
MH□□□□□100-32	E84DVB□5524S□□□2□				
MH□□□□□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

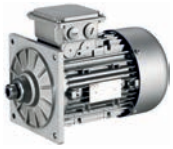
Design	Standard Standard	LongLife LongLife

Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
080-32	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
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		

Spring-applied brake

Assignment of 4-pole motors and brakes

Design	Standard		LongLife	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
112-22	12 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	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		
200-32	18 18 20 20 20 20	80.0 150 145 260 315 400		
225-12	25 25 25	265 400 490		
225-22	25 25 25 25	265 400 490 600		



Spring-applied brake

Direct connection without rectifier

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

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

Connection via mains voltage with brake rectifier

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

Half-wave rectifier, 6-pole

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

Bridge rectifier, 6-pole

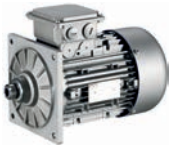
- Ratio of supply voltage to brake coil voltage = 1.11
- Supply voltage
  AC 230 V

Bridge/half-wave rectifier, 6-pole

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

Supply voltages:

- AC 230 V
- AC 400 V



Spring-applied brake

Connection via mains voltage with brake rectifier

Bridge/half-wave rectifier, 6-pole
- Ratio of supply voltage to brake coil voltage
  up to overexcitation time = 1.11
  beyond overexcitation time = 2.22

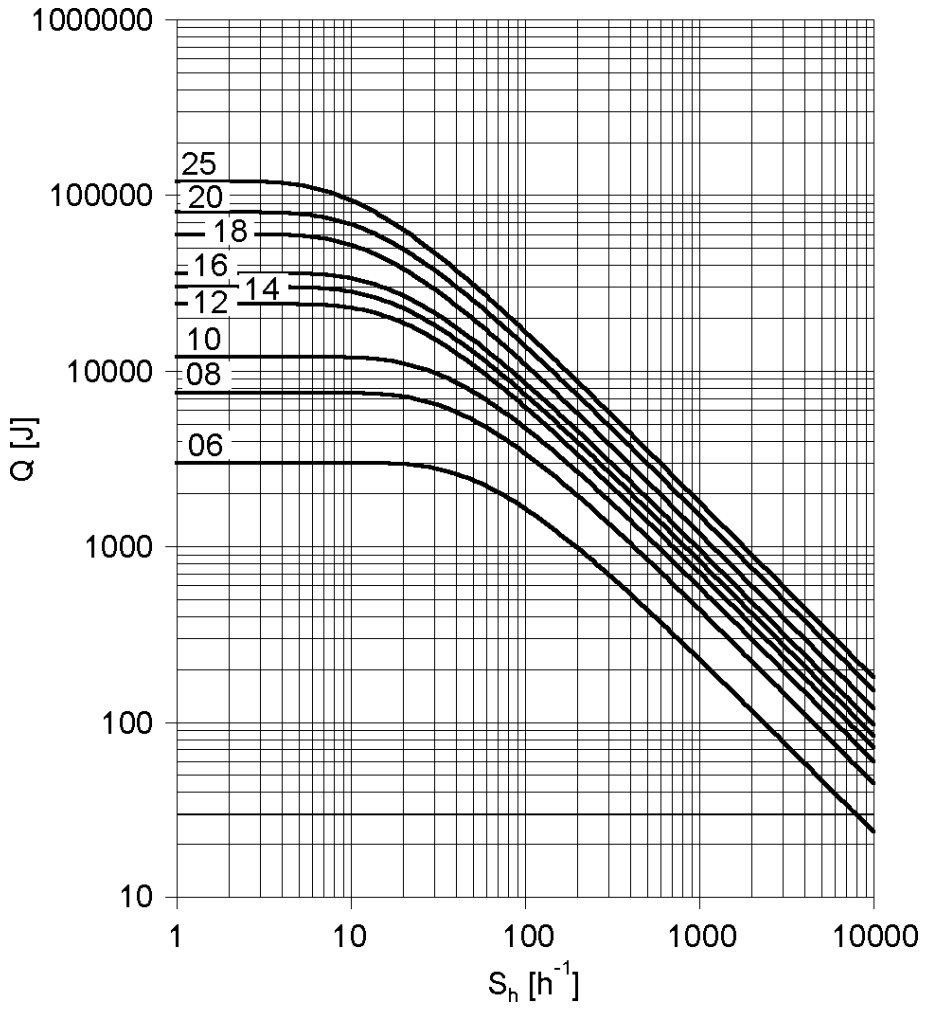
Supply voltages:
- AC 230 V
- AC 400 V

During the switching operation the bridge/half-wave rectifier functions as a bridge rectifier for the overexcitation time $t_{ü}$ 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:

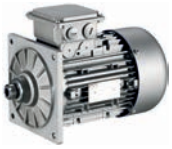
- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_{ü}$ with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.
  These features make this activation version 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

Permissible friction energy



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



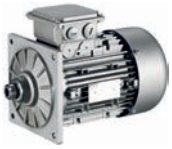
Spring-applied brake

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

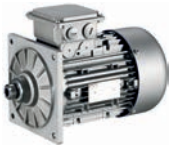
► Activation via half-wave or bridge rectifier

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.



