L-force catalogue

Automation systems
Drive solutions

Controls
Inverters
Motors
Gearboxes
Engineering Tools

Motors: MH three-phase AC motors

Gearboxes: g500-S shaft-mounted helical 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.

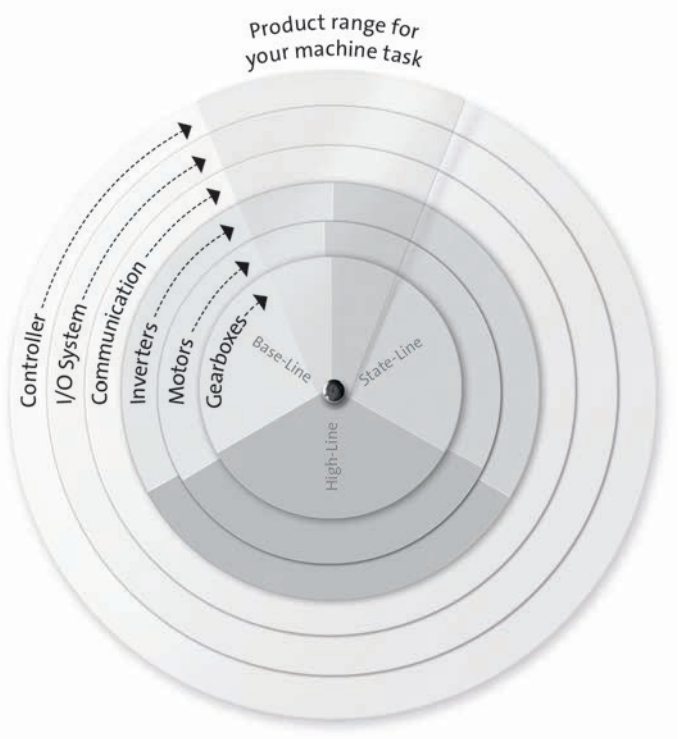
A matter of principle: the right products for every application.

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.

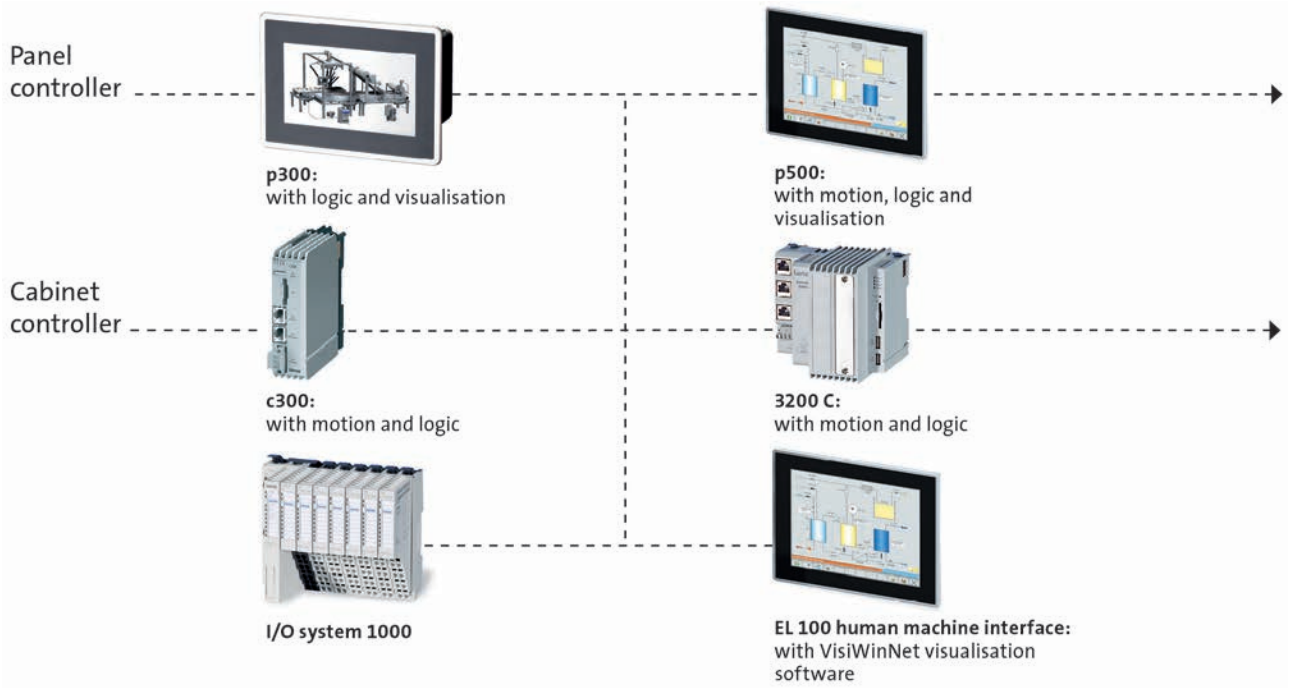
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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!

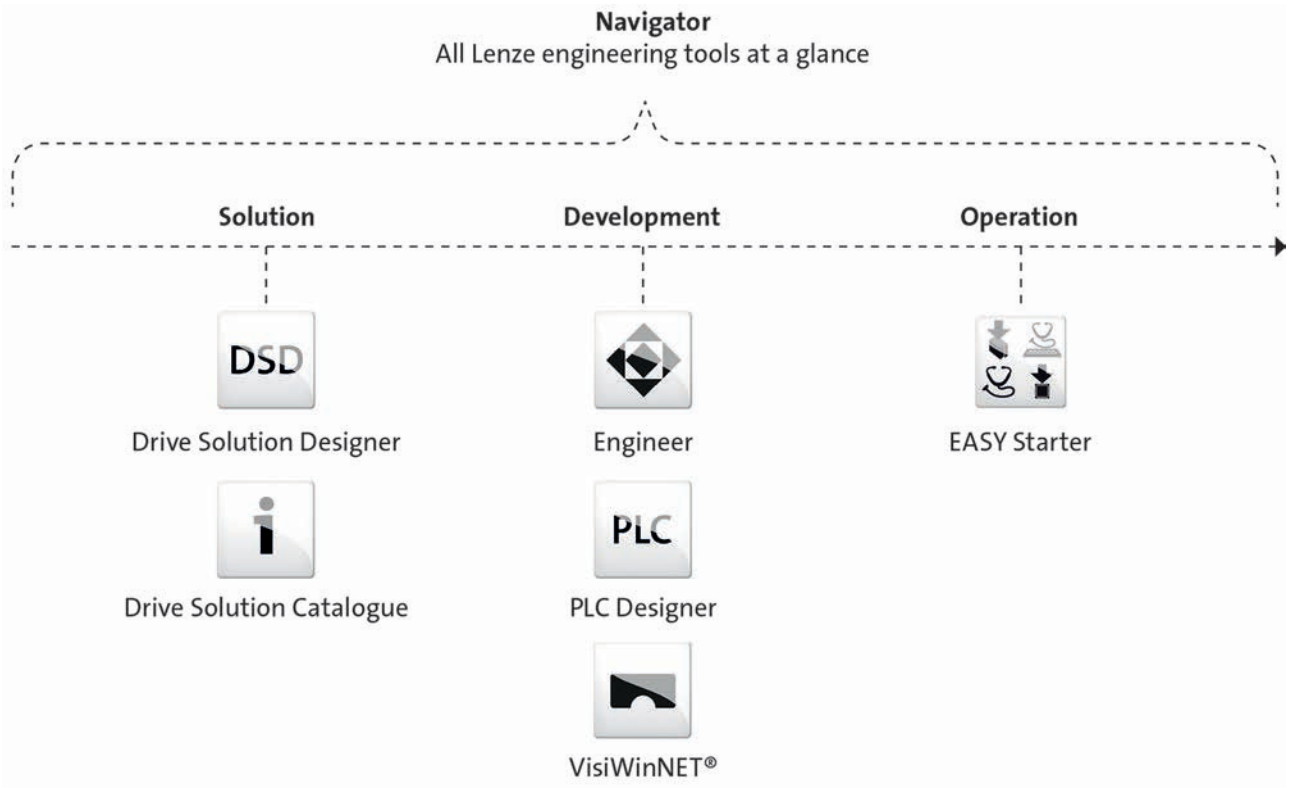


L-force product portfolio

Controls

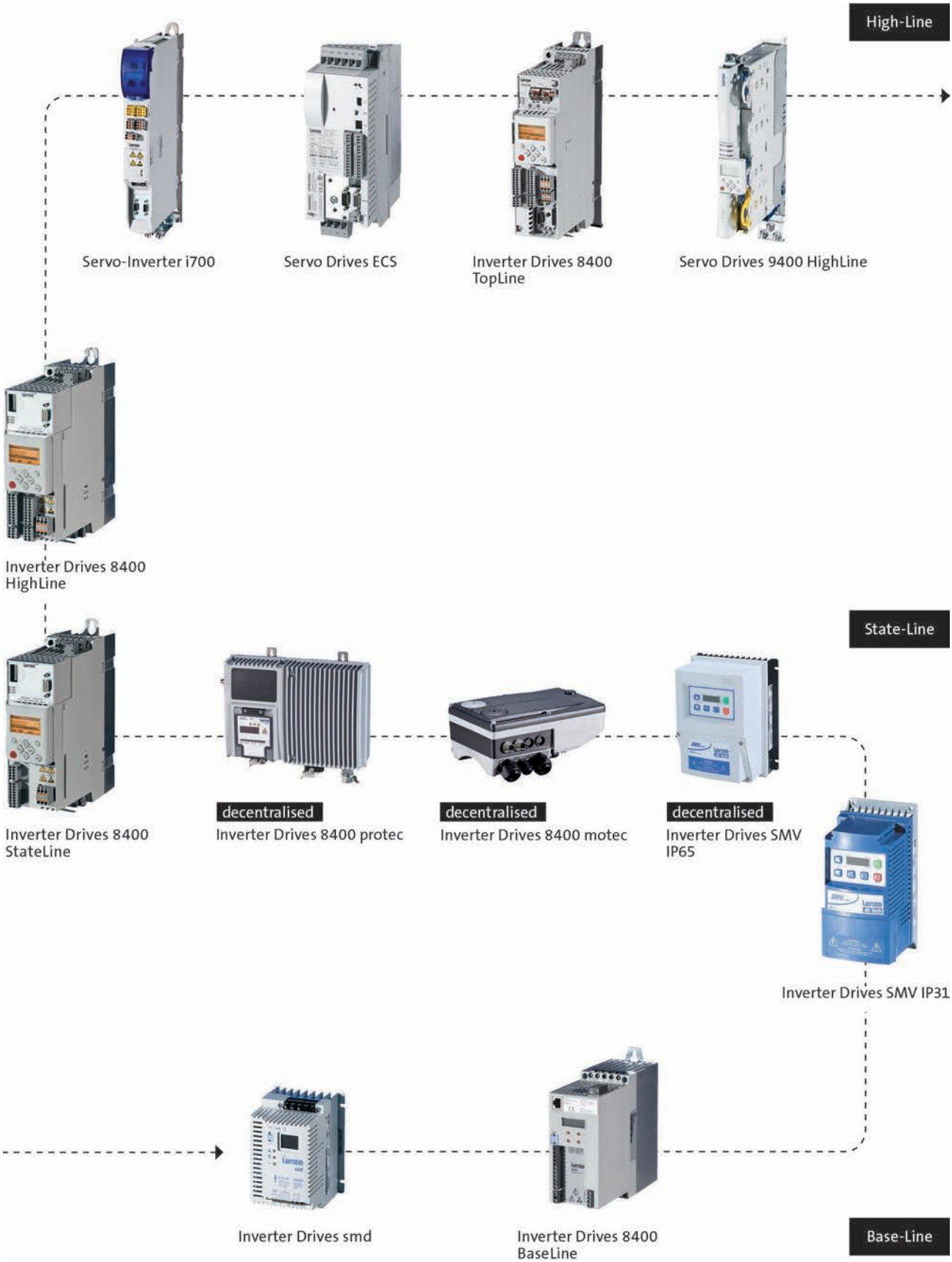


Engineering Tools



L-force product portfolio

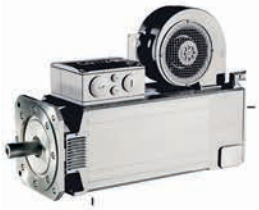
Inverters



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

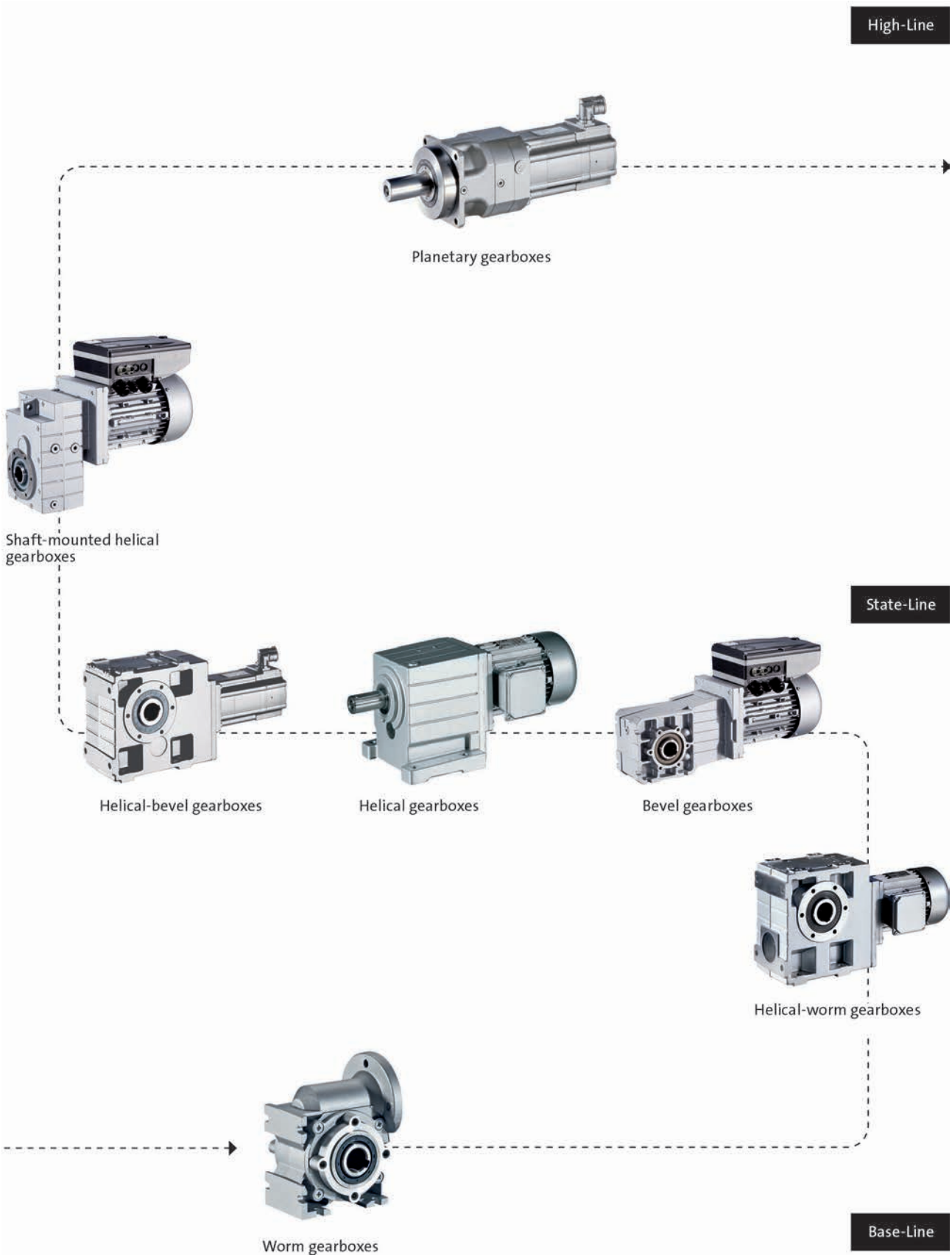
MD three-phase AC motors

Basic MD/MH three-phase AC motors

Base-Line

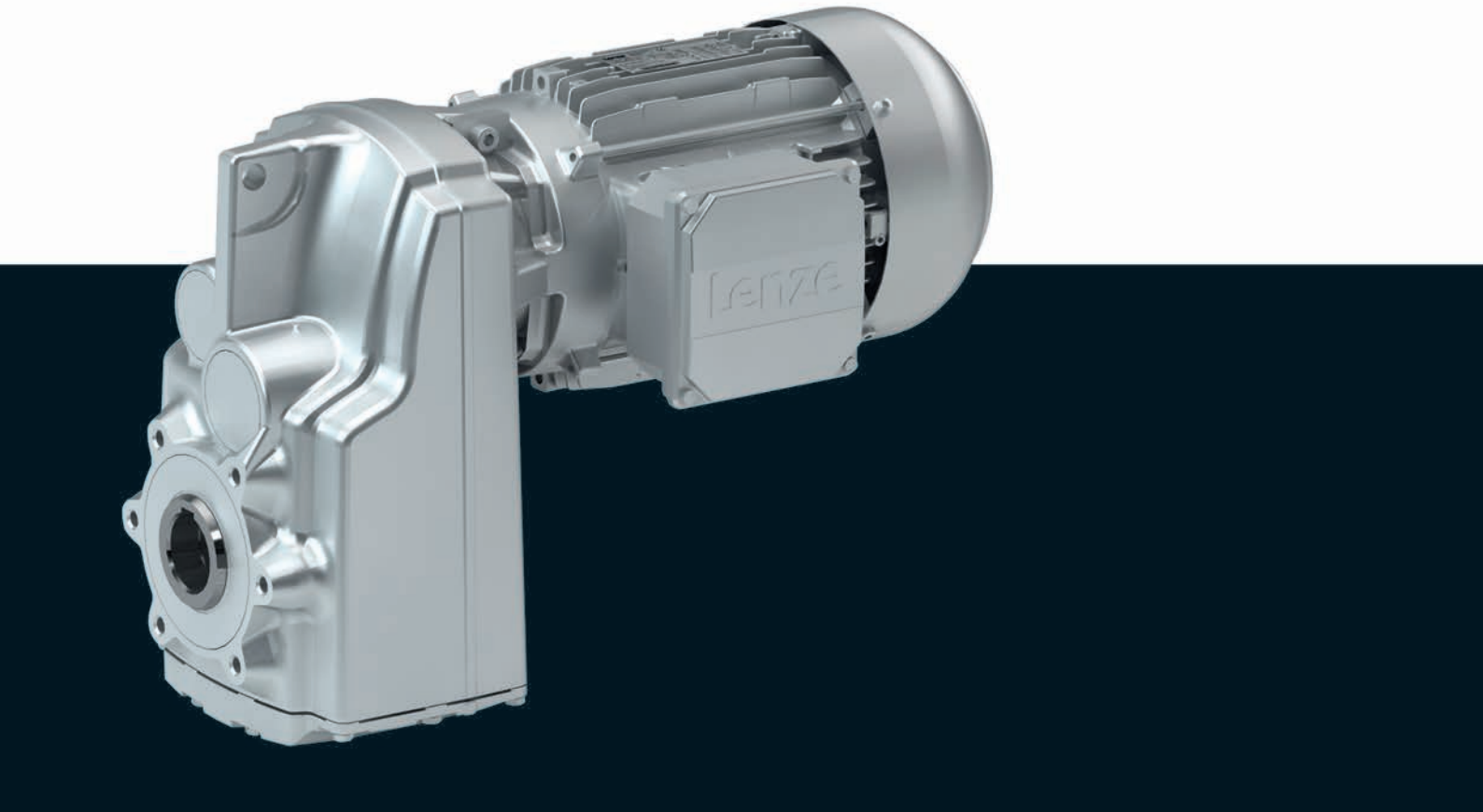
L-force product portfolio

Gearboxes



g500-S shaft-mounted helical geared motors

0.75 to 7.5 kW (efficiency class IE2)



g500-S shaft-mounted helical geared motors

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 shaft-mounted helical 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 slim shaft-mounted helical 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 660 Nm and a ratio of up to i= 495.

Versions

- Slimline design saves installation space of the machine
- Solid shaft, hollow shaft and shrink disc for direct integration into the machine
- High accuracy with axial output provide for the highest efficiency
- With IE2 three-phase AC motors in the power range 0.75 ... 7.5 kW

Inverters for motor-proximity installation

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

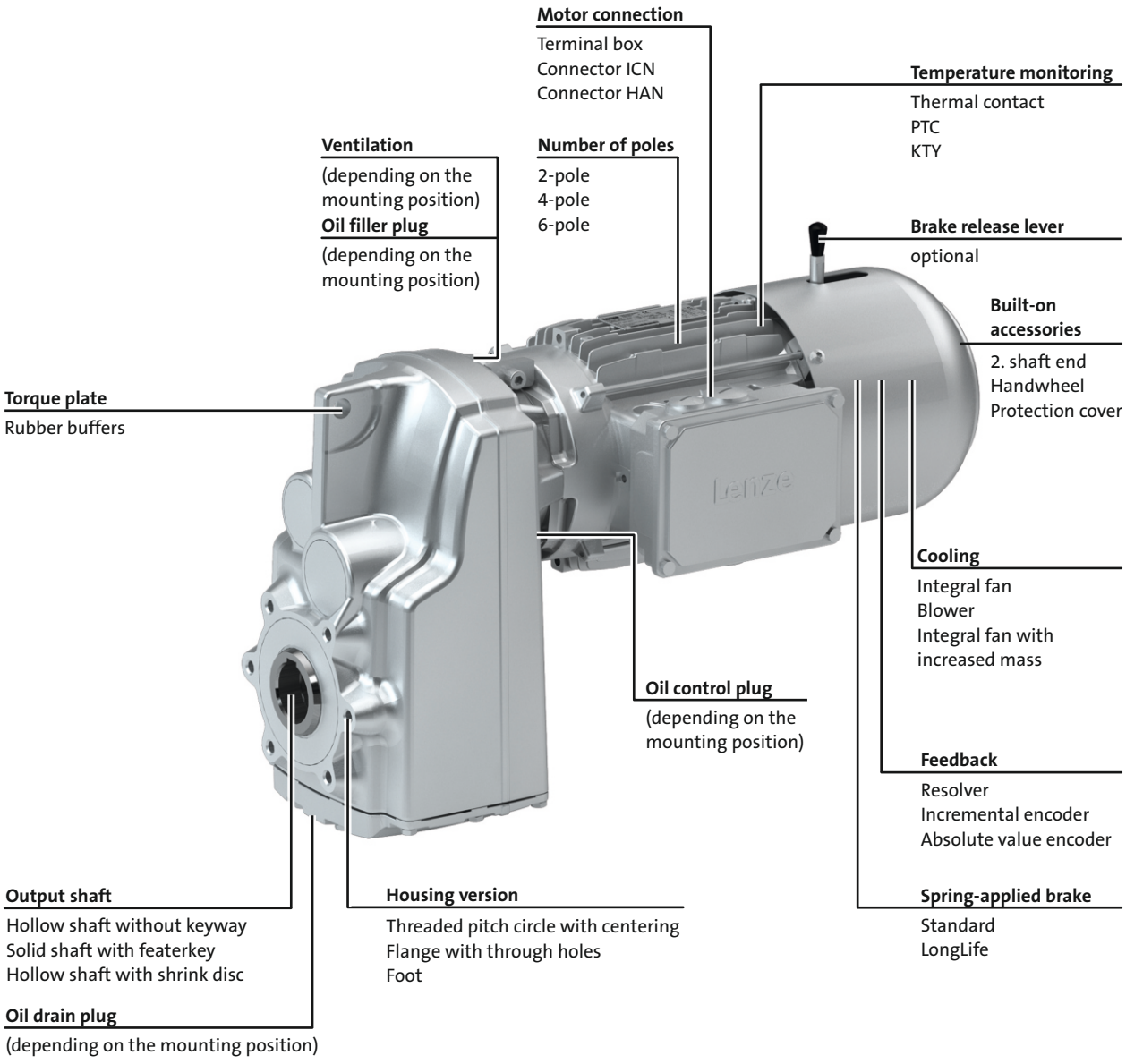
The product name

Gearbox type	Product range		Design	Rated torque [Nm]	Product
Shaft-mounted helical gearbox	g500	-	S	130	g500-S130
				220	g500-S220
				400	g500-S400
				660	g500-S660

Equipment

Overview

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



The gearbox kit

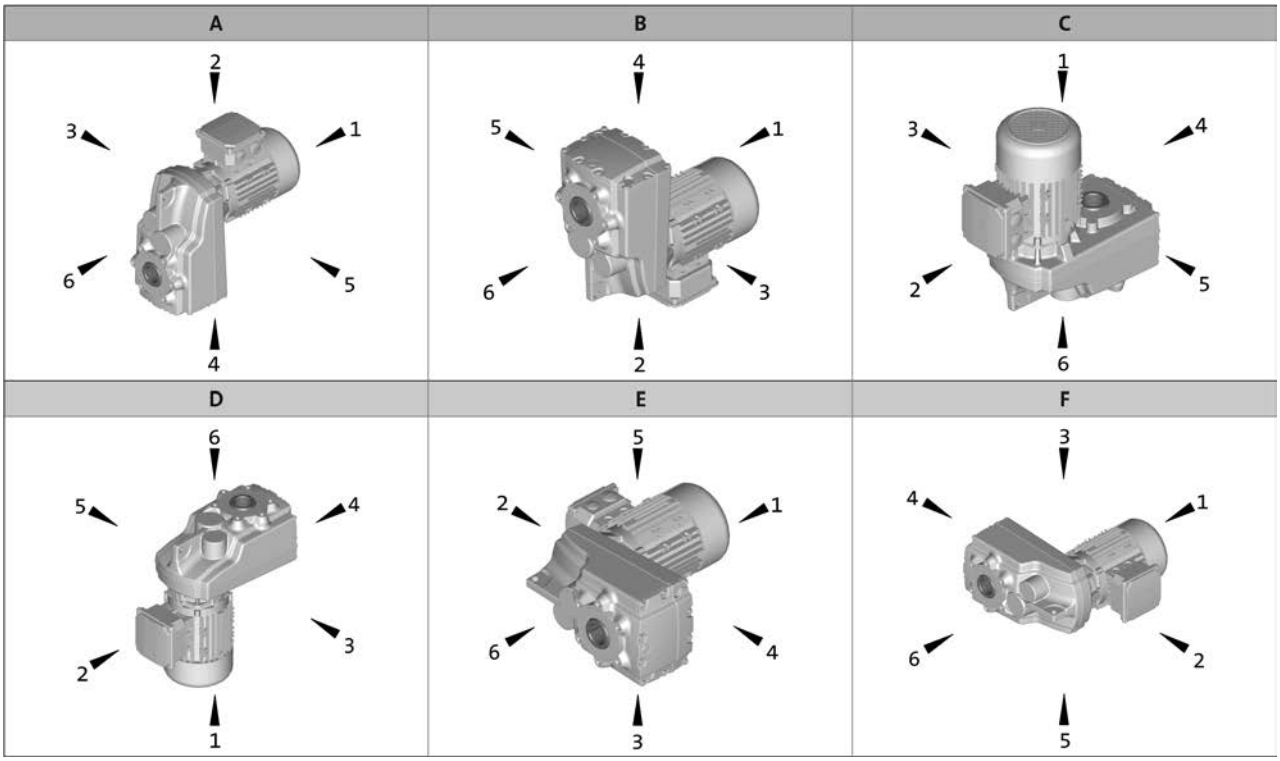
Geared motor

Product	g500-S130	g500-S220	g500-S400	g500-S660
Motor type				
Efficiency class IE1				
Efficiency class IE2	MH□MA AC motor			
4-pole motor				
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				132
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	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: 6
Hollow shaft with shrink disc: 1, 6

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

The gearbox kit

Motor details

Product	MH□MA□□				
	080-32	090-12 090-32	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]	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

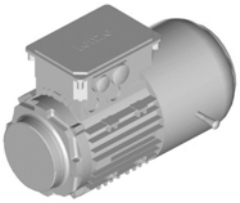
Terminal box

ICN connector

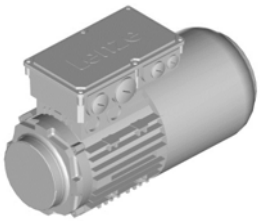
HAN connector

Cooling: integral fan

Without built-on accessories

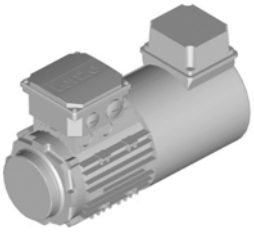


With spring-applied brake
With or without manual release lever

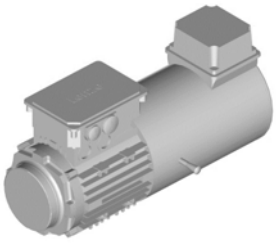


With feedback
With feedback and spring-applied brake

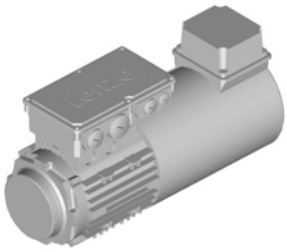
Cooling: blower



Without built-on accessories



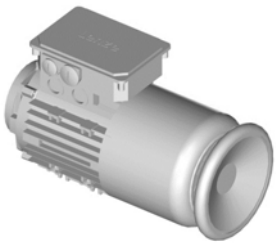
With spring-applied brake
With or without manual release lever



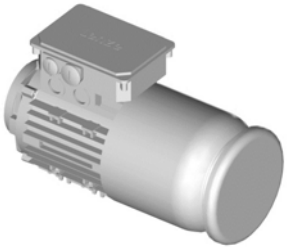
With feedback
With feedback and spring-applied brake

Further options

With 2nd shaft end
Only integral fan



With handwheel
Only integral fan



With protection cover

6.5

The gearbox kit

Gearbox details

Product	g500-S130	g500-S220	g500-S400	g500-S660
Driven shaft				
Solid shaft with featherkey [mm]	25x50		30x60	35x70 40x80
Hollow shaft with keyway [mm]	25	25/30	30/35	40/45
Hollow shaft with shrink disc [mm]	25	25/30	35	40
Design	Standard stainless steel			
Gasket	Standard FPM (Viton)			
Bearing	Standard			
Fitting grease	Not enclosed Enclosed			
Housing				
Housing version	With foot without centring With centering			
Output flange				
flange diameter [mm]	160		200	200/250 [1]
Lubricant				
Type	CLP 460 [2] CLP HC 320 CLP HC 220 CLP HC 220 USDA H1			
Oil-level 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			
Shaft cover	Shrink disc: Rotating cover Shrink disc: Fixed cover			

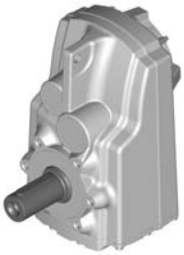
[1] 200 mm flange diameter only possible on hollow shaft version.
[2] Not suitable for geared servo motors.

