L-force catalogue

Automation systems
Drive solutions

Controls
Inverters
Motors
Gearboxes
Engineering Tools

Motors: MH three-phase AC motors, MD three-phase AC motors

Gearboxes: g500-B bevel gearbox

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.

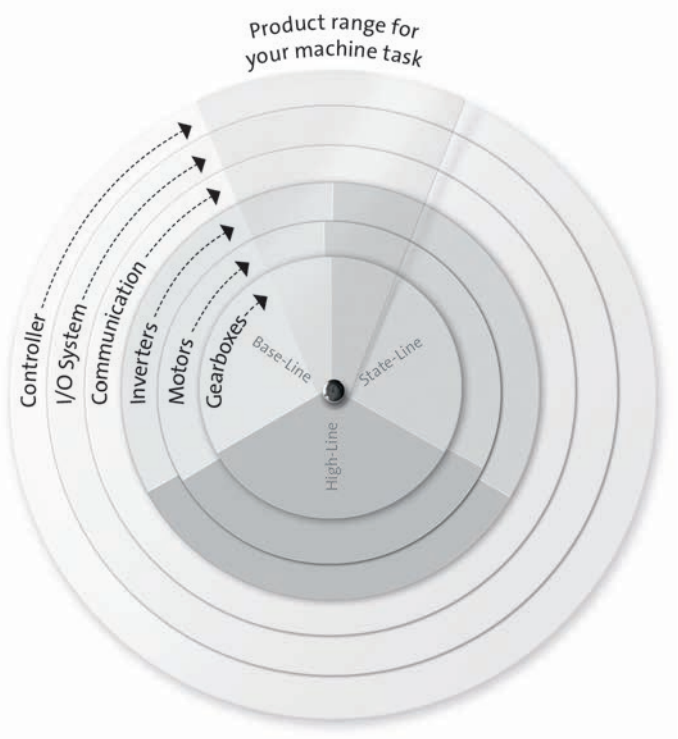
A matter of principle: the right products for every application.

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.

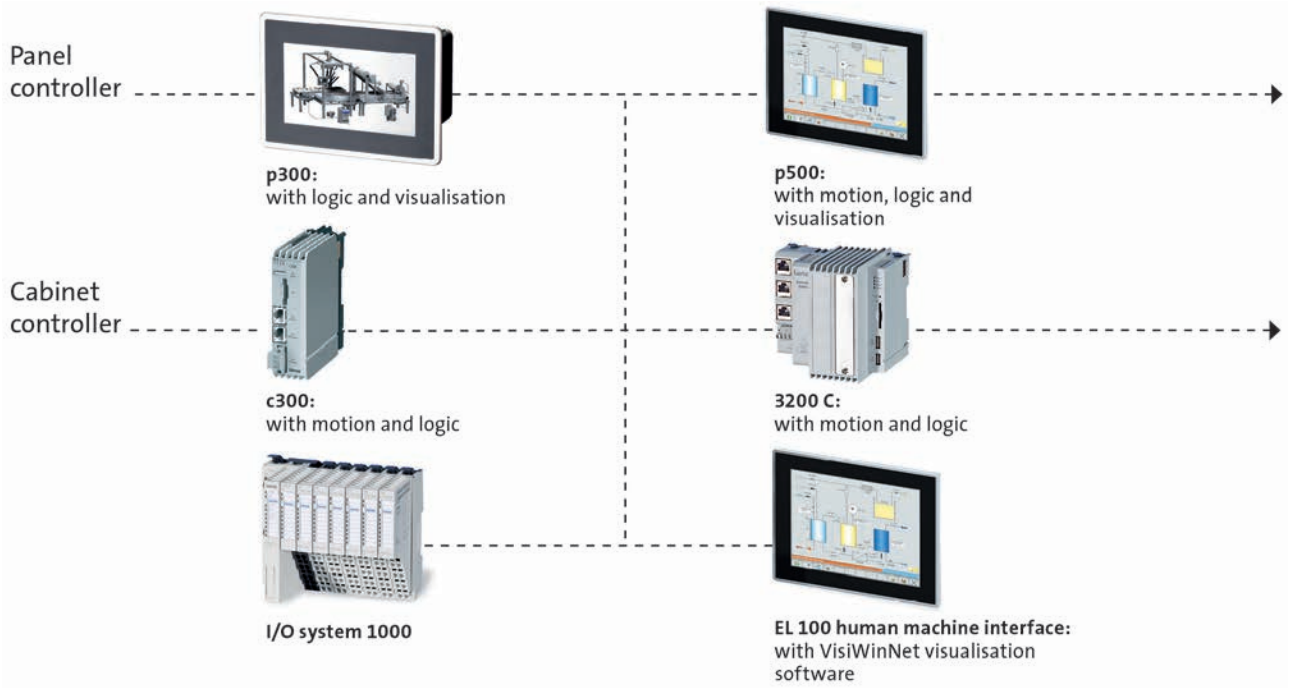
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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!

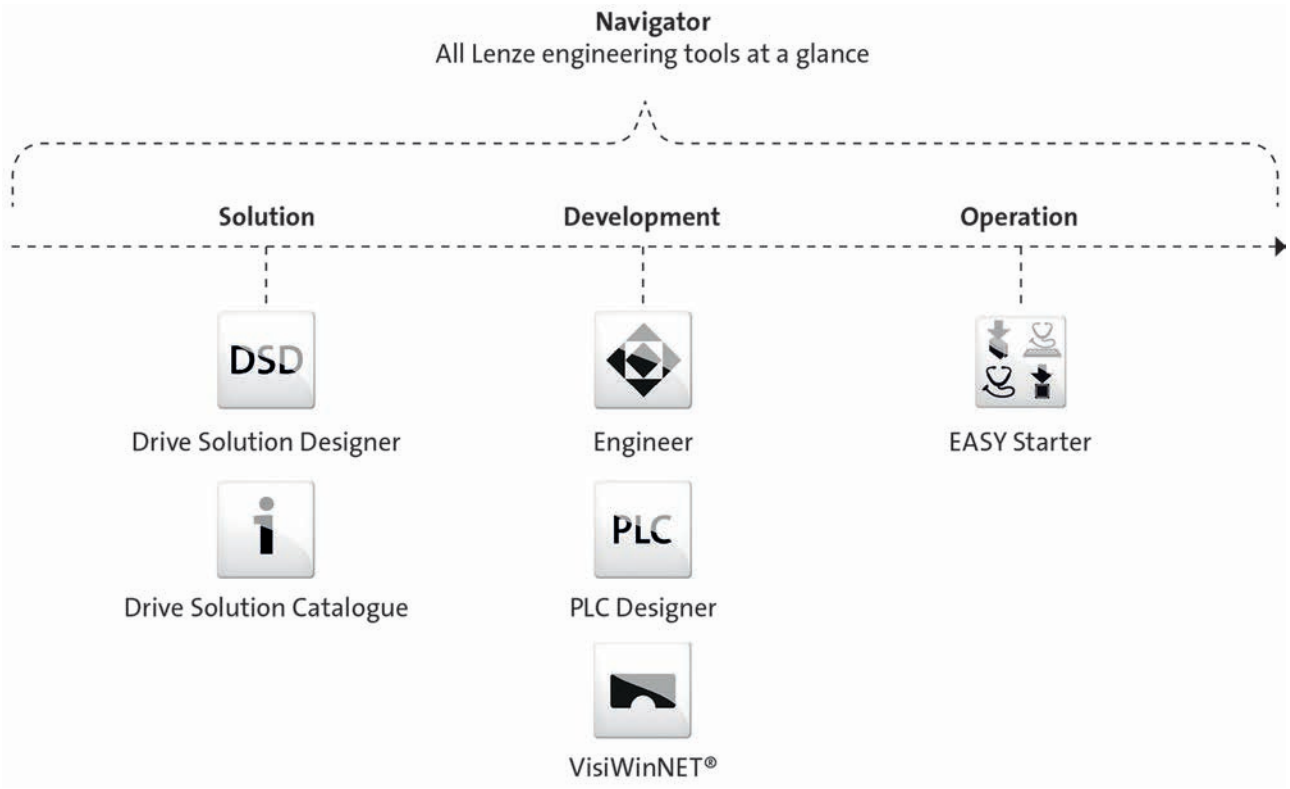


L-force product portfolio

Controls

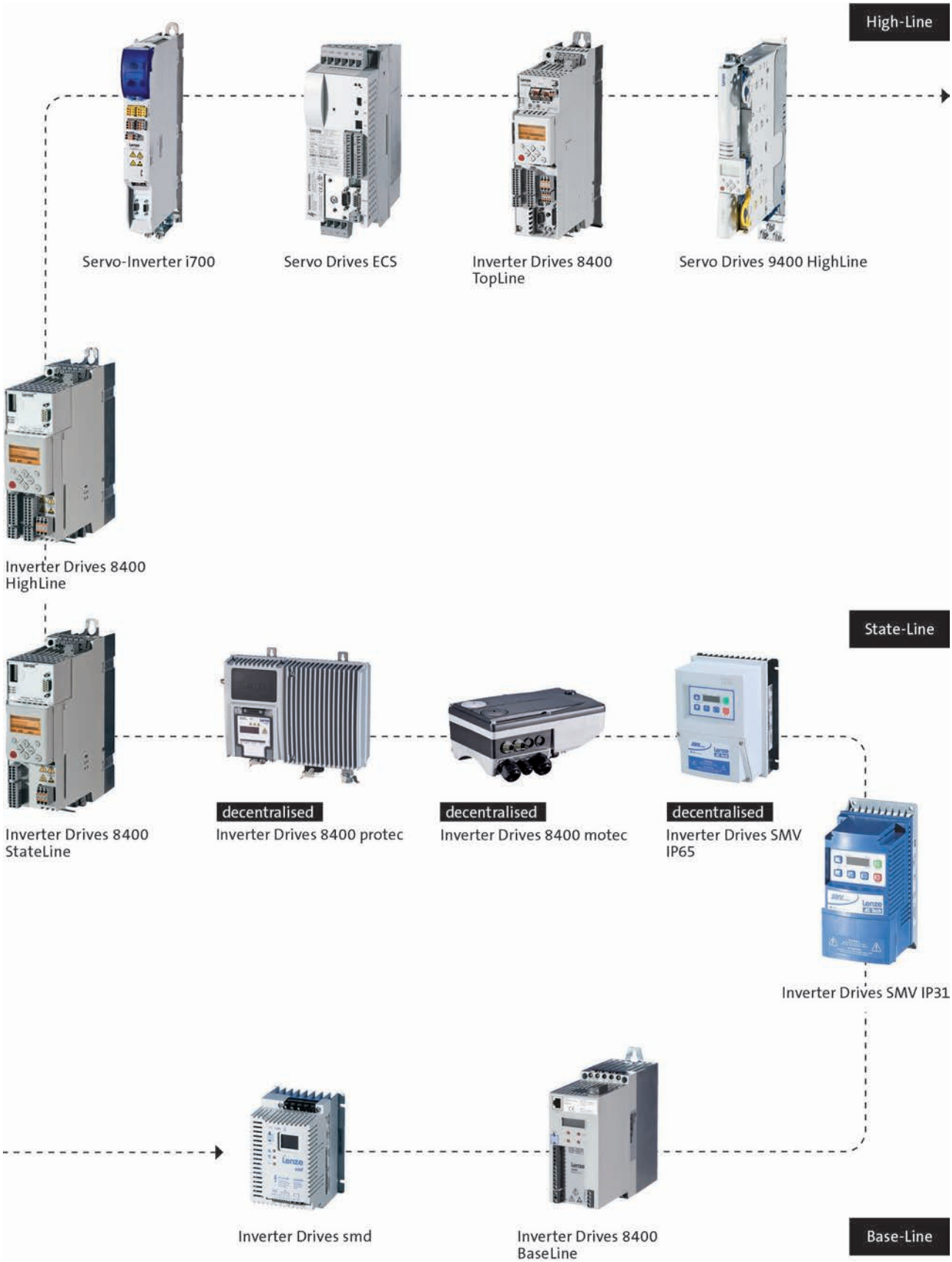


Engineering Tools



L-force product portfolio

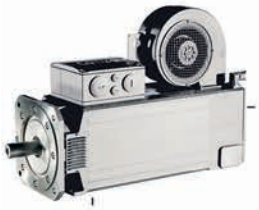
Inverters



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

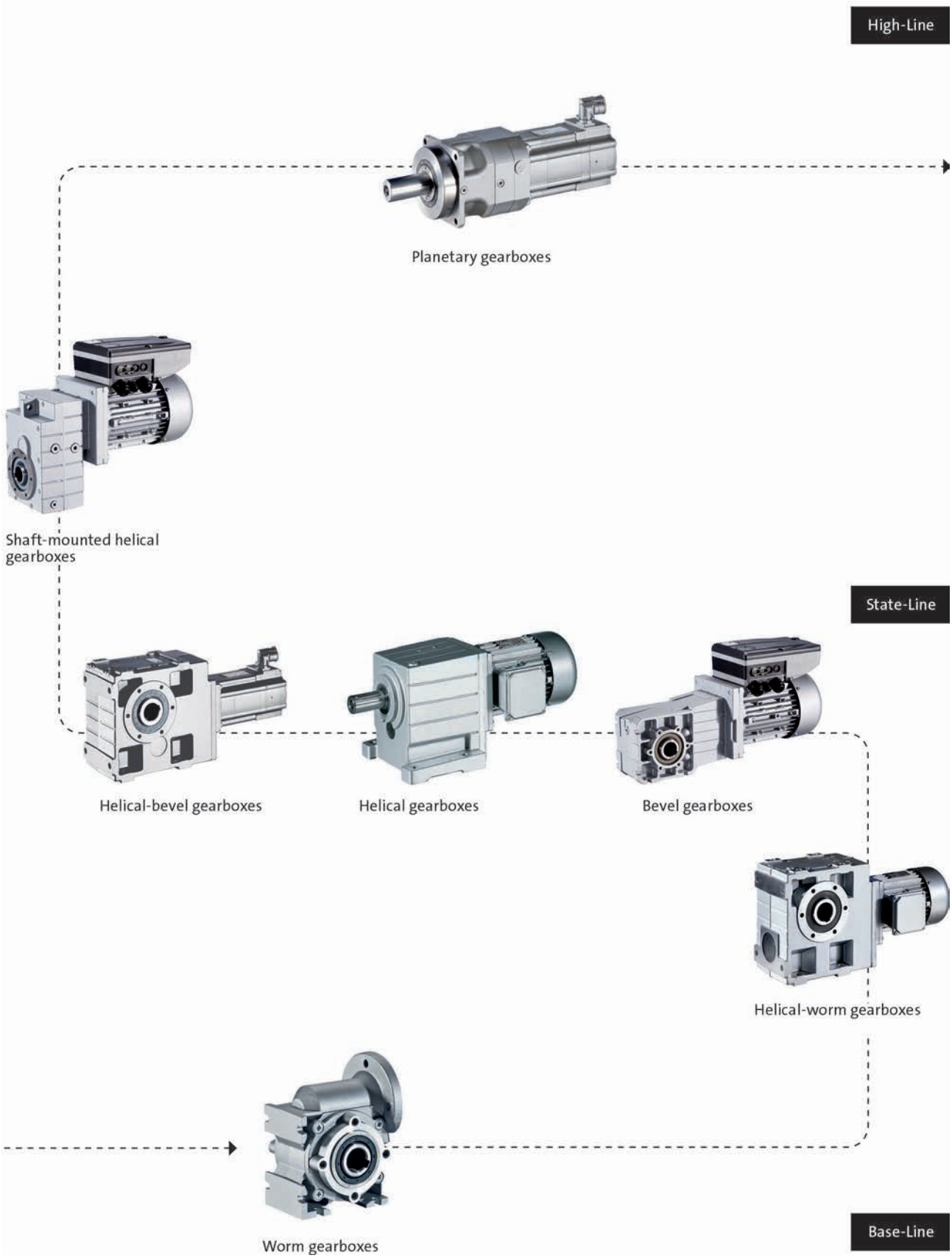
MD three-phase AC motors

Basic MD/MH three-phase AC motors

Base-Line

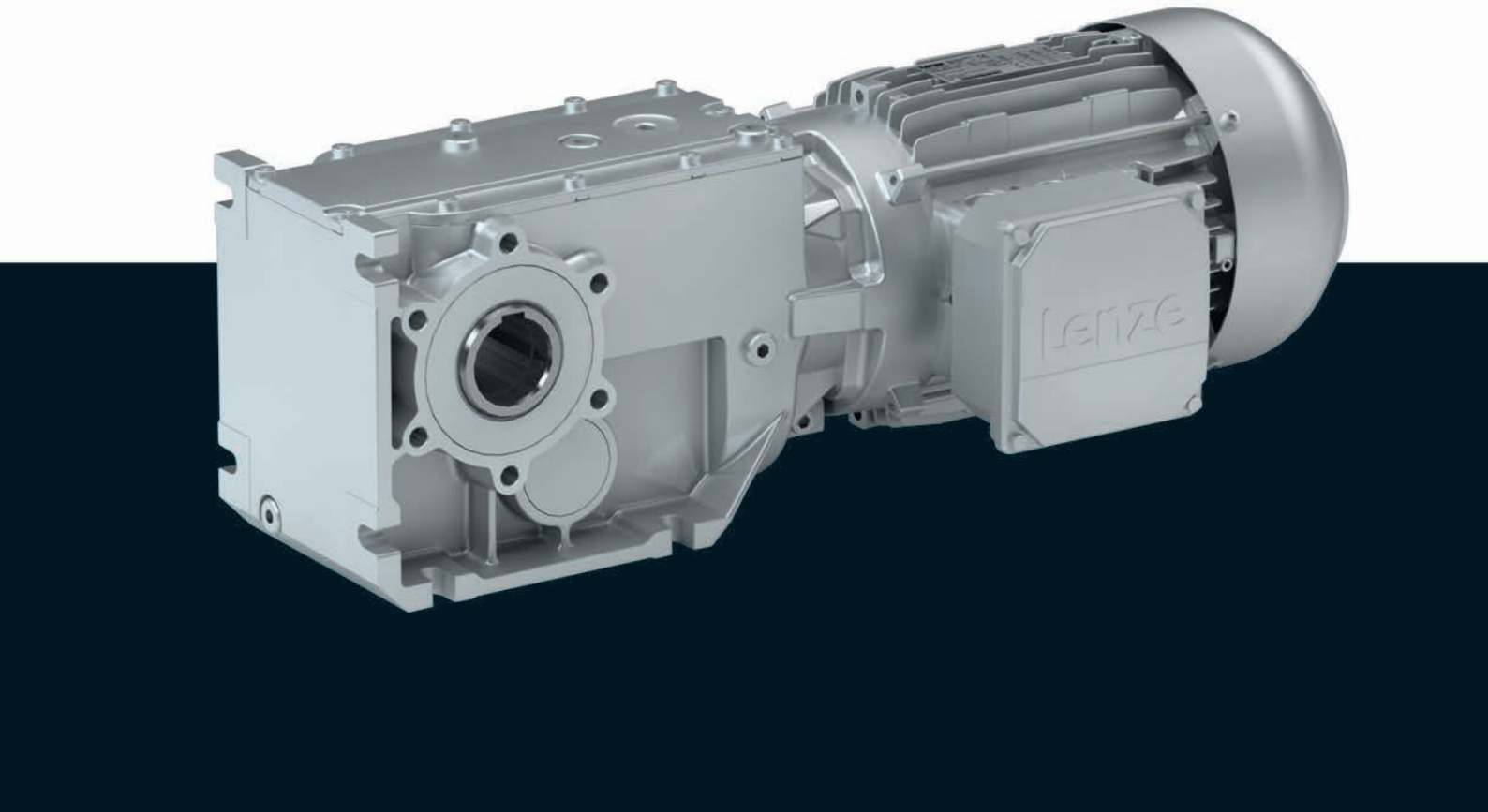
L-force product portfolio

Gearboxes



g500-B bevel geared motors

0.06 to 0.55 kW
0.75 to 3 kW (efficiency class IE2)



g500-B bevel geared motors

Contents

Contents

List of abbreviations

c		Load capacity
i		Ratio
m	[kg]	Mass
M_2	[Nm]	Output torque
M_{22}	[Nm]	Output torque
$M_{a\_,1}$	[Nm]	Starting torque
$M_{a\_,2}$	[Nm]	Starting torque
n_2	[r/min]	Output speed
n_{21}	[r/min]	Output speed
n_{22}	[r/min]	Output speed

CCC	China Compulsory Certificate
CE	Communauté Européenne
CSA	Canadian Standards Association
cURus	Combined certification marks of UL for the USA and Canada
DIN	Deutsches Institut für Normung e.V.
EMC	Electromagnetic compatibility
EN	European standard
GOST	Certificate for Russian Federation
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)

Product information

In combination with three-phase AC motors, our bevel gearboxes form a compact and powerful drive unit. Numerous options at the input and output end provide for the drive to be exactly adapted to your application.

The efficient bevel gearboxes feature high reliable radial forces, closely stepped gear reductions and a low backlash. They are available in 2-pole and 3-pole design with a torque up to 450 Nm and a ratio of up to i= 360.

Versions

- High-efficient right-angle gearbox in a compact design for space-saving installation
- Standardised shaft and flange dimensions for an easy machine integration
- Low backlash and high torsional stiffness provide for exact results in positioning applications
- With three-phase AC motors in the power range 0.06 ... 0.55 kW
  With IE2 three-phase AC motors in the power range 0.75 ... 3 kW

Inverters for motor-proximity installation

The Drive Package with decentralised Inverter Drives 8400 motec covers a power range up to 3 kW.

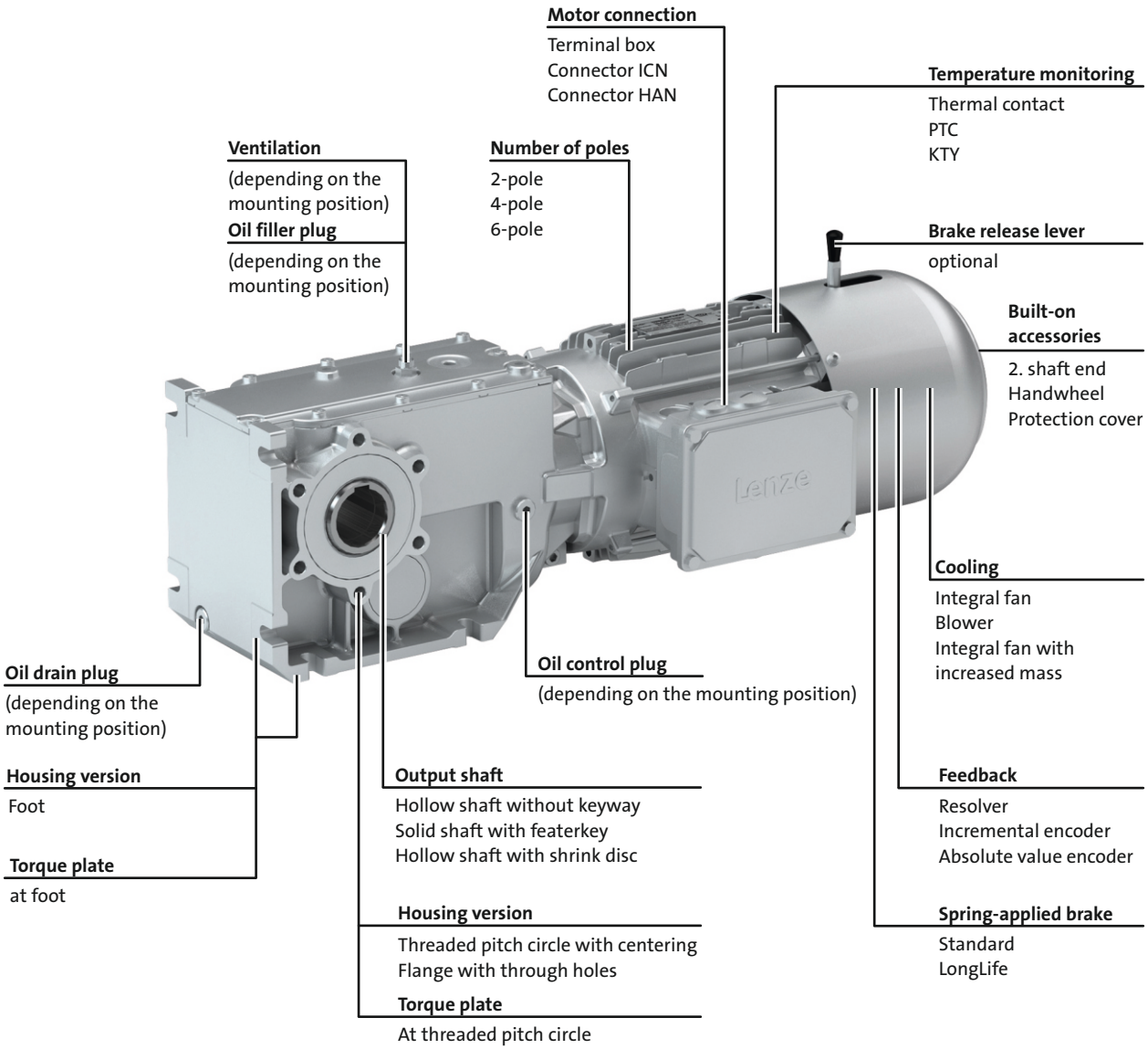
The product name

Gearbox type	Product range		Design	Rated torque [Nm]	Product
Bevel gearbox	g500	-	B	45	g500-B45
				110	g500-B110
				240	g500-B240
				450	g500-B450

Equipment

Overview

The equipment includes all the options available as standard and all the built-on accessories of the product.



The gearbox kit

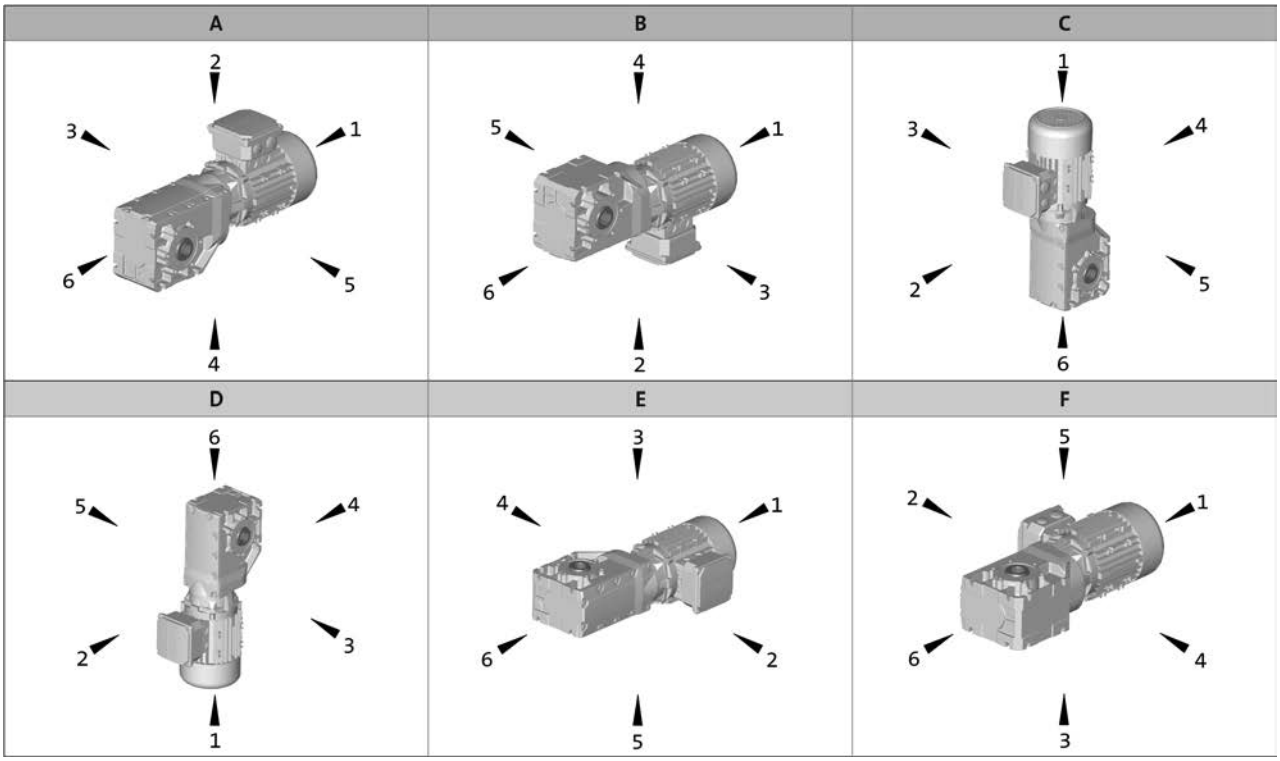
Geared motor

Product	g500-B45	g500-B110	g500-B240	g500-B450
Motor type				
Efficiency class IE1				
Efficiency class IE2		MH□MA AC motor		
4-pole motor				
0.06 - 0.09 kW	063			
0.12 - 0.25 kW		063		
0.37 - 0.55 kW		071		
0.75 kW		080		
1.1 - 1.5 kW		090		
2.2 - 3.0 kW			100	
4.0 kW				112
5.5 - 7.5 kW				
2-pole motor				
0.18 - 0.25 kW		063		
0.37 - 0.55 kW		071		
6-pole motor				
0.18 - 0.25 kW		071		
0.37 - 0.55 kW		080		
Technical data				
Rated power		See selection table		
Mains voltage		230/400 V ; 230 V; 460 V		
Mains frequency		50 Hz; 60 Hz; 60 Hz		
Output torque		See selection table		
Output speed		See selection table		
Ratio		See selection table		
Load capacity		See selection table		
Mounting position				
Standard		A/B/C/D/E/F		
Combined	ABCDEF	AEF		
Colour				
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		
Surface and corrosion protection				
		Without OKS(uncoated) OKS-G (primed) OKS-S (small) OKS-M (medium) OKS-L (large)		

The gearbox kit

Mounting positions

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



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

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

The gearbox kit

Motor details

Product	MD□MA□□				MH□MA□□				
	063-02 063-22 063-11 063-12 063-31 063-32 063-42	071-11 071-12 071-13 071-31 071-32 071-33	071-42	080-13 080-33	080-32	090-12	100-12 100-32	112-22	132-12 132-22
Connection type	Terminal box ICN connector HAN-10E connector HAN-Modular connector								
Spring-applied brake									
Rated torque [Nm]	4		4 8	8 16			16 32	32 60	60 80
Brake voltage [V]	DC 24/180/205 AC 230/400/460								
Brake design	Standard LongLife								
	Standard Overexcited Cold Brake								
Options	Manual release lever Low noise With cover ring								
Feedback	With absolute value encoder With incremental encoder With resolver								
Cooling	Without blower/integral fan Blower Integral fan with increased mass								
Temperature monitoring	TKO thermal contact KTY83-110 thermal detector KTY84-130 thermal detector PTC thermistor								
Approval	cURus CCC								
Degree of protection	IP55								
Further options	Protection cover 2nd shaft end Handwheel								

► Further information and installation feasibilities can be found in the Motors chapter.

The gearbox kit

Motor details

Connection type

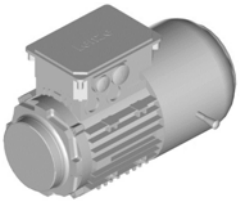

Terminal box

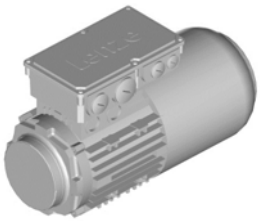

ICN connector


HAN connector

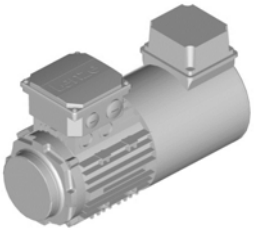
Cooling: integral fan

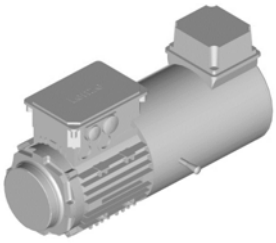

Without built-on accessories

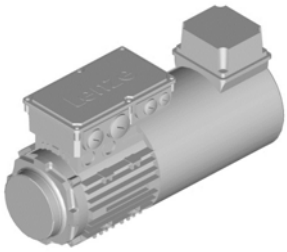

With spring-applied brake
With or without manual release lever


With feedback
With feedback and spring-applied brake

Cooling: blower

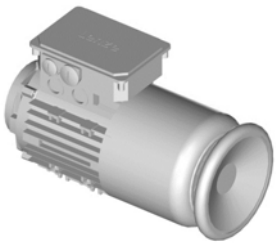

Without built-on accessories

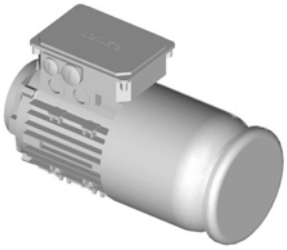

With spring-applied brake
With or without manual release lever


With feedback
With feedback and spring-applied brake

Further options


With 2nd shaft end
Only integral fan


With handwheel
Only integral fan


With protection cover

The gearbox kit

Gearbox details

Product	g500-B45	g500-B110	g500-B240	g500-B450
Driven shaft				
Solid shaft without keyway [mm]				
Solid shaft with featherkey [mm]	20x40		30x60	
Hollow shaft with keyway [mm]	18/20	20/25	30/35	35/40
Hollow shaft with shrink disc [mm]	20		30/35	35
Design	Standard stainless steel			
Gasket	Standard FPM (Viton)			
Bearing	Standard			
Fitting grease	Not enclosed Enclosed			
Housing				
Housing version	With foot With foot and centering			
Output flange				
flange diameter [mm]	110/120	120/160	160/200	200
Lubricant				
Type	CLP 460 [1)] CLP HC 320 CLP HC 220 CLP HC 220 USDA H1			
Oil-level inspection	Without inspection			Without inspection With inspection
Breather element	Without			Standard mounting position: Mounted Combined mounting position: loosely enclosed
Backlash				
Backlash	Standard			
Accessories				
Torque plate	Rubber buffers At threaded pitch circle	At threaded pitch circle	At threaded pitch circle At foot	At foot
Shaft cover	Hollow shaft Shrink disc: Rotating cover Shrink disc: Fixed cover			

[1)] Not suitable for geared servo motors.

► Further information and installation feasibilities can be found in the Gearboxes chapter.

The gearbox kit

Gearbox details

Solid shaft

Foot mounting
without centring

Foot mounting
With centering

Flange with through holes

Hollow shaft

Foot mounting
without centring

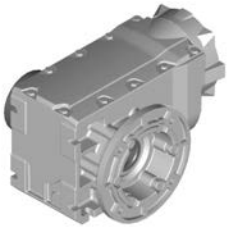
Foot mounting
With centering

Flange with through holes

Hollow shaft with shrink disc

Foot mounting
without centring

Foot mounting
With centering



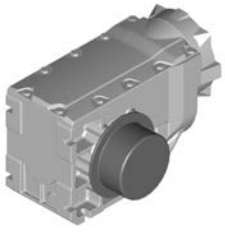
Flange with through holes

Accessories

2nd output shaft end

Torque plate
at foot

Torque plate
at threaded pitch circle



Cover
Hollow shaft/shrink disc

Dimensioning

General information about the data provided in this catalogue

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 gears;
- the load and the speed
- the ambient conditions: temperature, air circulation, input or dissipation via shafts and the foundation

If the following input speeds n_1 are exceeded, please contact Lenze:

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

► For a short period of time up to 5 min, 30 % higher speeds are permissible

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

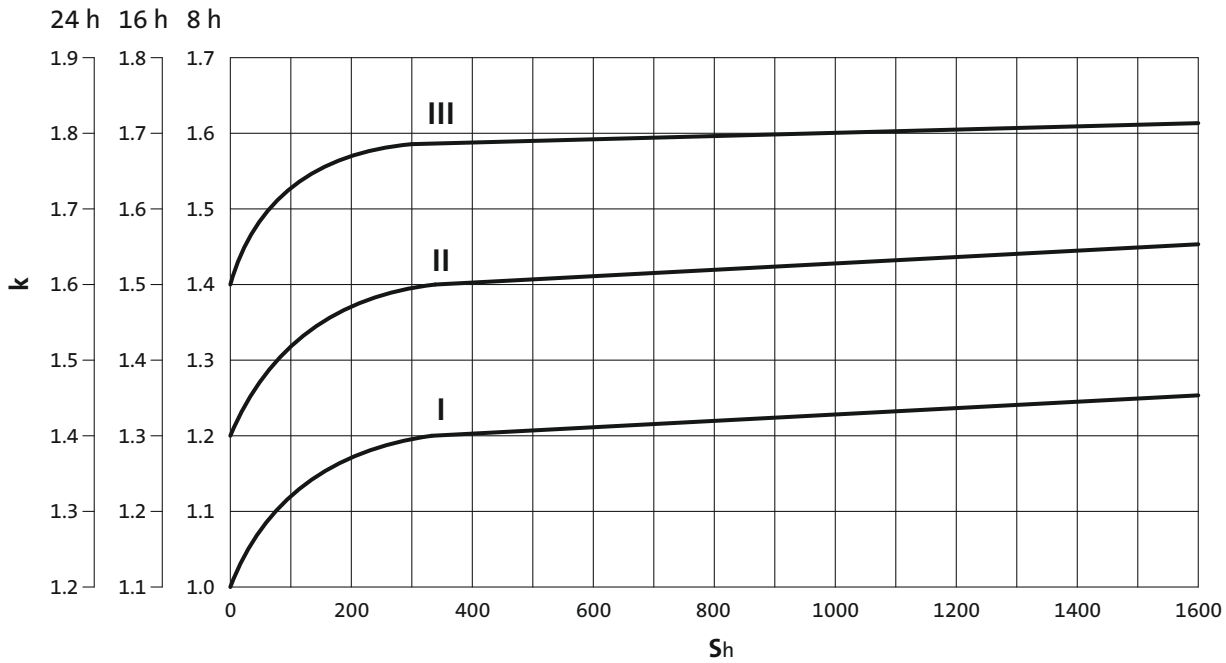
Load capacity and application factor

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



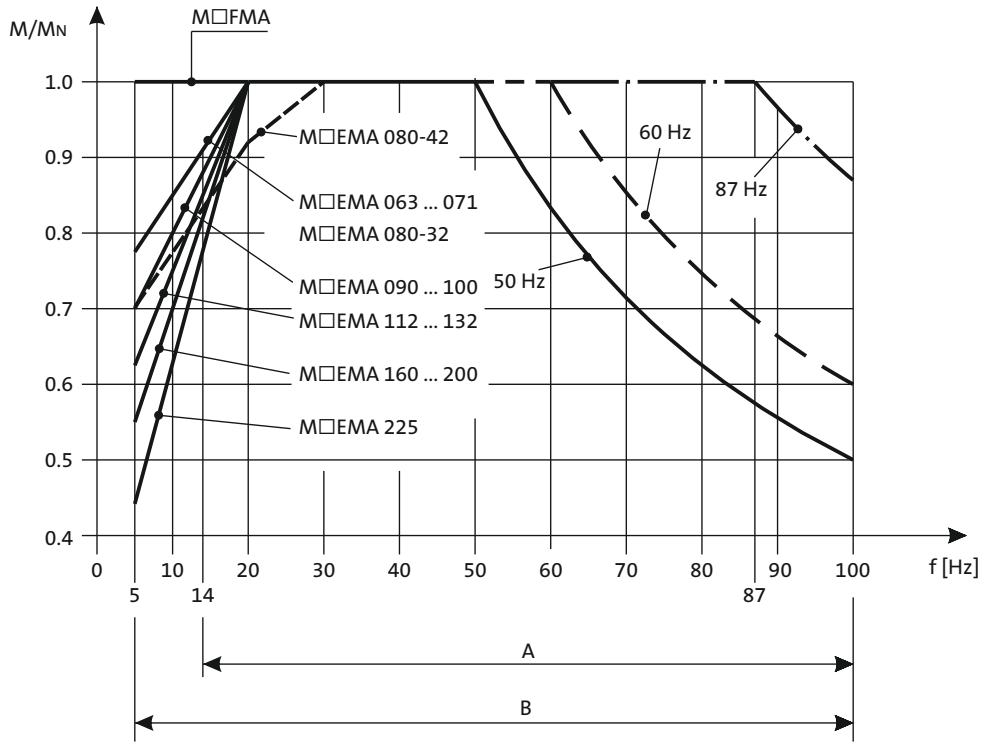
► S_h= switchings/h

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

Weights

The values given in the tables consider the following gearbox/motor combination:
- Gearbox with hollow shaft without flange including lubricant amount for mounting position A
- Motor without built-on accessories (with integral fan)

For versions deviating from this, additional weights have to be considered.

The respective values can be found for:
- Geared motors without built-on accessories
  > Chapter: Geared motors/Technical data
- Gearbox options
  > Chapter: Gearboxes/Technical data and accessories
- Motor options: Spring-applied brake, feedback, 2. Shaft end, handwheel and increased centrifugal mass
  > Chapter: Motors/Accessories

Moments of inertia

The given moments of inertia of the gearbox refer to the drive shaft. The influence of the ratio (i^2) has been considered in the data.

When the total moment of inertia of the geared motor is calculated, the values of the gearbox, motor and accessories have to be added.

The respective values can be found for:
- Gearboxes
  > Chapter: Gearbox/Technical data
- Motors without built-on accessories
  > Chapter: Motors/Technical data/Rated data
- Motor options: Spring-applied brake, feedback, 2. Shaft end, handwheel and increased centrifugal mass
  > Chapter: Motors/Accessories

Selection tables, notes

Notes on the selection tables with 4-pole motors

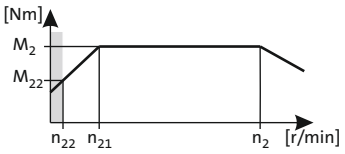
The selection tables show the available combinations of gearbox type, number of stages, ratio and motor. They are used only to provide basic orientation.
The following legend indicates the structure of the selection tables.

Rated power Prated of the drive motor depending on the rated frequency

50 Hz: P_N = 0.06 kW
87 Hz: P_N = 0.11 kW

2-stufige Getriebe ← **Number of the gear stage of the gearbox**

Torque diagram



Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
146	7.0	5.4	8.3	7.0	35	7.0	146	7.0	5.4	146	7.0	5.4	17.378	-B45	063-02	60
131	8.0	4.9	7.5	7.6	31	8.0	131	8.0	4.9	131	8.0	4.9	19.365	-B45	063-02	60

Product Gearbox
Product Motor
Ratio i
Page number for dimensions

Load capacity c of the gearbox
c is the ratio between the permissible rated torque of the gearbox and the rated torque of the three-phase AC motor (converted to the driven shaft).
c must be always higher than the service factor **k** determined for the application **k**.

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

Mains operation
Output speed **n2**
Output torque **M2**

Inverter operation
The speed and torque data are valid for self-ventilated and forced ventilated drives. Forced ventilated drives can always output the torque **M2** in the entire setting ranges. In the case of self-ventilated drives, a reduction to **M22** is required in the lower speed range.

The following applies to self-ventilated geared motors:
n22 is the minimum speed where the torque **M22** is permissible, from **n21** to **n2**, the maximum torque is **M2**
The following applies to forced ventilated geared motors:
From the minimum speed **n22** to **n2**, the maximum torque is **M2**

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.

Selection tables, notes

Notes on the selection tables with 2-pole and 6-pole motors

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.

Rated power Prated of the drive motor depending on the rated frequency

50 Hz: P_N = 0.18 kW

2-stufige Getriebe ← **Number of the gear stage of the gearbox**

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
239	7.0	5.7	11.449	-B110	063-11	72
216	8.0	5.3	12.698	-B110	063-11	72

Mains operation
Output speed **n_2**
Output torque **M_2**

Load capacity c of the gearbox
c is the ratio between the permissible rated torque of the gearbox and the rated torque of the three-phase AC motor (converted to the driven shaft).
c must be always higher than the service factor **k** determined for the application **k**.

