

Automation systems Drive solutions

Controls
Inverters

Motors

Gearboxes

Engineering Tools

Motors: MH three-phase AC motors

Gearboxes: g500-H helical gearbox

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Lenze makes many things easy for you.

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

1

Developing ideas

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

2

Drafting concepts

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

3

Implementing solutions

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

4

Manufacturing machines

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

5

Ensuring productivity

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

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

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

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

Powerful products with a major impact:

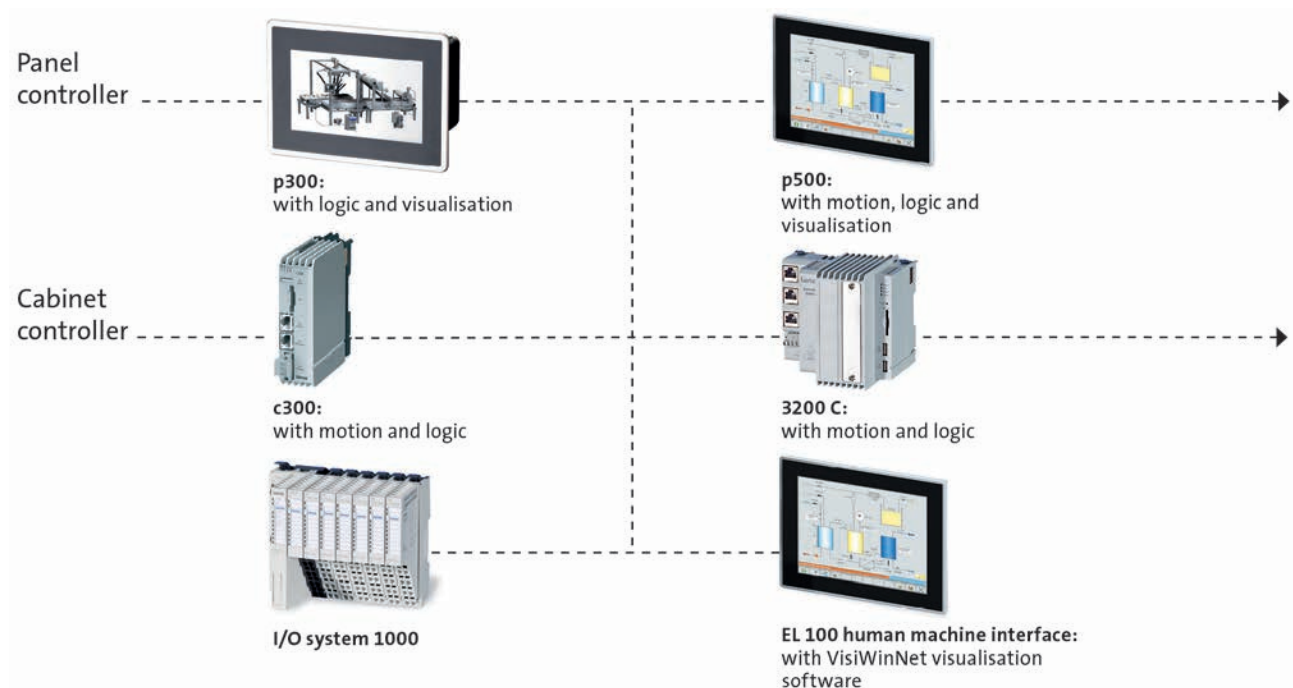
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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

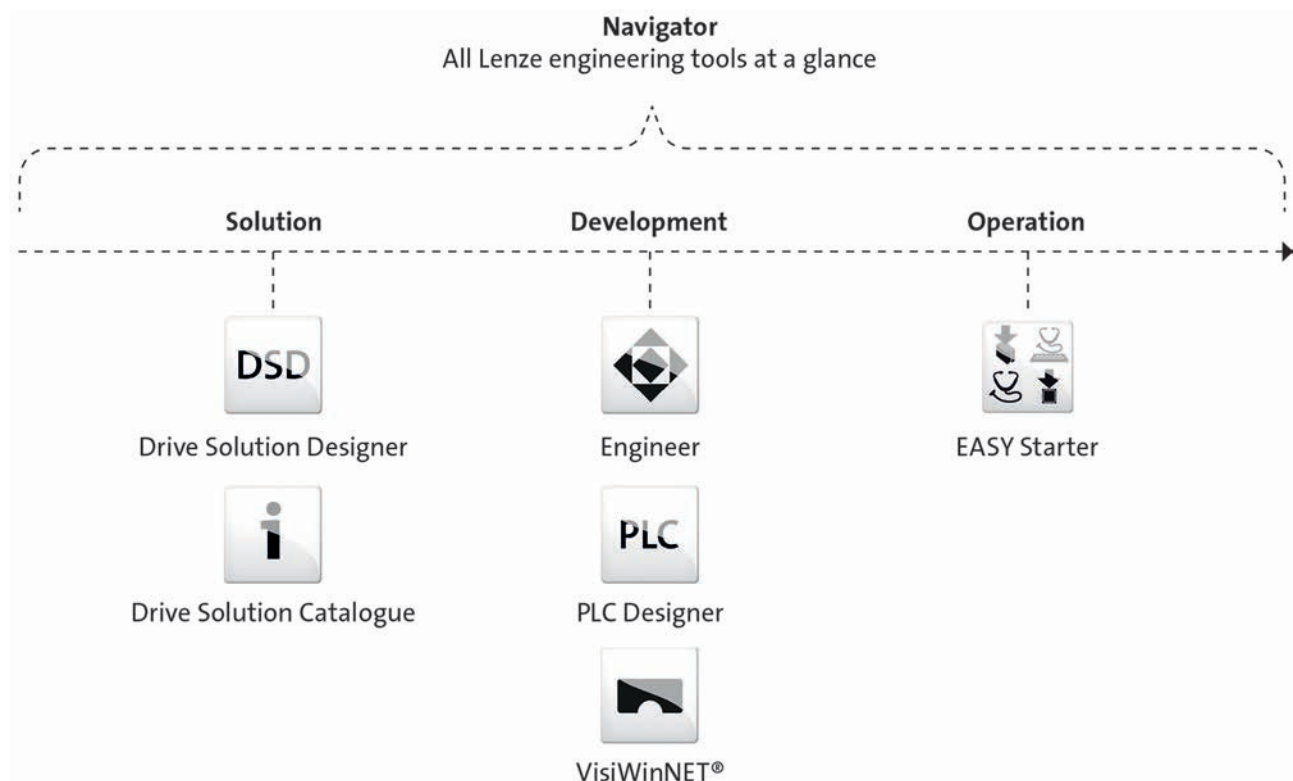


L-force product portfolio

Controls

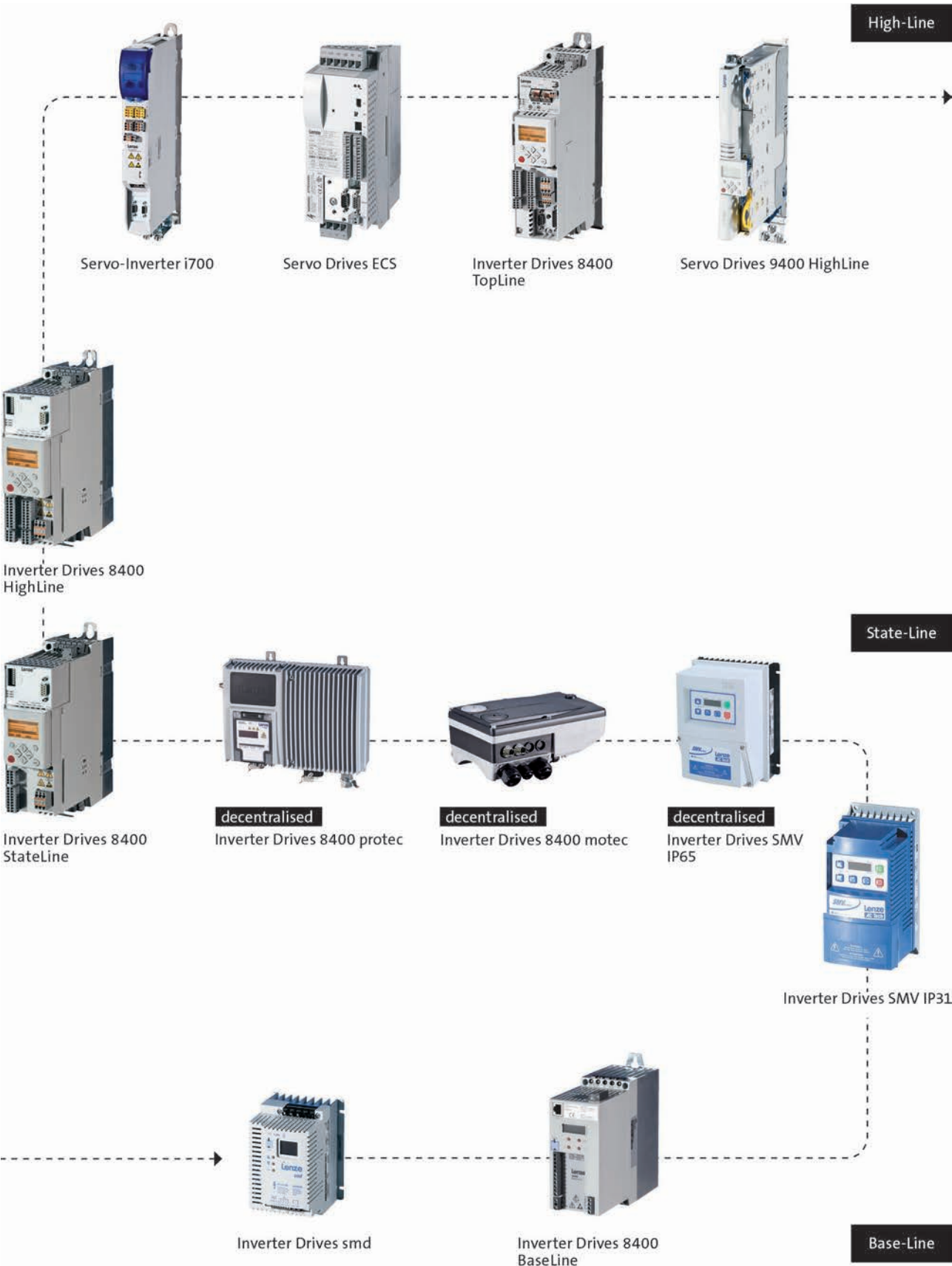


Engineering Tools



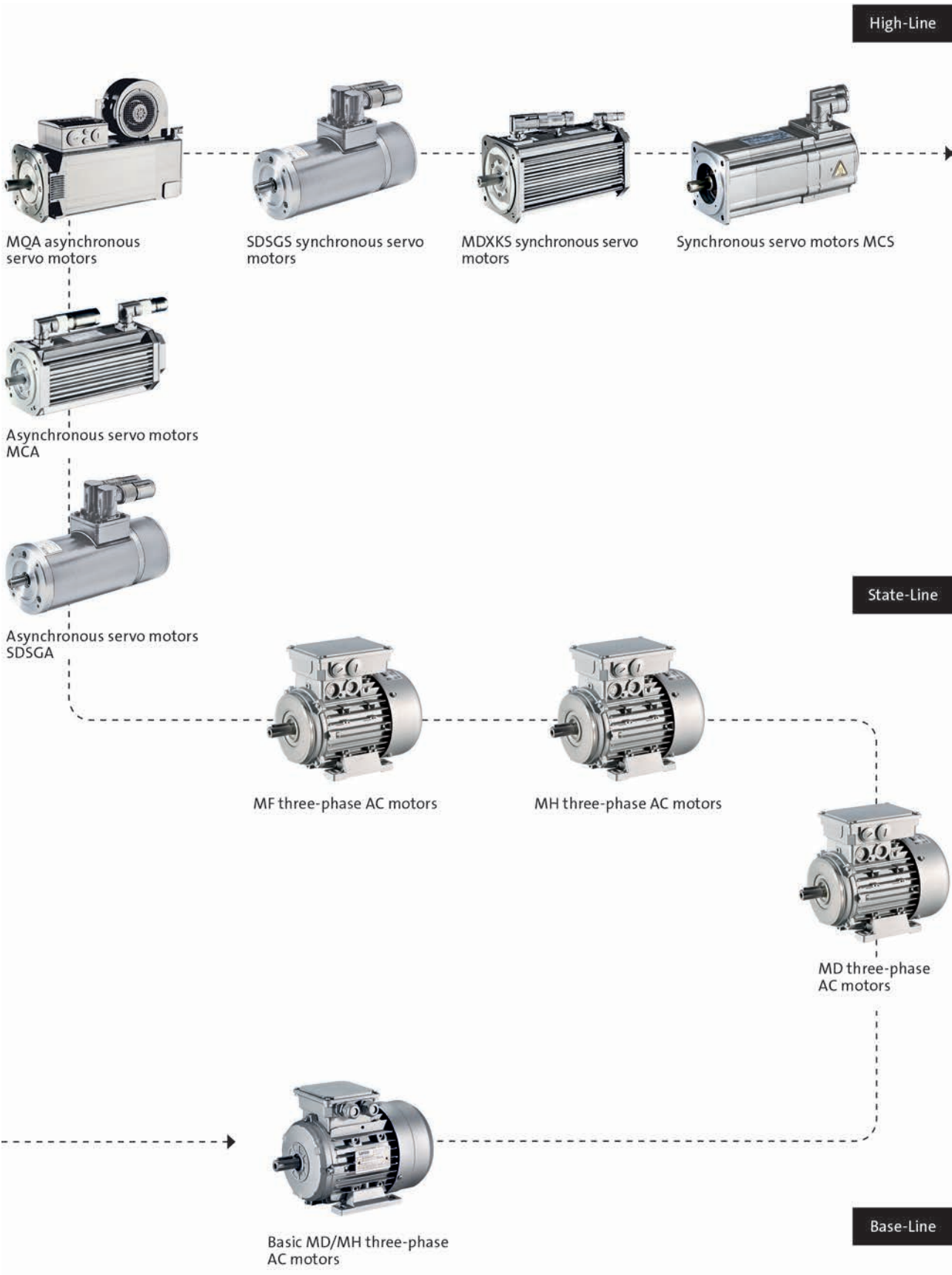
L-force product portfolio

Inverters



L-force product portfolio

Motors



L-force product portfolio

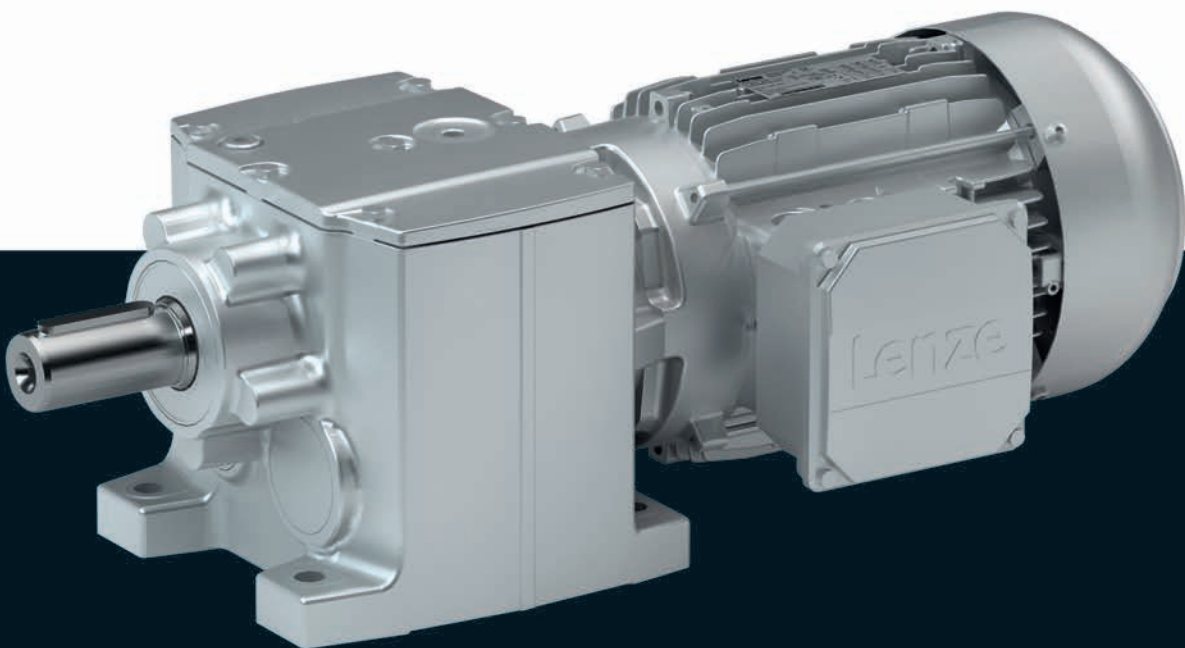
Gearboxes



Gearboxes

g500-H helical geared motors

0.75 to 7.5 kW (efficiency class IE2)



g500-H helical geared motors

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g500-H helical geared motors

Contents



g500-H helical geared motors

General information



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)

g500-H helical geared motors

General information



Product information

In combination with three-phase AC motors, our 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 robust helical gearboxes feature high permissible radial forces, closely stepped ratios and a low backlash. They are available in 2-pole and 3-pole design with a torque up to 450 Nm and a ratio of up to $i = 370$.

Versions

- Fine-scaling of size / torque provides for an optimum machine adaptation
- Standardised shaft and flange dimensions for an easy machine integration
- High 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
Helical gearbox	g500	-	H	100	g500-H100
				140	g500-H140
				210	g500-H210
				320	g500-H320
				450	g500-H450

g500-H helical geared motors

General information



Equipment

Overview

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

g500-H helical geared motors

General information



The gearbox kit

Geared motor

Product	g500-H100	g500-H140	g500-H210	g500-H320	g500-H450
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)				

g500-H helical geared motors

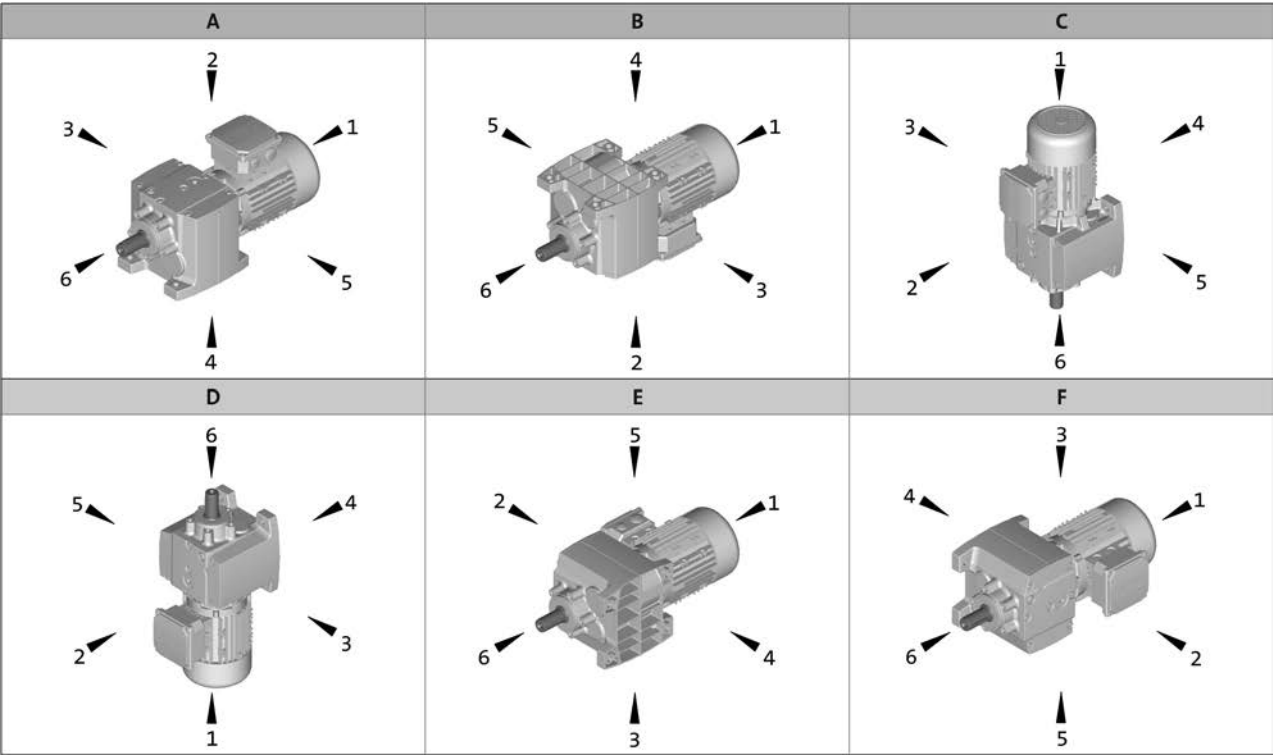
General information



The gearbox kit

Mounting positions

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



Terminal box / motec: 2, 3, 4, 5

g500-H helical geared motors

General information



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				
Enclosure	IP55				
Further options	Protection cover 2nd shaft end Handwheel				

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

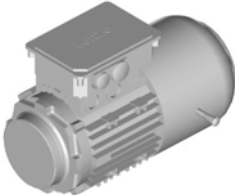
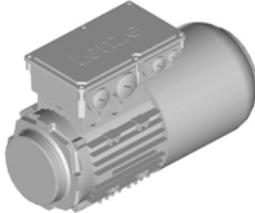
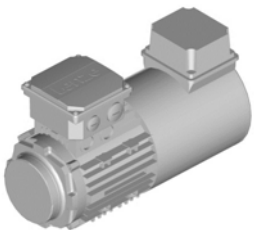
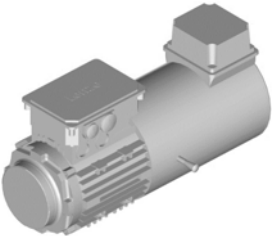
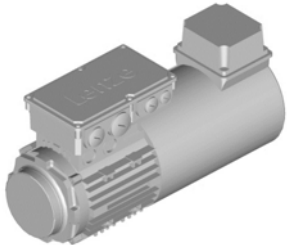
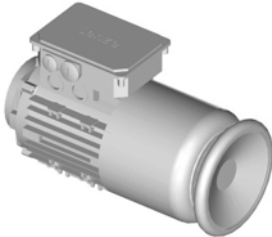
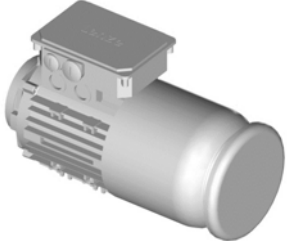
g500-H helical geared motors

General information



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

g500-H helical geared motors

General information



The gearbox kit

Gearbox details

Product						
	g500-H45	g500-H100	g500-H140	g500-H210	g500-H320	g500-H450
Driven shaft						
Solid shaft without keyway [mm]		20x40	25x50		30x60	35x70
Solid shaft with featherkey [mm]	14x28 20x40	20x40	25x50		30x60	30x60 35x70
Design	Standard stainless steel					
Gasket	Standard FPM (Viton)					
Bearing	Standard	Standard Reinforced				
Fitting grease	Not enclosed Enclosed					
Housing						
Housing version	With foot Without foot with centering	With foot With foot and centering Without foot with centering				
Output flange						
flange diameter [mm]	120/140/160			120/140/160/200	160/200	160/200/250
Lubricant						
Type	CLP 460 ¹⁾ 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					

¹⁾ Not suitable for geared servo motors.