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

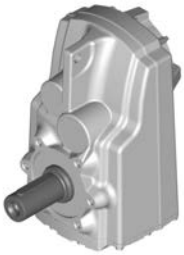
The gearbox kit

Gearbox details

Solid shaft



without centring



With centering

Flange with through holes

Hollow shaft

without centring

With centering

Flange with through holes

Hollow shaft with shrink disc

without centring

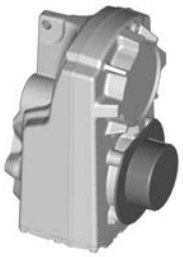
With centering

Flange with through holes

Accessories

Foot mounting

With rubber buffer



Shrink disc cover

6.5

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

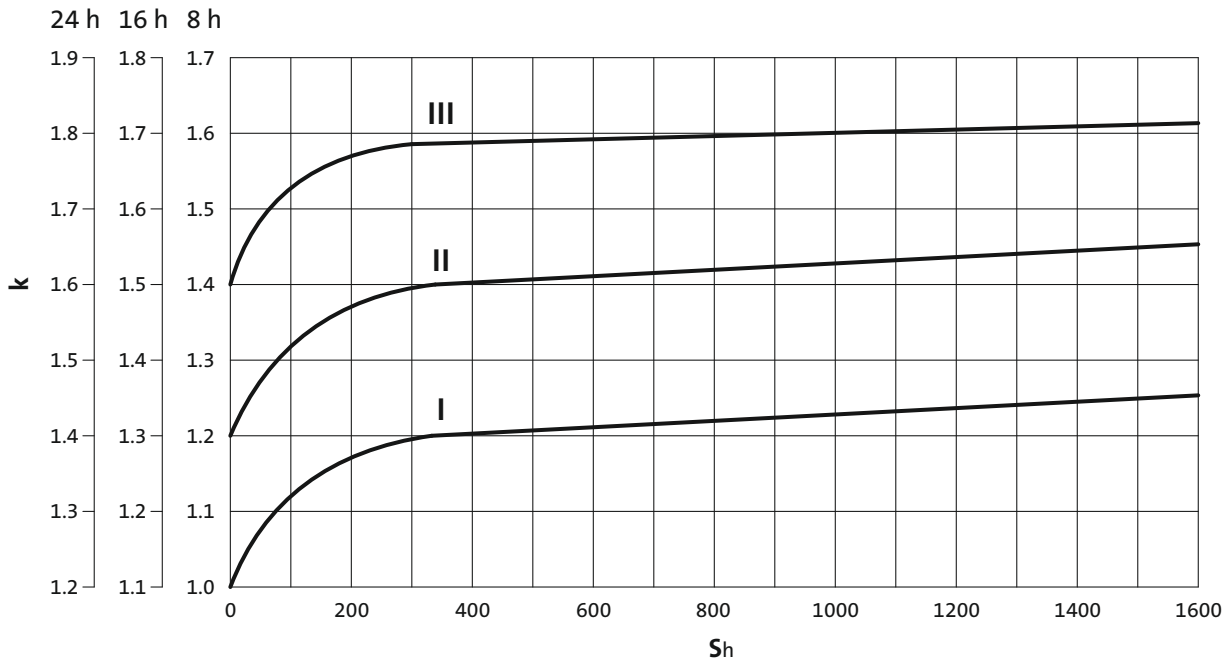
Load capacity and application factor

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



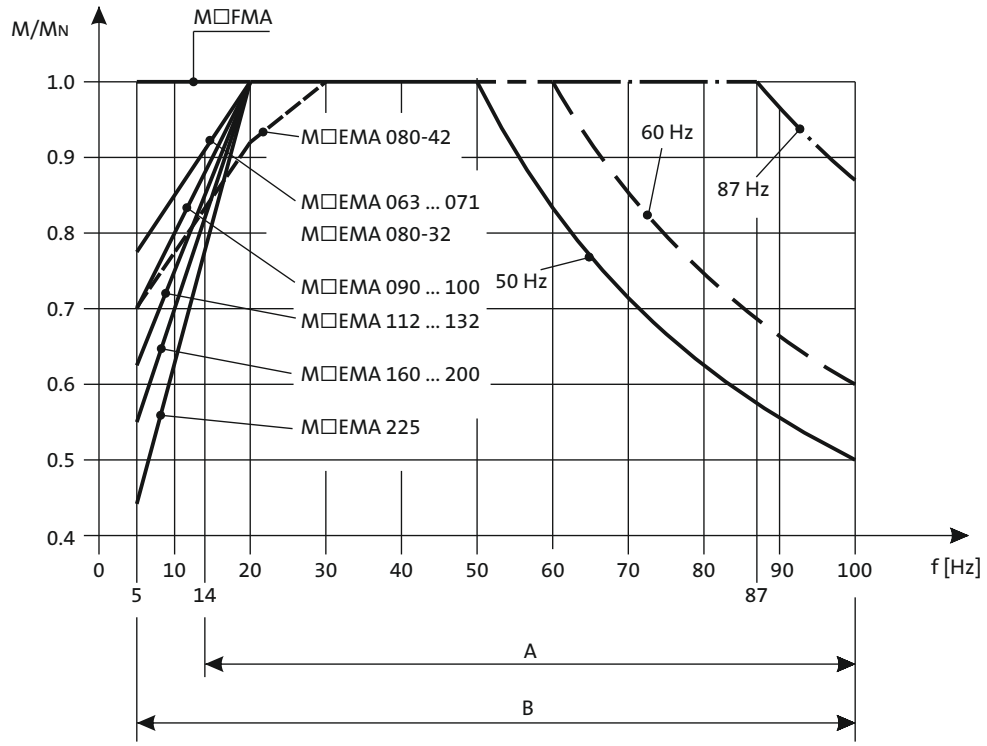
► S_h= switchings/h

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 foot and 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

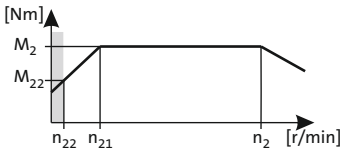
The selection tables show the available combinations of gearbox type, number of stages, ratio and motor. They are used only to provide basic orientation.
The following legend indicates the structure of the selection tables.

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

50 Hz: P_N = 0.12 kW
87 Hz: P_N = 0.21 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□□	
45	24	5.3	4.6	19	19	24	45	24	5.3	81	24	5.4	31.387	-S130	063-12	65
40	28	4.7	4.1	21	17	27	40	28	4.7	71	27	4.8	35.493	-S130	063-12	65

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**.

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

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**

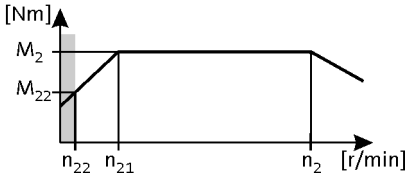
Motor voltages

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, 4-pole motors

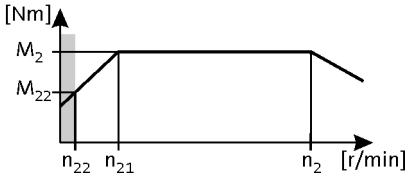


50 Hz: P_N = 0.75 kW
87 Hz: P_N = 1.35 kW

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□□	
385	18	3.5	40	14	164	18	385	18	3.5				3.661	-S130	080-32	32
281	25	3.1	29	19	120	25	281	25	3.1	502	25	2.6	5.021	-S130	080-32	32
241	29	4.1	25	22	102	29	241	29	4.1	430	29	3.5	5.860	-S400	080-32	40
219	32	2.8	23	24	93	32	219	32	2.8	392	32	2.3	6.425	-S130	080-32	32
201	35	2.7	21	27	85	35	201	35	2.7	359	35	2.2	7.029	-S130	080-32	32
169	41	2.8	17	32	72	41	169	41	2.8	303	41	2.4	8.322	-S130	080-32	32
150	46	2.7	15	36	64	46	150	46	2.7	268	47	2.3	9.411	-S130	080-32	32
124	56	2.3	13	43	53	56	124	56	2.3	221	57	1.9	11.413	-S130	080-32	32
109	64	2.0	11	49	47	64	109	64	2.0	195	64	1.7	12.907	-S130	080-32	32
97	72	1.8	9.9	55	41	72	97	72	1.8	173	72	1.5	14.606	-S130	080-32	32
96	73	3.0	9.9	56	41	73	96	73	3.0	171	73	2.5	14.720	-S220	080-32	36
95	73	4.1	9.8	56	41	73	95	73	4.1				14.806	-S400	080-32	40
88	79	1.7	9.1	61	38	79	88	79	1.7	158	79	1.4	15.979	-S130	080-32	32
85	82	2.7	8.8	63	36	82	85	82	2.7	152	82	2.3	16.571	-S220	080-32	36
78	89	1.5	8.0	69	33	89	78	89	1.5	140	90	1.4	18.069	-S130	080-32	32
75	93	2.4	7.7	71	32	93	75	93	2.4	134	93	2.3	18.776	-S220	080-32	36
70	100	2.2	7.1	77	30	100	70	100	2.2	124	101	2.1	20.300	-S220	080-32	36
69	100	1.3	7.1	77	29	100	69	100	1.3	124	101	1.2	20.381	-S130	080-32	32
61	113	1.9	6.3	87	26	113	61	113	1.9	110	114	1.8	23.000	-S220	080-32	36
61	114	1.1	6.3	87	26	114	61	114	1.1	109	114	1.1	23.048	-S130	080-32	32
57	123	1.1	5.8	95	24	123	57	123	1.1	101	124	1.0	24.967	-S130	080-32	32
56	125	3.2	5.7	96	24	125	56	125	3.2	100	126	3.0	25.308	-S400	080-32	40
53	130	1.7	5.5	100	23	130	53	130	1.7	95	131	1.6	26.422	-S220	080-32	36
48	144	2.8	5.0	111	21	144	48	144	2.8	86	145	2.6	29.156	-S400	080-32	40
47	148	1.5	4.8	114	20	148	47	148	1.5	84	149	1.4	29.937	-S220	080-32	36
45	154	2.9	4.7	118	19	154	45	154	2.9				31.167	-S660	080-32	44
43	162	1.4	4.4	125	18	162	43	162	1.4	77	163	1.4	32.867	-S220	080-32	36
43	162	2.5	4.4	125	18	162	43	162	2.5	77	163	2.5	32.940	-S400	080-32	40
40	175	2.9	4.1	135	17	175	40	175	2.9				35.511	-S660	080-32	44
39	179	2.2	4.0	138	17	179	39	179	2.2	70	180	2.2	36.267	-S400	080-32	40
38	184	1.2	3.9	141	16	184	38	184	1.2	68	185	1.2	37.238	-S220	080-32	36
35	199	2.6	3.6	153	15	199	35	199	2.6	63	200	2.6	40.333	-S660	080-32	44
34	202	2.0	3.5	155	15	202	34	202	2.0	62	203	2.0	40.974	-S400	080-32	40
33	210	1.1	3.4	161	14	210	33	210	1.1	59	211	1.0	42.533	-S220	080-32	36
31	226	2.6	3.2	174	13	226	31	226	2.6	55	228	2.6	45.956	-S660	080-32	44

Selection tables, 4-pole motors



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

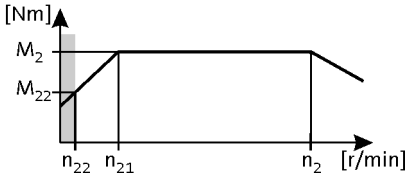
2-stage gearboxes

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□□	
30	231	1.4	3.1	178	13	231	30	231	1.4	54	233	1.4	46.933	-S400	080-32	40
29	241	1.9	3.0	186	12	241	29	241	1.9	52	243	1.8	48.950	-S660	080-32	44
27	261	1.3	2.7	201	11	261	27	261	1.3	48	263	1.3	53.026	-S400	080-32	40
25	275	1.9	2.6	212	11	275	25	275	1.9	45	277	1.8	55.773	-S660	080-32	44

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□□	
28	242	2.6	2.9	186	12	242	28	242	2.6	51	244	2.5	49.867	-S660	080-32	44
25	276	2.4	2.6	212	11	276	25	276	2.4	44	278	2.2	56.818	-S660	080-32	44
24	282	1.4	2.5	217	10	282	24	282	1.4	43	284	1.4	58.027	-S400	080-32	40
22	310	2.1	2.3	239	9.4	310	22	310	2.1	40	312	2.0	63.817	-S660	080-32	44
22	318	1.3	2.2	245	9.2	318	22	318	1.3	38	321	1.2	65.559	-S400	080-32	40
20	339	2.0	2.1	261	8.6	339	20	339	2.0	36	341	1.9	69.813	-S660	080-32	44
19	353	1.9	2.0	272	8.3	353	19	353	1.9	35	355	1.9	72.713	-S660	080-32	44
19	360	1.1	2.0	278	8.1	360	19	360	1.1	34	363	1.1	74.260	-S400	080-32	40
18	386	1.7	1.8	297	7.5	386	18	386	1.7	32	389	1.7	79.545	-S660	080-32	44
16	432	1.5	1.6	333	6.7	432	16	432	1.5	28	435	1.5	89.048	-S660	080-32	44
14	493	1.3	1.4	379	5.9	493	14	493	1.3	25	496	1.3	101.460	-S660	080-32	44
13	530	1.3	1.3	408	5.5	530	13	530	1.3	23	533	1.2	109.083	-S660	080-32	44
11	603	1.1	1.2	464	4.8	603	11	603	1.1	20	608	1.1	124.289	-S660	080-32	44

Selection tables, 4-pole motors

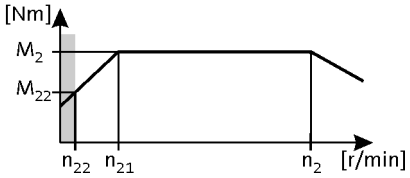


50 Hz: P_N = 1.1 kW
87 Hz: P_N = 2.0 kW

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□□	
391	26	2.4	40	18	164	26	391	26	2.4	694	27	2.0	3.661	-S130	090-12	32
312	33	5.8	32	23	131	33	312	33	5.8				4.579	-S400	090-12	40
285	36	2.1	29	25	120	36	285	36	2.1	506	37	1.7	5.021	-S130	090-12	32
244	42	5.4	25	29	102	42	244	42	5.4				5.860	-S400	090-12	40
223	46	1.9	23	32	93	46	223	46	1.9	395	47	1.6	6.425	-S130	090-12	32
203	50	1.8	21	35	85	50	203	50	1.8	361	51	1.5	7.029	-S130	090-12	32
172	59	2.0	17	42	72	59	172	59	2.0	305	61	1.6	8.322	-S130	090-12	32
152	67	1.9	15	47	64	67	152	67	1.9	270	69	1.5	9.411	-S130	090-12	32
136	75	2.9	14	53	57	75	136	75	2.9	242	77	2.4	10.514	-S220	090-12	36
125	81	1.6	13	57	53	81	125	81	1.6	223	83	1.3	11.413	-S130	090-12	32
120	85	2.6	12	59	51	85	120	85	2.6	214	87	2.1	11.876	-S220	090-12	36
111	92	1.4	11	64	47	92	111	92	1.4	197	94	1.2	12.907	-S130	090-12	32
110	93	2.4	11	65	46	93	110	93	2.4	196	95	2.0	12.992	-S220	090-12	36
106	96	2.3	11	67	45	96	106	96	2.3	189	98	1.9	13.456	-S220	090-12	36
98	104	1.3	9.9	73	41	104	98	104	1.3	174	107	1.0	14.606	-S130	090-12	32
97	105	2.1	9.9	73	41	105	97	105	2.1	173	107	1.7	14.720	-S220	090-12	36
97	106	3.8	9.8	74	41	106	97	106	3.8				14.806	-S400	090-12	40
90	114	1.1	9.1	80	38	114	90	114	1.1				15.979	-S130	090-12	32
86	118	1.9	8.8	83	36	118	86	118	1.9	153	121	1.5	16.571	-S220	090-12	36
79	129	1.0	8.0	90	33	129	79	129	1.0				18.069	-S130	090-12	32
78	130	3.1	7.9	91	33	130	78	130	3.1	139	133	2.9	18.286	-S400	090-12	40
76	134	1.6	7.7	94	32	134	76	134	1.6	135	137	1.5	18.776	-S220	090-12	36
70	145	1.5	7.1	101	30	145	70	145	1.5	125	148	1.4	20.300	-S220	090-12	36
69	147	2.7	7.0	103	29	147	69	147	2.7	123	151	2.5	20.659	-S400	090-12	40
64	160	2.5	6.5	112	27	160	64	160	2.5	113	163	2.3	22.400	-S400	090-12	40
62	164	1.3	6.3	115	26	164	62	164	1.3	110	168	1.3	23.000	-S220	090-12	36
57	179	3.2	5.8	125	24	179	57	179	3.2	101	183	3.0	25.056	-S660	090-12	44
57	180	2.2	5.7	126	24	180	57	180	2.2	100	185	2.1	25.308	-S400	090-12	40
54	188	1.2	5.5	132	23	188	54	188	1.2	96	193	1.1	26.422	-S220	090-12	36
50	203	3.2	5.1	142	21	203	50	203	3.2	89	208	3.0	28.548	-S660	090-12	44
49	208	1.9	5.0	146	21	208	49	208	1.9	87	213	1.8	29.156	-S400	090-12	40
48	213	1.0	4.8	149	20	213	48	213	1.0				29.937	-S220	090-12	36
46	222	3.0	4.7	156	19	222	46	222	3.0	82	227	2.9	31.167	-S660	090-12	44
43	235	1.7	4.4	164	18	235	43	235	1.7	77	240	1.7	32.940	-S400	090-12	40
40	253	2.6	4.1	177	17	253	40	253	2.6	72	259	2.6	35.511	-S660	090-12	44

Selection tables, 4-pole motors



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

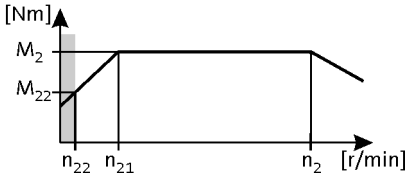
2-stage gearboxes

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□□	
39	258	1.6	4.0	181	17	258	39	258	1.6	70	265	1.5	36.267	-S400	090-12	40
36	287	1.9	3.6	201	15	287	36	287	1.9	63	294	1.9	40.333	-S660	090-12	44
35	292	1.4	3.5	204	15	292	35	292	1.4	62	299	1.3	40.974	-S400	090-12	40
31	328	1.9	3.2	229	13	328	31	328	1.9	55	335	1.9	45.956	-S660	090-12	44
29	349	1.3	3.0	244	12	349	29	349	1.3	52	357	1.3	48.950	-S660	090-12	44
26	397	1.3	2.6	278	11	397	26	397	1.3	46	407	1.3	55.773	-S660	090-12	44

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□□	
29	350	1.8	2.9	245	12	350	29	350	1.8	51	358	1.7	49.867	-S660	090-12	44
25	399	1.6	2.6	279	11	399	25	399	1.6	45	408	1.5	56.818	-S660	090-12	44
22	448	1.5	2.3	314	9.4	448	22	448	1.5	40	459	1.4	63.817	-S660	090-12	44
21	490	1.4	2.1	343	8.6	490	21	490	1.4	36	502	1.3	69.813	-S660	090-12	44
20	510	1.3	2.0	357	8.3	510	20	510	1.3	35	523	1.3	72.713	-S660	090-12	44
18	558	1.2	1.8	391	7.5	558	18	558	1.2	32	572	1.2	79.545	-S660	090-12	44
16	625	1.1	1.6	438	6.7	625	16	625	1.1	29	640	1.0	89.048	-S660	090-12	44

Selection tables, 4-pole motors

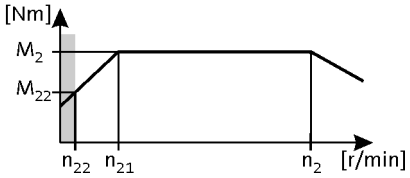


50 Hz: P_N = 1.5 kW
87 Hz: P_N = 2.7 kW

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□□	
392	35	1.8	40	25	164	35	392	35	1.8	695	36	1.5	3.661	-S130	090-32	32
313	44	4.3	32	31	131	44	313	44	4.3				4.579	-S400	090-32	40
286	49	1.6	29	34	120	49	286	49	1.6	507	49	1.3	5.021	-S130	090-32	32
245	57	4.0	25	40	102	57	245	57	4.0				5.860	-S400	090-32	40
223	62	1.4	23	44	93	62	223	62	1.4	396	63	1.2	6.425	-S130	090-32	32
204	68	1.4	21	48	85	68	204	68	1.4	362	69	1.1	7.029	-S130	090-32	32
187	74	2.9	19	52	78	74	187	74	2.9	332	75	2.4	7.667	-S220	090-32	36
172	81	1.4	17	56	72	81	172	81	1.4				8.322	-S130	090-32	32
155	90	2.5	16	63	65	90	155	90	2.5	274	91	2.0	9.280	-S220	090-32	36
153	91	1.4	15	64	64	91	153	91	1.4				9.411	-S130	090-32	32
137	102	2.2	14	71	57	102	137	102	2.2	242	103	1.8	10.514	-S220	090-32	36
126	111	1.2	13	77	53	111	126	111	1.2				11.413	-S130	090-32	32
121	115	1.9	12	81	51	115	121	115	1.9	214	117	1.6	11.876	-S220	090-32	36
111	125	1.0	11	88	47	125	111	125	1.0				12.907	-S130	090-32	32
111	126	1.8	11	88	46	126	111	126	1.8	196	128	1.4	12.992	-S220	090-32	36
110	127	3.2	11	89	46	127	110	127	3.2	194	129	2.6	13.105	-S400	090-32	40
107	130	1.7	11	91	45	130	107	130	1.7	189	132	1.4	13.456	-S220	090-32	36
100	139	2.9	10	97	42	139	100	139	2.9	178	141	2.4	14.336	-S400	090-32	40
98	143	1.5	9.9	100	41	143	98	143	1.5	173	145	1.3	14.720	-S220	090-32	36
97	143	2.8	9.8	100	41	143	97	143	2.8	172	146	2.3	14.806	-S400	090-32	40
89	157	2.6	9.0	110	37	157	89	157	2.6	157	159	2.1	16.197	-S400	090-32	40
87	160	1.4	8.8	112	36	160	87	160	1.4	154	163	1.1	16.571	-S220	090-32	36
79	177	2.3	7.9	124	33	177	79	177	2.3	139	180	2.1	18.286	-S400	090-32	40
76	182	1.2	7.7	127	32	182	76	182	1.2	136	185	1.1	18.776	-S220	090-32	36
71	197	1.1	7.1	138	30	197	71	197	1.1	125	200	1.1	20.300	-S220	090-32	36
70	200	2.0	7.0	140	29	200	70	200	2.0	123	203	1.9	20.659	-S400	090-32	40
65	212	3.1	6.6	149	27	212	65	212	3.1	116	216	2.9	21.933	-S660	090-32	44
64	217	1.8	6.5	152	27	217	64	217	1.8	114	220	1.7	22.400	-S400	090-32	40
57	243	2.4	5.8	170	24	243	57	243	2.4	102	246	2.2	25.056	-S660	090-32	44
57	245	1.6	5.7	172	24	245	57	245	1.6	101	249	1.5	25.308	-S400	090-32	40
50	276	2.4	5.1	194	21	276	50	276	2.4	89	281	2.2	28.548	-S660	090-32	44
49	282	1.4	5.0	198	21	282	49	282	1.4	87	287	1.3	29.156	-S400	090-32	40
46	302	2.2	4.7	211	19	302	46	302	2.2	82	306	2.2	31.167	-S660	090-32	44
44	319	1.3	4.4	223	18	319	44	319	1.3	77	324	1.2	32.940	-S400	090-32	40
40	344	1.9	4.1	241	17	344	40	344	1.9	72	349	1.9	35.511	-S660	090-32	44