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

Ratio i

Product Gearbox

Product Motor

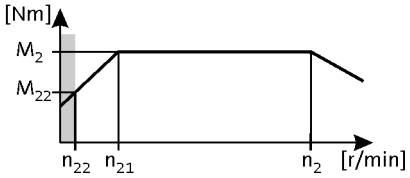
Page number for dimensions

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

6.7

Selection tables, 4-pole motors

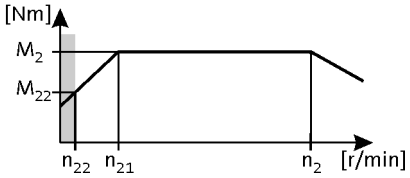


50 Hz: P_N = 0.06 kW
87 Hz: P_N = 0.11 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
64	9.0	5.3	6.5	8.5	27	9.0	64	9.0	5.3	114	9.0	4.3	22.270	-B45	063-02	51
57	10	4.7	5.8	9.6	24	10	57	10	4.7	101	10	4.4	25.051	-B45	063-02	51
50	11	4.1	5.0	11	21	11	50	11	4.1	88	11	3.8	28.808	-B45	063-02	51
44	12	3.6	4.4	12	18	12	44	12	3.6	78	13	3.4	32.593	-B45	063-02	51
38	14	3.1	3.9	14	16	14	38	14	3.1	68	15	2.9	37.481	-B45	063-02	51
34	16	2.8	3.4	16	14	16	34	16	2.8	60	17	2.7	42.222	-B45	063-02	51
29	19	2.4	3.0	19	12	19	29	19	2.4	52	19	2.4	48.556	-B45	063-02	51
26	21	2.2	2.7	21	11	21	26	21	2.2	47	21	2.1	53.889	-B45	063-02	51
23	24	1.9	2.3	24	9.7	24	23	24	1.9	41	24	1.8	61.972	-B45	063-02	51

Selection tables, 4-pole motors

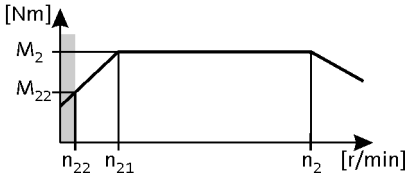


50 Hz: P_N = 0.09 kW
87 Hz: P_N = 0.16 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
103	8.0	5.7	11	7.8	45	8.0	103	8.0	5.7	186	8.0	4.9	13.386	-B45	063-22	51
91	9.0	5.0	9.6	8.8	40	9.0	91	9.0	5.0	164	9.0	4.3	15.111	-B45	063-22	51
79	10	4.4	8.3	10	35	10	79	10	4.4	143	10	3.8	17.378	-B45	063-22	51
71	11	3.9	7.5	11	31	11	71	11	3.9	128	11	3.4	19.365	-B45	063-22	51
62	13	3.4	6.5	13	27	13	62	13	3.4	112	13	2.9	22.270	-B45	063-22	51
55	15	3.0	5.8	15	24	15	55	15	3.0	99	15	3.0	25.051	-B45	063-22	51
48	17	2.6	5.0	17	21	17	48	17	2.6	86	17	2.6	28.808	-B45	063-22	51
42	19	2.3	4.4	19	18	19	42	19	2.3	76	19	2.3	32.593	-B45	063-22	51
37	22	2.0	3.9	22	16	22	37	22	2.0	66	22	2.0	37.481	-B45	063-22	51
33	25	1.8	3.4	25	14	25	33	25	1.8	59	25	1.8	42.222	-B45	063-22	51
28	29	1.6	3.0	28	12	28	28	29	1.6	51	28	1.6	48.556	-B45	063-22	51
26	32	1.4	2.7	32	11	31	26	32	1.4	46	31	1.4	53.889	-B45	063-22	51
22	37	1.2	2.3	36	9.7	36	22	37	1.2	40	36	1.2	61.972	-B45	063-22	51

Selection tables, 4-pole motors



50 Hz: P_N = 0.12 kW
87 Hz: P_N = 0.21 kW

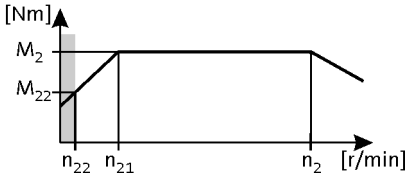
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
			20	4.2	84	5.0				357	5.0		7.111	-B45	063-12	51
			18	4.8	73	6.0				310	6.0		8.178	-B45	063-12	51
			16	5.4	66	7.0				279	7.0		9.101	-B45	063-12	51
136	8.0	5.6	14	6.2	57	8.0	136	8.0	5.6	242	8.0	4.8	10.466	-B45	063-12	51
122	9.0	5.1	13	6.8	52	9.0	122	9.0	5.1	218	9.0	4.3	11.640	-B45	063-12	51
			11	7.5	47	10				200	10	5.5	12.698	-B110	063-12	54
107	10	4.4	11	7.9	45	10	107	10	4.4	189	10	3.8	13.386	-B45	063-12	51
94	12	3.9	9.6	8.9	40	11	94	12	3.9	168	11	3.3	15.111	-B45	063-12	51
82	13	3.4	8.3	10	35	13	82	13	3.4	146	13	2.9	17.378	-B45	063-12	51
74	15	3.0	7.5	11	31	15	74	15	3.0	131	15	2.6	19.365	-B45	063-12	51
73	15	5.5	7.4	12	31	15	73	15	5.5	130	15	4.7	19.556	-B110	063-12	54
64	17	2.6	6.5	13	27	17	64	17	2.6	114	17	2.3	22.270	-B45	063-12	51
63	17	5.5	6.4	13	27	17	63	17	5.5	113	17	4.7	22.489	-B110	063-12	54
57	19	2.4	5.8	15	24	19	57	19	2.4	101	19	2.3	25.051	-B45	063-12	51
57	19	4.6	5.8	15	24	19	57	19	4.6	101	19	3.9	25.185	-B110	063-12	54
50	22	2.0	5.0	17	21	22	50	22	2.0	88	22	2.0	28.808	-B45	063-12	51
49	22	4.6	5.0	17	21	22	49	22	4.6	88	22	3.9	28.963	-B110	063-12	54
45	24	4.0	4.5	19	19	24	45	24	4.0	79	24	3.4	31.919	-B110	063-12	54
44	25	1.8	4.4	19	18	24	44	25	1.8	78	24	1.8	32.593	-B45	063-12	51
38	29	3.7	3.9	22	16	28	38	29	3.7	68	28	3.2	37.400	-B110	063-12	54
38	29	1.6	3.9	22	16	28	38	29	1.6	68	28	1.5	37.481	-B45	063-12	51
36	31	3.3	3.6	24	15	30	36	31	3.3	63	30	3.2	40.000	-B110	063-12	54
34	32	1.4	3.4	25	14	32	34	32	1.4	60	32	1.4	42.222	-B45	063-12	51
31	35	3.1	3.2	27	13	35	31	35	3.1	55	35	3.0	46.000	-B110	063-12	54
30	37	3.0	3.0	28	13	36	30	37	3.0	53	36	2.9	48.167	-B110	063-12	54
29	37	1.2	3.0	29	12	36	29	37	1.2	52	36	1.2	48.556	-B45	063-12	51
27	40	1.7	2.8	31	11	40	27	40	1.7	48	40	1.7	52.698	-B110	063-12	54
26	41	1.1	2.7	32	11	40	26	41	1.1	47	40	1.1	53.889	-B45	063-12	51
24	46	1.7	2.4	36	9.9	46	24	46	1.7	42	46	1.7	60.603	-B110	063-12	54
23	47	2.4	2.4	36	9.8	46	23	47	2.4	42	46	2.4	61.045	-B110	063-12	54
21	51	3.1	2.2	40	8.9	50	21	51	3.1	38	50	3.2	67.113	-B240	063-12	57
19	58	3.1	1.9	45	7.9	57	19	58	3.1	33	57	3.2	76.213	-B240	063-12	57
19	58	1.9	1.9	45	7.8	57	19	58	1.9	33	57	1.9	76.500	-B110	063-12	54
14	77	1.4	1.4	59	6.0	76	14	77	1.4	25	76	1.5	100.786	-B110	063-12	54

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
21	51	4.7	2.1	39	8.8	50	21	51	4.7	37	50	4.6	68.459	-B240	063-12	57

Selection tables, 4-pole motors

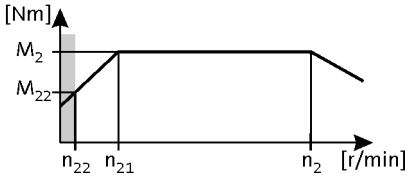


50 Hz: P_N = 0.12 kW
87 Hz: P_N = 0.21 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
16	65	3.7	1.7	50	6.9	64	16	65	3.7	29	64	3.6	87.563	-B240	063-12	57
14	74	3.2	1.5	57	6.0	73	14	74	3.2	26	73	3.1	99.437	-B240	063-12	57
13	85	2.8	1.3	65	5.3	83	13	85	2.8	22	83	2.9	113.673	-B240	063-12	57
11	96	2.5	1.1	74	4.6	95	11	96	2.5	20	95	2.5	129.087	-B240	063-12	57
9.8	108	2.2	1.0	84	4.1	107	9.8	108	2.2	17	107	2.3	145.674	-B240	063-12	57
8.6	123	2.0	0.9	95	3.6	121	8.6	123	2.0	15	121	2.0	165.426	-B240	063-12	57
7.6	140	1.7	0.8	108	3.2	138	7.6	140	1.7	14	138	1.7	188.442	-B240	063-12	57
7.3	148	3.0	0.7	114	3.1	146	7.3	148	3.0	13	146	3.1	193.948	-B450	063-12	60
6.7	159	1.5	0.7	123	2.8	157	6.7	159	1.5	12	157	1.5	213.994	-B240	063-12	57
6.4	171	2.6	0.6	132	2.7	168	6.4	171	2.6	11	168	2.7	223.563	-B450	063-12	60
5.8	183	1.3	0.6	141	2.4	180	5.8	183	1.3	10	180	1.3	245.178	-B240	063-12	57
5.7	189	2.4	0.6	146	2.4	186	5.7	189	2.4	10	186	2.4	247.882	-B450	063-12	60
5.1	207	1.2	0.5	160	2.2	204	5.1	207	1.2	9.1	204	1.2	278.422	-B240	063-12	57
4.5	237	1.0	0.5	182	1.9	233	4.5	237	1.0	8.0	233	1.0	317.617	-B240	063-12	57

Selection tables, 4-pole motors

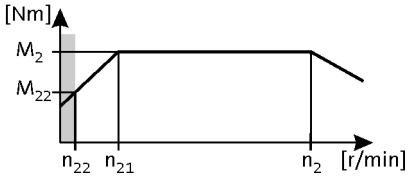


50 Hz: P_N = 0.18 kW
87 Hz: P_N = 0.33 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
252	6.0	4.7	27	5.0	111	6.0	252	6.0	4.7	457	7.0	3.9	5.411	-B45	063-32	51
219	7.0	4.7	23	5.7	96	7.0	219	7.0	4.7	398	8.0	3.9	6.222	-B45	063-32	51
192	9.0	4.5	20	6.6	84	9.0	192	9.0	4.5	348	9.0	3.7	7.111	-B45	063-32	51
167	10	4.5	18	7.5	73	10	167	10	4.5	303	10	3.7	8.178	-B45	063-32	51
150	11	4.1	16	8.4	66	11	150	11	4.1	272	11	3.5	9.101	-B45	063-32	51
130	13	3.6	14	9.6	57	13	130	13	3.6	237	13	3.0	10.466	-B45	063-32	51
119	14	4.5	13	11	52	14	119	14	4.5	216	14	3.7	11.449	-B110	063-32	54
117	14	3.2	13	11	52	14	117	14	3.2	213	14	2.7	11.640	-B45	063-32	51
108	15	4.1	11	12	47	15	108	15	4.1	195	15	3.5	12.698	-B110	063-32	54
102	16	2.8	11	12	45	16	102	16	2.8	185	16	2.4	13.386	-B45	063-32	51
94	17	4.1	9.9	14	41	17	94	17	4.1	170	18	3.5	14.603	-B110	063-32	54
90	18	2.5	9.6	14	40	18	90	18	2.5	164	18	2.1	15.111	-B45	063-32	51
79	21	2.2	8.3	16	35	21	79	21	2.2	142	21	1.8	17.378	-B45	063-32	51
71	23	1.9	7.5	18	31	23	71	23	1.9	128	23	1.6	19.365	-B45	063-32	51
70	23	3.5	7.4	18	31	23	70	23	3.5	127	24	2.9	19.556	-B110	063-32	54
61	27	1.7	6.5	21	27	27	61	27	1.7	111	27	1.4	22.270	-B45	063-32	51
61	27	3.5	6.4	21	27	27	61	27	3.5	110	27	2.9	22.489	-B110	063-32	54
55	30	1.5	5.8	23	24	30	55	30	1.5	99	30	1.4	25.051	-B45	063-32	51
54	30	2.9	5.8	23	24	30	54	30	2.9	98	30	2.5	25.185	-B110	063-32	54
47	34	1.3	5.0	27	21	34	47	34	1.3	86	35	1.2	28.808	-B45	063-32	51
47	35	2.9	5.0	27	21	35	47	35	2.9	86	35	2.5	28.963	-B110	063-32	54
43	38	2.6	4.5	29	19	38	43	38	2.6	78	39	2.2	31.919	-B110	063-32	54
42	39	1.2	4.4	30	18	39	42	39	1.2	76	39	1.1	32.593	-B45	063-32	51
37	44	2.5	4.0	34	16	44	37	44	2.5	67	44	2.1	36.707	-B110	063-32	54
37	45	2.4	3.9	35	16	45	37	45	2.4	66	45	2.0	37.400	-B110	063-32	54
36	45	1.0	3.9	35	16	45	36	45	1.0				37.481	-B45	063-32	51
34	48	2.1	3.6	37	15	48	34	48	2.1	62	48	2.0	40.000	-B110	063-32	54
32	52	2.9	3.4	40	14	52	32	52	2.9	57	52	2.8	43.267	-B240	063-32	57
30	55	2.0	3.2	42	13	55	30	55	2.0	54	56	1.9	46.000	-B110	063-32	54
28	58	1.9	3.0	44	13	58	28	58	1.9	51	58	1.8	48.167	-B110	063-32	54
28	59	2.9	3.0	45	12	59	28	59	2.9	50	59	2.8	49.133	-B240	063-32	57
26	63	2.6	2.8	48	11	63	26	63	2.6	47	64	2.4	52.510	-B240	063-32	57
26	63	1.1	2.8	49	11	63	26	63	1.1	47	64	1.0	52.698	-B110	063-32	54
23	71	2.6	2.4	55	10	71	23	71	2.6	42	72	2.4	59.630	-B240	063-32	57
23	73	1.1	2.4	56	9.9	73	23	73	1.1	41	73	1.1	60.603	-B110	063-32	54

Selection tables, 4-pole motors



50 Hz: P_N = 0.18 kW
87 Hz: P_N = 0.33 kW

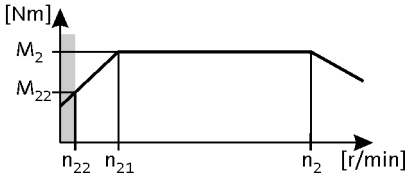
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
22	73	1.5	2.4	56	9.8	73	22	73	1.5	41	74	1.5	61.045	-B110	063-32	54
20	80	2.0	2.2	62	8.9	80	20	80	2.0	37	81	2.0	67.113	-B240	063-32	57
18	91	2.0	1.9	70	7.9	91	18	91	2.0	33	92	2.0	76.213	-B240	063-32	57
18	92	1.2	1.9	71	7.8	92	18	92	1.2	32	93	1.2	76.500	-B110	063-32	54

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
20	80	3.0	2.1	62	8.8	80	20	80	3.0	36	81	2.9	68.459	-B240	063-32	57
18	91	2.7	1.9	70	7.7	91	18	91	2.7	32	92	2.5	77.741	-B240	063-32	57
16	102	2.4	1.7	79	6.9	102	16	102	2.4	28	103	2.2	87.563	-B240	063-32	57
14	116	2.1	1.5	89	6.0	116	14	116	2.1	25	117	2.0	99.437	-B240	063-32	57
12	133	1.8	1.3	102	5.3	133	12	133	1.8	22	134	1.8	113.673	-B240	063-32	57
11	151	1.6	1.1	116	4.6	151	11	151	1.6	19	152	1.6	129.087	-B240	063-32	57
9.5	172	2.6	1.0	133	4.2	172	9.5	172	2.6	17	174	2.6	144.128	-B450	063-32	60
9.4	170	1.4	1.0	131	4.1	170	9.4	170	1.4	17	172	1.4	145.674	-B240	063-32	57
8.5	191	2.4	0.9	147	3.8	191	8.5	191	2.4	16	193	2.3	159.807	-B450	063-32	60
8.3	193	1.2	0.9	149	3.6	193	8.3	193	1.2	15	195	1.2	165.426	-B240	063-32	57
7.8	209	2.2	0.8	161	3.4	209	7.8	209	2.2	14	212	2.1	174.919	-B450	063-32	60
7.2	220	1.1	0.8	169	3.2	220	7.2	220	1.1	13	222	1.1	188.442	-B240	063-32	57
7.0	232	1.9	0.7	179	3.1	232	7.0	232	1.9	13	235	1.9	193.948	-B450	063-32	60
6.1	267	1.7	0.6	206	2.7	267	6.1	267	1.7	11	270	1.7	223.563	-B450	063-32	60
5.5	296	1.5	0.6	228	2.4	296	5.5	296	1.5	10	300	1.5	247.882	-B450	063-32	60

Selection tables, 4-pole motors

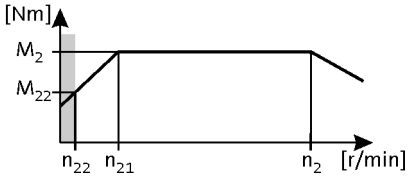


50 Hz: P_N = 0.25 kW
87 Hz: P_N = 0.45 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
264	9.0	5.6	28	6.6	116	9.0	264	9.0	5.6	478	9.0	4.8	5.185	-B110	063-42	54
253	9.0	4.4	27	6.9	111	9.0	253	9.0	4.4	458	9.0	3.7	5.411	-B45	063-42	51
230	10	5.6	24	7.6	101	10	230	10	5.6	416	10	4.8	5.963	-B110	063-42	54
220	10	3.9	23	7.9	96	10	220	10	3.9	399	10	3.3	6.222	-B45	063-42	51
193	12	3.7	20	9.1	84	12	193	12	3.7	349	12	3.1	7.111	-B45	063-42	51
193	12	5.6	20	9.1	84	12	193	12	5.6	349	12	4.8	7.111	-B110	063-42	54
168	14	3.3	18	10	73	13	168	14	3.3	303	13	2.8	8.178	-B45	063-42	51
168	14	5.6	18	10	73	13	168	14	5.6	303	13	4.8	8.178	-B110	063-42	54
151	15	3.0	16	12	66	15	151	15	3.0	273	15	2.5	9.101	-B45	063-42	51
151	15	5.2	16	12	66	15	151	15	5.2	273	15	4.4	9.101	-B110	063-42	54
131	17	2.6	14	13	57	17	131	17	2.6	237	17	2.2	10.466	-B45	063-42	51
131	17	5.1	14	13	57	17	131	17	5.1	237	17	4.4	10.466	-B110	063-42	54
120	19	4.8	13	15	52	19	120	19	4.8	217	19	4.0	11.449	-B110	063-42	54
118	19	2.3	13	15	52	19	118	19	2.3	213	19	2.0	11.640	-B45	063-42	51
108	21	4.3	11	16	47	21	108	21	4.3	195	21	3.6	12.698	-B110	063-42	54
102	22	2.0	11	17	45	22	102	22	2.0	185	22	1.7	13.386	-B45	063-42	51
94	24	3.7	9.9	19	41	24	94	24	3.7	170	24	3.2	14.603	-B110	063-42	54
91	25	1.8	9.6	19	40	25	91	25	1.8	164	25	1.5	15.111	-B45	063-42	51
88	26	3.6	9.3	20	39	26	88	26	3.6	159	26	3.0	15.556	-B110	063-42	54
79	29	1.6	8.3	22	35	29	79	29	1.6	143	29	1.3	17.378	-B45	063-42	51
77	30	3.2	8.1	23	34	29	77	30	3.2	139	29	2.8	17.889	-B110	063-42	54
71	32	1.4	7.5	25	31	32	71	32	1.4	128	32	1.2	19.365	-B45	063-42	51
70	32	3.1	7.4	25	31	32	70	32	3.1	127	32	2.6	19.556	-B110	063-42	54
62	37	1.2	6.5	28	27	37	62	37	1.2	111	37	1.0	22.270	-B45	063-42	51
61	37	2.8	6.4	29	27	37	61	37	2.8	110	37	2.4	22.489	-B110	063-42	54
55	41	1.1	5.8	32	24	41	55	41	1.1	99	41	1.1	25.051	-B45	063-42	51
54	42	2.6	5.8	32	24	41	54	42	2.6	99	41	2.2	25.185	-B110	063-42	54
47	48	2.3	5.0	37	21	48	47	48	2.3	86	48	2.0	28.963	-B110	063-42	54
43	53	2.0	4.5	41	19	53	43	53	2.0	78	53	1.7	31.919	-B110	063-42	54
37	61	1.8	4.0	47	16	60	37	61	1.8	68	60	1.5	36.707	-B110	063-42	54
37	62	1.7	3.9	48	16	62	37	62	1.7	66	62	1.5	37.400	-B110	063-42	54
34	66	1.2	3.6	51	15	66	34	66	1.2	62	66	1.2	40.000	-B110	063-42	54
30	76	1.2	3.2	59	13	76	30	76	1.2	54	76	1.2	46.000	-B110	063-42	54
28	80	1.4	3.0	61	13	79	28	80	1.4	52	79	1.3	48.167	-B110	063-42	54
28	81	3.0	3.0	63	12	81	28	81	3.0	51	81	2.9	49.133	-B240	063-42	57

Selection tables, 4-pole motors



50 Hz: P_N = 0.25 kW
87 Hz: P_N = 0.45 kW

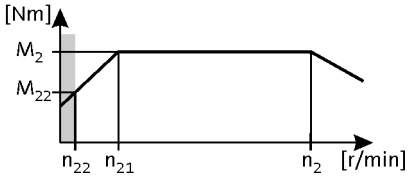
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
26	87	2.7	2.8	67	11	86	26	87	2.7	47	86	2.6	52.510	-B240	063-42	57
23	99	2.4	2.4	76	10	98	23	99	2.4	42	98	2.4	59.630	-B240	063-42	57
22	101	1.1	2.4	78	9.8	100	22	101	1.1	41	100	1.1	61.045	-B110	063-42	54
20	111	1.4	2.2	86	8.9	110	20	111	1.4	37	110	1.4	67.113	-B240	063-42	57
18	126	1.4	1.9	97	7.9	125	18	126	1.4	33	125	1.4	76.213	-B240	063-42	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
20	110	2.2	2.1	85	8.8	110	20	110	2.2	36	110	2.1	68.459	-B240	063-42	57
18	125	1.9	1.9	97	7.7	125	18	125	1.9	32	125	1.9	77.741	-B240	063-42	57
16	141	1.7	1.7	109	6.9	140	16	141	1.7	28	140	1.6	87.563	-B240	063-42	57
15	148	3.0	1.6	114	6.7	147	15	148	3.0	28	147	2.9	89.534	-B450	063-42	60
14	164	2.7	1.5	127	6.0	163	14	164	2.7	25	163	2.7	99.274	-B450	063-42	60
14	160	1.5	1.5	124	6.0	160	14	160	1.5	25	160	1.5	99.437	-B240	063-42	57
12	184	2.4	1.3	142	5.4	183	12	184	2.4	22	183	2.5	111.372	-B450	063-42	60
12	183	1.3	1.3	141	5.3	182	12	183	1.3	22	182	1.3	113.673	-B240	063-42	57
11	204	2.2	1.2	157	4.9	203	11	204	2.2	20	203	2.2	123.487	-B450	063-42	60
11	208	1.2	1.1	160	4.6	207	11	208	1.2	19	207	1.2	129.087	-B240	063-42	57
9.5	239	1.9	1.0	184	4.2	237	9.5	239	1.9	17	237	1.9	144.128	-B450	063-42	60
9.4	235	1.0	1.0	181	4.1	234	9.4	235	1.0	17	234	1.0	145.674	-B240	063-42	57
8.6	265	1.7	0.9	204	3.8	263	8.6	265	1.7	16	263	1.7	159.807	-B450	063-42	60
7.8	290	1.6	0.8	223	3.4	288	7.8	290	1.6	14	288	1.6	174.919	-B450	063-42	60
7.1	321	1.4	0.7	247	3.1	319	7.1	321	1.4	13	319	1.4	193.948	-B450	063-42	60
6.1	370	1.2	0.6	285	2.7	368	6.1	370	1.2	11	368	1.2	223.563	-B450	063-42	60
5.5	410	1.1	0.6	316	2.4	408	5.5	410	1.1	10	408	1.1	247.882	-B450	063-42	60

Selection tables, 4-pole motors

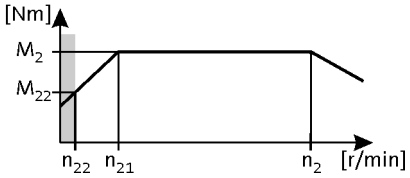


50 Hz: P_N = 0.37 kW
87 Hz: P_N = 0.66 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
272	12	4.9	28	9.5	116	12	272	12	4.9				5.185	-B110	071-32	54
261	13	3.0	27	9.9	111	13	261	13	3.0	466	13	2.6	5.411	-B45	071-32	51
237	14	4.9	24	11	101	14	237	14	4.9				5.963	-B110	071-32	54
227	15	2.7	23	11	96	15	227	15	2.7	405	15	2.3	6.222	-B45	071-32	51
198	17	2.5	20	13	84	17	198	17	2.5	354	17	2.1	7.111	-B45	071-32	51
198	17	4.6	20	13	84	17	198	17	4.6				7.111	-B110	071-32	54
172	19	2.3	18	15	73	19	172	19	2.3	308	19	1.9	8.178	-B45	071-32	51
172	19	4.2	18	15	73	19	172	19	4.2				8.178	-B110	071-32	54
155	22	2.1	16	17	66	22	155	22	2.1	277	22	1.8	9.101	-B45	071-32	51
155	22	3.9	16	17	66	22	155	22	3.9				9.101	-B110	071-32	54
135	25	1.8	14	19	57	25	135	25	1.8	241	25	1.5	10.466	-B45	071-32	51
135	25	3.6	14	19	57	25	135	25	3.6				10.466	-B110	071-32	54
123	27	3.3	13	21	52	27	123	27	3.3				11.449	-B110	071-32	54
121	28	1.6	13	21	52	28	121	28	1.6	217	28	1.4	11.640	-B45	071-32	51
111	30	3.0	11	23	47	30	111	30	3.0	198	30	2.5	12.698	-B110	071-32	54
105	32	1.4	11	25	45	32	105	32	1.4	188	32	1.2	13.386	-B45	071-32	51
97	35	2.6	9.9	27	41	35	97	35	2.6	173	35	2.2	14.603	-B110	071-32	54
93	36	1.3	9.6	28	40	36	93	36	1.3	167	36	1.1	15.111	-B45	071-32	51
91	37	2.5	9.3	29	39	37	91	37	2.5	162	37	2.1	15.556	-B110	071-32	54
81	41	1.1	8.3	32	35	41	81	41	1.1				17.378	-B45	071-32	51
79	43	2.3	8.1	33	34	43	79	43	2.3	141	43	1.9	17.889	-B110	071-32	54
72	47	2.2	7.4	36	31	46	72	47	2.2	129	46	1.8	19.556	-B110	071-32	54
63	54	1.9	6.4	41	27	53	63	54	1.9	112	53	1.6	22.489	-B110	071-32	54
56	60	1.8	5.8	46	24	60	56	60	1.8	100	60	1.5	25.185	-B110	071-32	54
49	69	1.6	5.0	53	21	69	49	69	1.6	87	69	1.3	28.963	-B110	071-32	54
44	76	1.4	4.5	59	19	76	44	76	1.4	79	76	1.2	31.919	-B110	071-32	54
42	80	3.0	4.3	61	18	79	42	80	3.0	75	79	2.5	33.433	-B240	071-32	57
38	87	1.3	4.0	67	16	87	38	87	1.3	69	87	1.1	36.707	-B110	071-32	54
38	89	1.2	3.9	69	16	89	38	89	1.2	67	89	1.0	37.400	-B110	071-32	54
37	90	2.7	3.8	70	16	90	37	90	2.7	66	90	2.2	37.967	-B240	071-32	57
35	95	1.1	3.6	73	15	95	35	95	1.1	63	95	1.0	40.000	-B110	071-32	54
33	103	2.3	3.4	79	14	103	33	103	2.3	58	103	2.2	43.267	-B240	071-32	57
31	110	1.0	3.2	84	13	110	31	110	1.0				46.000	-B110	071-32	54
29	117	2.1	3.0	90	12	117	29	117	2.1	51	117	2.0	49.133	-B240	071-32	57
27	125	1.9	2.8	96	11	125	27	125	1.9	48	125	1.8	52.510	-B240	071-32	57

Selection tables, 4-pole motors



50 Hz: P_N = 0.37 kW
87 Hz: P_N = 0.66 kW

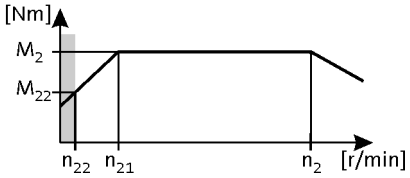
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
24	142	1.7	2.4	109	10	142	24	142	1.7	42	142	1.6	59.630	-B240	071-32	57
21	160	1.1	2.2	123	8.9	159	21	160	1.1	38	159	1.1	67.113	-B240	071-32	57
19	181	1.1	1.9	140	7.9	181	19	181	1.1	33	181	1.1	76.213	-B240	071-32	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
31	108	3.2	3.2	83	13	108	31	108	3.2				45.245	-B450	071-32	60
28	119	3.2	2.9	92	12	119	28	119	3.2				50.167	-B450	071-32	60
23	148	3.0	2.3	114	9.6	148	23	148	3.0	41	148	2.9	62.262	-B450	071-32	60
21	159	1.5	2.1	122	8.8	159	21	159	1.5	37	159	1.5	68.459	-B240	071-32	57
18	180	1.3	1.9	139	7.7	180	18	180	1.3	32	180	1.3	77.741	-B240	071-32	57
16	203	1.2	1.7	157	6.9	203	16	203	1.2	29	203	1.1	87.563	-B240	071-32	57
16	213	2.1	1.6	164	6.7	213	16	213	2.1	28	213	2.0	89.534	-B450	071-32	60
14	236	1.9	1.5	182	6.0	236	14	236	1.9	25	236	1.8	99.274	-B450	071-32	60
14	231	1.0	1.5	178	6.0	230	14	231	1.0	25	230	1.0	99.437	-B240	071-32	57
13	265	1.7	1.3	204	5.4	265	13	265	1.7	23	265	1.7	111.372	-B450	071-32	60
11	294	1.5	1.2	226	4.9	293	11	294	1.5	20	293	1.5	123.487	-B450	071-32	60
9.8	343	1.3	1.0	264	4.2	342	9.8	343	1.3	18	342	1.3	144.128	-B450	071-32	60
8.8	380	1.2	0.9	293	3.8	380	8.8	380	1.2	16	380	1.2	159.807	-B450	071-32	60
8.1	416	1.1	0.8	321	3.4	416	8.1	416	1.1	14	416	1.1	174.919	-B450	071-32	60

Selection tables, 4-pole motors



50 Hz: P_N = 0.55 kW
87 Hz: P_N = 1.0 kW

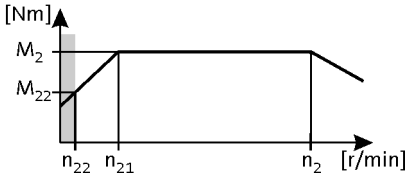
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
394	13	5.1	41	9.7	168	13	394	13	5.1				3.565	-B240	071-42	57
271	18	3.8	28	14	116	18	271	18	3.8				5.185	-B110	071-42	54
260	19	2.0	27	15	111	19	260	19	2.0	465	20	1.7	5.411	-B45	071-42	51
236	21	3.4	24	16	101	21	236	21	3.4				5.963	-B110	071-42	54
226	22	1.8	23	17	96	22	226	22	1.8	404	22	1.5	6.222	-B45	071-42	51
225	22	4.5	23	17	96	22	225	22	4.5				6.257	-B240	071-42	57
198	25	1.7	20	19	84	25	198	25	1.7	354	26	1.4	7.111	-B45	071-42	51
198	25	3.1	20	19	84	25	198	25	3.1	354	26	2.5	7.111	-B110	071-42	54
172	29	1.5	18	22	73	29	172	29	1.5	308	29	1.3	8.178	-B45	071-42	51
172	29	2.8	18	22	73	29	172	29	2.8	308	29	2.3	8.178	-B110	071-42	54
154	32	1.4	16	25	66	32	154	32	1.4	276	33	1.2	9.101	-B45	071-42	51
154	32	2.6	16	25	66	32	154	32	2.6	276	33	2.2	9.101	-B110	071-42	54
134	37	1.2	14	29	57	37	134	37	1.2	240	38	1.0	10.466	-B45	071-42	51
134	37	2.4	14	29	57	37	134	37	2.4	240	38	2.0	10.466	-B110	071-42	54
123	41	2.2	13	31	52	41	123	41	2.2	220	41	1.8	11.449	-B110	071-42	54
121	41	1.1	13	32	52	41	121	41	1.1				11.640	-B45	071-42	51
111	45	2.0	11	35	47	45	111	45	2.0	198	46	1.7	12.698	-B110	071-42	54
96	52	1.7	9.9	40	41	52	96	52	1.7	172	53	1.4	14.603	-B110	071-42	54
90	55	1.7	9.3	43	39	55	90	55	1.7	162	56	1.4	15.556	-B110	071-42	54
79	64	1.5	8.1	49	34	64	79	64	1.5	141	65	1.3	17.889	-B110	071-42	54
72	69	1.4	7.4	54	31	69	72	69	1.4	129	71	1.2	19.556	-B110	071-42	54
63	80	1.3	6.4	62	27	80	63	80	1.3	112	81	1.1	22.489	-B110	071-42	54
60	83	2.9	6.2	64	26	83	60	83	2.9	107	85	2.4	23.450	-B240	071-42	57
56	89	1.2	5.8	69	24	89	56	89	1.2	100	91	1.0	25.185	-B110	071-42	54
52	95	2.5	5.4	74	22	95	52	95	2.5	94	97	2.1	26.878	-B240	071-42	57
49	103	1.1	5.0	79	21	103	49	103	1.1				28.963	-B110	071-42	54
46	108	2.2	4.8	84	20	108	46	108	2.2	82	110	1.8	30.522	-B240	071-42	57
42	119	2.0	4.3	91	18	119	42	119	2.0	75	121	1.7	33.433	-B240	071-42	57
37	135	1.8	3.8	104	16	135	37	135	1.8	66	137	1.5	37.967	-B240	071-42	57
33	154	1.6	3.4	118	14	154	33	154	1.6	58	156	1.5	43.267	-B240	071-42	57
29	174	1.4	3.0	134	12	174	29	174	1.4	51	177	1.3	49.133	-B240	071-42	57
27	186	1.3	2.8	144	11	186	27	186	1.3	48	189	1.2	52.510	-B240	071-42	57
24	212	1.1	2.4	163	10	212	24	212	1.1	42	215	1.1	59.630	-B240	071-42	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
35	143	3.1	3.6	110	15	143	35	143	3.1	62	145	3.0	40.330	-B450	071-42	60
31	161	2.8	3.2	124	13	161	31	161	2.8	56	163	2.6	45.245	-B450	071-42	60

Selection tables, 4-pole motors

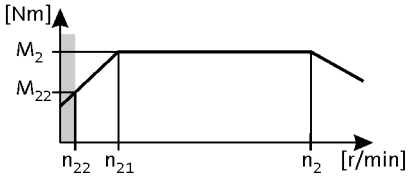


50 Hz: P_N = 0.55 kW
87 Hz: P_N = 1.0 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
28	178	2.5	2.9	137	12	178	28	178	2.5	50	181	2.4	50.167	-B450	071-42	60
25	199	2.3	2.6	154	11	199	25	199	2.3	45	203	2.1	56.154	-B450	071-42	60
23	221	2.0	2.3	170	9.6	221	23	221	2.0	40	225	1.9	62.262	-B450	071-42	60
21	237	1.0	2.1	183	8.8	237	21	237	1.0				68.459	-B240	071-42	57
20	244	1.8	2.1	188	8.7	244	20	244	1.8	37	248	1.7	68.788	-B450	071-42	60
18	271	1.7	1.9	209	7.9	271	18	271	1.7	33	275	1.6	76.271	-B450	071-42	60
16	318	1.4	1.6	245	6.7	318	16	318	1.4	28	323	1.3	89.534	-B450	071-42	60
14	352	1.3	1.5	271	6.0	352	14	352	1.3	25	358	1.2	99.274	-B450	071-42	60
13	395	1.1	1.3	305	5.4	395	13	395	1.1	23	402	1.1	111.372	-B450	071-42	60
11	438	1.0	1.2	338	4.9	438	11	438	1.0	20	445	1.0	123.487	-B450	071-42	60

Selection tables, 4-pole motors



50 Hz: P_N = 0.75 kW
87 Hz: P_N = 1.35 kW

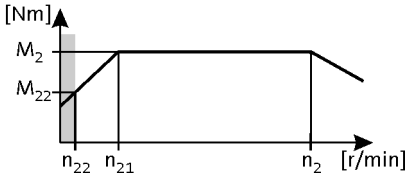
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
396	17	4.7	41	13	168	17	396	17	4.7	707	17	3.9	3.565	-B240	080-32	57
272	25	2.8	28	19	116	25	272	25	2.8	486	25	2.3	5.185	-B110	080-32	54
237	29	2.5	24	22	101	29	237	29	2.5	423	29	2.1	5.963	-B110	080-32	54
225	30	4.1	23	23	96	30	225	30	4.1				6.257	-B240	080-32	57
198	34	2.2	20	26	84	34	198	34	2.2	354	35	1.9	7.111	-B110	080-32	54
172	39	2.1	18	30	73	39	172	39	2.1	308	40	1.7	8.178	-B110	080-32	54
155	44	1.9	16	34	66	44	155	44	1.9	277	44	1.6	9.101	-B110	080-32	54
135	51	1.8	14	39	57	51	135	51	1.8	241	51	1.5	10.466	-B110	080-32	54
123	55	1.6	13	43	52	55	123	55	1.6	220	56	1.4	11.449	-B110	080-32	54
111	61	1.5	11	47	47	61	111	61	1.5	198	62	1.2	12.698	-B110	080-32	54
97	70	1.3	9.9	54	41	70	97	70	1.3	173	71	1.1	14.603	-B110	080-32	54
94	72	3.1	9.7	56	40	72	94	72	3.1	168	73	2.6	15.008	-B240	080-32	57
91	75	1.2	9.3	58	39	75	91	75	1.2	162	76	1.0	15.556	-B110	080-32	54
84	81	3.0	8.6	63	36	81	84	81	3.0	150	82	2.5	16.857	-B240	080-32	57
79	86	1.1	8.1	67	34	86	79	86	1.1				17.889	-B110	080-32	54
74	92	2.6	7.6	71	31	92	74	92	2.6	132	93	2.2	19.143	-B240	080-32	57
72	94	1.1	7.4	73	31	94	72	94	1.1				19.556	-B110	080-32	54
68	100	2.4	7.0	77	29	100	68	100	2.4	122	100	2.0	20.650	-B240	080-32	57
60	113	2.1	6.2	87	26	113	60	113	2.1	108	114	1.8	23.450	-B240	080-32	57
53	130	1.9	5.4	100	22	130	53	130	1.9	94	131	1.6	26.878	-B240	080-32	57
46	147	1.6	4.8	113	20	147	46	147	1.6	83	148	1.4	30.522	-B240	080-32	57
42	161	1.5	4.3	124	18	161	42	161	1.5	75	162	1.2	33.433	-B240	080-32	57
37	183	1.3	3.8	141	16	183	37	183	1.3	66	185	1.1	37.967	-B240	080-32	57
33	209	1.2	3.4	161	14	209	33	209	1.2	58	210	1.1	43.267	-B240	080-32	57
29	237	1.0	3.0	183	12	237	29	237	1.0				49.133	-B240	080-32	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
46	149	3.0	4.7	115	19	149	46	149	3.0	81	151	2.5	30.985	-B450	080-32	60
39	175	2.6	4.0	135	17	175	39	175	2.6	69	177	2.1	36.373	-B450	080-32	60
35	195	2.3	3.6	150	15	195	35	195	2.3	63	196	2.2	40.330	-B450	080-32	60
31	218	2.1	3.2	168	13	218	31	218	2.1	56	220	2.0	45.245	-B450	080-32	60
28	242	1.9	2.9	186	12	242	28	242	1.9	50	244	1.8	50.167	-B450	080-32	60
25	271	1.7	2.6	209	11	271	25	271	1.7	45	273	1.6	56.154	-B450	080-32	60
23	300	1.5	2.3	231	9.6	300	23	300	1.5	41	303	1.4	62.262	-B450	080-32	60
21	332	1.4	2.1	256	8.7	332	21	332	1.4	37	334	1.3	68.788	-B450	080-32	60
19	368	1.2	1.9	283	7.9	368	19	368	1.2	33	371	1.2	76.271	-B450	080-32	60
16	432	1.0	1.6	333	6.7	432	16	432	1.0				89.534	-B450	080-32	60

Selection tables, 4-pole motors



50 Hz: P_N = 1.1 kW
87 Hz: P_N = 2.0 kW

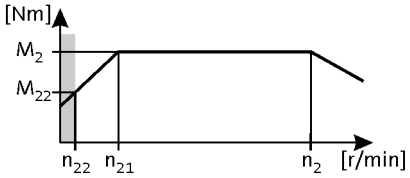
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
401	25	5.6	41	17	168	25	401	25	5.6				3.565	-B240	090-12	57
276	36	1.9	28	25	116	36	276	36	1.9	490	37	1.6	5.185	-B110	090-12	54
240	42	1.7	24	29	101	42	240	42	1.7				5.963	-B110	090-12	54
229	44	3.6	23	31	96	44	229	44	3.6				6.257	-B240	090-12	57
201	50	1.6	20	35	84	50	201	50	1.6	357	51	1.3	7.111	-B110	090-12	54
175	57	1.4	18	40	73	57	175	57	1.4	311	58	1.2	8.178	-B110	090-12	54
157	64	1.3	16	45	66	64	157	64	1.3	279	65	1.1	9.101	-B110	090-12	54
152	66	2.9	15	46	64	66	152	66	2.9	269	67	2.4	9.440	-B240	090-12	57
137	73	1.2	14	51	57	73	137	73	1.2	243	75	1.0	10.466	-B110	090-12	54
133	75	2.7	14	52	56	75	133	75	2.7	237	77	2.2	10.720	-B240	090-12	57
125	80	1.1	13	56	52	80	125	80	1.1				11.449	-B110	090-12	54
118	84	2.5	12	59	50	84	118	84	2.5	210	86	2.0	12.081	-B240	090-12	57
113	89	1.0	11	62	47	89	113	89	1.0				12.698	-B110	090-12	54
104	96	2.3	11	67	44	96	104	96	2.3	185	98	1.9	13.719	-B240	090-12	57
95	105	2.1	9.7	73	40	105	95	105	2.1	169	107	1.8	15.008	-B240	090-12	57
85	118	2.0	8.6	82	36	118	85	118	2.0	151	120	1.7	16.857	-B240	090-12	57
75	134	1.8	7.6	94	31	134	75	134	1.8	133	137	1.5	19.143	-B240	090-12	57
69	144	1.7	7.0	101	29	144	69	144	1.7	123	148	1.4	20.650	-B240	090-12	57
61	164	1.5	6.2	115	26	164	61	164	1.5	108	168	1.2	23.450	-B240	090-12	57
53	188	1.3	5.4	131	22	188	53	188	1.3	95	192	1.1	26.878	-B240	090-12	57
47	213	1.1	4.8	149	20	213	47	213	1.1				30.522	-B240	090-12	57
43	233	1.0	4.3	163	18	233	43	233	1.0				33.433	-B240	090-12	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
72	138	3.3	7.3	97	30	138	72	138	3.3	128	142	2.7	19.831	-B450	090-12	60
63	159	2.8	6.4	111	26	159	63	159	2.8	111	163	2.3	22.813	-B450	090-12	60
57	176	2.6	5.7	124	24	176	57	176	2.6	100	181	2.1	25.294	-B450	090-12	60
51	195	2.3	5.2	137	22	195	51	195	2.3	91	200	1.9	27.945	-B450	090-12	60
46	216	2.1	4.7	151	19	216	46	216	2.1	82	221	1.7	30.985	-B450	090-12	60
39	254	1.8	4.0	178	17	254	39	254	1.8	70	260	1.5	36.373	-B450	090-12	60
36	281	1.6	3.6	197	15	281	36	281	1.6	63	288	1.5	40.330	-B450	090-12	60
32	316	1.4	3.2	221	13	316	32	316	1.4	56	323	1.3	45.245	-B450	090-12	60
29	350	1.3	2.9	245	12	350	29	350	1.3	51	358	1.2	50.167	-B450	090-12	60
26	392	1.2	2.6	274	11	392	26	392	1.2	45	401	1.1	56.154	-B450	090-12	60
23	434	1.0	2.3	304	9.6	434	23	434	1.0				62.262	-B450	090-12	60

Selection tables, 4-pole motors



50 Hz: P_N = 1.5 kW
87 Hz: P_N = 2.7 kW

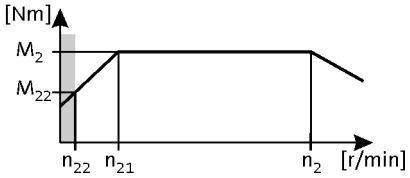
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
403	34	4.1	41	24	168	34	403	34	4.1				3.565	-B240	090-32	57
294	46	3.2	30	33	123	46	294	46	3.2	521	47	2.6	4.889	-B240	090-32	57
277	49	1.4	28	34	116	49	277	49	1.4				5.185	-B110	090-32	54
241	57	1.3	24	40	101	57	241	57	1.3				5.963	-B110	090-32	54
229	59	2.6	23	42	96	59	229	59	2.6	407	60	2.2	6.257	-B240	090-32	57
209	65	2.7	21	46	87	65	209	65	2.7	370	66	2.3	6.883	-B240	090-32	57
202	67	1.1	20	47	84	67	202	67	1.1				7.111	-B110	090-32	54
184	74	2.5	19	52	77	74	184	74	2.5				7.817	-B240	090-32	57
176	78	1.0	18	54	73	78	176	78	1.0				8.178	-B110	090-32	54
152	90	2.1	15	63	64	90	152	90	2.1	270	91	1.8	9.440	-B240	090-32	57
134	102	2.0	14	71	56	102	134	102	2.0	237	103	1.7	10.720	-B240	090-32	57
119	115	1.8	12	80	50	115	119	115	1.8	211	116	1.5	12.081	-B240	090-32	57
105	130	1.7	11	91	44	130	105	130	1.7	186	132	1.4	13.719	-B240	090-32	57
96	142	1.6	9.7	100	40	142	96	142	1.6	170	144	1.3	15.008	-B240	090-32	57
85	160	1.5	8.6	112	36	160	85	160	1.5	151	162	1.2	16.857	-B240	090-32	57
75	182	1.3	7.6	127	31	182	75	182	1.3	133	184	1.1	19.143	-B240	090-32	57
70	196	1.2	7.0	137	29	196	70	196	1.2	123	199	1.0	20.650	-B240	090-32	57
61	222	1.1	6.2	156	26	222	61	222	1.1				23.450	-B240	090-32	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
101	134	3.1	10	94	42	134	101	134	3.1	180	136	2.6	14.165	-B450	090-32	60
88	155	2.8	8.9	109	37	155	88	155	2.8	156	157	2.3	16.349	-B450	090-32	60
80	170	2.6	8.1	119	34	170	80	170	2.6	142	172	2.2	17.885	-B450	090-32	60
72	188	2.4	7.3	132	30	188	72	188	2.4	128	191	2.0	19.831	-B450	090-32	60
63	216	2.1	6.4	151	26	216	63	216	2.1	112	220	1.7	22.813	-B450	090-32	60
57	240	1.9	5.7	168	24	240	57	240	1.9	101	243	1.6	25.294	-B450	090-32	60
51	265	1.7	5.2	186	22	265	51	265	1.7	91	269	1.4	27.945	-B450	090-32	60
46	294	1.5	4.7	206	19	294	46	294	1.5	82	298	1.3	30.985	-B450	090-32	60
40	345	1.3	4.0	241	17	345	40	345	1.3	70	350	1.1	36.373	-B450	090-32	60
36	382	1.2	3.6	268	15	382	36	382	1.2	63	388	1.1	40.330	-B450	090-32	60
32	429	1.1	3.2	300	13	429	32	429	1.1				45.245	-B450	090-32	60