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

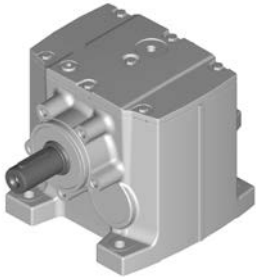
g500-H helical geared motors

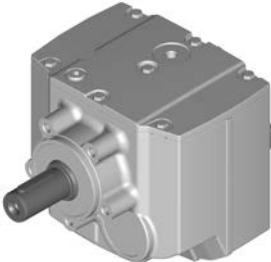
General information



The gearbox kit

Gearbox details

Solid shaft		
		
Foot mounting	Foot mounting With centering	Foot mounting Flange with through holes

Solid shaft	
	
With centering	Flange with through holes

g500-H helical geared motors

General information



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
- $T_{amb} = 20\text{ °C}$ for gearboxes,
 $T_{amb} = 40\text{ °C}$ for motors (in accordance with EN 60034)
- Site altitude $< = 1000\text{ m amsl}$
- The selection tables provide the permissible mechanical powers and torques. For notes on the thermal power limit, see chapter drive dimensioning.
- The rated power specified for motors and geared motors applies to operating mode S1 (in accordance with EN 60034).

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

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

g500-H helical geared motors

General information



Dimensioning

Thermal power limit

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

The thermal power limit is affected by:

- the churning losses in the lubricant. These are determined by the mounting position and the circumferential speed of the 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

g500-H helical geared motors

General information



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.

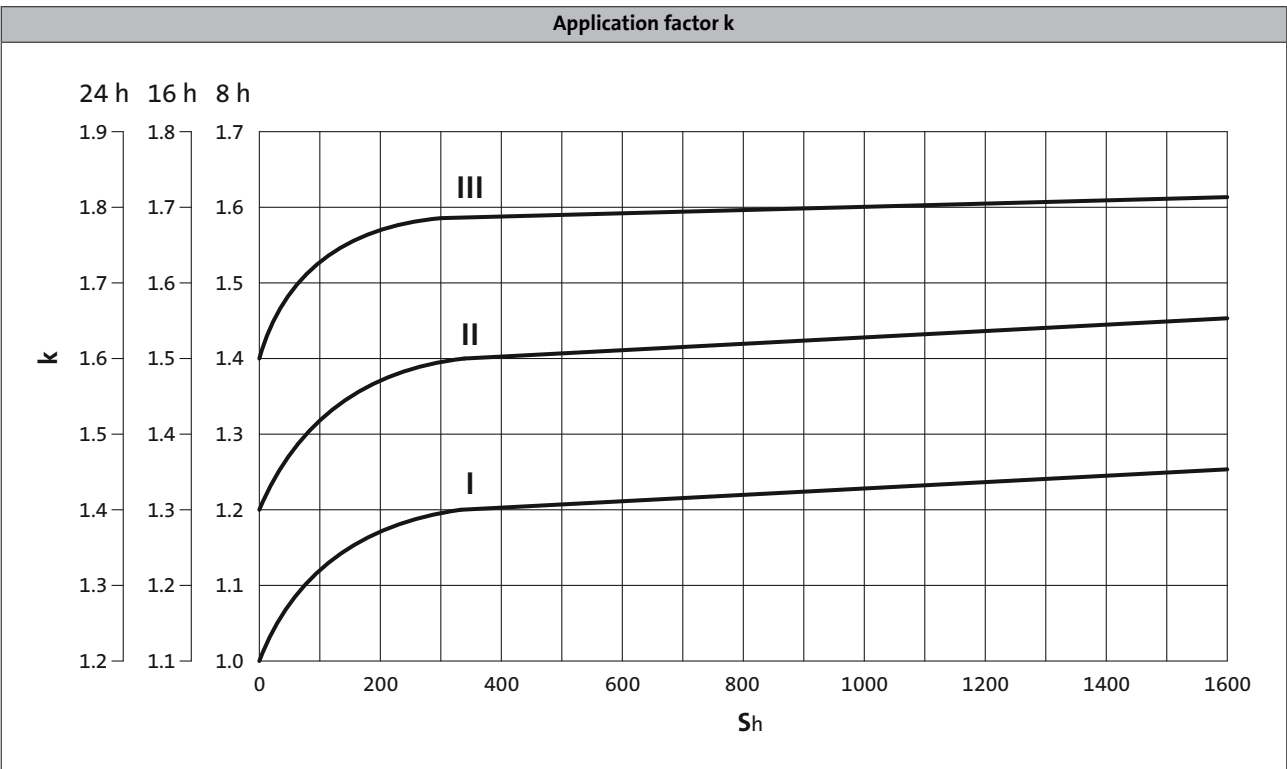
Application factor k (according to DIN 3990)

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



► S_h = switchings/h

g500-H helical geared motors

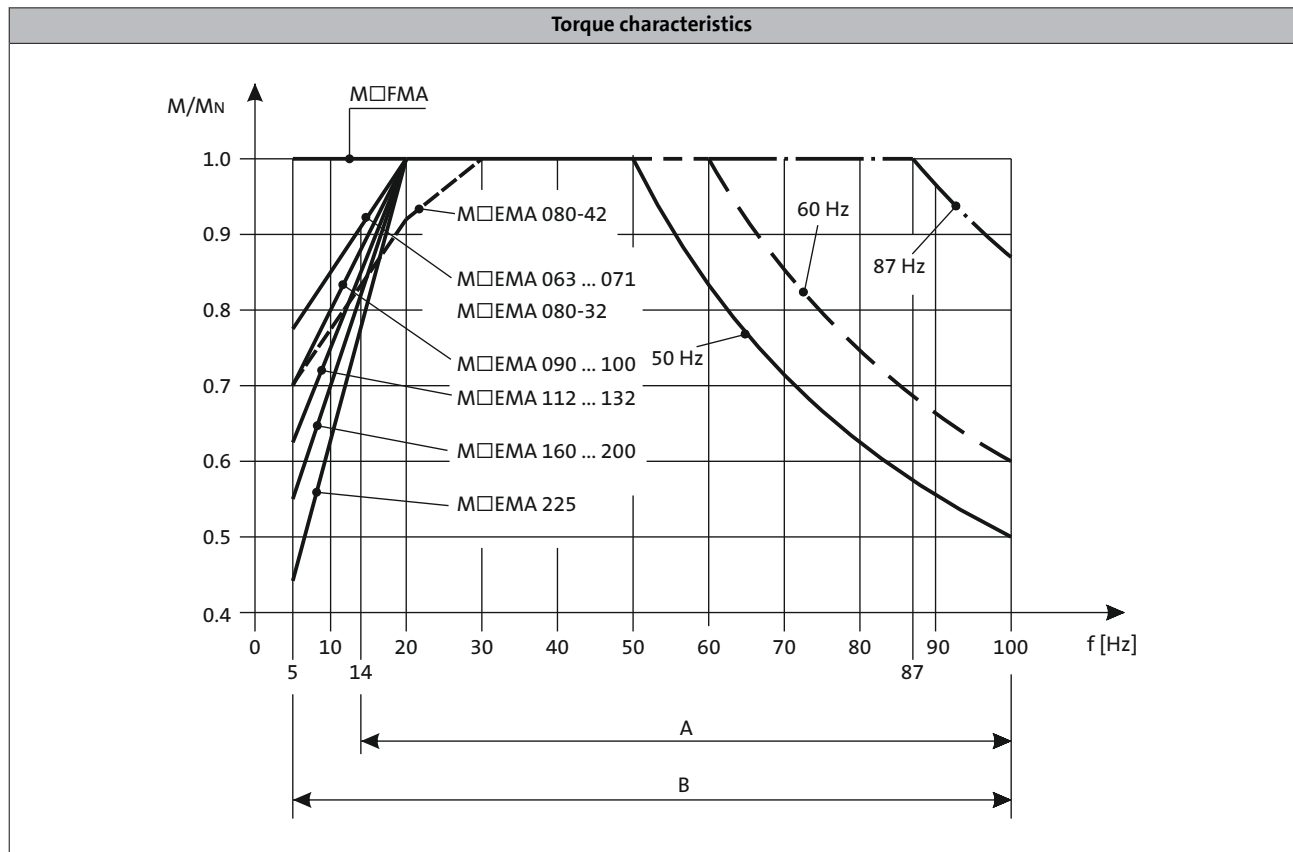
General information



Dimensioning

Torque derating at low motor frequencies

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



A = Operation with integral fan and brake

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

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.

g500-H helical geared motors

General information



Dimensioning

Weights

The values given in the tables consider the following gearbox/motor combination:

- Gearbox with solid 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

g500-H helical geared motors

Technical data



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.

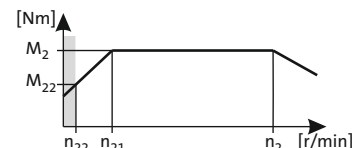
The following legend indicates the structure of the selection tables.

Rated power P_{rated} of the drive motor depending on the rated frequency

50 Hz: $P_N = 0.06$ kW

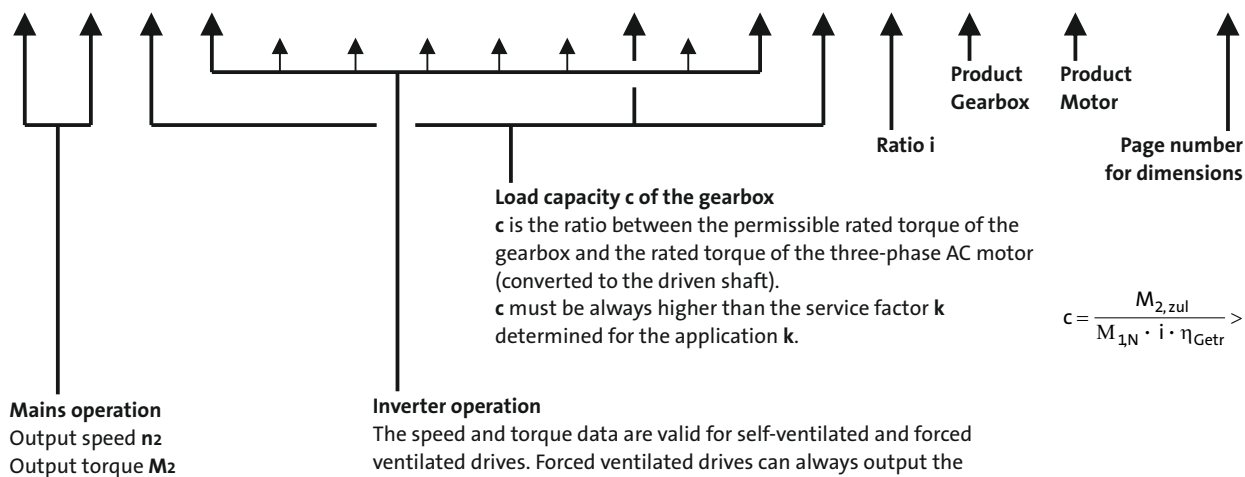
87 Hz: $P_N = 0.11$ kW

Torque diagram



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

Mains operation 400 V, 50 Hz			Inverter operation										i	Product		
n ₂ [r/min]	M ₂ [Nm]	c	5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MD□MA□□	
			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				
75	7.0	5.7	7.6	7.4	32	7.0	75	7.0	5.7	133	8.0	5.2	19.013	-H45	063-02	76
67	8.0	5.3	6.8	8.3	28	8.0	67	8.0	5.3	119	9.0	4.9	21.350	-H45	063-02	76



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 n_2
Output torque M_2

Inverter operation

The speed and torque data are valid for self-ventilated and forced ventilated drives. Forced ventilated drives can always output the torque M_2 in the entire setting ranges. In the case of self-ventilated drives, a reduction to M_{22} is required in the lower speed range.

The following applies to self-ventilated geared motors:

n_{22} is the minimum speed where the torque M_{22} is permissible, from n_{21} to n_2 , the maximum torque is M_2

The following applies to forced ventilated geared motors:

From the minimum speed n_{22} to n_2 , the maximum torque is M_2

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.

g500-H helical geared motors

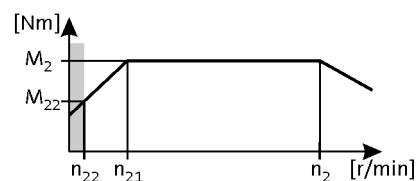
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 0.75 \text{ kW}$
87 Hz: $P_N = 1.35 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb												i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			g500	MH□MA□□				
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						
432	16	4.2	44	12	184	16	432	16	4.2				3.267	-H140	080-32	36		
420	17	3.8	43	13	179	17	420	17	3.8				3.354	-H100	080-32	33		
307	23	3.2	32	18	130	23	307	23	3.2	548	23	2.7	4.600	-H100	080-32	33		
273	25	3.0	28	20	116	25	273	25	3.0	488	26	2.5	5.167	-H100	080-32	33		
240	29	2.8	25	22	102	29	240	29	2.8	428	29	2.3	5.887	-H100	080-32	33		
219	32	2.6	23	24	93	32	219	32	2.6	391	32	2.2	6.440	-H100	080-32	33		
199	35	2.5	21	27	85	35	199	35	2.5	356	35	2.1	7.086	-H100	080-32	33		
194	36	3.0	20	28	83	36	194	36	3.0	347	36	2.5	7.269	-H140	080-32	36		
176	39	3.0	18	30	75	39	176	39	3.0	315	40	2.5	8.000	-H140	080-32	36		
172	40	2.3	18	31	73	40	172	40	2.3	307	41	1.9	8.214	-H100	080-32	33		
156	44	2.6	16	34	67	44	156	44	2.6	279	45	2.2	9.029	-H140	080-32	36		
156	45	2.2	16	34	66	45	156	45	2.2	278	45	1.8	9.068	-H100	080-32	33		
144	48	2.6	15	37	61	48	144	48	2.6	257	49	2.2	9.800	-H140	080-32	36		
140	50	2.0	14	38	60	50	140	50	2.0	250	50	1.7	10.063	-H100	080-32	33		
124	56	1.8	13	43	53	56	124	56	1.8	222	56	1.5	11.360	-H100	080-32	33		
122	57	2.3	13	44	52	57	122	57	2.3	218	57	1.9	11.554	-H140	080-32	36		
118	59	3.2	12	46	50	59	118	59	3.2	210	60	2.6	12.000	-H210	080-32	39		
112	62	2.1	12	48	48	62	112	62	2.1	199	63	1.8	12.640	-H140	080-32	36		
111	62	1.6	12	48	47	62	111	62	1.6	199	63	1.3	12.653	-H100	080-32	33		
103	67	3.0	11	52	44	67	103	67	3.0	184	68	2.5	13.673	-H210	080-32	39		
101	69	2.0	10	53	43	69	101	69	2.0	181	69	1.7	13.957	-H140	080-32	36		
97	71	1.4	10	55	41	71	97	71	1.4	174	72	1.2	14.490	-H100	080-32	33		
92	75	2.7	9.5	58	39	75	92	75	2.7	165	76	2.2	15.306	-H210	080-32	39		
91	76	1.3	9.4	59	39	76	91	76	1.3	163	77	1.1	15.500	-H100	080-32	33		
88	79	1.8	9.0	61	37	79	88	79	1.8	156	80	1.5	16.122	-H140	080-32	36		
84	83	2.5	8.7	64	36	83	84	83	2.5	150	83	2.1	16.750	-H210	080-32	39		
79	87	1.1	8.2	67	34	87	79	87	1.1				17.750	-H100	080-32	33		
79	88	1.6	8.1	68	34	88	79	88	1.6	142	88	1.3	17.802	-H140	080-32	36		
75	92	2.3	7.7	71	32	92	75	92	2.3	134	93	1.9	18.750	-H210	080-32	39		
72	96	1.0	7.4	74	31	96	72	96	1.0				19.486	-H100	080-32	33		
71	97	1.4	7.3	75	30	97	71	97	1.4	128	98	1.2	19.750	-H140	080-32	36		
68	102	2.9	7.0	79	29	102	68	102	2.9	122	103	2.5	20.731	-H320	080-32	42		
65	107	2.0	6.7	83	28	107	65	107	2.0	116	108	1.6	21.802	-H210	080-32	39		
65	107	1.3	6.6	83	28	107	65	107	1.3	116	108	1.1	21.808	-H140	080-32	36		
59	117	2.7	6.1	90	25	117	59	117	2.7	106	118	2.3	23.754	-H320	080-32	42		

g500-H helical geared motors

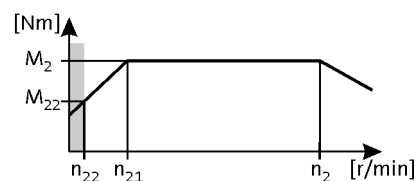
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 0.75 \text{ kW}$
87 Hz: $P_N = 1.35 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
58	120	1.8	5.9	93	25	120	58	120	1.8	103	121	1.5	24.405	-H210	080-32	39
57	122	1.1	5.8	94	24	122	57	122	1.1				24.829	-H140	080-32	36
52	133	2.4	5.4	102	22	133	52	133	2.4	93	134	2.3	26.983	-H320	080-32	42
52	134	1.6	5.3	103	22	134	52	134	1.6	93	135	1.5	27.119	-H210	080-32	39
51	135	1.0	5.3	104	22	135	51	135	1.0				27.415	-H140	080-32	36
51	136	2.9	5.3	105	22	136	51	136	2.9				27.578	-H450	080-32	45
48	146	2.2	4.9	112	20	146	48	146	2.2	85	147	2.1	29.548	-H320	080-32	42
46	150	1.4	4.8	115	20	150	46	150	1.4	83	151	1.3	30.357	-H210	080-32	39
45	154	2.9	4.7	118	19	154	45	154	2.9	81	155	2.8	31.167	-H450	080-32	45
42	165	1.9	4.3	127	18	165	42	165	1.9	75	167	1.8	33.564	-H320	080-32	42
40	173	1.2	4.1	133	17	173	40	173	1.2	72	174	1.2	35.095	-H210	080-32	39
40	176	2.6	4.1	135	17	176	40	176	2.6	71	177	2.4	35.689	-H450	080-32	45
37	188	1.3	3.8	145	16	188	37	188	1.3	66	190	1.3	38.238	-H320	080-32	42
36	194	1.1	3.7	149	15	194	36	194	1.1	64	195	1.0	39.286	-H210	080-32	39
35	199	2.3	3.6	153	15	199	35	199	2.3	63	200	2.3	40.333	-H450	080-32	45
33	213	1.5	3.3	164	14	213	33	213	1.5	58	215	1.5	43.313	-H450	080-32	45
33	214	1.3	3.3	165	14	214	33	214	1.3	58	216	1.3	43.436	-H320	080-32	42
29	241	1.5	3.0	186	12	241	29	241	1.5	52	243	1.5	48.950	-H450	080-32	45
26	270	1.0	2.6	208	11	270	26	270	1.0	46	272	1.0	54.750	-H450	080-32	45
23	305	1.0	2.3	235	9.7	305	23	305	1.0	41	307	1.0	61.875	-H450	080-32	45