Selection tables, 4-pole motors



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

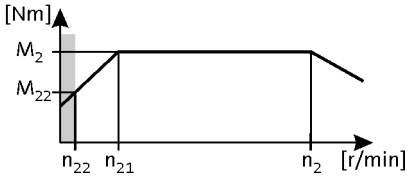
2-stage gearboxes

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□□	
40	351	1.1	4.0	246	17	351	40	351	1.1	70	356	1.1	36.267	-S400	090-32	40
36	391	1.4	3.6	273	15	391	36	391	1.4	63	396	1.4	40.333	-S660	090-32	44
35	397	1.0	3.5	278	15	397	35	397	1.0				40.974	-S400	090-32	40
31	445	1.4	3.2	312	13	445	31	445	1.4	55	452	1.4	45.956	-S660	090-32	44

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□□	
29	476	1.3	2.9	333	12	476	29	476	1.3	51	483	1.2	49.867	-S660	090-32	44
25	542	1.2	2.6	379	11	542	25	542	1.2	45	550	1.1	56.818	-S660	090-32	44
23	609	1.1	2.3	426	9.4	609	23	609	1.1	40	618	1.0	63.817	-S660	090-32	44

Selection tables, 4-pole motors

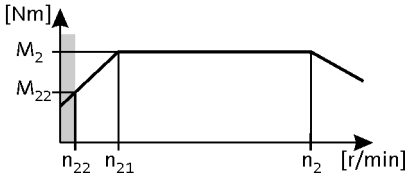


50 Hz: P_N = 2.2 kW
87 Hz: P_N = 3.9 kW

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□□	
376	54	3.3	38	38	156	54	376	54	3.3	665	54	2.7	3.840	-S220	100-12	36
369	55	5.6	37	39	153	55	369	55	5.6				3.920	-S660	100-12	44
316	65	3.8	32	45	131	65	316	65	3.8	558	65	3.2	4.579	-S400	100-12	40
274	74	2.4	28	52	114	74	274	74	2.4	485	74	2.0	5.267	-S220	100-12	36
247	83	3.1	25	58	102	83	247	83	3.1	436	83	2.6	5.860	-S400	100-12	40
225	90	2.9	23	63	94	90	225	90	2.9	399	91	2.4	6.411	-S400	100-12	40
214	95	2.3	21	67	89	95	214	95	2.3				6.767	-S220	100-12	36
194	105	3.5	19	74	80	105	194	105	3.5	342	106	2.9	7.467	-S400	100-12	40
189	108	2.0	19	76	78	108	189	108	2.0				7.667	-S220	100-12	36
171	119	3.2	17	83	71	119	171	119	3.2	303	119	2.7	8.436	-S400	100-12	40
156	131	1.7	16	91	65	131	156	131	1.7				9.280	-S220	100-12	36
141	144	2.8	14	101	59	144	141	144	2.8	250	145	2.3	10.240	-S400	100-12	40
137	148	1.5	14	104	57	148	137	148	1.5				10.514	-S220	100-12	36
125	163	2.5	13	114	52	163	125	163	2.5	221	164	2.1	11.569	-S400	100-12	40
122	168	1.3	12	117	51	168	122	168	1.3				11.876	-S220	100-12	36
111	183	1.2	11	128	46	183	111	183	1.2				12.992	-S220	100-12	36
110	185	2.2	11	129	46	185	110	185	2.2	195	185	1.8	13.105	-S400	100-12	40
107	190	1.2	11	133	45	190	107	190	1.2				13.456	-S220	100-12	36
101	202	2.0	10	141	42	202	101	202	2.0	178	203	1.7	14.336	-S400	100-12	40
98	208	1.1	9.9	145	41	208	98	208	1.1				14.720	-S220	100-12	36
98	209	1.9	9.8	146	41	209	98	209	1.9	173	209	1.6	14.806	-S400	100-12	40
92	222	3.0	9.2	155	38	222	92	222	3.0	163	222	2.5	15.714	-S660	100-12	44
89	228	1.8	9.0	160	37	228	89	228	1.8	158	229	1.5	16.197	-S400	100-12	40
81	253	2.6	8.1	176	34	253	81	253	2.6	143	253	2.2	17.905	-S660	100-12	44
79	258	1.6	7.9	180	33	258	79	258	1.6	140	259	1.5	18.286	-S400	100-12	40
75	272	2.4	7.5	190	31	272	75	272	2.4	133	272	2.3	19.250	-S660	100-12	44
70	291	1.4	7.0	203	29	291	70	291	1.4	124	292	1.3	20.659	-S400	100-12	40
66	309	2.1	6.6	216	27	309	66	309	2.1	117	310	2.0	21.933	-S660	100-12	44
65	316	1.3	6.5	221	27	316	65	316	1.3	114	317	1.2	22.400	-S400	100-12	40
58	353	1.6	5.8	247	24	353	58	353	1.6	102	354	1.6	25.056	-S660	100-12	44
57	357	1.1	5.7	249	24	357	57	357	1.1	101	358	1.1	25.308	-S400	100-12	40
51	403	1.6	5.1	281	21	403	51	403	1.6	90	404	1.6	28.548	-S660	100-12	44
46	440	1.5	4.7	307	19	440	46	440	1.5	82	441	1.5	31.167	-S660	100-12	44
41	501	1.3	4.1	350	17	501	41	501	1.3	72	502	1.3	35.511	-S660	100-12	44

Selection tables, 4-pole motors

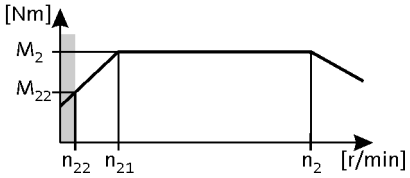


50 Hz: P_N = 3.0 kW
87 Hz: P_N = 5.4 kW

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□□	
433	64	3.2	43	45	180	64	433	64	3.2	765	65	2.6	3.339	-S400	100-32	40
376	74	2.4	38	52	156	74	376	74	2.4				3.840	-S220	100-32	36
369	75	4.1	37	53	153	75	369	75	4.1				3.920	-S660	100-32	44
316	88	2.8	32	62	131	88	316	88	2.8	558	90	2.3	4.579	-S400	100-32	40
274	101	1.8	28	71	114	101	274	101	1.8				5.267	-S220	100-32	36
247	113	2.3	25	79	102	113	247	113	2.3	436	115	1.9	5.860	-S400	100-32	40
225	123	2.1	23	86	94	123	225	123	2.1	399	126	1.7	6.411	-S400	100-32	40
214	130	1.7	21	91	89	130	214	130	1.7				6.767	-S220	100-32	36
194	144	2.5	19	100	80	144	194	144	2.5				7.467	-S400	100-32	40
189	147	1.5	19	103	78	147	189	147	1.5				7.667	-S220	100-32	36
171	162	2.3	17	113	71	162	171	162	2.3				8.436	-S400	100-32	40
156	179	1.2	16	125	65	179	156	179	1.2				9.280	-S220	100-32	36
144	193	3.2	15	135	60	193	144	193	3.2	255	196	2.7	10.027	-S660	100-32	44
141	197	2.0	14	138	59	197	141	197	2.0	250	201	1.7	10.240	-S400	100-32	40
137	202	1.1	14	141	57	202	137	202	1.1				10.514	-S220	100-32	36
128	217	3.1	13	151	53	217	128	217	3.1	227	221	2.5	11.262	-S660	100-32	44
125	223	1.8	13	156	52	223	125	223	1.8				11.569	-S400	100-32	40
117	237	2.8	12	166	49	237	117	237	2.8	207	241	2.3	12.320	-S660	100-32	44
113	247	2.7	11	173	47	247	113	247	2.7	199	251	2.2	12.832	-S660	100-32	44
110	252	1.6	11	176	46	252	110	252	1.6	195	257	1.3	13.105	-S400	100-32	40
103	270	2.4	10	189	43	270	103	270	2.4	182	275	2.0	14.037	-S660	100-32	44
101	276	1.5	10	193	42	276	101	276	1.5	178	281	1.2	14.336	-S400	100-32	40
98	285	1.4	9.8	199	41	285	98	285	1.4				14.806	-S400	100-32	40
92	302	2.2	9.2	211	38	302	92	302	2.2	163	308	1.8	15.714	-S660	100-32	44
89	312	1.3	9.0	218	37	312	89	312	1.3	158	317	1.1	16.197	-S400	100-32	40
81	344	1.9	8.1	241	34	344	81	344	1.9	143	351	1.6	17.905	-S660	100-32	44
79	352	1.1	7.9	246	33	352	79	352	1.1	140	358	1.1	18.286	-S400	100-32	40
75	370	1.8	7.5	259	31	370	75	370	1.8	133	377	1.7	19.250	-S660	100-32	44
70	397	1.0	7.0	278	29	397	70	397	1.0				20.659	-S400	100-32	40
66	422	1.6	6.6	295	27	422	66	422	1.6	117	429	1.5	21.933	-S660	100-32	44
58	482	1.2	5.8	337	24	482	58	482	1.2	102	491	1.1	25.056	-S660	100-32	44
51	549	1.2	5.1	384	21	549	51	549	1.2	90	559	1.1	28.548	-S660	100-32	44
46	599	1.1	4.7	419	19	599	46	599	1.1	82	610	1.1	31.167	-S660	100-32	44

Selection tables, 4-pole motors

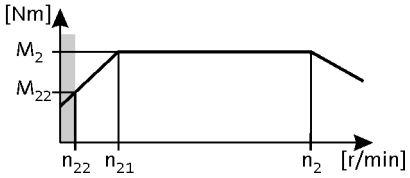


50 Hz: P_N = 4.0 kW
87 Hz: P_N = 7.1 kW

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□□	
436	85	2.4	43	53	180	85	436	85	2.4				3.339	-S400	112-22	40
371	100	3.4	37	63	153	100	371	100	3.4				3.920	-S660	112-22	44
318	117	2.1	32	73	131	117	318	117	2.1	560	117	1.7	4.579	-S400	112-22	40
248	149	1.7	25	94	102	149	248	149	1.7	438	150	1.4	5.860	-S400	112-22	40
227	163	1.6	23	102	94	163	227	163	1.6	400	164	1.3	6.411	-S400	112-22	40
212	175	2.8	21	110	87	175	212	175	2.8	373	176	2.4	6.880	-S660	112-22	44
199	186	3.2	20	117	82	186	199	186	3.2				7.311	-S660	112-22	44
195	190	1.9	19	119	80	190	195	190	1.9				7.467	-S400	112-22	40
173	215	1.8	17	135	71	215	173	215	1.8				8.436	-S400	112-22	40
165	224	2.9	17	140	68	224	165	224	2.9				8.800	-S660	112-22	44
145	255	2.5	15	160	60	255	145	255	2.5				10.027	-S660	112-22	44
142	261	1.5	14	163	59	261	142	261	1.5				10.240	-S400	112-22	40
129	287	2.3	13	180	53	287	129	287	2.3	228	289	1.9	11.262	-S660	112-22	44
126	295	1.4	13	185	52	295	126	295	1.4				11.569	-S400	112-22	40
118	314	2.1	12	197	49	314	118	314	2.1	208	316	1.8	12.320	-S660	112-22	44
113	327	2.0	11	205	47	327	113	327	2.0	200	329	1.7	12.832	-S660	112-22	44
111	334	1.2	11	209	46	334	111	334	1.2				13.105	-S400	112-22	40
104	358	1.9	10	224	43	358	104	358	1.9				14.037	-S660	112-22	44
102	365	1.1	10	229	42	365	102	365	1.1				14.336	-S400	112-22	40
98	377	1.1	9.8	236	41	377	98	377	1.1				14.806	-S400	112-22	40
93	400	1.7	9.2	251	38	400	93	400	1.7	163	403	1.4	15.714	-S660	112-22	44
81	456	1.5	8.1	286	34	456	81	456	1.5	143	459	1.2	17.905	-S660	112-22	44
76	490	1.4	7.5	307	31	490	76	490	1.4	133	494	1.3	19.250	-S660	112-22	44
66	559	1.2	6.6	350	27	559	66	559	1.2	117	562	1.1	21.933	-S660	112-22	44

Selection tables, 4-pole motors

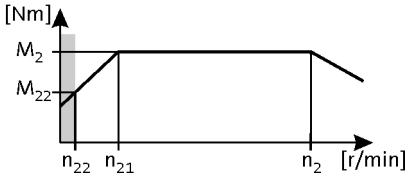


50 Hz: P_N = 5.5 kW
87 Hz: P_N = 9.7 kW

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□□	
375	136	3.1	37	85	153	136	375	136	3.1				3.920	-S660	132-12	44
273	186	2.6	27	116	112	186	273	186	2.6				5.376	-S660	132-12	44
229	222	2.7	23	139	94	222	229	222	2.7				6.417	-S660	132-12	44
214	238	2.1	21	149	87	238	214	238	2.1				6.880	-S660	132-12	44
201	253	2.3	20	158	82	253	201	253	2.3				7.311	-S660	132-12	44
167	305	2.1	17	191	68	305	167	305	2.1				8.800	-S660	132-12	44
147	348	1.8	15	217	60	348	147	348	1.8				10.027	-S660	132-12	44
131	390	1.7	13	244	53	390	131	390	1.7				11.262	-S660	132-12	44
119	427	1.6	12	267	49	427	119	427	1.6				12.320	-S660	132-12	44
115	445	1.5	11	278	47	445	115	445	1.5				12.832	-S660	132-12	44
105	487	1.4	10	304	43	487	105	487	1.4				14.037	-S660	132-12	44
94	545	1.2	9.2	340	38	545	94	545	1.2				15.714	-S660	132-12	44
82	621	1.1	8.1	388	34	621	82	621	1.1				17.905	-S660	132-12	44

Selection tables, 4-pole motors



50 Hz: P_N = 7.5 kW
87 Hz: P_N = 13.2 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□□	
372	187	2.3	37	117	153	187	372	187	2.3				3.920	-S660	132-22	44
272	256	1.9	27	160	112	256	272	256	1.9				5.376	-S660	132-22	44
228	305	2.0	23	191	94	305	228	305	2.0				6.417	-S660	132-22	44
212	327	1.5	21	205	87	327	212	327	1.5				6.880	-S660	132-22	44
200	348	1.7	20	218	82	348	200	348	1.7				7.311	-S660	132-22	44
166	419	1.5	17	262	68	419	166	419	1.5				8.800	-S660	132-22	44
146	477	1.3	15	299	60	477	146	477	1.3				10.027	-S660	132-22	44
130	536	1.2	13	335	53	536	130	536	1.2				11.262	-S660	132-22	44
119	586	1.1	12	367	49	586	119	586	1.1				12.320	-S660	132-22	44
114	611	1.1	11	382	47	611	114	611	1.1				12.832	-S660	132-22	44

Dimensions, notes

Notes on the dimensions

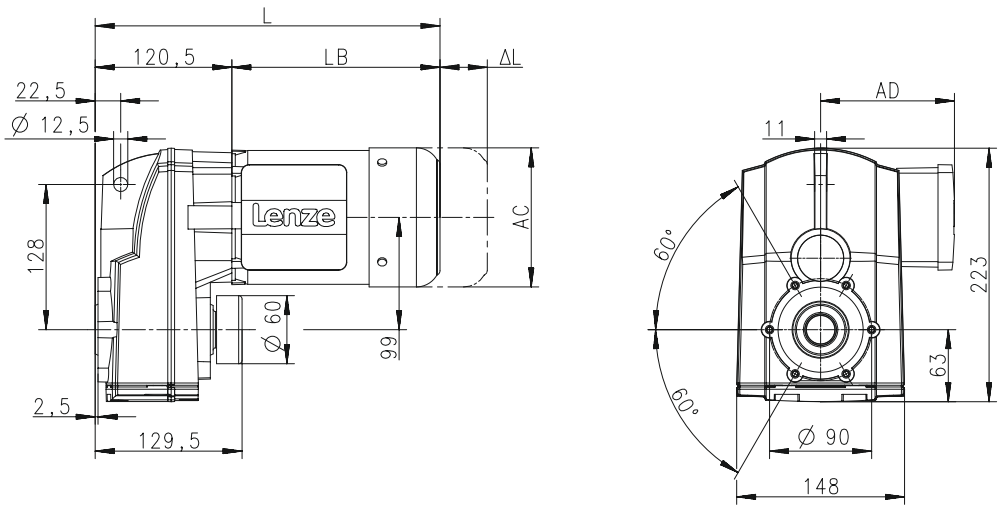
The following legend shows the layout of the dimension sheets.

Product gearbox

g500-S130

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]**		304		324		347		380
Länge Motor	**LB**	**[mm]**		183		203		226		259
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

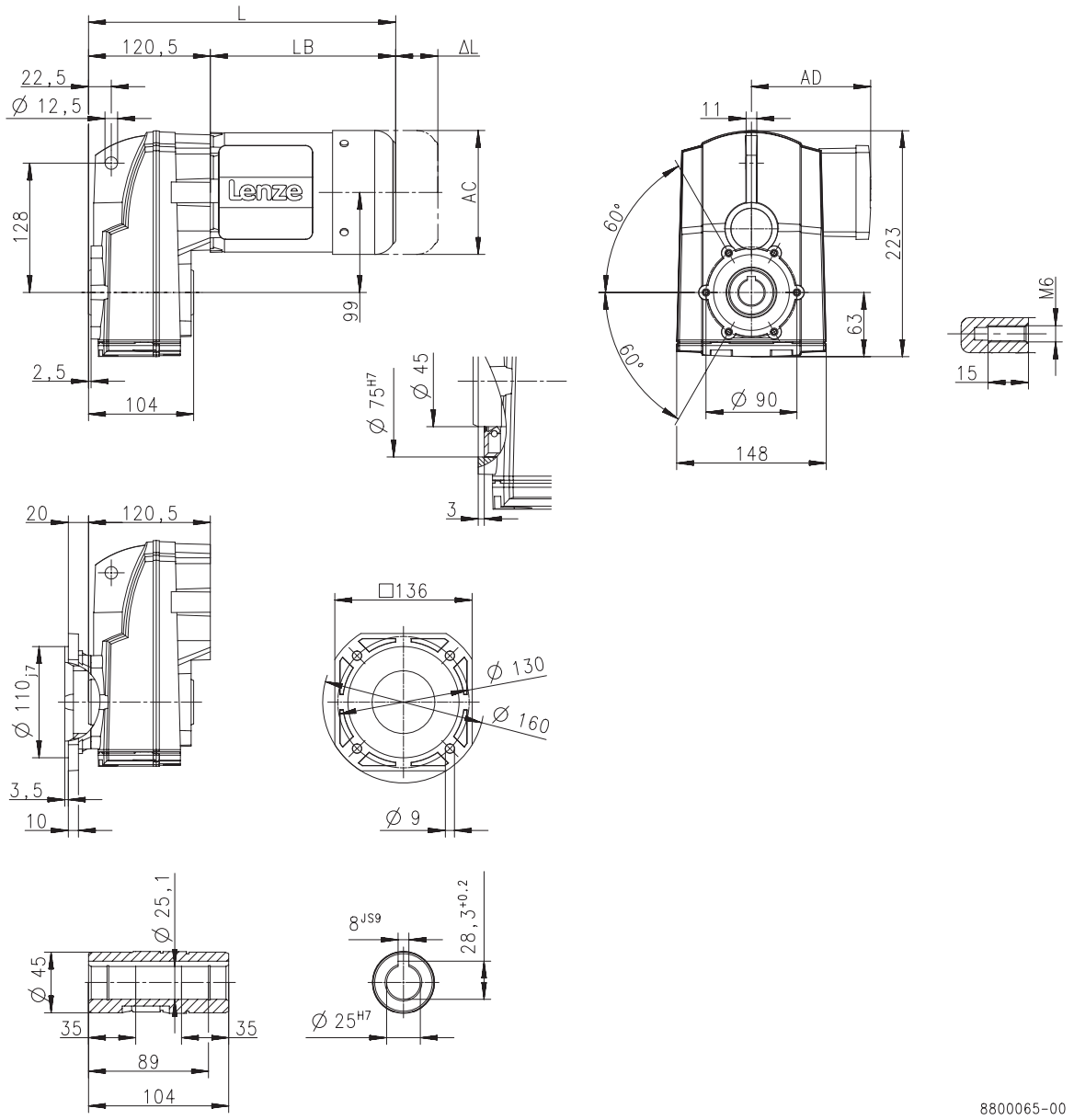
Additional length of the built-on accessories (longest version)

6.5

Dimensions, 4-pole motors

g500-S130

Dimensions with hollow shaft

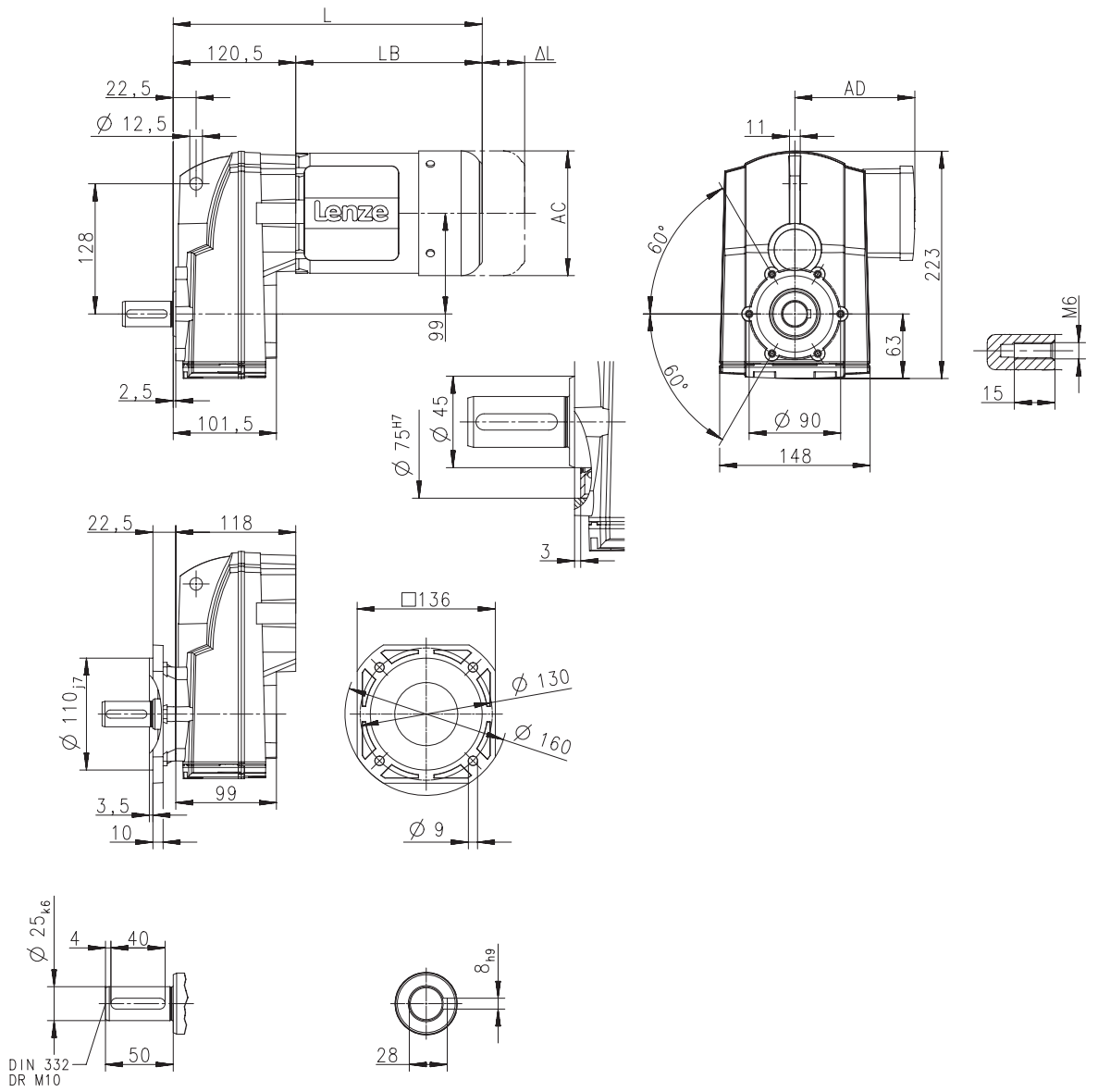


Product			MH□MA□□		
			080-32	090-12	090-32
Dimensions					
Total length	**L**	**[mm]**	347	406	
Motor length	**LB**	**[mm]**	226	285	
Length of motor options	**Δ L**	**[mm]**	183	181	
Motor diameter	**AC**	**[mm]**	156	176	
Distance motor/connection	**AD**	**[mm]**	150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with solid shaft

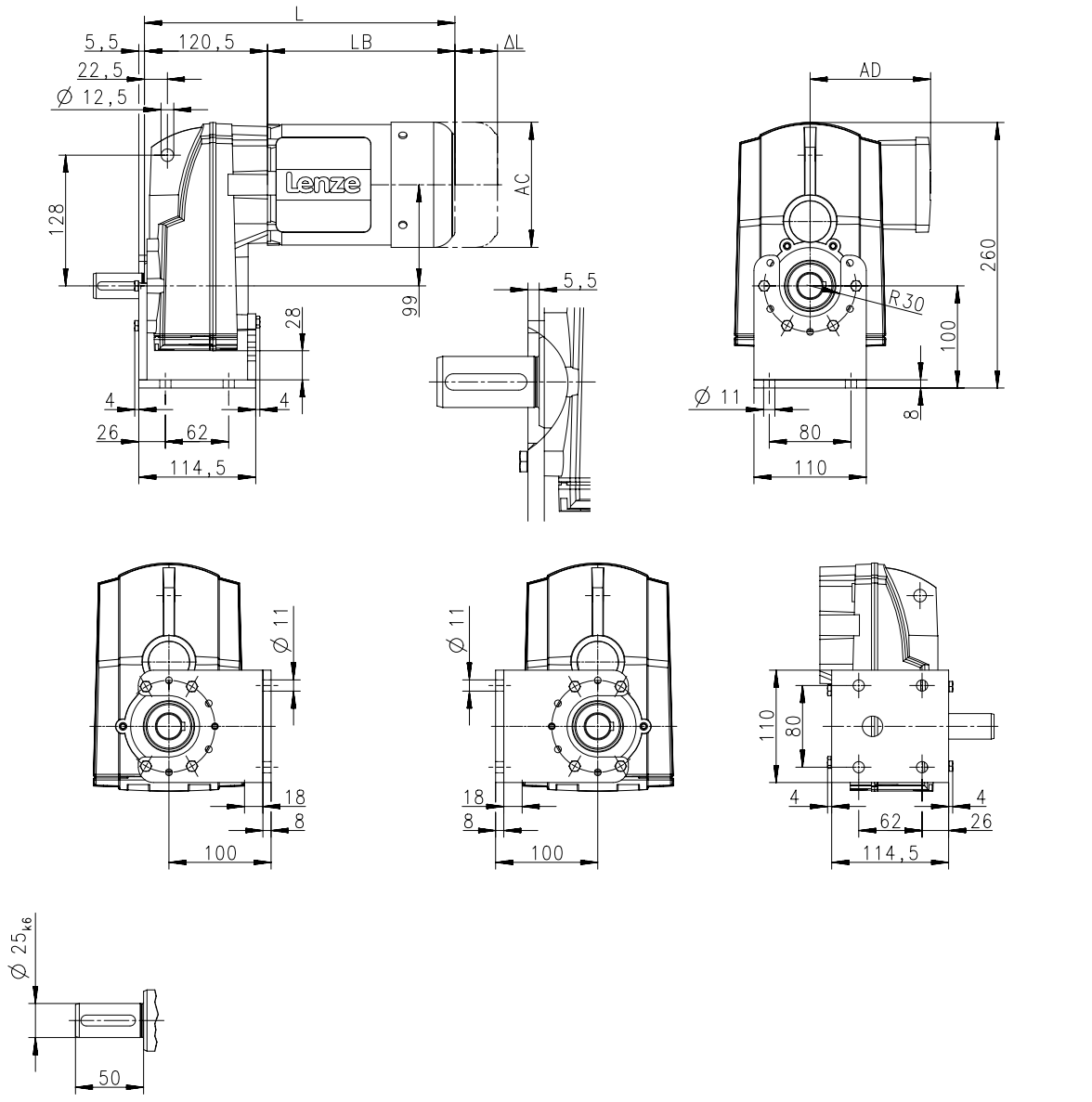


Product			MH□MA□□		
			080-32	090-12	090-32
Dimensions					
Total length	**L**	**[mm]**	347	406	
Motor length	**LB**	**[mm]**	226	285	
Length of motor options	**Δ L**	**[mm]**	183	181	
Motor diameter	**AC**	**[mm]**	156	176	
Distance motor/connection	**AD**	**[mm]**	150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with solid shaft and foot