Selection tables, 4-pole motors



50 Hz: P_N = 2.2 kW
87 Hz: P_N = 3.9 kW

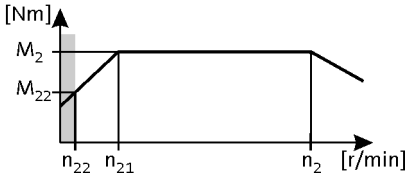
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
405	49	2.8	41	34	168	49	405	49	2.8	717	49	2.3	3.565	-B240	100-12	57
296	68	2.2	30	47	123	68	296	68	2.2	523	68	1.8	4.889	-B240	100-12	57
231	86	1.8	23	60	96	86	231	86	1.8	408	87	1.5	6.257	-B240	100-12	57
210	95	1.9	21	66	87	95	210	95	1.9				6.883	-B240	100-12	57
185	108	1.7	19	75	77	108	185	108	1.7				7.817	-B240	100-12	57
153	130	1.5	15	91	64	130	153	130	1.5				9.440	-B240	100-12	57
135	148	1.4	14	103	56	148	135	148	1.4				10.720	-B240	100-12	57
120	167	1.3	12	117	50	167	120	167	1.3				12.081	-B240	100-12	57
105	189	1.2	11	132	44	189	105	189	1.2				13.719	-B240	100-12	57
96	207	1.1	9.7	145	40	207	96	207	1.1				15.008	-B240	100-12	57
86	233	1.0	8.6	163	36	233	86	233	1.0				16.857	-B240	100-12	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
211	95	3.3	21	66	88	95	211	95	3.3	372	95	2.7	6.860	-B450	100-12	60
155	129	2.9	16	90	64	129	155	129	2.9	274	129	2.4	9.315	-B450	100-12	60
140	143	2.7	14	100	58	143	140	143	2.7	247	143	2.3	10.328	-B450	100-12	60
113	176	2.3	11	123	47	176	113	176	2.3	200	177	1.9	12.775	-B450	100-12	60
102	196	2.2	10	137	42	196	102	196	2.2	180	196	1.8	14.165	-B450	100-12	60
88	226	1.9	8.9	158	37	226	88	226	1.9	156	226	1.6	16.349	-B450	100-12	60
81	247	1.8	8.1	172	34	247	81	247	1.8	143	248	1.5	17.885	-B450	100-12	60
73	274	1.6	7.3	191	30	274	73	274	1.6	129	275	1.4	19.831	-B450	100-12	60
63	315	1.4	6.4	220	26	315	63	315	1.4	112	316	1.2	22.813	-B450	100-12	60
57	349	1.3	5.7	244	24	349	57	349	1.3	101	350	1.1	25.294	-B450	100-12	60
52	386	1.2	5.2	269	22	386	52	386	1.2				27.945	-B450	100-12	60
47	428	1.1	4.7	299	19	428	47	428	1.1				30.985	-B450	100-12	60

Selection tables, 4-pole motors



50 Hz: P_N = 3.0 kW
87 Hz: P_N = 5.4 kW

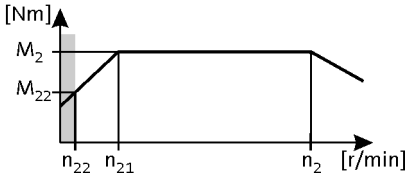
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
405	67	2.1	41	47	168	67	405	67	2.1				3.565	-B240	100-32	57
296	92	1.6	30	64	123	92	296	92	1.6				4.889	-B240	100-32	57
231	118	1.3	23	82	96	118	231	118	1.3				6.257	-B240	100-32	57
210	130	1.4	21	91	87	130	210	130	1.4				6.883	-B240	100-32	57
185	147	1.3	19	103	77	147	185	147	1.3				7.817	-B240	100-32	57
153	178	1.1	15	124	64	178	153	178	1.1				9.440	-B240	100-32	57
135	202	1.0	14	141	56	202	135	202	1.0				10.720	-B240	100-32	57

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
289	94	3.0	29	66	120	94	289	94	3.0	511	96	2.4	5.002	-B450	100-32	60
211	129	2.4	21	90	88	129	211	129	2.4	372	132	2.0	6.860	-B450	100-32	60
155	175	2.1	16	123	64	175	155	175	2.1				9.315	-B450	100-32	60
140	195	2.0	14	136	58	195	140	195	2.0				10.328	-B450	100-32	60
113	241	1.7	11	168	47	241	113	241	1.7				12.775	-B450	100-32	60
102	267	1.6	10	187	42	267	102	267	1.6				14.165	-B450	100-32	60
88	308	1.4	8.9	215	37	308	88	308	1.4				16.349	-B450	100-32	60
81	337	1.3	8.1	236	34	337	81	337	1.3	143	343	1.1	17.885	-B450	100-32	60
73	373	1.2	7.3	261	30	373	73	373	1.2				19.831	-B450	100-32	60
63	430	1.1	6.4	300	26	430	63	430	1.1				22.813	-B450	100-32	60

Selection tables, 4-pole motors



50 Hz: P_N = 4.0 kW
87 Hz: P_N = 7.1 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
291	125	2.2	29	78	120	125	291	125	2.2				5.002	-B450	112-22	60
212	171	1.8	21	107	88	171	212	171	1.8				6.860	-B450	112-22	60
156	232	1.6	16	145	64	232	156	232	1.6				9.315	-B450	112-22	60
141	258	1.5	14	161	58	258	141	258	1.5				10.328	-B450	112-22	60
114	319	1.3	11	200	47	319	114	319	1.3				12.775	-B450	112-22	60
103	353	1.2	10	221	42	353	103	353	1.2				14.165	-B450	112-22	60
89	408	1.1	8.9	255	37	408	89	408	1.1				16.349	-B450	112-22	60
81	446	1.0	8.1	279	34	446	81	446	1.0				17.885	-B450	112-22	60

Selection tables, 2-pole motors

50 Hz: P_N = 0.18 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
140	12	5.8	19.556	-B110	063-11	63
122	13	5.8	22.489	-B110	063-11	63
109	15	4.8	25.185	-B110	063-11	63
116	17	4.8	28.963	-B110	063-11	63
106	19	4.2	31.919	-B110	063-11	63
73	22	3.9	37.400	-B110	063-11	63
69	24	3.9	40.000	-B110	063-11	63
60	27	3.7	46.000	-B110	063-11	63
52	31	2.0	52.698	-B110	063-11	63
45	36	2.2	60.603	-B110	063-11	63
45	36	3.0	61.045	-B110	063-11	63
36	46	2.4	76.500	-B110	063-11	63
27	60	1.8	100.786	-B110	063-11	63

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
40	40	5.6	68.459	-B240	063-11	66
31	51	4.4	87.563	-B240	063-11	66
24	66	3.6	113.673	-B240	063-11	66
21	75	3.2	129.087	-B240	063-11	66
19	85	2.8	145.674	-B240	063-11	66
17	96	2.5	165.426	-B240	063-11	66
15	109	2.2	188.442	-B240	063-11	66
14	116	3.9	193.948	-B450	063-11	69
13	124	1.9	213.994	-B240	063-11	66
11	142	1.7	245.178	-B240	063-11	66
11	148	3.1	247.882	-B450	063-11	69
12	162	1.5	278.422	-B240	063-11	66
11	185	1.3	317.617	-B240	063-11	66
7.6	210	1.2	360.683	-B240	063-11	66

Selection tables, 2-pole motors

50 Hz: P_N = 0.25 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
237	10	5.2	11.449	-B110	063-31	63
213	11	4.9	12.698	-B110	063-31	63
186	12	4.9	14.603	-B110	063-31	63
139	16	4.1	19.556	-B110	063-31	63
121	19	4.1	22.489	-B110	063-31	63
108	21	3.4	25.185	-B110	063-31	63
117	24	3.4	28.963	-B110	063-31	63
106	27	3.0	31.919	-B110	063-31	63
74	31	2.9	36.707	-B110	063-31	63
73	31	2.8	37.400	-B110	063-31	63
68	33	2.8	40.000	-B110	063-31	63
59	38	2.7	46.000	-B110	063-31	63
56	40	2.6	48.167	-B110	063-31	63
51	44	1.5	52.698	-B110	063-31	63
45	51	1.6	60.603	-B110	063-31	63
44	51	2.2	61.045	-B110	063-31	63
40	56	2.8	67.113	-B240	063-31	66
36	64	2.8	76.213	-B240	063-31	66
35	64	1.7	76.500	-B110	063-31	63
27	84	1.3	100.786	-B110	063-31	63

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
40	56	4.0	68.459	-B240	063-31	66
31	71	3.1	87.563	-B240	063-31	66
27	81	2.8	99.437	-B240	063-31	66
24	93	2.6	113.673	-B240	063-31	66
21	105	2.3	129.087	-B240	063-31	66
19	119	2.0	145.674	-B240	063-31	66
16	135	1.8	165.426	-B240	063-31	66
16	146	3.1	174.919	-B450	063-31	69
14	154	1.6	188.442	-B240	063-31	66
14	162	2.8	193.948	-B450	063-31	69
13	175	1.4	213.994	-B240	063-31	66
12	187	2.4	223.563	-B450	063-31	69
11	200	1.2	245.178	-B240	063-31	66
11	207	2.2	247.882	-B450	063-31	69
12	227	1.1	278.422	-B240	063-31	66

Selection tables, 2-pole motors

50 Hz: P_N = 0.37 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
260	13	5.7	10.466	-B110	071-11	63
238	14	5.2	11.449	-B110	071-11	63
214	16	4.7	12.698	-B110	071-11	63
186	18	4.1	14.603	-B110	071-11	63
175	19	3.9	15.556	-B110	071-11	63
152	22	3.6	17.889	-B110	071-11	63
139	24	3.4	19.556	-B110	071-11	63
121	28	3.1	22.489	-B110	071-11	63
108	31	2.9	25.185	-B110	071-11	63
116	36	2.5	28.963	-B110	071-11	63
105	39	2.3	31.919	-B110	071-11	63
74	45	2.0	36.707	-B110	071-11	63
73	46	1.9	37.400	-B110	071-11	63
68	49	1.9	40.000	-B110	071-11	63
59	57	1.8	46.000	-B110	071-11	63
57	59	1.7	48.167	-B110	071-11	63
46	74	3.0	59.630	-B240	071-11	66
45	75	1.5	61.045	-B110	071-11	63
41	83	2.2	67.113	-B240	071-11	66
36	94	2.2	76.213	-B240	071-11	66
36	94	1.2	76.500	-B110	071-11	63

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
40	82	2.7	68.459	-B240	071-11	66
35	94	2.4	77.741	-B240	071-11	66
31	105	2.1	87.563	-B240	071-11	66
27	120	1.9	99.437	-B240	071-11	66
24	137	1.8	113.673	-B240	071-11	66
22	152	3.0	123.487	-B450	071-11	69
21	155	1.6	129.087	-B240	071-11	66
19	178	2.5	144.128	-B450	071-11	69
19	175	1.4	145.674	-B240	071-11	66
17	197	2.3	159.807	-B450	071-11	69
16	199	1.2	165.426	-B240	071-11	66
16	216	2.1	174.919	-B450	071-11	69
14	227	1.1	188.442	-B240	071-11	66
14	239	1.9	193.948	-B450	071-11	69
12	276	1.6	223.563	-B450	071-11	69
11	306	1.5	247.882	-B450	071-11	69

Selection tables, 2-pole motors

50 Hz: P_N = 0.55 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
507	10	5.1	5.185	-B110	071-31	63
441	11	5.1	5.963	-B110	071-31	63
370	13	4.7	7.111	-B110	071-31	63
322	16	4.3	8.178	-B110	071-31	63
289	17	4.0	9.101	-B110	071-31	63
251	20	3.7	10.466	-B110	071-31	63
230	22	3.4	11.449	-B110	071-31	63
207	24	3.1	12.698	-B110	071-31	63
180	28	2.7	14.603	-B110	071-31	63
169	30	2.6	15.556	-B110	071-31	63
147	34	2.4	17.889	-B110	071-31	63
135	37	2.2	19.556	-B110	071-31	63
117	43	2.0	22.489	-B110	071-31	63
104	48	1.9	25.185	-B110	071-31	63
112	55	1.7	28.963	-B110	071-31	63
102	61	1.5	31.919	-B110	071-31	63
79	63	3.1	33.433	-B240	071-31	66
72	70	1.3	36.707	-B110	071-31	63
70	71	1.2	37.400	-B110	071-31	63
69	72	2.8	37.967	-B240	071-31	66
66	76	1.2	40.000	-B110	071-31	63
61	82	2.8	43.267	-B240	071-31	66
57	87	1.2	46.000	-B110	071-31	63
55	91	1.1	48.167	-B110	071-31	63
54	93	2.4	49.133	-B240	071-31	66
50	100	2.2	52.510	-B240	071-31	66
44	113	2.0	59.630	-B240	071-31	66
39	127	1.4	67.113	-B240	071-31	66
35	145	1.4	76.213	-B240	071-31	66

6.7

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
38	127	1.8	68.459	-B240	071-31	66
34	144	1.6	77.741	-B240	071-31	66
30	162	1.4	87.563	-B240	071-31	66
29	170	2.5	89.534	-B450	071-31	69
27	188	2.3	99.274	-B450	071-31	69
26	184	1.2	99.437	-B240	071-31	66
24	211	2.1	111.372	-B450	071-31	69
23	210	1.1	113.673	-B240	071-31	66

Selection tables, 2-pole motors

50 Hz: P_N = 0.55 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
21	234	1.9	123.487	-B450	071-31	69
20	239	1.0	129.087	-B240	071-31	66
18	273	1.7	144.128	-B450	071-31	69
17	303	1.5	159.807	-B450	071-31	69
15	332	1.4	174.919	-B450	071-31	69
14	368	1.2	193.948	-B450	071-31	69
12	424	1.1	223.563	-B450	071-31	69

Selection tables, 6-pole motors

50 Hz: P_N = 0.18 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
114	14	5.6	8.178	-B110	071-13	72
102	16	5.3	9.101	-B110	071-13	72
109	18	4.8	10.466	-B110	071-13	72
81	20	4.5	11.449	-B110	071-13	72
73	22	4.0	12.698	-B110	071-13	72
64	26	3.5	14.603	-B110	071-13	72
60	27	3.4	15.556	-B110	071-13	72
52	31	3.1	17.889	-B110	071-13	72
48	34	2.9	19.556	-B110	071-13	72
41	39	2.6	22.489	-B110	071-13	72
37	44	2.4	25.185	-B110	071-13	72
32	51	2.2	28.963	-B110	071-13	72
29	56	1.9	31.919	-B110	071-13	72
25	64	1.7	36.707	-B110	071-13	72
25	66	1.6	37.400	-B110	071-13	72
23	70	1.4	40.000	-B110	071-13	72
22	76	3.2	43.267	-B240	071-13	75
20	81	1.4	46.000	-B110	071-13	72
19	85	1.3	48.167	-B110	071-13	72
19	86	2.8	49.133	-B240	071-13	75
18	92	2.5	52.510	-B240	071-13	75
16	105	2.3	59.630	-B240	071-13	75
15	107	1.0	61.045	-B110	071-13	72
14	118	1.5	67.113	-B240	071-13	75
12	134	1.5	76.213	-B240	071-13	75

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
14	117	2.1	68.459	-B240	071-13	75
12	133	1.8	77.741	-B240	071-13	75
11	150	1.6	87.563	-B240	071-13	75
10	157	2.9	89.534	-B450	071-13	78
12	174	2.6	99.274	-B450	071-13	78
12	170	1.4	99.437	-B240	071-13	75
10	196	2.3	111.372	-B450	071-13	78
10	195	1.2	113.673	-B240	071-13	75
7.5	217	2.1	123.487	-B450	071-13	78
7.2	221	1.1	129.087	-B240	071-13	75
6.5	253	1.8	144.128	-B450	071-13	78
5.8	281	1.6	159.807	-B450	071-13	78

Selection tables, 6-pole motors

50 Hz: P_N = 0.18 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
5.3	307	1.5	174.919	-B450	071-13	78
4.8	340	1.3	193.948	-B450	071-13	78
4.2	392	1.2	223.563	-B450	071-13	78
3.8	435	1.0	247.882	-B450	071-13	78

Selection tables, 6-pole motors

50 Hz: P_N = 0.25 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
179	13	4.7	5.185	-B110	071-33	72
156	15	4.7	5.963	-B110	071-33	72
131	17	4.4	7.111	-B110	071-33	72
114	20	4.1	8.178	-B110	071-33	72
102	22	3.8	9.101	-B110	071-33	72
109	26	3.5	10.466	-B110	071-33	72
81	28	3.2	11.449	-B110	071-33	72
73	31	2.9	12.698	-B110	071-33	72
64	36	2.5	14.603	-B110	071-33	72
60	38	2.4	15.556	-B110	071-33	72
52	44	2.2	17.889	-B110	071-33	72
48	48	2.1	19.556	-B110	071-33	72
41	55	1.9	22.489	-B110	071-33	72
37	61	1.8	25.185	-B110	071-33	72
32	71	1.6	28.963	-B110	071-33	72
31	74	3.2	30.522	-B240	071-33	75
29	78	1.4	31.919	-B110	071-33	72
28	82	2.9	33.433	-B240	071-33	75
25	90	1.2	36.707	-B110	071-33	72
25	91	1.2	37.400	-B110	071-33	72
25	93	2.6	37.967	-B240	071-33	75
23	98	1.0	40.000	-B110	071-33	72
22	106	2.3	43.267	-B240	071-33	75
19	120	2.0	49.133	-B240	071-33	75
18	128	1.8	52.510	-B240	071-33	75
16	145	1.7	59.630	-B240	071-33	75
14	164	1.1	67.113	-B240	071-33	75
12	186	1.1	76.213	-B240	071-33	75

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
21	110	3.1	45.245	-B450	071-33	78
19	122	3.1	50.167	-B450	071-33	78
15	152	3.0	62.262	-B450	071-33	78
14	163	1.5	68.459	-B240	071-33	75
12	185	1.3	77.741	-B240	071-33	75
11	208	1.2	87.563	-B240	071-33	75
10	218	2.1	89.534	-B450	071-33	78
12	242	1.9	99.274	-B450	071-33	78
12	236	1.0	99.437	-B240	071-33	75

Selection tables, 6-pole motors

50 Hz: P_N = 0.25 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
10	272	1.7	111.372	-B450	071-33	78
7.5	301	1.5	123.487	-B450	071-33	78
6.5	351	1.3	144.128	-B450	071-33	78
5.8	390	1.2	159.807	-B450	071-33	78
5.3	427	1.1	174.919	-B450	071-33	78

Selection tables, 6-pole motors

50 Hz: P_N = 0.37 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
183	18	3.8	5.185	-B110	080-13	72
159	21	3.4	5.963	-B110	080-13	72
152	22	5.7	6.257	-B240	080-13	75
134	25	3.1	7.111	-B110	080-13	72
116	29	2.8	8.178	-B110	080-13	72
104	32	2.6	9.101	-B110	080-13	72
111	37	2.4	10.466	-B110	080-13	72
101	40	2.2	11.449	-B110	080-13	72
75	45	2.0	12.698	-B110	080-13	72
65	52	1.7	14.603	-B110	080-13	72
61	55	1.7	15.556	-B110	080-13	72
53	63	1.5	17.889	-B110	080-13	72
49	69	1.5	19.556	-B110	080-13	72
42	79	1.3	22.489	-B110	080-13	72
41	83	2.9	23.450	-B240	080-13	75
38	89	1.2	25.185	-B110	080-13	72
35	95	2.5	26.878	-B240	080-13	75
33	102	1.1	28.963	-B110	080-13	72
31	108	2.2	30.522	-B240	080-13	75
28	118	2.0	33.433	-B240	080-13	75
25	134	1.8	37.967	-B240	080-13	75
22	153	1.6	43.267	-B240	080-13	75
19	174	1.4	49.133	-B240	080-13	75
18	186	1.3	52.510	-B240	080-13	75
16	211	1.1	59.630	-B240	080-13	75

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
24	142	3.2	40.330	-B450	080-13	78
21	160	2.8	45.245	-B450	080-13	78
19	177	2.5	50.167	-B450	080-13	78
17	198	2.3	56.154	-B450	080-13	78
15	220	2.1	62.262	-B450	080-13	78
14	236	1.0	68.459	-B240	080-13	75
14	243	1.9	68.788	-B450	080-13	78
13	269	1.7	76.271	-B450	080-13	78
11	316	1.4	89.534	-B450	080-13	78
12	351	1.3	99.274	-B450	080-13	78
10	393	1.1	111.372	-B450	080-13	78
7.7	436	1.0	123.487	-B450	080-13	78

Selection tables, 6-pole motors

50 Hz: P_N = 0.55 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
261	19	4.2	3.565	-B240	080-33	75
179	28	2.5	5.185	-B110	080-33	72
156	32	2.3	5.963	-B110	080-33	72
149	34	3.7	6.257	-B240	080-33	75
131	38	2.0	7.111	-B110	080-33	72
114	44	1.9	8.178	-B110	080-33	72
102	49	1.7	9.101	-B110	080-33	72
109	56	1.6	10.466	-B110	080-33	72
81	61	1.5	11.449	-B110	080-33	72
77	65	3.2	12.081	-B240	080-33	75
73	68	1.3	12.698	-B110	080-33	72
68	74	3.0	13.719	-B240	080-33	75
64	78	1.2	14.603	-B110	080-33	72
62	81	2.8	15.008	-B240	080-33	75
60	83	1.1	15.556	-B110	080-33	72
55	90	2.7	16.857	-B240	080-33	75
52	96	1.0	17.889	-B110	080-33	72
49	103	2.3	19.143	-B240	080-33	75
45	111	2.2	20.650	-B240	080-33	75
40	126	1.9	23.450	-B240	080-33	75
35	144	1.7	26.878	-B240	080-33	75
31	164	1.5	30.522	-B240	080-33	75
28	179	1.3	33.433	-B240	080-33	75
25	204	1.2	37.967	-B240	080-33	75
22	232	1.0	43.267	-B240	080-33	75

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
33	150	3.0	27.945	-B450	080-33	78
30	166	2.7	30.985	-B450	080-33	78
26	195	2.3	36.373	-B450	080-33	78
23	216	2.1	40.330	-B450	080-33	78
21	243	1.9	45.245	-B450	080-33	78
19	269	1.7	50.167	-B450	080-33	78
17	301	1.5	56.154	-B450	080-33	78
15	334	1.4	62.262	-B450	080-33	78
14	369	1.2	68.788	-B450	080-33	78
12	409	1.1	76.271	-B450	080-33	78

Dimensions, notes

Notes on the dimensions

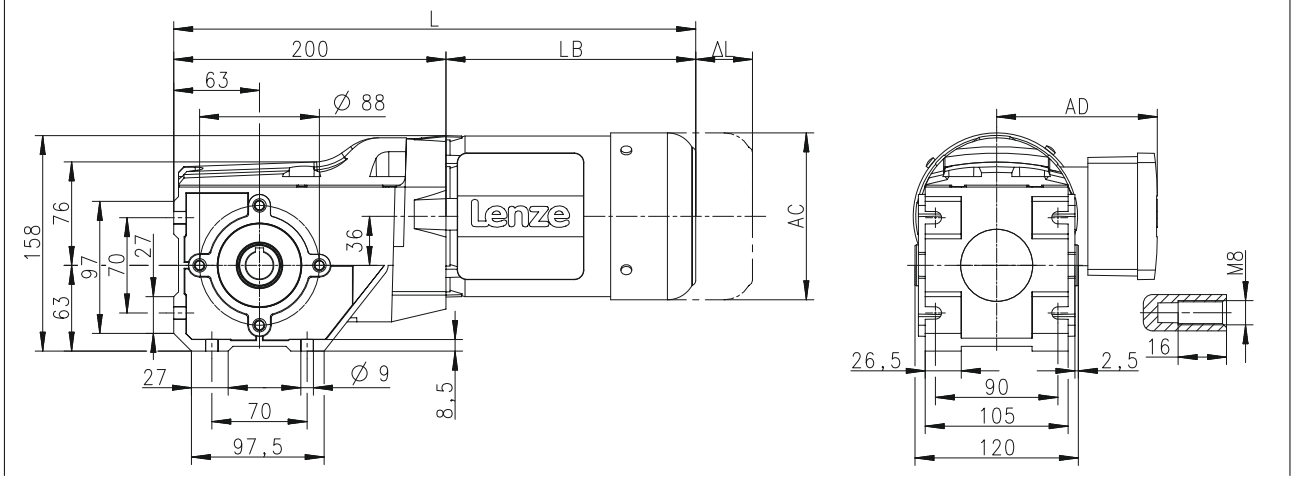
The following legend shows the layout of the dimension sheets.

Product gearbox

g500-B110

Driven shaft design

Abmessungen mit Hohlwelle



Product Motor

Produkt			MD□MA□□							
			063-12	063-32	063-42	071-32	071-42	080-32	080-42	090-32
Abmessungen										
Gesamtlänge	**L**	**[mm]**		358		378		395		419
Länge Motor	**LB**	**[mm]**		187		207		224.5		248
Länge Motoranbauten	**Δ L**	**[mm]**		170		165		183		181
Motordurchmesser	**AC**	**[mm]**		123		139		156		176
Abstand Motor/Anschluss	**AD**	**[mm]**		100		109		150		157

Distance of motor centre to the end of terminal box

Total length of the drive without built-on accessories

Motor diameter

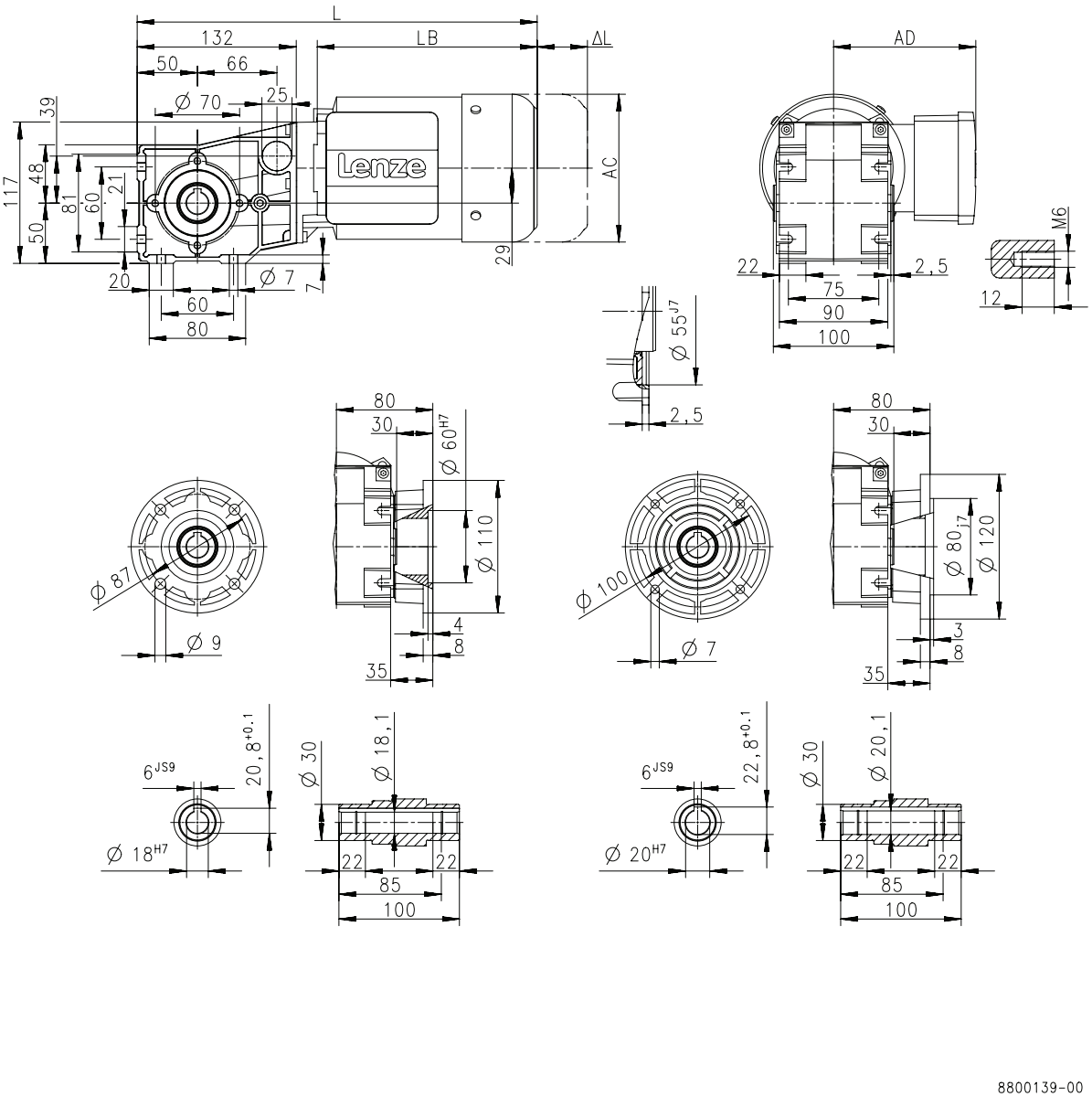
Motor length without built-on accessories

Additional length of the built-on accessories (longest version)

Dimensions, 4-pole motors

g500-B45

Dimensions with hollow shaft

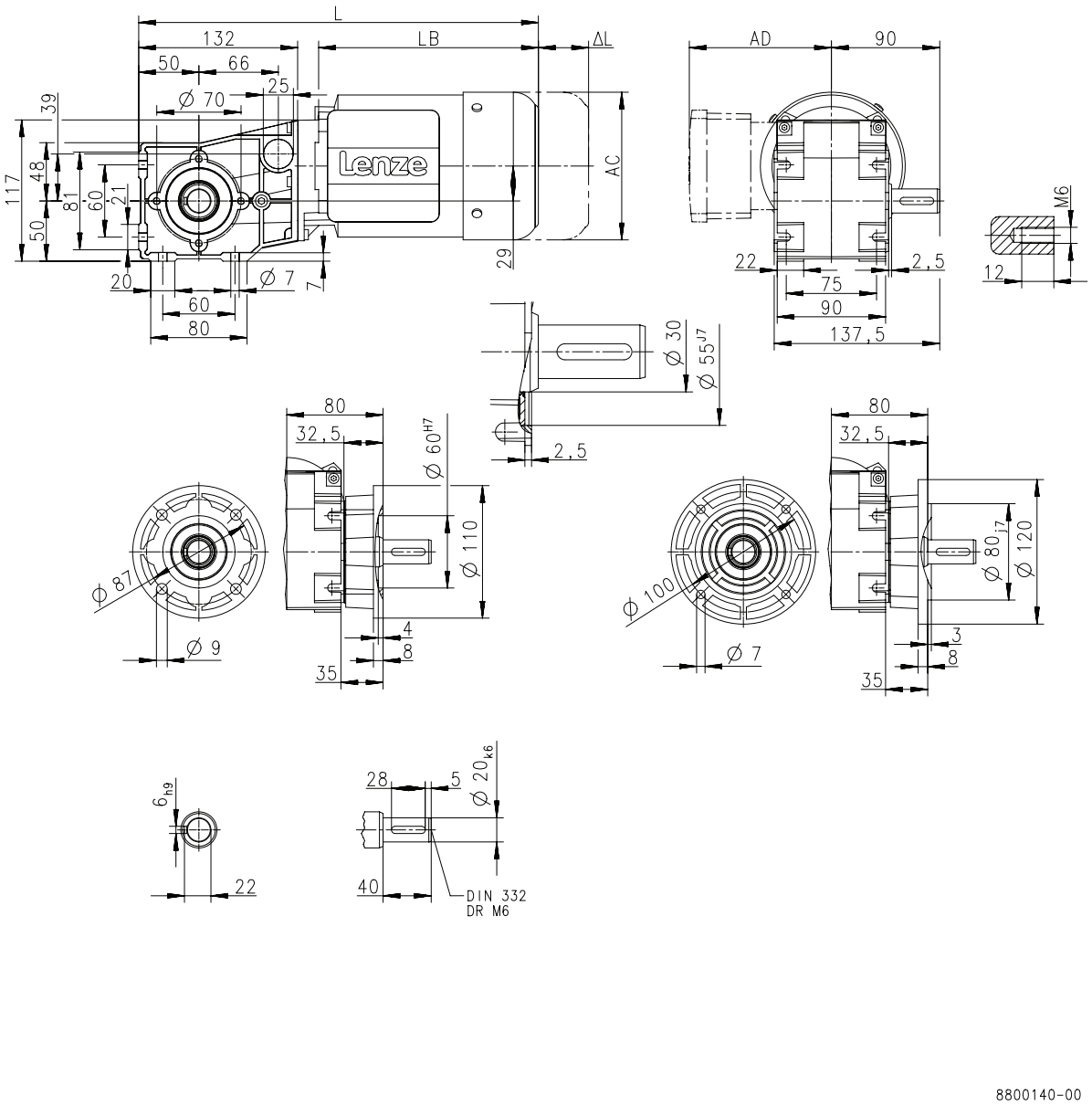


Product			MD□MA□□						
			063-02	063-12	063-22	063-32	063-42	071-32	071-42
Dimensions									
Total length	**L**	**[mm]**	305	332	305	332		352	
Motor length	**LB**	**[mm]**	156	183	156	183		203	
Length of motor options	**Δ L**	**[mm]**	135	170	135	170		165	
Motor diameter	**AC**	**[mm]**	123					139	
Distance motor/connection	**AD**	**[mm]**	100					109	

Dimensions, 4-pole motors

g500-B45

Dimensions with solid shaft

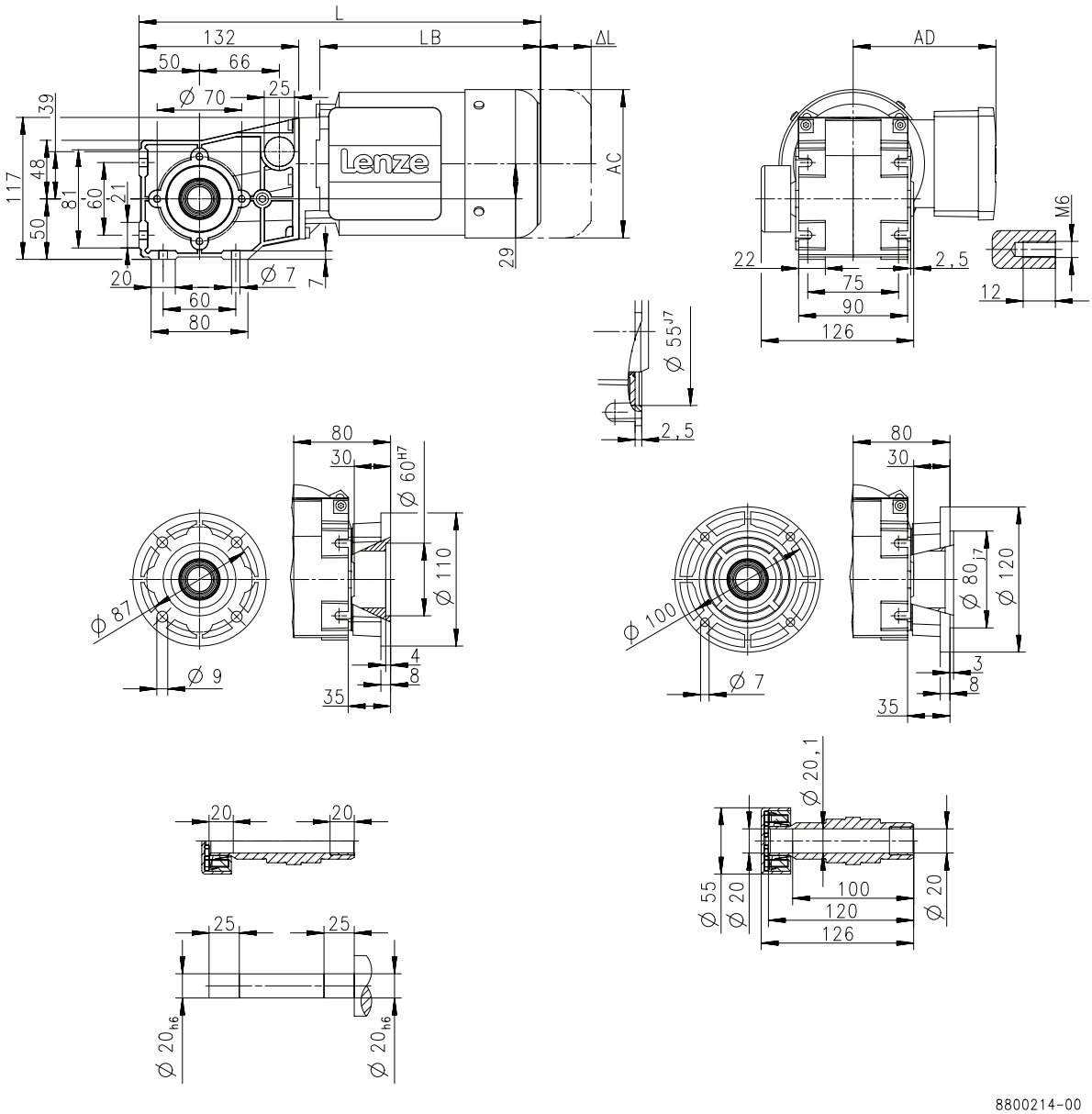


Product			MD□MA□□						
			063-02	063-12	063-22	063-32	063-42	071-32	071-42
Dimensions									
Total length	**L**	**[mm]**	305	332	305	332		352	
Motor length	**LB**	**[mm]**	156	183	156	183		203	
Length of motor options	**Δ L**	**[mm]**	135	170	135	170		165	
Motor diameter	**AC**	**[mm]**	123					139	
Distance motor/connection	**AD**	**[mm]**	100					109	

Dimensions, 4-pole motors

g500-B45

Dimensions with shrink disc

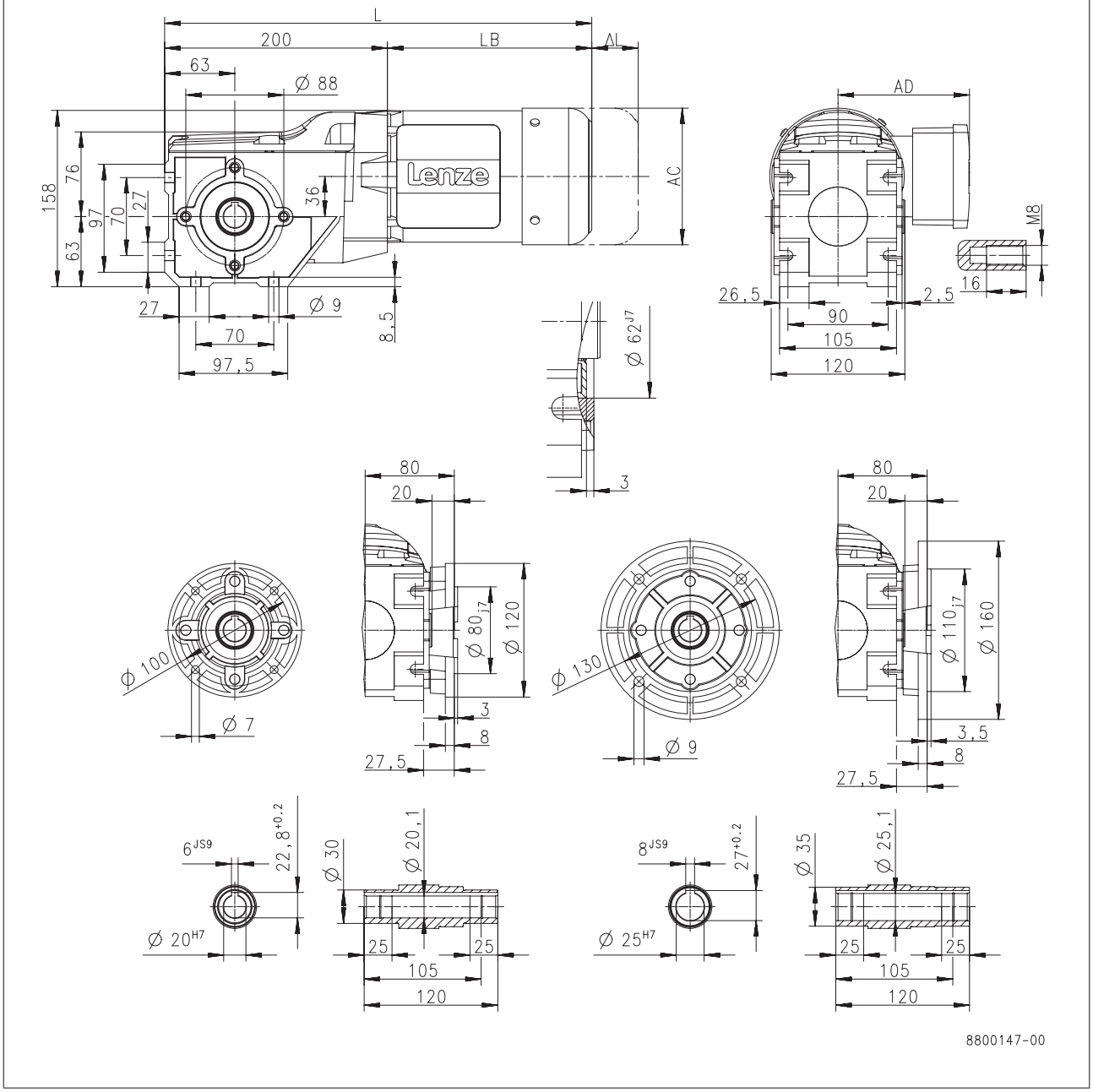


Product			MD□MA□□						
			063-02	063-12	063-22	063-32	063-42	071-32	071-42
Dimensions									
Total length	**L**	**[mm]**	305	332	305	332		352	
Motor length	**LB**	**[mm]**	156	183	156	183		203	
Length of motor options	**Δ L**	**[mm]**	135	170	135	170		165	
Motor diameter	**AC**	**[mm]**	123					139	
Distance motor/connection	**AD**	**[mm]**	100					109	

Dimensions, 4-pole motors

g500-B110

Dimensions with hollow shaft

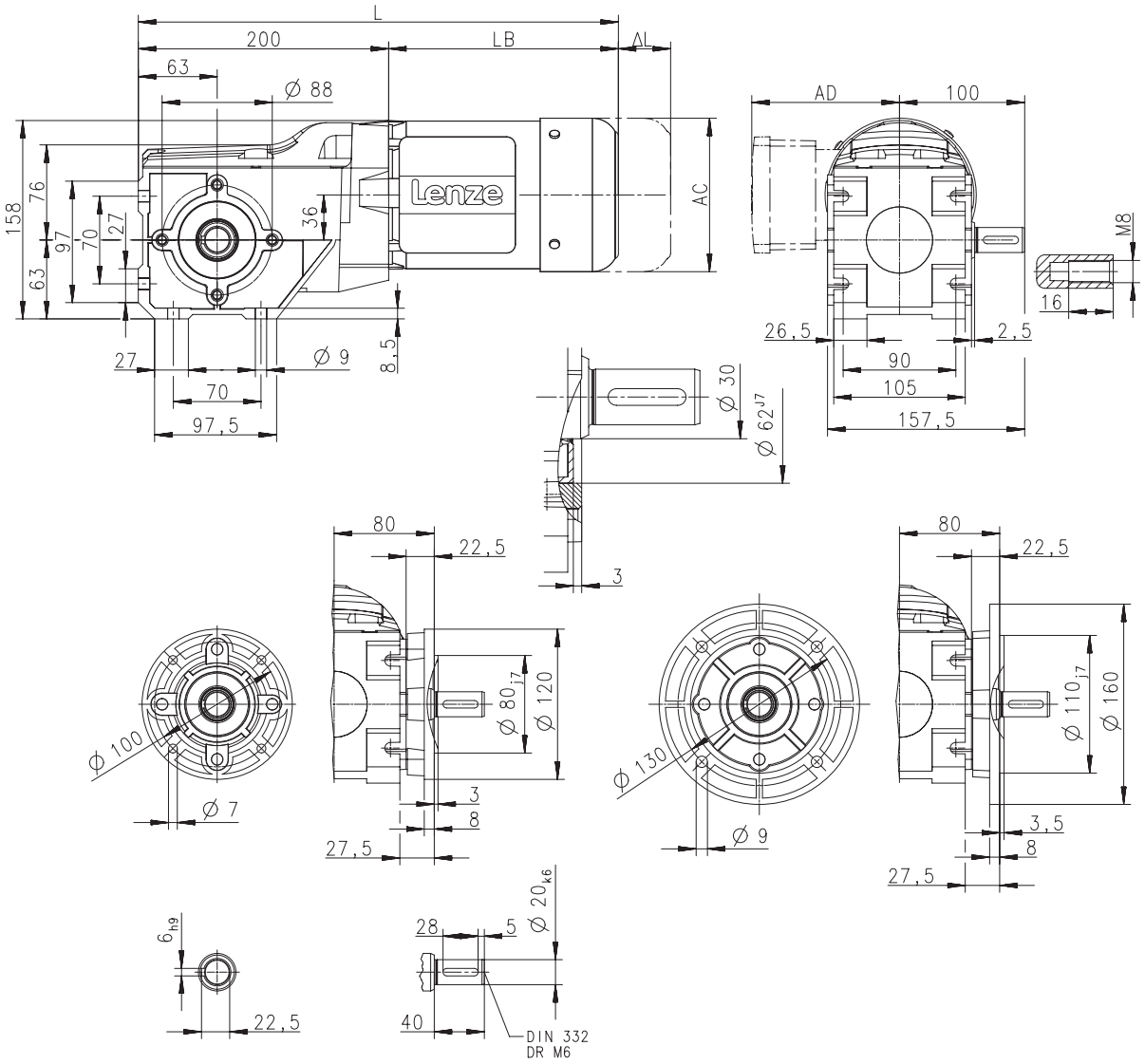


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	383			403		426	485	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-B110