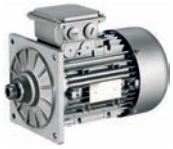
Spring-applied brake

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

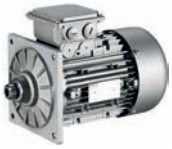
► Activation via half-wave or bridge rectifier

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

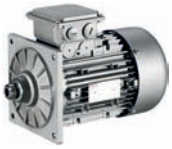
Rated data with increased braking torque

► 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

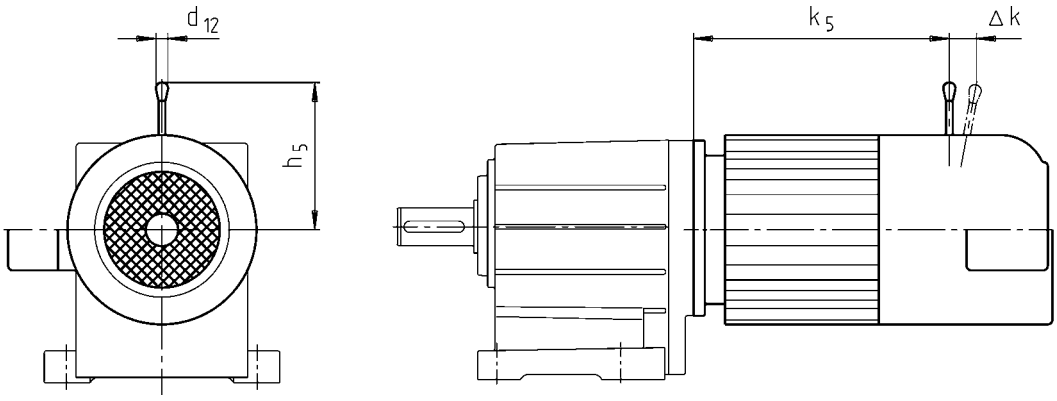
Design			Over-excitation									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time												
	$t_ü$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
Engaging	t_{11}	[ms]	29.0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

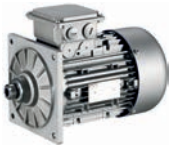
Manual release lever



Motor frame size	Size				
	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
080-32	06 08	207 218	29 27	107 116	13.0 13.0
090-12 090-32	08 10	245 256	27 28	116 132	13.0 13.0
100-12	10 12	279 281	28 37	132 161	13.0 13.0
100-32	10 12	294 296	28 37	132 161	13.0 13.0
112-22	12 14	292 296	37 41	161 195	13.0 24.0
132-12 132-22	14 16	373 373	41 55	195 240	24.0 24.0
160-22	16 18	420 423	55 59	240 279	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 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)

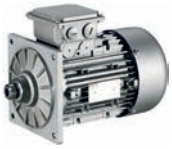
Servo-Inverters
- Servo Drives 9400 (E94A)
- 9300 servo inverters (EVS93)
- Servo Drives ECS

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

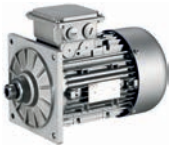
► The thermal sensors are integrated in the windings. The use of an additional motor protection switch is recommended.

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

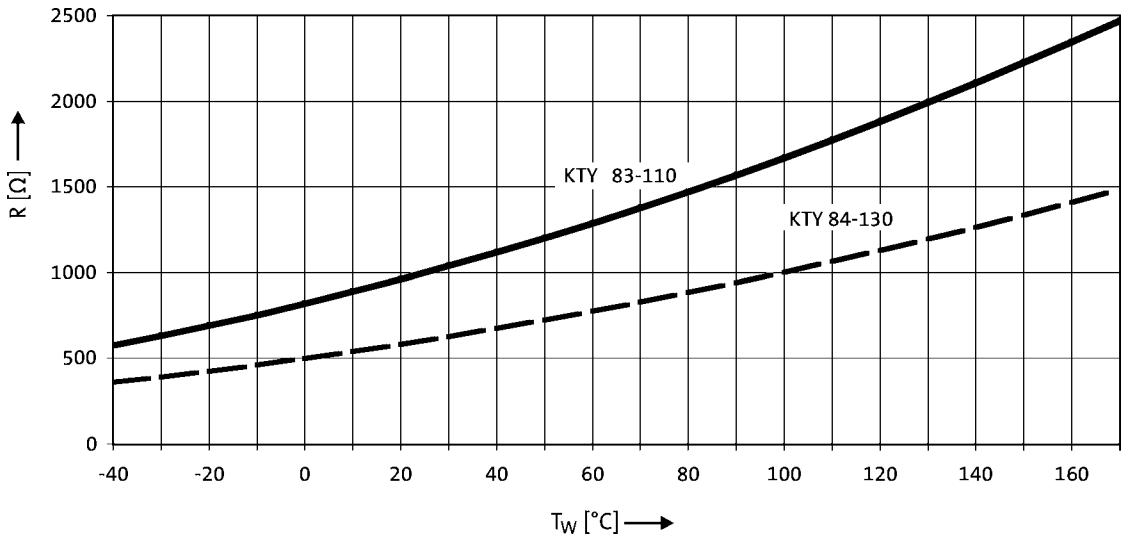


Temperature monitoring

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.