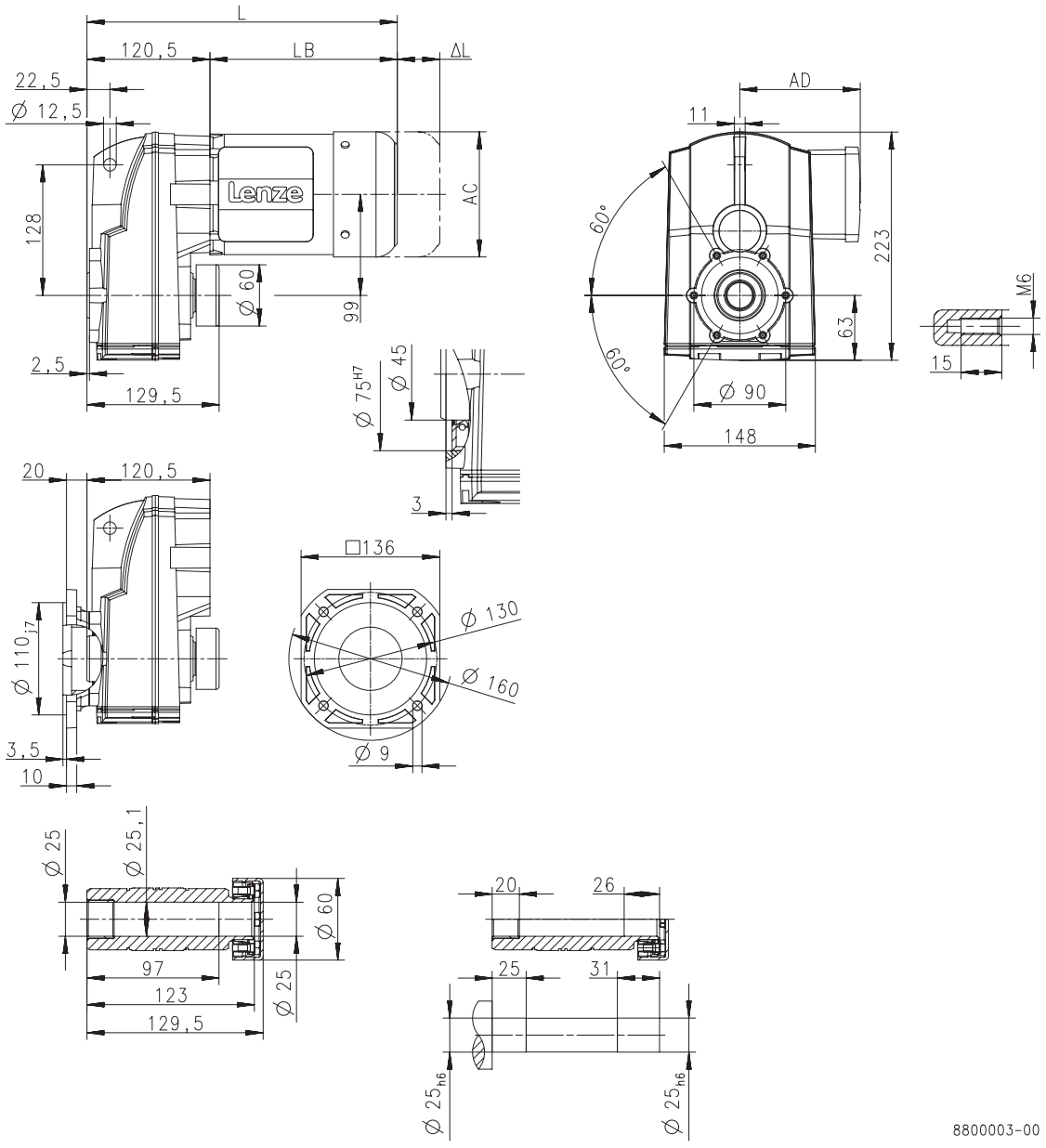


Product			MH□MA□□		
			080-32	090-12	090-32
Dimensions					
Total length	**L**	**[mm]**	347	406	
Motor length	**LB**	**[mm]**	226	285	
Length of motor options	**Δ L**	**[mm]**	183	181	
Motor diameter	**AC**	**[mm]**	156	176	
Distance motor/connection	**AD**	**[mm]**	150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with shrink disc

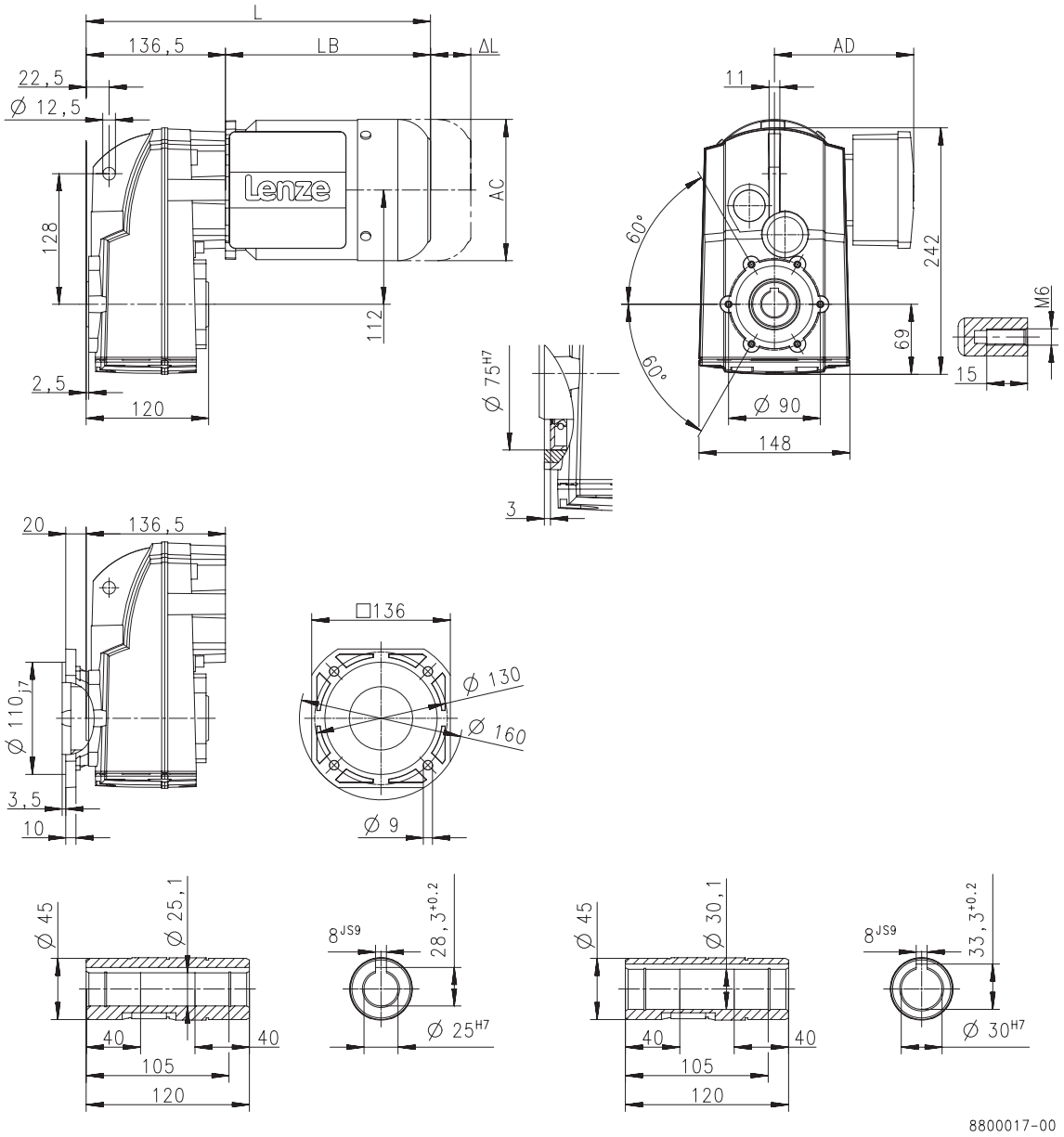


Product			MH□MA□□		
			080-32	090-12	090-32
Dimensions					
Total length	**L**	**[mm]**	347	406	
Motor length	**LB**	**[mm]**	226	285	
Length of motor options	**Δ L**	**[mm]**	183	181	
Motor diameter	**AC**	**[mm]**	156	176	
Distance motor/connection	**AD**	**[mm]**	150	152	157

Dimensions, 4-pole motors

g500-S220

Dimensions with hollow shaft

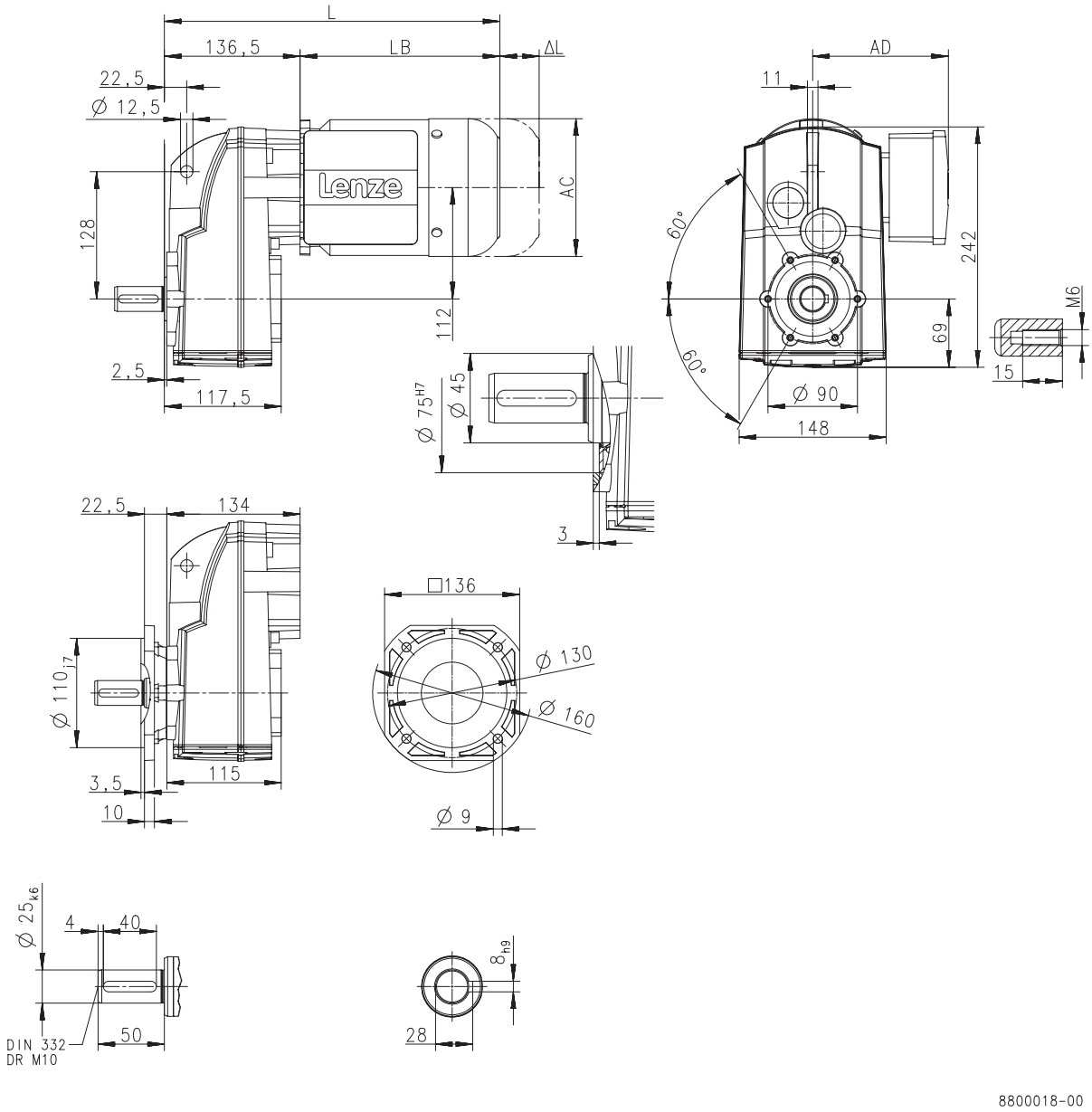


Product			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Dimensions							
Total length	**L**	**[mm]**	363	422		458	474
Motor length	**LB**	**[mm]**	226	285		321	337
Length of motor options	**Δ L**	**[mm]**	183	181		170	
Motor diameter	**AC**	**[mm]**	156	176		194	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with solid shaft

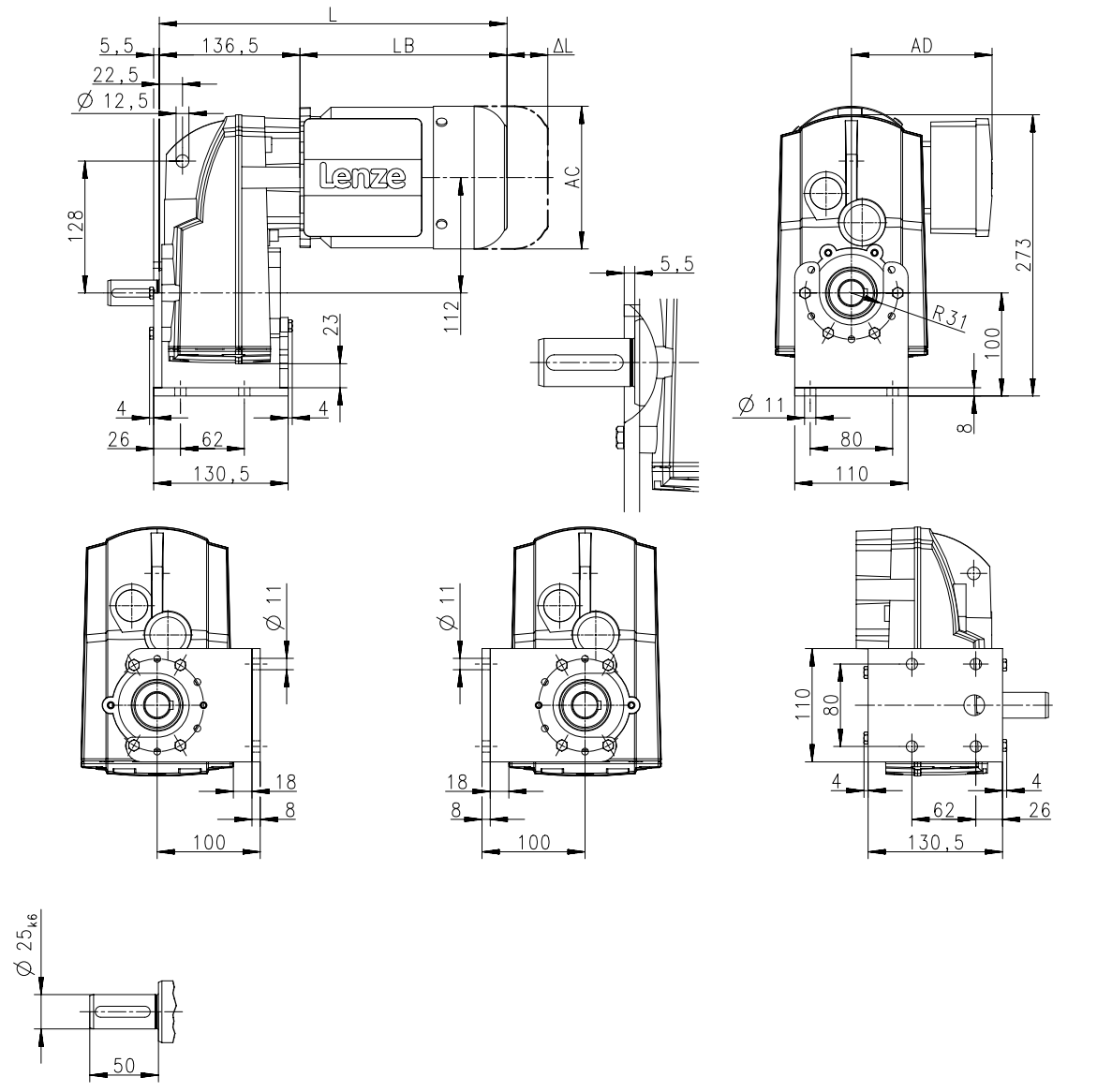


Product			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Dimensions							
Total length	**L**	**[mm]**	363	422		458	474
Motor length	**LB**	**[mm]**	226	285		321	337
Length of motor options	**Δ L**	**[mm]**	183	181		170	
Motor diameter	**AC**	**[mm]**	156	176		194	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with solid shaft and foot

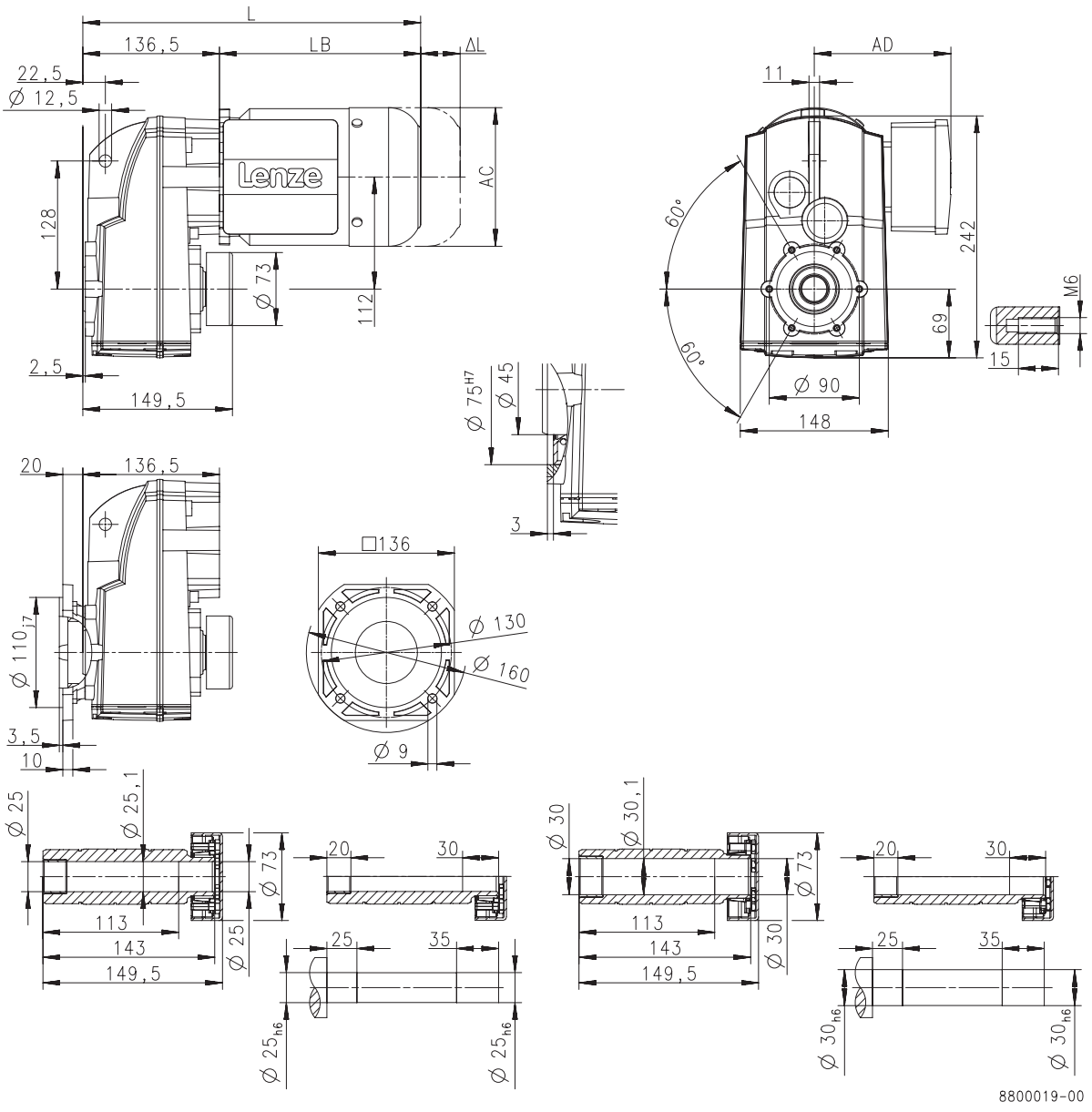


Product			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Dimensions							
Total length	**L**	**[mm]**	363	422		458	474
Motor length	**LB**	**[mm]**	226	285		321	337
Length of motor options	**Δ L**	**[mm]**	183	181		170	
Motor diameter	**AC**	**[mm]**	156	176		194	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with shrink disc

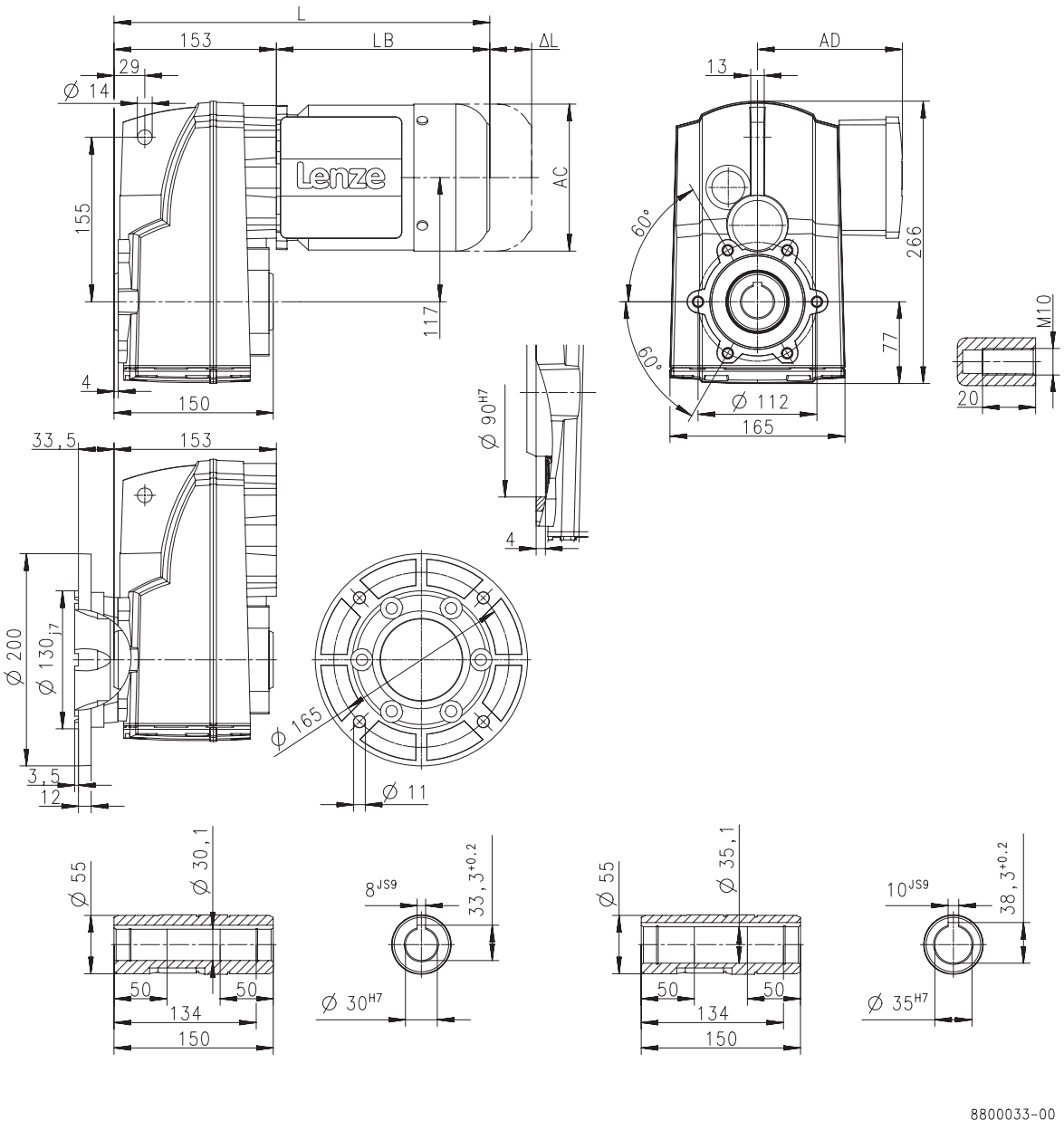


Product			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Dimensions							
Total length	**L**	**[mm]**	363	422		458	474
Motor length	**LB**	**[mm]**	226	285		321	337
Length of motor options	**Δ L**	**[mm]**	183	181		170	
Motor diameter	**AC**	**[mm]**	156	176		194	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166	