Dimensions with solid shaft

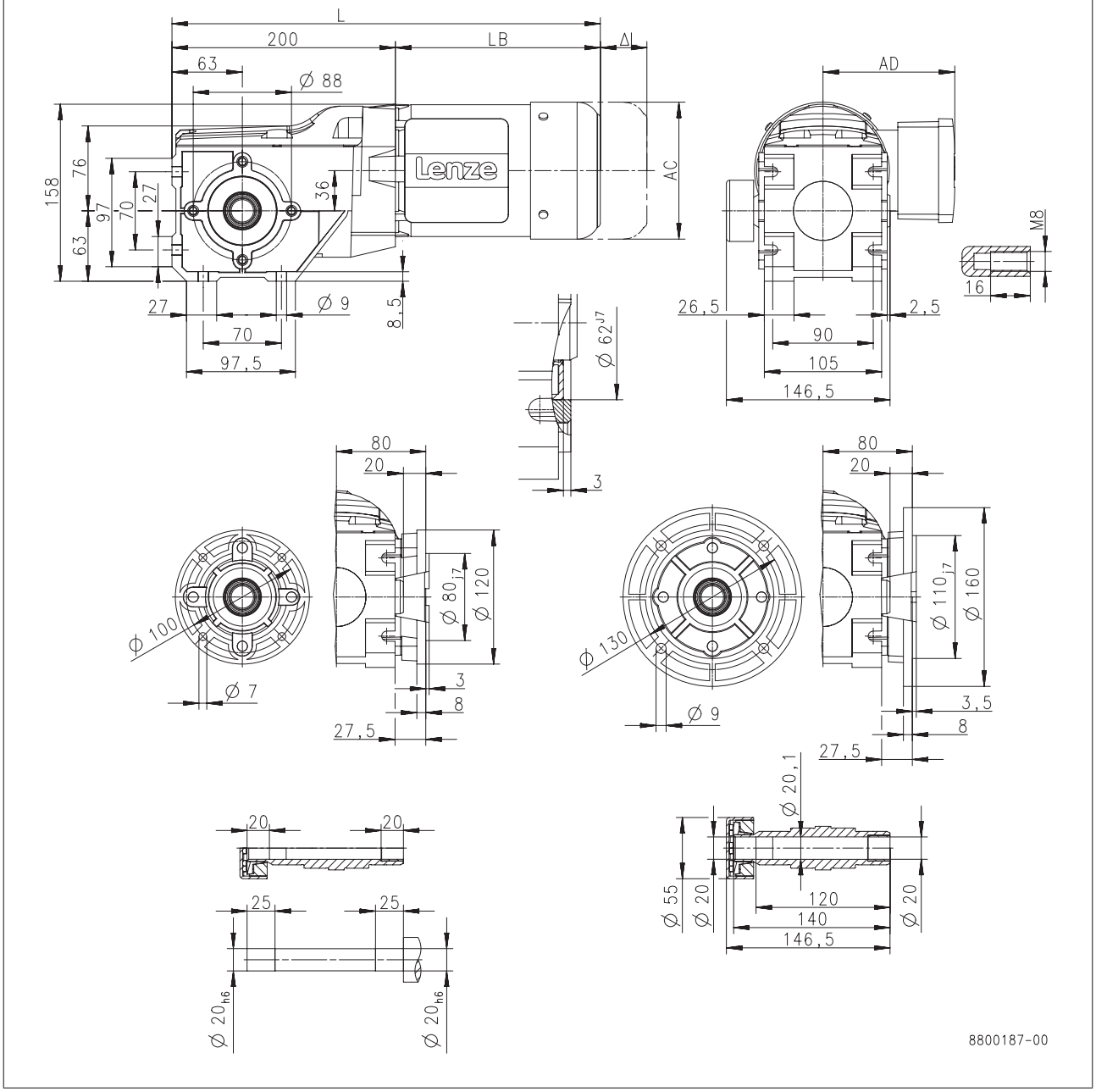


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	383			403		426	485	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-B110

Dimensions with shrink disc

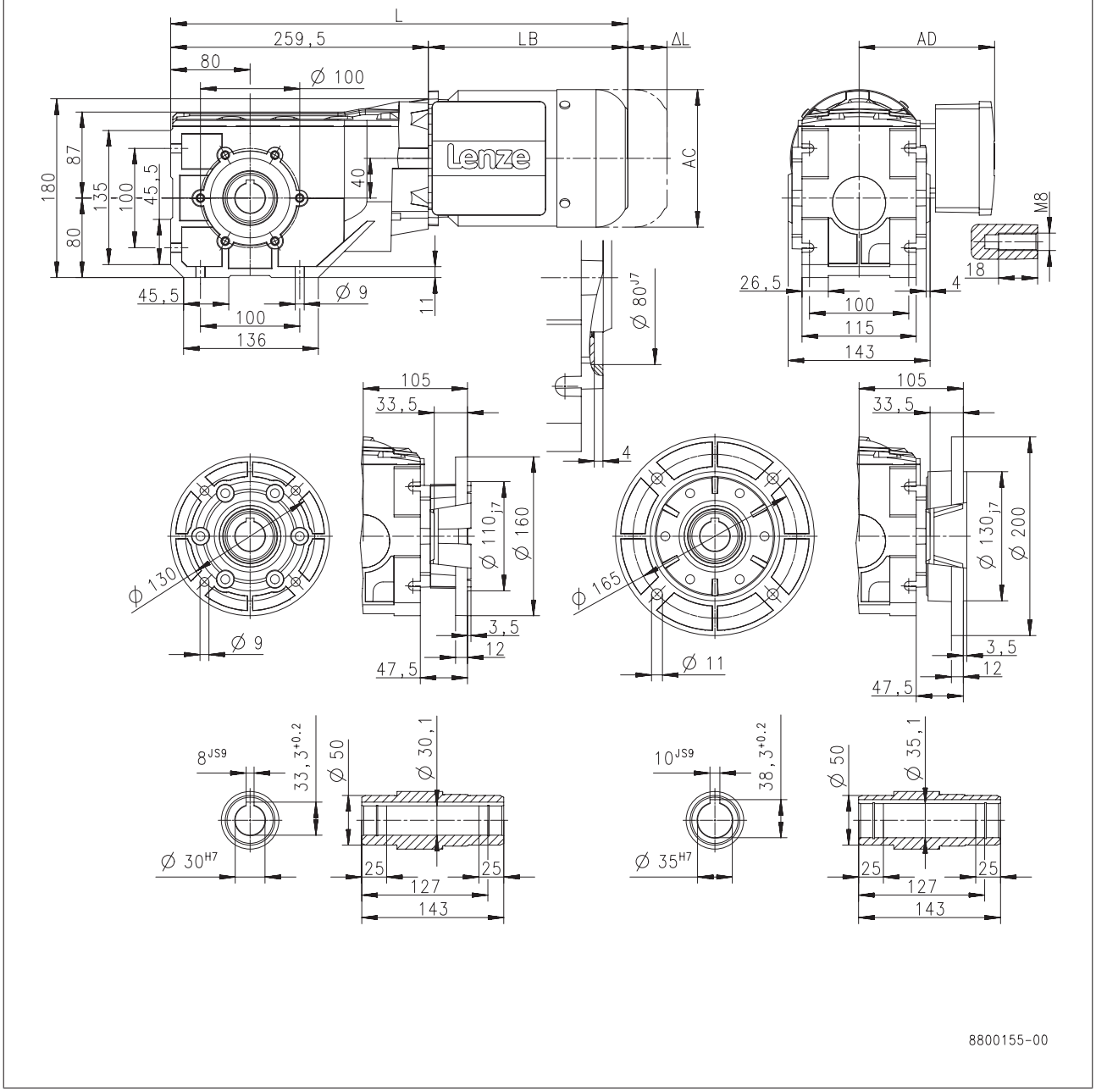


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	383			403		426	485	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-B240

Dimensions with hollow shaft

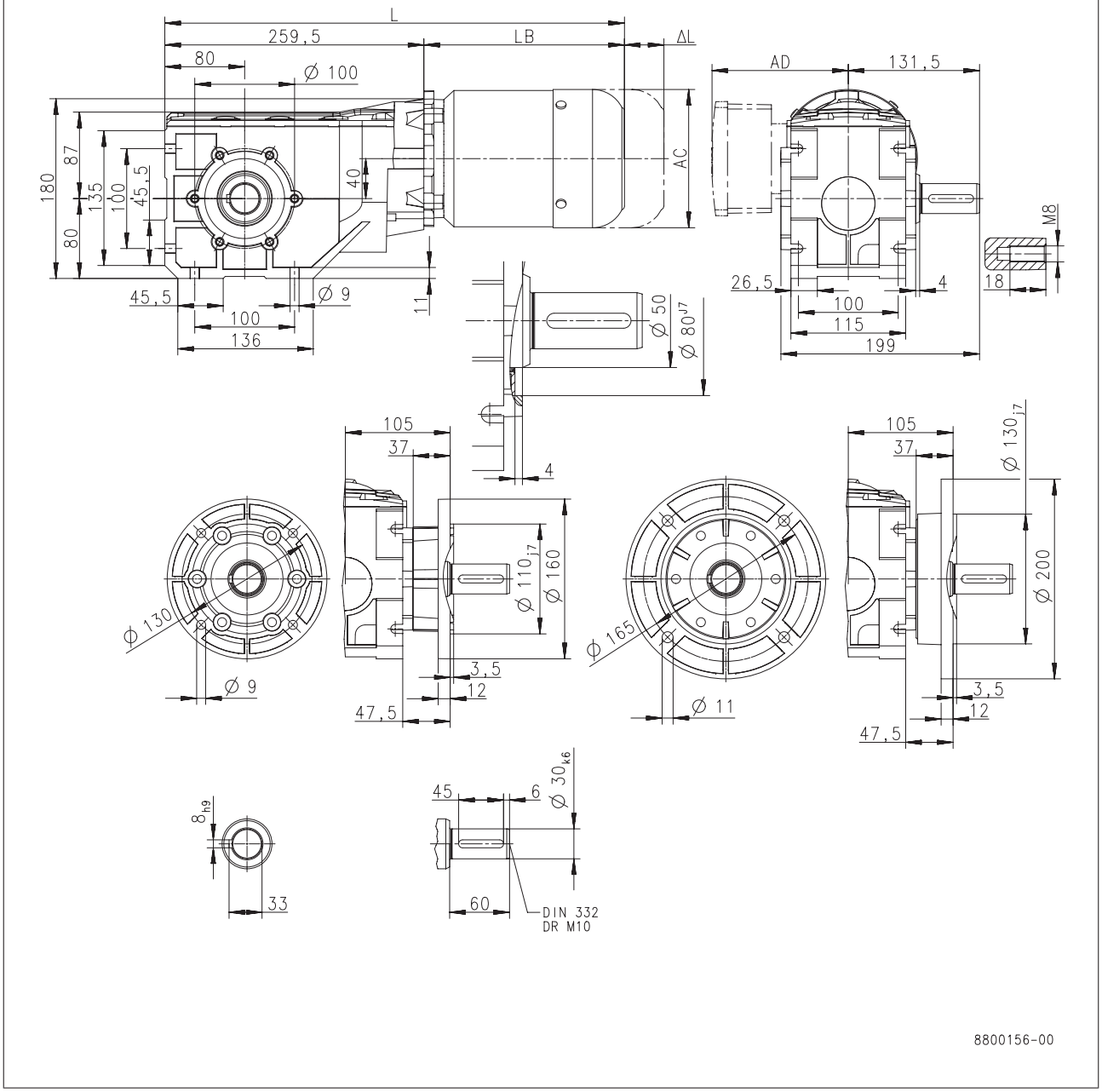


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	443			463		486	545		581	597
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-B240

Dimensions with solid shaft

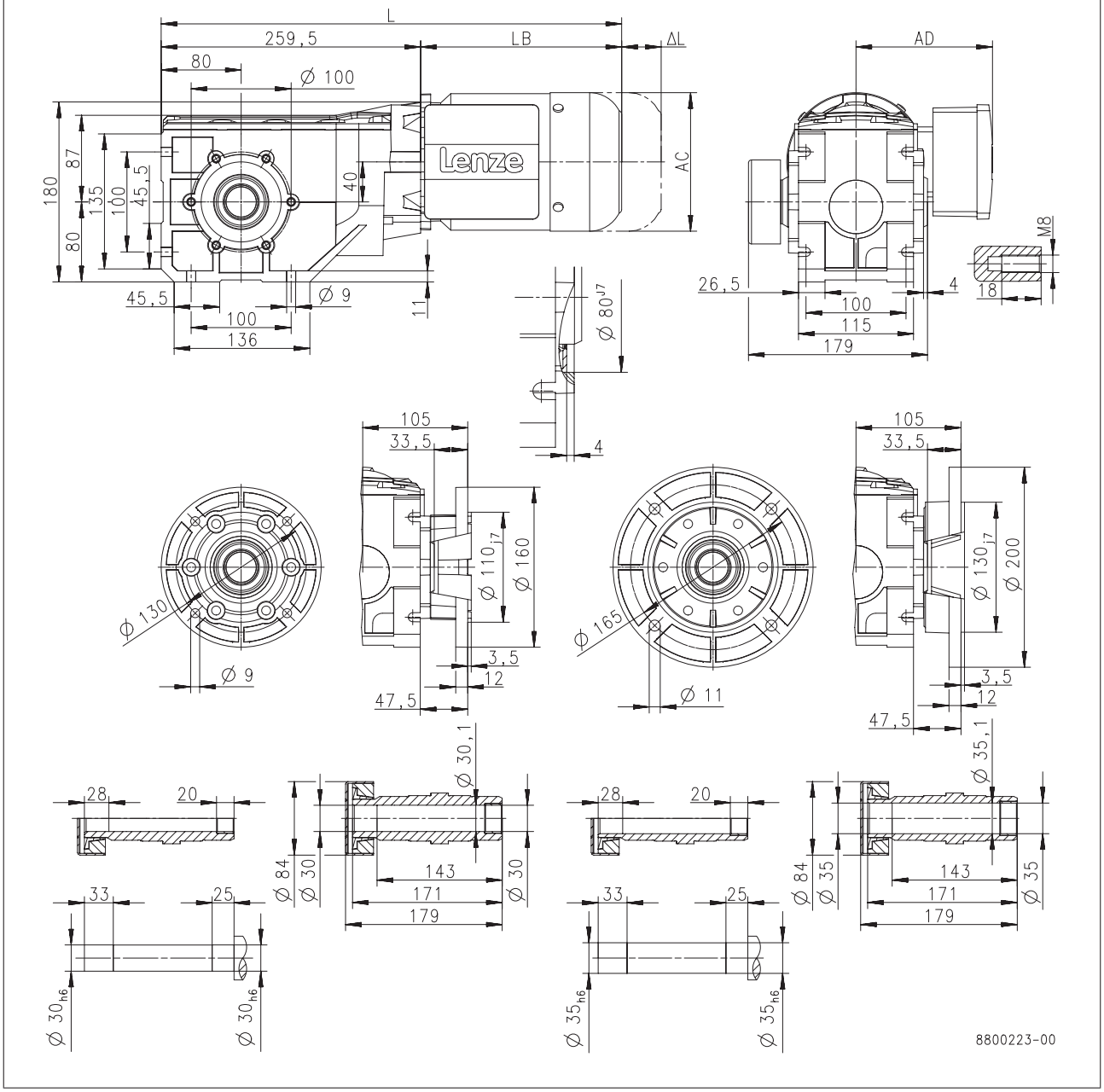


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	443			463		486	545		581	597
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-B240

Dimensions with shrink disc

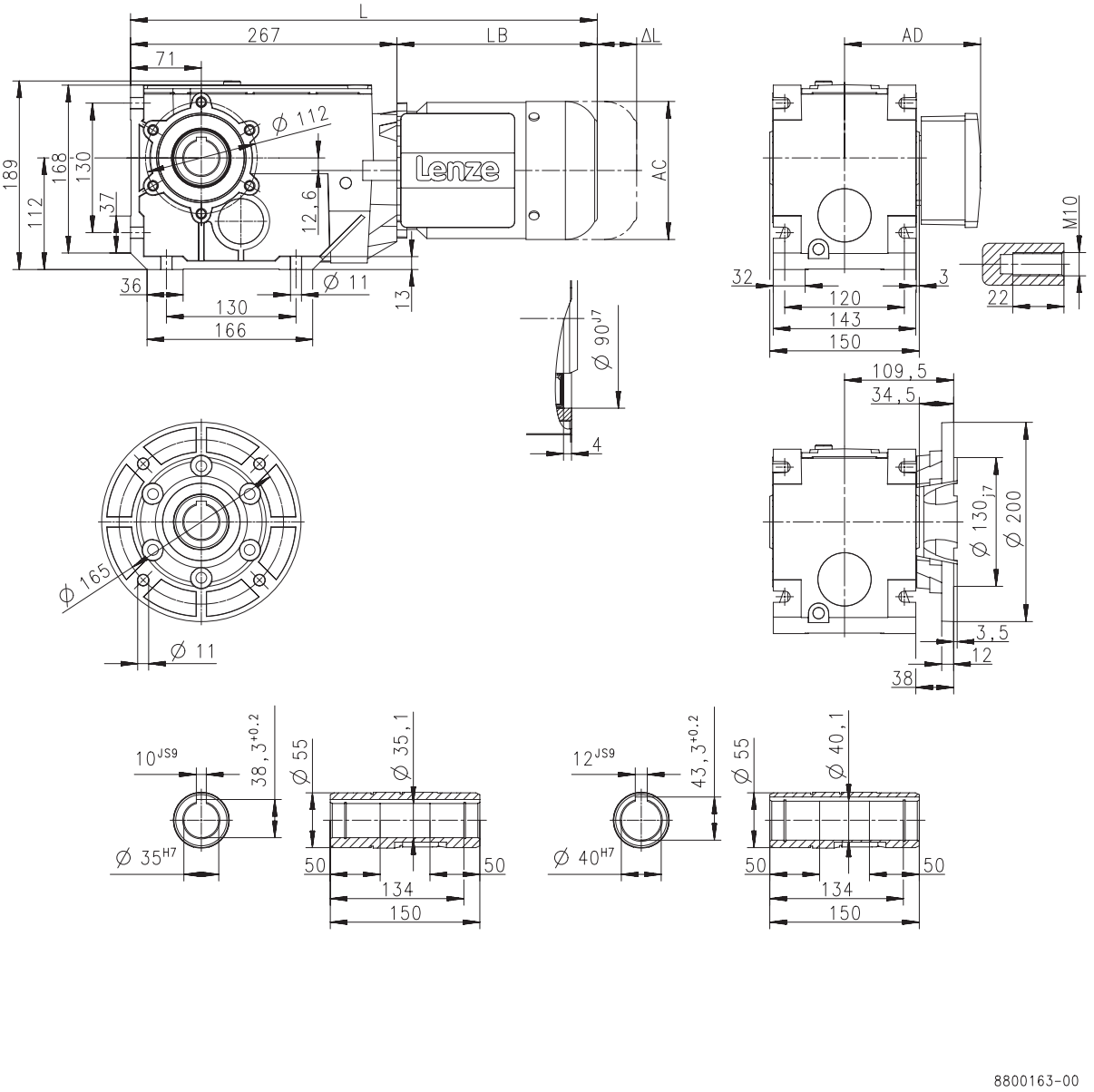


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	443			463		486	545		581	597
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-B450

Dimensions with hollow shaft

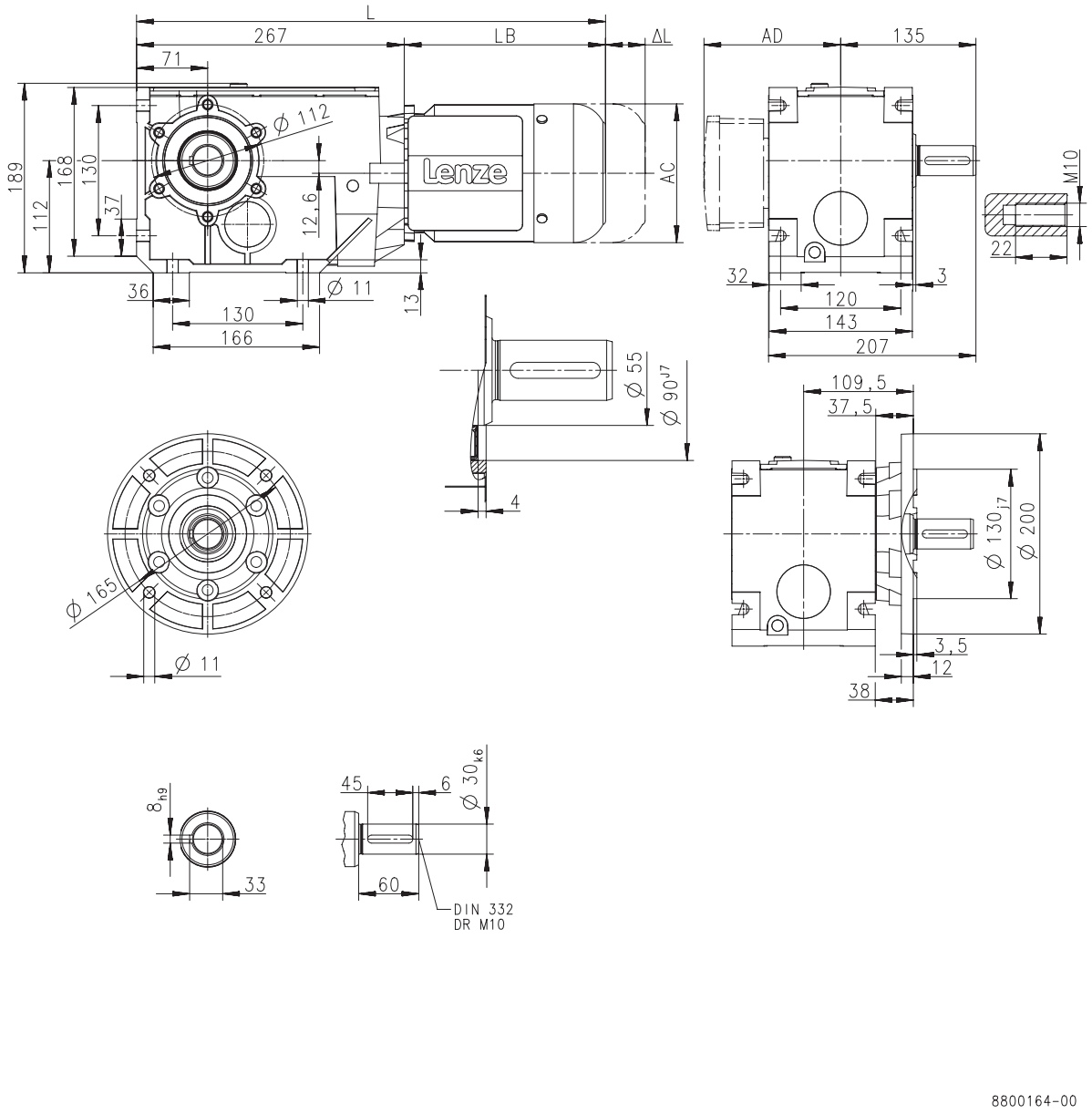


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	450			470		493	552		588	604	647
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-B450

Dimensions with solid shaft

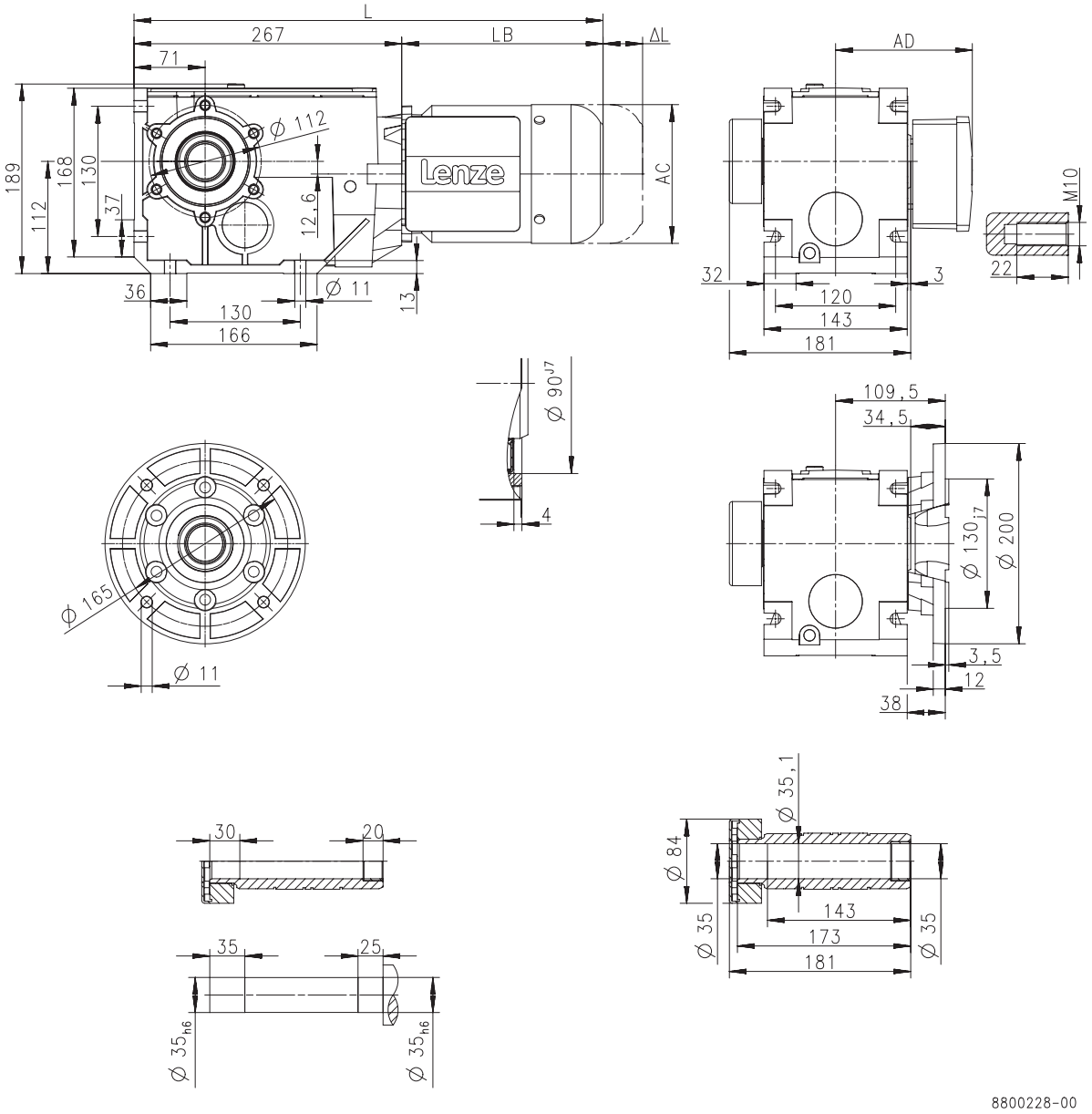


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	450			470		493	552		588	604	647
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-B450

Dimensions with shrink disc

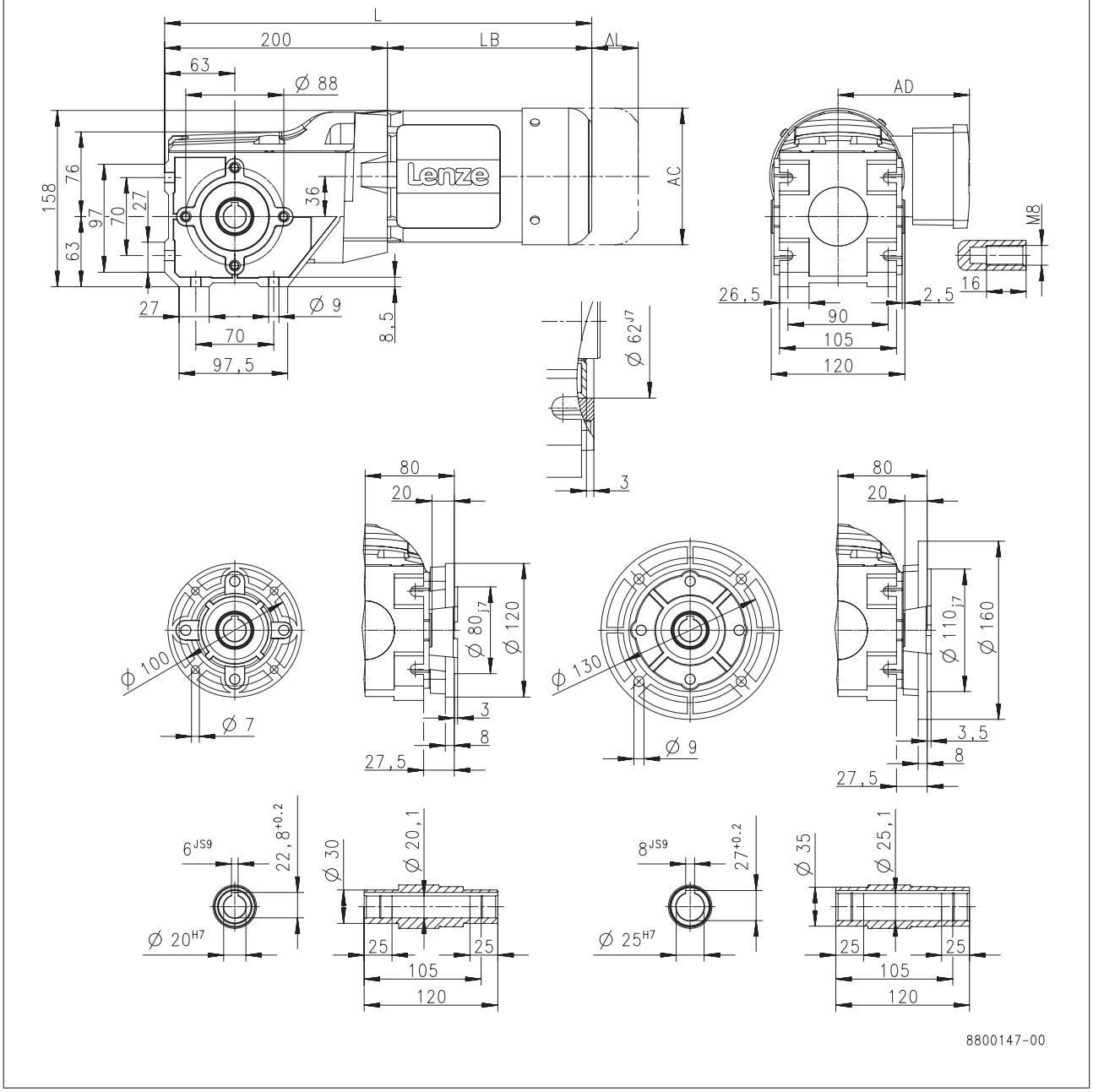


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	450			470		493	552		588	604	647
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 2-pole motors

g500-B110

Dimensions with hollow shaft



Product			MD□MA□□			
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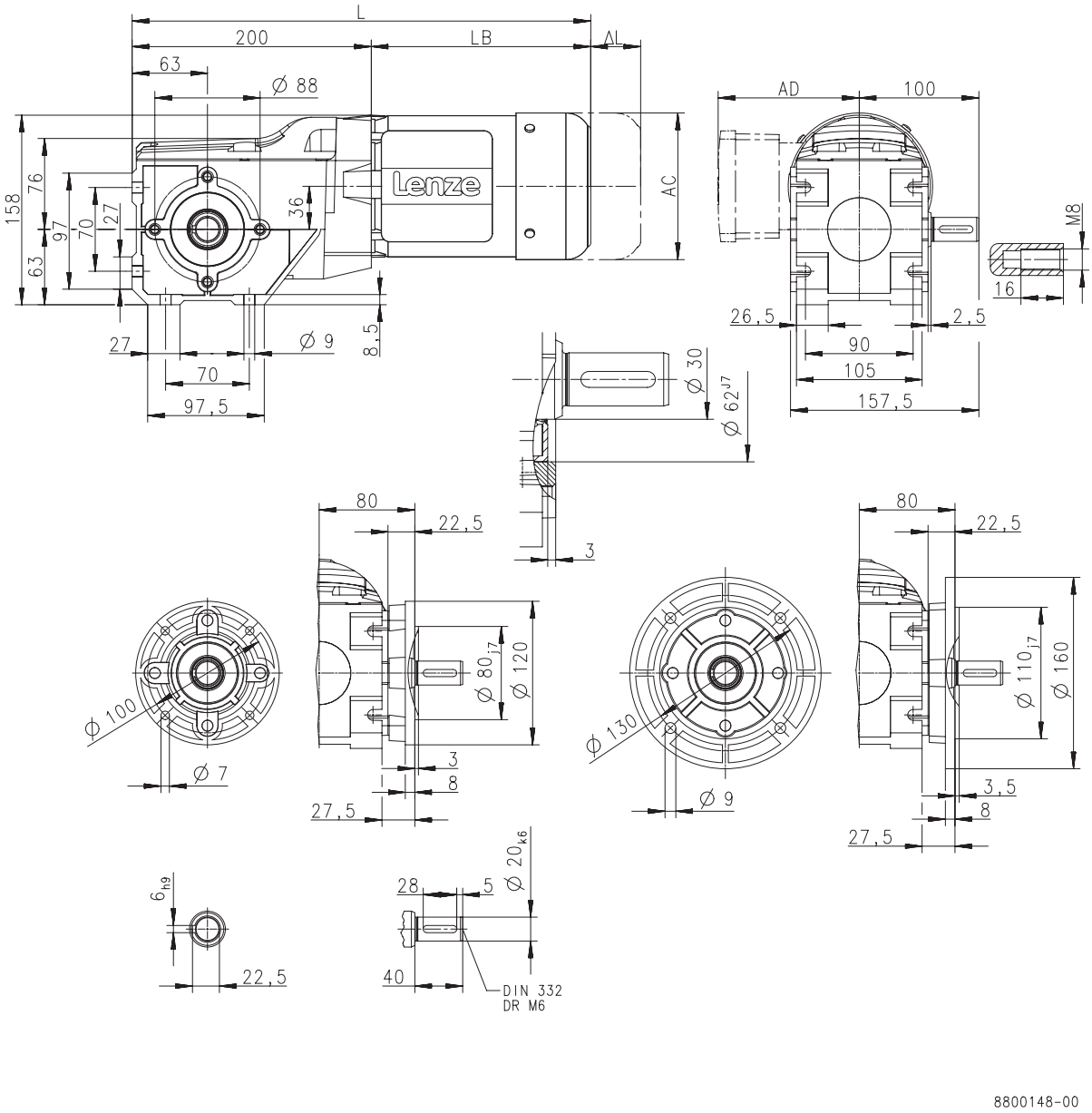
Dimensions						
Total length	**L**	**[mm]**	383		403	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B110

Dimensions with solid shaft

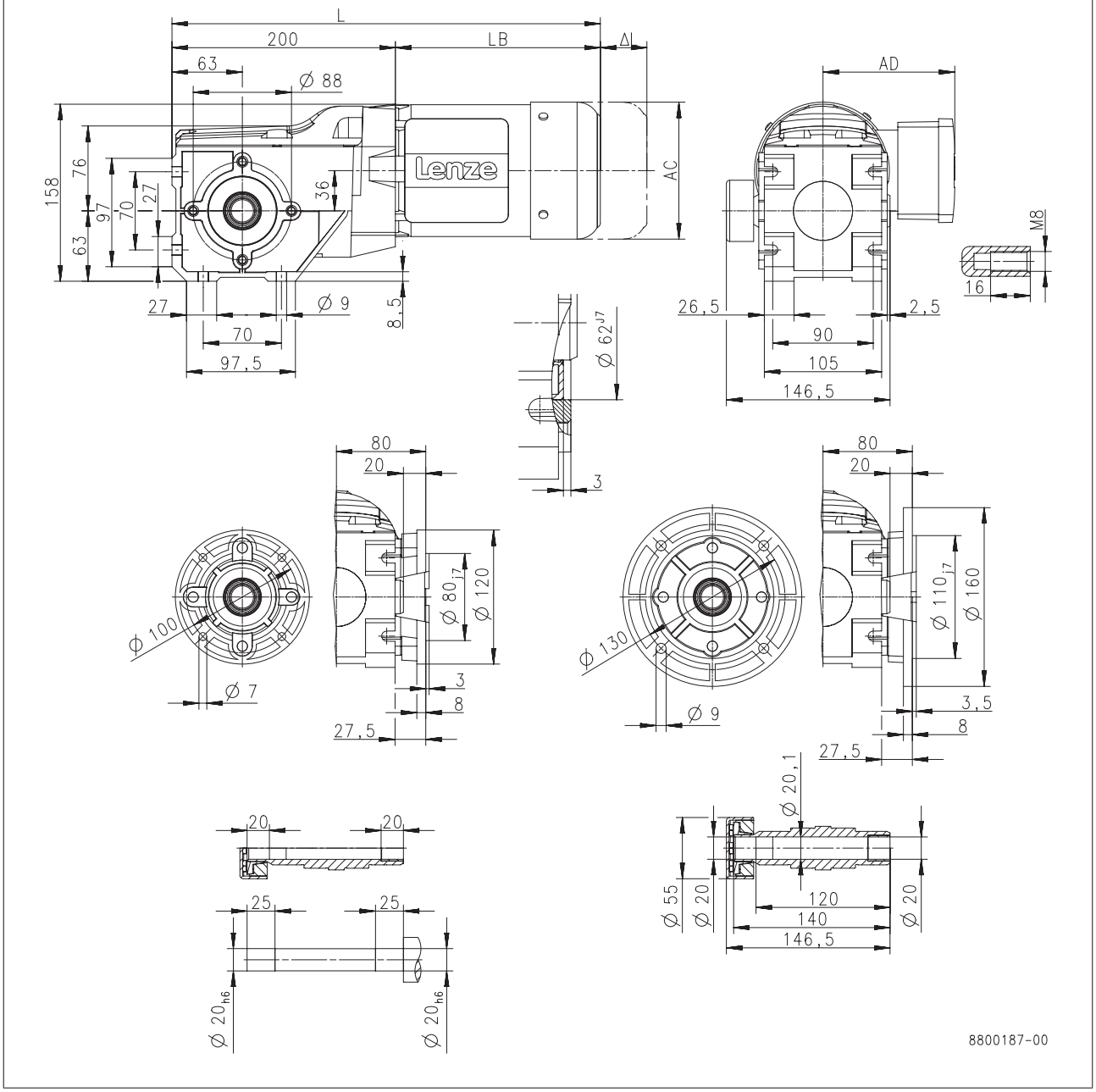


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	383		403	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B110

Dimensions with shrink disc

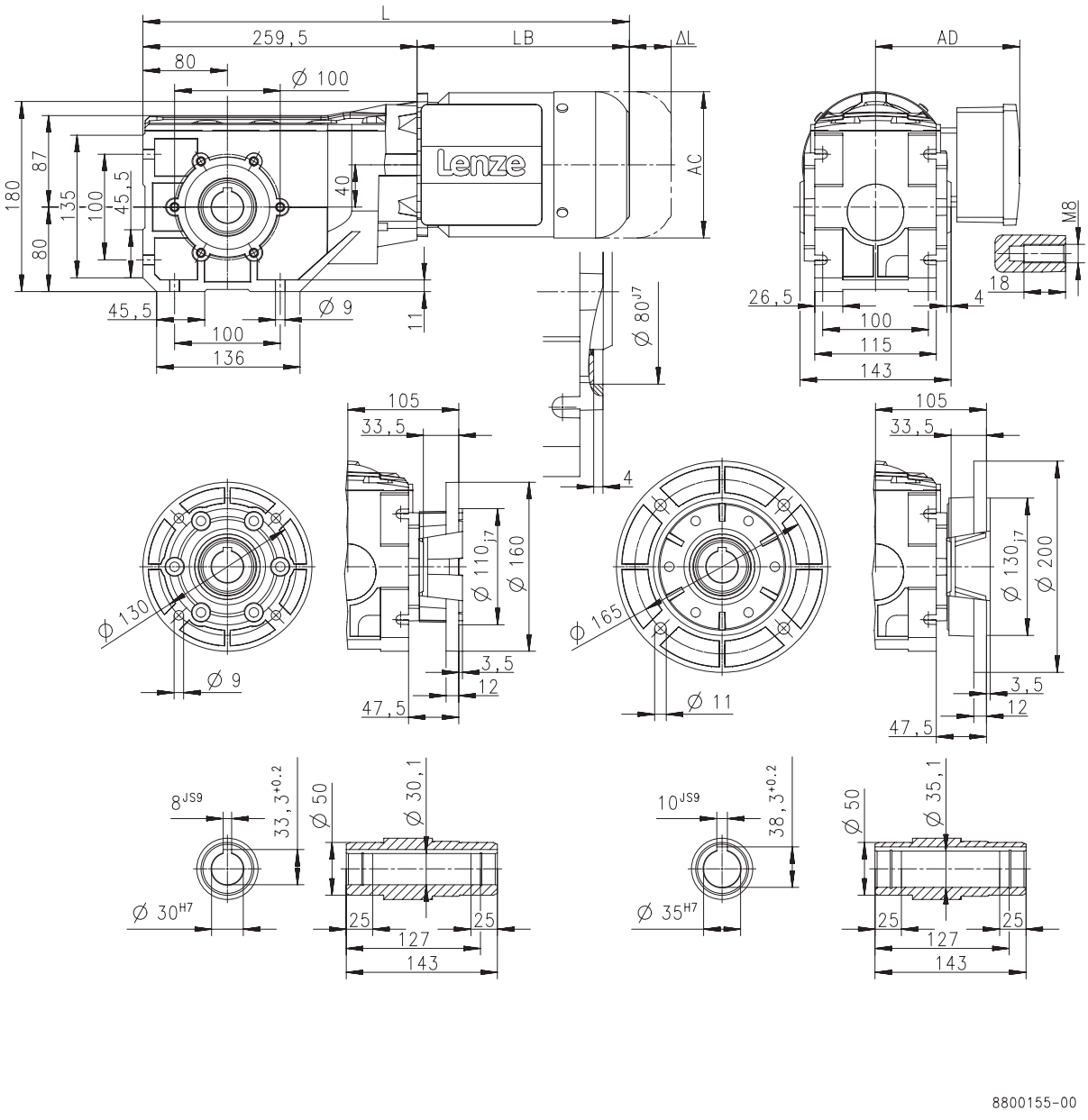


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	383		403	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B240