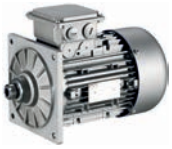
Terminal box

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

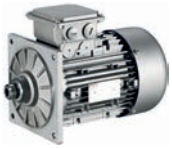
Motor type	M□□MAXX	M□□MARS M□□MAIG M□□MAAG	M□□MAZE M□□MAHA	M□□MALL	M□□MALZ M□□MALH
Motor frame size					
	Terminal box				
063-02 063-22	KK1	KK2			
063-12 063-32 063-42	KK1	KK2			
071-32 071-42 071-13 071-33	KK1	KK2	KK2	KK1	KK1
080-13 080-32 080-33 080-42	KK1	KK2	KK2	KK1	KK1
090-12 090-32	KK1	KK2	KK2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

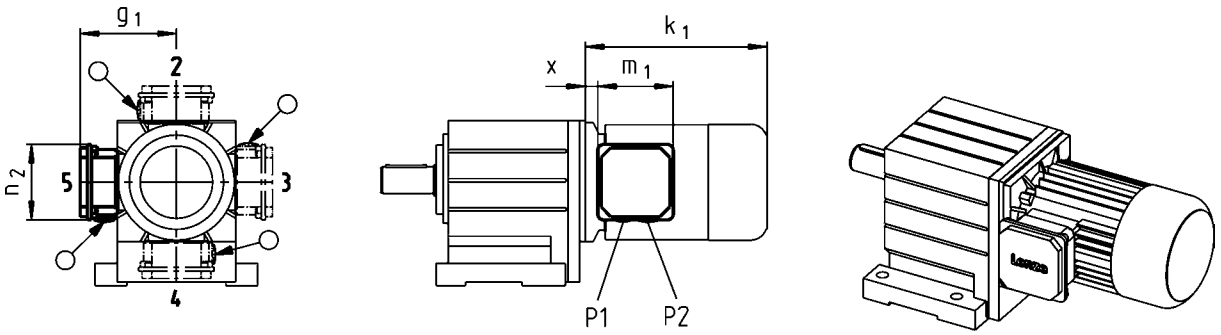
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size				
	Terminal box			
063-02 063-22	KK2	KK3		
063-12 063-32 063-42	KK2	KK3		
071-32 071-42 071-13 071-33	KK2	KK3	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK3	KK2	KK2
090-12 090-32	KK2	KK3	KK2	KK2
100-12 100-32	KK2	KK3	KK2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