3-stage gearboxes

Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
33	211	1.0	3.3	162	14	211	33	211	1.0				43.390	-H210	080-32	39
32	214	2.1	3.3	165	14	214	32	214	2.1	57	216	1.8	44.124	-H450	080-32	45
30	229	1.4	3.1	177	13	229	30	229	1.4	53	231	1.3	47.276	-H320	080-32	42
28	242	1.9	2.9	186	12	242	28	242	1.9	51	244	1.8	49.867	-H450	080-32	45
26	261	1.2	2.7	201	11	261	26	261	1.2	47	263	1.2	53.703	-H320	080-32	42
25	274	1.6	2.6	211	11	274	25	274	1.6	45	276	1.6	56.469	-H450	080-32	45
23	294	1.1	2.4	226	9.9	294	23	294	1.1	42	296	1.0	60.502	-H320	080-32	42
23	300	1.5	2.3	231	9.7	300	23	300	1.5	41	302	1.4	61.774	-H450	080-32	45
20	339	1.3	2.1	261	8.6	339	20	339	1.3	36	341	1.3	69.813	-H450	080-32	45
18	382	1.2	1.8	294	7.6	382	18	382	1.2	32	385	1.1	78.794	-H450	080-32	45
16	432	1.0	1.6	333	6.7	432	16	432	1.0	28	435	1.0	89.048	-H450	080-32	45

g500-H helical geared motors

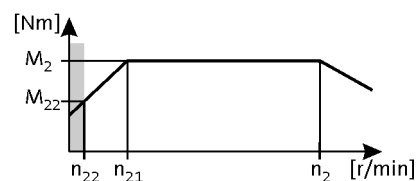
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 1.1 \text{ kW}$
87 Hz: $P_N = 2.0 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
438	23	3.5	44	16	184	23	438	23	3.5	778	24	2.9	3.267	-H140	090-12	36
426	24	2.6	43	17	179	24	426	24	2.6	757	24	2.1	3.354	-H100	090-12	33
319	32	2.9	32	22	134	32	319	32	2.9	567	33	2.4	4.480	-H140	090-12	36
311	33	2.2	32	23	130	33	311	33	2.2	552	34	1.8	4.600	-H100	090-12	33
277	37	2.0	28	26	116	37	277	37	2.0	492	38	1.7	5.167	-H100	090-12	33
249	41	2.5	25	29	105	41	249	41	2.5	443	42	2.1	5.733	-H140	090-12	36
243	42	1.9	25	29	102	42	243	42	1.9	432	43	1.6	5.887	-H100	090-12	33
228	45	2.4	23	31	96	45	228	45	2.4	405	46	1.9	6.272	-H140	090-12	36
222	46	1.8	23	32	93	46	222	46	1.8	394	47	1.5	6.440	-H100	090-12	33
202	50	1.7	21	35	85	50	202	50	1.7	359	52	1.4	7.086	-H100	090-12	33
197	52	2.1	20	36	83	52	197	52	2.1	349	53	1.7	7.269	-H140	090-12	36
187	55	3.2	19	38	78	55	187	55	3.2	332	56	2.6	7.657	-H210	090-12	39
179	57	2.1	18	40	75	57	179	57	2.1	318	58	1.7	8.000	-H140	090-12	36
174	59	1.6	18	41	73	59	174	59	1.6	309	60	1.3	8.214	-H100	090-12	33
167	61	2.8	17	43	70	61	167	61	2.8	296	63	2.3	8.571	-H210	090-12	39
158	64	1.8	16	45	67	64	158	64	1.8	281	66	1.5	9.029	-H140	090-12	36
158	65	1.5	16	45	66	65	158	65	1.5	280	66	1.2	9.068	-H100	090-12	33
146	70	2.6	15	49	61	70	146	70	2.6	259	71	2.1	9.799	-H210	090-12	39
146	70	1.8	15	49	61	70	146	70	1.8	259	71	1.5	9.800	-H140	090-12	36
142	72	1.4	14	50	60	72	142	72	1.4	252	73	1.1	10.063	-H100	090-12	33
133	76	2.5	14	54	56	76	133	76	2.5	237	78	2.0	10.720	-H210	090-12	39
126	81	1.2	13	57	53	81	126	81	1.2	224	83	1.0	11.360	-H100	090-12	33
124	82	1.6	13	58	52	82	124	82	1.6	220	84	1.3	11.554	-H140	090-12	36
119	86	2.2	12	60	50	86	119	86	2.2	212	88	1.8	12.000	-H210	090-12	39
118	86	2.9	12	61	50	86	118	86	2.9	209	88	2.4	12.128	-H320	090-12	42
113	90	1.5	12	63	48	90	113	90	1.5	201	92	1.2	12.640	-H140	090-12	36
113	90	1.1	12	63	47	90	113	90	1.1				12.653	-H100	090-12	33
108	95	2.8	11	66	45	95	108	95	2.8	191	97	2.3	13.268	-H320	090-12	42
105	97	2.1	11	68	44	100	105	97	2.1	186	100	1.7	13.673	-H210	090-12	39
103	99	1.4	10	70	43	102	103	99	1.4	182	102	1.1	13.957	-H140	090-12	36
96	106	2.8	9.7	74	40	106	96	106	2.8	171	109	2.3	14.898	-H320	090-12	42
93	109	1.8	9.5	76	39	109	93	109	1.8	166	112	1.5	15.306	-H210	090-12	39
89	115	1.2	9.0	80	37	115	89	115	1.2	158	118	1.0	16.122	-H140	090-12	36
85	119	1.8	8.7	84	36	119	85	119	1.8	152	122	1.4	16.750	-H210	090-12	39
85	121	2.3	8.6	84	36	121	85	121	2.3	150	123	1.9	16.923	-H320	090-12	42

g500-H helical geared motors

Technical data

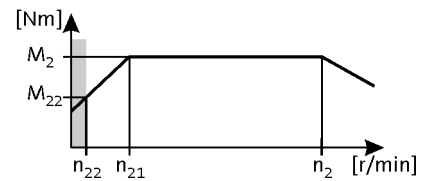


Selection tables, 4-pole motors

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

87 Hz: $P_N = 2.0 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
80	127	1.1	8.1	89	34	127	80	127	1.1				17.802	-H140	090-12	36
78	130	2.4	7.9	91	33	130	78	130	2.4	139	133	2.0	18.250	-H320	090-12	42
76	134	1.6	7.7	94	32	134	76	134	1.6	136	137	1.3	18.750	-H210	090-12	39
69	148	2.0	7.0	103	29	148	69	148	2.0	123	151	1.7	20.731	-H320	090-12	42
66	155	1.4	6.7	109	28	155	66	155	1.4	117	159	1.1	21.802	-H210	090-12	39
65	158	2.9	6.5	111	27	158	65	158	2.9	115	162	2.3	22.170	-H450	090-12	45
60	169	1.9	6.1	119	25	169	60	169	1.9	107	173	1.6	23.754	-H320	090-12	42
59	174	1.2	5.9	122	25	174	59	174	1.2				24.405	-H210	090-12	39
57	179	2.5	5.8	125	24	179	57	179	2.5	101	183	2.1	25.056	-H450	090-12	45
53	192	1.7	5.4	135	22	192	53	192	1.7	94	197	1.6	26.983	-H320	090-12	42
53	193	1.1	5.3	135	22	193	53	193	1.1	94	198	1.0	27.119	-H210	090-12	39
52	197	2.3	5.3	138	22	197	52	197	2.3	92	201	2.1	27.578	-H450	090-12	45
48	211	1.5	4.9	147	20	211	48	211	1.5	86	216	1.4	29.548	-H320	090-12	42
46	222	2.0	4.7	156	19	222	46	222	2.0	82	227	1.9	31.167	-H450	090-12	45
43	239	1.3	4.3	168	18	239	43	239	1.3	76	245	1.3	33.564	-H320	090-12	42
40	254	1.8	4.1	178	17	254	40	254	1.8	71	260	1.7	35.689	-H450	090-12	45
36	287	1.6	3.6	201	15	287	36	287	1.6	63	294	1.5	40.333	-H450	090-12	45
33	309	1.0	3.3	216	14	309	33	309	1.0	59	316	1.0	43.313	-H450	090-12	45
29	349	1.1	3.0	244	12	349	29	349	1.1	52	357	1.0	48.950	-H450	090-12	45

3-stage gearboxes

Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)						
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□□	
32	310	1.5	3.3	217	14	310	32	310	1.5	58	317	1.2	44.124	-H450	090-12	45
29	350	1.3	2.9	245	12	350	29	350	1.3	51	358	1.2	49.867	-H450	090-12	45
25	396	1.1	2.6	278	11	396	25	396	1.1	45	406	1.1	56.469	-H450	090-12	45
23	434	1.0	2.3	304	9.7	434	23	434	1.0				61.774	-H450	090-12	45

g500-H helical geared motors

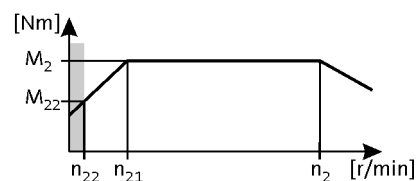
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 1.5 \text{ kW}$
87 Hz: $P_N = 2.7 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
439	32	2.6	44	22	184	32	439	32	2.6	779	32	2.1	3.267	-H140	090-32	36
428	32	1.9	43	23	179	32	428	32	1.9	759	33	1.6	3.354	-H100	090-32	33
320	43	2.2	32	30	134	43	320	43	2.2	568	44	1.8	4.480	-H140	090-32	36
312	45	1.6	32	31	130	45	312	45	1.6	553	45	1.3	4.600	-H100	090-32	33
309	45	3.2	31	32	129	45	309	45	3.2	548	46	2.6	4.648	-H210	090-32	39
278	50	1.5	28	35	116	50	278	50	1.5				5.167	-H100	090-32	33
257	54	2.9	26	38	108	54	257	54	2.9	456	55	2.4	5.583	-H210	090-32	39
250	56	1.9	25	39	105	56	250	56	1.9	444	56	1.5	5.733	-H140	090-32	36
244	57	1.4	25	40	102	57	244	57	1.4	432	58	1.2	5.887	-H100	090-32	33
230	61	2.6	23	42	96	61	230	61	2.6				6.250	-H210	090-32	39
229	61	1.7	23	43	96	61	229	61	1.7	406	62	1.4	6.272	-H140	090-32	36
223	62	1.3	23	44	93	62	223	62	1.3	395	63	1.1	6.440	-H100	090-32	33
203	69	1.3	21	48	85	69	203	69	1.3	359	70	1.0	7.086	-H100	090-32	33
197	70	1.5	20	49	83	70	197	70	1.5				7.269	-H140	090-32	36
187	74	2.3	19	52	78	74	187	74	2.3	332	75	1.9	7.657	-H210	090-32	39
179	77	1.5	18	54	75	77	179	77	1.5	318	79	1.3	8.000	-H140	090-32	36
175	80	1.2	18	56	73	80	175	80	1.2				8.214	-H100	090-32	33
172	81	3.1	17	57	72	81	172	81	3.1	305	82	2.6	8.343	-H320	090-32	42
167	83	2.1	17	58	70	83	167	83	2.1	297	84	1.7	8.571	-H210	090-32	39
159	87	1.3	16	61	67	87	159	87	1.3	282	89	1.1	9.029	-H140	090-32	36
158	88	1.1	16	62	66	88	158	88	1.1				9.068	-H100	090-32	33
151	92	2.6	15	64	63	92	151	92	2.6	269	93	2.1	9.477	-H320	090-32	42
146	95	1.9	15	66	61	95	146	95	1.9	260	96	1.6	9.799	-H210	090-32	39
146	95	1.3	15	66	61	95	146	95	1.3	260	96	1.1	9.800	-H140	090-32	36
143	97	1.0	14	68	60	97	143	97	1.0				10.063	-H100	090-32	33
134	103	2.6	14	72	56	103	134	103	2.6	238	105	2.1	10.677	-H320	090-32	42
134	104	1.8	14	73	56	104	134	104	1.8	237	105	1.5	10.720	-H210	090-32	39
124	112	1.1	13	78	52	112	124	112	1.1				11.554	-H140	090-32	36
123	113	2.4	12	79	51	113	123	113	2.4	218	115	2.0	11.680	-H320	090-32	42
120	116	1.6	12	81	50	116	120	116	1.6	212	118	1.3	12.000	-H210	090-32	39
118	117	2.2	12	82	50	117	118	117	2.2	210	119	1.8	12.128	-H320	090-32	42
114	122	1.1	12	86	48	122	114	122	1.1				12.640	-H140	090-32	36
108	128	2.0	11	90	45	128	108	128	2.0	192	130	1.7	13.268	-H320	090-32	42
105	132	1.5	11	93	44	132	105	132	1.5	186	134	1.3	13.673	-H210	090-32	39
103	135	3.2	10	94	43	135	103	135	3.2	183	137	2.6	13.905	-H450	090-32	45

g500-H helical geared motors

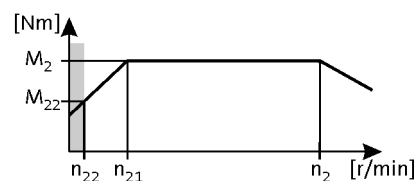
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 1.5 \text{ kW}$
87 Hz: $P_N = 2.7 \text{ kW}$

2-stage gearboxes



Netzbetrieb 400 V, 50 Hz			Umrichterbetrieb										i	Produkt		
n ₂ [r/min]	M ₂ [Nm]	c	5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
			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				
103	135	1.0	10	95	43	135	103	135	1.0				13.957	-H140	090-32	36
96	144	2.0	9.7	101	40	144	96	144	2.0	171	146	1.7	14.898	-H320	090-32	42
94	148	1.4	9.5	104	39	148	94	148	1.4	166	150	1.1	15.306	-H210	090-32	39
91	152	2.9	9.2	107	38	152	91	152	2.9	162	154	2.4	15.714	-H450	090-32	45
86	162	1.3	8.7	114	36	162	86	162	1.3	152	165	1.1	16.750	-H210	090-32	39
85	164	1.7	8.6	115	36	164	85	164	1.7	150	166	1.4	16.923	-H320	090-32	42
84	165	2.7	8.5	116	35	165	84	165	2.7	149	167	2.3	17.033	-H450	090-32	45
79	177	1.8	7.9	124	33	177	79	177	1.8	140	179	1.5	18.250	-H320	090-32	42
77	182	1.2	7.7	127	32	182	77	182	1.2				18.750	-H210	090-32	39
75	186	2.4	7.5	131	31	186	75	186	2.4	132	189	2.0	19.250	-H450	090-32	45
69	201	1.5	7.0	141	29	201	69	201	1.5	123	204	1.2	20.731	-H320	090-32	42
65	215	2.1	6.5	150	27	215	65	215	2.1	115	218	1.7	22.170	-H450	090-32	45
60	230	1.4	6.1	161	25	230	60	230	1.4	107	233	1.2	23.754	-H320	090-32	42
57	243	1.9	5.8	170	24	243	57	243	1.9	102	246	1.5	25.056	-H450	090-32	45
53	261	1.2	5.4	183	22	261	53	261	1.2	94	265	1.2	26.983	-H320	090-32	42
52	267	1.7	5.3	187	22	267	52	267	1.7	92	271	1.6	27.578	-H450	090-32	45
49	286	1.1	4.9	200	20	286	49	286	1.1	86	290	1.1	29.548	-H320	090-32	42
46	302	1.5	4.7	211	19	302	46	302	1.5	82	306	1.4	31.167	-H450	090-32	45
40	346	1.3	4.1	242	17	346	40	346	1.3	71	351	1.2	35.689	-H450	090-32	45
36	391	1.2	3.6	273	15	391	36	391	1.2	63	396	1.1	40.333	-H450	090-32	45

3-stage gearboxes

Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
33	421	1.1	3.3	295	14	421	33	421	1.1				44.124	-H450	090-32	45

g500-H helical geared motors

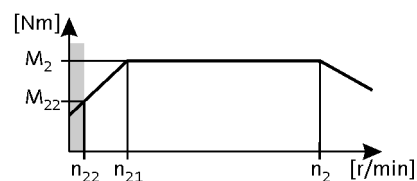
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 2.2 \text{ kW}$
87 Hz: $P_N = 3.9 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb											i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			g500		MH□MA□□		
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					
426	48	2.6	43	33	177	48	426	48	2.6				3.389	-H210	100-12	39	
311	66	2.9	31	46	129	66	311	66	2.9	550	66	2.4	4.648	-H320	100-12	42	
311	66	2.2	31	46	129	66	311	66	2.2	550	66	1.8	4.648	-H210	100-12	39	
259	79	2.0	26	55	108	79	259	79	2.0				5.583	-H210	100-12	39	
238	86	2.7	24	60	99	86	238	86	2.7				6.083	-H320	100-12	42	
231	88	1.8	23	62	96	88	231	88	1.8				6.250	-H210	100-12	39	
209	97	2.2	21	68	87	97	209	97	2.2				6.910	-H320	100-12	42	
189	108	1.6	19	75	78	108	189	108	1.6				7.657	-H210	100-12	39	
186	110	3.2	19	77	77	110	186	110	3.2	328	110	2.7	7.787	-H450	100-12	45	
173	118	2.1	17	82	72	118	173	118	2.1	306	118	1.8	8.343	-H320	100-12	42	
169	121	1.4	17	84	70	121	169	121	1.4				8.571	-H210	100-12	39	
164	124	3.0	17	87	68	124	164	124	3.0	290	124	2.5	8.800	-H450	100-12	45	
153	134	1.8	15	93	63	134	153	134	1.8				9.477	-H320	100-12	42	
148	138	1.3	15	97	61	138	148	138	1.3				9.799	-H210	100-12	39	
145	141	2.7	15	98	60	141	145	141	2.7	256	141	2.3	9.965	-H450	100-12	45	
135	151	1.8	14	105	56	151	135	151	1.8	239	151	1.5	10.677	-H320	100-12	42	
135	151	1.3	14	106	56	151	135	151	1.3	238	152	1.0	10.720	-H210	100-12	39	
128	159	2.5	13	111	53	159	128	159	2.5	227	159	2.1	11.262	-H450	100-12	45	
124	165	1.7	12	115	51	165	124	165	1.7	219	165	1.4	11.680	-H320	100-12	42	
120	169	1.1	12	118	50	169	120	169	1.1				12.000	-H210	100-12	39	
119	171	1.5	12	119	50	171	119	171	1.5	211	172	1.2	12.128	-H320	100-12	42	
117	174	2.4	12	121	49	174	117	174	2.4	207	174	2.0	12.320	-H450	100-12	45	
109	187	1.4	11	131	45	187	109	187	1.4	193	188	1.2	13.268	-H320	100-12	42	
106	193	1.0	11	135	44	193	106	193	1.0				13.673	-H210	100-12	39	
104	196	2.2	10	137	43	196	104	196	2.2				13.905	-H450	100-12	45	
97	210	1.4	9.7	147	40	210	97	210	1.4	172	211	1.2	14.898	-H320	100-12	42	
92	222	2.0	9.2	155	38	222	92	222	2.0	163	222	1.7	15.714	-H450	100-12	45	
85	239	1.2	8.6	167	36	239	85	239	1.2				16.923	-H320	100-12	42	
85	240	1.9	8.5	168	35	240	85	240	1.9	150	241	1.6	17.033	-H450	100-12	45	
79	257	1.2	7.9	180	33	257	79	257	1.2	140	258	1.0	18.250	-H320	100-12	42	
75	272	1.7	7.5	190	31	272	75	272	1.7	133	272	1.4	19.250	-H450	100-12	45	
70	292	1.0	7.0	204	29	292	70	292	1.0				20.731	-H320	100-12	42	
65	313	1.4	6.5	218	27	313	65	313	1.4	115	314	1.2	22.170	-H450	100-12	45	
58	353	1.3	5.8	247	24	353	58	353	1.3	102	354	1.1	25.056	-H450	100-12	45	
52	389	1.2	5.3	272	22	389	52	389	1.2	93	390	1.1	27.578	-H450	100-12	45	

g500-H helical geared motors

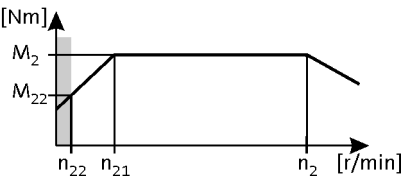
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 2.2 \text{ kW}$
87 Hz: $P_N = 3.9 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb											i	Produkt			
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			g500					MH□MA□□
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						
46	440	1.0	4.7	307	19	440	46	440	1.0				31.167	-H450	100-12	45		

g500-H helical geared motors

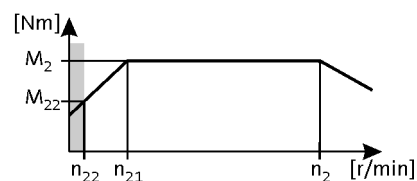
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 3.0 \text{ kW}$
87 Hz: $P_N = 5.4 \text{ kW}$

2-stage gearboxes



Netzbetrieb 400 V, 50 Hz			Umrichterbetrieb										i	Produkt		
n ₂ [r/min]	M ₂ [Nm]	c	5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
			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				
426	65	2.5	43	46	177	65	426	65	2.5				3.389	-H320	100-32	42
426	65	1.9	43	46	177	65	426	65	1.9				3.389	-H210	100-32	39
311	89	2.1	31	63	129	89	311	89	2.1	550	91	1.7	4.648	-H320	100-32	42
311	89	1.6	31	63	129	89	311	89	1.6				4.648	-H210	100-32	39
306	91	3.2	31	64	127	91	306	91	3.2	541	92	2.7	4.724	-H450	100-32	45
259	107	1.5	26	75	108	107	259	107	1.5				5.583	-H210	100-32	39
255	109	2.9	26	76	106	109	255	109	2.9				5.678	-H450	100-32	45
239	116	2.8	24	81	99	116	239	116	2.8	423	118	2.3	6.045	-H450	100-32	45
238	117	1.9	24	82	99	117	238	117	1.9				6.083	-H320	100-32	42
231	120	1.3	23	84	96	120	231	120	1.3				6.250	-H210	100-32	39
219	127	2.6	22	89	91	127	219	127	2.6	386	129	2.2	6.613	-H450	100-32	45
209	133	1.6	21	93	87	133	209	133	1.6				6.910	-H320	100-32	42
189	147	1.2	19	103	78	147	189	147	1.2				7.657	-H210	100-32	39
186	150	2.4	19	105	77	150	186	150	2.4				7.787	-H450	100-32	45
173	160	1.6	17	112	72	160	173	160	1.6				8.343	-H320	100-32	42
169	165	1.0	17	115	70	165	169	165	1.0				8.571	-H210	100-32	39
164	169	2.2	17	118	68	169	164	169	2.2				8.800	-H450	100-32	45
153	182	1.3	15	127	63	182	153	182	1.3				9.477	-H320	100-32	42
145	192	2.0	15	134	60	192	145	192	2.0				9.965	-H450	100-32	45
135	205	1.3	14	144	56	205	135	205	1.3				10.677	-H320	100-32	42
128	217	1.9	13	151	53	217	128	217	1.9				11.262	-H450	100-32	45
124	225	1.2	12	157	51	225	124	225	1.2				11.680	-H320	100-32	42
119	233	1.1	12	163	50	233	119	233	1.1				12.128	-H320	100-32	42
117	237	1.7	12	166	49	237	117	237	1.7				12.320	-H450	100-32	45
109	255	1.0	11	178	45	255	109	255	1.0				13.268	-H320	100-32	42
104	267	1.6	10	187	43	267	104	267	1.6				13.905	-H450	100-32	45
97	287	1.0	9.7	200	40	287	97	287	1.0				14.898	-H320	100-32	42
92	302	1.5	9.2	211	38	302	92	302	1.5	163	308	1.2	15.714	-H450	100-32	45
85	328	1.4	8.5	229	35	328	85	328	1.4	150	334	1.1	17.033	-H450	100-32	45
75	370	1.2	7.5	259	31	370	75	370	1.2	133	377	1.0	19.250	-H450	100-32	45
65	426	1.1	6.5	298	27	426	65	426	1.1				22.170	-H450	100-32	45

g500-H helical geared motors

Technical data

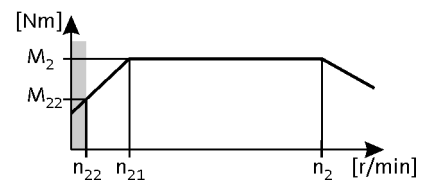


Selection tables, 4-pole motors

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

87 Hz: $P_N = 7.1 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb										i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)				g500	MH□MA□□	
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				
429	86	1.9	43	54	177	86	429	86	1.9				3.389	-H320	112-22	42
422	88	2.9	42	55	174	88	422	88	2.9				3.444	-H450	112-22	45
313	118	1.6	31	74	129	118	313	118	1.6				4.648	-H320	112-22	42
308	120	2.4	31	75	127	120	308	120	2.4				4.724	-H450	112-22	45
256	145	2.2	26	91	106	145	256	145	2.2				5.678	-H450	112-22	45
241	154	2.1	24	96	99	154	241	154	2.1	424	155	1.7	6.045	-H450	112-22	45
239	155	1.5	24	97	99	155	239	155	1.5				6.083	-H320	112-22	42
220	168	2.0	22	106	91	168	220	168	2.0	388	170	1.7	6.613	-H450	112-22	45
211	176	1.2	21	110	87	176	211	176	1.2				6.910	-H320	112-22	42
187	198	1.8	19	124	77	198	187	198	1.8				7.787	-H450	112-22	45
174	212	1.2	17	133	72	212	174	212	1.2				8.343	-H320	112-22	42
165	224	1.7	17	140	68	224	165	224	1.7				8.800	-H450	112-22	45
146	254	1.5	15	159	60	254	146	254	1.5				9.965	-H450	112-22	45
129	287	1.4	13	180	53	287	129	287	1.4				11.262	-H450	112-22	45
118	314	1.3	12	197	49	314	118	314	1.3				12.320	-H450	112-22	45
105	354	1.2	10	222	43	354	105	354	1.2				13.905	-H450	112-22	45
93	400	1.1	9.2	251	38	400	93	400	1.1				15.714	-H450	112-22	45
85	434	1.0	8.5	272	35	434	85	434	1.0				17.033	-H450	112-22	45

g500-H helical geared motors

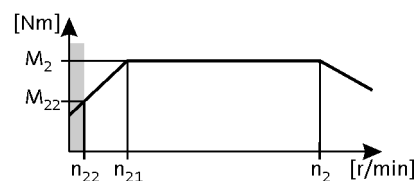
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 5.5 \text{ kW}$
87 Hz: $P_N = 9.7 \text{ kW}$