Dimensions, 4-pole motors

g500-S400

Dimensions with hollow shaft

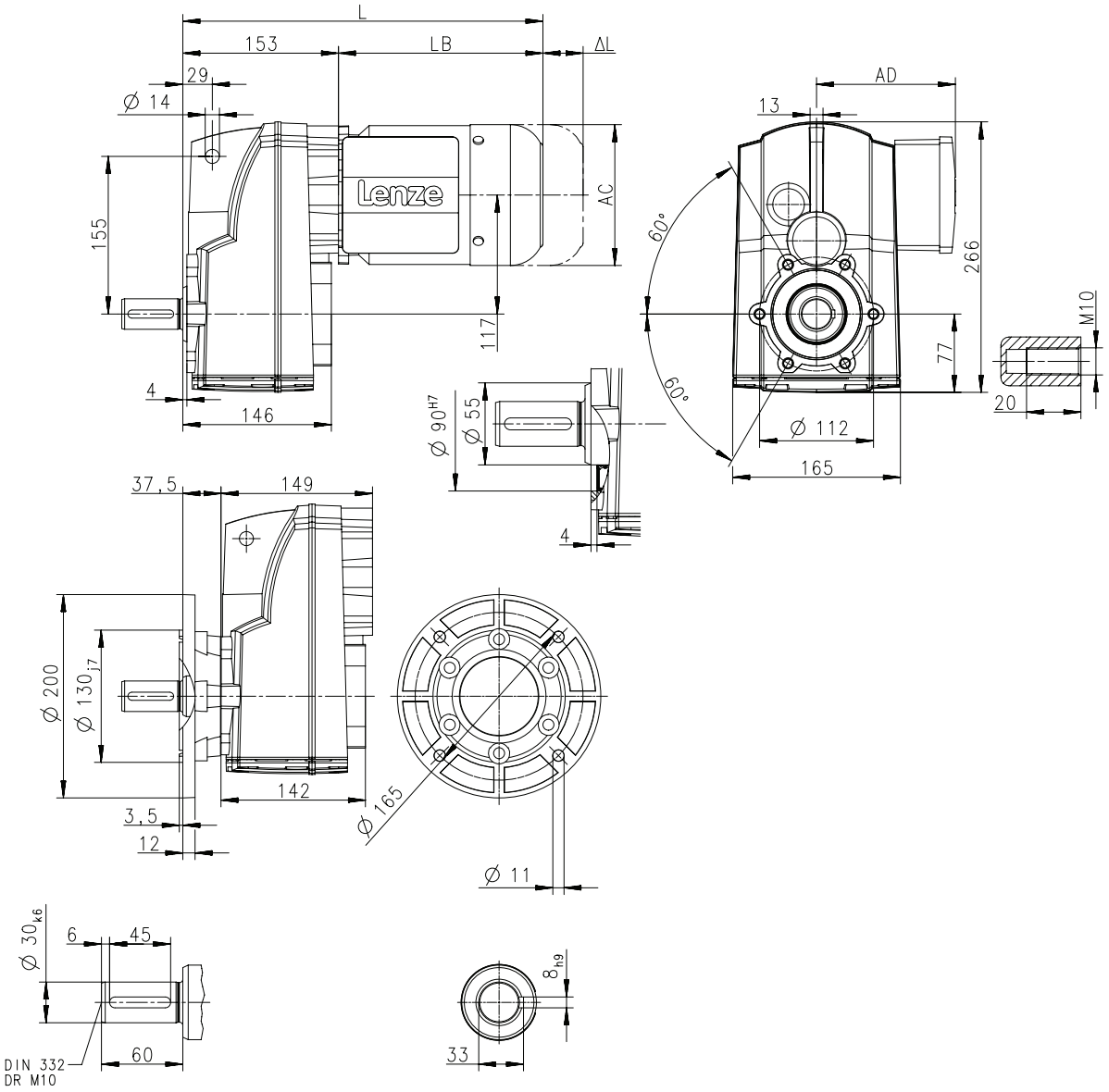


Product			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Dimensions								
Total length	**L**	**[mm]**	379	438		474	490	533
Motor length	**LB**	**[mm]**	226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	183	181		170		183
Motor diameter	**AC**	**[mm]**	156	176		194		218
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with solid shaft

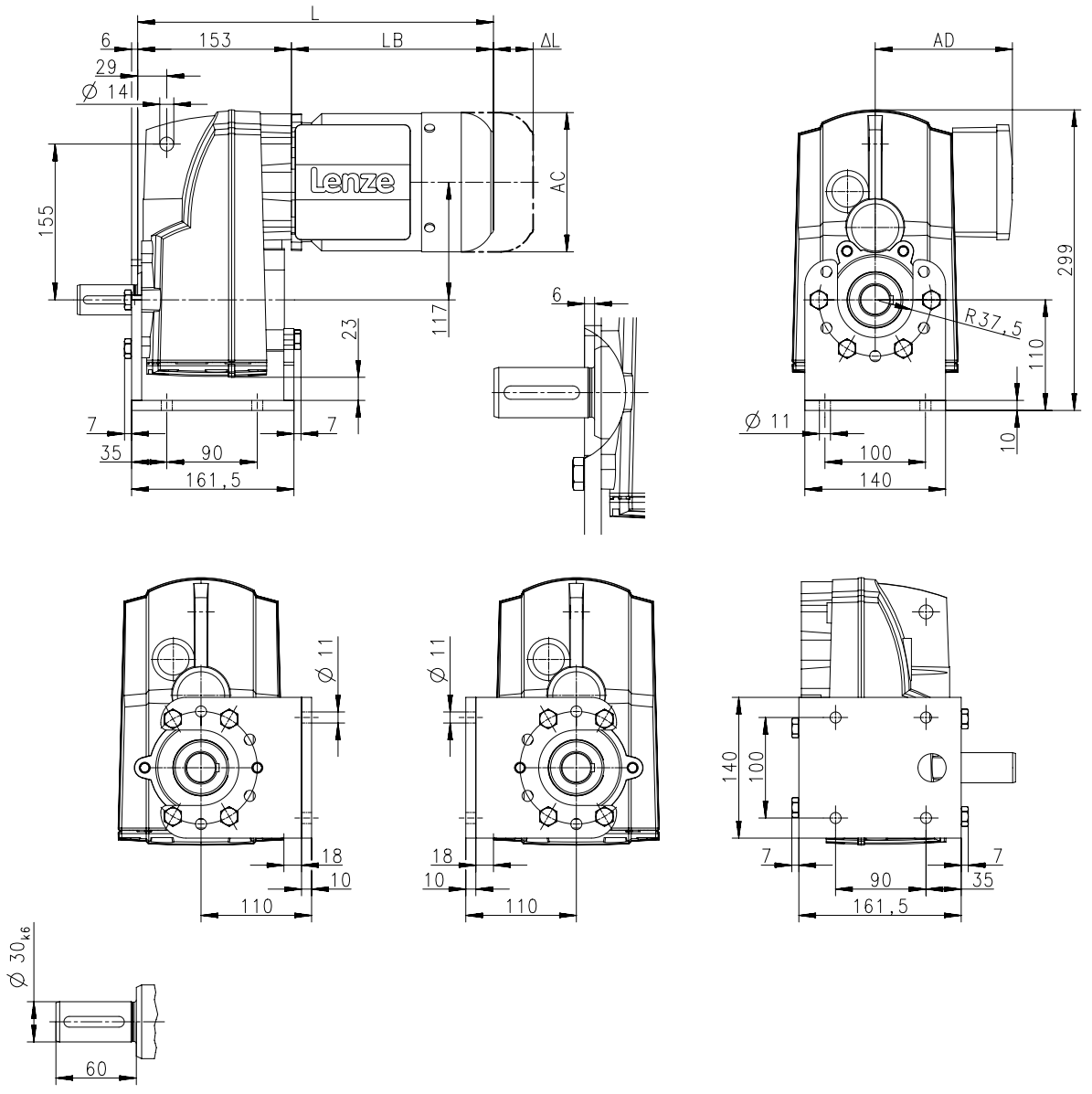


Product			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Dimensions								
Total length	**L**	**[mm]**	379	438		474	490	533
Motor length	**LB**	**[mm]**	226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	183	181		170		183
Motor diameter	**AC**	**[mm]**	156	176		194		218
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with solid shaft and foot

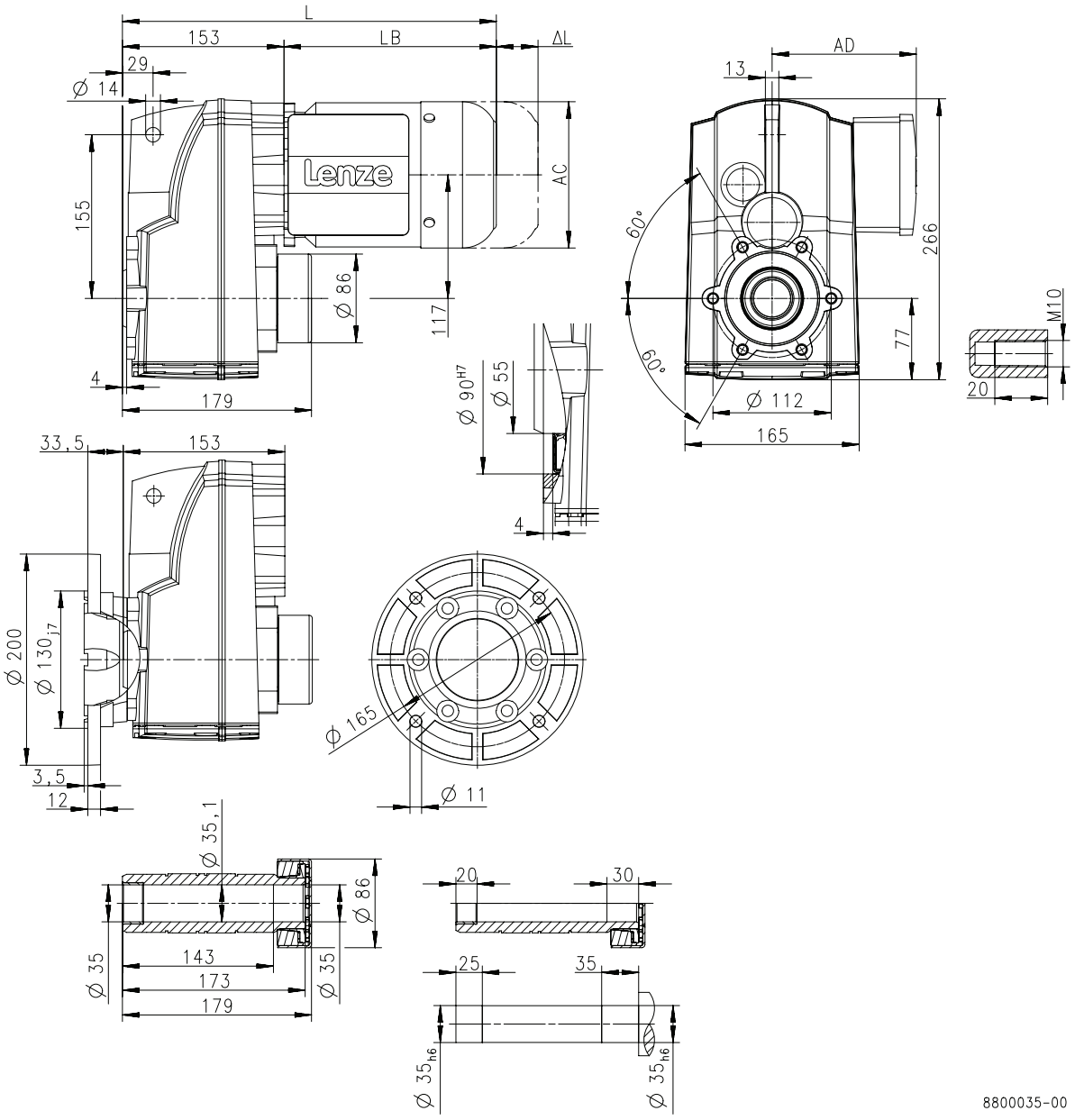


Product			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Dimensions								
Total length	**L**	**[mm]**	379	438		474	490	533
Motor length	**LB**	**[mm]**	226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	183	181		170		183
Motor diameter	**AC**	**[mm]**	156	176		194		218
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with shrink disc

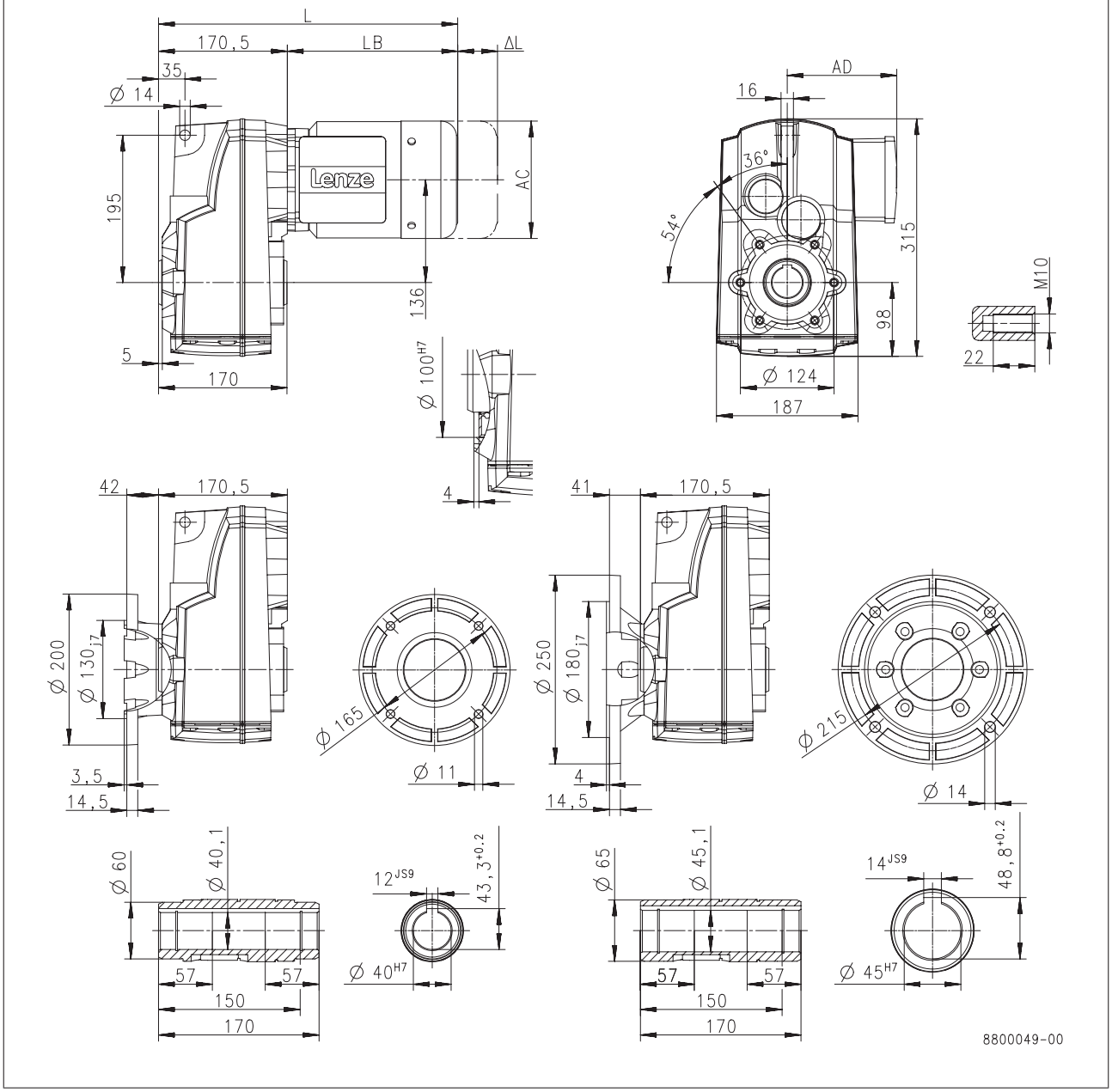


Product			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Dimensions								
Total length	**L**	**[mm]**	379	438		474	490	533
Motor length	**LB**	**[mm]**	226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	183	181		170		183
Motor diameter	**AC**	**[mm]**	156	176		194		218
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176

Dimensions, 4-pole motors

g500-S660

Dimensions with hollow shaft

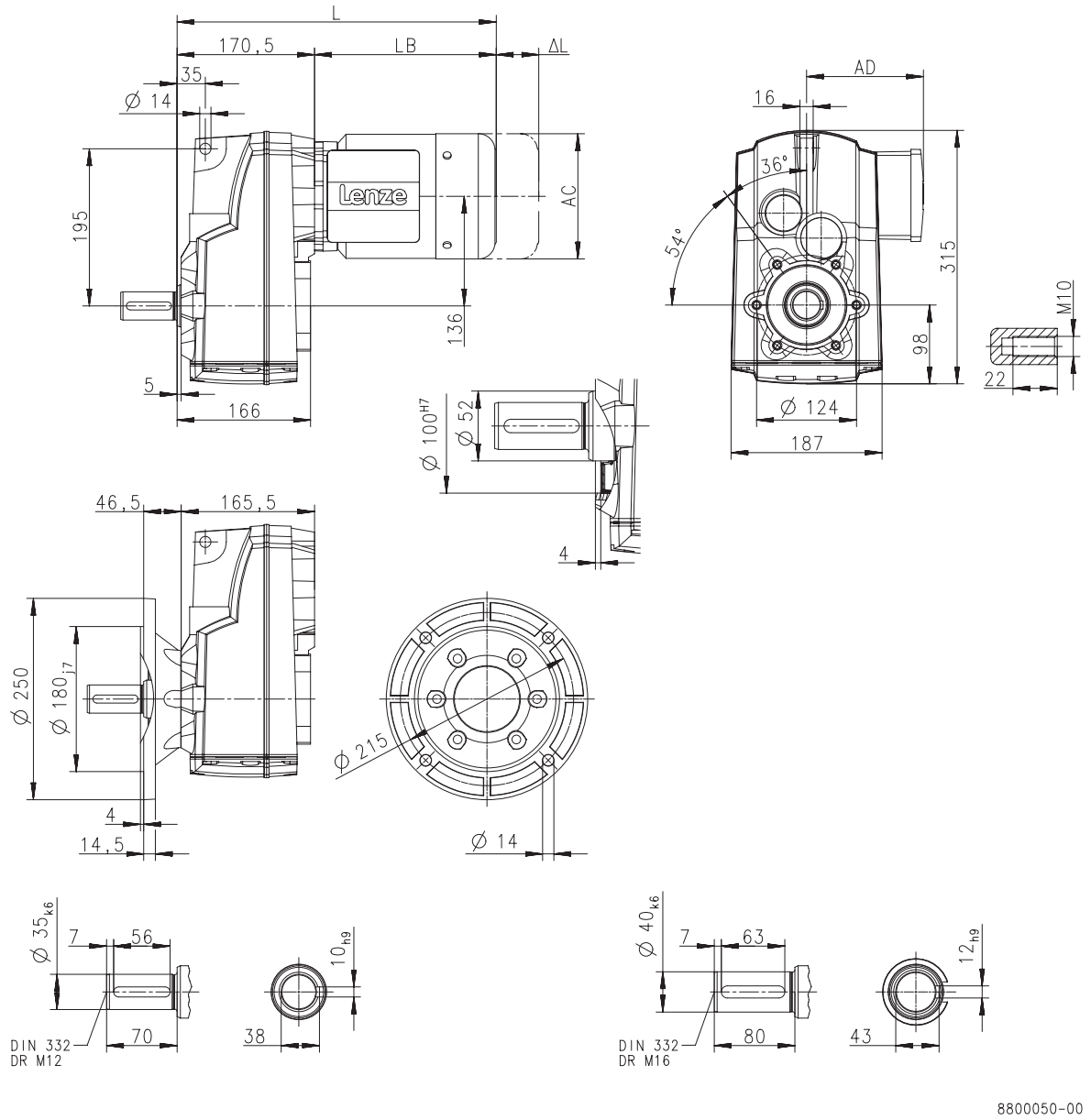


Product			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions										
Total length	**L**	**[mm]**	397	456		492	508	551	599	
Motor length	**LB**	**[mm]**	226	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	183	181		170		183	202	
Motor diameter	**AC**	**[mm]**	156	176		194		218	258	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176	195	

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft



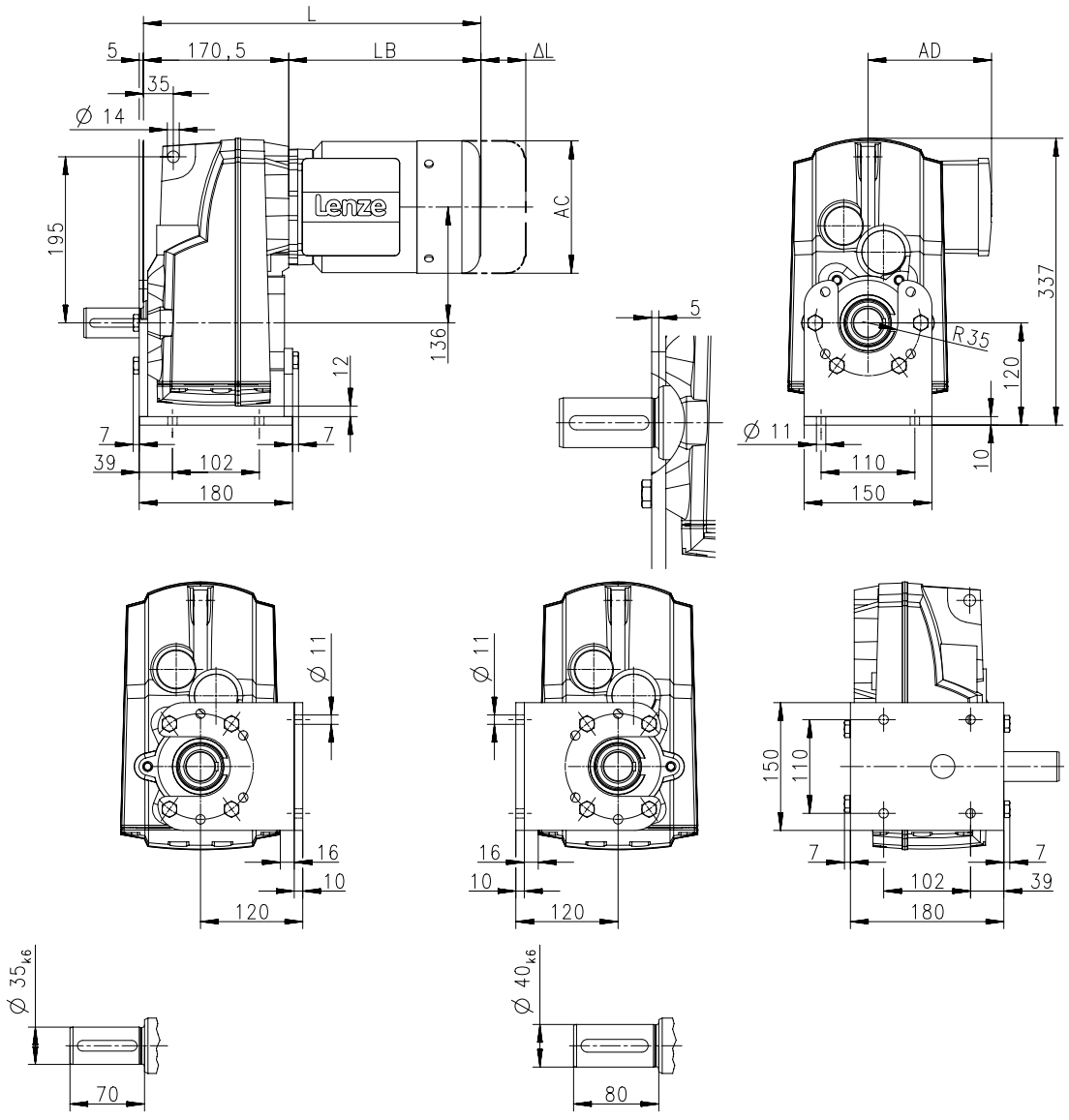
Product			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions										
Total length	**L**	**[mm]**	397	456		492	508	551	599	
Motor length	**LB**	**[mm]**	226	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	183	181		170		183	202	
Motor diameter	**AC**	**[mm]**	156	176		194		218	258	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176	195	

6.5

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft and foot



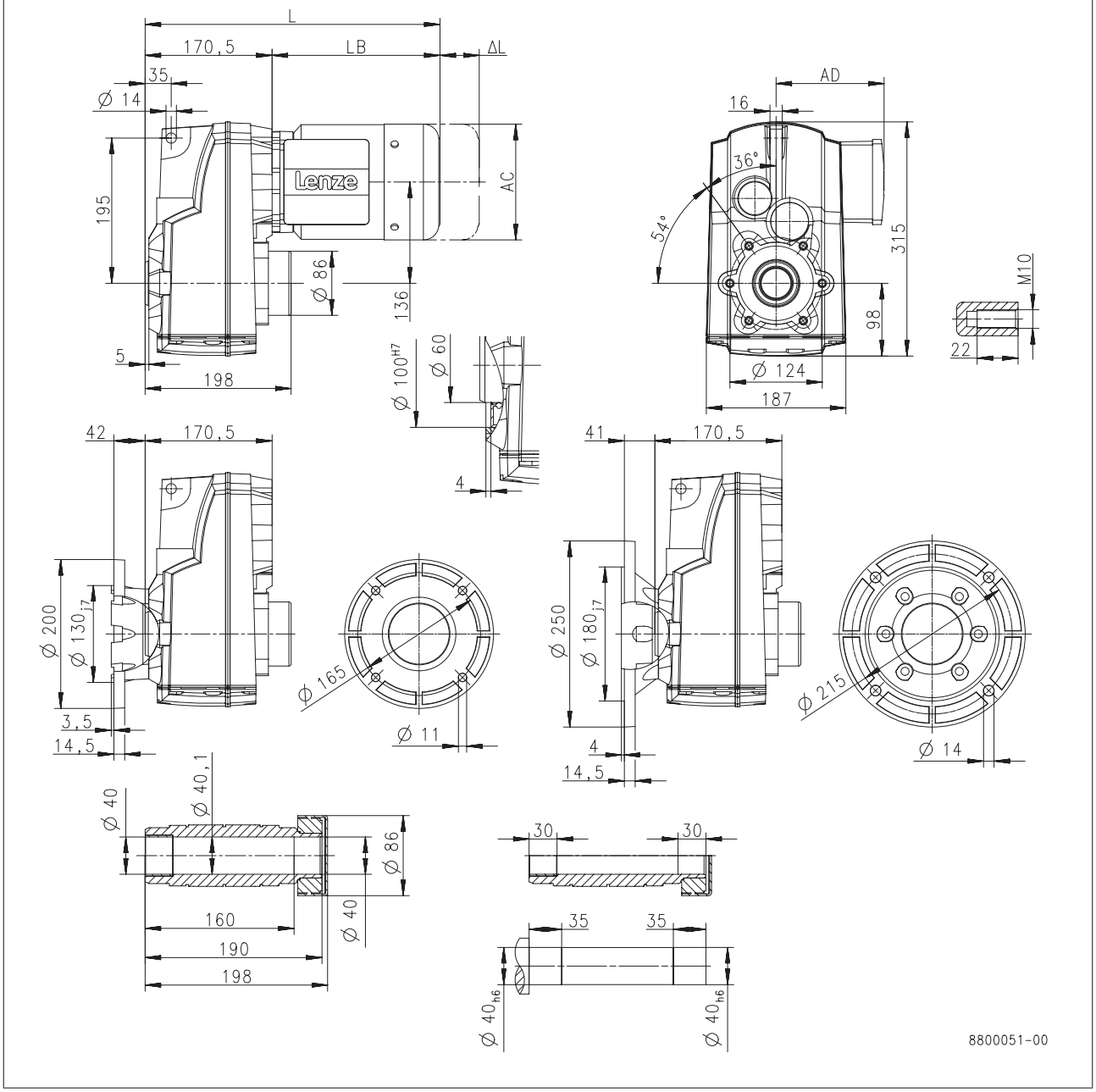
8800052-00

Product			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions										
Total length	**L**	**[mm]**	397	456		492	508	551	599	
Motor length	**LB**	**[mm]**	226	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	183	181		170		183	202	
Motor diameter	**AC**	**[mm]**	156	176		194		218	258	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176	195	

Dimensions, 4-pole motors

g500-S660

Dimensions with shrink disc



Product			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions										
Total length	**L**	**[mm]**	397	456		492	508	551	599	
Motor length	**LB**	**[mm]**	226	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	183	181		170		183	202	
Motor diameter	**AC**	**[mm]**	156	176		194		218	258	
Distance motor/connection	**AD**	**[mm]**	150	152	157	166		176	195	

Weights, 4-pole motors

2-stage gearboxes

				MH□MA□□							
				080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
g500	-S130	m	[kg]	16	21	23					
	-S220	m	[kg]	17	22	24	30	33			
	-S400	m	[kg]	20	25	27	33	36	47		
	-S660	m	[kg]	25	30	32	38	40	52	70	77

3-stage gearboxes

				MH□MA□□		
				080-32	090-12	090-32
g500	-S220	m	[kg]	18		
	-S400	m	[kg]	21		
	-S660	m	[kg]	25	30	32

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

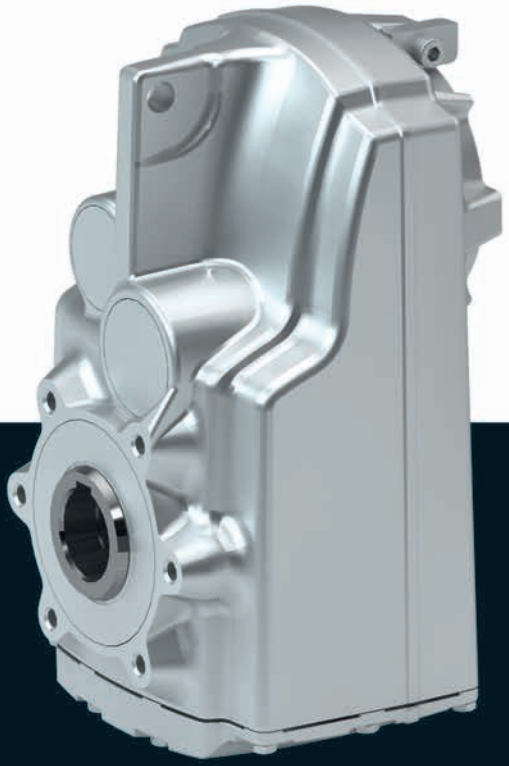
Surface and corrosion protection

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-S shaft-mounted helical gearbox

130 to 660 Nm



g500-S shaft-mounted helical gearbox

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

g500-S shaft-mounted helical gearbox

General information

Product information

The slim shaft-mounted helical 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 660 Nm and a ratio of up to i= 495.