Dimensions with hollow shaft

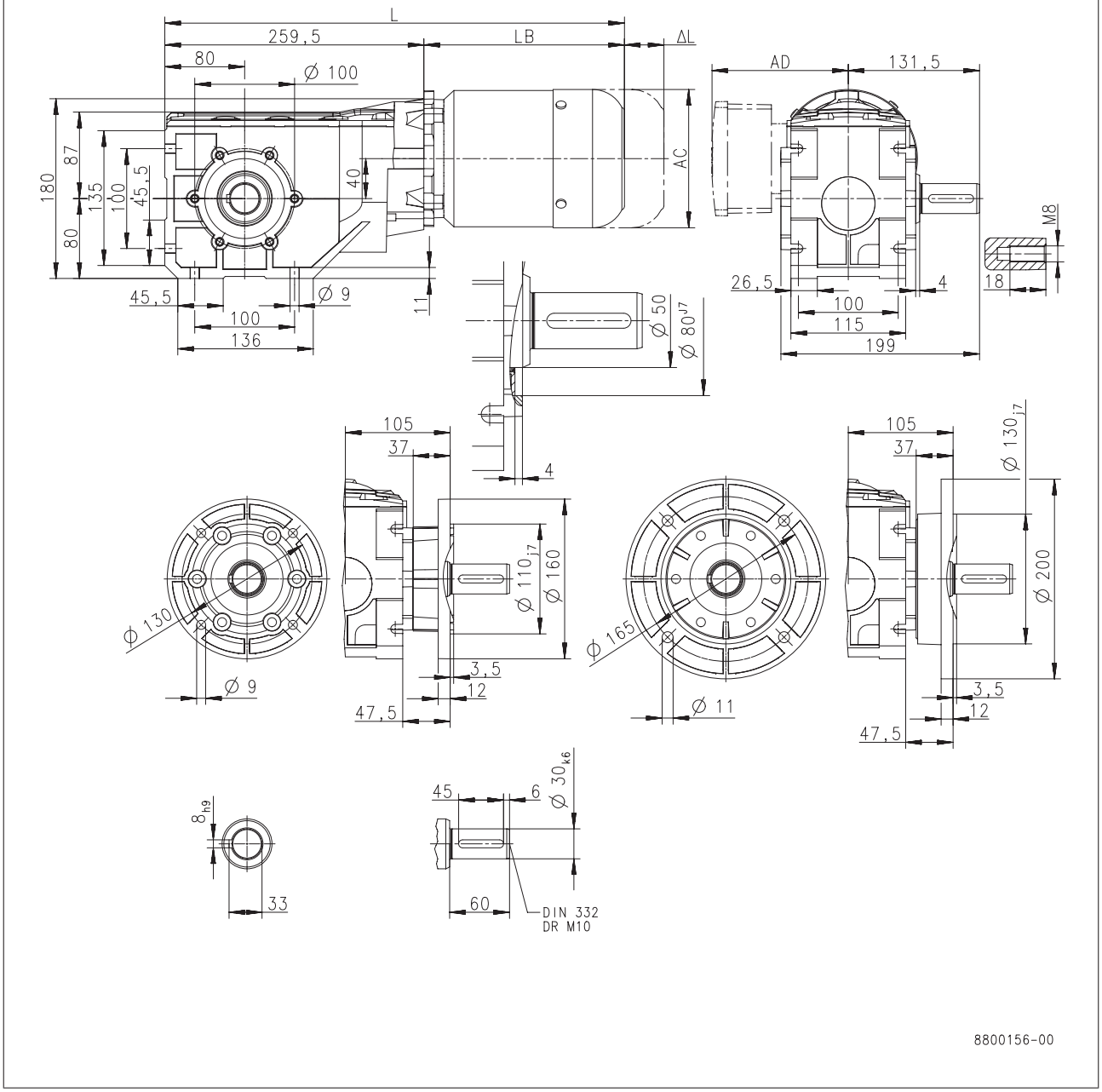


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	443		463	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B240

Dimensions with solid shaft

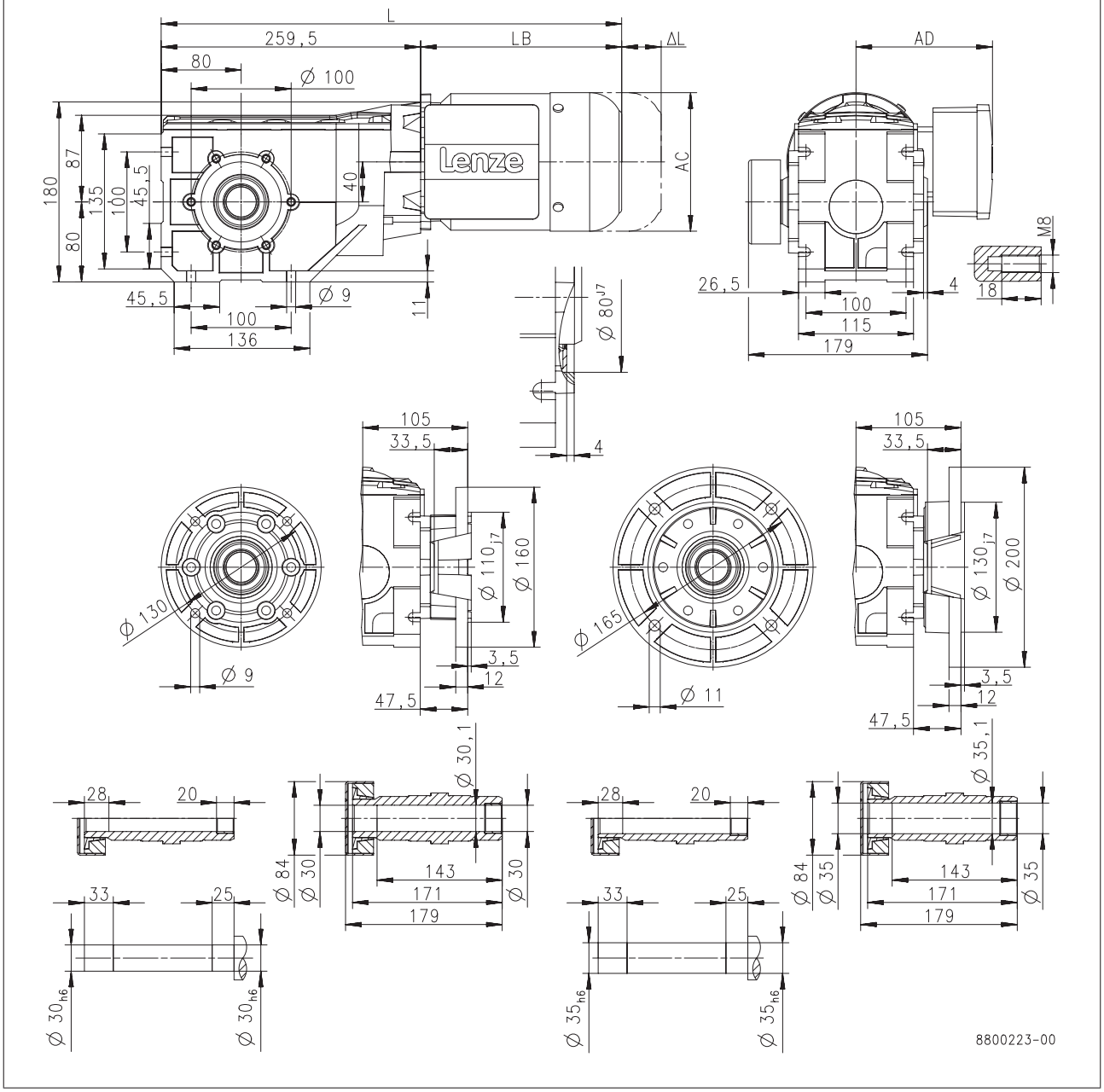


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	443		463	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B240

Dimensions with shrink disc

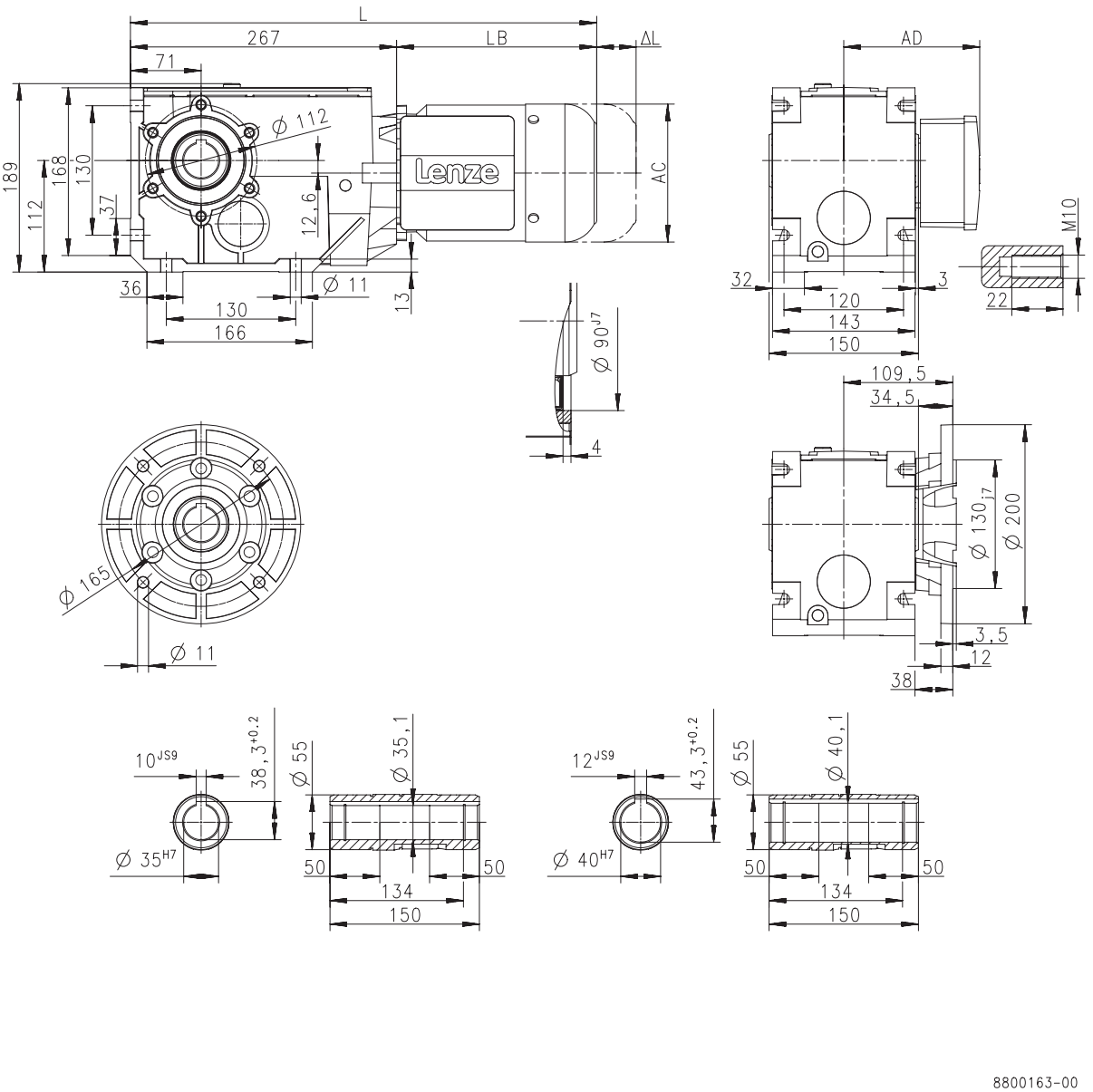


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	443		463	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B450

Dimensions with hollow shaft

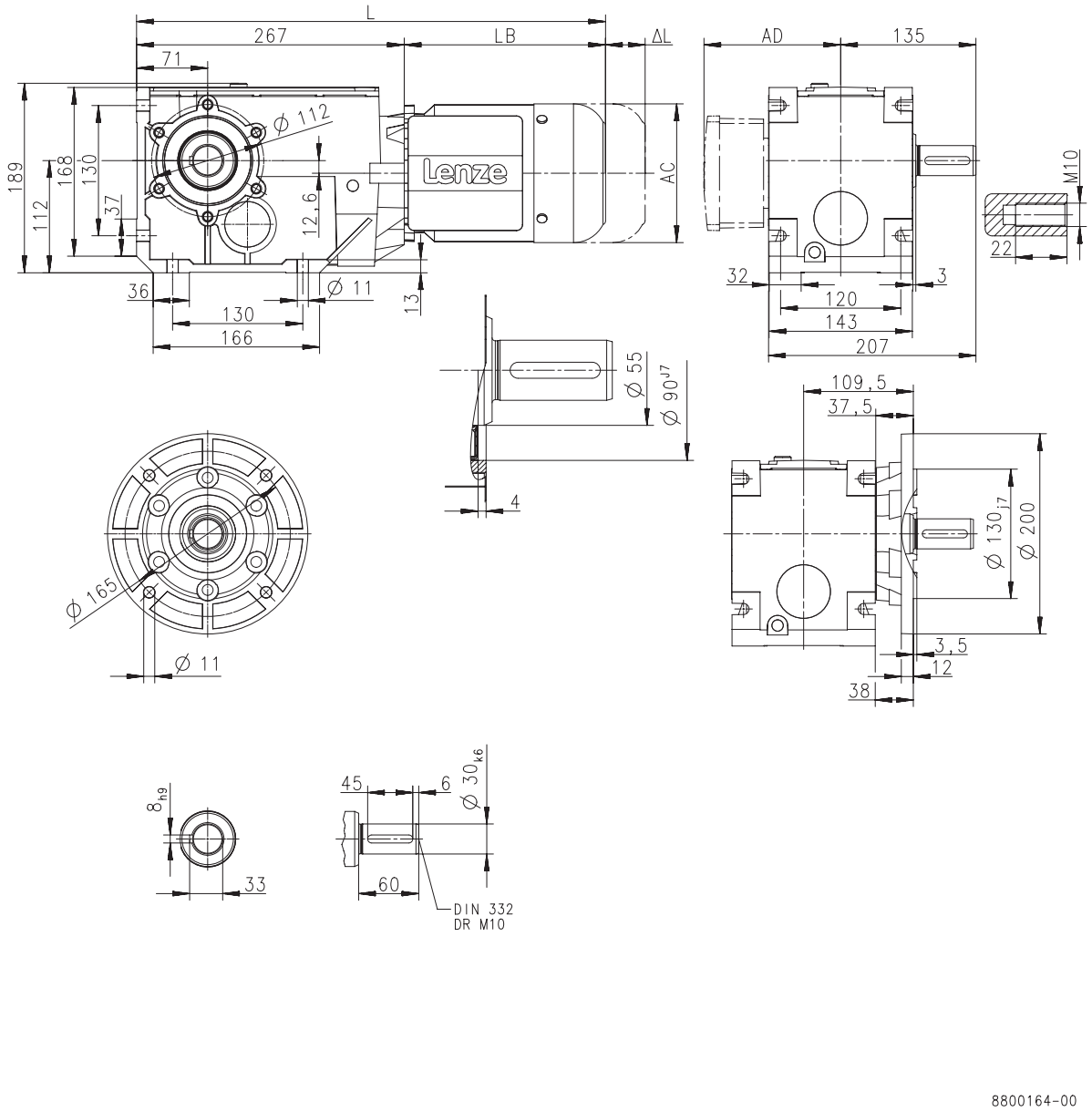


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	450		470	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B450

Dimensions with solid shaft

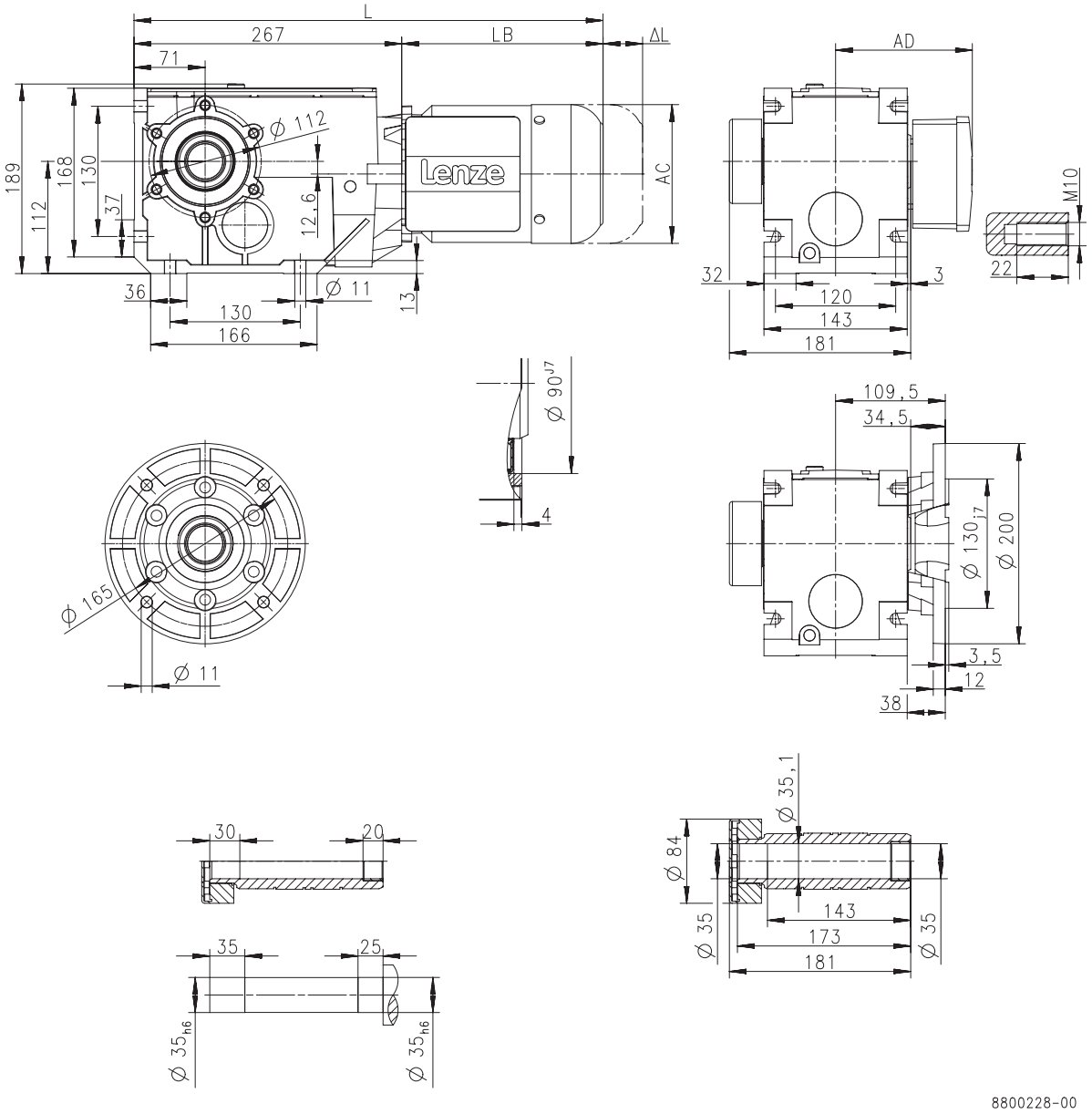


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	450		470	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 2-pole motors

g500-B450

Dimensions with shrink disc

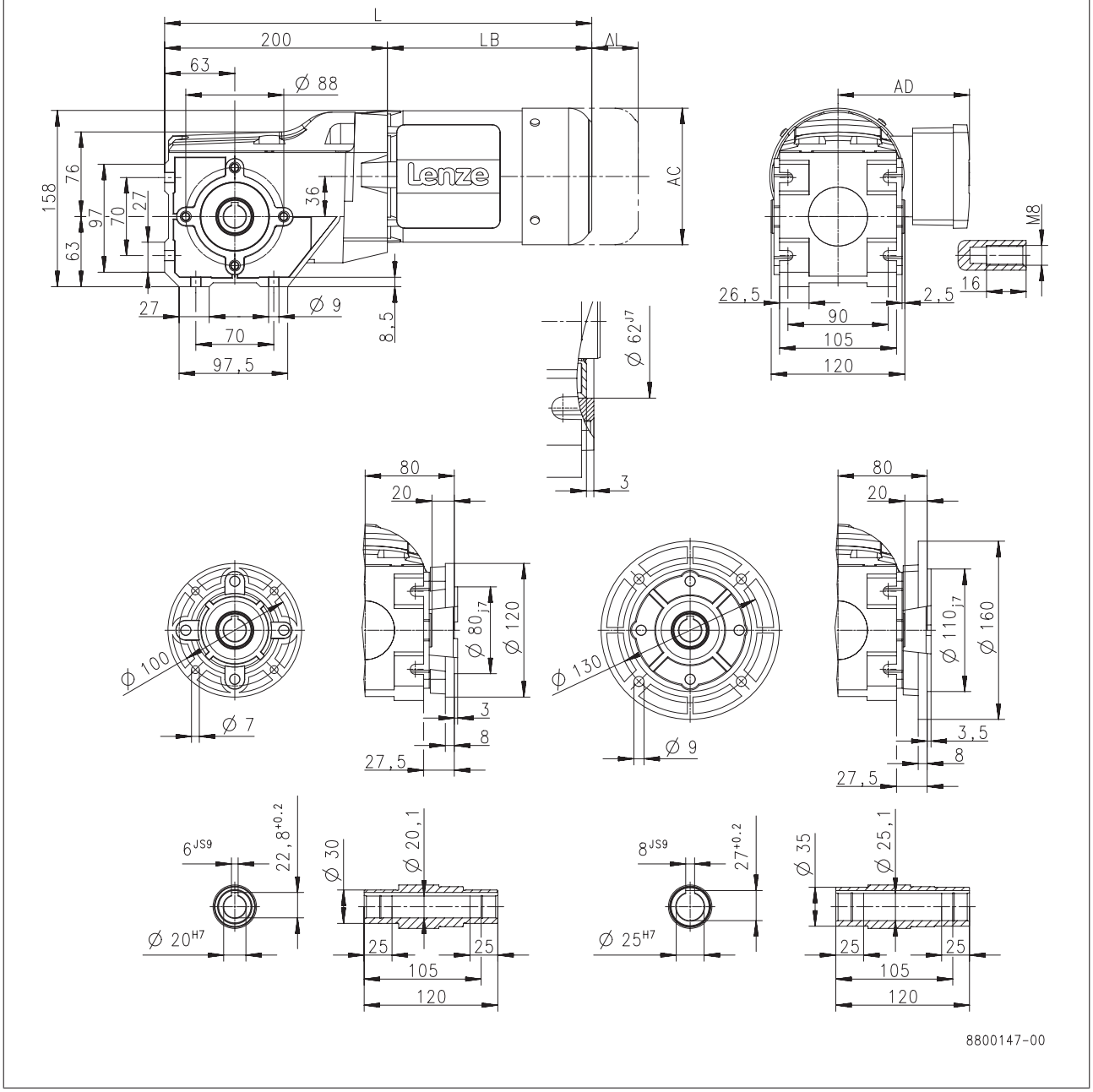


Product			MD□MA□□			
			063-11	063-31	071-11	071-31
Dimensions						
Total length	**L**	**[mm]**	450		470	
Motor length	**LB**	**[mm]**	183		203	
Length of motor options	**Δ L**	**[mm]**	170		165	
Motor diameter	**AC**	**[mm]**	123		139	
Distance motor/connection	**AD**	**[mm]**	100		109	

Dimensions, 6-pole motors

g500-B110

Dimensions with hollow shaft

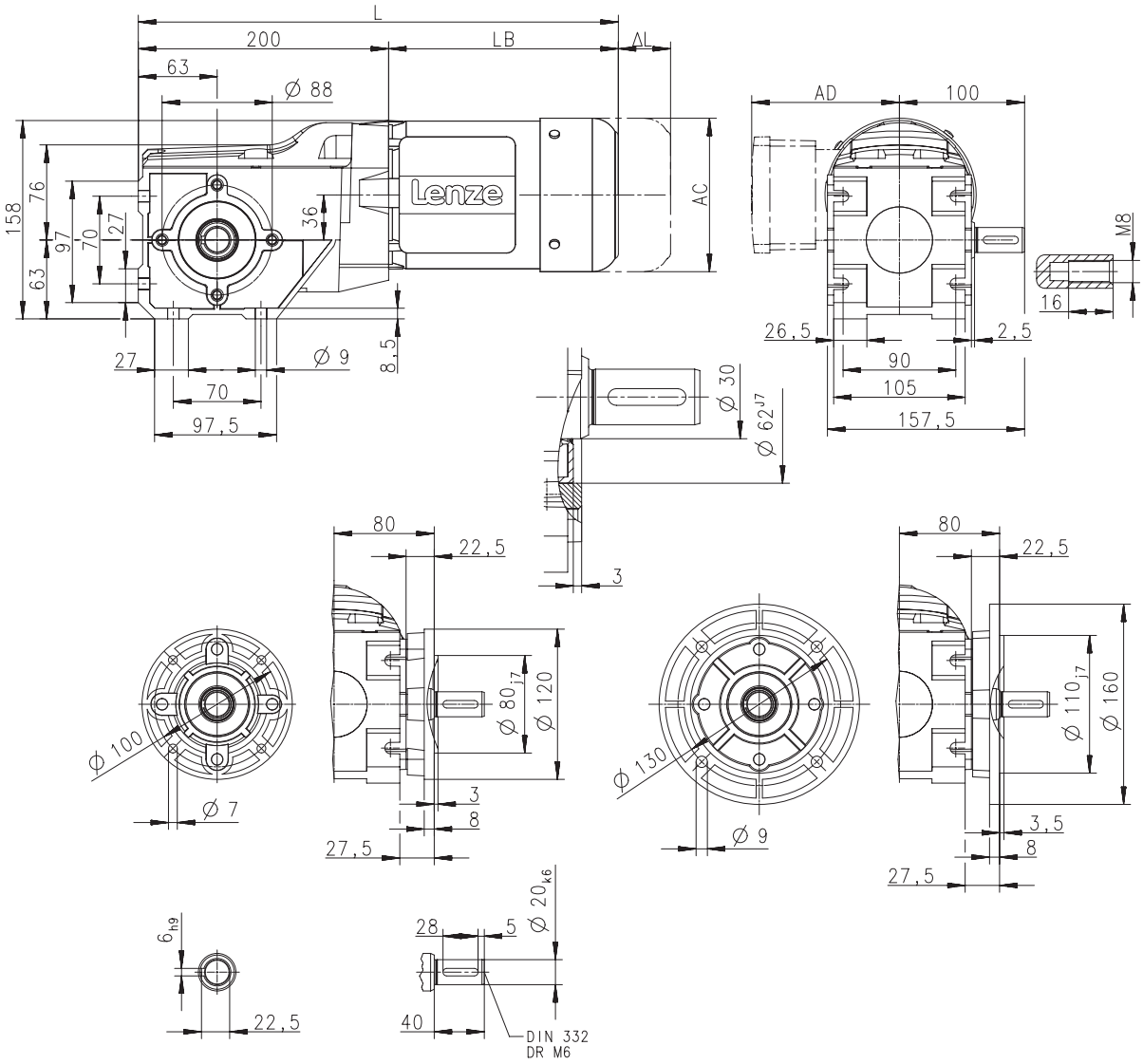


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	403		426	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B110

Dimensions with solid shaft

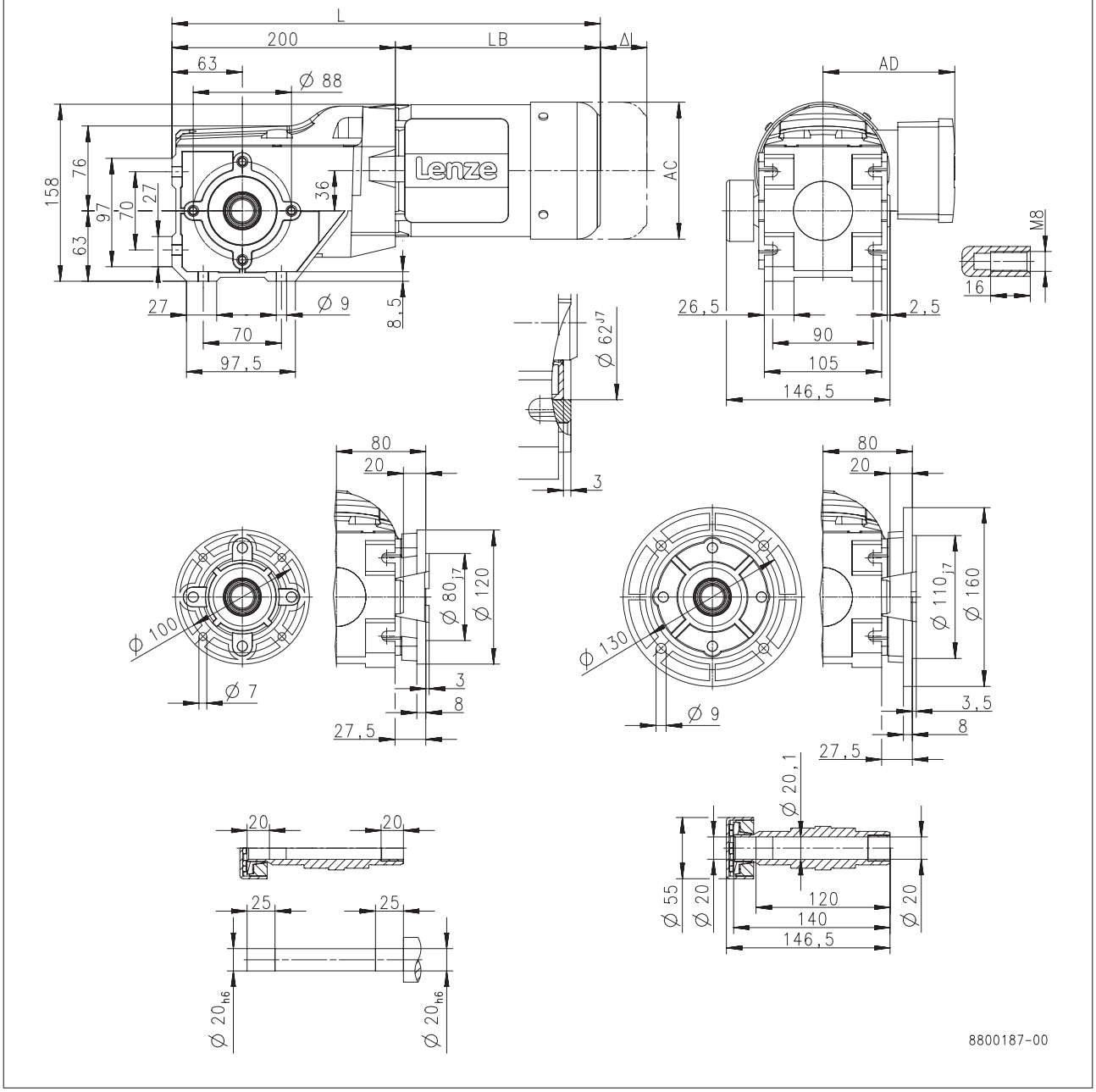


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	403		426	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B110

Dimensions with shrink disc



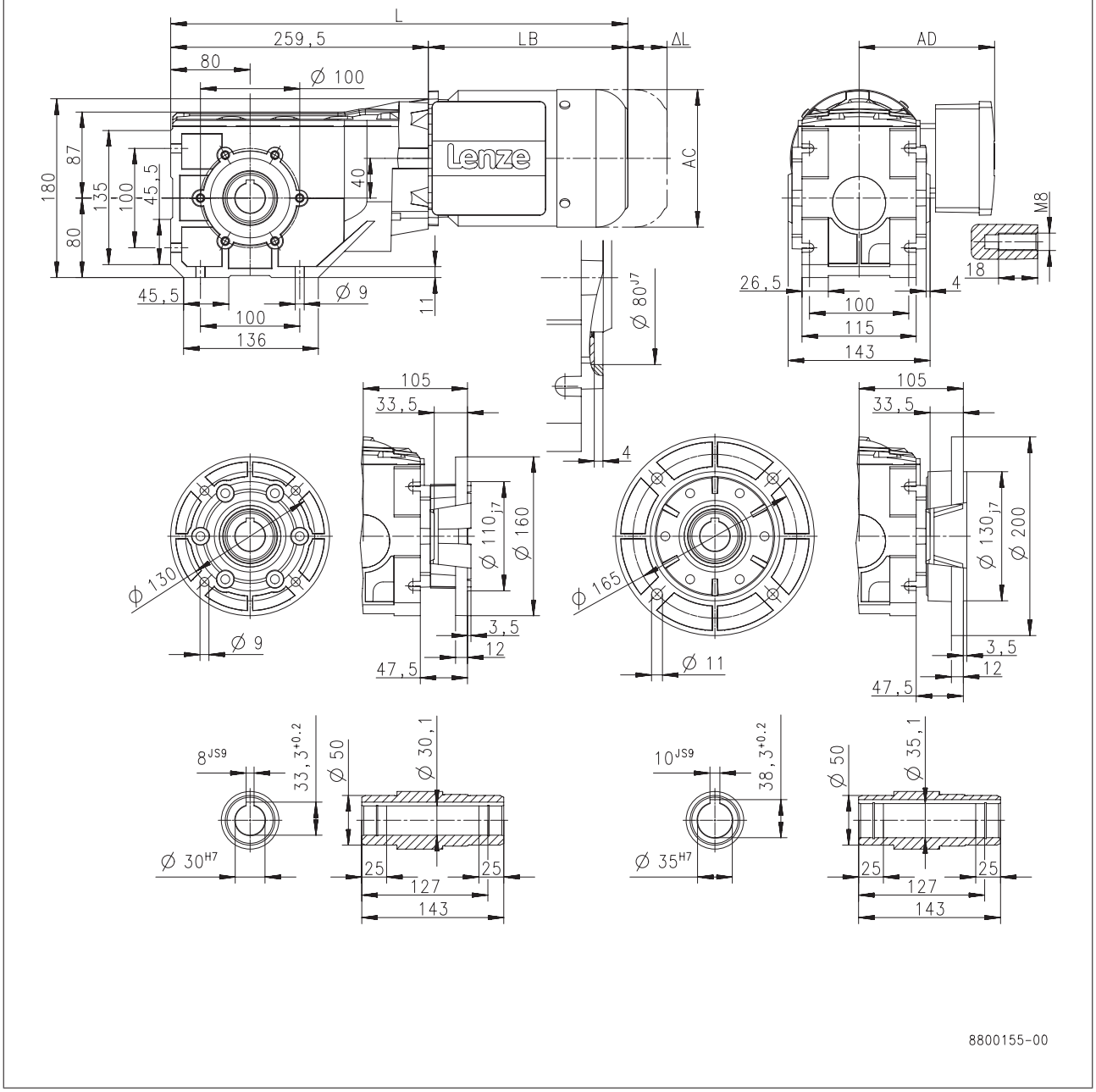
Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	403		426	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

6.7

Dimensions, 6-pole motors

g500-B240

Dimensions with hollow shaft

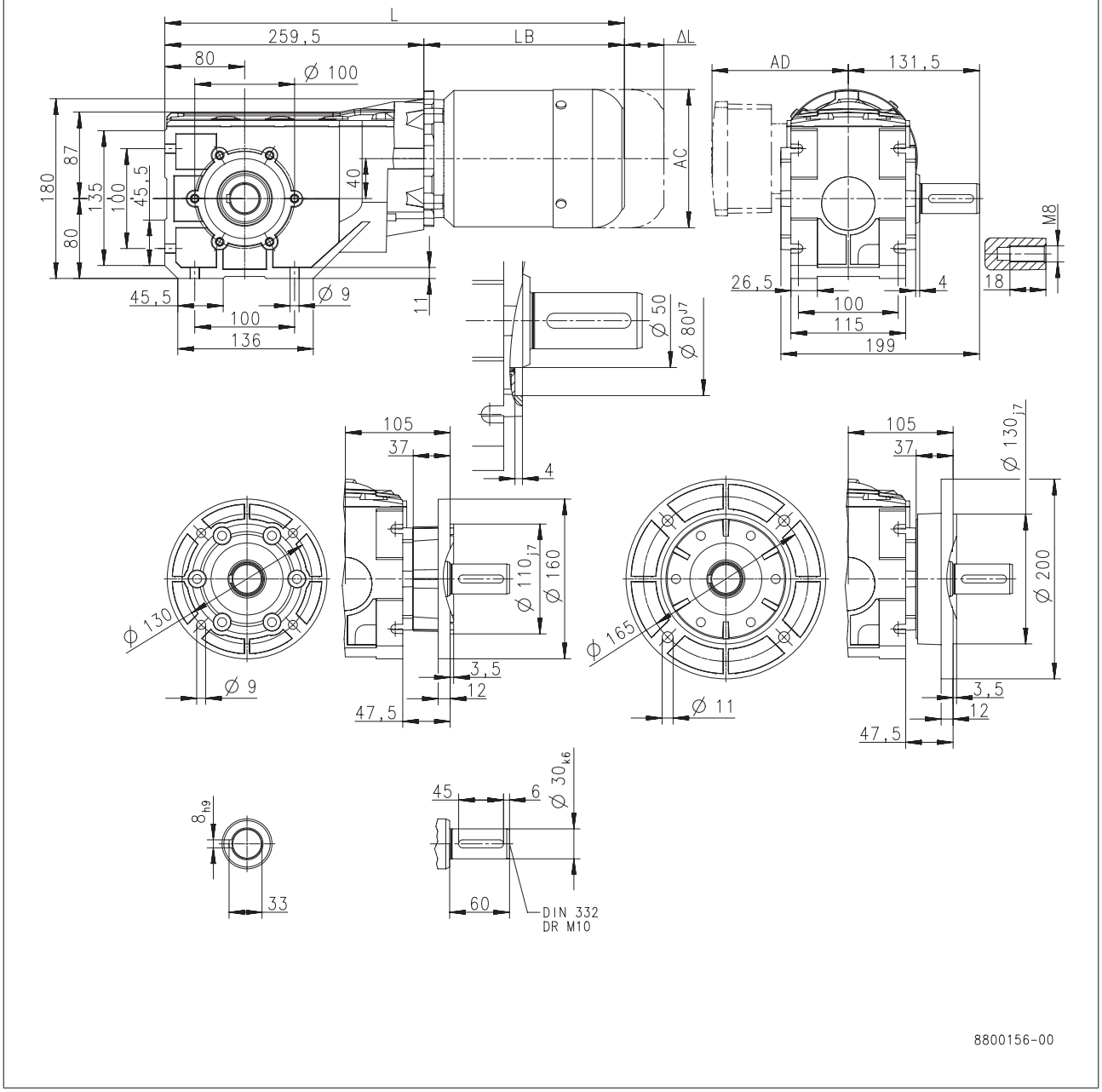


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	463		486	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B240

Dimensions with solid shaft

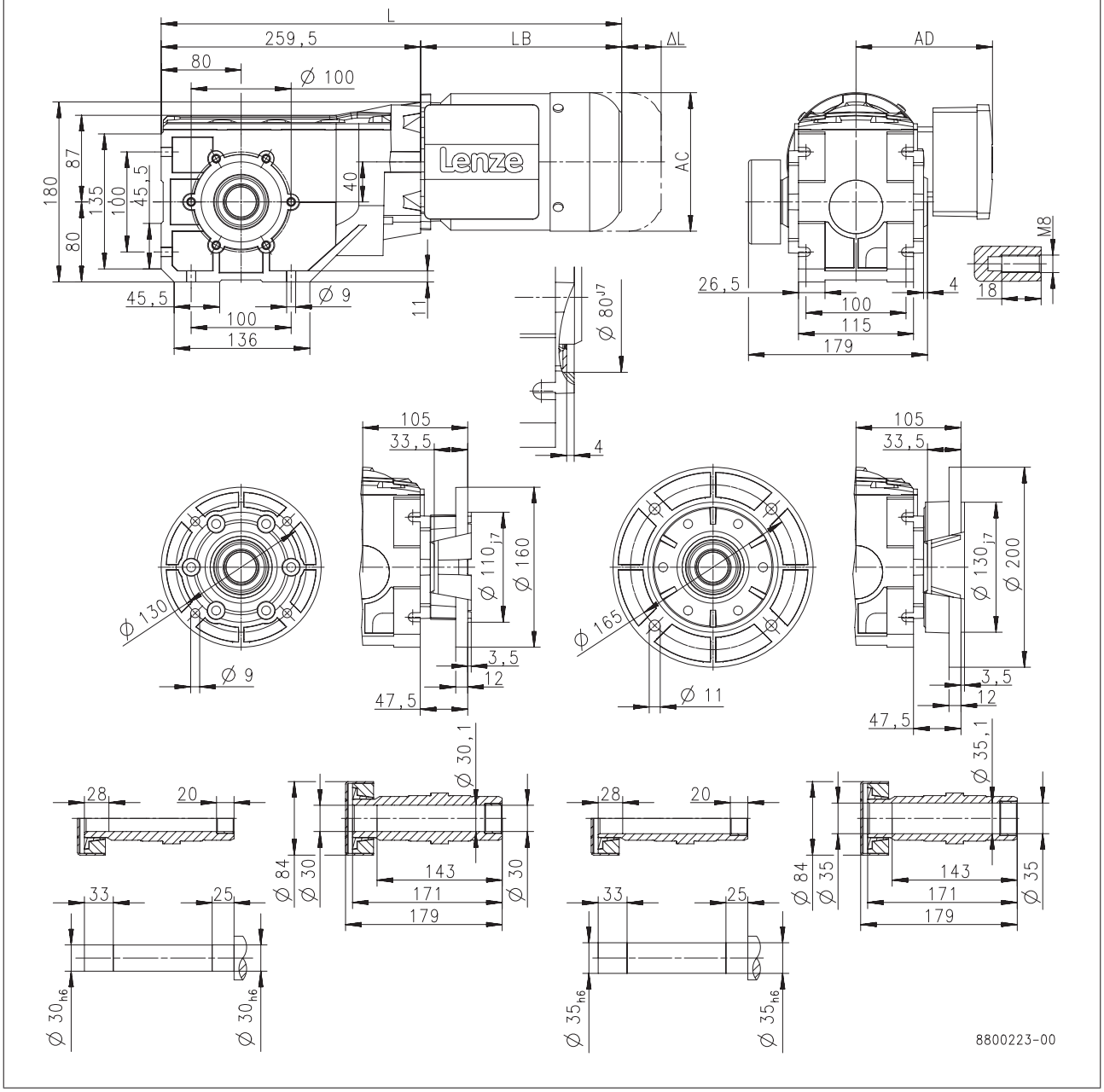


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	463		486	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B240

Dimensions with shrink disc

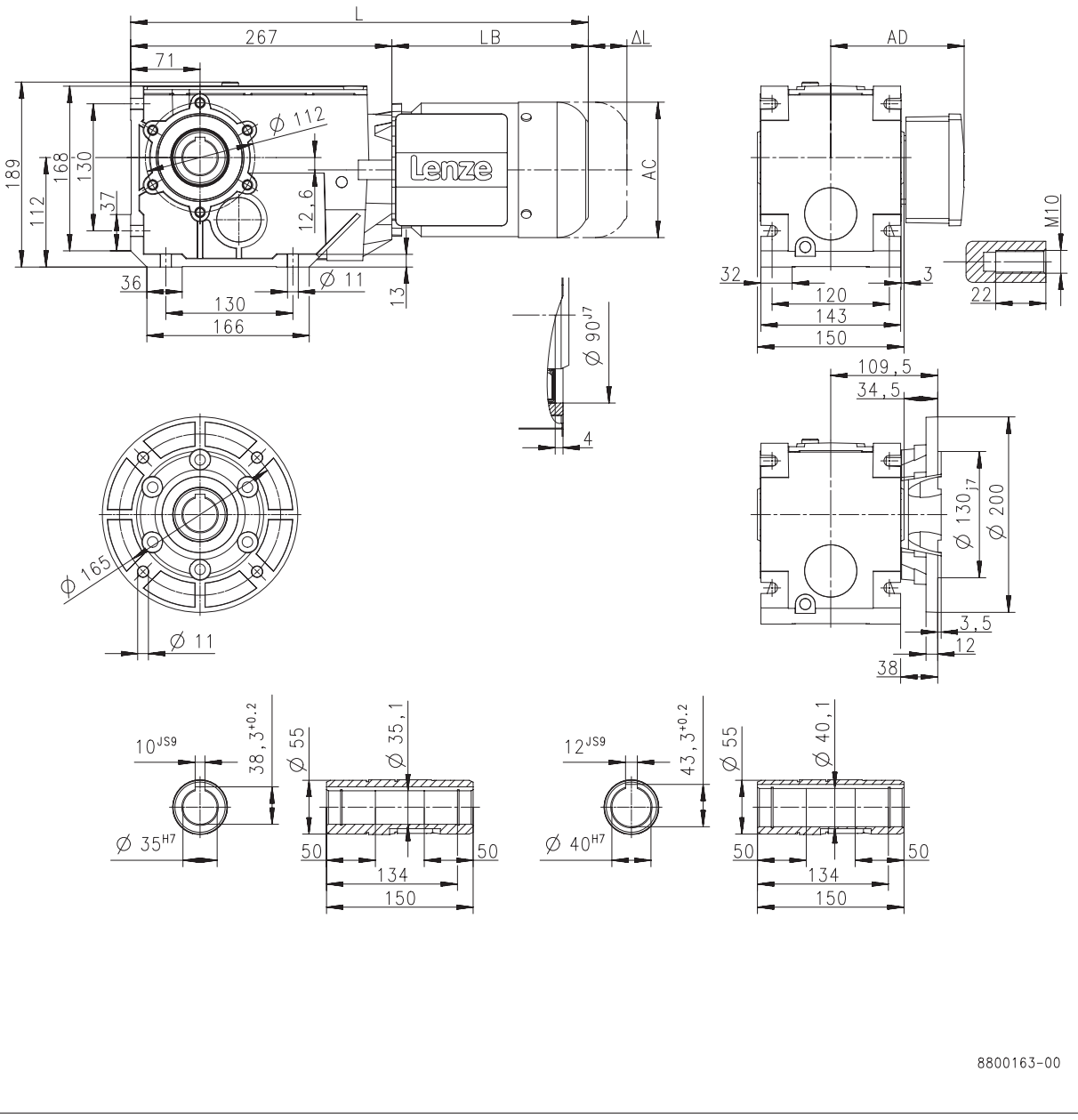


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	463		486	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B450