2-stage gearboxes



Netzbetrieb 400 V, 50 Hz			Umrichterbetrieb											i	Produkt			
n ₂ [r/min]	M ₂ [Nm]	c	5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			g500		MH□MA□□			
			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						
427	119	2.1	42	75	174	119	427	119	2.1				3.444	-H450	132-12	45		
311	164	1.8	31	102	127	164	311	164	1.8				4.724	-H450	132-12	45		
259	197	1.6	26	123	106	197	259	197	1.6				5.678	-H450	132-12	45		
243	210	1.5	24	131	99	210	243	210	1.5				6.045	-H450	132-12	45		
222	229	1.5	22	143	91	229	222	229	1.5				6.613	-H450	132-12	45		
189	270	1.3	19	169	77	270	189	270	1.3				7.787	-H450	132-12	45		
167	305	1.2	17	191	68	305	167	305	1.2				8.800	-H450	132-12	45		
148	345	1.1	15	216	60	345	148	345	1.1				9.965	-H450	132-12	45		
131	390	1.0	13	244	53	390	131	390	1.0				11.262	-H450	132-12	45		

g500-H helical geared motors

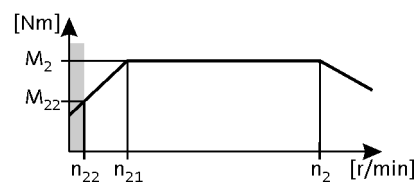
Technical data



Selection tables, 4-pole motors

50 Hz: $P_N = 7.5 \text{ kW}$
87 Hz: $P_N = 13.2 \text{ kW}$

2-stage gearboxes



Netzbetrieb			Umrichterbetrieb											i	Produkt		
400 V, 50 Hz			5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			g500		MH□MA□□		
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					
424	164	1.6	42	103	174	164	424	164	1.6				3.444	-H450	132-22	45	
309	225	1.3	31	141	127	225	309	225	1.3				4.724	-H450	132-22	45	
257	270	1.2	26	169	106	270	257	270	1.2				5.678	-H450	132-22	45	
242	288	1.1	24	180	99	288	242	288	1.1				6.045	-H450	132-22	45	
221	315	1.1	22	197	91	315	221	315	1.1				6.613	-H450	132-22	45	

g500-H helical geared motors

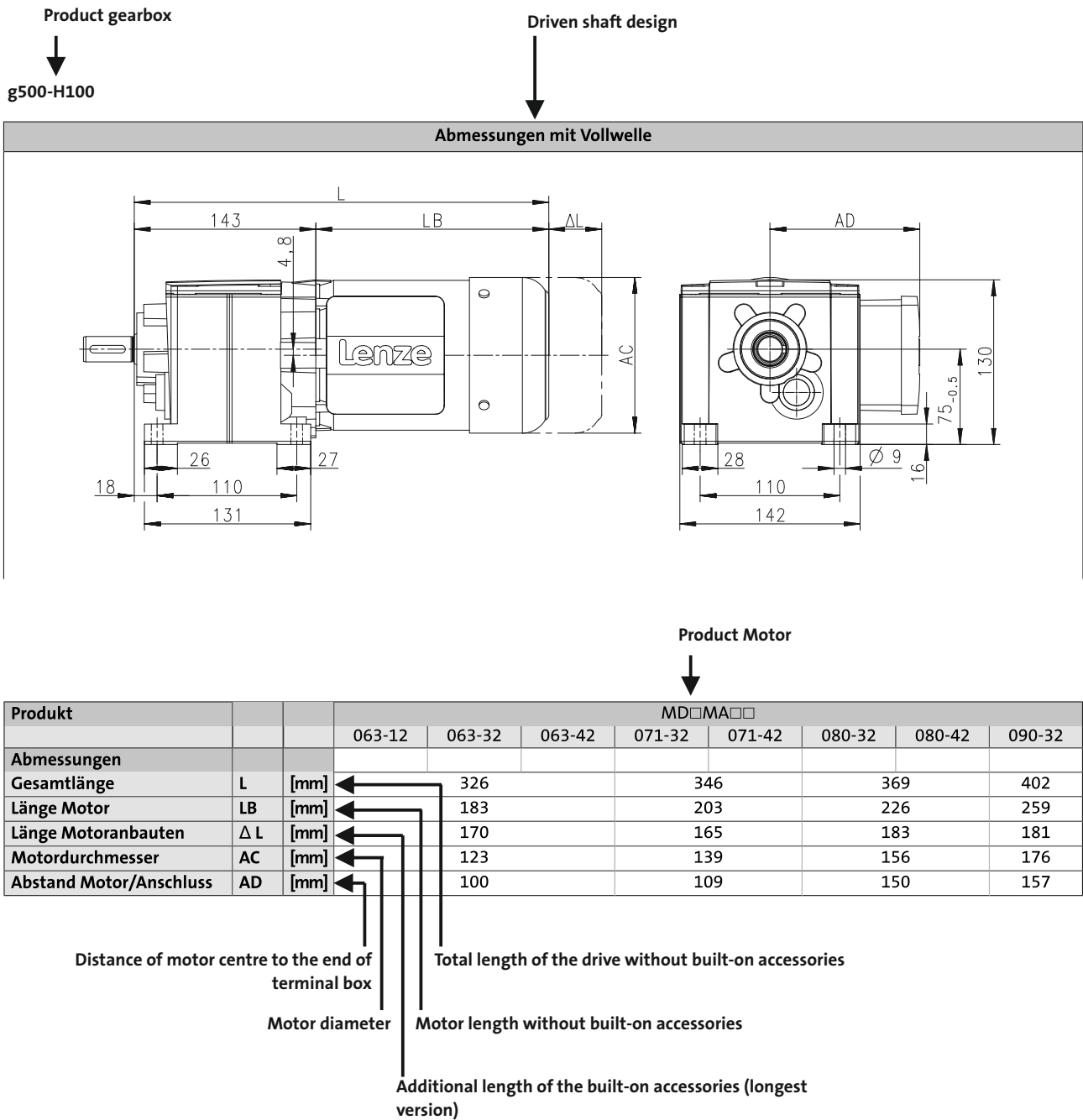
Technical data



Dimensions, notes

Notes on the dimensions

The following legend shows the layout of the dimension sheets.



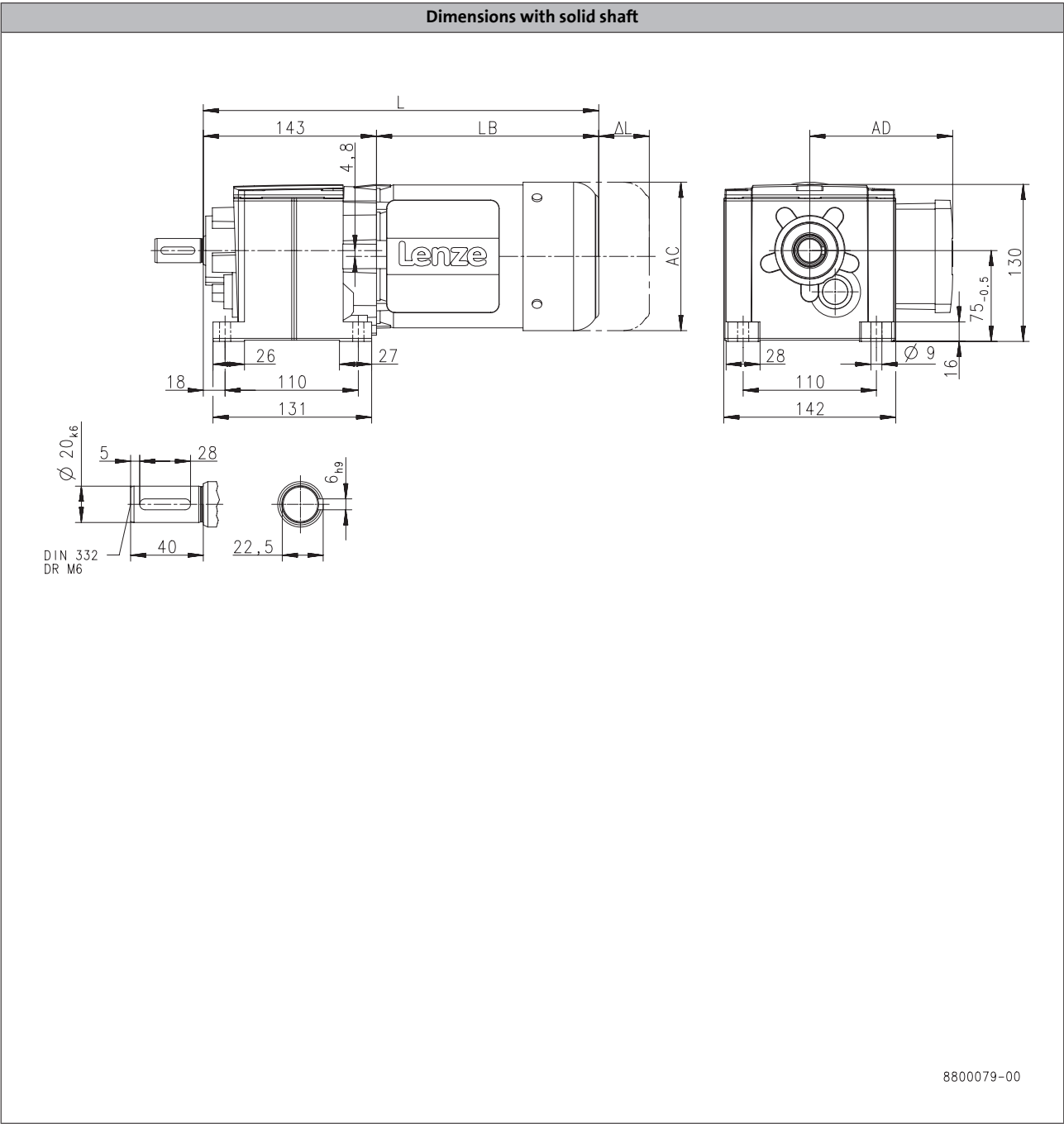
g500-H helical geared motors

Technical data



4-pole motors

g500-H100



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	369	428	
Länge Motor	LB	[mm]	226	285	
Länge Motoranbauten	ΔL	[mm]	183	181	
Motordurchmesser	AC	[mm]	156	176	
Abstand Motor/Anschluss	AD	[mm]	150	152	157

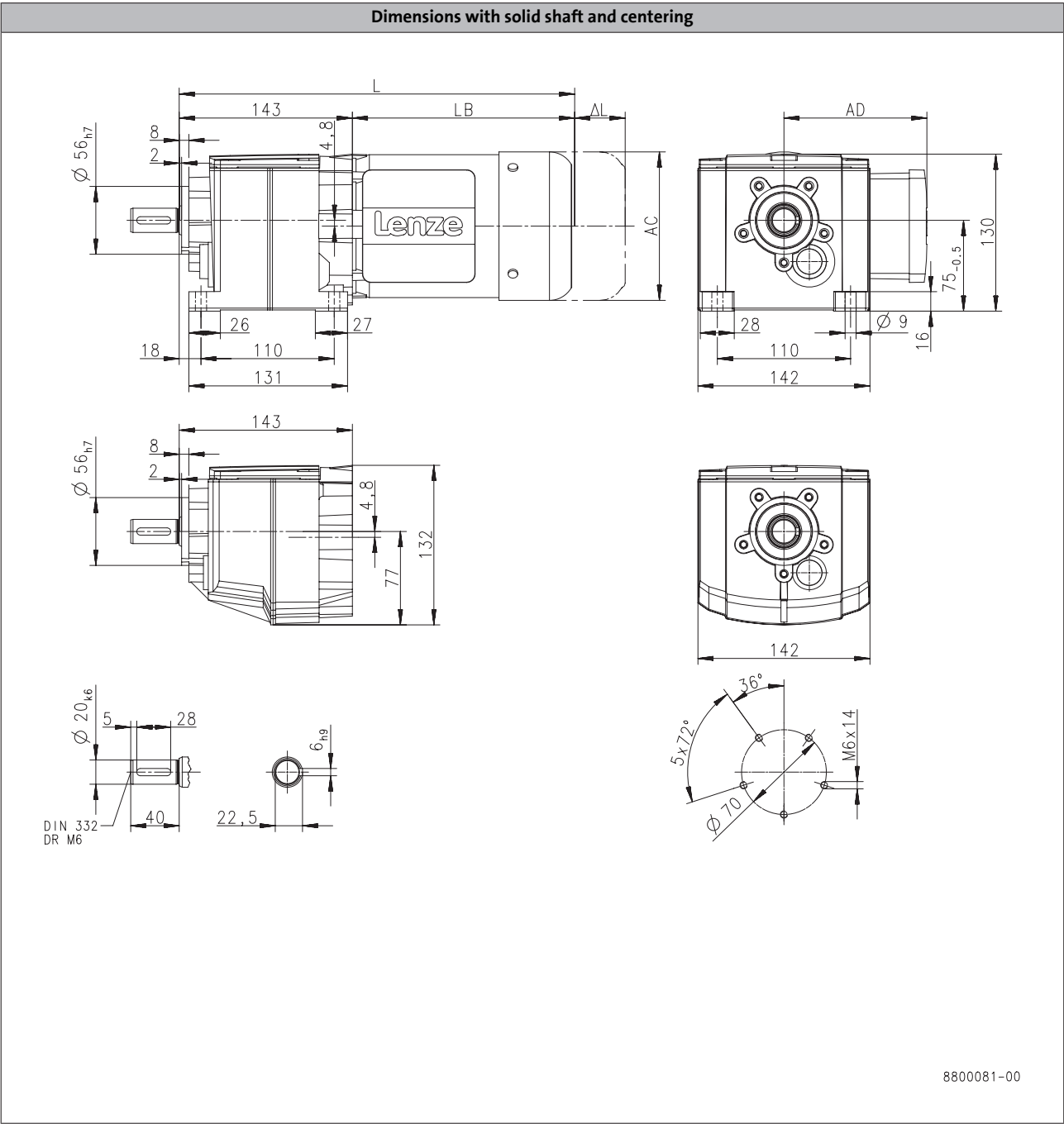
g500-H helical geared motors

Technical data



4-pole motors

g500-H100



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	369		428
Länge Motor	LB	[mm]	226		285
Länge Motoranbauten	Δ L	[mm]	183		181
Motordurchmesser	AC	[mm]	156		176
Abstand Motor/Anschluss	AD	[mm]	150	152	157

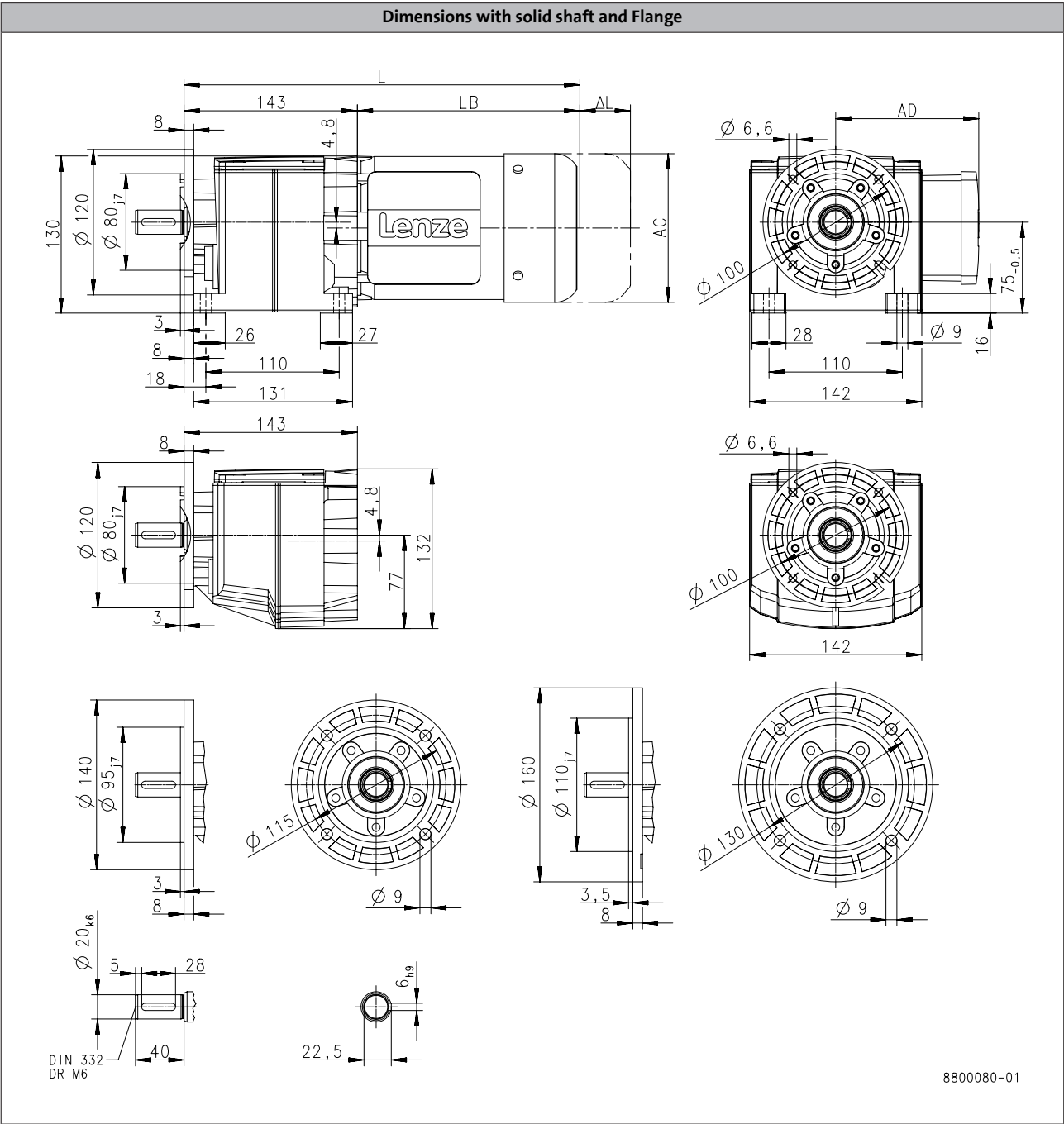
g500-H helical geared motors

Technical data



4-pole motors

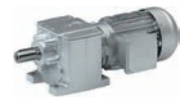
g500-H100



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	369		428
Länge Motor	LB	[mm]	226		285
Länge Motoranbauten	Δ L	[mm]	183		181
Motordurchmesser	AC	[mm]	156		176
Abstand Motor/Anschluss	AD	[mm]	150	152	157