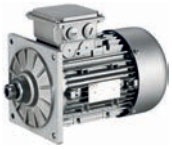
Dimensions of KK1

- ► 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

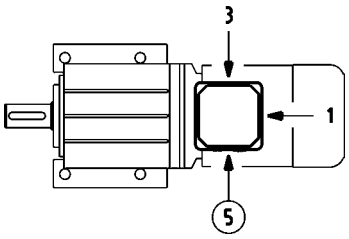
[1)] UL/CSA approval: cURus



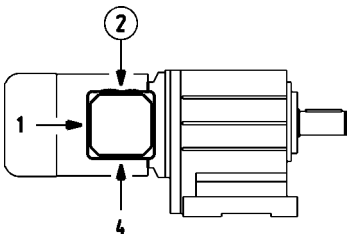
Terminal box

Cable entry position when using KK1

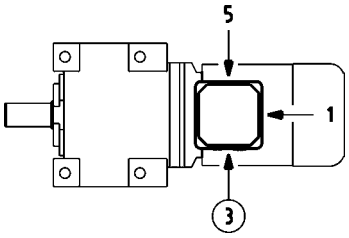
Terminal box in position 2



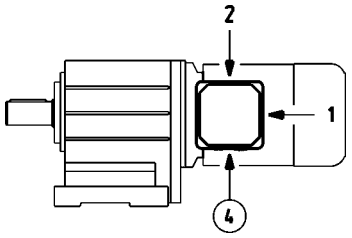
Terminal box in position 3

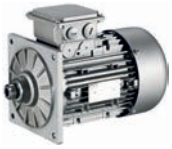


Terminal box in position 4



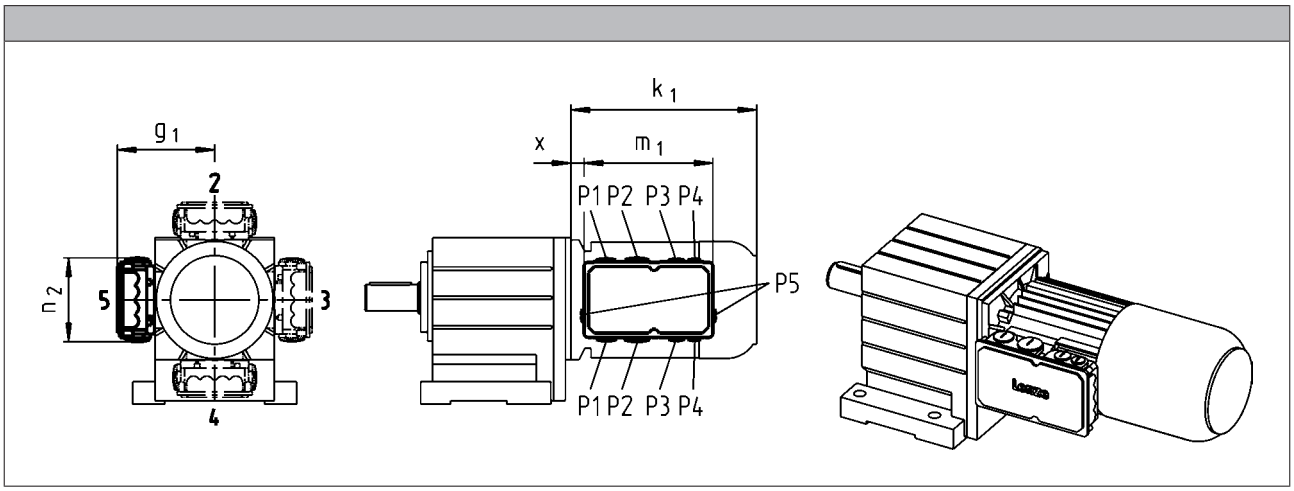
Terminal box in position 5



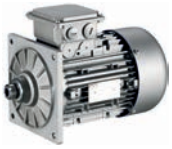


Terminal box

Dimensions of KK2

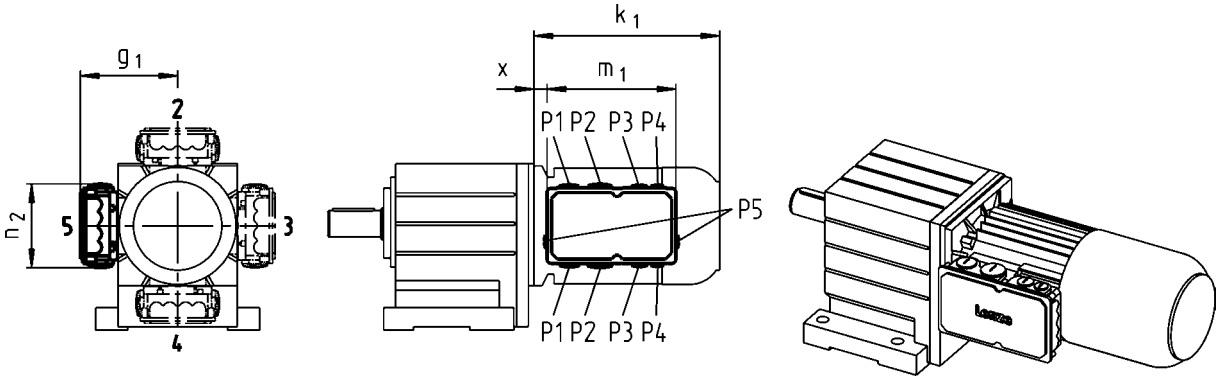


Size						
Motor						
	x	g_1	m_1	n_2	P_1	P_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	M16x1.5	M20x1.5
071	15	118				
080	17	132	152	121	M20x1.5	M25x1.5
090	22	137				
100	23	147				
112	25	158				



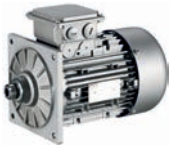
Terminal box

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.

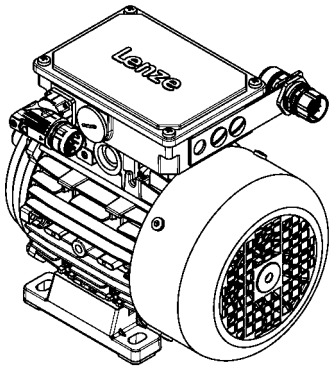


Plug connectors

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

ICN connector

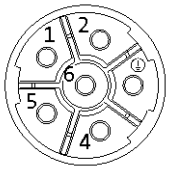
A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



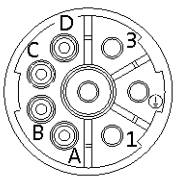
Connection for power, brake and temperature monitoring

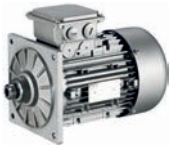
The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As this connector is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and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

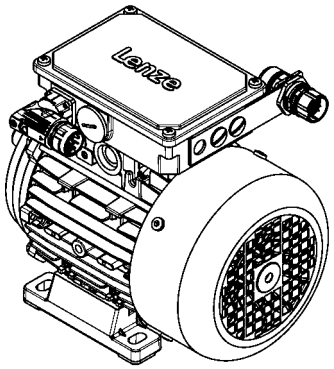
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	V	Phase V power	
4	W	Phase W power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake /AC	



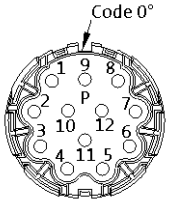
ICN connector

Feedback connection

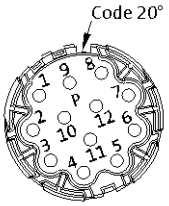
All encoder systems (apart from IG128-24V-H) are also available with an ICN connector fixed to the motor terminal box for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing mating connectors can therefore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

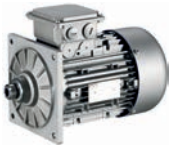


► Resolver

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

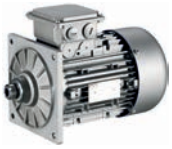
Pin assignment			
Contact	Designation	Meaning	
1	B	Track B/+SIN	
2	A^-	Track A inverse/-COS	
3	A	Track A/+COS	
4	$+U_B$	Supply +	
5	GND	Mass	
6	Z^-	Zero track inverse/-RS485	
7	Z	Zero track/+RS485	
8		Not assigned	
9	B^-	Track B inverse/-SIN	
10		Not assigned	
11	+KTY	KTY temperature sensor	
12	-KTY		



ICN connector

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

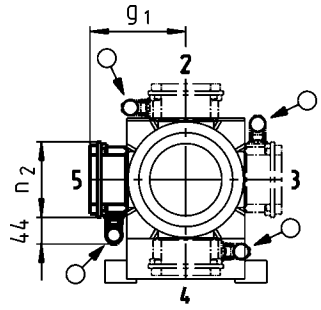
Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