Versions

- Slimline design saves installation space of the machine
- Solid shaft, hollow shaft and shrink disc for direct integration into the machine
- High accuracy with axial output provide for the highest efficiency

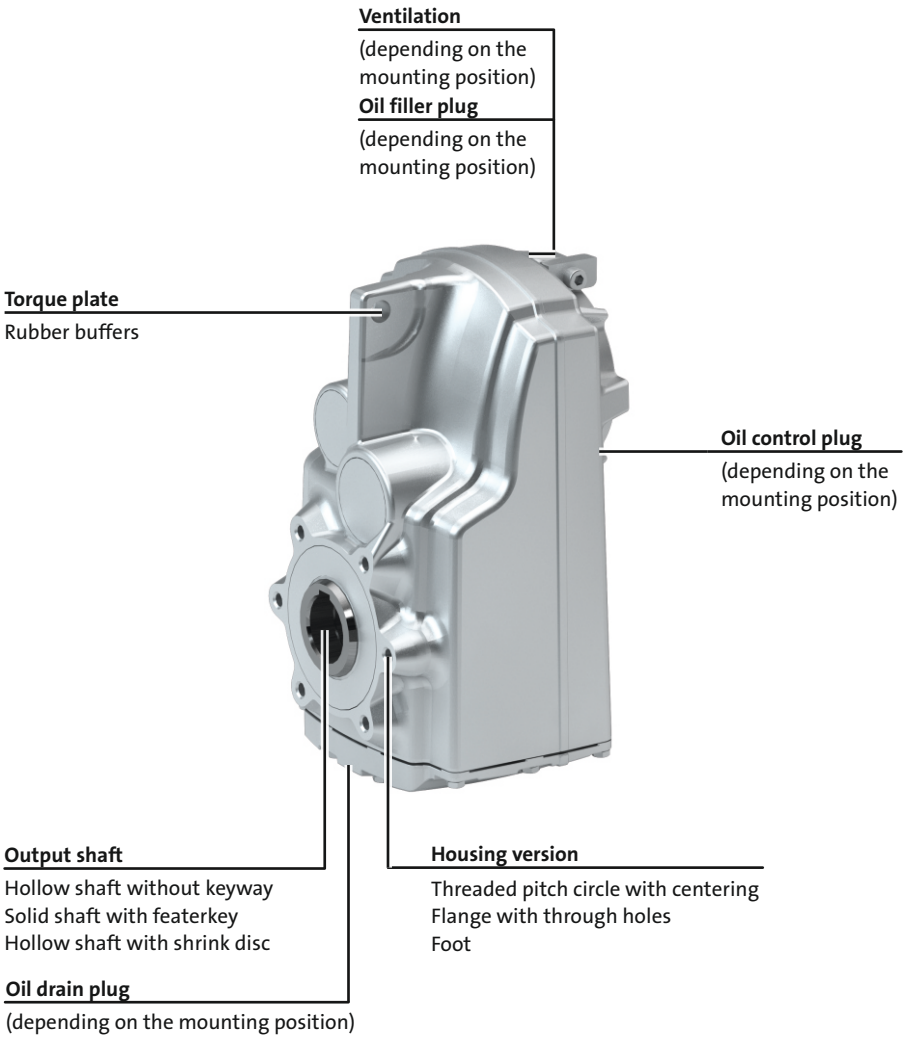
The product name

Gearbox type	Product range		Design	Rated torque [Nm]	Product
Shaft-mounted helical gearbox	g500	-	S	130	g500-S130
				220	g500-S220
				400	g500-S400
				660	g500-S660

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-S130	g500-S220	g500-S400	g500-S660
Driven shaft				
Solid shaft with featherkey [mm]	25x50		30x60	35x70 40x80
Hollow shaft with keyway [mm]	25	25/30	30/35	40/45
Hollow shaft with shrink disc [mm]	25	25/30	35	40
Design	Standard stainless steel			
Gasket	Standard FPM (Viton)			
Bearing	Standard			
Fitting grease	Not enclosed Enclosed			
Housing				
Housing version	With foot without centring With centering			
Output flange				
flange diameter [mm]	160		200	200/250 [1]
Lubricant				
Type	CLP 460 [2] CLP HC 320 CLP HC 220 CLP HC 220 USDA H1			
Oil-level 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			
Shaft cover	Shrink disc: Rotating cover Shrink disc: Fixed cover			

[1] 200 mm flange diameter only possible on hollow shaft version.
[2] Not suitable for geared servo motors.

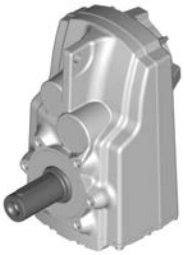
6.5

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

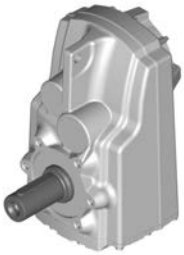
The gearbox kit

Gearbox details

Solid shaft



without centring



With centering

Flange with through holes

Hollow shaft

without centring

With centering

Flange with through holes

Hollow shaft with shrink disc

without centring

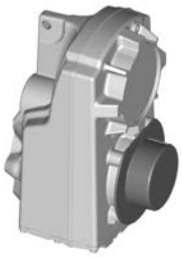
With centering

Flange with through holes

Accessories

Foot mounting

With rubber buffer



Shrink disc cover

6.5

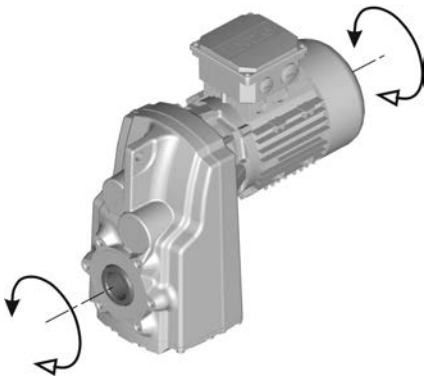
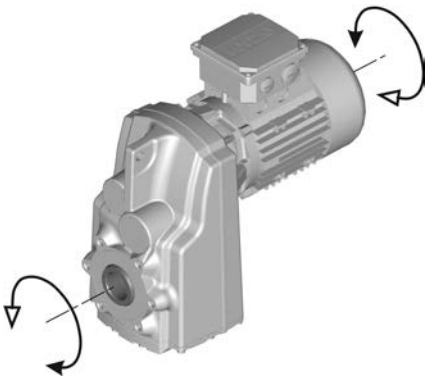
Functions and features

Product	g500-S130	g500-S220	g500-S400	g500-S660
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

6.5

2-stage gearboxes	3-stage gearboxes
	

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-S130 to S220.

Ventilated gearboxes

The g500-S400 S660 gearbox is supplied with a breather element as standard.

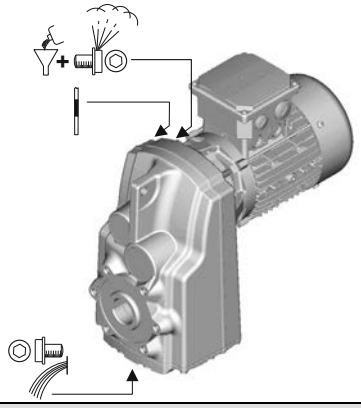
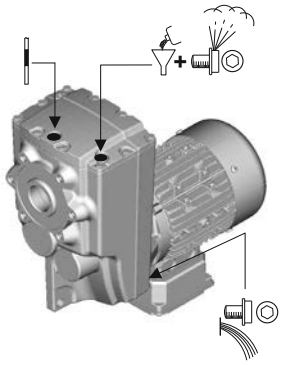
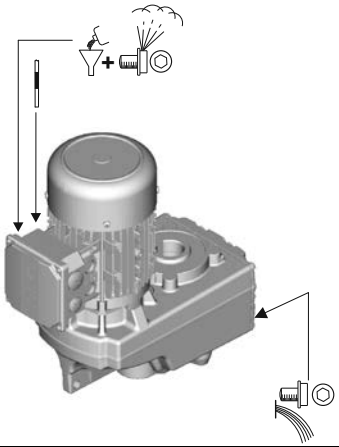
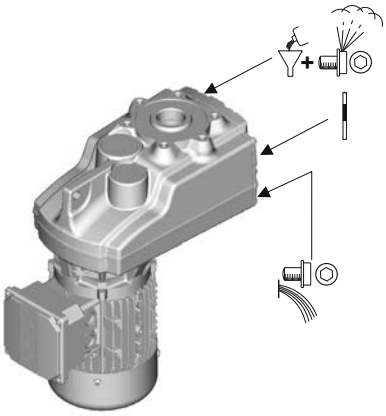
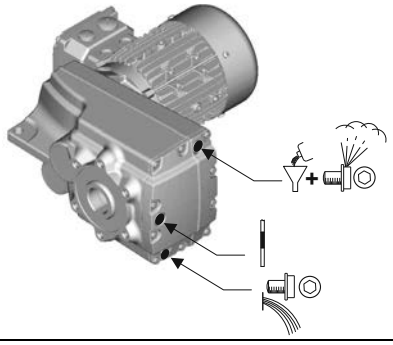
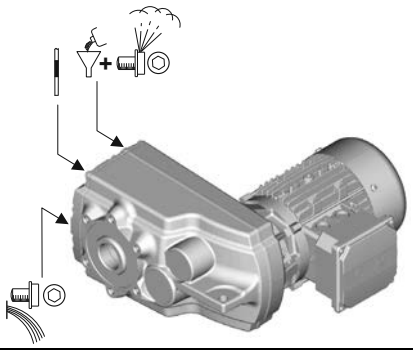
Gearboxes in combined mounting position

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-S130 to S660 in combined mounting position AEF
The breather elements are supplied loose.

Ventilation

Position of ventilation, sealing elements and oil level check

► **A ... F** mounting position

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

	Filling		Drain
	Ventilation		Check

Permissible radial and axial forces at output

Permissible radial force

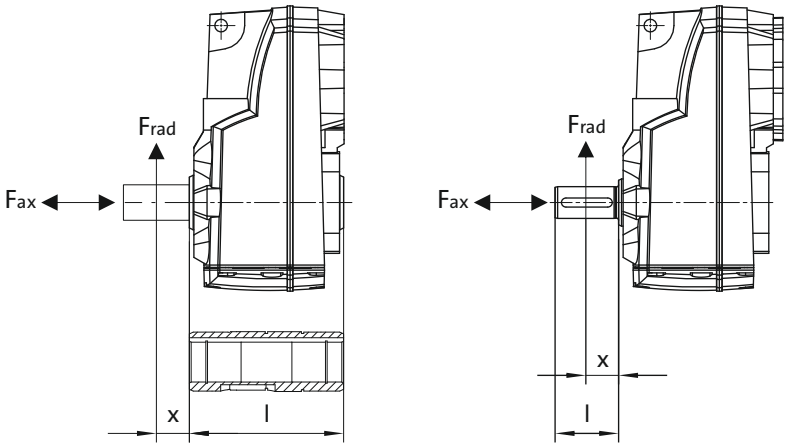
$F_{rad,perm} = f_w \times F_{rad,max}$

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

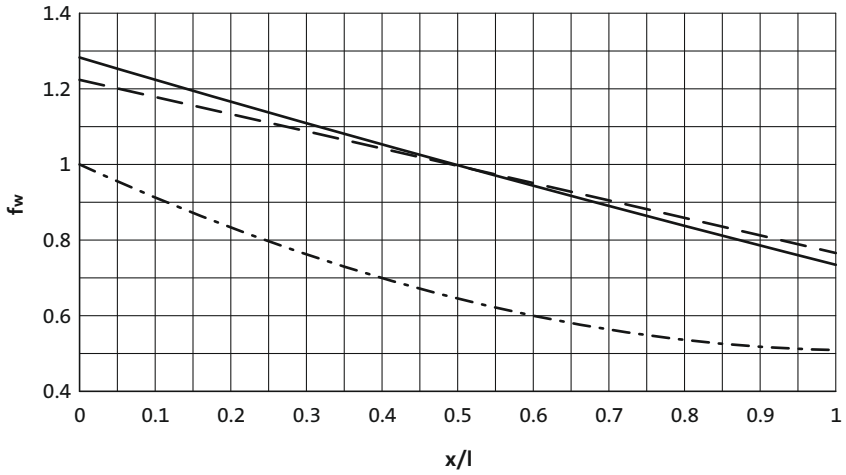
Permissible axial force

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

6.5

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-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	2100	2700	2800	3200	3800	4600	5500	6300	7000	7000
g500-S400	1800	2400	3000	3400	4100	5000	6000	7100	8000	8000
g500-S660	2400	3300	4300	4700	5000	6600	8500	10800	12000	12000

	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-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	1650	2100	2300	2700	3200	3600	3600	3600	3600	3600
g500-S400	1400	1900	2400	2700	3200	4000	4800	5800	6200	6200
g500-S660	1850	2500	3200	3600	3900	5100	6500	8400	9000	9000

	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-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	2300	2800	3200	3700	4400	4600	4600	4600	4600	4600
g500-S400	2900	3700	4300	5100	5900	6800	7000	7000	7000	7000
g500-S660	4000	5000	6100	7000	7800	9600	10000	10000	10000	10000

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-S130	3.661	1.56
	5.021	0.89
	6.425	0.57
	7.029	0.49
	8.322	0.69
	9.411	1.03
	11.413	0.42
	12.907	0.60
	14.606	0.29
	15.979	0.25
	18.069	0.34
	20.381	0.17
	23.048	0.23
	24.967	0.13
	28.233	0.17
	31.387	0.087
	35.493	0.11
	40.422	0.059
	45.711	0.074
	51.230	0.039
	57.933	0.048
	64.200	0.027
	72.600	0.032
	84.581	0.016
	95.648	0.019
g500-S220	3.840	2.60
	5.267	1.54
	6.767	1.64
	7.667	1.50
	9.280	1.04
	10.514	0.96
	11.876	0.72
	12.992	0.62
	13.456	0.67
	14.720	0.58
	16.571	0.44
	18.776	0.42
	20.300	0.34
	23.000	0.32
	26.422	0.21
	29.937	0.20
	32.867	0.15
	37.238	0.14
	42.533	0.095
	48.190	0.091
	51.620	0.069
	58.486	0.067
	65.975	0.044
	74.750	0.043

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-S400	3.339	5.16
	4.579	2.91
	5.860	1.86
	6.411	1.58
	7.467	2.18
	8.436	1.95
	10.240	1.32
	11.569	1.20
	13.105	0.89
	14.336	0.77
	14.806	0.82
	16.197	0.70
	18.286	0.53
	20.659	0.49
	22.400	0.40
	25.308	0.37
	29.156	0.24
	32.940	0.23
	36.267	0.17
	40.974	0.16
	46.933	0.11
	53.026	0.10
	56.960	0.079
	64.354	0.074
g500-S660	3.920	8.80
	5.376	5.26
	6.417	5.48
	6.880	3.48
	7.311	4.90
	8.800	3.50
	10.027	3.19
	11.262	2.41
	12.320	2.12
	12.832	2.22
	14.037	1.96
	15.714	1.51
	17.905	1.42
	19.250	1.15
	21.933	1.09
	25.056	0.65
	28.548	0.61
	31.167	0.47
	35.511	0.44
	40.333	0.29
	45.956	0.28
	48.950	0.21
	55.773	0.20

Moments of inertia

3-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-S220	40.012	0.20
	45.333	0.20
	52.587	0.13
	59.581	0.13
	67.298	0.092
	76.249	0.091
	86.079	0.062
	97.528	0.061
	111.747	0.044
	126.610	0.043
	143.205	0.030
	162.252	0.030
	241.022	0.014
	273.079	0.014
	312.233	0.003
	353.762	0.003
	398.508	0.006
	451.512	0.006
g500-S400	58.027	0.14
	65.559	0.14
	74.260	0.098
	83.900	0.095
	94.984	0.066
	107.314	0.064
	123.307	0.046
	139.313	0.045
	158.019	0.032
	178.531	0.031
	204.412	0.021
	230.946	0.021
	265.956	0.014
	300.479	0.014
	344.533	0.004
	389.256	0.004
	439.733	0.006
	496.814	0.006

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-S660	49.867	0.39
	56.818	0.38
	63.817	0.27
	69.813	0.23
	72.713	0.26
	79.545	0.23
	89.048	0.17
	101.460	0.16
	109.083	0.13
	124.289	0.12
	137.133	0.083
	156.249	0.082
	176.611	0.056
	201.230	0.056
	223.833	0.037
	255.034	0.037
	280.500	0.026
	319.600	0.025
	369.548	0.016
	421.060	0.015

Additional weights for gearboxes

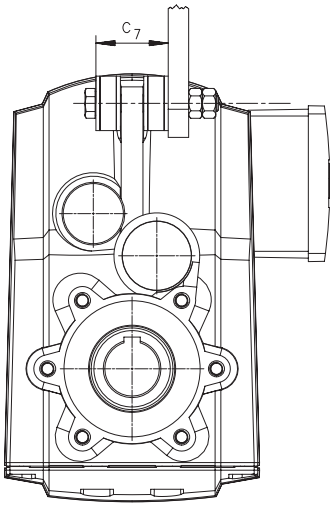
Product			g500-S130	g500-S220	g500-S400	g500-S660
Mass						
Solid shaft	m	[kg]	0.5	0.5	1.7	2.5
Shrink disc	m	[kg]	0.2	0.4	0.6	0.6
Foot	m	[kg]	1.7	1.8	3.3	4.3
Flange	m	[kg]	0.4	0.4	0.9	1.7

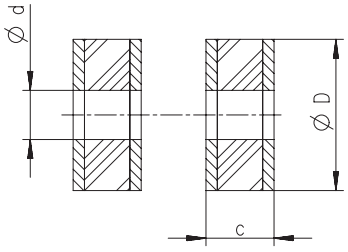
Torque plate

The torque is usually supported via the foot or the flange.
Another simple option is the integrated torque plate at the housing. Here, the torque is supported only via one point and is, among other things, suitable for shaft-mounted gearboxes. Moreover, the suitable rubber buffers provide for a low-tension installation and absorb slight shocks.

The rubber buffers can be ordered optionally.

Rubber buffer for torque plate



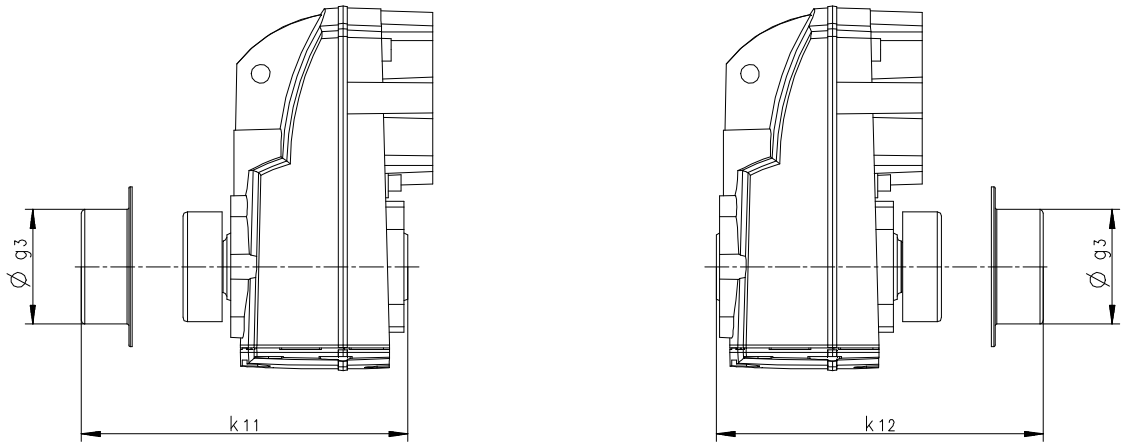


Product	Dimensions				Mass
	d	D	c	c_7	m
	[mm]	[mm]	[mm]	[mm]	[kg]
g500-S130	11.0	30.0	17.0	45.0	0.050
g500-S220	11.0	30.0	17.0	45.0	0.050
g500-S400	13.0	40.0	18.0	49.0	0.10
g500-S660	13.0	40.0	18.0	52.0	0.10

Shaft cover

Shrink disc cover

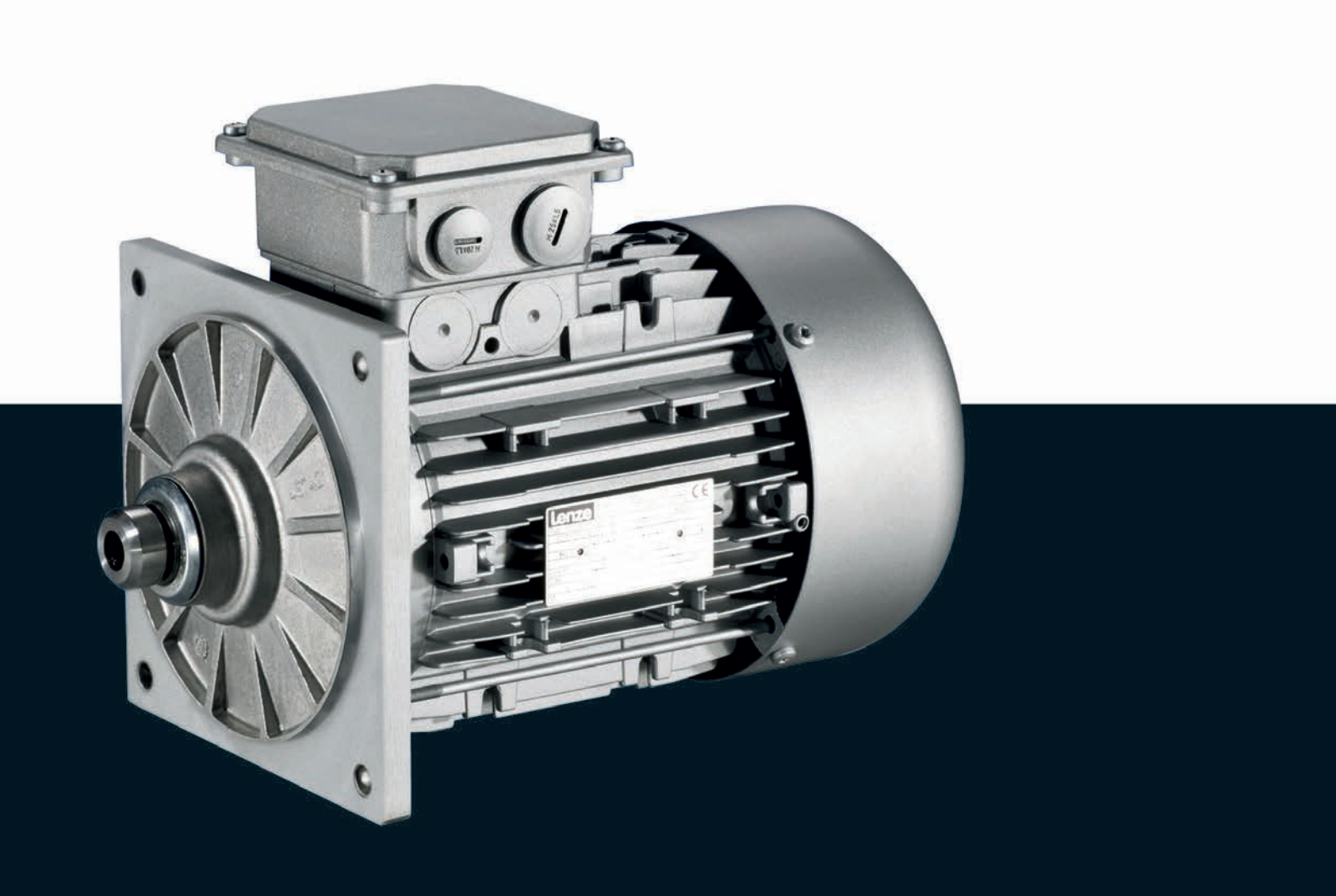
The cover is provided for the shrink disc to be protected from contact.