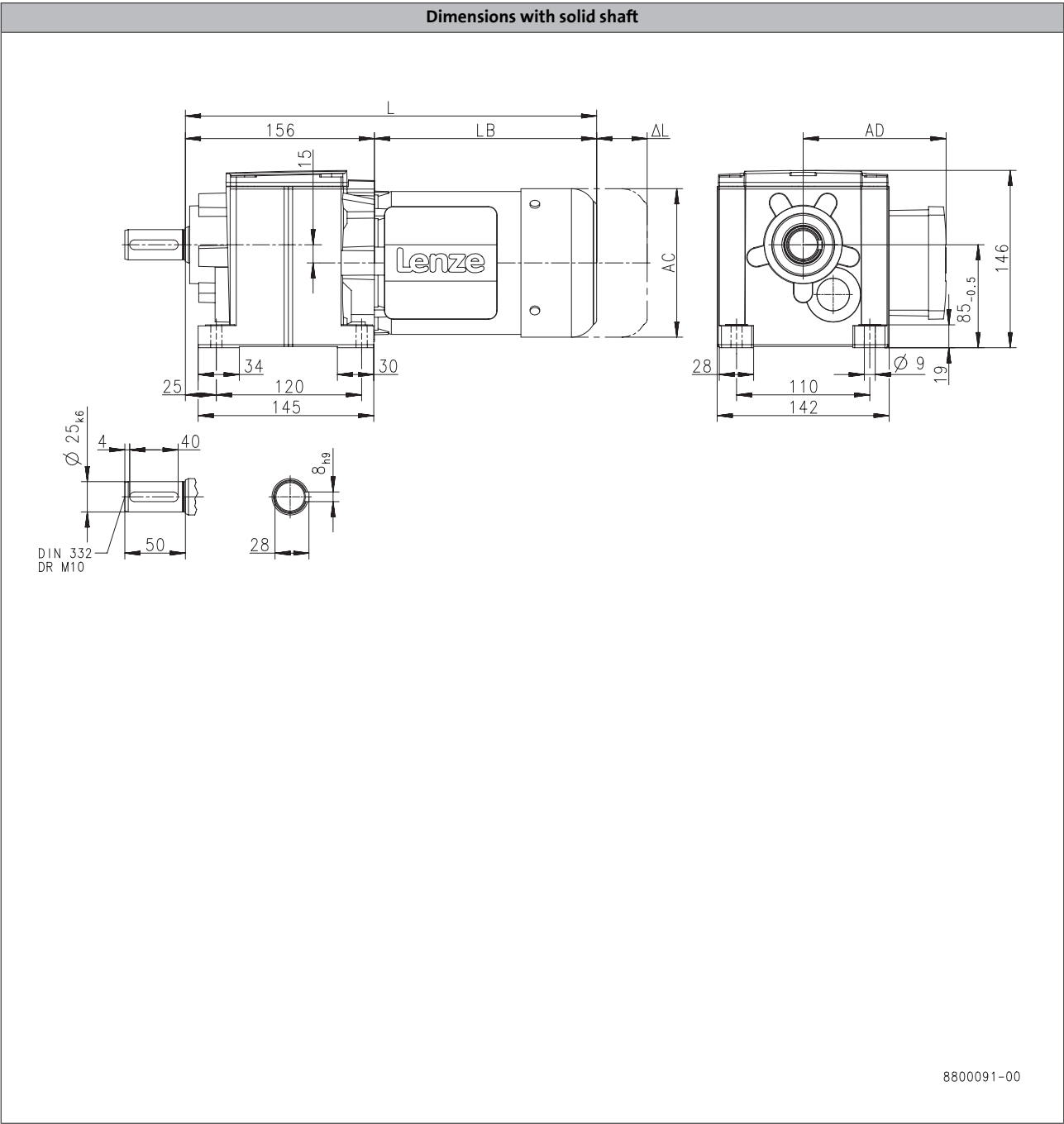
g500-H helical geared motors

Technical data



4-pole motors

g500-H140



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	382	441	
Länge Motor	LB	[mm]	226	285	
Länge Motoranbauten	Δ L	[mm]	183	181	
Motordurchmesser	AC	[mm]	156	176	
Abstand Motor/Anschluss	AD	[mm]	150	152	157

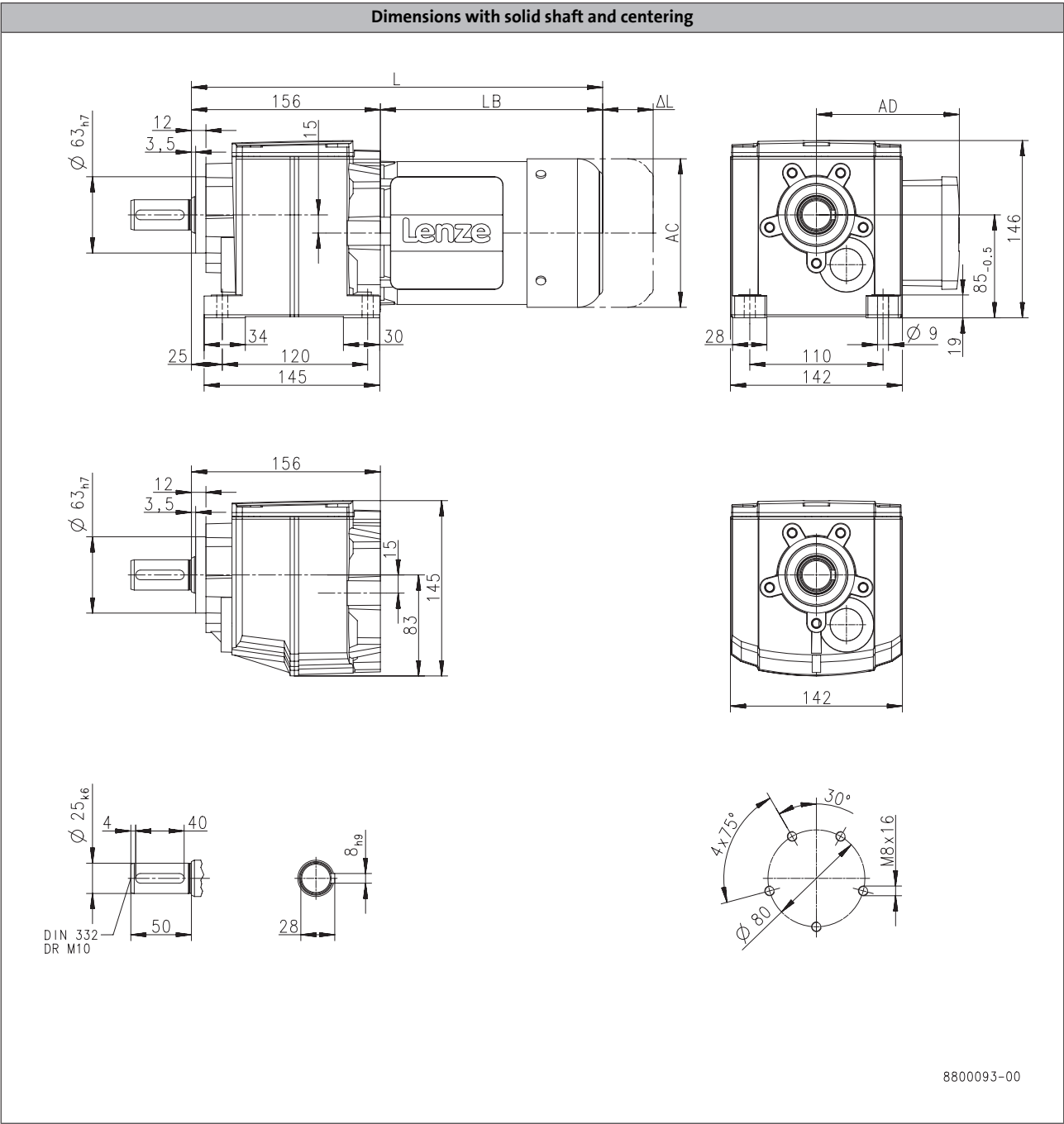
g500-H helical geared motors

Technical data



4-pole motors

g500-H140



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	382		441
Länge Motor	LB	[mm]	226		285
Länge Motoranbauten	Δ L	[mm]	183		181
Motordurchmesser	AC	[mm]	156		176
Abstand Motor/Anschluss	AD	[mm]	150	152	157

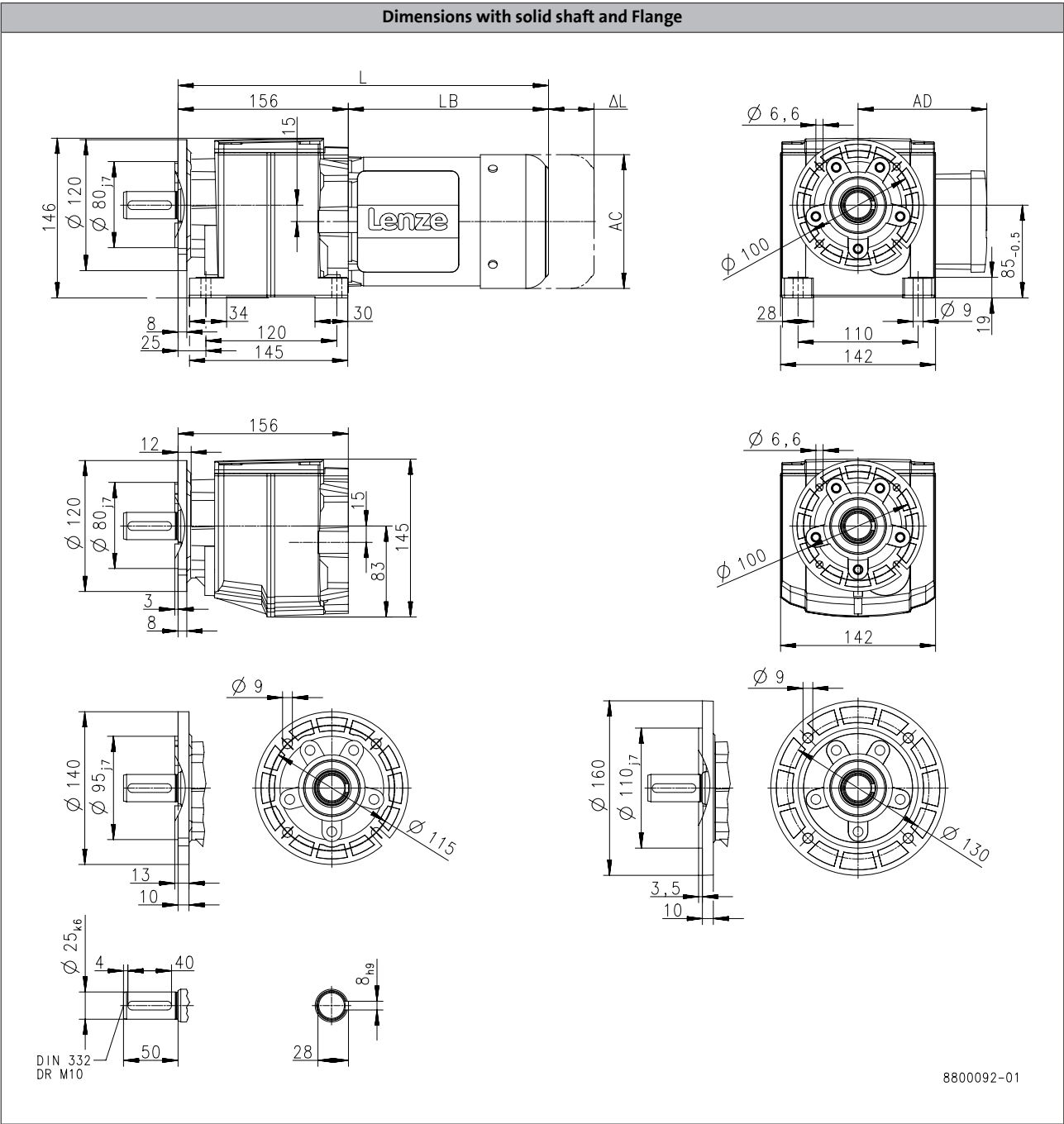
g500-H helical geared motors

Technical data



4-pole motors

g500-H140



Produkt			MH□MA□□		
			080-32	090-12	090-32
Abmessungen					
Gesamtlänge	L	[mm]	382	441	
Länge Motor	LB	[mm]	226	285	
Länge Motoranbauten	Δ L	[mm]	183	181	
Motordurchmesser	AC	[mm]	156	176	
Abstand Motor/Anschluss	AD	[mm]	150	152	157

g500-H helical geared motors

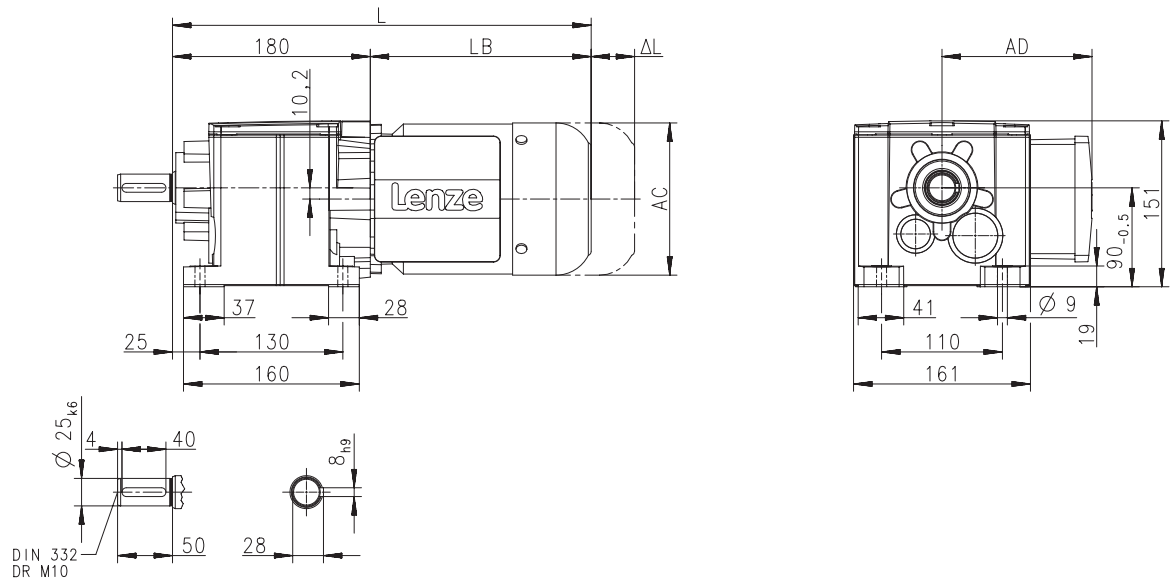
Technical data



4-pole motors

g500-H210

Dimensions with solid shaft



8800103-00

Produkt			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Abmessungen							
Gesamtlänge	L	[mm]	406	465		501	517
Länge Motor	LB	[mm]	226	285		321	337
Länge Motoranbauten	Δ L	[mm]	183	181		170	
Motordurchmesser	AC	[mm]	156	176		194	
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166	

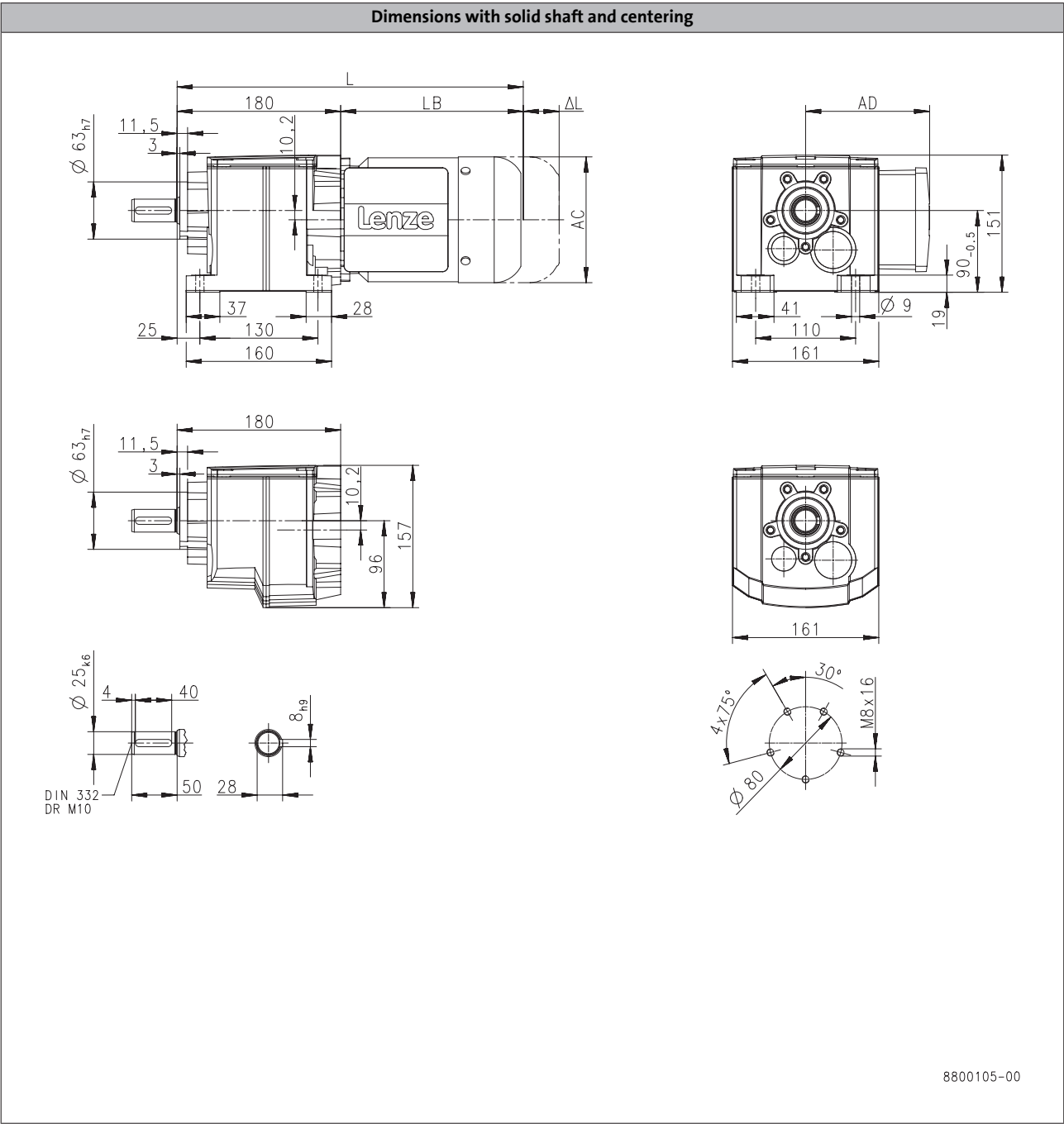
g500-H helical geared motors

Technical data



4-pole motors

g500-H210



6.3

Produkt			MH□MA□□				
			080-32	090-12	090-32	100-12	100-32
Abmessungen							
Gesamtlänge	L	[mm]	406	465		501	517
Länge Motor	LB	[mm]	226	285		321	337
Länge Motoranbauten	Δ L	[mm]	183	181		170	
Motordurchmesser	AC	[mm]	156	176		194	
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166	

g500-H210

Technical drawing of a Lenze motor showing various views and dimensions. The drawing includes a side view, a front view, a top view, and a detail view of the mounting bracket. Dimensions are given in millimeters (mm).

Side View Dimensions:

- Overall length: 180
- Motor body length: LB
- Motor body diameter: $\varnothing 120$
- Motor body width: 10.2
- Motor body mounting flange diameter: $\varnothing 80_{-0.71}$
- Motor body mounting flange thickness: 3
- Motor body mounting flange inner diameter: 8
- Motor body mounting flange outer diameter: 25
- Motor body mounting flange inner diameter: 37
- Motor body mounting flange outer diameter: 130
- Motor body mounting flange outer diameter: 160
- Motor body mounting flange outer diameter: 28
- Motor body mounting flange outer diameter: AC
- Motor body mounting flange outer diameter: AL

Front View Dimensions:

- Overall width: 161
- Motor body diameter: $\varnothing 100$
- Motor body mounting flange diameter: $\varnothing 6,6$
- Motor body mounting flange thickness: 3
- Motor body mounting flange inner diameter: 8
- Motor body mounting flange outer diameter: 25
- Motor body mounting flange inner diameter: 37
- Motor body mounting flange outer diameter: 130
- Motor body mounting flange outer diameter: 160
- Motor body mounting flange outer diameter: 28
- Motor body mounting flange outer diameter: AC
- Motor body mounting flange outer diameter: AL

Top View Dimensions:

- Overall diameter: $\varnothing 115$
- Motor body diameter: $\varnothing 9$
- Motor body mounting flange diameter: $\varnothing 6,6$
- Motor body mounting flange thickness: 3
- Motor body mounting flange inner diameter: 8
- Motor body mounting flange outer diameter: 25
- Motor body mounting flange inner diameter: 37
- Motor body mounting flange outer diameter: 130
- Motor body mounting flange outer diameter: 160
- Motor body mounting flange outer diameter: 28
- Motor body mounting flange outer diameter: AC
- Motor body mounting flange outer diameter: AL

Detail View Dimensions:

- Overall diameter: $\varnothing 25_{k6}$
- Motor body diameter: 4
- Motor body mounting flange diameter: 40
- Motor body mounting flange thickness: 50
- Motor body mounting flange inner diameter: 28
- Motor body mounting flange outer diameter: 8_{hg}

Other Dimensions:

- AD: 151
- 90-0.5
- 19
- 110
- 161
- 140
- 95.17
- 10
- 3.5
- 160
- 110.17
- 10
- 3.5
- 200
- 130.17
- 10
- 3.5
- 165
- 11