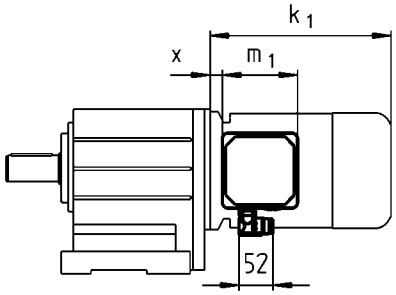
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size				
	Terminal box with ICN connector			
063-02 063-22	KK2	KK2		
063-12 063-32 063-42	KK2	KK2		
071-32 071-42 071-13 071-33	KK2	KK2	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK2	KK2	KK2
090-12 090-32	KK2	KK2	KK2	KK2
100-12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

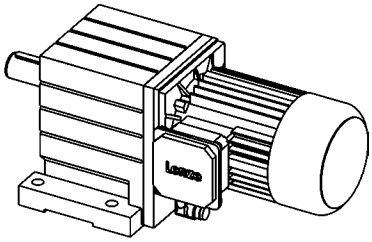
ICN connector

Dimensions of KK1

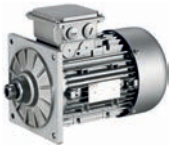
- ► For motors with connectors, the connector position can be selected in accordance with the terminal box position.
- ► If preferred positions are not specified in the order, the connector will be positioned as circled on the diagram below.







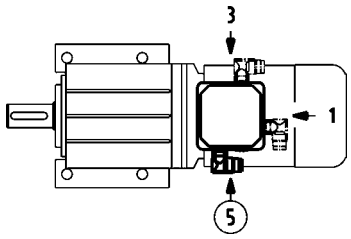
Size				
Motor				
	x	g_1	m_1	n_2
	[mm]	[mm]	[mm]	[mm]
063	12	117	93.0	93.0
071	15	126		
080	14	150	115	115
090	19	157		
100	20	166		
112	22	176		
132	33	195	122	122



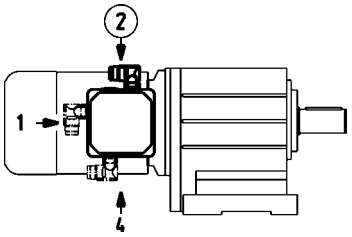
ICN connector

Connector position when using KK1

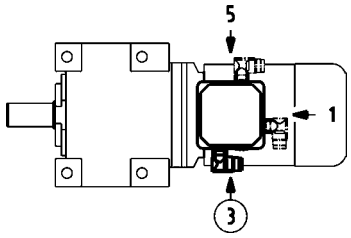
Terminal box in position 2



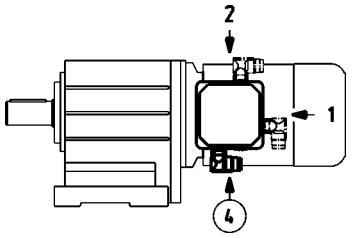
Terminal box in position 3



Terminal box in position 4



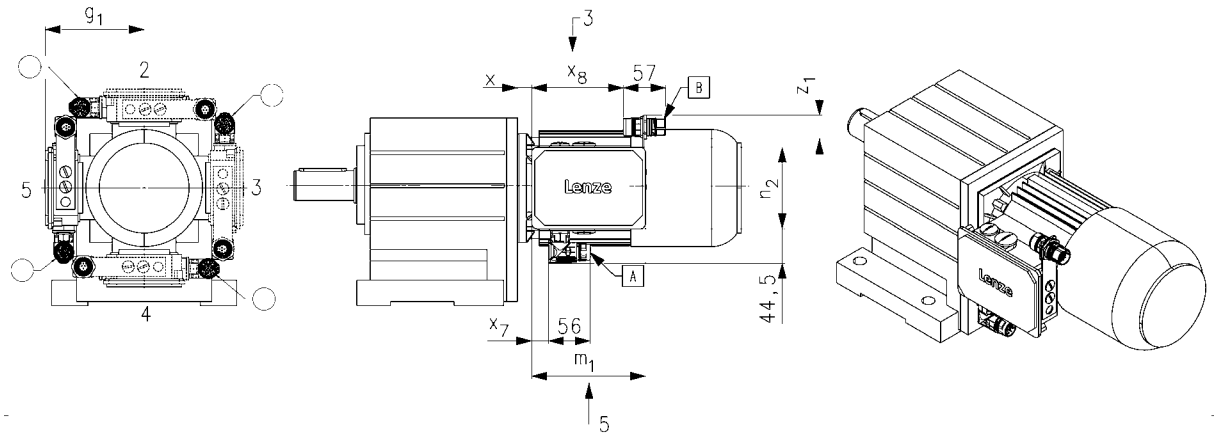
Terminal box in position 5



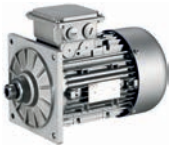
ICN connector

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.