Product	Dimensions			Mass
	g_3	k_{11}	k_{12}	m
	[mm]	[mm]	[mm]	[kg]
g500-S130	63.0	132	132	0.050
g500-S220	76.0	152	152	0.050
g500-S400	90.0	182	182	0.050
g500-S660	90.0	200	202	0.050

MH three-phase AC motors

0.75 to 45 kW



MH three-phase AC motors

Contents

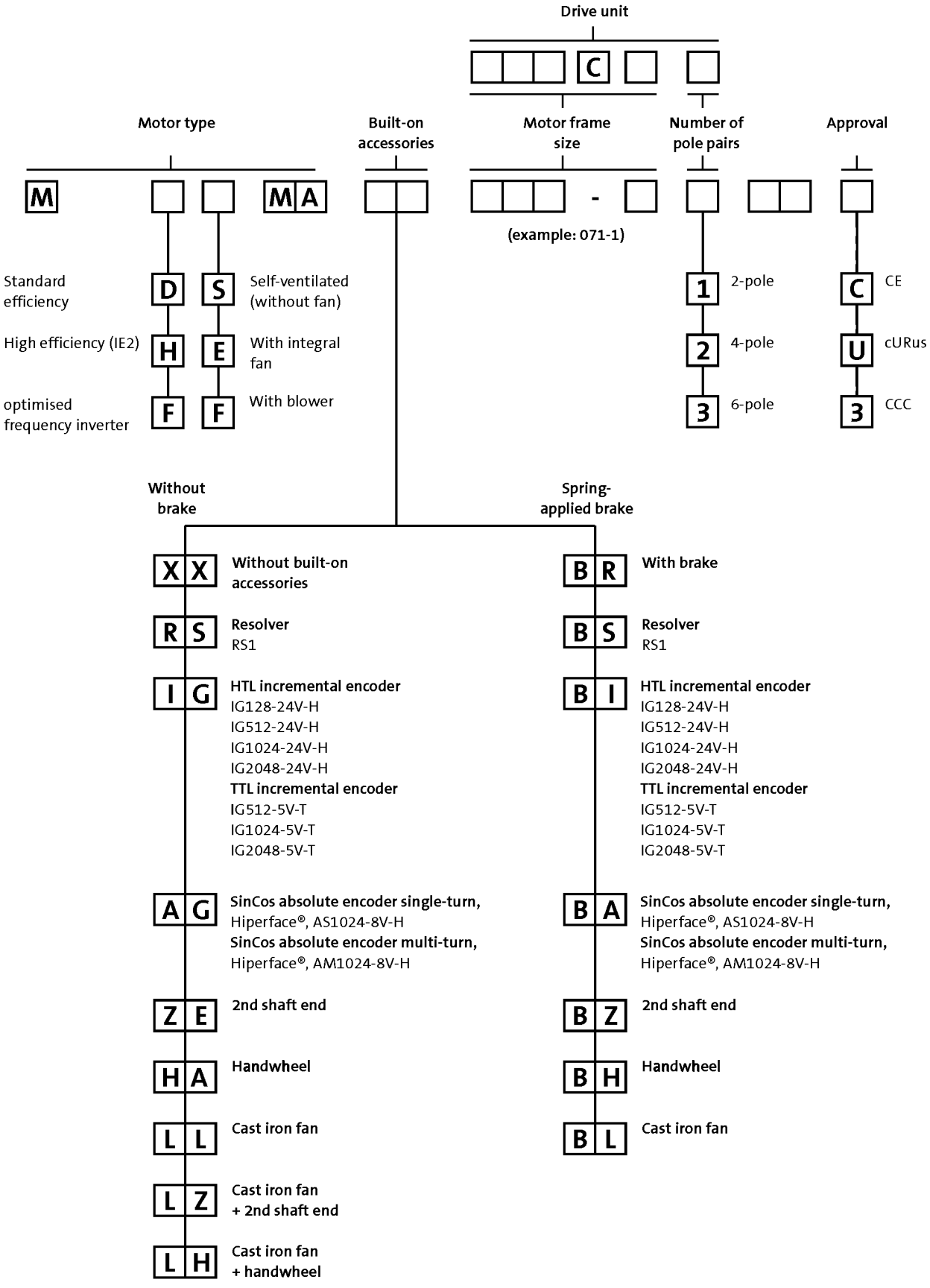
List of abbreviations

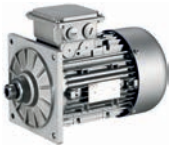
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
cos ϕ		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated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

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

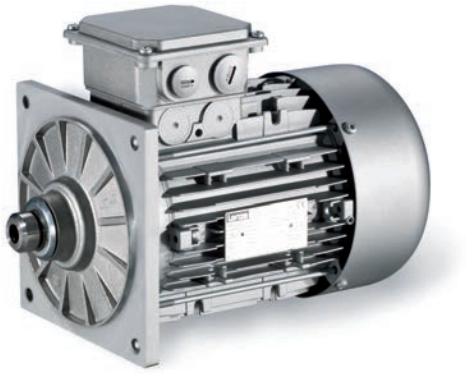

Drive unit
C
Motor type
Built-on accessories
Motor frame size
Number of pole pairs
Approval
M
M A
-
(example: 071-1)
Standard efficiency
D
S
Self-ventilated (without fan)
High efficiency (IE2)
H
E
With integral fan
optimised frequency inverter
F
F
With blower
1
2-pole
2
4-pole
3
6-pole
C
CE
U
cURus
3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



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

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

Options
- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach 10 x 10^6 switching cycles.
- A resolver and various incremental and absolute value encoders can be fitted for speed and position detection.
- For fast commissioning, the motors are also available with connectors for the power connection, brake, blower and feedback.
- Instead of an integral fan, the motor can optionally be equipped with a blower. No torque reduction is then necessary, even at speeds below 20 Hz.
- For drive tasks in decentralised applications, the motor can be ordered with the motec inverter connected to the terminal box.
- The motors are available with cURus, GOST-R, CCC and UkrSepro approval.
- Smooth start/braking is possible by increasing the motor's centrifugal mass with a cast iron fan.
- The motor can be equipped with a handwheel for manual setup or emergency operations.
- To protect the fan from 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	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)		
Temperature 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)		
Temperature 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)		
Temperature sensor			
Thermal contact	TKO		
Thermal detector	KTY83-110 KTY84-130		
PTC thermistor	PTC		
Motor connection			
Power connection	Terminal box		
Brake connection	Terminal box		
Blower connection	Terminal box ICN connector		
Feedback connection	Terminal box ICN connector		
Temperature sensor connection	Terminal box		
Shaft bearings			
Position of the locating bearing	Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		Drive end
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour			
	Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		
Further options			

Functions and features

Surface and corrosion protection

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

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

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

Structure of surface coating

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

Motor – inverter assignment

Rated frequency 50/60 Hz

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

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

Motor – inverter assignment

Rated frequency 87 Hz

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

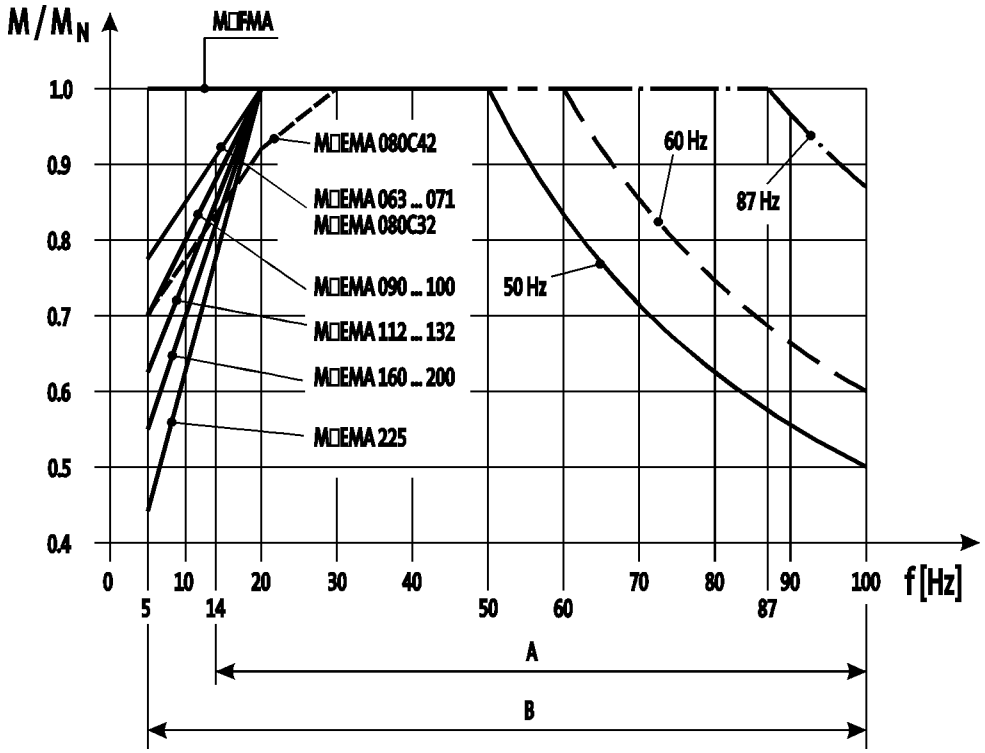
Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
1.35	MH□□□□□080-32	E84DVB□1524S□□□2□	
2.00	MH□□□□□090-12	E84DVB□2224S□□□2□	
2.70	MH□□□□□090-32	E84DVB□3024S□□□2□	
3.90	MH□□□□□100-12	E84DVB□4024S□□□2□	
5.40	MH□□□□□100-32	E84DVB□5524S□□□2□	
7.10	MH□□□□□112-22	E84DVB□7524S□□□2□	
9.70	MH□□□□□132-12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

Dimensioning

Torque derating at low motor frequencies

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

Torque characteristics



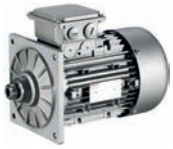
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

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

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

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

Please contact your Lenze sales office.



Standards and operating conditions

Degree of protection			
EN 60529			IP55 [1] IP65 [1] IP66 [1]
Energy efficiency class			
IEC 60034-30			IE2
IEC 60034-2-1			Methodology for measuring efficiency
Approval			
Class			cURus/UL Energy-verified [2] CCC GOST-R UkrSepro
Temperature class			
IEC/EN 60034-1; utilisation			B
IEC/EN 60034-1; insulation system (enamel-insulated wire)			F
Min. ambient operating temperature			
	$T_{opr,min}$	[°C]	-20
Max. ambient 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

4-pole motors

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

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

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose rated data at 50 Hz displays the voltage values Δ 230 V.
With motor frame sizes 132-12 to 225-22, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 400 V.

Rated data for 60 Hz

4-pole motors

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

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

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

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose rated data at 60 Hz displays the voltage values Δ 265 V.
With motor frame sizes 132-12 to 225-22, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 460 V.

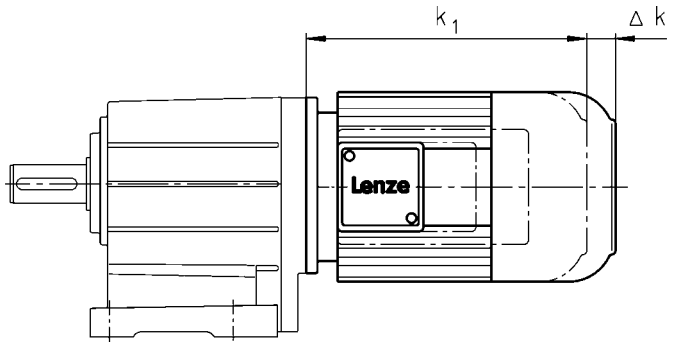
Rated data for 87 Hz

4-pole motors

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

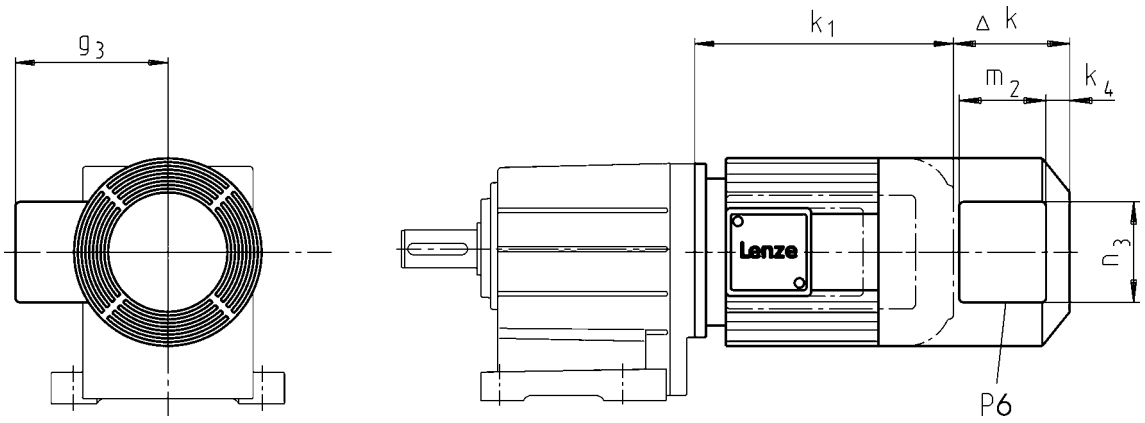
[1] Without accessories

Dimensions, self-ventilated (4-pole)



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

Dimensions, forced ventilated (4-pole)

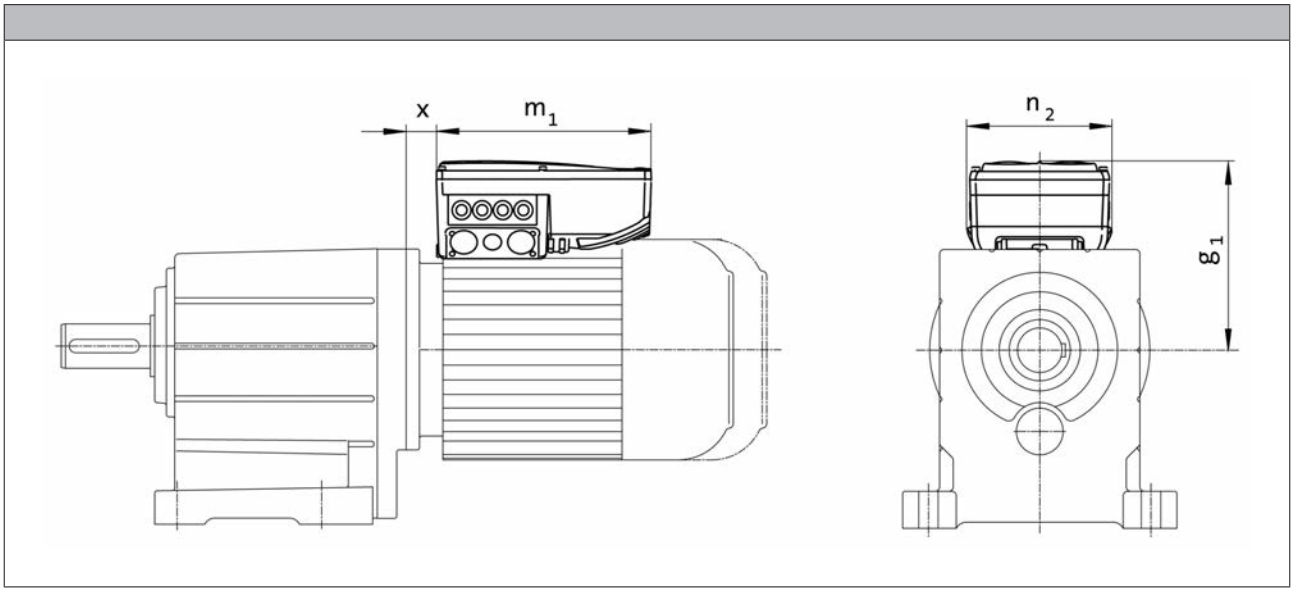


Motor type									
	MHFMAXX	MHFMABR	MHFMABS MHFMABI MHFMABA	MHFMARS MHFMAIG MHFMAAG					

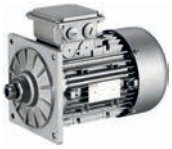
Motor frame size									
	Δ k	Δ k	Δ k	Δ k	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080-32	128	183	183	128	13	132	96	106	1x M16x1.5
090-12 090-32		181	181		22	141	95	105	
100-12 100-32	109	170	170	109		150			
112-22	102	183	183	183		162			
132-12 132-22	115	202	202	202	32	182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

Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz

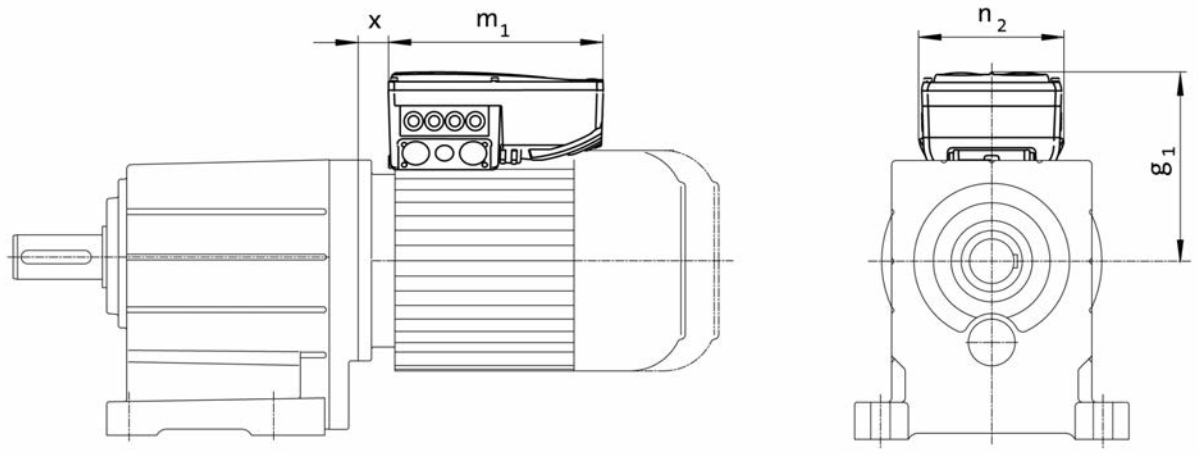


Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MH□□□□□080-32	E84DVB□7514S□□□2□	172	241	161	25.5
MH□□□□□090-12	E84DVB□1124S□□□2□	177			28.8
MH□□□□□090-32	E84DVB□1524S□□□2□				
MH□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	29.6
MH□□□□□100-32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



Dimensions, 8400 motec inverter

Rated frequency 87 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 87Hz}$	$m_{1,\ 87Hz}$	$n_{2,\ 87Hz}$	x_{87Hz}
		[mm]	[mm]	[mm]	[mm]
MH□□□□□080-32	E84DVB□1524S□□□2□	172	241	161	25.5
MH□□□□□090-12	E84DVB□2224S□□□2□	206	260	176	27.8
MH□□□□□090-32	E84DVB□3024S□□□2□				
MH□□□□□100-12	E84DVB□4024S□□□2□	272	325	195	17.1
MH□□□□□100-32	E84DVB□5524S□□□2□				
MH□□□□□112-22	E84DVB□7524S□□□2□	282			19.0

Spring-applied 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 4-pole motors and brakes

Design	Standard Standard	LongLife LongLife

Motor frame size	Size	Rated torque	Size	Rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
080-32	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
090-12 090-32	08 08 10 10 10	3.50 8.00 7.00 16.0 23.0	08 10 10	8.00 7.00 16.0
100-12	10 10 12 12	7.00 16.0 14.0 32.0	10 12 12	16.0 14.0 32.0
100-32	10 10 12 12 12	7.00 16.0 14.0 32.0 46.0		

Spring-applied 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

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

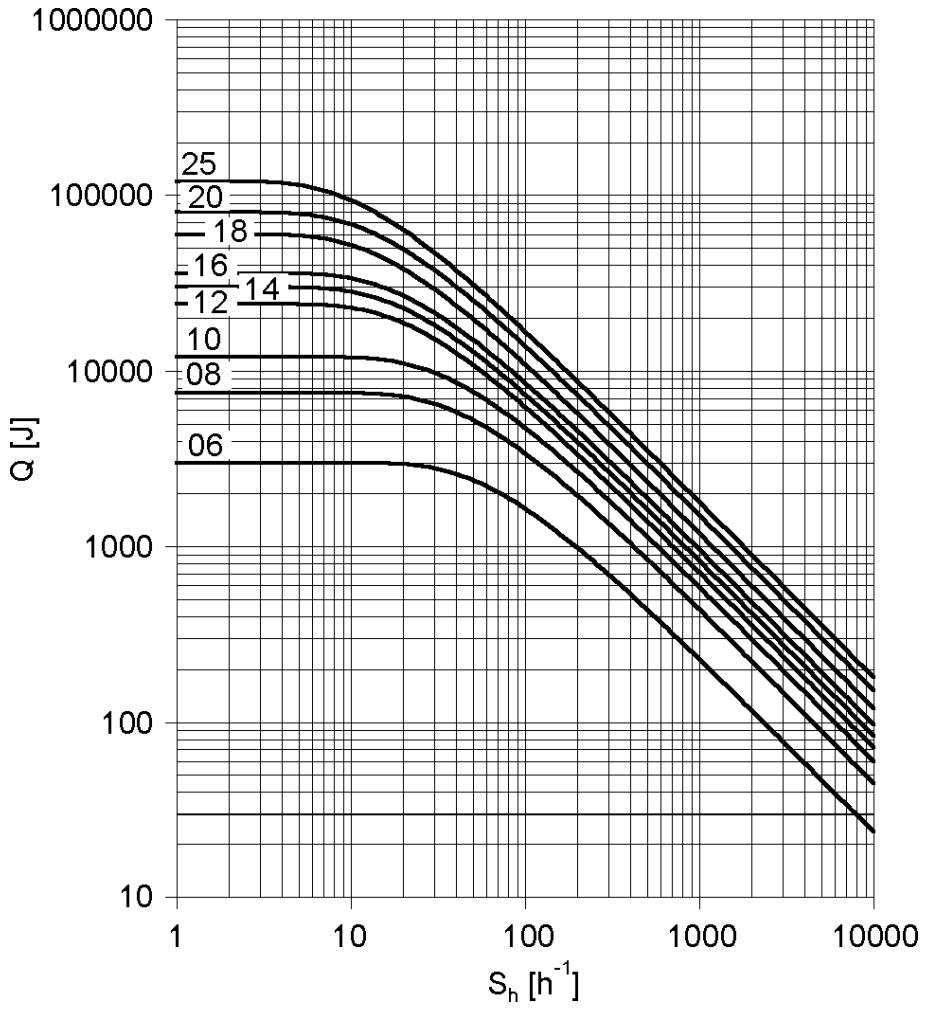
Supply voltages:
- AC 230 V
- AC 400 V

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

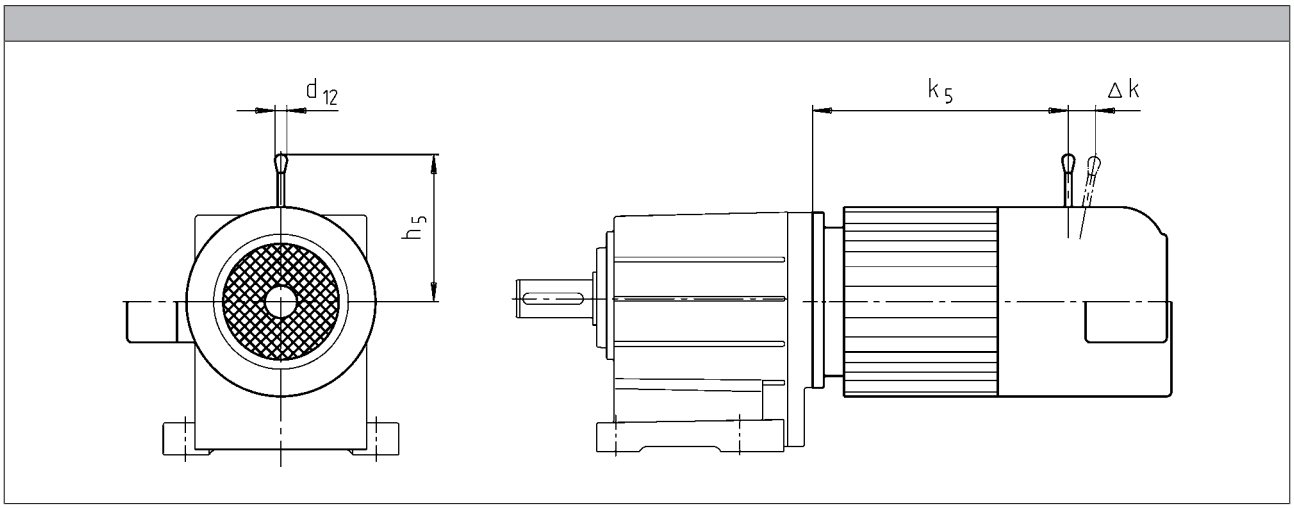
Design			Holding current reduction (cold brake)									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Overexcitation time												
	$t_{ü}$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
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]
080-32	06 08	207 218	29 27	107 116	13.0 13.0
090-12 090-32	08 10	245 256	27 28	116 132	13.0 13.0
100-12	10 12	279 281	28 37	132 161	13.0 13.0
100-32	10 12	294 296	28 37	132 161	13.0 13.0
112-22	12 14	292 296	37 41	161 195	13.0 24.0
132-12 132-22	14 16	373 373	41 55	195 240	24.0 24.0
160-22	16 18	420 423	55 59	240 279	24.0 24.0
160-32	16 18	464 467	55 59	240 279	24.0 24.0
180-12 180-32	18 20	539 546	59 74	279 319	24.0 24.0
180-42	18 20	596 603	59 74	279 319	24.0 24.0
225-12 225-22	25 25	785 785	103 103	445 445	24.0 24.0

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

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

Resolver

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

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

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

Incremental encoder and SinCos absolute value encoder

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

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

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

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

Blowers

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

Rated data for 50 Hz

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

Blowers

Rated data for 50 Hz

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

Rated data for 60 Hz

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

Temperature monitoring

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

TKO thermal contacts

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

PTC thermistor

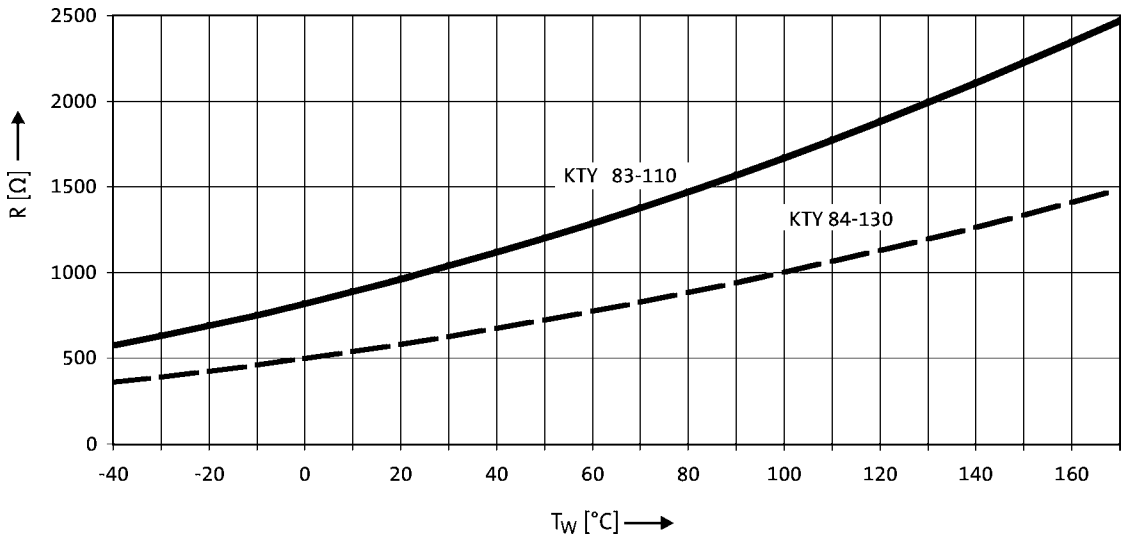
Function	Operating temperature	Rated resistance			Standard
		155 °C	-20 °C	140 °C	
	T	R_N	R_N	R_N	
	-5 ... 5				
	[°C]	[Ω]	[Ω]	[Ω]	
Sudden change in resistance	150	550	30.0	250	DIN 44080 DIN VDE 0660 Part 303

Temperature monitoring

KTY temperature sensor

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

Variation of resistance



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

Terminal box

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

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

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

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

Terminal box

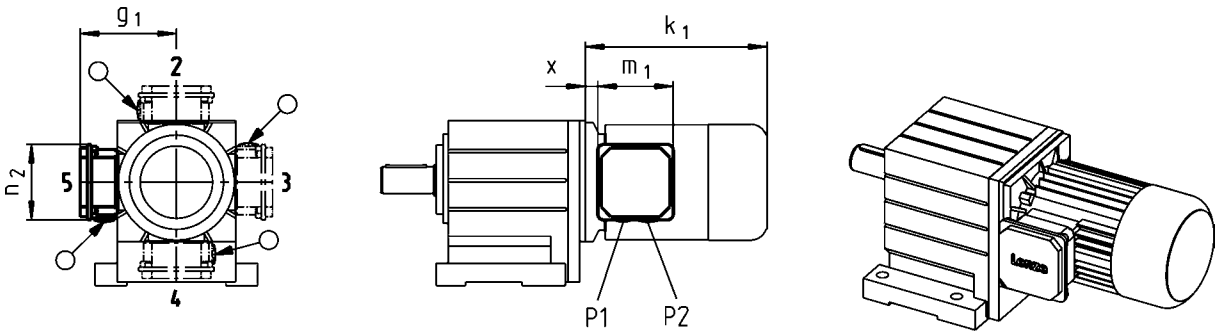
Motor terminal box - built-on accessories assignment: 4-pole / 6-pole motors