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6.3

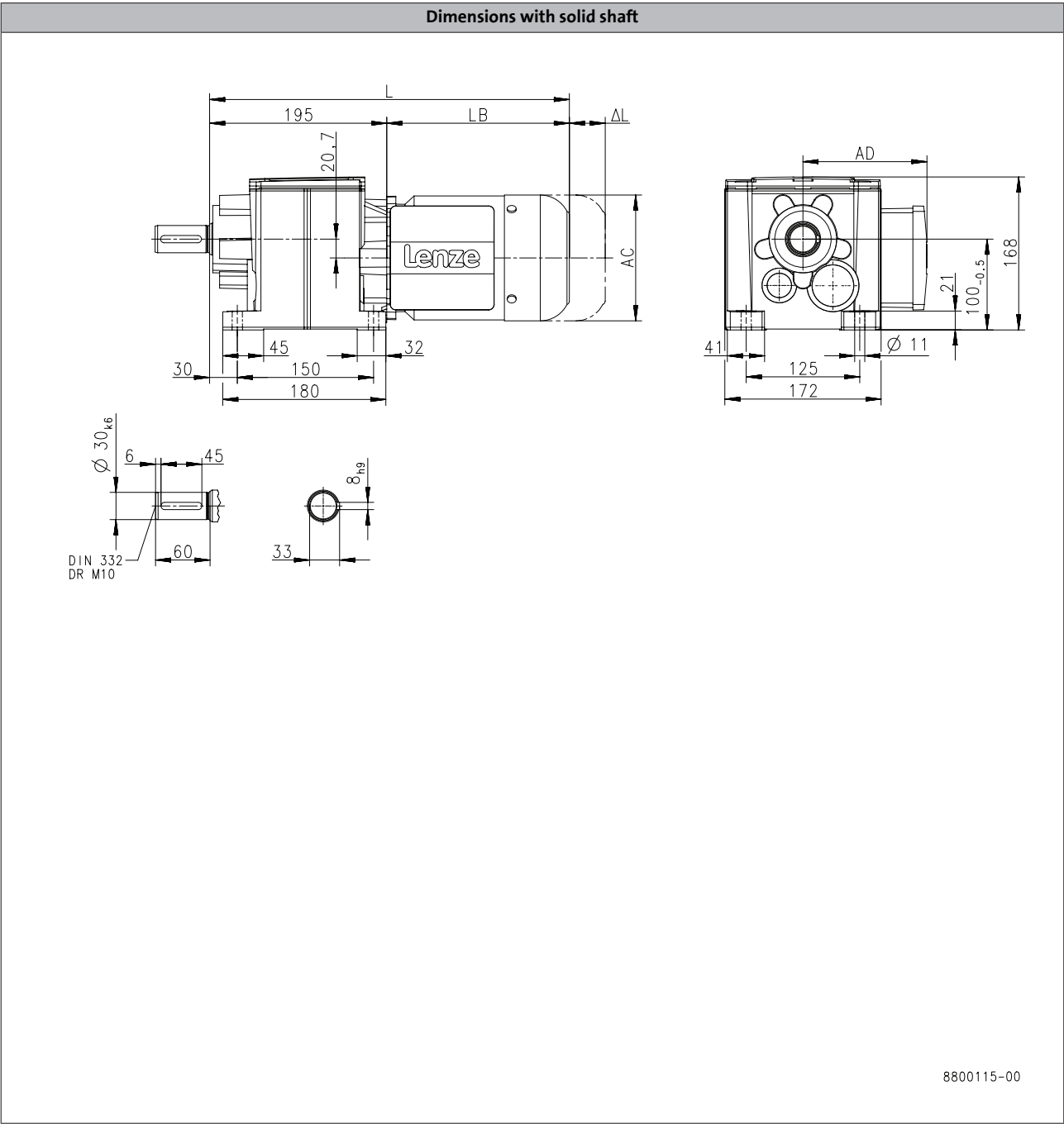
g500-H helical geared motors

Technical data



4-pole motors

g500-H320



Produkt			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Abmessungen								
Gesamtlänge	L	[mm]	426	485		521	537	580
Länge Motor	LB	[mm]	226	285		321	337	380
Länge Motoranbauten	Δ L	[mm]	183	181		170		183
Motordurchmesser	AC	[mm]	156	176		194		218
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166		176

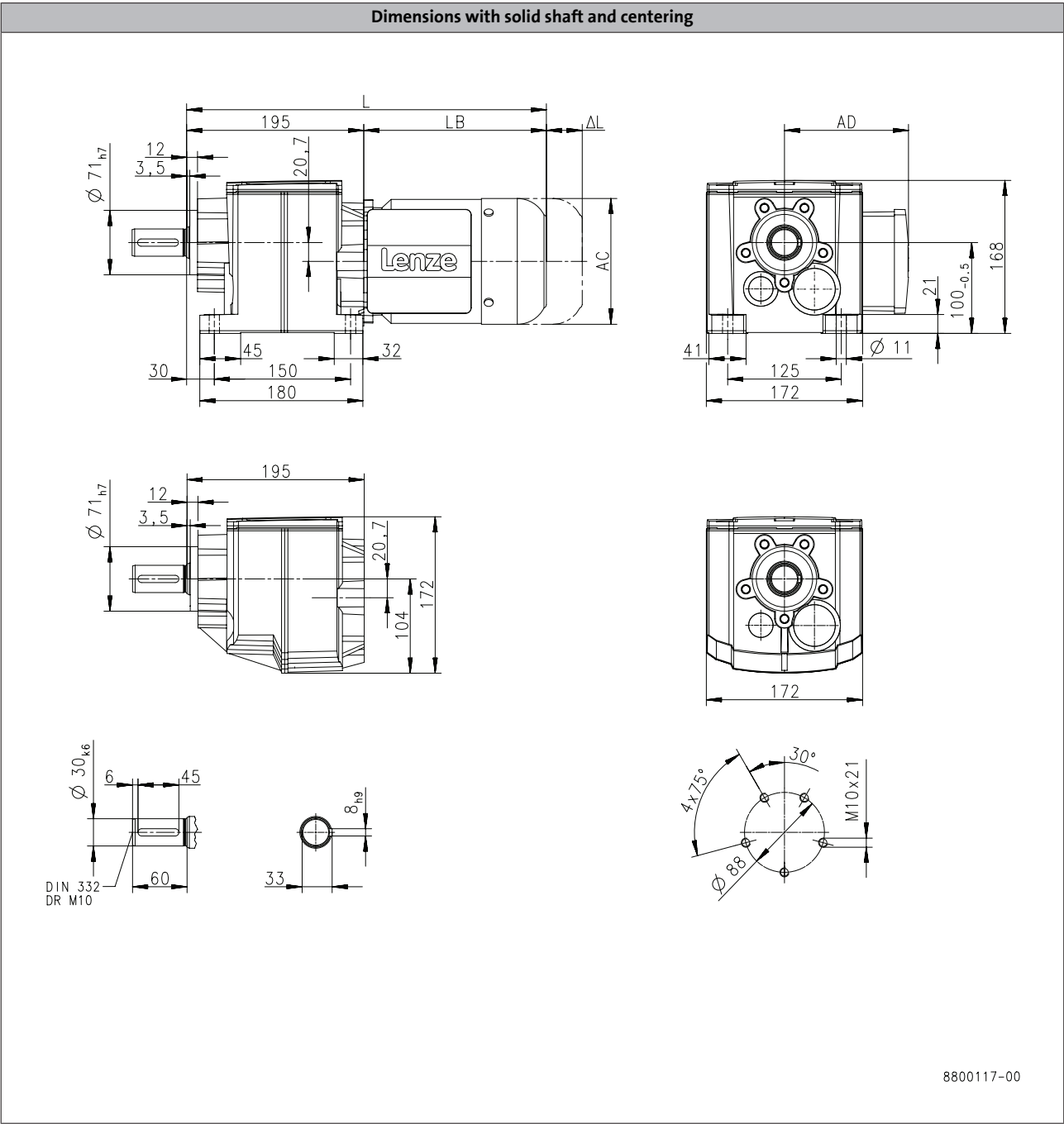
g500-H helical geared motors

Technical data



4-pole motors

g500-H320



Produkt			MH□MA□□					
			080-32	090-12	090-32	100-12	100-32	112-22
Abmessungen								
Gesamtlänge	L	[mm]	426	485		521	537	580
Länge Motor	LB	[mm]	226	285		321	337	380
Länge Motoranbauten	Δ L	[mm]	183	181		170		183
Motordurchmesser	AC	[mm]	156	176		194		218
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166		176

4-pole motors

g500-H320

Technical drawing of a Lenze motor with dimensions in mm. The drawing includes a side view, a front view, a rear view, and a detail of the mounting bracket. Dimensions include: 195, LB, ΔL, 168, Ø 160, Ø 110, 20.7, 3.5, 11, 45, 150, 180, 32, 12, 172, 104, 20.7, Ø 200, Ø 130, 3.5, 11, Ø 30, 6, 45, 60, 33, 8, 9, Ø 9, AD, Ø 130, 41, 125, 172, Ø 11, 21, 100, 5, Ø 11, Ø 165.

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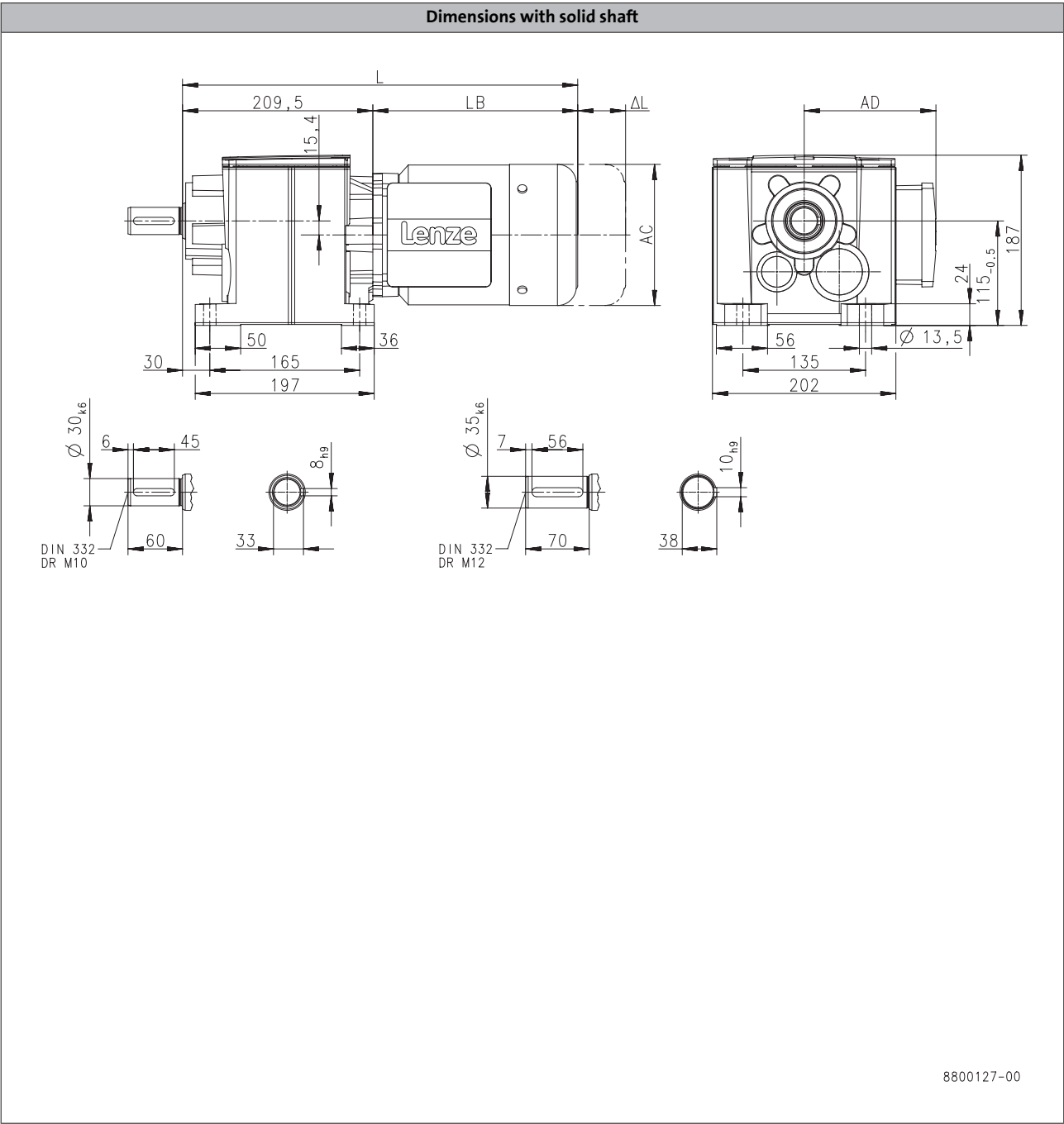
g500-H helical geared motors

Technical data



4-pole motors

g500-H450



Produkt			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Abmessungen										
Gesamtlänge	L	[mm]	436	495		531	547	590	638	
Länge Motor	LB	[mm]	226	285		321	337	380	428	
Länge Motoranbauten	Δ L	[mm]	183	181		170		183	202	
Motordurchmesser	AC	[mm]	156	176		194		218	258	
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166		176	195	

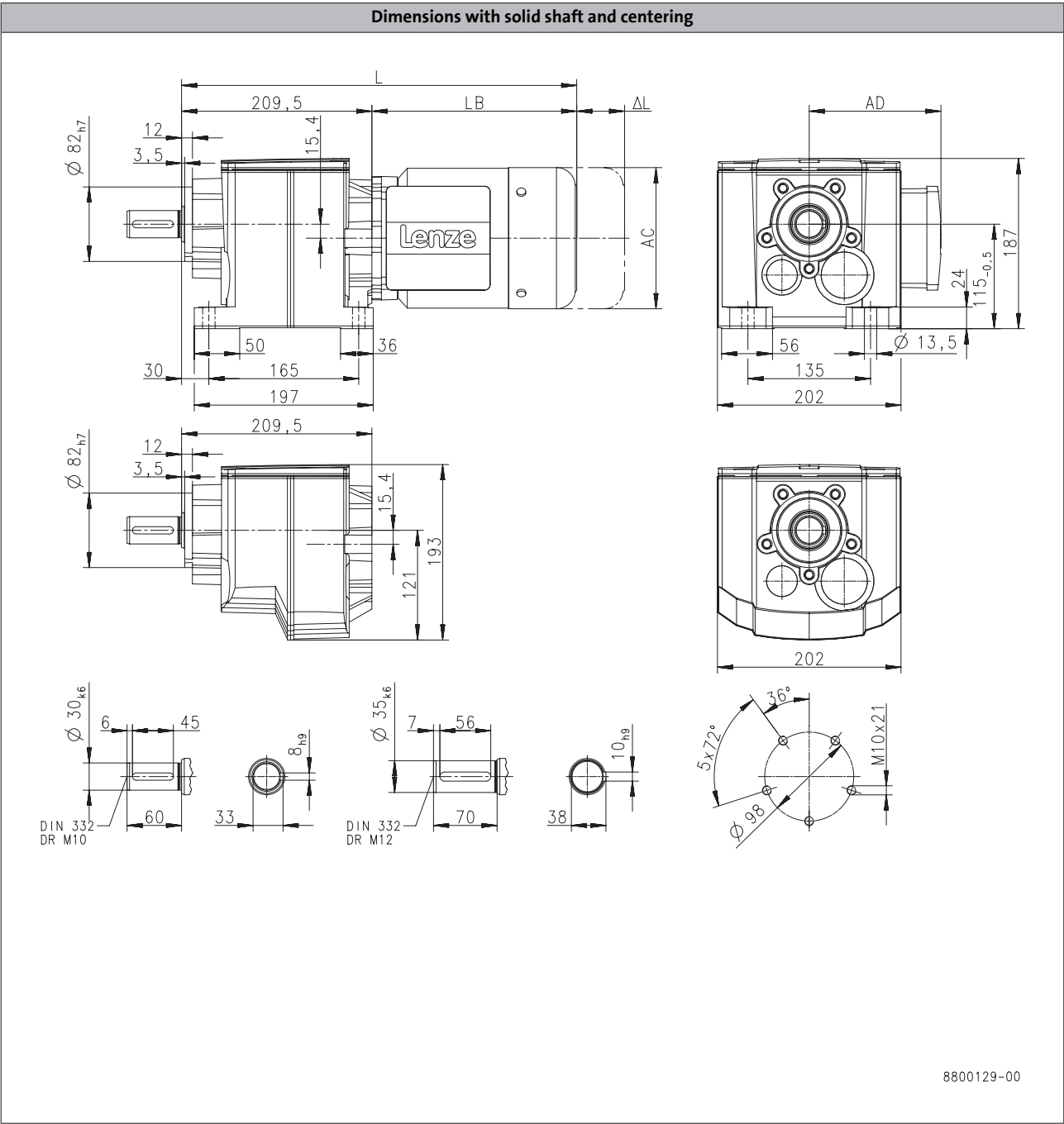
g500-H helical geared motors

Technical data



4-pole motors

g500-H450



Produkt			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Abmessungen										
Gesamtlänge	L	[mm]	436	495		531	547	590	638	
Länge Motor	LB	[mm]	226	285		321	337	380	428	
Länge Motoranbauten	Δ L	[mm]	183	181		170		183	202	
Motordurchmesser	AC	[mm]	156	176		194		218	258	
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166		176	195	

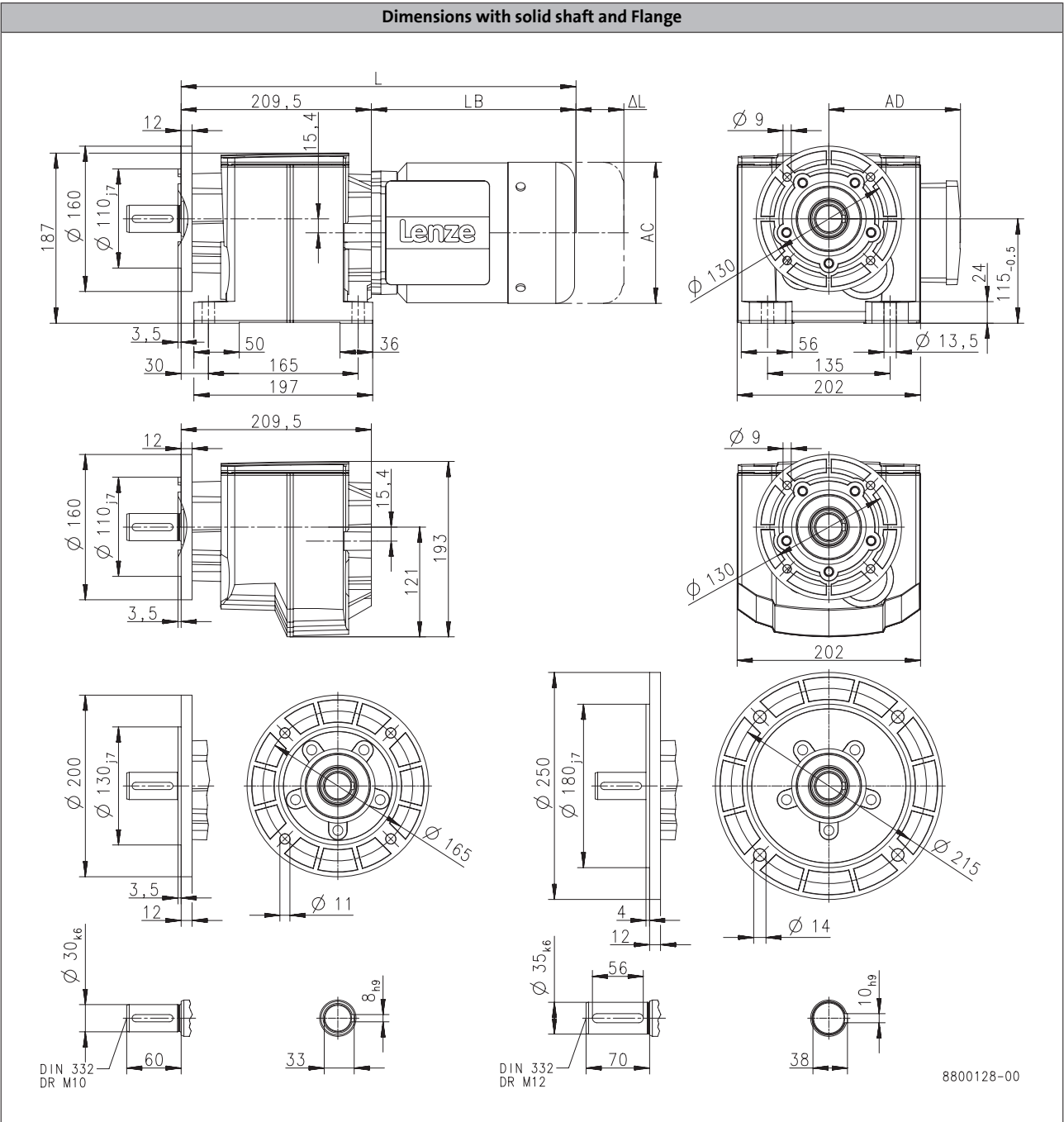
g500-H helical geared motors

Technical data



4-pole motors

g500-H450



Produkt			MH□MA□□							
			080-32	090-12	090-32	100-12	100-32	112-22	132-12	132-22
Abmessungen										
Gesamtlänge	L	[mm]	436	495		531	547	590	638	
Länge Motor	LB	[mm]	226	285		321	337	380	428	
Länge Motoranbauten	Δ L	[mm]	183	181		170		183	202	
Motordurchmesser	AC	[mm]	156	176		194		218	258	
Abstand Motor/Anschluss	AD	[mm]	150	152	157	166		176	195	

g500-H helical geared motors

Technical data



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	-H100	m	[kg]	14	19	21					
	-H140	m	[kg]	15	20	22					
	-H210	m	[kg]	16	21	23	29	32			
	-H320	m	[kg]	18	23	25	31	34	45		
	-H450	m	[kg]	22	26	28	34	37	48	66	74

3-stage gearboxes

				MH□MA□□		
				080-32	090-12	090-32
g500	-H210	m	[kg]	17		
	-H320	m	[kg]	19		
	-H450	m	[kg]	22	27	29

g500-H helical geared motors

Technical data



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

g500-H helical geared motors

Technical data



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	
OKS-L (large)	C3	2K-PUR top coat	

g500-H helical geared motors

Technical data



g500-H helical geared motors

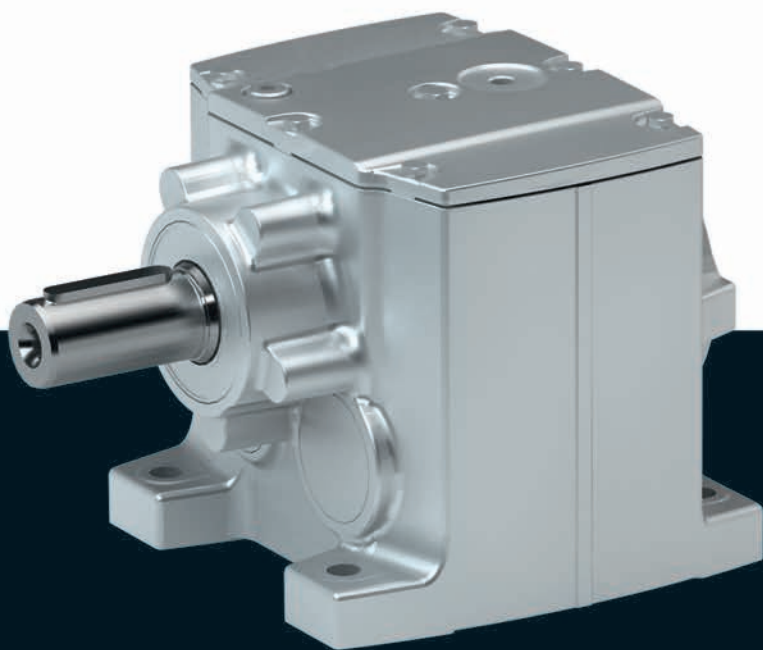
Technical data



Gearboxes

g500-H helical gearbox

45 to 450 Nm



g500-H helical gearbox

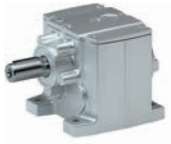
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Technical data	Ventilation	6.3 - 12
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g500-H helical gearbox

Contents



g500-H helical gearbox

General information



List of abbreviations

$F_{ax,max}$	[N]	Max. axial force
$F_{rad,max}$	[N]	Max. radial force
i		Ratio
J	[kgcm ²]	Moment of inertia
m	[kg]	Mass

g500-H helical gearbox

General information



Product information

The robust helical gearboxes feature high permissible radial forces, closely stepped ratios and a low backlash. They are available in 2-pole and 3-pole design with a torque up to 450 Nm and a ratio of up to $i = 370$.