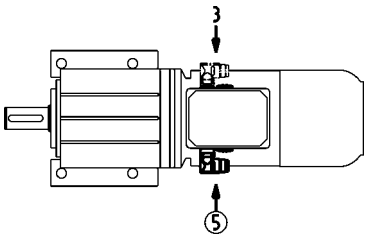
Size							
Motor							
	x	g_1	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	16	109	43
071	15	118					
080	17	132	152	121	23	125	41
090	22	137					
100	23	147					
112	25	158					
132	38	187	195	125	27	166	71



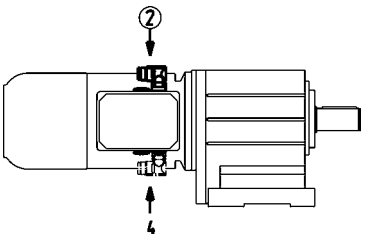
ICN connector

Connector position when using KK2/KK3

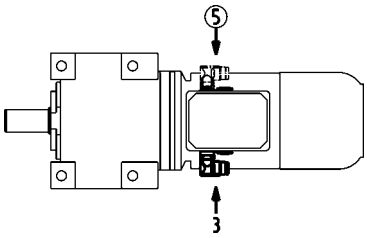
Terminal box in position 2



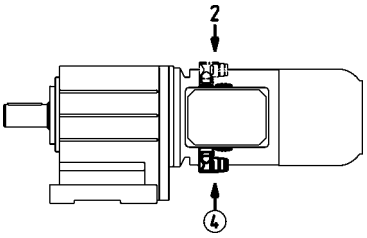
Terminal box in position 3

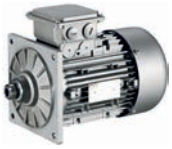


Terminal box in position 4



Terminal box in position 5

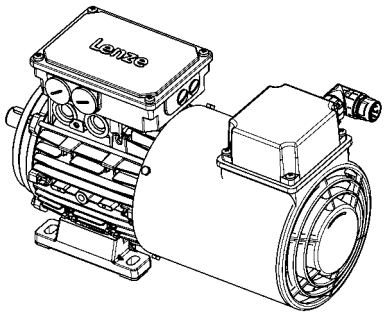




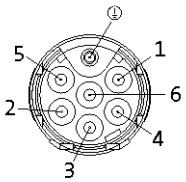
ICN connector

Blower connection

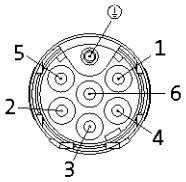
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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

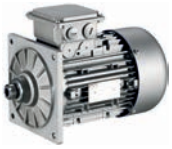


► Blower 1-ph

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

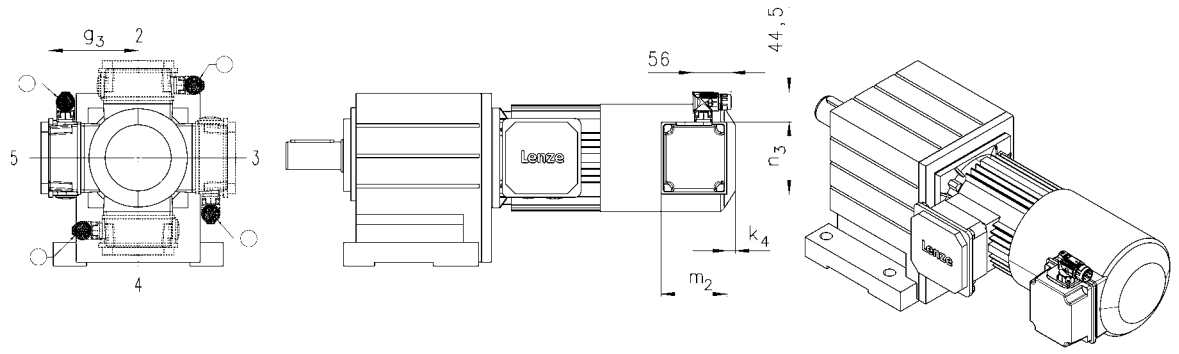
► Blower 3-ph

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	



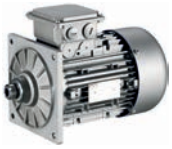
ICN connector

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				

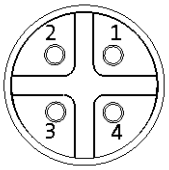
► In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.

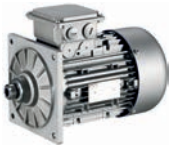


M12 connector

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.

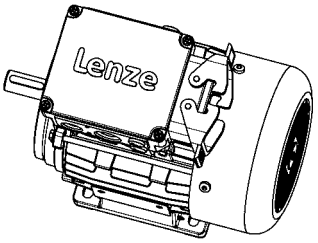
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	



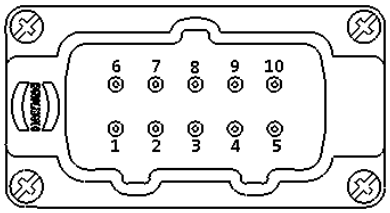
HAN connector

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.