Dimensions with hollow shaft

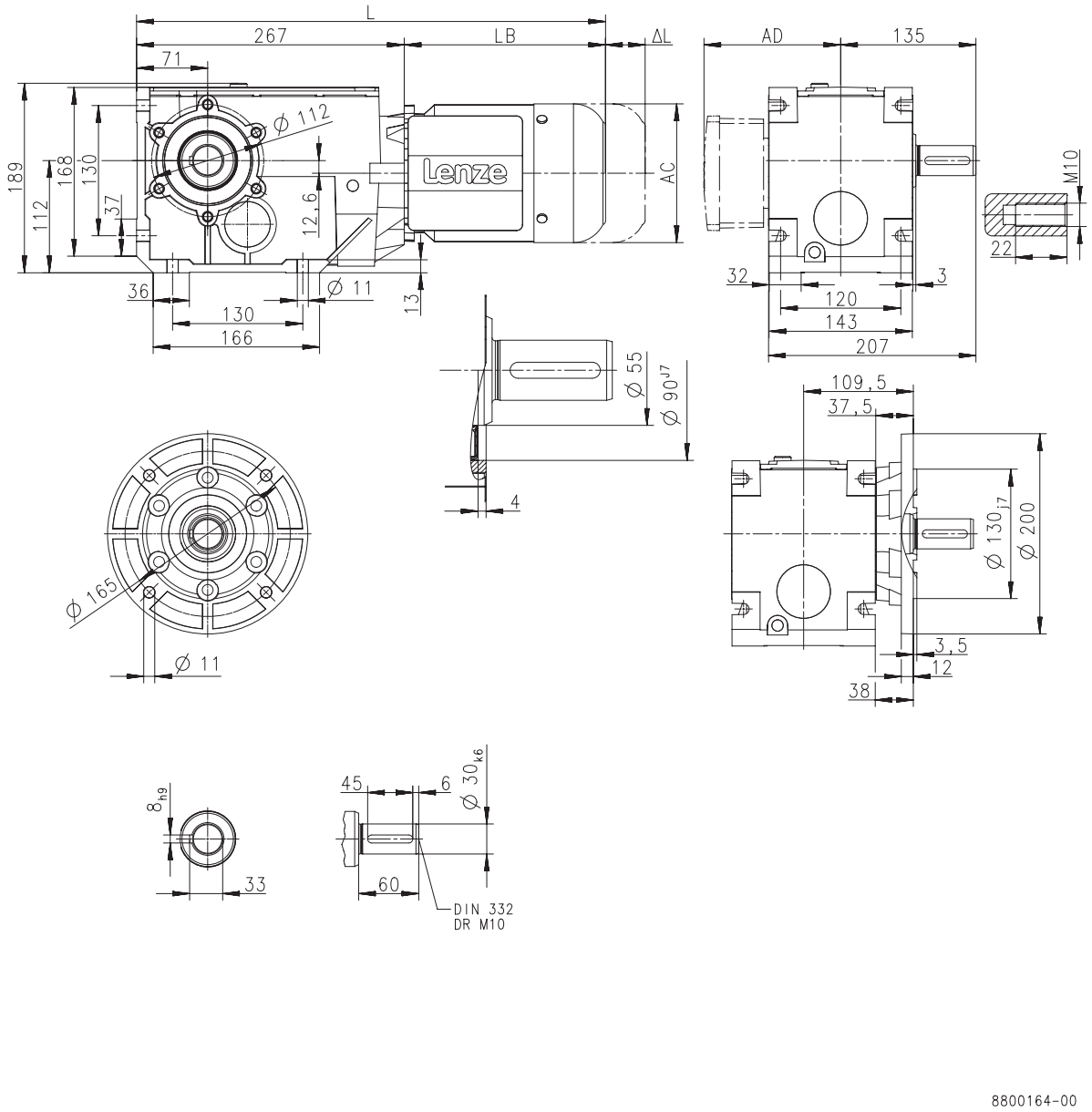


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	470		493	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B450

Dimensions with solid shaft

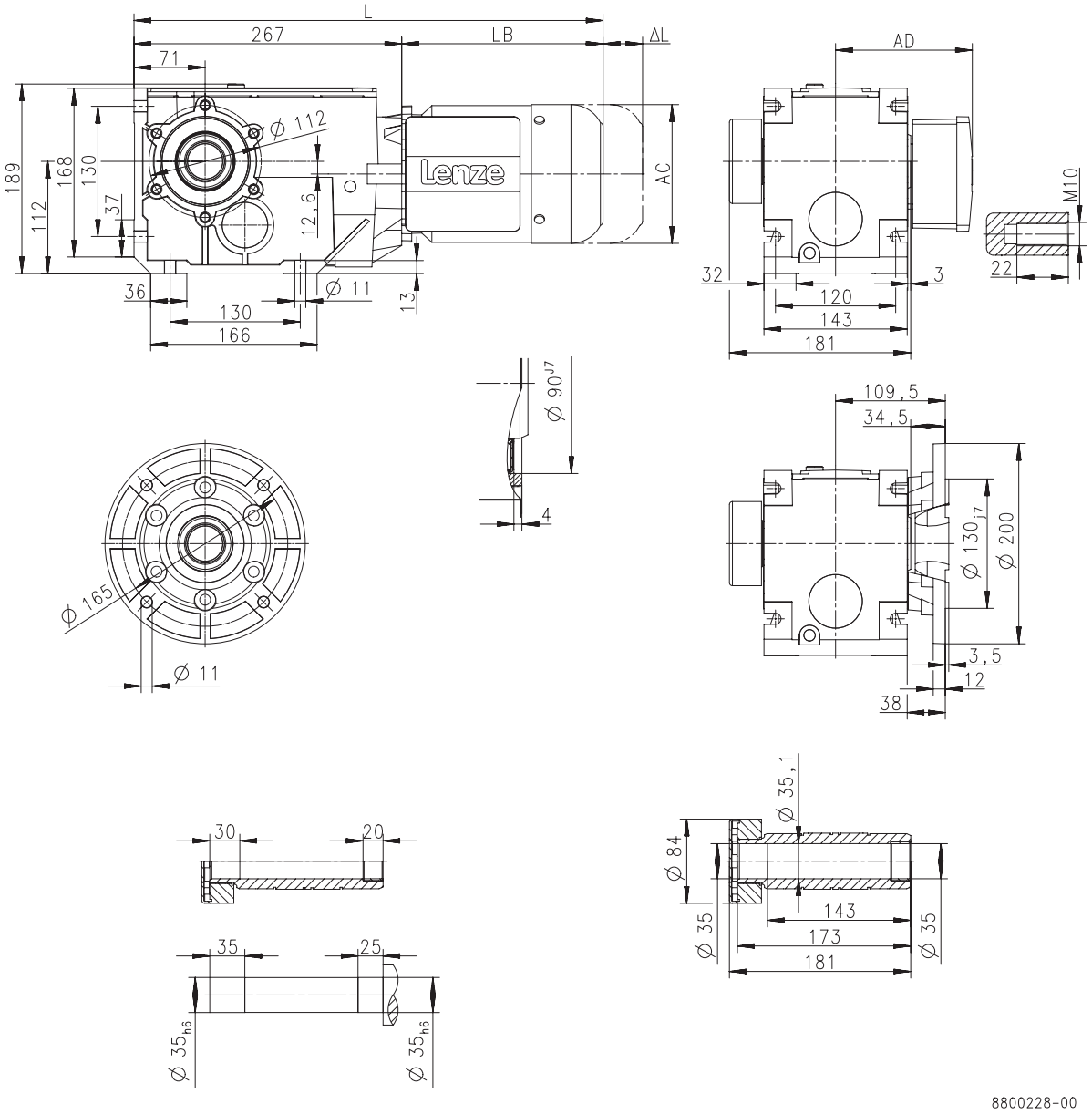


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	470		493	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 6-pole motors

g500-B450

Dimensions with shrink disc



Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	470		493	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

6.7

Weights, 4-pole motors

2-stage gearboxes

				MD□MA□□							MH□MA□□				
				063-02	063-12	063-22	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
g500	-B45	m	[kg]	6.7	7.0	6.7	7.0	7.3	8.7	9.3					
	-B110	m	[kg]		8.6		8.6	8.9	10	11	15	20	22		
	-B240	m	[kg]		12		12	13	14	15	19	24	26	32	35

3-stage gearboxes

				MD□MA□□			MH□MA□□					
				063-12 063-32 063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
g500	-B240	m	[kg]	13	14	15						
	-B450	m	[kg]	16	17	18	22	27	29	35	38	49

Weights, 2-pole motors

2-stage gearboxes

				MD□MA□□			
				063-11	063-31	071-11	071-31
g500	-B110	m	[kg]	8.4	8.3	10	11
	-B240	m	[kg]		12	14	15

3-stage gearboxes

				MD□MA□□		
				063-11 063-31	071-11	071-31
g500	-B240	m	[kg]	12	14	15
	-B450	m	[kg]	15	18	

Weights, 6-pole motors

2-stage gearboxes

				MD□MA□□	
				071-13 071-33	080-13 080-33
g500	-B110	m	[kg]	11	15
	-B240	m	[kg]	15	19

3-stage gearboxes

				MD□MA□□		
				071-13 071-33	080-13	080-33
g500	-B240	m	[kg]	15	19	
	-B450	m	[kg]	18	22	

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	Applications	Measures
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 (large)	• 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

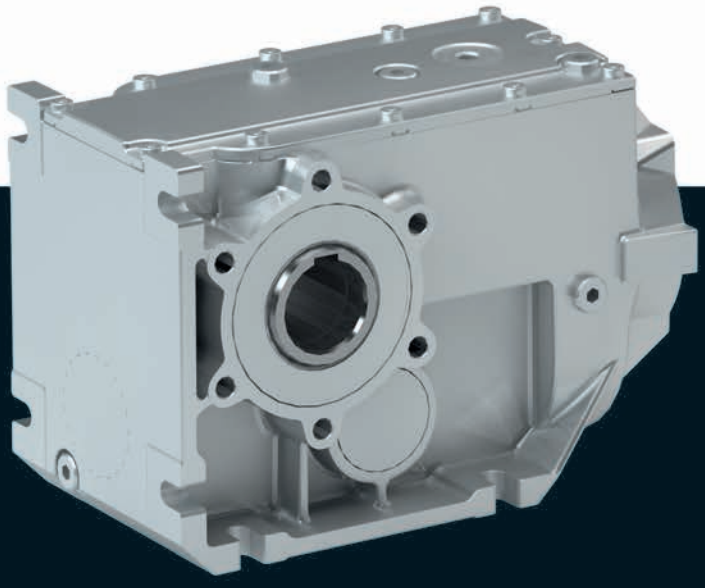
Surface and corrosion protection

Structure of surface coating

Surface and corrosion protection	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	
OKS-L (large)	C3		

g500-B bevel gearboxes

45 to 450 Nm



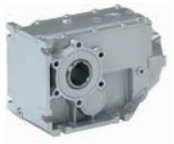
g500-B bevel gearbox

Contents

Contents

List of abbreviations

$F_{ax,max}$	[N]	Max. axial force
$F_{rad,max}$	[N]	Max. radial force
i		Ratio
J	[kgcm²]	Moment of inertia
m	[kg]	Mass



Product information

The efficient bevel gearboxes feature high reliable radial forces, closely stepped gear reductions and a low backlash. They are available in 2-pole and 3-pole design with a torque up to 450 Nm and a ratio of up to i= 360.

Versions

- High-efficient right-angle gearbox in a compact design for space-saving installation
- Standardised shaft and flange dimensions for an easy machine integration
- Low backlash and high torsional stiffness provide for exact results in positioning applications

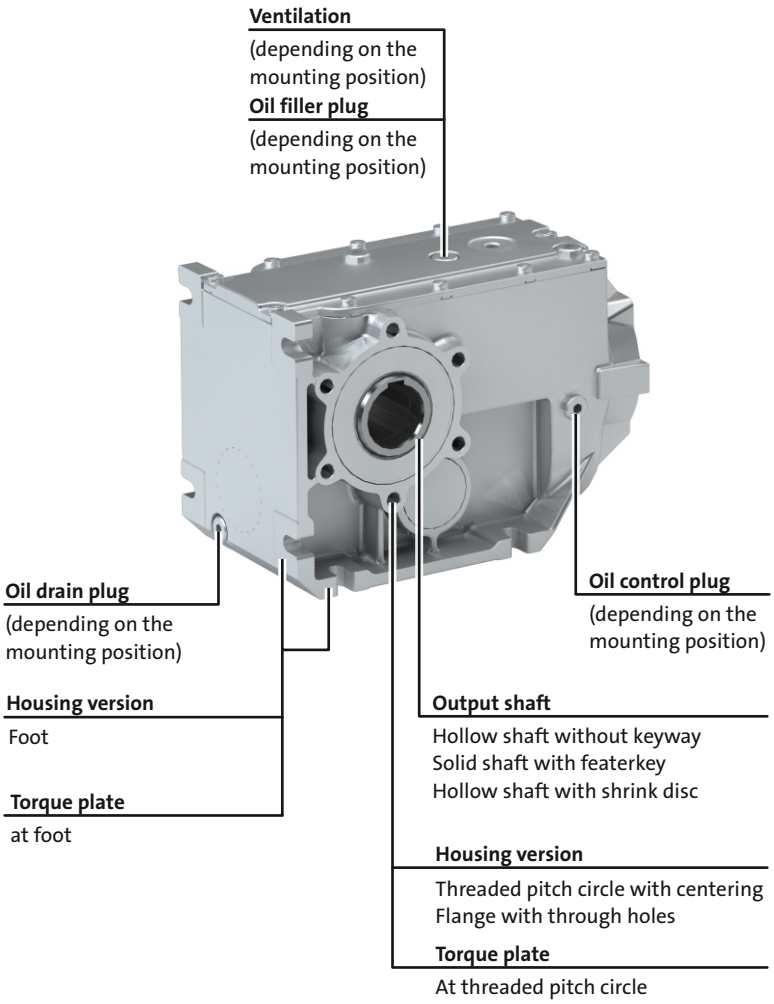
The product name

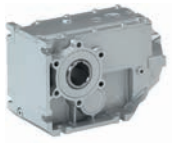
Gearbox type	Product range		Design	Rated torque [Nm]	Product
Bevel gearbox	g500	-	B	45	g500-B45
				110	g500-B110
				240	g500-B240
				450	g500-B450

Equipment

Overview

The equipment includes all the options available as standard and all the built-on accessories of the product.





The gearbox kit

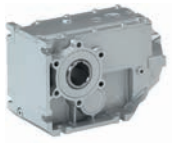
Gearbox details

Product	g500-B45	g500-B110	g500-B240	g500-B450
Driven shaft				
Solid shaft without keyway [mm]				
Solid shaft with featherkey [mm]	20x40		30x60	
Hollow shaft with keyway [mm]	18/20	20/25	30/35	35/40
Hollow shaft with shrink disc [mm]	20		30/35	35
Design	Standard stainless steel			
Gasket	Standard FPM (Viton)			
Bearing	Standard			
Fitting grease	Not enclosed Enclosed			
Housing				
Housing version	With foot With foot and centering			
Output flange				
flange diameter [mm]	110/120	120/160	160/200	200
Lubricant				
Type	CLP 460 [1)] CLP HC 320 CLP HC 220 CLP HC 220 USDA H1			
Oil-level inspection	Without inspection			Without inspection With inspection
Breather element	Without			Standard mounting position: Mounted Combined mounting position: loosely enclosed
Backlash				
Backlash	Standard			
Accessories				
Torque plate	Rubber buffers At threaded pitch circle	At threaded pitch circle	At threaded pitch circle At foot	At foot
Shaft cover	Hollow shaft Shrink disc: Rotating cover Shrink disc: Fixed cover			

6.7

[1)] Not suitable for geared servo motors.

► Further information and installation feasibilities can be found in the Gearboxes chapter.



The gearbox kit

Gearbox details

Solid shaft

Foot mounting
without centring

Foot mounting
With centering

Flange with through holes

Hollow shaft

Foot mounting
without centring

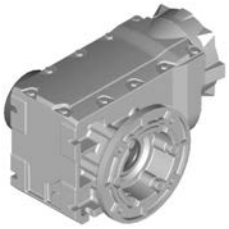
Foot mounting
With centering

Flange with through holes

Hollow shaft with shrink disc

Foot mounting
without centring

Foot mounting
With centering



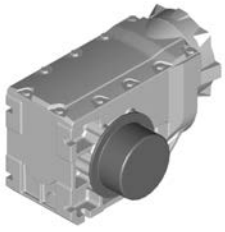
Flange with through holes

Accessories

2nd output shaft end

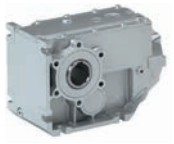
Torque plate
at foot

Torque plate
at threaded pitch circle



Cover
Hollow shaft/shrink disc

6.7

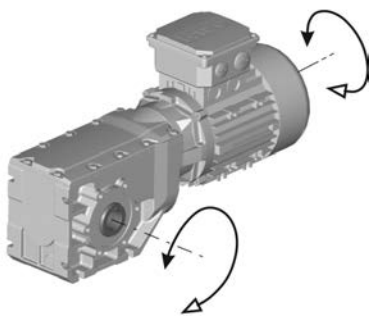
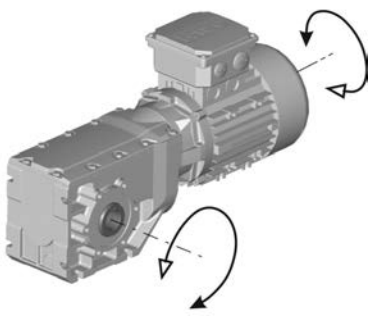


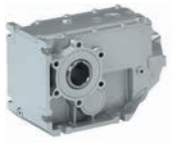
Functions and features

Product	g500-B45	g500-B110	g500-B240	g500-B450
Housing				
Design	Cuboid			
Material	Aluminium			
Solid shaft				
Design	with keyway to DIN 6885			
Tolerance	Shaft diameter ≤ 50 mm: k6 Shaft diameter > 50 mm: m6			
Material	Tempered steel C45 Nirosta X46Cr13			
Hollow shaft				
Design	With keyway Without keyway (for shrink disc)			
Tolerance	Bore H7			
Material	Tempered steel C45 Nirosta X46Cr13			
Toothed parts				
Design	Ground tooth flanks Optimised tooth flank geometry			
Material	Case-hardened steel			
Shaft-hub joint				
	1st and 2nd step: Force-fit 3rd step: positive-fit			
Shaft sealing rings				
Design	With dust lip			
Material	NB / FP			
Bearing				
Design	Ball bearing / tapered-roller bearing depending on size and design			
Lubricants				
	Standard: mineral oil Optional: synthetic oil [1]			
Quantities	Corresponding to mounting position (see nameplate)			
Mechanical efficiency				
2-stage gearboxes [$\eta_{c=1}$]	0.96			
3-stage gearboxes [$\eta_{c=1}$]			0.95	

[1] Standard for geared servo motors.

Direction of rotation

2-stage gearboxes B45 ... B240 3-stage gearbox B450	3-stage gearbox B240
	



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)	
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.

Shaft sealing rings

By default, the gearboxes come with NBR shaft sealing rings at the output end. At high speed and unfavourable ambient conditions as high temperature, reduced circulation of air etc., Lenze recommends the use of Viton shaft sealing rings.

Please consider this in your order.

Ventilation

Non-ventilated gearboxes

No ventilation is required for gearboxes g500-B45 to B240.

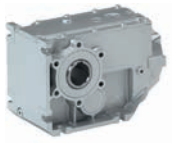
Ventilated gearboxes

The g500-B450 gearbox is supplied with a breather element as standard.

Gearboxes in combined mounting position

To reduce the number of different versions, the gearboxes can also be ordered with combined mounting positions.
Depending on the gearbox in question, the following combinations are available:
- g500-B45 in combined mounting position ABCDEF
- g500-B110 ... B450 in combined mounting position AEF

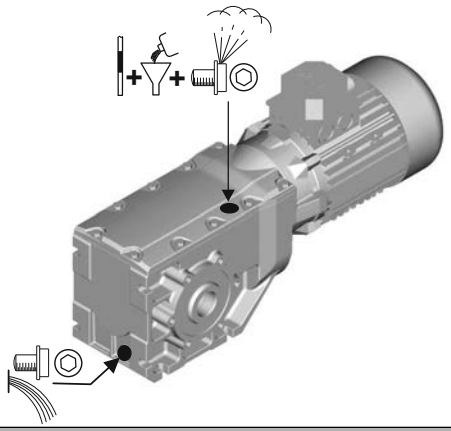
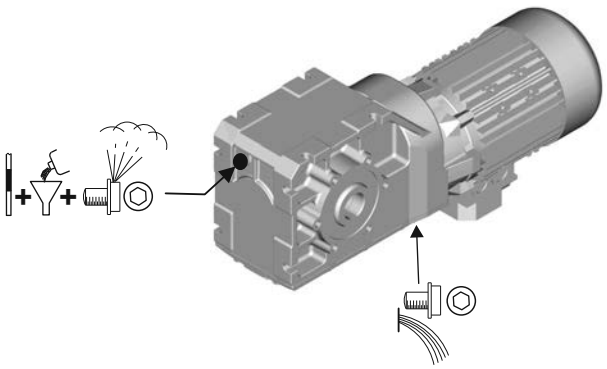
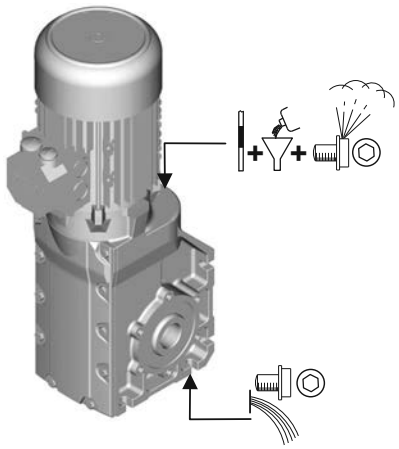
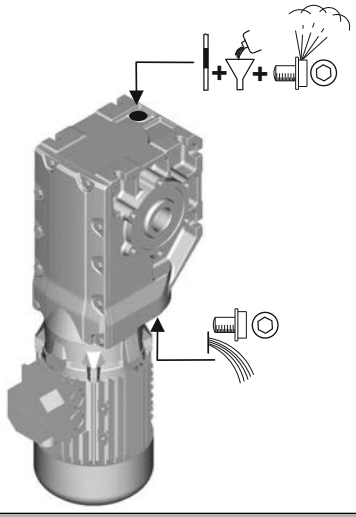
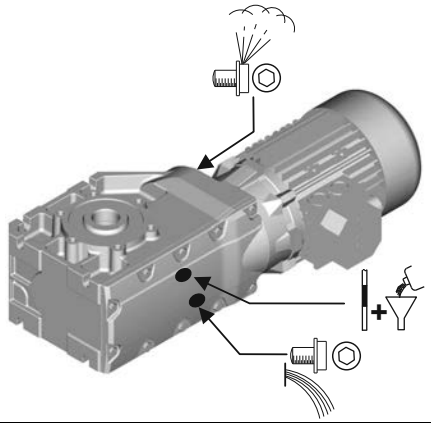
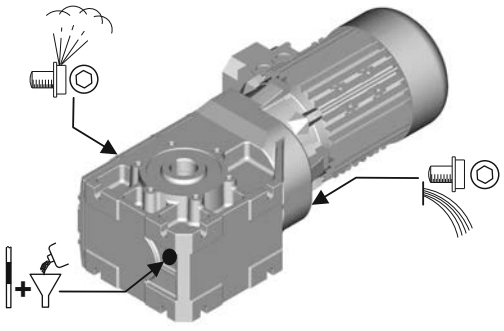
The breather elements are supplied loose.



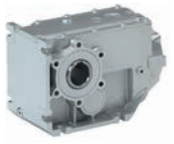
Ventilation

g500-B240

► **A ... F** mounting position

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

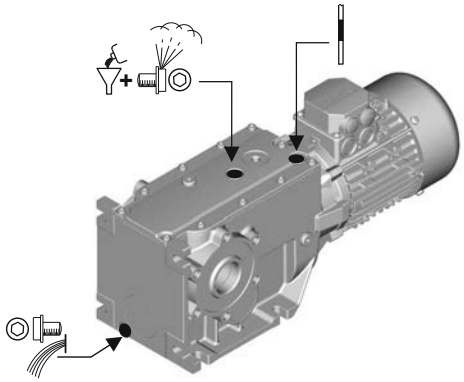
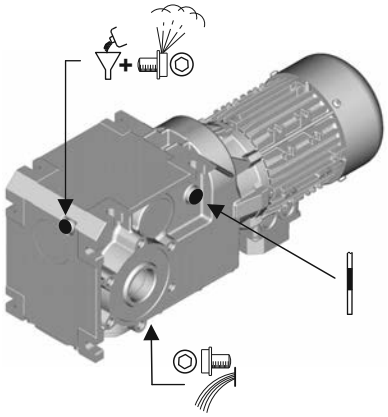
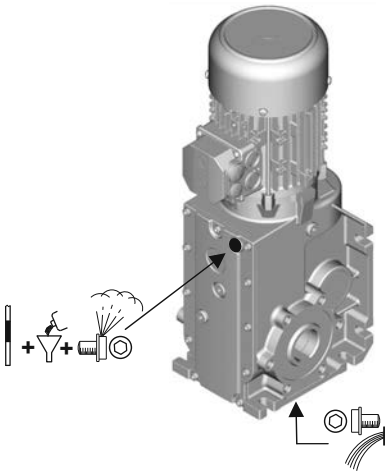
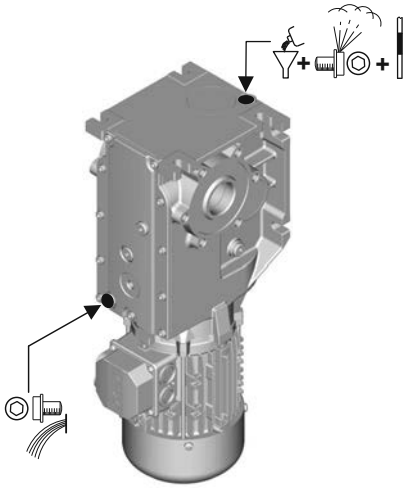
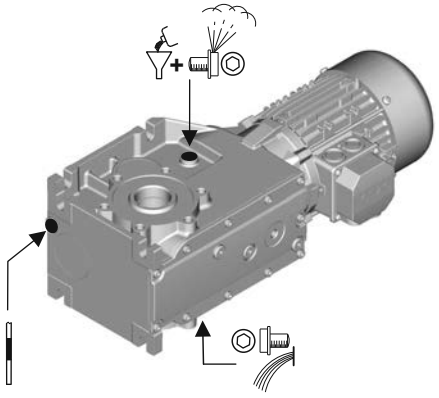
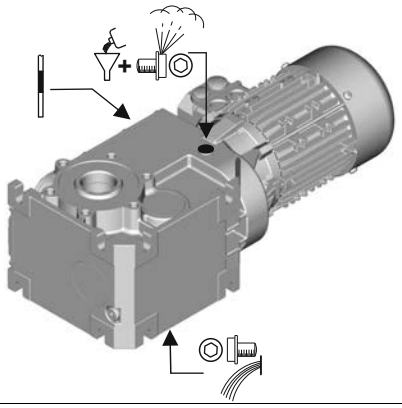
	Filler		Drain
	Breather element		Check



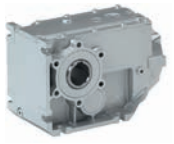
Ventilation

g500-B450

► **A ... F** mounting position

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

	Filler		Drain
	Breather element		Check



Permissible radial and axial forces at output

Permissible radial force

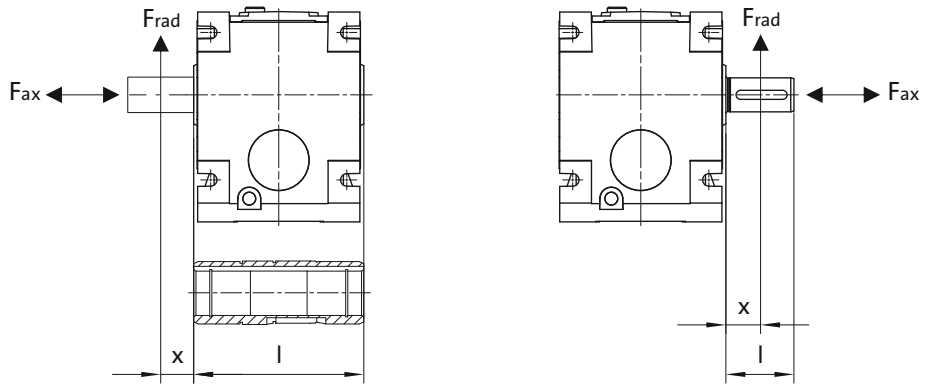
$F_{rad,perm} = f_w \times F_{rad,max}$

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

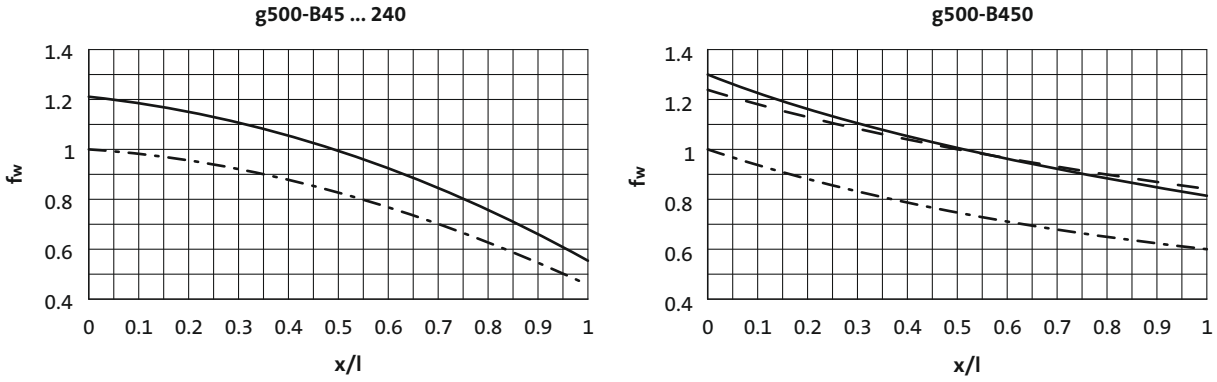
Permissible axial force

If there is no radial force, the maximum permissible axial force is 50 % of the table value $F_{rad,max}$

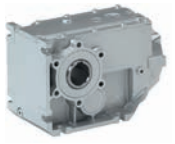
Application of forces



Additional load factor f_w at output shaft



——— Solid shaft
— — — Solid shaft with flange
— · — Hollow shaft



Permissible radial and axial forces at output

The values given in the table refer to the center shaft end force application point and are minimum values calculated according to the most unfavourable conditions (force application angle, mounting position, direction of rotation). The values were calculated for the motor/gearbox combination with a load capacity of c= 1.3 and an input speed of 1400 rpm.

- ► If the torque is transmitted via the flange face, max 50 % of the radial force $F_{rad,max}$ are permissible.
- ► Neither radial nor axial forces are permissible for the hollow shaft with shrink disc.

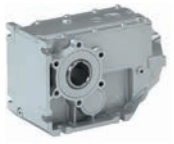
In case of different operating conditions, considerably higher forces can be transmitted. Please contact Lenze.

Product	n_2 [r/min]									
	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]
g500-B45	900	1200	2200	2500	2800	3000	3000	3000	3000	3000
g500-B110	1000	2200	2550	3000	3300	3600	3600	3600	3600	3600
g500-B240	1500	2250	3800	4500	5100	6200	7400	7800	7800	7800
g500-B450	3000	3800	5000	5200	5200	5500	7000	9000	9000	9000

	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]
g500-B45	900	1200	1800	2100	2400	2800	3000	3000	3000	3000
g500-B110	1000	1800	2100	2500	2700	3000	3000	3000	3000	3000
g500-B240	1500	2350	3000	3600	4500	5000	6000	6500	6500	6500
g500-B450	1800	2800	3600	4200	5100	6000	7200	7800	7800	7800

	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]
g500-B45	900	1200	1800	2100	2400	2800	3000	3000	3000	3000
g500-B110	1000	1800	2100	2500	2700	3000	3000	3000	3000	3000
g500-B240	2400	3600	5200	6000	6500	6500	6500	6500	6500	6500
g500-B450	3000	4000	5500	6200	7000	7500	7800	7800	7800	7800



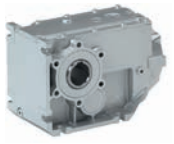
Moments of inertia

- 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.

2-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-B45	5.411	0.31
	6.222	0.28
	7.111	0.20
	8.178	0.18
	9.101	0.13
	10.466	0.12
	11.640	0.086
	13.386	0.079
	15.111	0.059
	17.378	0.055
	19.365	0.038
	22.270	0.054
	25.051	0.025
	28.808	0.023
	32.593	0.016
	37.481	0.015
	42.222	0.010
	48.556	0.009
	53.889	0.006
	61.972	0.006
g500-B110	5.185	0.79
	5.963	0.70
	7.111	0.48
	8.178	0.43
	9.101	0.32
	10.466	0.29
	11.449	0.26
	12.698	0.19
	14.603	0.18
	15.556	0.14
	17.889	0.13
	19.556	0.095
	22.489	0.088
	25.185	0.063
	28.963	0.060
	31.919	0.041
	36.707	0.039
	37.400	0.072
	40.000	0.028
	46.000	0.027
	48.167	0.050
	52.698	0.017
	60.603	0.016
	61.045	0.033
	76.500	0.023
	100.786	0.014

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-B240	3.565	2.97
	4.889	1.74
	6.257	1.15
	6.883	1.67
	7.817	1.51
	9.440	1.05
	10.720	0.97
	12.081	0.73
	13.719	0.68
	15.008	0.59
	16.857	0.45
	19.143	0.42
	20.650	0.34
	23.450	0.32
	26.878	0.21
	30.522	0.20
	33.433	0.15
	37.967	0.15
	43.267	0.096
	49.133	0.092
	52.510	0.070
	59.630	0.067
	67.113	0.045
	76.213	0.043



Moments of inertia

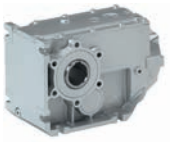
3-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-B240	68.459	0.093
	77.741	0.091
	87.563	0.062
	99.437	0.061
	113.673	0.044
	129.087	0.043
	145.674	0.030
	165.426	0.030
	188.442	0.021
	213.994	0.020
	245.178	0.014
	278.422	0.014
	317.617	0.003
	360.683	0.003

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-B450	5.002	4.36
	6.860	2.48
	9.315	3.21
	10.328	3.06
	12.775	1.87
	14.165	1.79
	16.349	1.23
	17.885	1.05
	19.831	1.01
	22.813	0.70
	25.294	0.68
	27.945	0.51
	30.985	0.49
	36.373	0.31
	40.330	0.30
	45.245	0.22
	50.167	0.21
	56.154	0.47
	62.262	0.47
	68.788	0.36
	76.271	0.36
	89.534	0.22
	99.274	0.22
	111.372	0.16
	123.487	0.16
	144.128	0.10
	159.807	0.099
	174.919	0.073
	193.948	0.072
	223.563	0.046
	247.882	0.046

Additional weights for gearboxes

Product			g500-B45	g500-B110	g500-B240	g500-B450
Mass						
Solid shaft	m	[kg]	0.4	0.5	1.4	1.3
Shrink disc	m	[kg]	0.2	0.2	0.7	0.6
Flange	m	[kg]	0.3	0.4	0.7	0.9



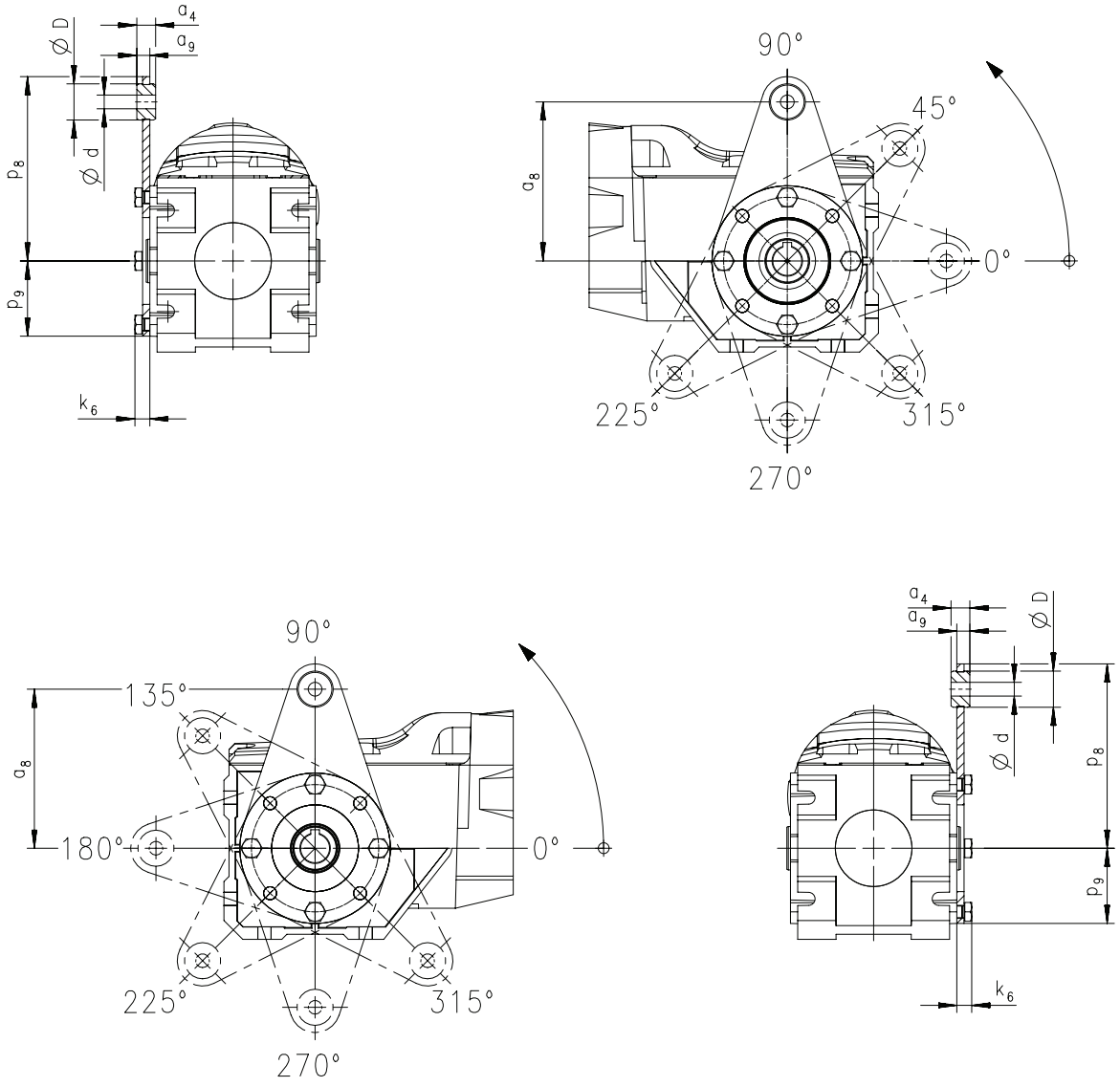
Torque plate

Torque support is usually effected by means of the foot or flange. Another simple possibility is provided by the attachable torque plates. Here, torque support is implemented solely via one point, which, among other things, is suitable for shaft-mounted gearboxes. Supplied rubber buffers provide for mounting with minimum stress and absorb light shocks.
The torque plates are available in two designs, for mounting on the available threaded pitch circle, or for the gearbox foot.

In addition, torque support for the g500-B45 gearbox can be effected via the holding fixture of the housing, which is integrated on both sides, by means of a rubber buffer.
The rubber buffers can be ordered optionally.

Torque plate

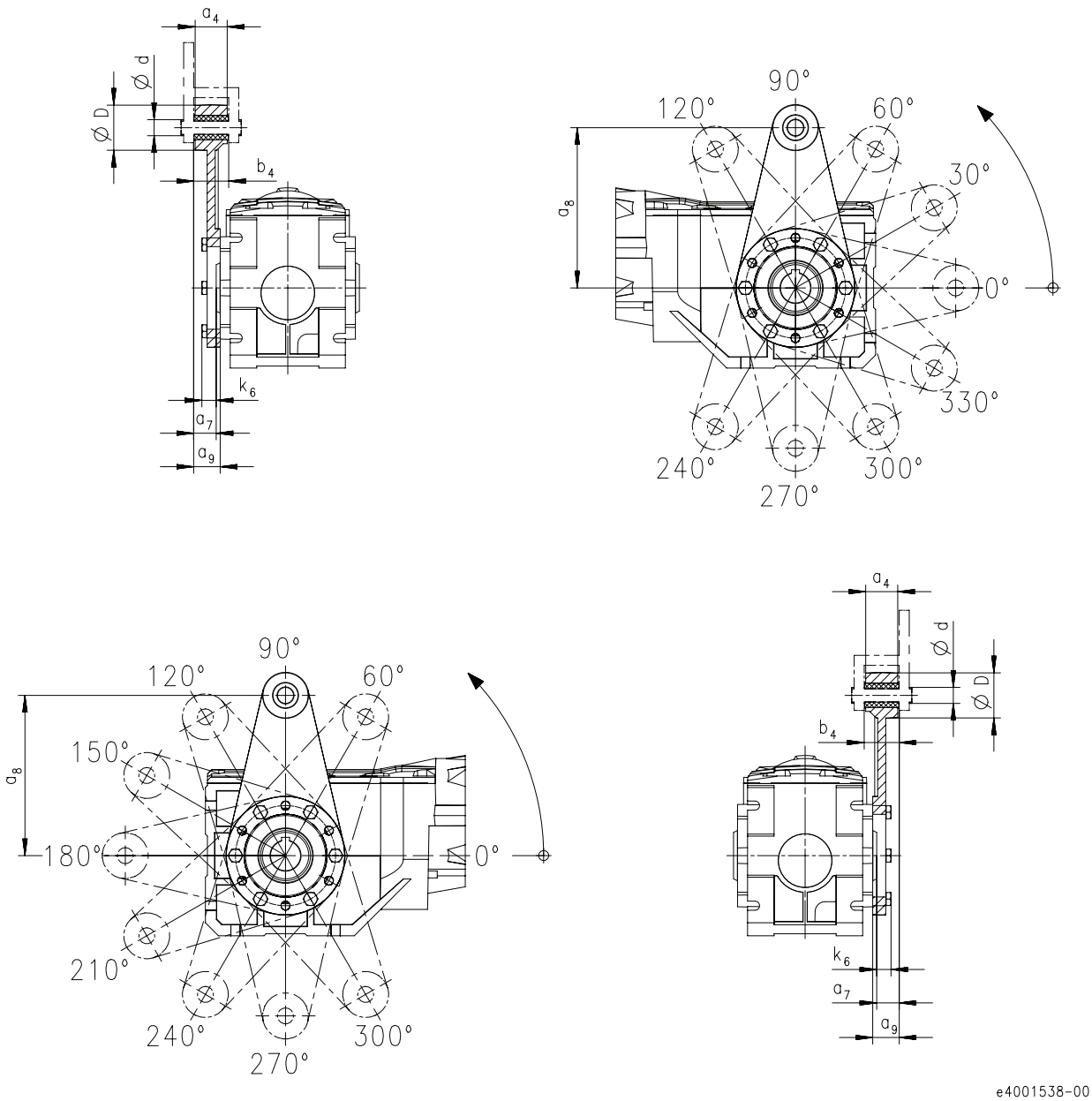
Torque plate on threaded pitch circle



Product	Dimensions								Mass
	a_4	a_8	a_9	d	D	p_8	p_9	k_6	m
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
g500-B45	12.0	100	8.0	8.0	20.0	115	42.0	9.0	0.30
g500-B110	13.0	110	9.0	10.0	25.0	128	54.0	11.0	0.50

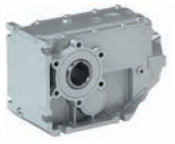
Torque plate

Torque plate on threaded pitch circle



Product	Dimensions								Mass
	a_4	a_7	a_8	a_9	b_4	d	D	k_6	m
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
- g500-B240	34.0	23.5	160	27.5	38.5	16.0	45.0	15.0	1.30

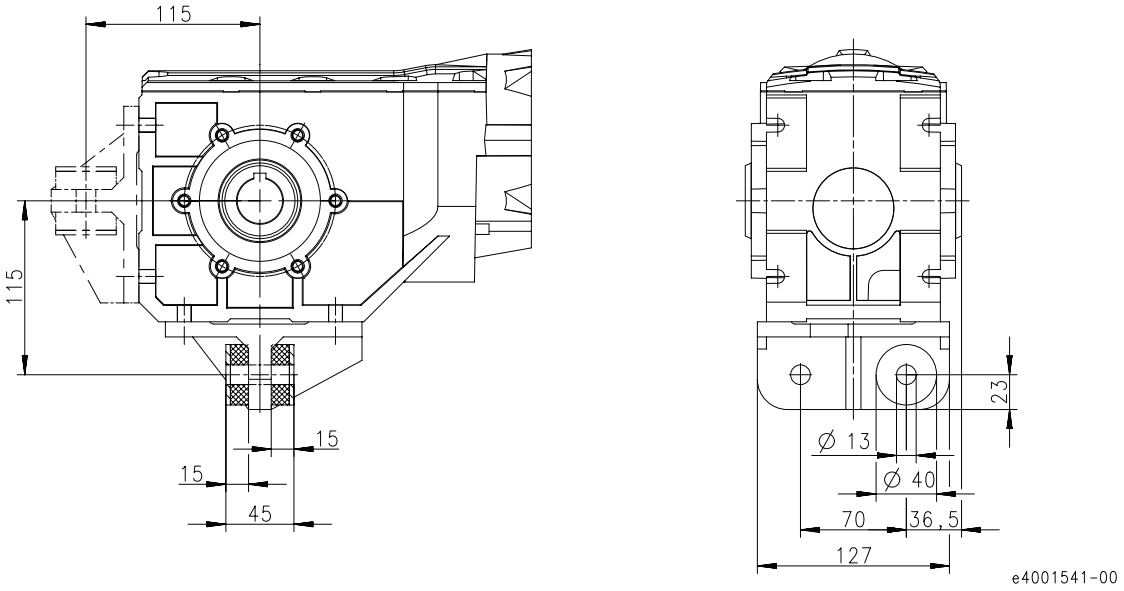
6.7



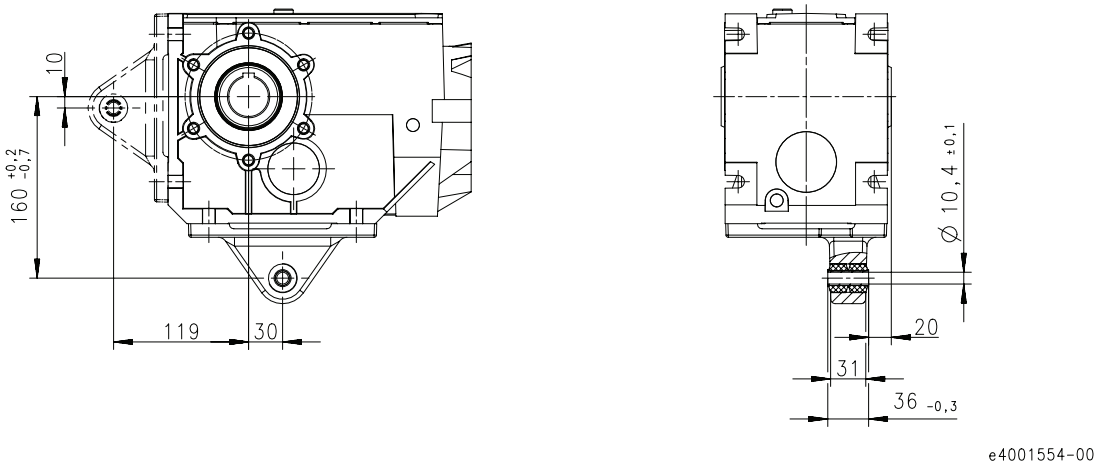
Torque plate

Torque plate at housing foot

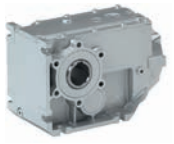
g500-B240



g500-B450



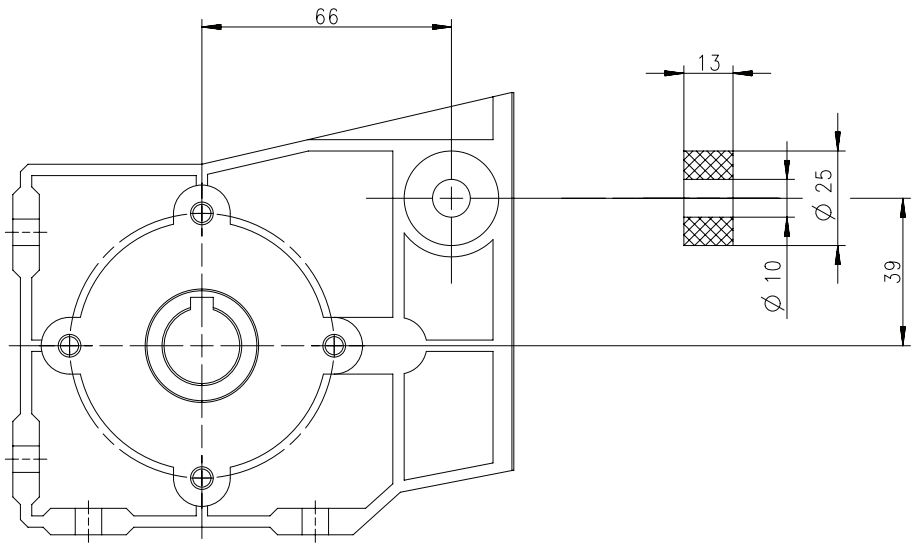
Product	Mass
	m
	[kg]
g500-B240	2.40
g500-B450	1.10

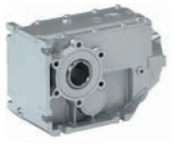


Torque plate

Rubber buffer for torque plate

g500-B45



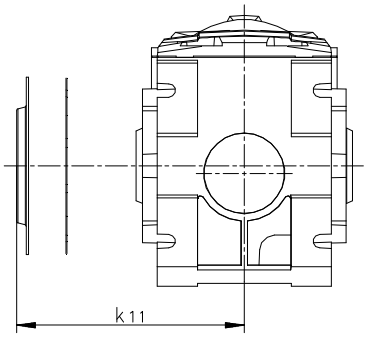


Shaft cover

Hoseproof hollow shaft cover

The cover protects the hollow shaft from objects falling in. It is sealed by a flat gasket between cover and housing. Thus, the hollow shaft is protected from dust and water jets.