Versions

- Fine-scaling of size / torque provides for an optimum machine adaptation
- Standardised shaft and flange dimensions for an easy machine integration
- High efficiency

The product name

Gearbox type	Product range		Design	Rated torque [Nm]	Product
Helical gearbox	g500	-	H	45	g500-H45
				100	g500-H100
				140	g500-H140
				210	g500-H210
				320	g500-H320
				450	g500-H450

g500-H helical gearbox

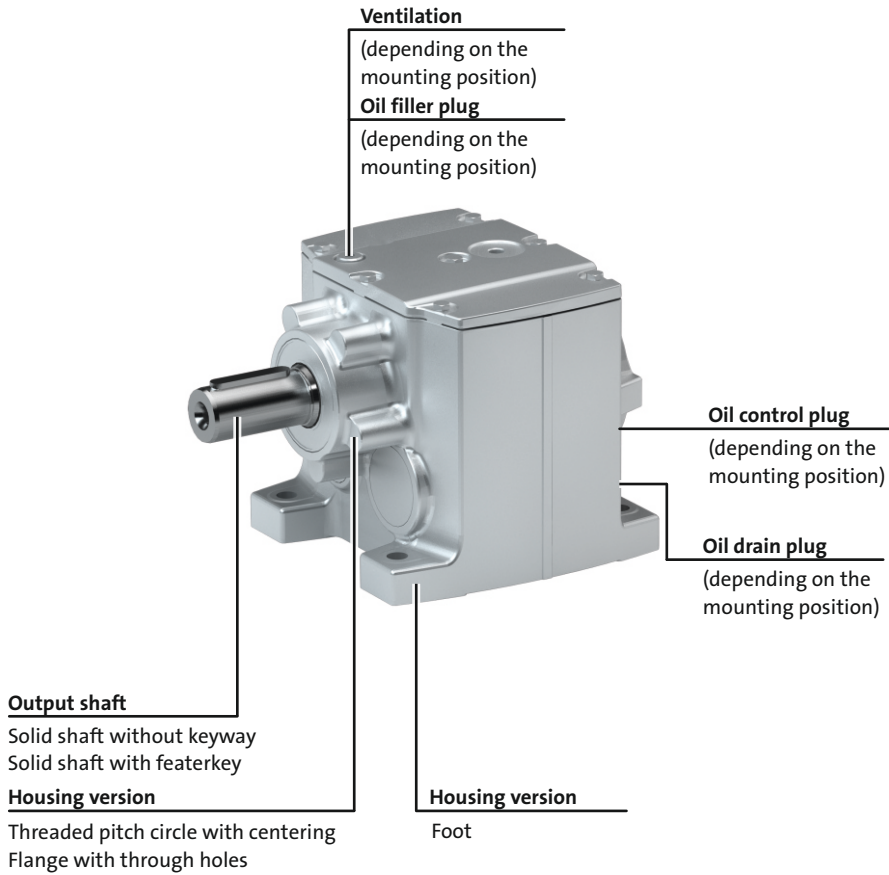
General information



Equipment

Overview

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



g500-H helical gearbox

General information



The gearbox kit

Gearbox details

Product						
	g500-H45	g500-H100	g500-H140	g500-H210	g500-H320	g500-H450
Driven shaft						
Solid shaft without keyway [mm]		20x40	25x50		30x60	35x70
Solid shaft with featherkey [mm]	14x28 20x40	20x40	25x50		30x60	30x60 35x70
Design	Standard stainless steel					
Gasket	Standard FPM (Viton)					
Bearing	Standard	Standard Reinforced				
Fitting grease	Not enclosed Enclosed					
Housing						
Housing version	With foot Without foot with centering	With foot With foot and centering Without foot with centering				
Output flange						
flange diameter [mm]	120/140/160			120/140/160/200	160/200	160/200/250
Lubricant						
Type	CLP 460 ¹⁾ 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					

¹⁾ Not suitable for geared servo motors.

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

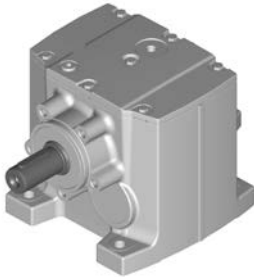
g500-H helical gearbox

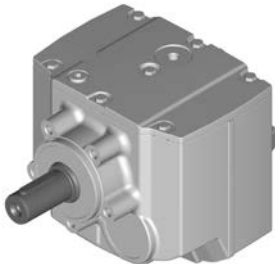
General information



The gearbox kit

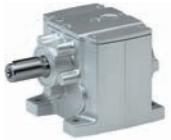
Gearbox details

Solid shaft		
		
Foot mounting	Foot mounting With centering	Foot mounting Flange with through holes

Solid shaft	
	
With centering	Flange with through holes

g500-H helical gearbox

General information

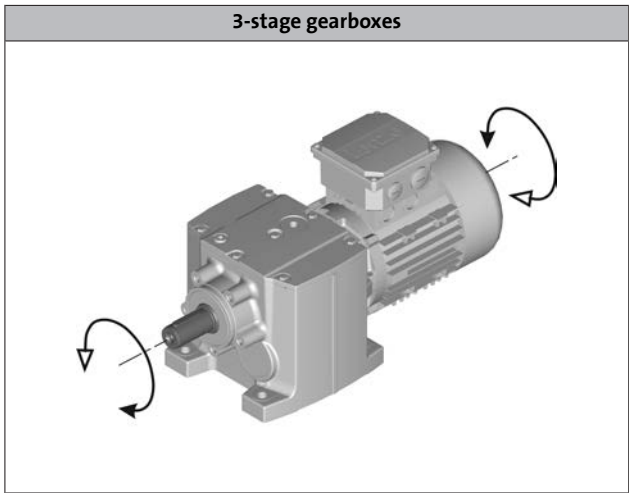
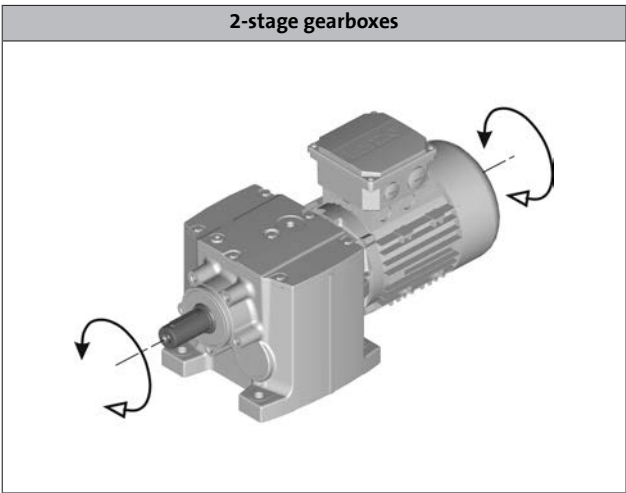


Functions and features

Product	g500-H45		g500-H100	g500-H140	g500-H210	g500-H320	g500-H450
Housing							
Design	Cuboid						
Material	Aluminium						
Solid shaft							
Design	with keyway to DIN 6885	with keyway to DIN 6885 Without keyway					
Tolerance	Shaft diameter ≤ 50 mm: k6 Shaft diameter > 50 mm: m6						
Material	Tempered steel C45 Nirosta X46Cr13						
Toothed parts							
Design	Ground tooth flanks Optimised tooth flank geometry						
Material	Case-hardened steel						
Shaft-hub joint							
	Force-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 [η _{C=1}]	0.96						
3-stage gearboxes [η _{C=1}]					0.95		

¹⁾ Standard for geared servo motors.

Direction of rotation



g500-H helical gearbox

General information



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.

g500-H helical gearbox

General information



Ventilation

Non-ventilated gearboxes

No ventilation is required for gearboxes g500-H45 to H210.

Ventilated gearboxes

The g500-H320 H450 gearbox is supplied with a breather element as standard.

Gearboxes in combined mounting position

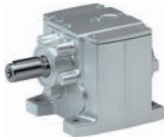
To reduce the number of different versions, the gearboxes can also be ordered with combined mounting positions. Depending on the gearbox in question, the following combinations are available:

- g500-H45 in combined mounting position ABCDEF
- g500-H100 ... H450 in combined mounting position AEF

The breather elements are supplied loose.

g500-H helical gearbox

General information



Ventilation

Position of ventilation, sealing elements and oil level check

► A ... F mounting position

A		B	
C		D	
E		F	
	Filling		Drain
	Ventilation		Check

g500-H helical gearbox

General information





Permissible radial and axial forces at output

Permissible radial force

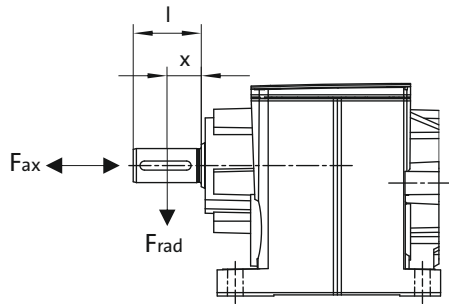
$$F_{\text{rad,perm}} = f_w \times F_{\text{rad,max}}$$

Permissible axial force

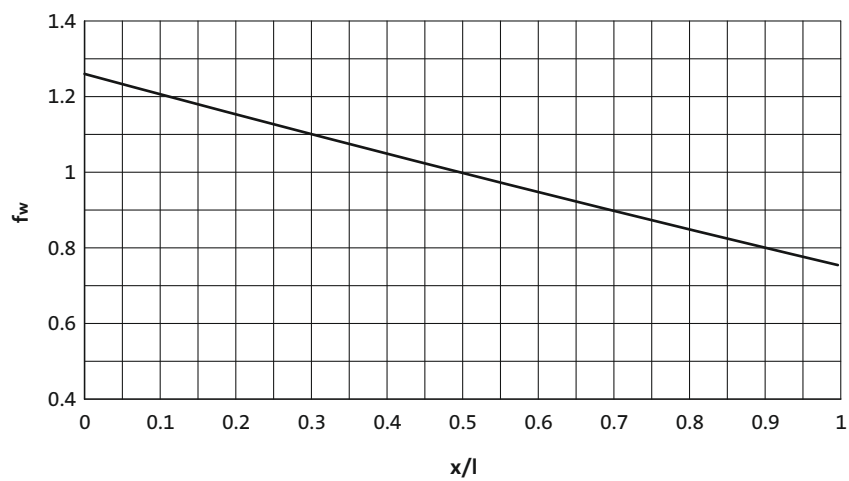
If there is no radial force, the maximum permissible axial force is 50 % of the table value $F_{\text{rad,max}}$

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

Application of forces



Additional load factor f_w at output shaft



g500-H helical gearbox

Technical data



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.

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

- If the torque is transmitted via the flange face, max 50 % of the radial force $F_{rad,max}$ are permissible.

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

Max. radial force, Solid 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-H45	300	370	630	710	800	920	1100	1400	1500	1500
g500-H100	820	1000	1200	1450	1750	2120	2560	2650	2650	2650
g500-H140	1210	1750	2000	2300	2700	3300	3800	3800	3800	3800
g500-H210	1150	1600	2020	2390	2780	3360	3900	3900	4360	4800
g500-H320	1500	1900	2200	2600	3000	3500	4100	4800	5600	5700
g500-H450	1900	2200	2560	3000	3470	4050	4720	5480	6610	7100

Max. radial force, Solid shaft (reinforced bearings)										
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
g500-H100	1020	1250	1500	1810	2190	2650	3200	3300	3300	3300
g500-H140	1510	2180	2500	2870	3370	4120	4750	4750	4750	4750
g500-H210	1430	2000	2520	2980	3470	4200	4870	4870	5450	6000
g500-H320	1870	2370	2750	3250	3750	4370	5120	6000	7000	7100
g500-H450	2370	2750	3200	3750	4330	5060	5900	6850	8260	8870

g500-H helical gearbox

Technical data



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.

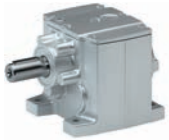
2-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm ²]
g500-H45	2.597	0.26
	3.413	0.17
	4.368	0.12
	5.312	0.18
	5.965	0.17
	6.982	0.12
	7.840	0.12
	8.935	0.089
	10.033	0.086
	11.429	0.059
	12.833	0.057
	14.836	0.041
	16.660	0.040
	19.013	0.028
	21.350	0.027
	24.595	0.019
	27.618	0.019
	32.000	0.012
	35.933	0.012
	41.455	0.008
g500-H100	46.550	0.008
	52.909	0.005
	59.413	0.005
	3.354	0.53
	4.600	0.34
	5.167	0.43
	5.887	0.24
	6.440	0.21
	7.086	0.28
	8.214	0.15
	9.068	0.20
	10.063	0.11
	11.360	0.17
	12.653	0.13
	14.490	0.13
	15.500	0.10
	17.750	0.10
	19.486	0.069
	22.314	0.067
	25.095	0.048
	28.738	0.047
	31.805	0.032
	36.422	0.031
	39.857	0.022
	45.643	0.022
	52.510	0.014
	60.133	0.013

Product	Ratio	Moment of inertia
	i	J
		[kgcm ²]
g500-H140	3.267	0.90
	4.480	0.54
	5.733	0.36
	6.272	0.31
	7.269	0.51
	8.000	0.21
	9.029	0.34
	9.800	0.15
	11.554	0.24
	12.640	0.21
	13.957	0.20
	16.122	0.15
	17.802	0.14
	19.750	0.11
	21.808	0.11
	24.829	0.077
	27.415	0.074
	31.976	0.053
	35.308	0.051
	40.526	0.035
g500-H210	44.748	0.034
	50.786	0.024
	56.077	0.024
	66.908	0.015
	73.879	0.014
	3.389	1.53
	4.648	0.98
	5.583	1.24
	6.250	1.18
	7.657	0.82
	8.571	0.79
	9.799	0.59
	10.720	0.51
	12.000	0.50
	13.673	0.38
	15.306	0.36
	16.750	0.29
	18.750	0.28
	21.802	0.18
	24.405	0.18
	27.119	0.13
	30.357	0.13
	35.095	0.085
	39.286	0.083
	42.593	0.062
	47.679	0.061
	54.438	0.040
	60.938	0.039

g500-H helical gearbox

Technical data



Moments of inertia

2-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-H320	3.389	1.23
	4.648	0.81
	6.083	1.66
	6.910	1.51
	8.343	1.04
	9.477	0.97
	10.677	0.72
	11.680	0.63
	12.128	0.68
	13.268	0.59
	14.898	0.44
	16.923	0.42
	18.250	0.34
	20.731	0.32
	23.754	0.21
	26.983	0.20
	29.548	0.15
	33.564	0.15
	38.238	0.095
	43.436	0.092
	46.407	0.070
	52.715	0.067

Product	Ratio	Moment of inertia
	i	J
		[kgcm²]
g500-H450	3.444	4.94
	4.724	3.21
	5.678	3.64
	6.045	2.23
	6.613	1.98
	7.787	2.52
	8.800	2.40
	9.965	1.81
	11.262	1.74
	12.320	1.56
	13.905	1.21
	15.714	1.17
	17.033	0.95
	19.250	0.93
	22.170	0.53
	25.056	0.51
	27.578	0.39
	31.167	0.38
	35.689	0.24
	40.333	0.24
	43.313	0.18
	48.950	0.17
	54.750	0.12
	61.875	0.11

g500-H helical gearbox

Technical data



Moments of inertia

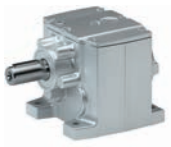
3-stage gearboxes

Product	Ratio	Moment of inertia
	i	J
		[kgcm ²]
g500-H210	43.390	0.13
	48.571	0.13
	55.529	0.088
	62.160	0.088
	71.026	0.060
	79.507	0.059
	92.205	0.042
	103.214	0.042
	118.162	0.029
	132.270	0.029
	152.853	0.020
	198.873	0.014
	222.619	0.013
	257.631	0.003
	288.393	0.003
	368.080	0.006
g500-H320	47.276	0.13
	53.703	0.13
	60.502	0.093
	68.726	0.091
	77.387	0.062
	87.906	0.061
	100.462	0.044
	114.118	0.043
	128.743	0.030
	146.244	0.030
	166.541	0.021
	216.683	0.014
	246.137	0.014
	280.702	0.003
	318.859	0.003

Product	Ratio	Moment of inertia
	i	J
		[kgcm ²]
g500-H450	44.124	0.36
	49.867	0.36
	56.469	0.25
	61.774	0.22
	69.813	0.22
	78.794	0.16
	89.048	0.15
	96.522	0.12
	109.083	0.12
	121.342	0.079
	137.133	0.078
	156.274	0.054
	176.611	0.054
	198.059	0.036
	223.833	0.035
	248.200	0.025
	280.500	0.025
	326.994	0.015
	369.548	0.015

g500-H helical gearbox

Technical data



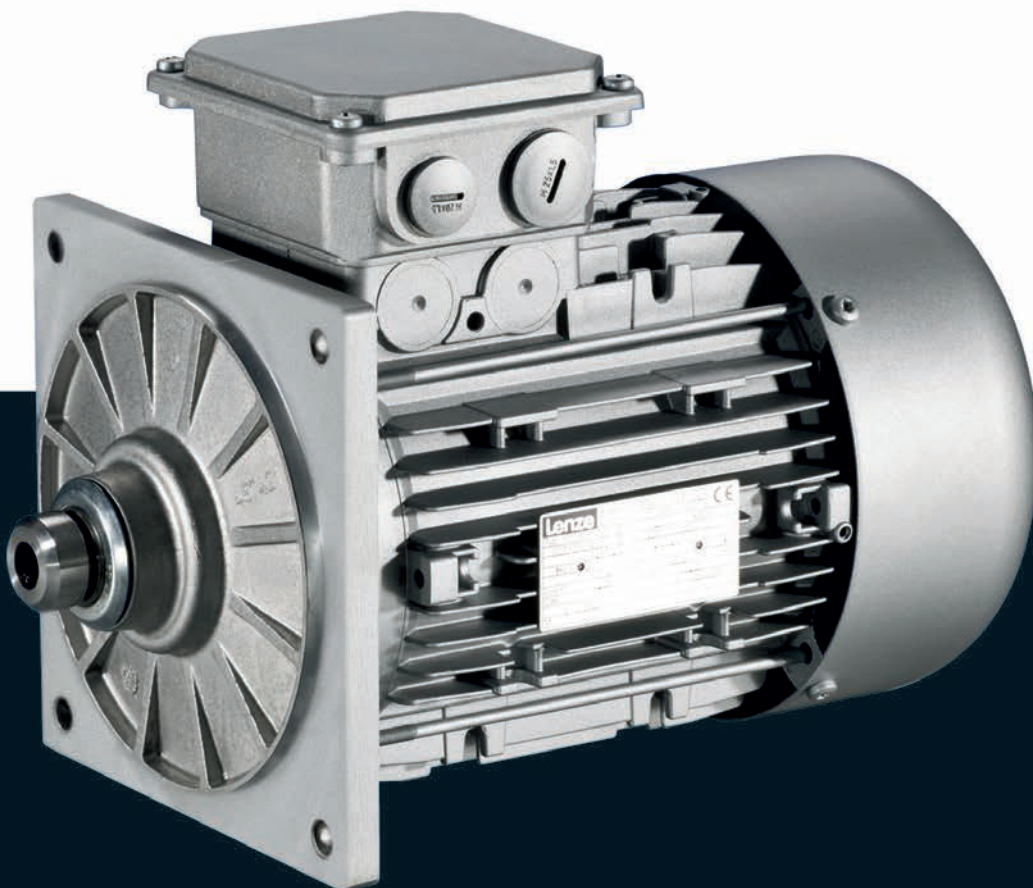
Additional weights for gearboxes

Product			g500-H45	g500-H100	g500-H140	g500-H210	g500-H320	g500-H450
Mass								
Foot	m	[kg]	0.1	0.1	0.2	0.1	0.1	0.2
Flange	m	[kg]	0.3	0.4	0.6	0.6	0.8	0.9