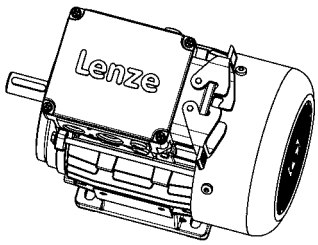
Pin assignment	
Contact	Meaning
1	Terminal board: U1
2	Terminal board: V1
3	Terminal board: W1
4	Brake +/AC
5	Brake -/AC
6	Terminal board: W2
7	Terminal board: U2
8	Terminal board: V2
9	Thermal sensor: +KTY/PTC/TKO
10	Thermal sensor: KTY/PTC/TKO



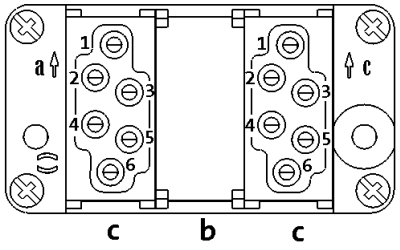
HAN connector

Modular

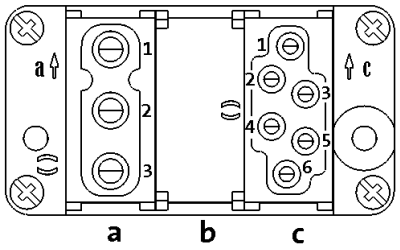
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.

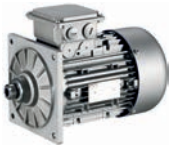


► HAN modular 16 A

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

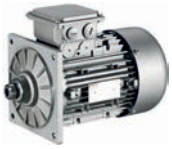
Pin assignment			
Module	Contact	Meaning	
A	1	Terminal board: U1	
	2	Terminal board: V1	
	3	Terminal board: W1	
B		Dummy module	
C	1	Thermal sensor: +KTY/PTC/TKO	
	2	Brake +/AC	
	3	Brake -/AC	
	4	Rectifier: Switching contact	
	5		
	6	Thermal sensor: KTY/PTC/TKO	



HAN connector

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

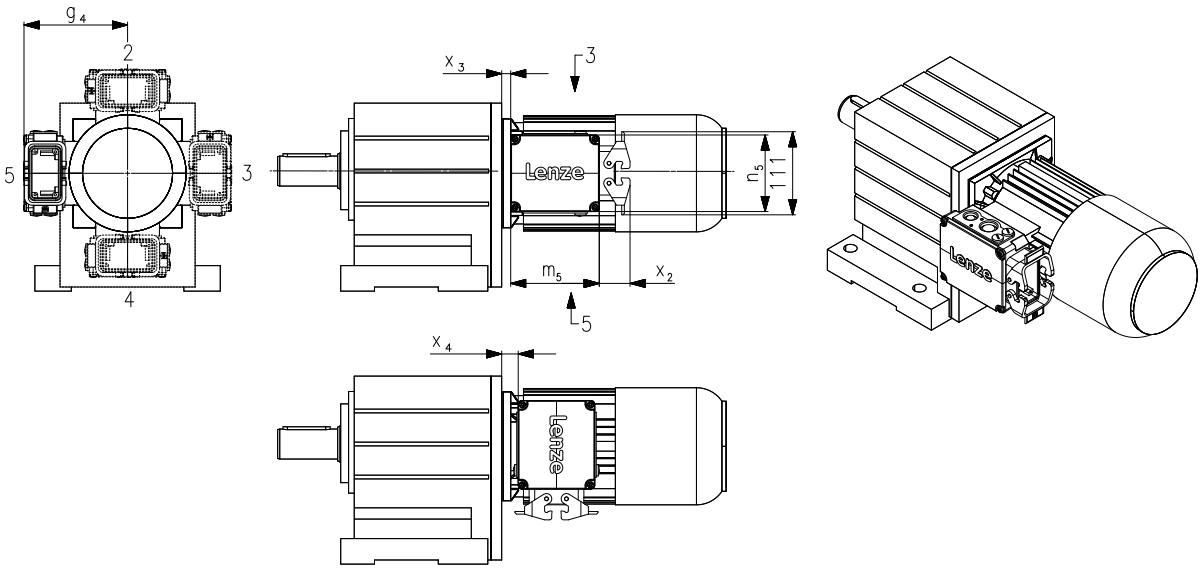
Motor type	M□□MAXX M□□MABR	M□□MAZE M□□MAHA M□□MABZ M□□MABH	M□□MALL M□□MABL	M□□MALZ M□□MALH
Motor frame size				
	Terminal box with HAN connector			
063-02 063-22	HAN-10E HAN modular			
063-12 063-32 063-42	HAN-10E HAN modular			
071-32 071-42 071-13 071-33	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E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



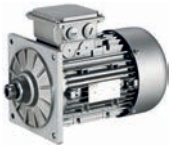
HAN connector

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.

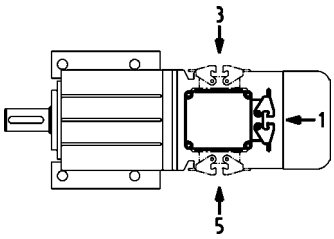
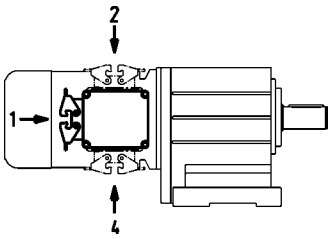


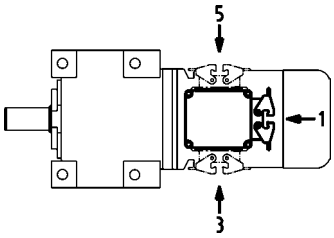
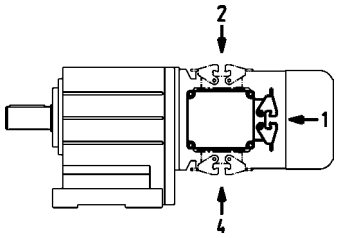
Size			
Motor			
	g_4	x_3	x_4
	[mm]	[mm]	[mm]
063	120	5.00	6.00
071	129	7.00	8.00
080	138	11.0	19.0
090	143	15.0	23.0
100	154	16.0	24.0
112	164	13.5	21.5
132	233	34.5	4.50
160	248	39.0	9.00