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

Terminal box

Dimensions of KK1

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



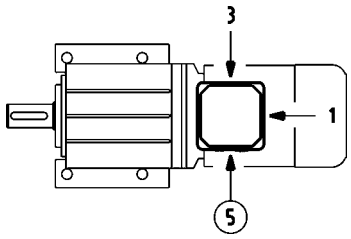
Size						
Motor						
	x	g_1	m_1	n_2	P_1	P_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	21 12 [1)]	100 117 [1)]	75.0 93.0 [1)]	75.0 93.0 [1)]	M16x1.5 M20x1.5 [1)]	M20x1.5 M20x1.5
071	24 15 [1)]	109 126 [1)]				
080	14	150	115	115	M20x1.5	M25x1.5
090	19	157				
100	20	166				
112	22	176				
132	33	195	122	122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

[1)] UL/CSA approval: cURus

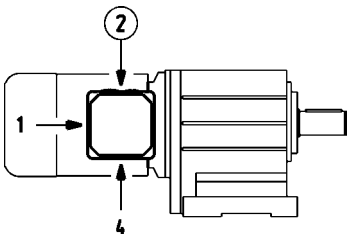
Terminal box

Cable entry position when using KK1

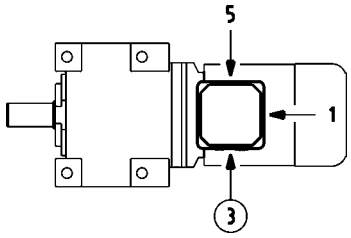
Terminal box in position 2



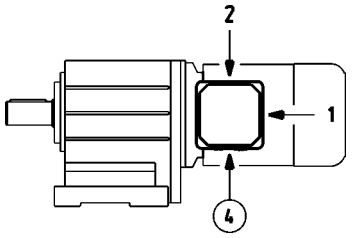
Terminal box in position 3



Terminal box in position 4

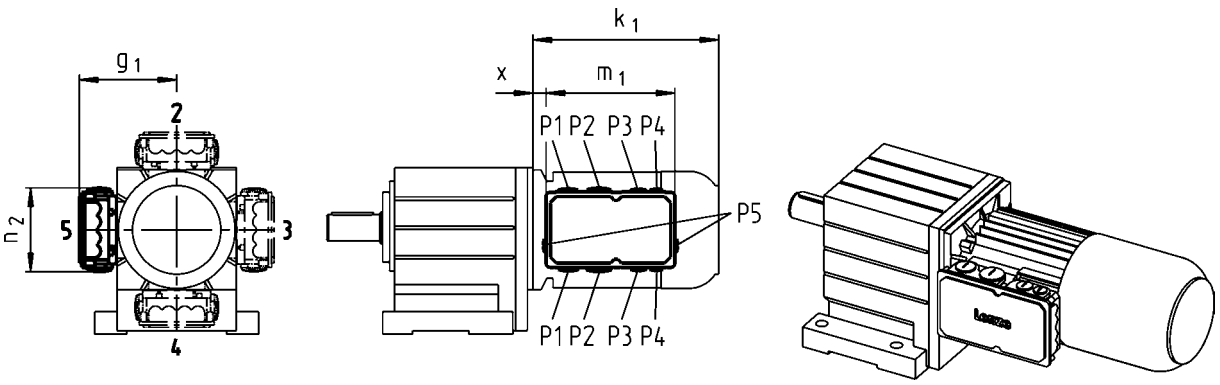


Terminal box in position 5



Terminal box

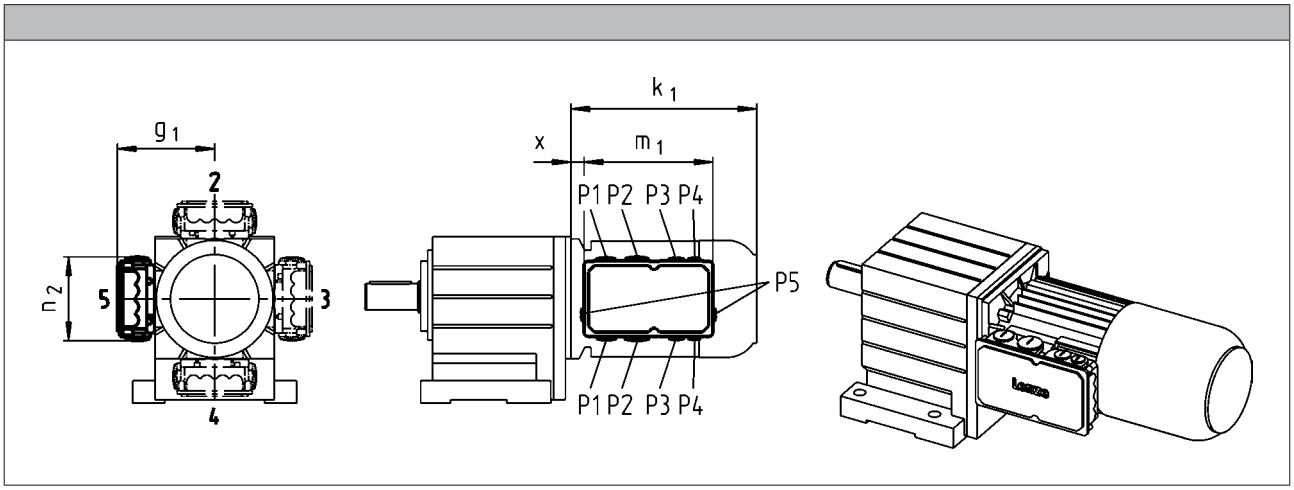
Dimensions of KK2



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

Terminal box

Dimensions of KK3



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

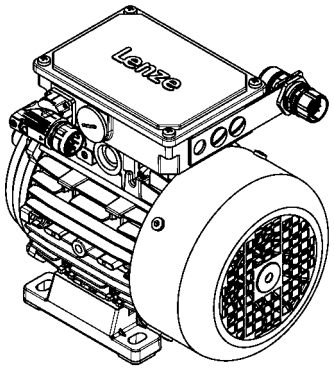
[1)] Cable entry only possible at one position.
Terminal box position 2: cable entry at position 5.
Terminal box position 3: cable entry at position 2.
Terminal box position 4: cable entry at position 3.
Terminal box position 5: cable entry at position 4.

Plug connectors

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

ICN connector

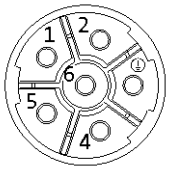
A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



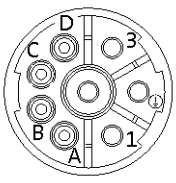
Connection for power, brake and temperature monitoring

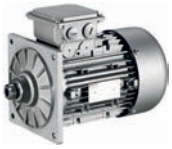
The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As this connector is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and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

► ICN 6-pole

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

► ICN 8-pole

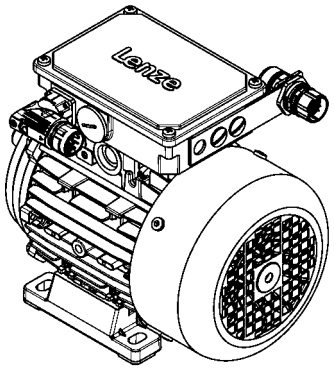
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	V	Phase V power	
4	W	Phase W power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake /AC	



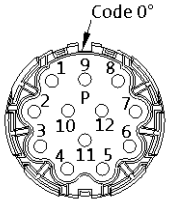
ICN connector

Feedback connection

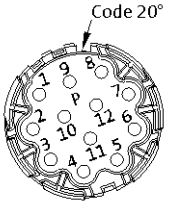
All encoder systems (apart from IG128-24V-H) are also available with an ICN connector fixed to the motor terminal box for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing mating connectors can therefore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



► Resolver

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

► Hiperface incremental encoder and SinCos absolute value encoder

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

ICN connector

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

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

ICN connector

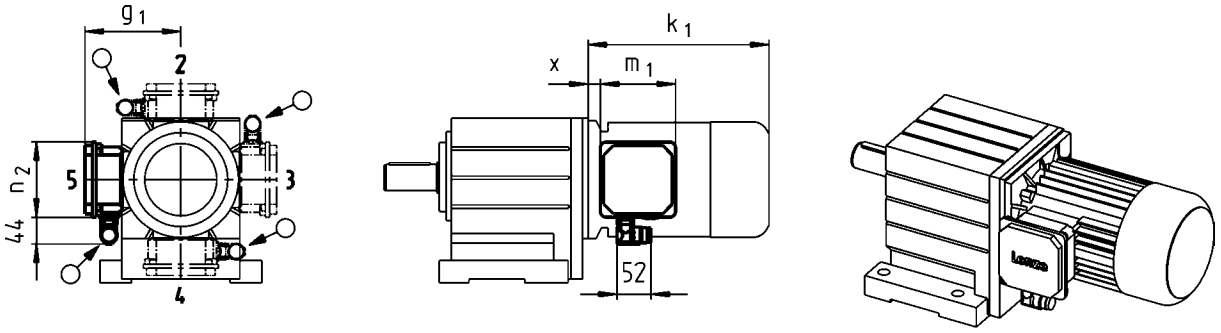
Motor terminal box with ICN connectors - built-on accessories assignment: 4-pole / 6-pole motors

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

ICN connector

Dimensions of KK1

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

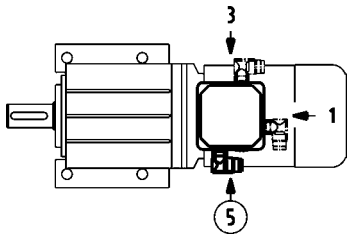


Size				
Motor				
	x	g_1	m_1	n_2
	[mm]	[mm]	[mm]	[mm]
063	12	117	93.0	93.0
071	15	126		
080	14	150	115	115
090	19	157		
100	20	166		
112	22	176		
132	33	195	122	122

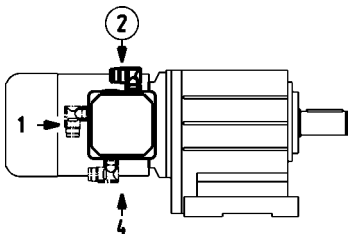
ICN connector

Connector position when using KK1

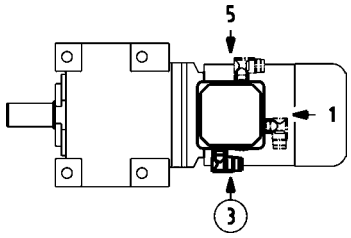
Terminal box in position 2



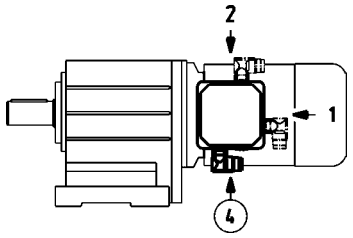
Terminal box in position 3



Terminal box in position 4



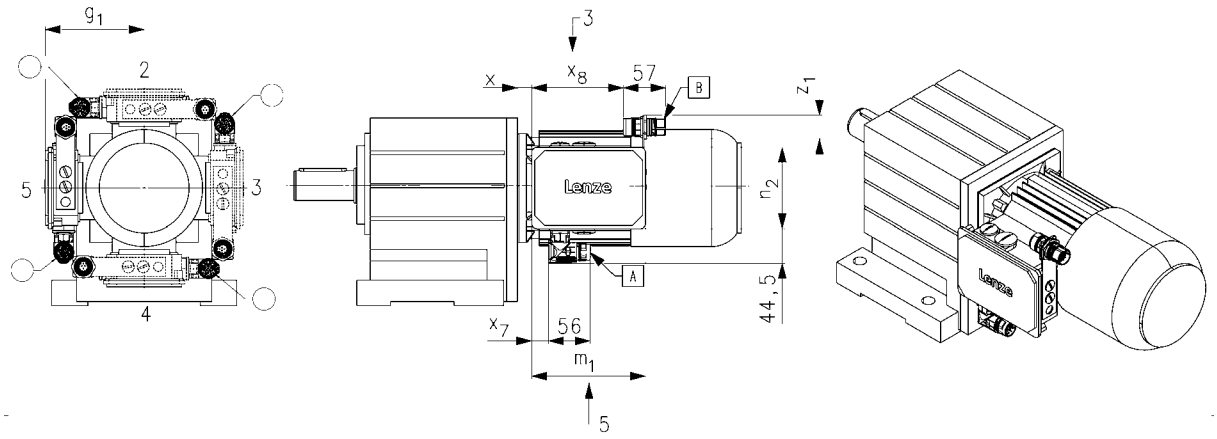
Terminal box in position 5



ICN connector

Dimensions of KK2/KK3

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

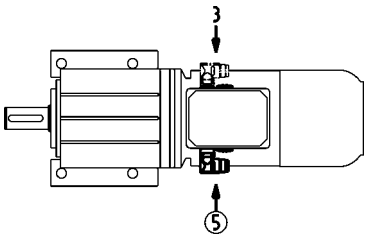


Size							
Motor							
	x	g_1	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	16	109	43
071	15	118					
080	17	132	152	121	23	125	41
090	22	137					
100	23	147					
112	25	158					
132	38	187	195	125	27	166	71

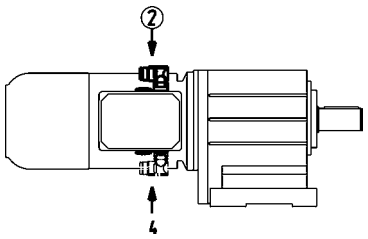
ICN connector

Connector position when using KK2/KK3

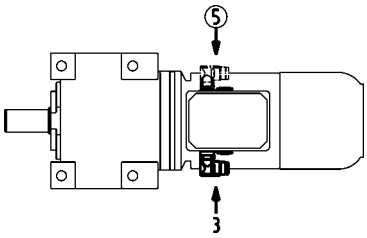
Terminal box in position 2



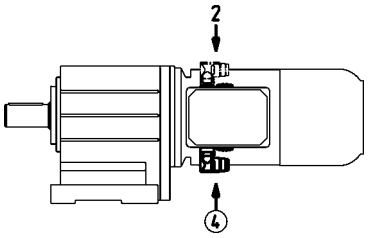
Terminal box in position 3

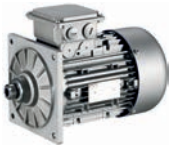


Terminal box in position 4



Terminal box in position 5

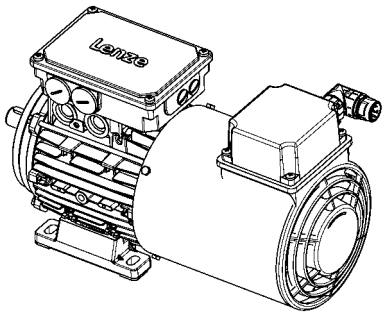




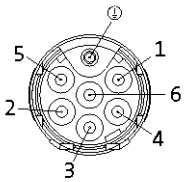
ICN connector

Blower connection

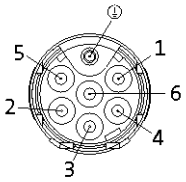
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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



► Blower 1-ph

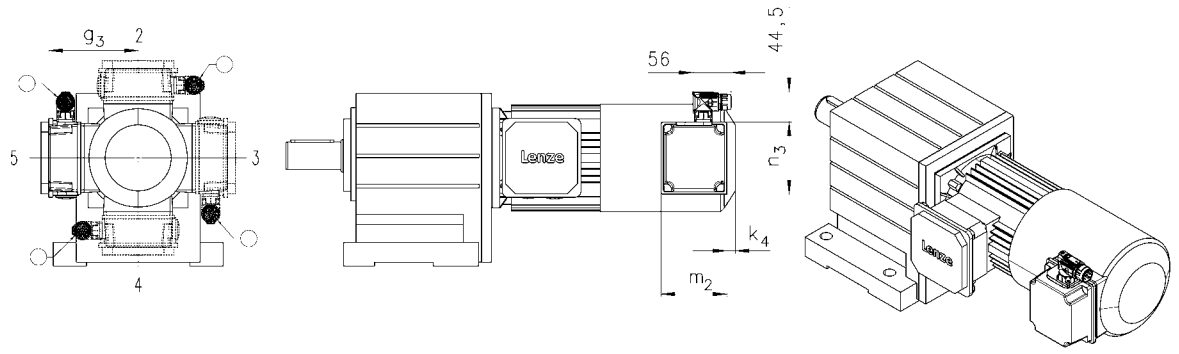
Pin assignment			
Contact	Designation	Meaning	
PE	PE	PE conductor	
1	U1	Fan	
2	U2		
3		Not assigned	
4			
5			
6			

► Blower 3-ph

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

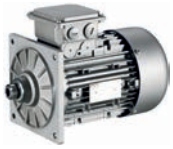
ICN connector

Dimensions of blower



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

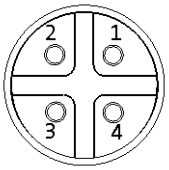
► In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.

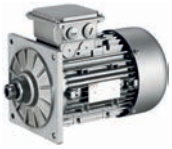


M12 connector

IG128-24V-H incremental encoder connection

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

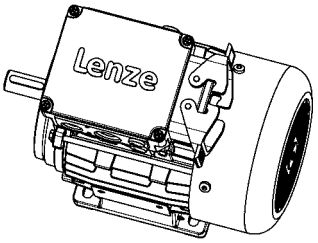
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

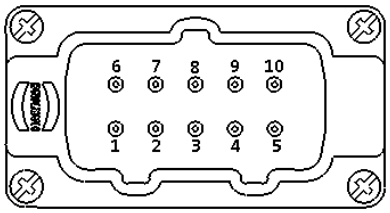


HAN connector

10E

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

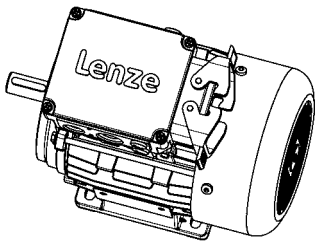


Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	

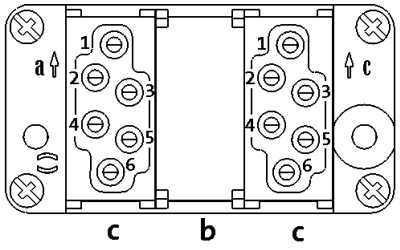
HAN connector

Modular

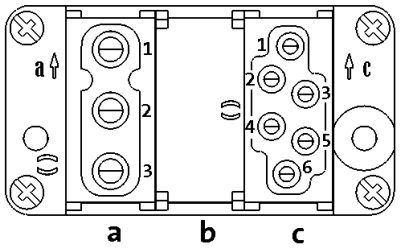
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.



► HAN modular 16 A

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

► HAN modular 40 A

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

HAN connector

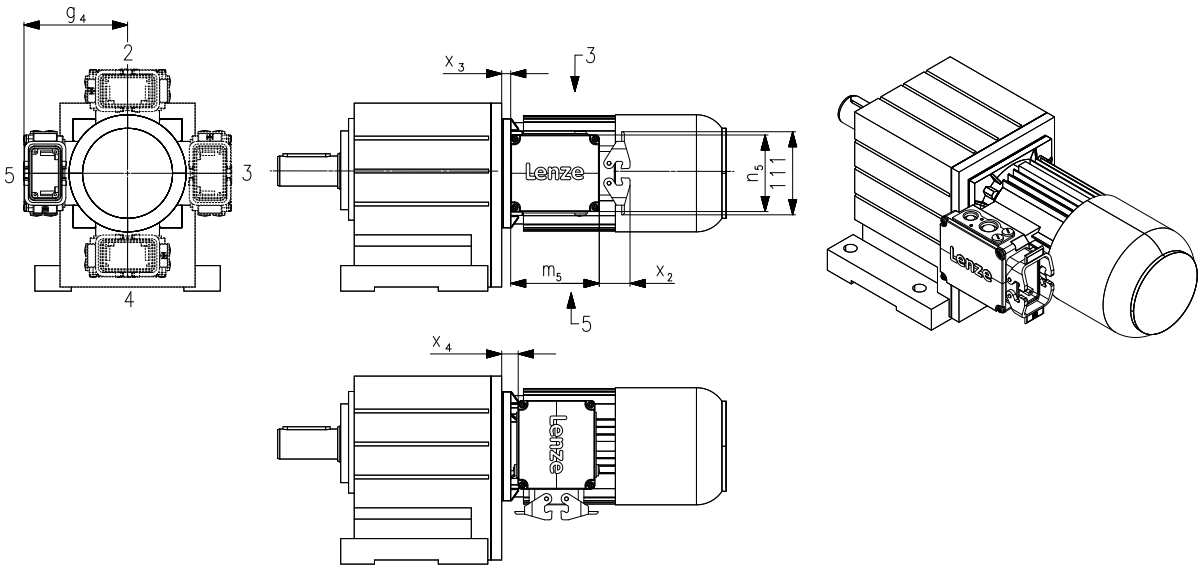
Motor terminal box with HAN connectors - built-on accessories assignment: 4-pole / 6-pole motors

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

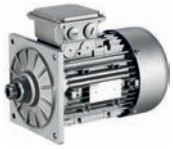
HAN connector

Dimensions

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



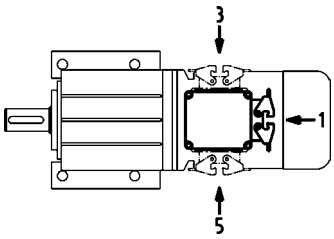
Size			
Motor			
	g_4	x_3	x_4
	[mm]	[mm]	[mm]
063	120	5.00	6.00
071	129	7.00	8.00
080	138	11.0	19.0
090	143	15.0	23.0
100	154	16.0	24.0
112	164	13.5	21.5
132	233	34.5	4.50
160	248	39.0	9.00



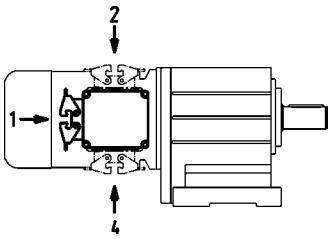
HAN connector

Position of connector

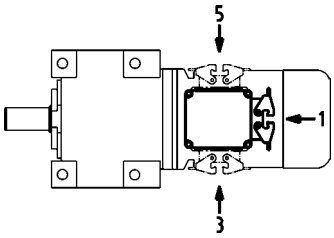
Connector in position 2



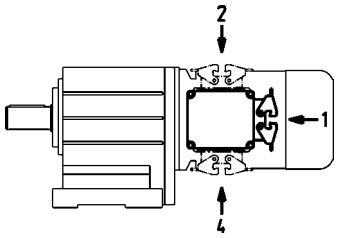
Connector in position 3



Connector in position 4



Connector in position 5



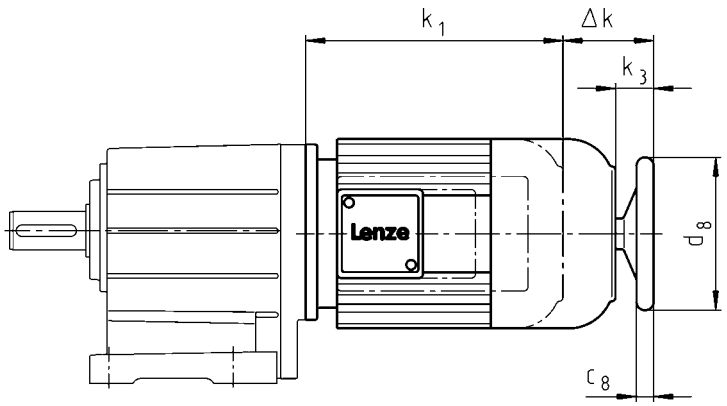
Handwheel

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

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

Handwheel

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



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

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

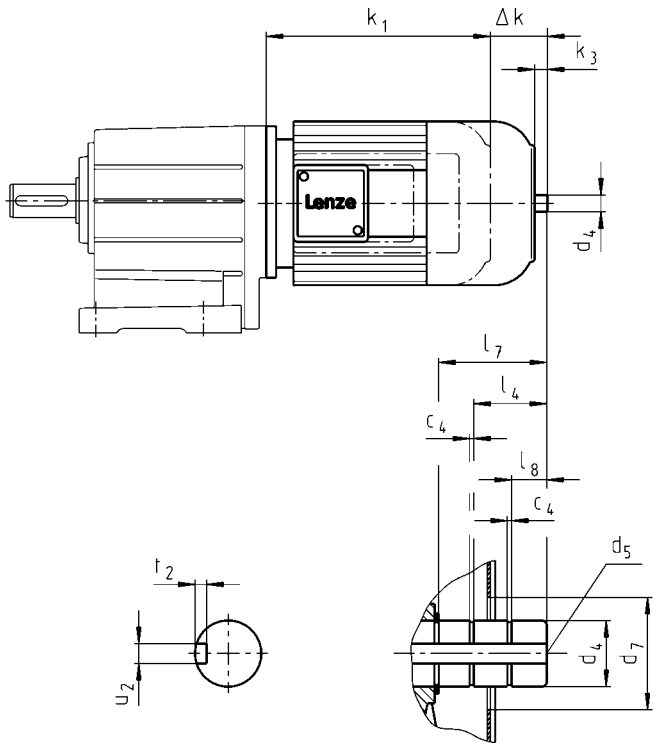
Centrifugal mass

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

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

2nd shaft end

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



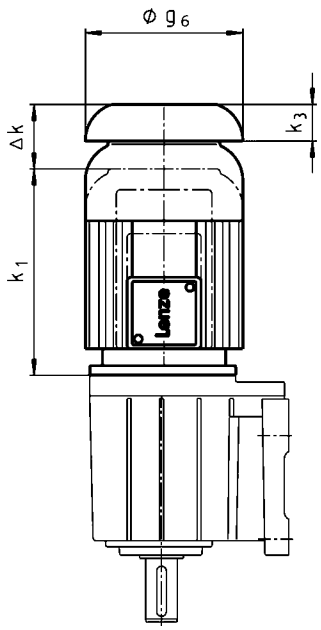
Motor type	
Built-on accessories	M□□MAZE M□□MABZ M□□MALZ

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

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

Protection cover

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

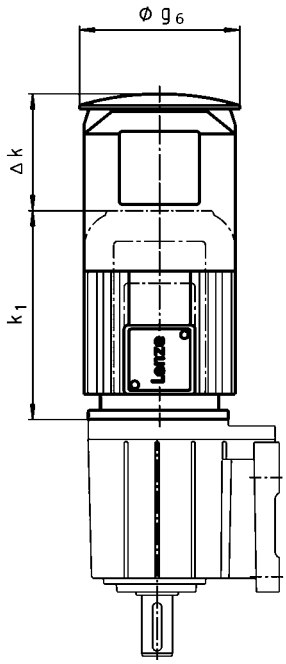


	Motor type							
	M□□MAXX	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABL	M□□MARS M□□MAIG M□□MAAG	M□□MALL		

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

Protection cover

Dimensions, forced ventilated (4/6-pole)



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

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

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