The cover is loosely enclosed and can be mounted on both sides of the hollow shaft bore.



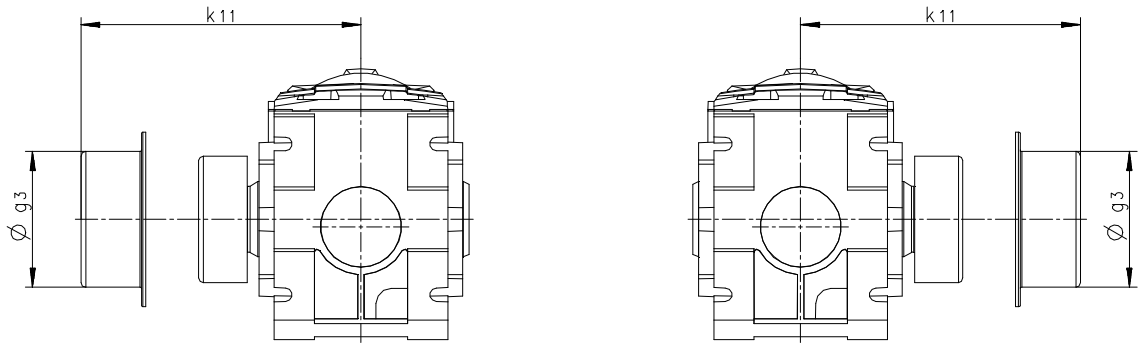
6.7

Product	Dimensions	Mass
	k_{11}	m
	[mm]	[kg]
g500-B45	55.0	0.050
g500-B110	65.0	0.050
g500-B240	75.0	0.10
g500-B450	79.5	0.15

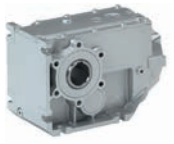
Shaft cover

Shrink disc cover

The cover is provided for the shrink disc to be protected from contact.

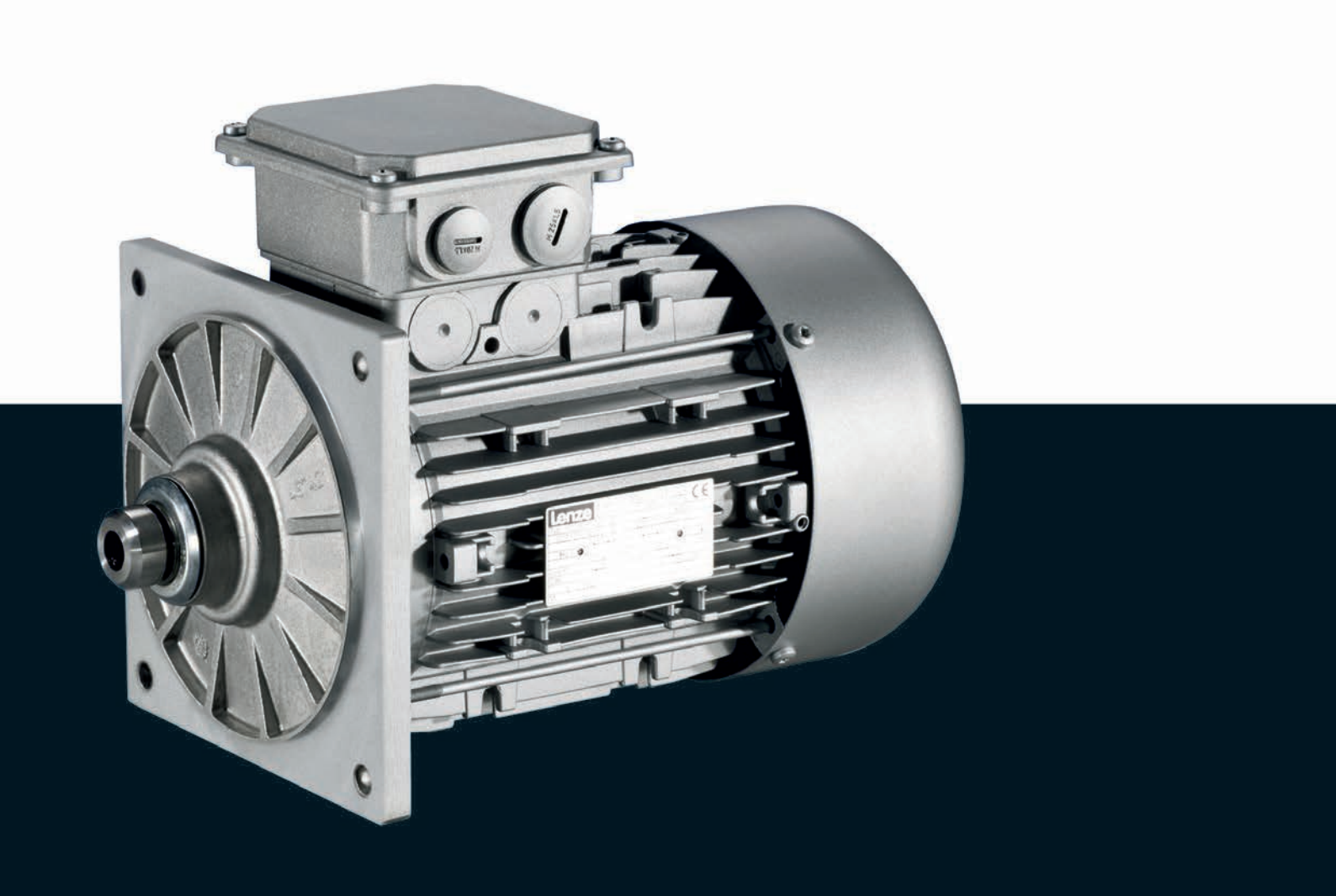


Product	Dimensions		Mass
	g_3	k_{11}	m
	[mm]	[mm]	[kg]
g500-B45	65.0	87.5	0.050
g500-B110	79.0	97.5	0.050
g500-B240	90.0	111	0.050
g500-B450	90.0	108	0.050



MD/MH three-phase AC motors

0.06 to 0.55 kW
0.75 to 45 kW (IE2)



MD/MH three-phase AC motors

Contents

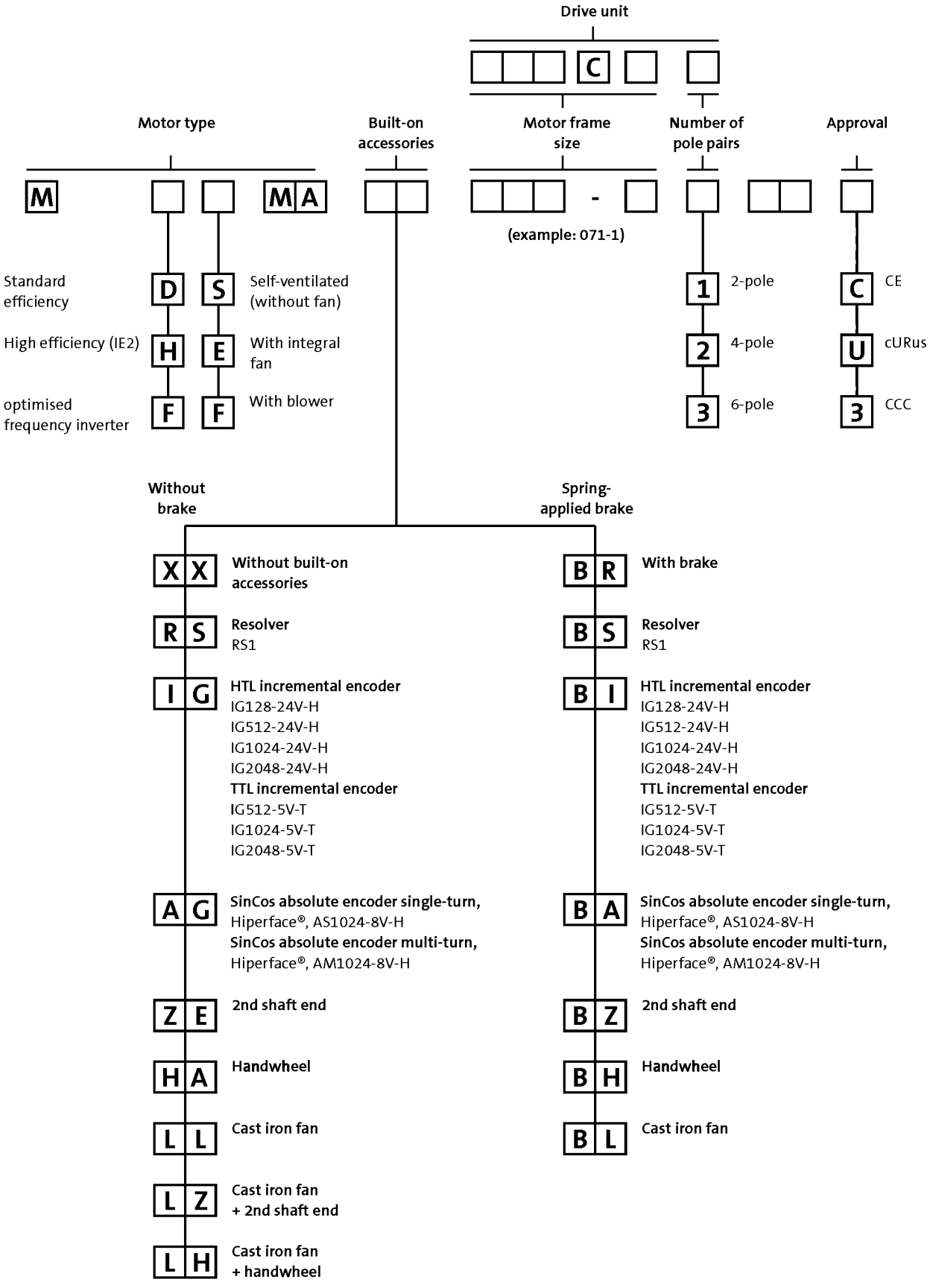
List of abbreviations

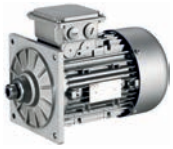
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
cos φ		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated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

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

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

Product key

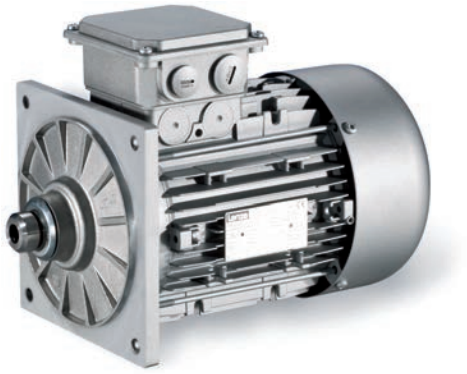

Drive unit
C
Motor type
Built-on accessories
Motor frame size
Number of pole pairs
Approval
M
M A
-
(example: 071-1)
Standard efficiency
D
S
Self-ventilated (without fan)
High efficiency (IE2)
H
E
With integral fan
optimised frequency inverter
F
F
With blower
1
2-pole
2
4-pole
3
6-pole
C
CE
U
cURus
3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



MD/MH L-force three-phase AC motors are available in a power range from 0.06 to 45 kW. From 0.75 kW, they 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 objects falling in, the fan cover can be equipped with a protection cover.
- A 2nd shaft end is available for further modifications.

Functions and features

Size		
Motor	063	071
Spring-applied brake		
Design	Standard or LongLife design Reduced or standard 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	Protection cover Increased centrifugal mass Handwheel 2nd shaft end

[1] With 2-pole motors not available.

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)

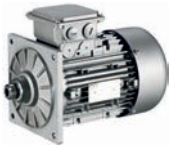
Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.12	MD□□□□□063-12		E84AV□□□2512□□0
0.18	MD□□□□□063-32		
0.25	MD□□□□□063-42 MD□□□□□071-12		
0.37	MD□□□□□071-32	E84DVB□3714S□□□2□	E84AV□□□3714□□0
0.55	MD□□□□□071-42 MD□□□□□080-12	E84DVB□5514S□□□2□	E84AV□□□5514□□0
0.75	MH□□□□□080-32	E84DVB□7514S□□□2□	E84AV□□□7514□□0
1.10	MH□□□□□090-12	E84DVB□1124S□□□2□	E84AV□□□1124□□0
1.50	MH□□□□□090-32	E84DVB□1524S□□□2□	E84AV□□□1524□□0
2.20	MH□□□□□100-12	E84DVB□2224S□□□2□	E84AV□□□2224□□0
3.00	MH□□□□□100-32	E84DVB□3024S□□□2□	E84AV□□□3024□□0
4.00	MH□□□□□112-22	E84DVB□4024S□□□2□	E84AV□□□4024□□0
5.50	MH□□□□□132-12	E84DVB□5524S□□□2□	E84AV□□□5524□□0
7.50	MH□□□□□132-22	E84DVB□7524S□□□2□	E84AV□□□7524□□0
11.0	MH□□□□□160-22		E84AV□□□1134□□0
15.0	MH□□□□□160-32		E84AV□□□1534□□0
18.5	MH□□□□□180-12		E84AV□□□1834□□0
22.0	MH□□□□□180-32		E84AV□□□2234□□0
30.0	MH□□□□□200-32		E84AV□□□3034□□0
37.0	MH□□□□□225-12		E84AV□□□3734□□0
45.0	MH□□□□□225-22		E84AV□□□4534□□0

Motor – inverter assignment

Rated frequency 87 Hz

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

Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.21	MD□□□□□063-12	E84DVB□5514S□□□2□	E84AV□□□5514□□0
0.33	MD□□□□□063-32		
0.45	MD□□□□□063-42 MD□□□□□071-12		
0.66	MD□□□□□071-32	E84DVB□7514S□□□2□	E84AV□□□7514□□0
1.00	MD□□□□□071-42 MD□□□□□080-12	E84DVB□1124S□□□2□	E84AV□□□1124□□0
1.35	MH□□□□□080-32	E84DVB□1524S□□□2□	E84AV□□□1524□□0
2.00	MH□□□□□090-12	E84DVB□2224S□□□2□	E84AV□□□2224□□0
2.70	MH□□□□□090-32	E84DVB□3024S□□□2□	E84AV□□□3024□□0
3.90	MH□□□□□100-12	E84DVB□4024S□□□2□	E84AV□□□4024□□0
5.40	MH□□□□□100-32	E84DVB□5524S□□□2□	E84AV□□□5524□□0
7.10	MH□□□□□112-22	E84DVB□7524S□□□2□	E84AV□□□7524□□0
9.70	MH□□□□□132-12		E84AV□□□1134□□0
13.2	MH□□□□□132-22		E84AV□□□1534□□0
19.4	MH□□□□□160-22		E84AV□□□2234□□0
26.4	MH□□□□□160-32		E84AV□□□3034□□0
32.5	MH□□□□□180-12		E84AV□□□3734□□0

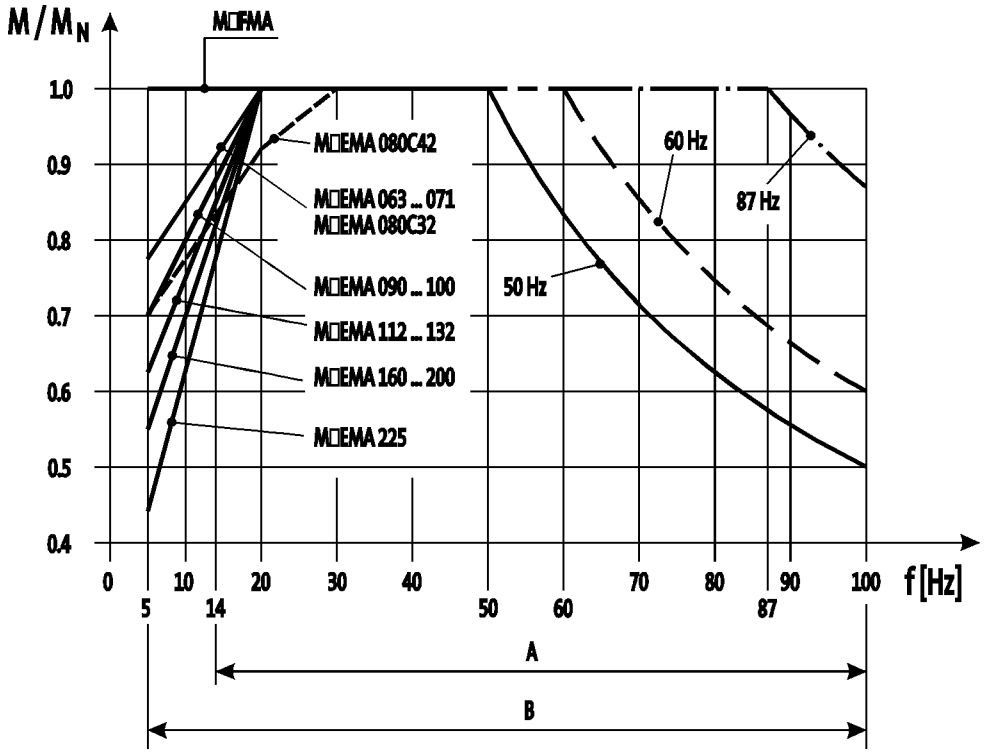


Dimensioning

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 [1] IP65 [1] IP66 [1]
Energy efficiency class			
IEC 60034-30			IE2
IEC 60034-2-1			Methodology for measuring efficiency
Conformity			
CE			Low-Voltage Directive
			2006/95/EC
EAC			TP TC 004/2011 (TR C
Approval			
			UkrSEPRO
CCC			GB Standard 12350-2009
CSA			CSA 22.2 No. 100 CSA C390-10
cURus [2]			UL 1004-1 UL 1004-8 Power Conversion Equipment (File-No. E210321)
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 temperature for operation			
	$T_{opr,max}$	[°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] Designs with different degrees of protection:
IP55 with brake (IP54 with manual release lever).
IP54 with resolver RS1.
IP54 with HTL incremental encoder IG128-24V-H.
[2] Motor frame size 225, in preparation.

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

Rated data for 50 Hz

2-pole motors

	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-11	0.18	2740	230	0.80	400	0.46	4.30
MD□□□□□063-31	0.25	2710	230	1.10	400	0.60	3.70
MD□□□□□071-11	0.37	2720	230	1.50	400	0.90	4.40
MD□□□□□071-31	0.55	2630	230	2.40	400	1.40	3.80

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-11	0.63	1.50	1.50	0.88	66.5	66.0	1.70	3.90
MD□□□□□063-31	0.90	1.90	2.00	0.89	67.0	66.0	1.70	3.80
MD□□□□□071-11	1.29	3.10	2.90	0.92	71.0	69.0	5.10	6.00
MD□□□□□071-31	2.00	3.80	4.20	0.93	70.0	63.0	5.10	6.50

4-pole motors

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-02	0.060	1425	230	0.42	400	0.24	3.50
MD□□□□□063-22	0.090	1375	230	0.48	400	0.28	2.90
MD□□□□□063-12	0.12	1425	230	0.85	400	0.49	3.10
MD□□□□□063-32	0.18	1365	230	1.00	400	0.58	2.70
MD□□□□□063-42	0.25	1370	230	1.40	400	0.82	2.90
MD□□□□□071-32	0.37	1410	230	1.60	400	0.95	3.30
MD□□□□□071-42	0.55	1405	230	2.40	400	1.40	3.50

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.40	1.30	1.36	0.57	59.0	63.0	3.30	3.90
MD□□□□□063-22	0.63	1.30	1.39	0.71	63.0	65.0	3.30	3.90
MD□□□□□063-12	0.80	2.50	2.64	0.56	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.26	2.50	2.61	0.70	63.0	64.0	3.30	4.10
MD□□□□□063-42	1.74	3.80	4.10	0.67	65.0	66.0	3.70	4.40
MD□□□□□071-32	2.51	4.76	5.81	0.77	73.0	73.0	10.7	5.80
MD□□□□□071-42	3.74	7.85	9.12	0.77	74.0	74.0	12.8	6.40

[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.

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 50 Hz

6-pole motors

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

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

[1] Without accessories

Rated data for 60 Hz

- 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.

2-pole motors

	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-11	0.18	3370	265	0.72	460	0.41	5.50
MD□□□□□063-31	0.25	3390	265	0.88	460	0.51	4.80
MD□□□□□071-11	0.37	3360	265	1.30	460	0.76	5.50
MD□□□□□071-31	0.55	3240	265	2.10	460	1.20	4.80

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-11	0.51	1.38	1.38	0.84	68.3	67.8	1.70	3.90
MD□□□□□063-31	0.72	1.74	1.84	0.86	71.1	70.0	1.70	3.80
MD□□□□□071-11	1.05	2.85	2.66	0.91	74.4	72.3	5.10	6.00
MD□□□□□071-31	1.62	3.49	3.86	0.90	73.6	66.3	5.10	6.50

4-pole motors

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-02	0.060	1735	265	0.37	460	0.21	4.40
MD□□□□□063-22	0.090	1695	265	0.43	460	0.25	4.20
MD□□□□□063-12	0.12	1735	265	0.69	460	0.40	4.00
MD□□□□□063-32	0.18	1695	265	0.80	460	0.46	3.60
MD□□□□□063-42	0.25	1680	265	1.30	460	0.75	3.80
MD□□□□□071-32	0.37	1720	265	1.50	460	0.84	3.90
MD□□□□□071-42	0.55	1720	265	2.10	460	1.20	4.10

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.33	1.10	1.36	0.54	60.0	63.0	3.30	3.90
MD□□□□□063-22	0.51	1.10	1.40	0.67	64.9	67.0	3.30	3.90
MD□□□□□063-12	0.66	2.25	2.64	0.55	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.00	2.21	2.56	0.68	65.0	66.0	3.30	4.10
MD□□□□□063-42	1.40	3.71	4.20	0.60	64.0	66.0	3.70	4.40
MD□□□□□071-32	2.05	4.40	5.80	0.74	74.0	75.0	10.7	5.80
MD□□□□□071-42	3.05	7.00	9.00	0.73	76.0	77.0	12.8	6.40

[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.

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 60 Hz

6-pole motors

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

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

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

[1] Without accessories

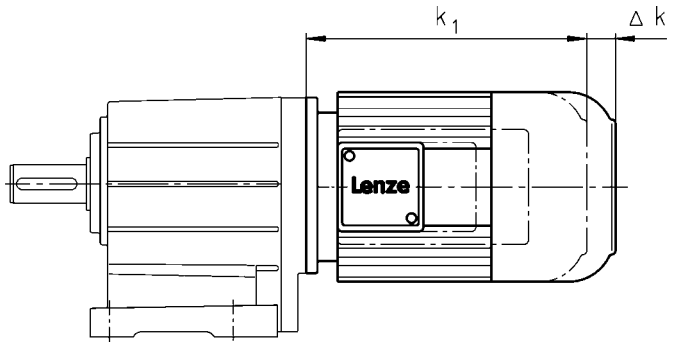
Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos φ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
					± 10 %							
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.11	2535	0.40	1.60	400	0.42	0.55		62.0	67.0	3.30	3.90
MD□□□□□063-22	0.16	2485	0.63	2.50	400	0.48	0.67		66.0	70.0	3.30	3.90
MD□□□□□063-12	0.21	2535	0.80	3.20	400	0.85	0.52		61.0	66.0	3.30	4.10
MD□□□□□063-32	0.33	2475	1.26	5.00	400	1.00	0.65		68.0	71.0	3.30	4.10
MD□□□□□063-42	0.45	2480	1.74	7.00	400	1.40	0.63		66.0	73.0	3.70	4.40
MD□□□□□071-32	0.66	2520	2.51	10.0	400	1.60	0.72		76.0	78.0	10.7	5.80
MD□□□□□071-42	1.00	2515	3.74	15.0	400	2.40	0.74		79.0	80.0	12.8	6.40
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

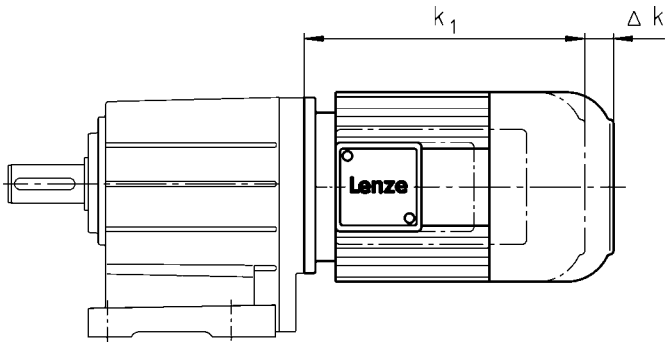
Dimensions, self-ventilated (2-pole)



	Motor type			
	MDEMAXX	MDEMABR	MDEMABL	MDEMALL

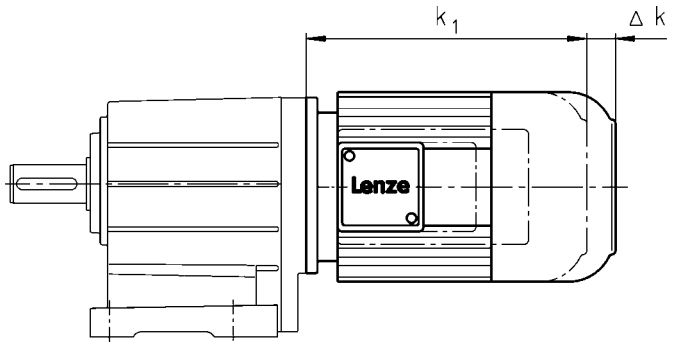
Motor frame size				
	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]
063-11 063-31	0	40		
071-11 071-31		52	52	0

Dimensions, self-ventilated (4-pole)



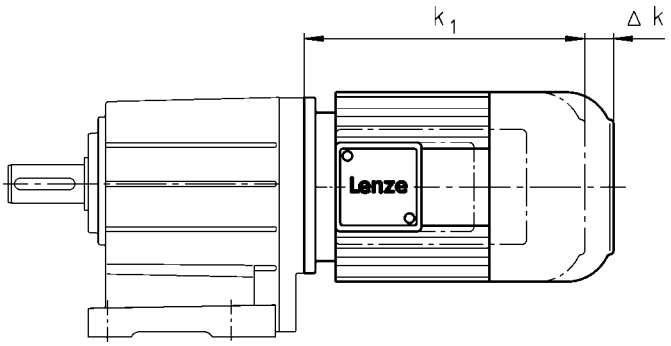
	Motor type					
	MDEMAXX	MDEMABR	MDEMABS MDEMABI MDEMABA	MDEMABL	MDEMARS MDEMAIG MDEMAAG	MDEMALL
Motor frame size						
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-02 063-22	0	71	135		71	
063-12 063-32 063-42		40	103		56	
071-32 071-42		52	96	52	52	0

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

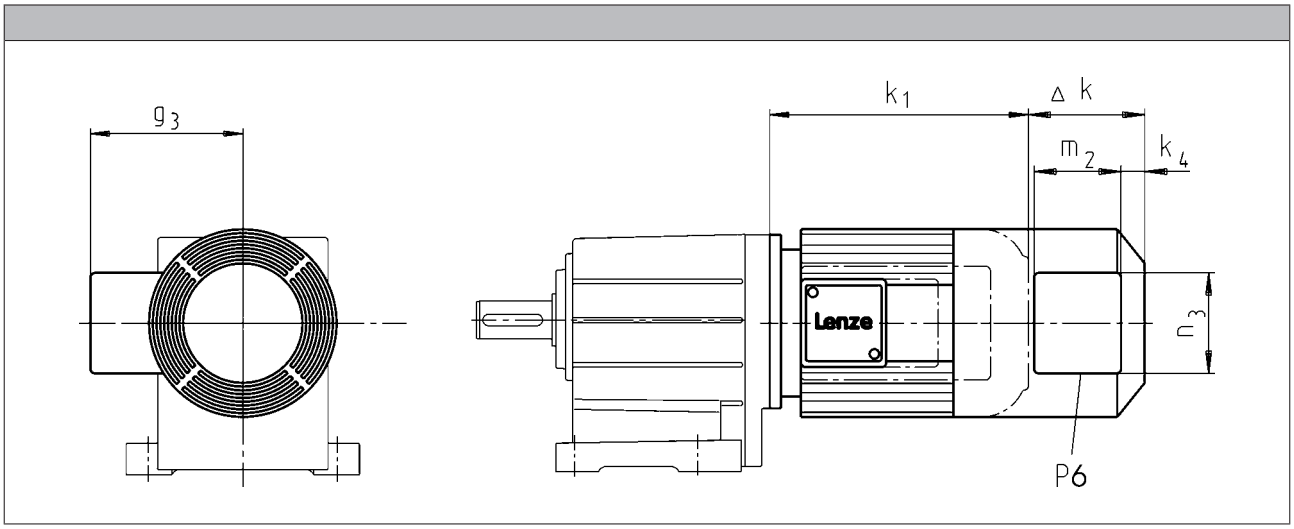
Dimensions, self-ventilated (6-pole)



	Motor type					
	MDEMAXX	MDEMABR	MDEMABS MDEMABI MDEMABA	MDEMABL	MDEMARS MDEMAIG MDEMAAG	MDEMALL

Motor frame size						
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-13 071-33	0	52	96	52	52	0
080-13 080-33		73	111	73	111	4

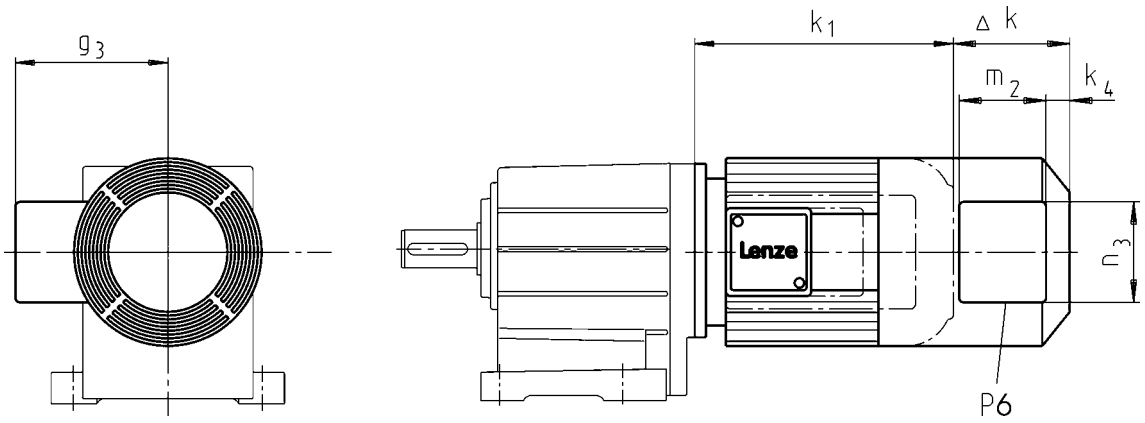
Dimensions, forced ventilated (2-pole)



Motor type							
	MDFMAXX	MDFMABR					

Motor frame size							
	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-11 063-31	128	170	12	115	95	105	1x M16x1.5
071-11 071-31		165		122			

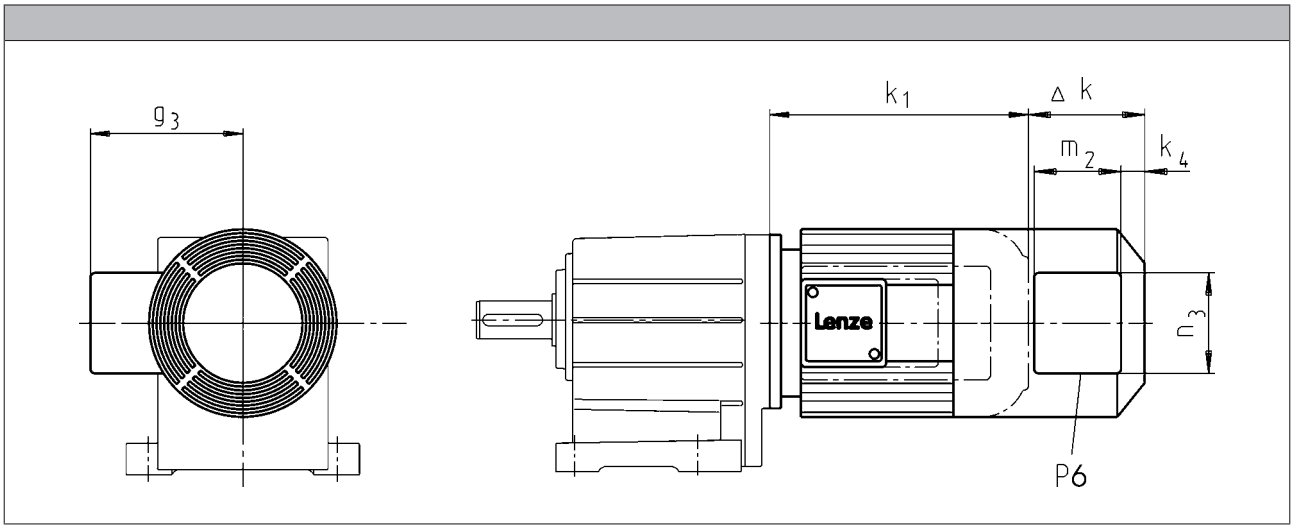
Dimensions, forced ventilated (4-pole)



Motor type									
	MDFMAXX	MDFMABR	MDFMABS MDFMABI MDFMABA	MDFMARS MDFMAIG MDFMAAG					

Motor frame size									
	Δ k	Δ k	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-12 063-32 063-42	128	170	170	128	12	115	95	105	1x M16x1.5
071-32 071-42		165	165			122			

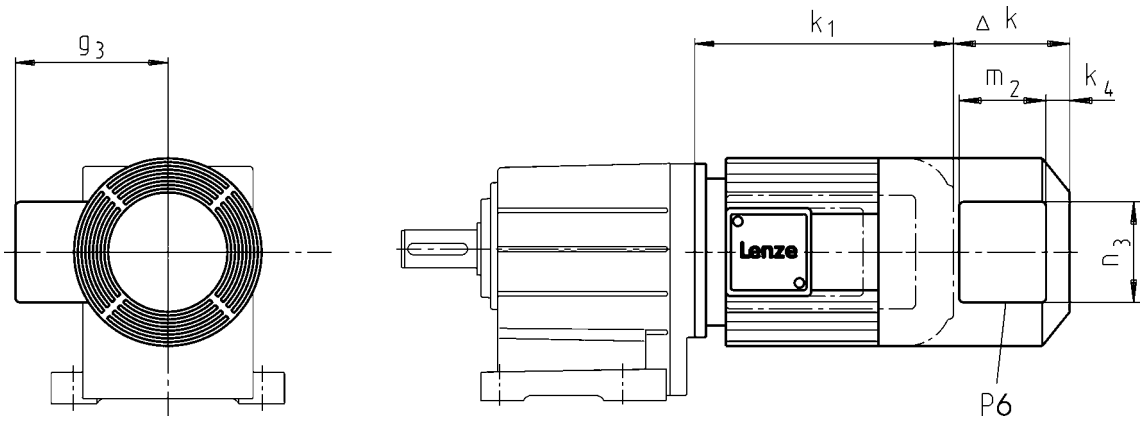
Dimensions, forced ventilated (4-pole)



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, forced ventilated (6-pole)

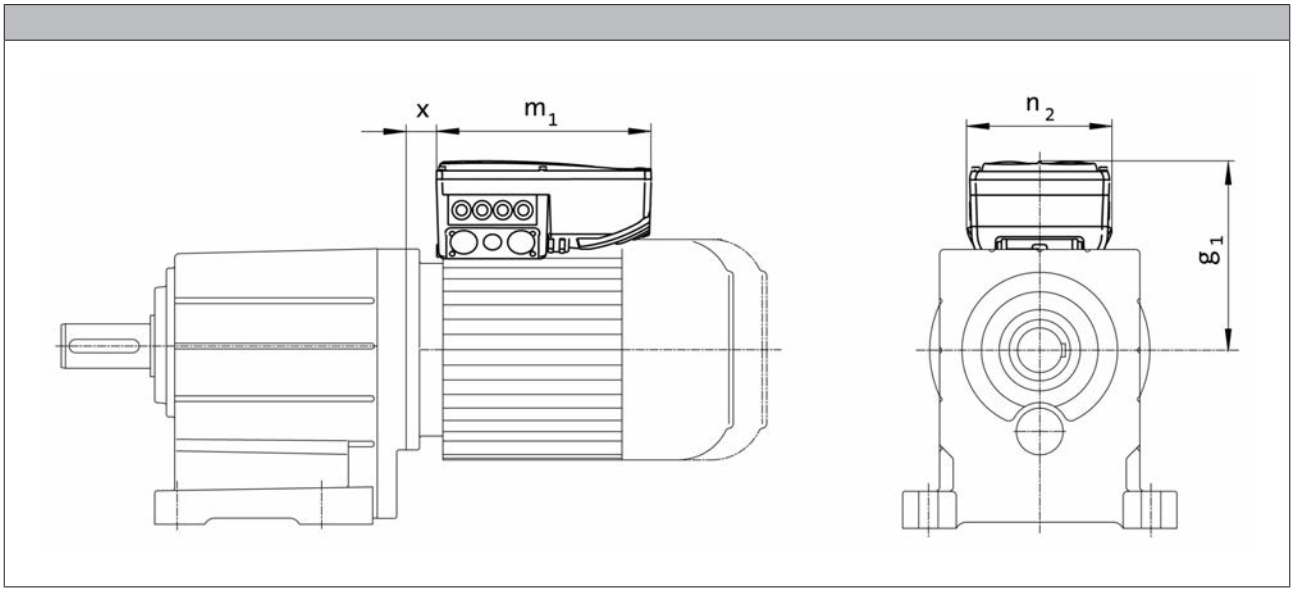


Motor type									
	MDFMAXX	MDFMABR	MDFMABS MDFMABI MDFMABA	MDFMARS MDFMAIG MDFMAAG					

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

Dimensions, 8400 motec inverter

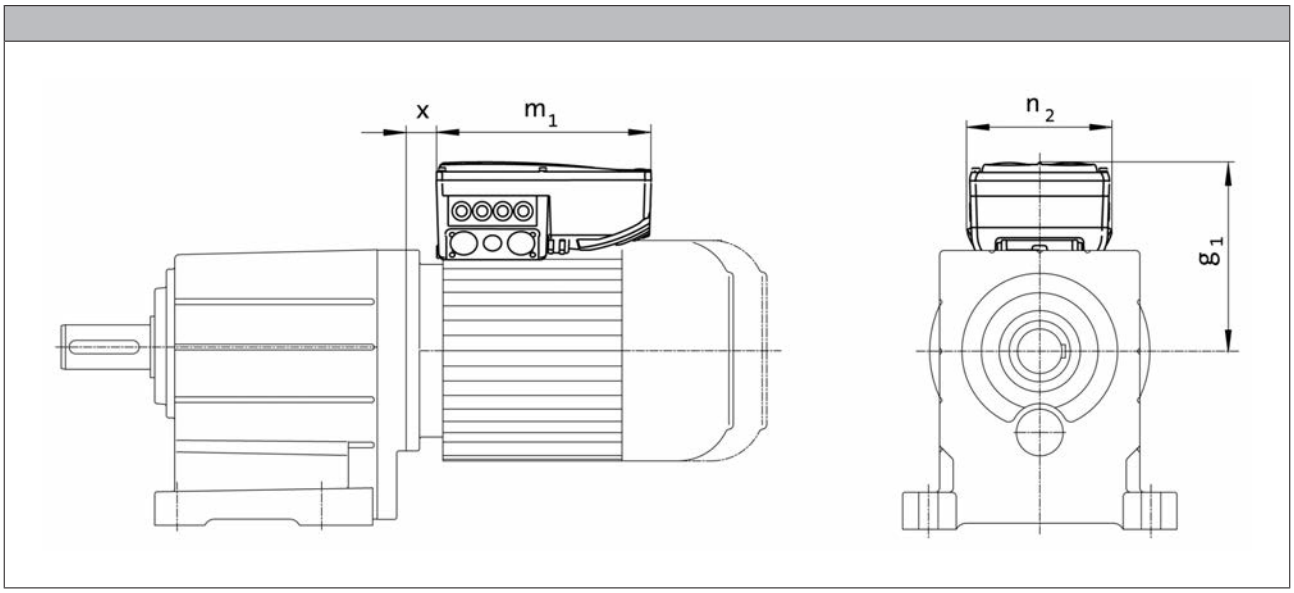
Rated frequency 50/60 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□071-32	E84DVB□3714S□□□2□	163	241	161	21.0
MD□□□□□071-42	E84DVB□5514S□□□2□				
MH□□□□□080-32	E84DVB□7514S□□□2□	172			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]
MD□□□□□063-32	E84DVB□3714S□□□2□	154	241	161	18.8
MD□□□□□063-42	E84DVB□5514S□□□2□				
MD□□□□□071-32	E84DVB□7514S□□□2□	163			21.0
MD□□□□□071-42	E84DVB□1124S□□□2□				
MH□□□□□080-32	E84DVB□1524S□□□2□	172			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 brakes

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 2-pole motors and brakes

Design	Standard		LongLife	
Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-11	06	2.50	06	2.50
063-31	06	4.00	06	4.00
071-11	06	2.50	06	4.00
071-31	06	4.00	08	3.50
	08	3.50		

Spring-applied brakes

Assignment of 4-pole motors and brakes

Design	Standard	LongLife

Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-02 063-12 063-22 063-32 063-42	06 06	2.50 4.00	06	4.00
071-12 071-32	06 06 08	2.50 4.00 3.50	06 08	4.00 3.50
071-42	06 06 08 08	2.50 4.00 3.50 8.00	06 08 08	4.00 3.50 8.00
080-32	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 brakes

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 brakes

Assignment of 6-pole motors and brakes

Design	Standard		LongLife	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
071-13 071-33	06 06 08	2.50 4.00 3.50	06 08	4.00 3.50
080-13 080-33	08 08 10	3.50 8.00 7.00	08 08 10	3.50 8.00 7.00