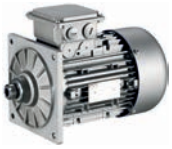


HAN connector

Position of connector

Connector in position 2	Connector in position 3
	

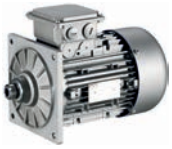
Connector in position 4	Connector in position 5
	



Handwheel

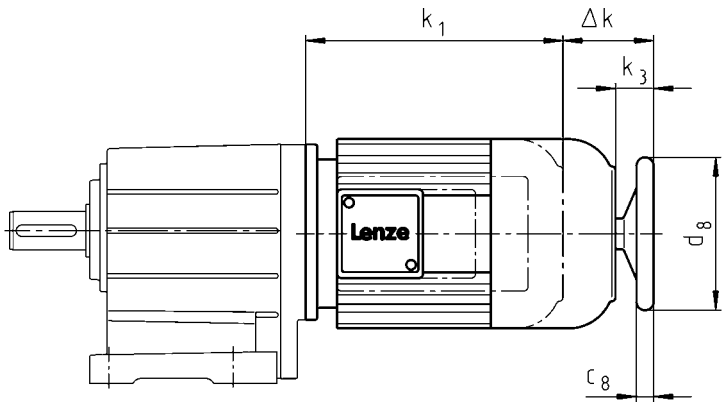
Design	Handwheel made from alloy, smooth wheel surface
Function	Manual operation: • Emergency operation • Setting-up operation for machines/systems
Note	The increased moment of inertia must be taken into account during project planning! For frequent switching operations, in particular if the direction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



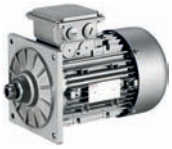
Handwheel

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



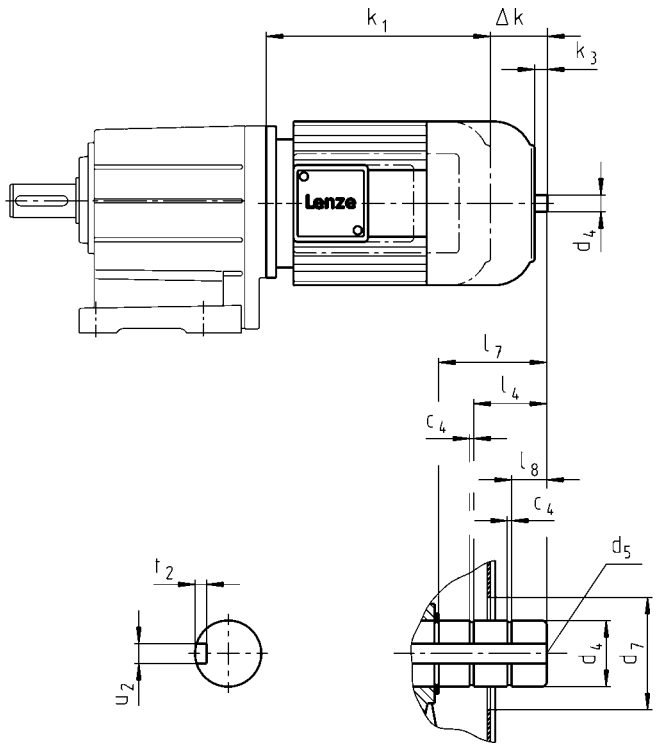
Centrifugal mass

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 (4/6-pole)



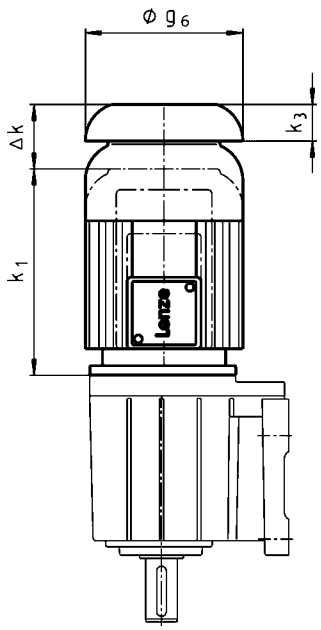
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

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.

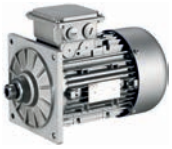
Protection cover

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



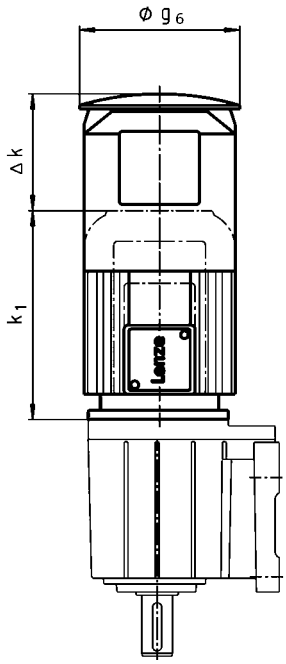
	Motor type							
	M□□MAXX	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABL	M□□MARS M□□MAIG M□□MAAG	M□□MALL		

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 (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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