Spring-applied brakes

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

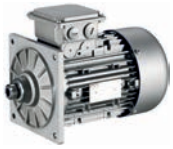
- Ratio of supply voltage to brake coil voltage = 1.11
- Supply voltage
  AC 230 V

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 brakes

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

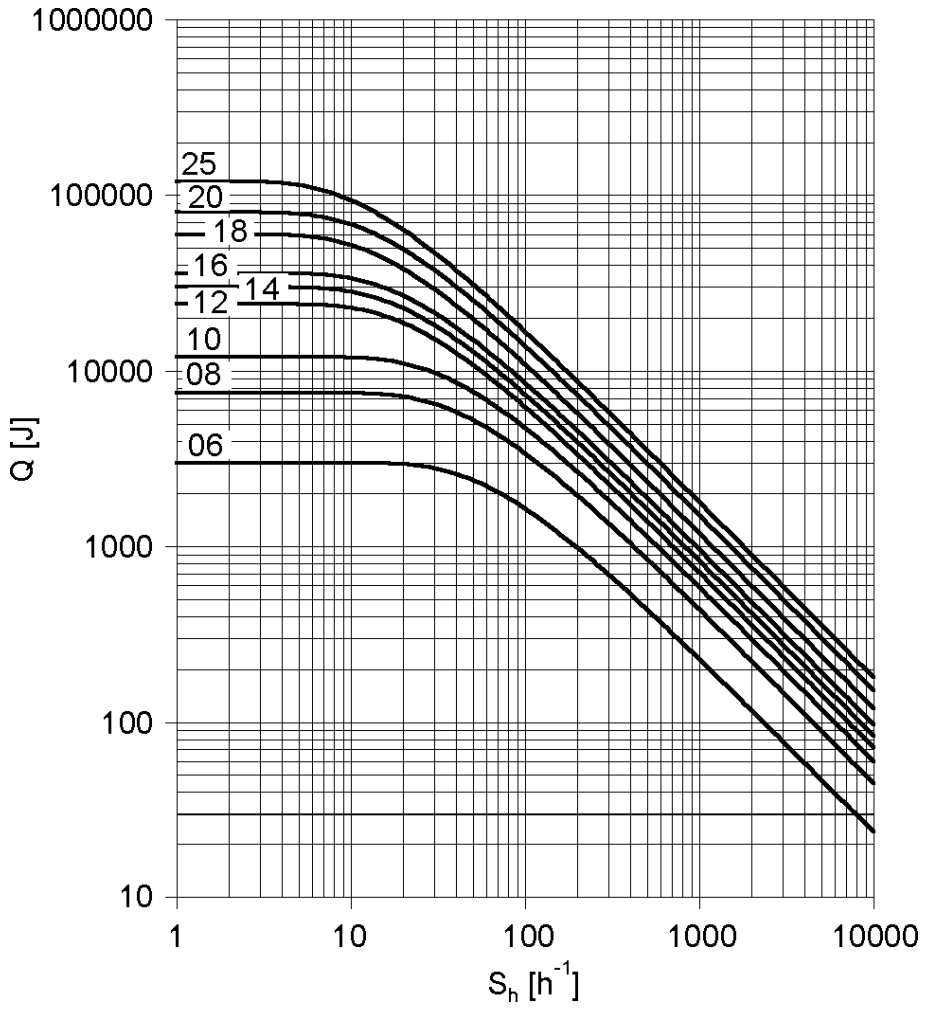
Supply voltages:
- AC 230 V
- AC 400 V

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 brakes

Permissible friction energy



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

Spring-applied brakes

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 brakes

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 brakes

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 brakes

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 brakes

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 brakes

Rated data with increased braking torque

► Activation via bridge/half-wave rectifier

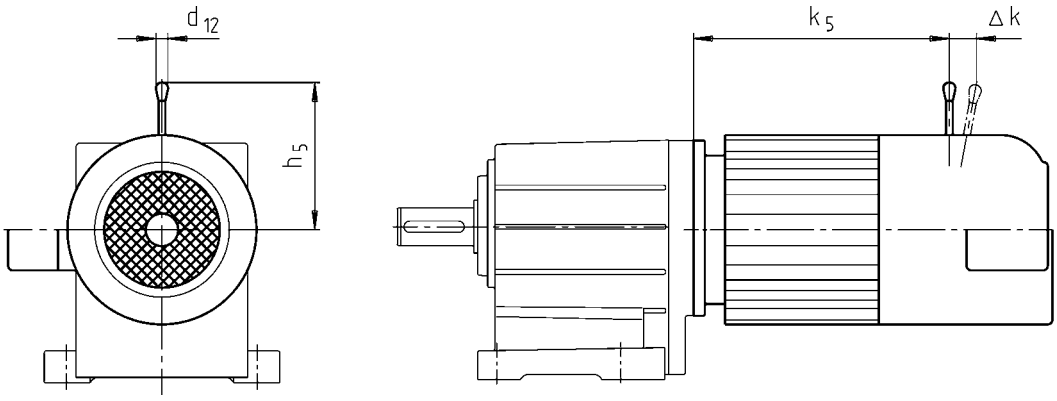
Design			Holding current reduction (cold brake)									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Overexcitation time												
	$t_{ü}$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
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 brakes

Manual release lever



Motor frame size			Size				
			Brake				
				k_5	Δ k	h_5	d_{12}
				[mm]	[mm]	[mm]	[mm]
	063-02 063-22		06	185	29	107	13.0
063-11 063-31	063-12 063-32 063-42		06	173	29	107	13.0
071-11 071-31	071-32 071-42	071-13 071-33	06 08	186 187	29 27	107 116	13.0 13.0
	080-32	080-13 080-33	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	59 55	279 240	24.0 24.0
	160-32		16 18	464 467	55 59	240 279	24.0 24.0
	180-12 180-32		18 20	539 546	59 74	279 319	24.0 24.0
	180-42		18 20	596 603	59 74	279 319	24.0 24.0
	225-12 225-22		25 25	785 785	103 103	445 445	24.0 24.0

The following combinations with manual release lever and motor connection in the same position are not possible:
- HAN connector with connection in position 1
- Inverter motec
- Terminal box of motor sizes 071, 080, 090 for brake and retracting (M□□MA BR/BS/BA/BI)

Resolver

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

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

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

Incremental encoder and SinCos absolute value encoder

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

Encoder type			HTL incremental				TTL incremental			SinCos absolute value
Product key			IG128-24V-H	IG512-24V-H	IG1024-24V-H	IG2048-24V-H	IG512-5V-T	IG1024-5V-T	IG2048-5V-T	AM1024-8V-H
Encoder type										Multi-turn
Pulses			128	512	1024	2048	512	1024	2048	1024
Output signals			HTL				TTL			1 Vss
Interfaces			A, B track	A, B, N track and inverted						Hiperface
Absolute revolutions			0							4096
Accuracy		[']	-22.5 ... 22.5	-2 ... 2						-0.8 ... 0.8
Min. input voltage										
DC	$U_{in,min}$	[V]	8.00				4.75			7.00
Max. input voltage										
DC	$U_{in,max}$	[V]	26.0	30.0			5.25			12.0
Max. current consumption										
	I_{max}	[A]	0.040	0.15						0.080
Limit frequency										
	f_{max}	[kHz]	30.0	160			300			200
Inverter assignment			E84AVSC E84AVHC	E84AVHC			E84AVTC E94A ECS EVS93			

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

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

Blowers

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

Rated data for 50 Hz

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

Blowers

Rated data for 50 Hz

Size	Number of phases	Connection method					
Motor							
			U_{min}	U_{max}	P_{max}	I_{max}	m
			[V]	[V]	[kW]	[A]	[kg]
200	1		230	277	0.25	0.97	8.00
	3	Δ	200	303		0.87	
		Y	346	525		0.50	
225		Δ	200	400	0.28	1.10	15.0
		Y	346	525	0.17	0.35	

Rated data for 60 Hz

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

Temperature monitoring

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

TKO thermal contacts

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

PTC thermistor

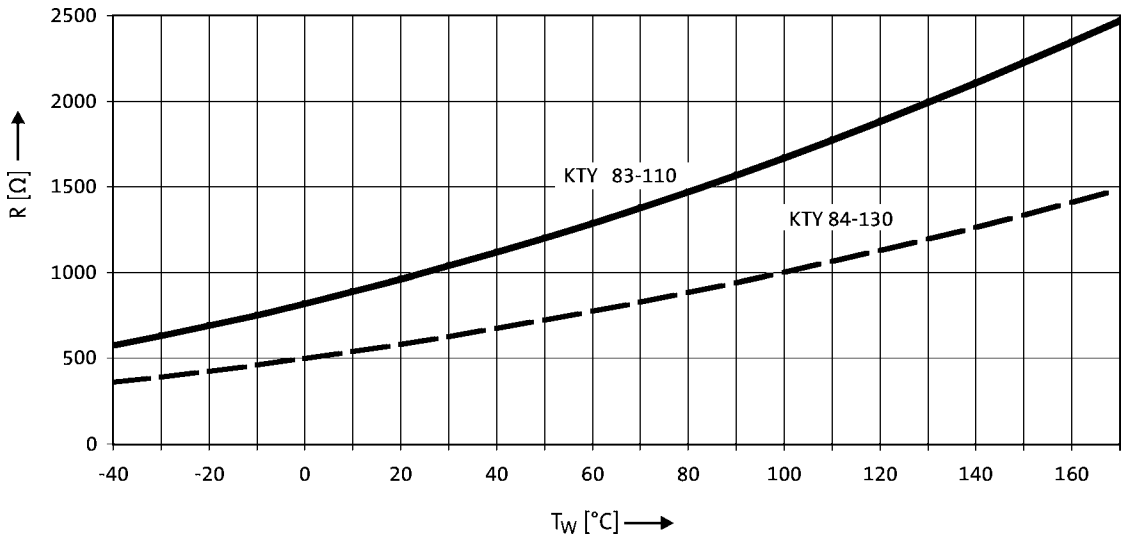
Function	Operating temperature	Rated resistance			Standard
		155 °C	-20 °C	140 °C	
	T	R_N	R_N	R_N	
	-5 ... 5				
	[°C]	[Ω]	[Ω]	[Ω]	
Sudden change in resistance	150	550	30.0	250	DIN 44080 DIN VDE 0660 Part 303

Temperature monitoring

KTY temperature sensor

	Function	Rated resistance			Max. input current	
		25 °C	150 °C	170 °C	25 °C	170 °C
		R_N	R_N	R_N	$I_{in,max}$	$I_{in,max}$
		[Ω]	[Ω]	[Ω]	[A]	[A]
KTY83-110	Continuous resistance change	1000	2225	2471	0.010	0.002
KTY84-130	Continuous resistance change	603	1334	1482	0.010	0.002

Variation of resistance



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

Terminal box

The three-phase AC motors are designed for operation at a constant mains frequency and with an inverter.
For 50 Hz operation, the motors are operated in Δconfiguration at 230 V or in star configuration at 400 V.
For inverter operation, the base frequency has been specified as 87 Hz at a rated voltage of 400 V in Δconfiguration.

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

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

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

Terminal box

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

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

Terminal box

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

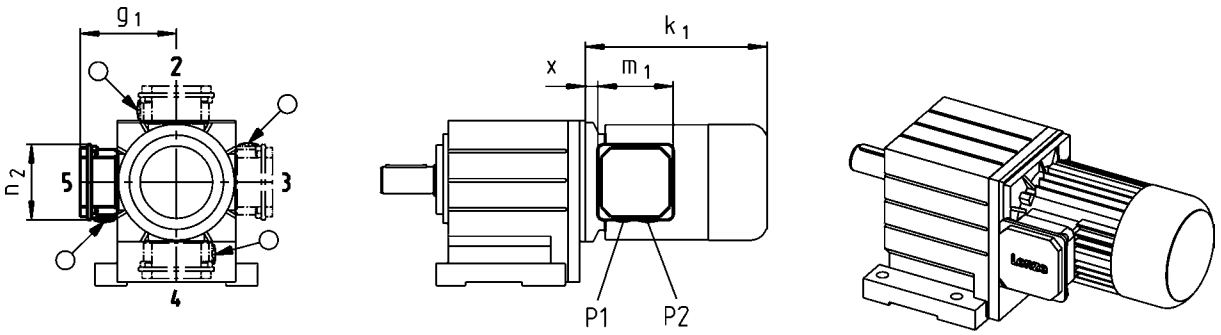
Motor type	M□□MAXX	M□□MAZE	M□□MALL	M□□MALZ
Motor frame size				
	Terminal box			
063-11 063-31	KK1			
071-11 071-31	KK1	KK2	KK1	KK2
080-11 080-31	KK1	KK2	KK1	KK2
090-31 090-11	KK1	KK2	KK1	KK2
100-31 100-41	KK1	KK2	KK1	KK2
112-31 112-41	KK1	KK2	KK1	KK2
132-21	KK1	KK3	KK1	KK3

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

Terminal box

Dimensions of KK1

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



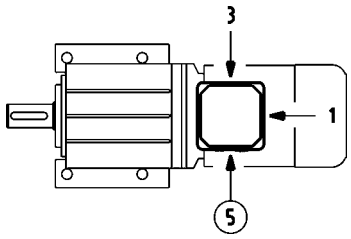
Size						
Motor						
	x	g_1	m_1	n_2	P_1	P_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	21 12 [1)]	100 117 [1)]	75.0 93.0 [1)]	75.0 93.0 [1)]	M16x1.5 M20x1.5 [1)]	M20x1.5 M20x1.5
071	24 15 [1)]	109 126 [1)]				
080	14	150	115	115	M20x1.5	M25x1.5
090	19	157				
100	20	166				
112	22	176				
132	33	195	122	122	M32x1.5	M32x1.5

[1)] UL/CSA approval: cURus

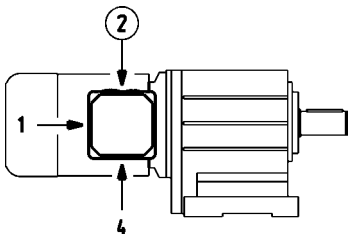
Terminal box

Cable entry position when using KK1

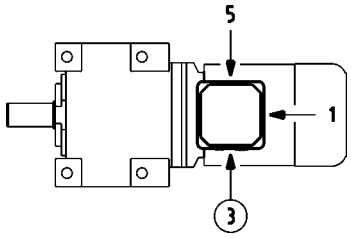
Terminal box in position 2



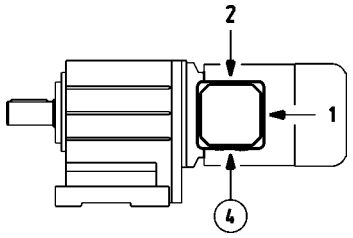
Terminal box in position 3



Terminal box in position 4

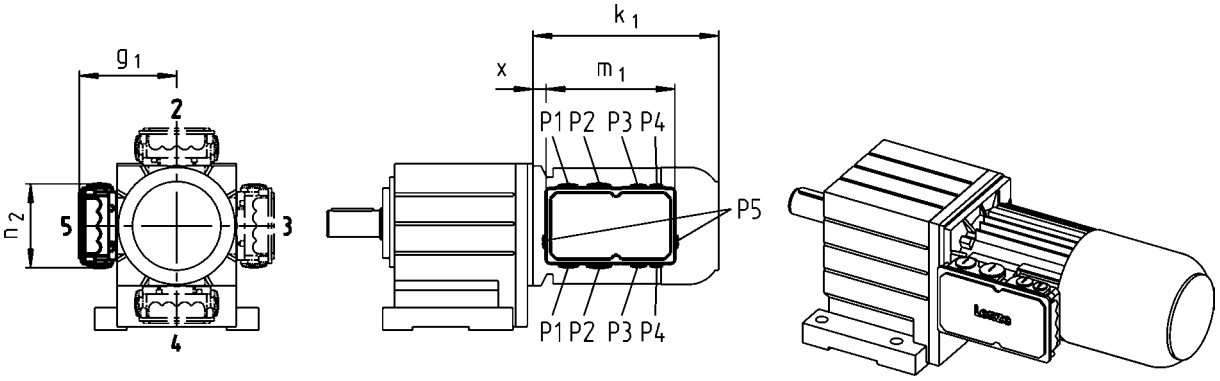


Terminal box in position 5



Terminal box

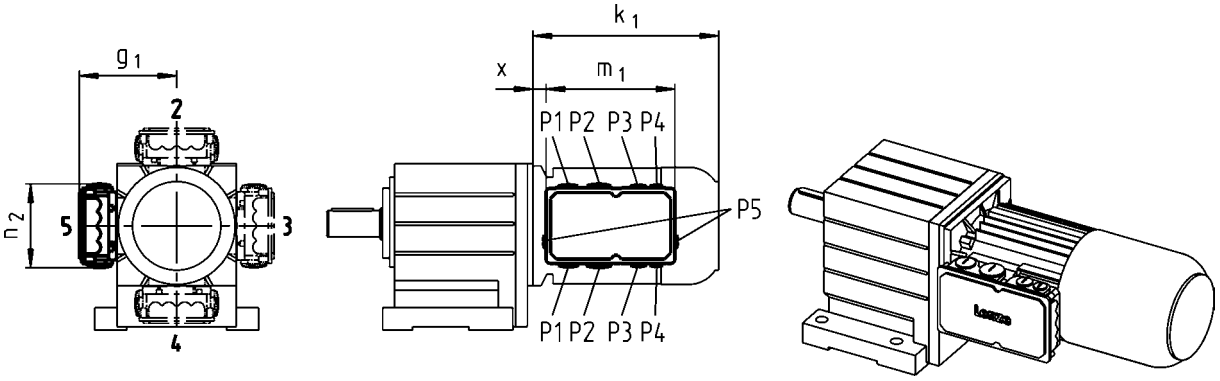
Dimensions of KK2



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

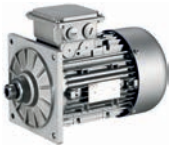
Terminal box

Dimensions of KK3



Size									
Motor									
	x	g_1	m_1	n_2	P_1	P_2	P_3	P_4	P_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	2	124	195	125	M25x1.5	M32x1.5	M20x1.5	M20x1.5	
071	5	133							
080	15	142							
090	20	147							
100	21	158							
112	23	168							
132	38	187							
160	35	210	226	127	M50x1.5	M16x1.5		M16x1.5	
180	73	230							
225	95	346	354	205		M63x1.5 [1)]	M50x1.5 [1)]		M16x1.5

[1)] Cable entry only possible at one position.
Terminal box position 2: cable entry at position 5.
Terminal box position 3: cable entry at position 2.
Terminal box position 4: cable entry at position 3.
Terminal box position 5: cable entry at position 4.

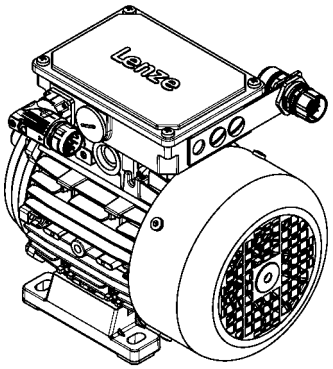


Plug connectors

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

ICN connector

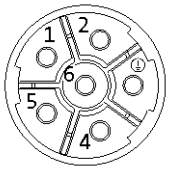
A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



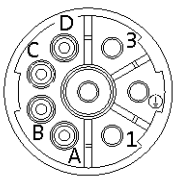
Connection for power, brake and temperature monitoring

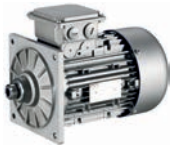
The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As this connector is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and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

► ICN 6-pole

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

► ICN 8-pole

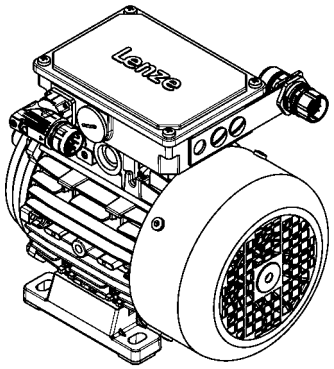
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	V	Phase V power	
4	W	Phase W power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake /AC	



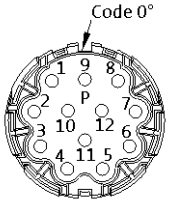
ICN connector

Feedback connection

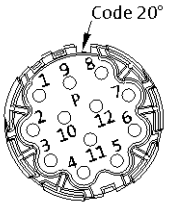
All encoder systems (apart from IG128-24V-H) are also available with an ICN connector fixed to the motor terminal box for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing mating connectors can therefore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



► Resolver

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

► Hiperface incremental encoder and SinCos absolute value encoder

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

ICN connector

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

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

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

ICN connector

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

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

ICN connector

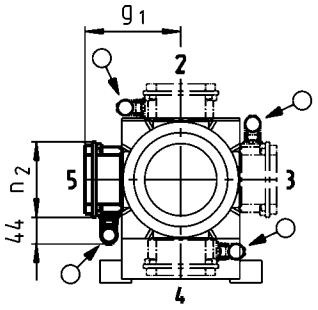
Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

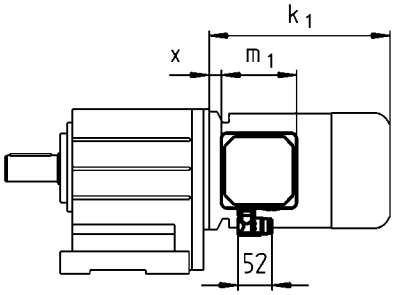
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size				
	Terminal box with ICN connector			
063-02 063-22	KK2	KK2		
063-12 063-32 063-42	KK2	KK2		
071-32 071-42 071-13 071-33	KK2	KK2	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK2	KK2	KK2
090-12 090-32	KK2	KK2	KK2	KK2
100-12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

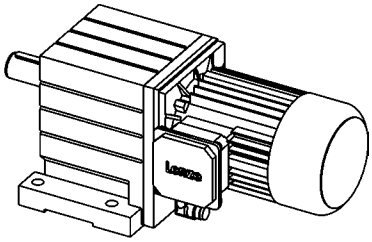
ICN connector

Dimensions of KK1

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





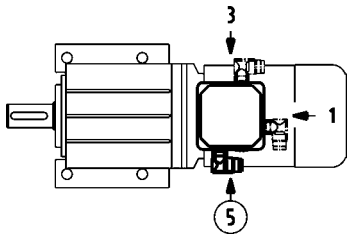


Size				
Motor				
	x	g_1	m_1	n_2
	[mm]	[mm]	[mm]	[mm]
063	12	117	93.0	93.0
071	15	126		
080	14	150	115	115
090	19	157		
100	20	166		
112	22	176		
132	33	195	122	122

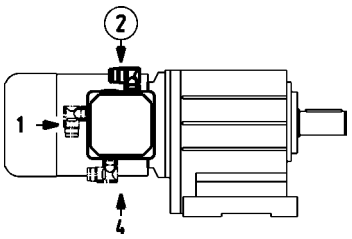
ICN connector

Connector position when using KK1

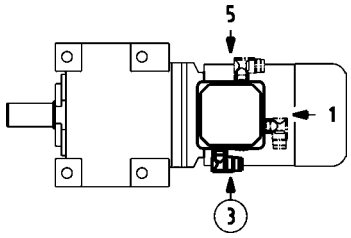
Terminal box in position 2



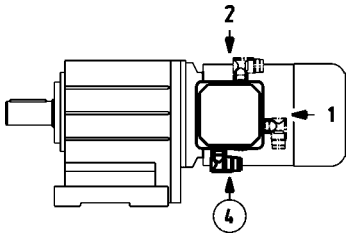
Terminal box in position 3



Terminal box in position 4



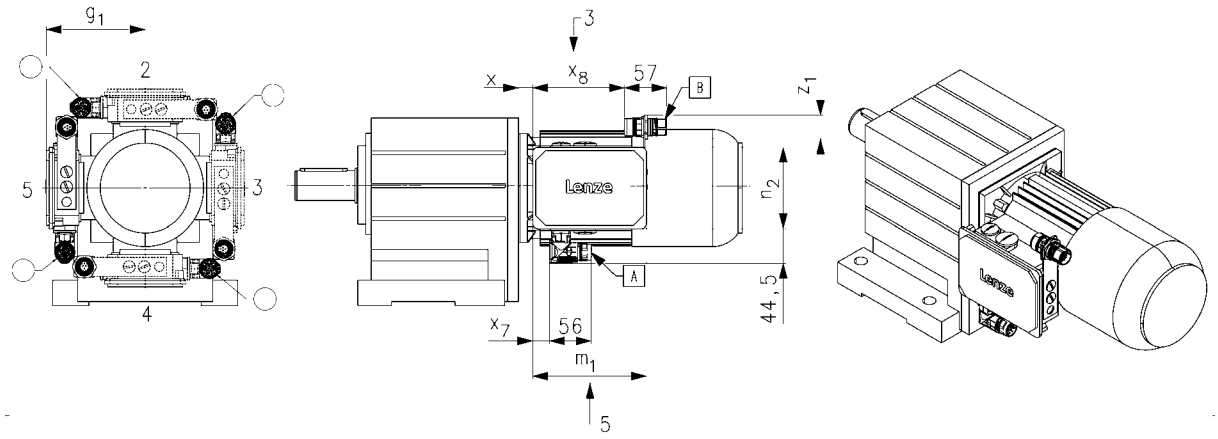
Terminal box in position 5



ICN connector

Dimensions of KK2/KK3

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

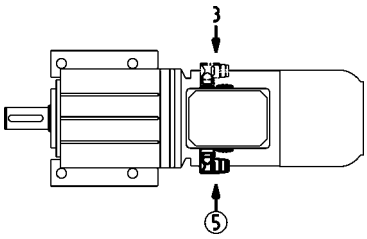


Size							
Motor							
	x	g_1	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	16	109	43
071	15	118					
080	17	132	152	121	23	125	41
090	22	137					
100	23	147					
112	25	158					
132	38	187	195	125	27	166	71

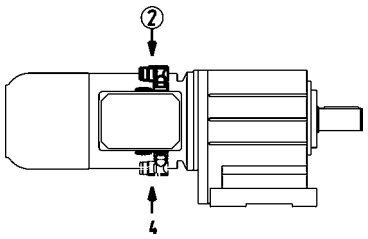
ICN connector

Connector position when using KK2/KK3

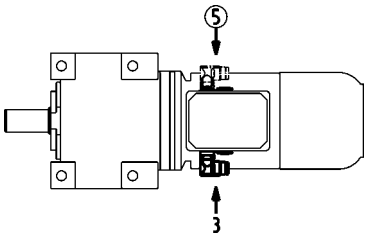
Terminal box in position 2



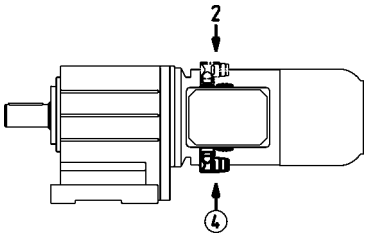
Terminal box in position 3

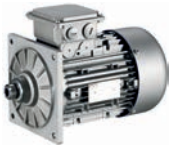


Terminal box in position 4



Terminal box in position 5

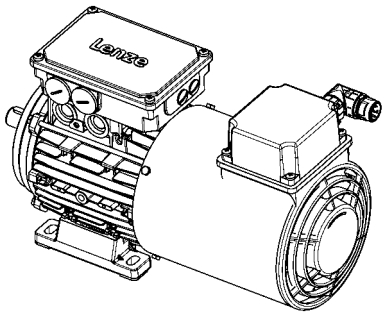




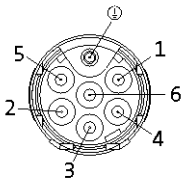
ICN connector

Blower connection

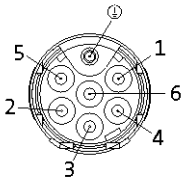
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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



► Blower 1-ph

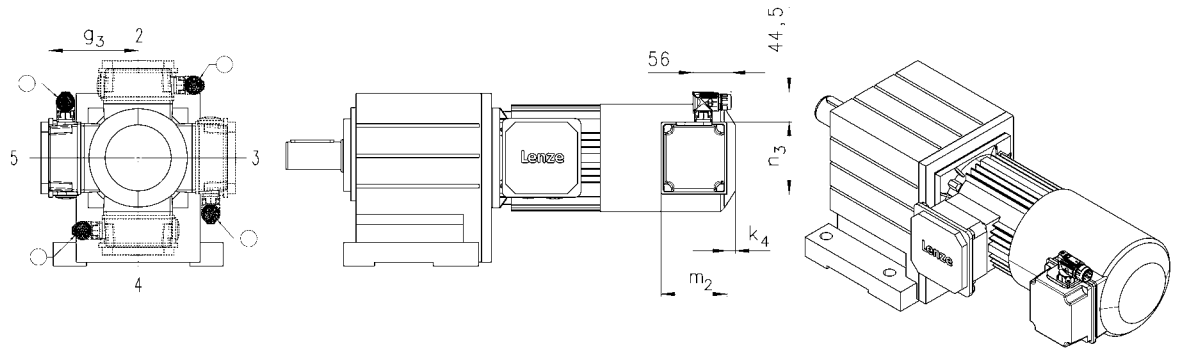
Pin assignment			
Contact	Designation	Meaning	
PE	PE	PE conductor	
1	U1	Fan	
2	U2		
3		Not assigned	
4			
5			
6			

► Blower 3-ph

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

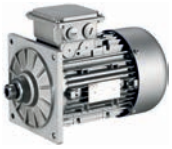
ICN connector

Dimensions of blower



Size				
Motor				
	k_4	g_3	m_2	n_3
	[mm]	[mm]	[mm]	[mm]
063	12	115	95	105
071		122		
080	13	132	96	106
090	22	141	95	105
100		150		
112		162		
132	32	182		
160	31	209	96	106
180				
225				

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

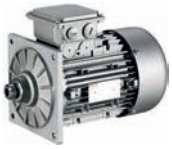


M12 connector

IG128-24V-H incremental encoder connection

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

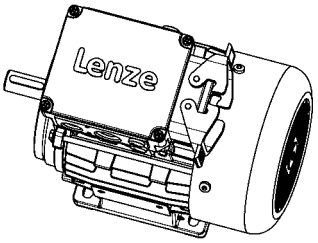
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

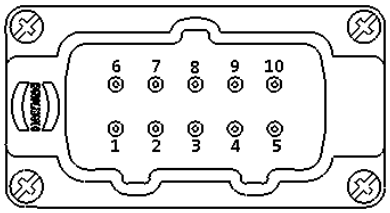


HAN connector

10E

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

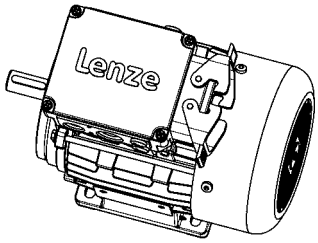


Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	

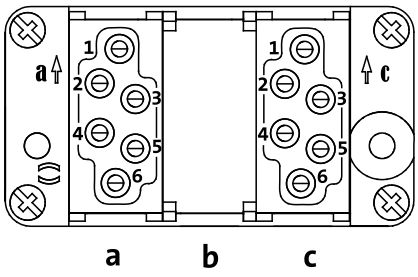
HAN connector

Modular

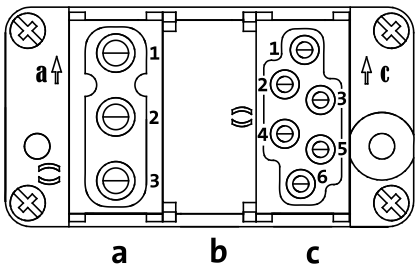
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.



► HAN modular 16 A

Pin assignment			
Module	Contact	Meaning	
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 modular 40 A

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

HAN connector

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

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

HAN connector

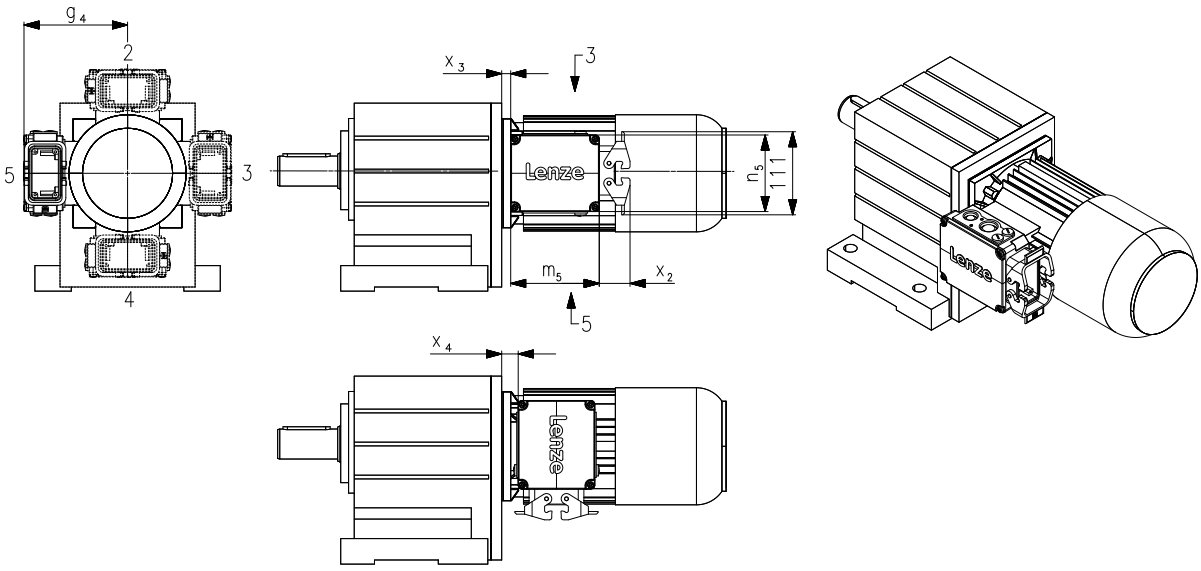
Motor terminal box with HAN connectors - built-on accessories assignment: 4-pole / 6-pole motors

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

HAN connector

Dimensions

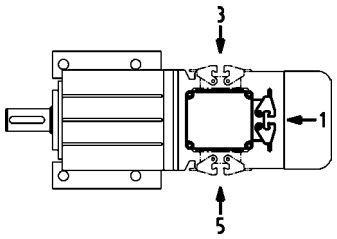
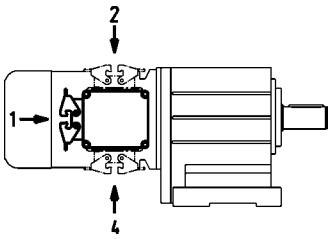
- For motors with connectors, the connector position can be selected in accordance with the terminal box position.
- Unless the connector position is specified, it will be supplied in position 1.

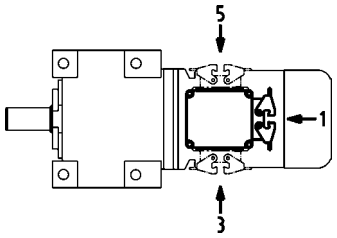
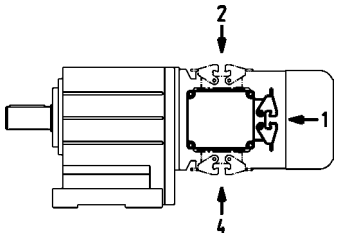


Size			
Motor			
	g_4	x_3	x_4
	[mm]	[mm]	[mm]
063	120	5.00	6.00
071	129	7.00	8.00
080	138	11.0	19.0
090	143	15.0	23.0
100	154	16.0	24.0
112	164	13.5	21.5
132	233	34.5	4.50
160	248	39.0	9.00

HAN connector

Position of connector

Connector in position 2	Connector in position 3
	

Connector in position 4	Connector in position 5
	

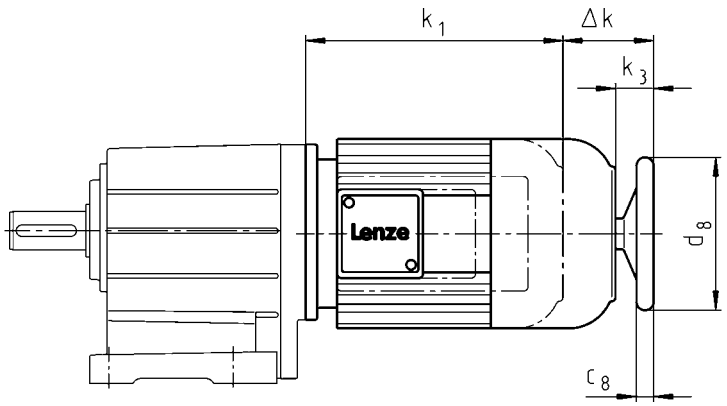
Handwheel

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

Size	Moment of inertia	Mass
Motor	Additional	Additional
	J	m
	[kgcm²]	[kg]
071	16.0	0.60
080	16.0	0.60
090	16.0	0.60
100	16.0	0.60
112	16.0	0.60
132	139	1.80

Handwheel

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



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

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

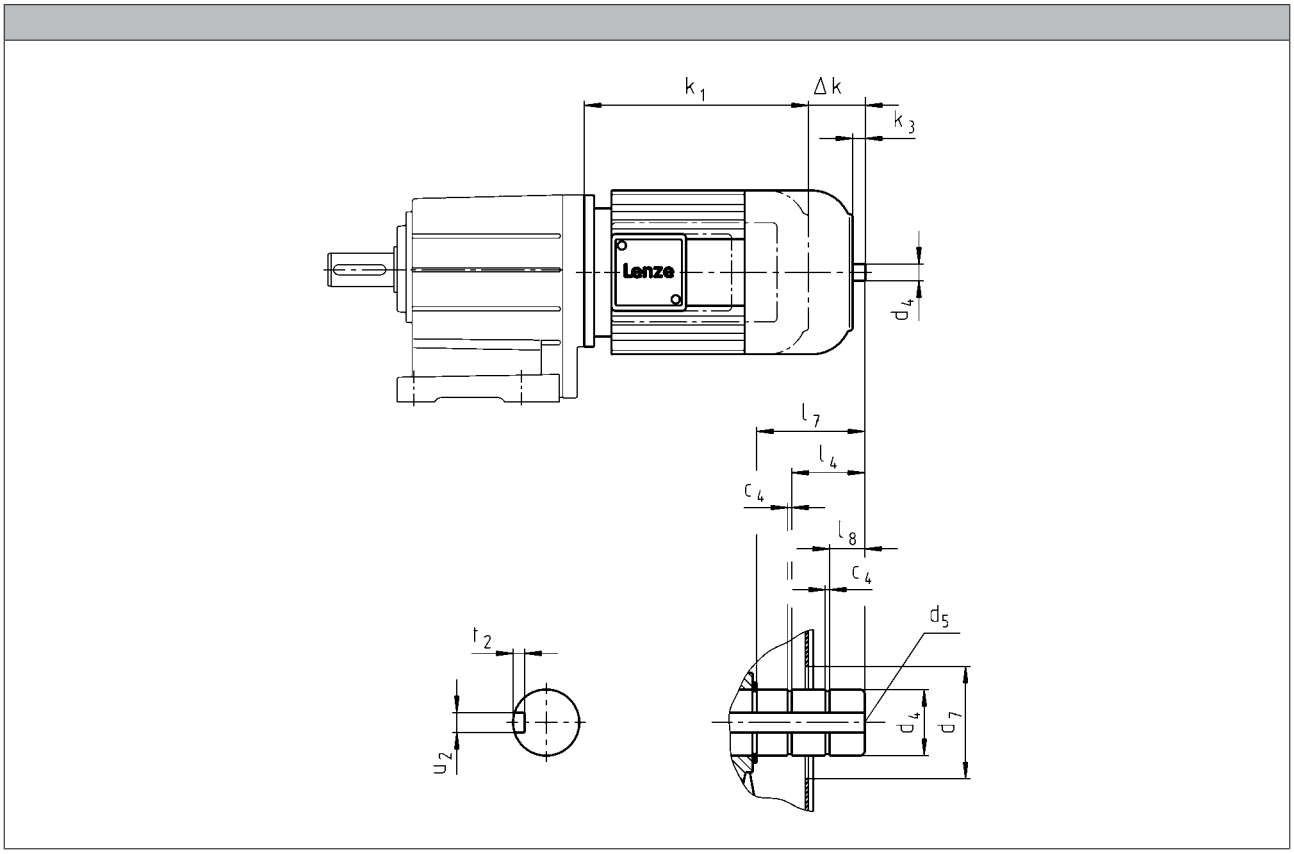
Centrifugal mass

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

	Moment of inertia	**Mass**
Motor frame size	Additional	Additional
	J	m
	[kgcm²]	[kg]
071	18.0	1.20
080	29.0	1.40
090-□1	83.0	2.80
090-□2	55.0	2.00
100	77.0	2.50
112	153	3.80
132	356	6.00

2nd shaft end

Dimensions, self-ventilated (2-pole)



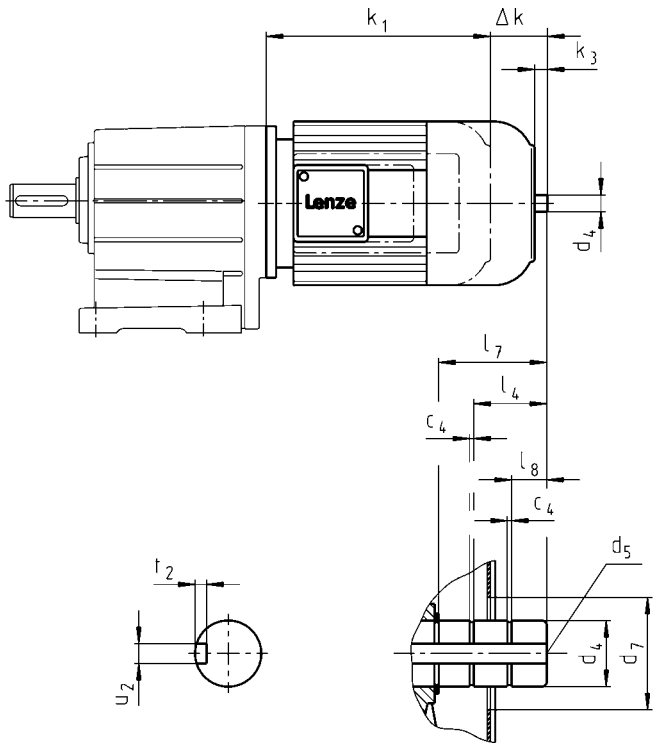
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

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

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

2nd shaft end

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



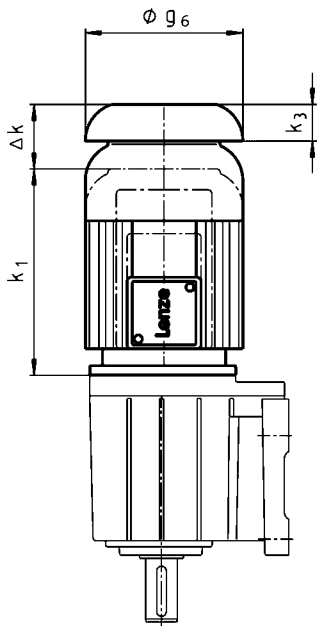
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

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

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

Protection cover

Dimensions, self-ventilated (2-pole)

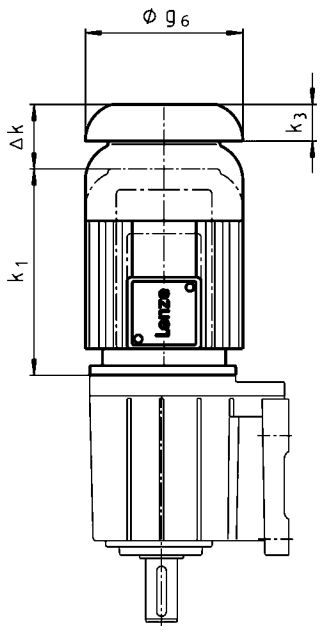


	Motor type					
	M□□MAXX	M□□MABR	M□□MABL	M□□MALL		

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

Protection cover

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

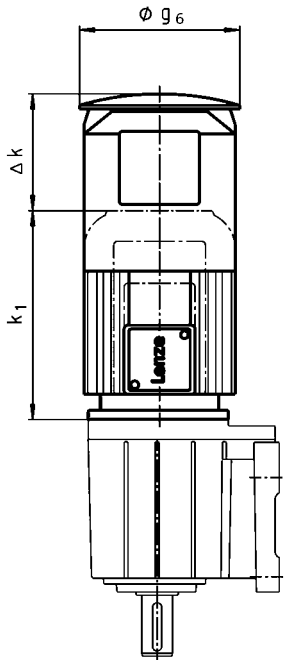


Motor type								
	M□□MAXX	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABL	M□□MARS M□□MAIG M□□MAAG	M□□MALL		

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

Protection cover

Dimensions, forced ventilated (2-pole)

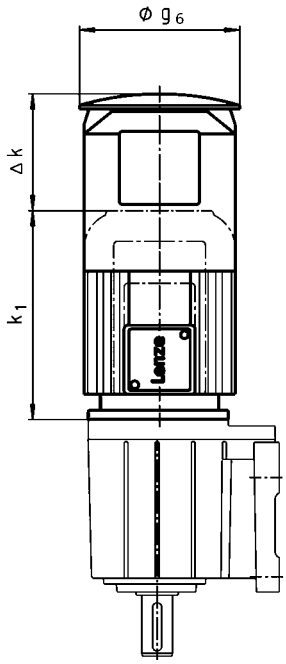


	Motor type		
	M□□MAXX	M□□MABR	

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

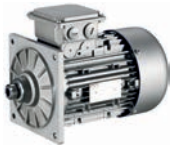
Protection cover

Dimensions, forced ventilated (4/6-pole)



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

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



Internet version

Lenze SE
Hans-Lenze-Straße 1
D-31855 Aerzen
Phone: +49 (0)5154 82-0
Telefax: +49 (0)5154 82 28 00

www.Lenze.com