Motors

MH three-phase AC motors

0.75 to 45 kW



MH three-phase AC motors

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MH three-phase AC motors

General information



List of abbreviations

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

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

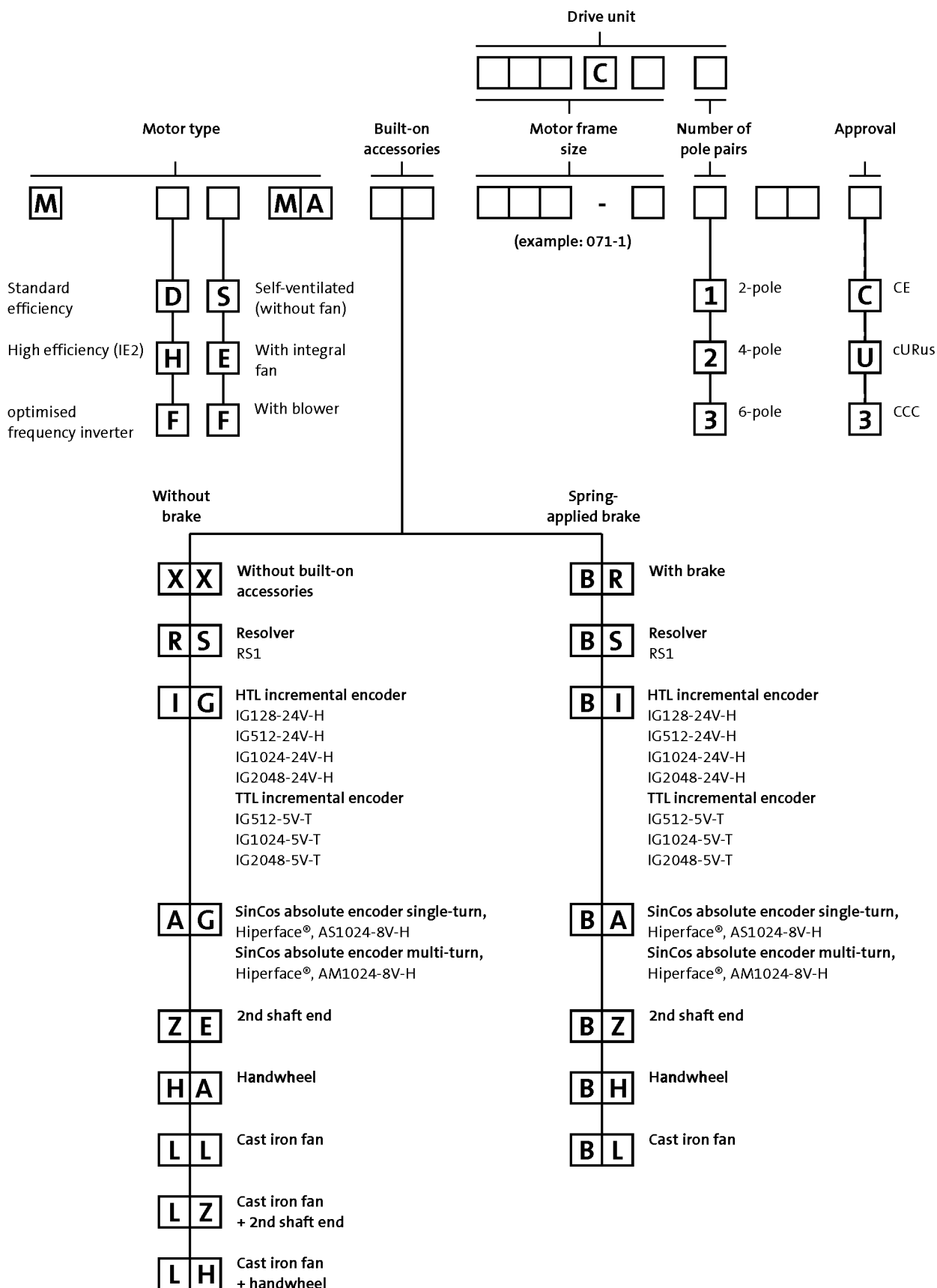
CE	Communauté Européenne
CSA	Canadian Standards Association
DIN	Deutsches Institut für Normung e.V.
EMC	Electromagnetic compatibility
EN	European standard
IEC	International Electrotechnical Commission
IM	International Mounting Code
IP	International Protection Code
NEMA	National Electrical Manufacturers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

MH three-phase AC motors

General information



Product key



MH three-phase AC motors

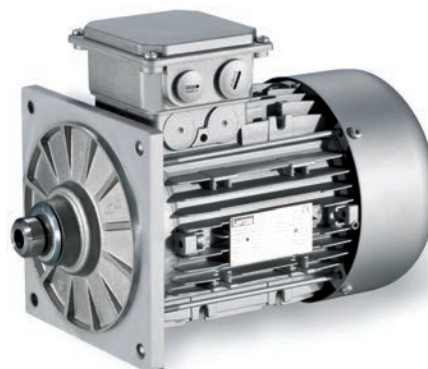
General information



Product information

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

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



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

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

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

Basic versions

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

Options

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

MH three-phase AC motors

General information



Functions and features

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

MH three-phase AC motors

General information



Functions and features

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

MH three-phase AC motors

General information



Functions and features

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

MH three-phase AC motors

General information



Functions and features

Surface and corrosion protection

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

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

Surface and corrosion protection system	Applications	Measures
OKS-G (primed)	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	
OKS-M (medium)	C2	2K PUR priming coat	Standard: RAL 7012 Optional: RAL Classic
OKS-L (high)	C3	2K-PUR top coat	

MH three-phase AC motors

General information



Motor – inverter assignment

Rated frequency 50/60 Hz

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

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

MH three-phase AC motors

General information



Motor – inverter assignment

Rated frequency 87 Hz

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

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

MH three-phase AC motors

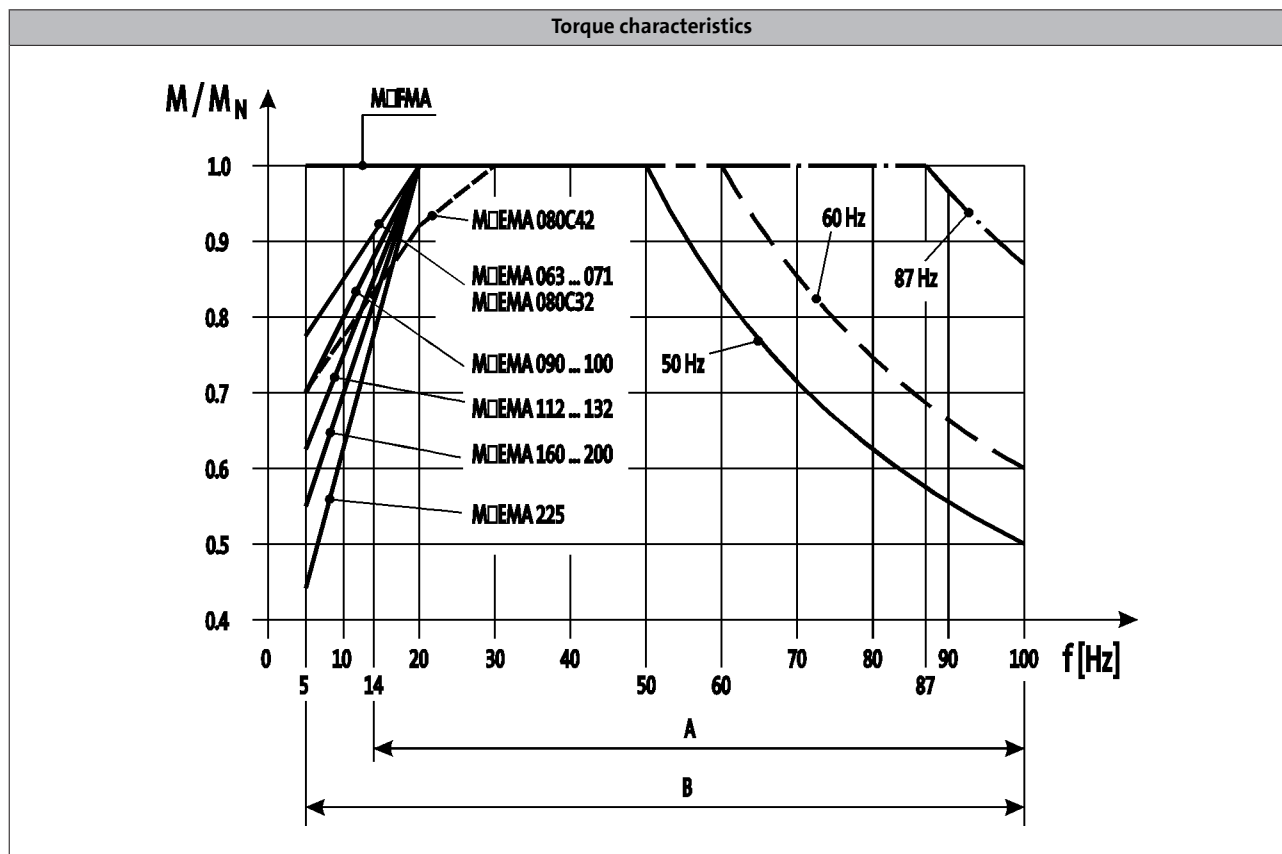
General information



Dimensioning

Torque derating at low motor frequencies

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



A = Operation with integral fan and brake

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

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

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

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

Please contact your Lenze sales office.

MH three-phase AC motors

General information



MH three-phase AC motors

Technical data



Standards and operating conditions

Enclosure			
EN 60529			IP55 ¹⁾ IP65 ¹⁾ IP66 ¹⁾
Energy efficiency class			
IEC 60034-30			IE2
IEC 60034-2-1			Methodology for measuring efficiency
Conformity			
CE			Low-Voltage Directive
			2006/95/EC
EAC			TP TC 004/2011 (TR C
Approval			
			UkrSEPRO
CCC			GB Standard 12350-2009
CSA			CSA 22.2 No. 100 CSA C390-10
cURus ²⁾			UL 1004-1 UL 1004-8 Power Conversion Equipment (File-No. E210321)
Temperature class			
IEC/EN 60034-1; utilisation			B
IEC/EN 60034-1; insulation system (enamel-insulated wire)			F
Min. ambient operating temperature			
	T _{opr,min}	[°C]	-20
Max. ambient temperature for operation			
	T _{opr,max}	[°C]	40
With power reduction	T _{opr,max}	[°C]	60
Site altitude			
Amsl	H _{max}	[m]	4000
Max. speed			
	n _{max}	[r/min]	4500

¹⁾ Designs with different degrees of protection:
IP55 with brake (IP54 with manual release lever).
IP54 with resolver RS1.
IP54 with HTL incremental encoder IG128-24V-H.

²⁾ Motor frame size 225, in preparation.

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

MH three-phase AC motors

Technical data



Rated data for 50 Hz

4-pole motors

	P _N	n _N	U _{N, Δ} ²⁾	I _{N, Δ}	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	η _{50 %}	η _{75 %}	η _{100 %}	J ¹⁾	m ¹⁾
	[Nm]	[Nm]	[Nm]		[%]	[%]	[%]	[kgcm ²]	[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.

MH three-phase AC motors

Technical data



Rated data for 60 Hz

4-pole motors

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

	P _N	n _N	U _{N, Δ} ²⁾	I _{N, Δ}	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	η _{50 %}	η _{75 %}	η _{100 %}	J ¹⁾	m ¹⁾
	[Nm]	[Nm]	[Nm]		[%]	[%]	[%]	[kgcm ²]	[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.

MH three-phase AC motors

Technical data



Rated data for 87 Hz

4-pole motors

	P _N	n _N	M _N	M _{max}	U _{N, Δ}	I _{N, Δ}	cos φ	η _{50 %}	η _{75 %}	η _{100 %}	J ¹⁾	m ¹⁾
					± 10 %							
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[%]	[kgcm ²]	[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

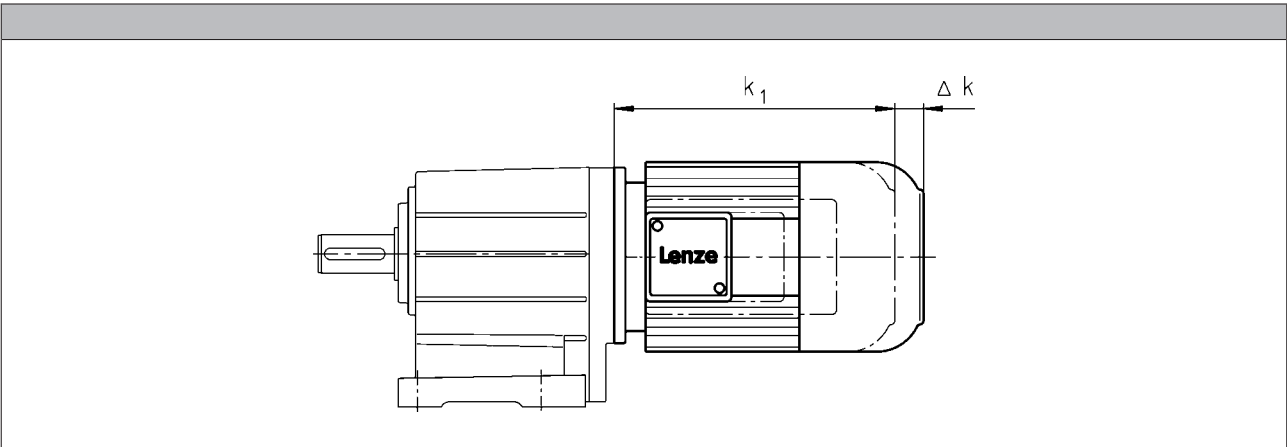
¹⁾ Without accessories

MH three-phase AC motors

Technical data



Dimensions, self-ventilated (4-pole)



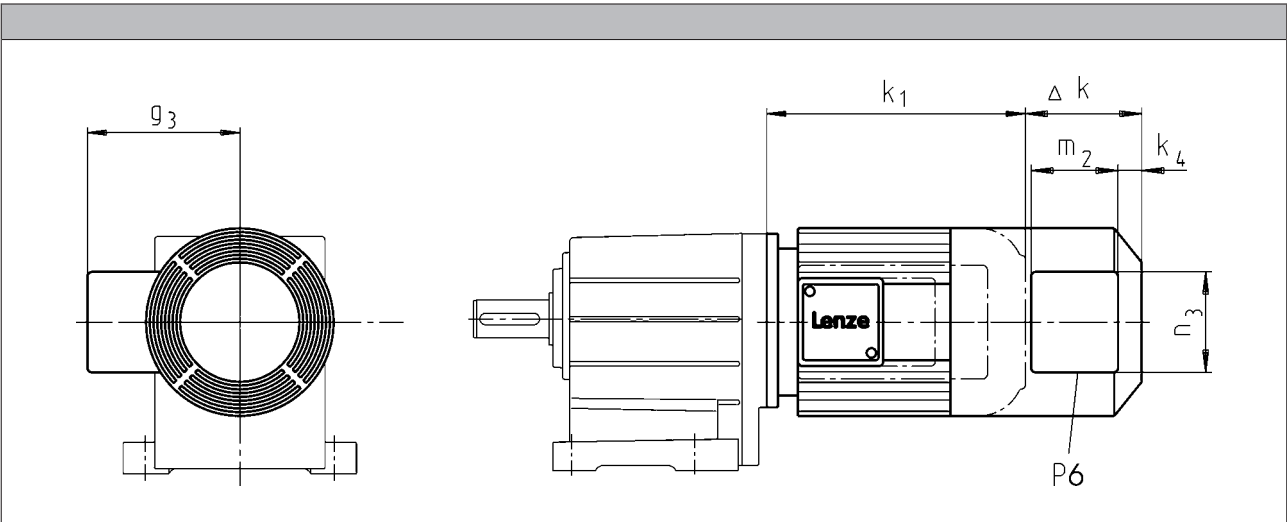
Motor type				
	MHEMAXX	MHEMABR	MHEMABS MHEMABI MHEMABA	MHEMALL MHEMARS MHEMAIG MHEMAAG
Motor frame size				
	Δ k	Δ k	Δ k	Δ k
	[mm]	[mm]	[mm]	[mm]
080-32	0	73	111	111
090-12		68	105	87
090-32				
100-12		76	101	81
100-32				
112-22		90	120	80
132-12		110	125	103
132-22				
160-22		105	191	83
160-32	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

MH three-phase AC motors

Technical data



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	1xM16x1.5
090-12 090-32		181	181		22	141	95	105	
100-12 100-32		109	170			170			
112-22	102	183	183	183		162			
132-12 132-22	115	202	202	202	32	182	96	106	
160-22 160-32	149	179	237	224	31	209			
180-12 180-32		215	275	215					
180-42			260						
225-12 225-22	213	213	213	213					

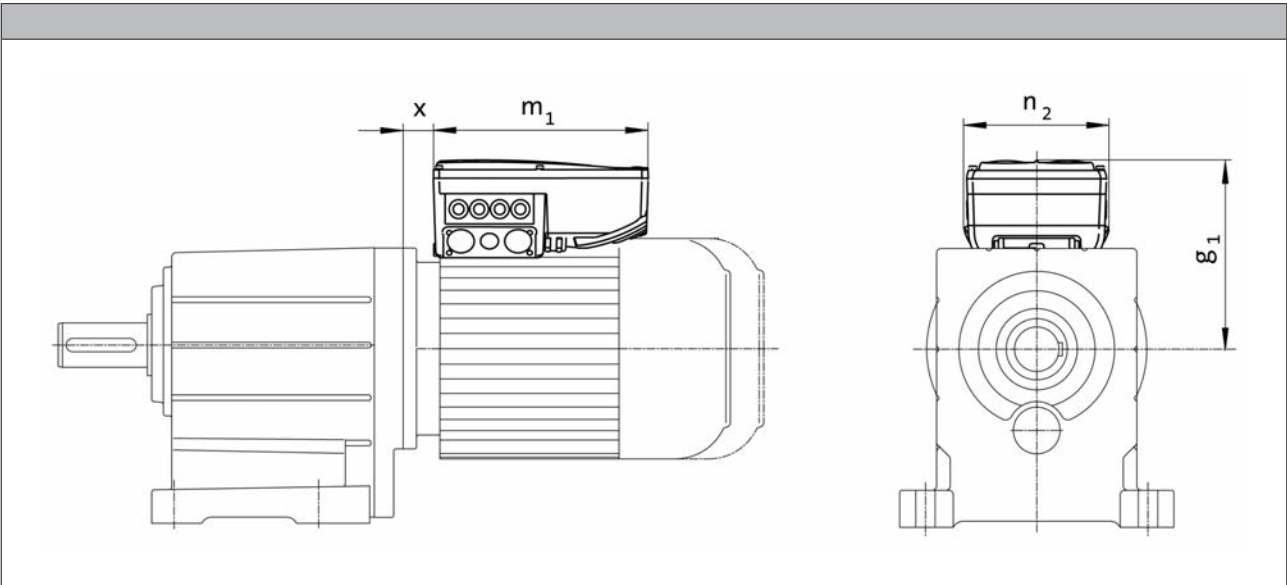
MH three-phase AC motors

Technical data



Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz



Product key					
Motor	Inverter				
		g 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□	282			
MH□□□□□112-22	E84DVB□4024S□□□2□	282	325	195	19.0
MH□□□□□132-12	E84DVB□5524S□□□2□	301			34.5
MH□□□□□132-22	E84DVB□7524S□□□2□				

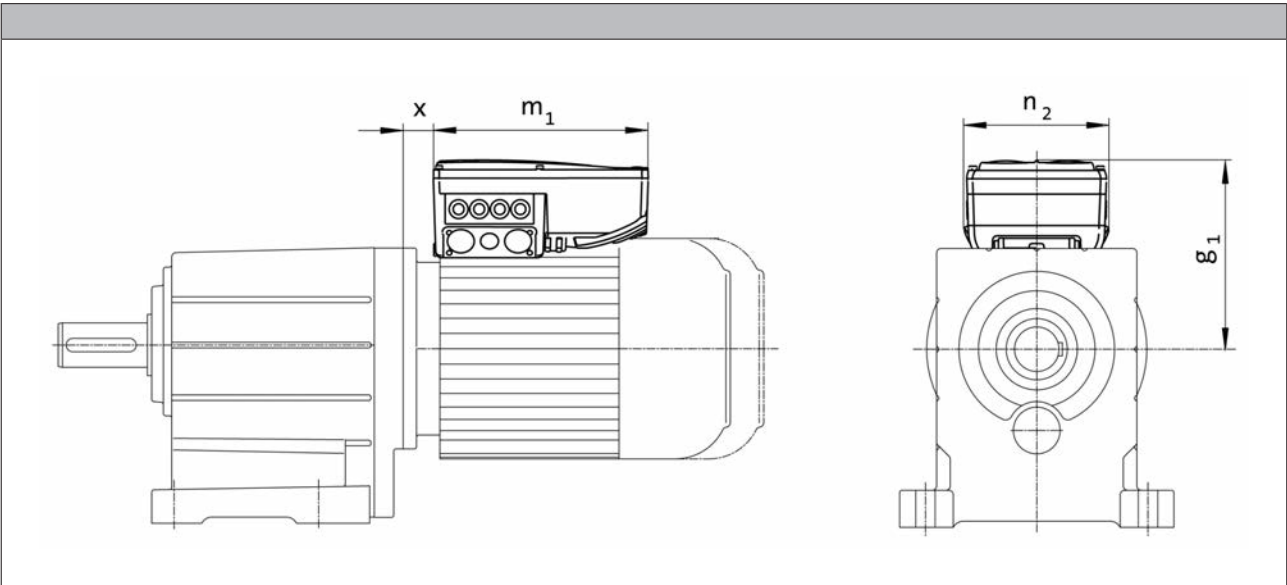
MH three-phase AC motors

Technical data



Dimensions, 8400 motec inverter

Rated frequency 87 Hz



Product key					
Motor	Inverter				
		g 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□	272	325	195	17.1
MH□□□□100-12	E84DVB□4024S□□□2□	272			19.0
MH□□□□100-32	E84DVB□5524S□□□2□	272			
MH□□□□112-22	E84DVB□7524S□□□2□	282			

MH three-phase AC motors

Accessories



Spring-applied 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 10⁶ repeating switching cycles
 - 1 x 10⁶ reversing switching cycles
- **LongLife**
 - 10 x 10⁶ repeating switching cycles
 - 15 x 10⁶ reversing switching cycles

Control

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

Enclosure

- Without manual release IP55
- With manual release IP54

Friction lining

- Non-asbestos, low wearing

Options

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

Assignment of 4-pole motors and brakes

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

MH three-phase AC motors

Accessories



Spring-applied 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	14.0		
	12	32.0		
	14	35.0		
	14	60.0		
132-12	14	35.0		
	14	60.0		
	16	60.0		
	16	80.0		
132-22	14	35.0		
	14	60.0		
	16	60.0		
	16	80.0		
	16	100		
160-22	16	60.0		
	16	80.0		
	18	80.0		
	18	150		
160-32	18	80.0		
	18	150		
	18	200		
180-12	18	80.0		
	18	150		
	20	145		
	20	260		
180-32	18	80.0		
	18	150		
	20	145		
	20	260		
	20	315		
200-32	18	80.0		
	18	150		
	20	145		
	20	260		
	20	315		
	20	400		
225-12	25	265		
	25	400		
	25	490		
225-22	25	265		
	25	400		
	25	490		
	25	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.

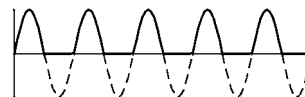
- Supply voltages
 - DC 24 V
 - DC 180 V
 - DC 205 V

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:

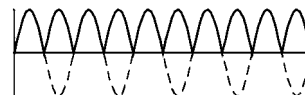
Half-wave rectifier, 6-pole

- 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



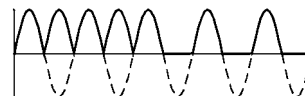
Bridge rectifier, 6-pole

- 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_{ij} and then as a half-wave rectifier. This combination optimises the performance of the brake – depending on the assignment of brake coil voltage and supply voltage:

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

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

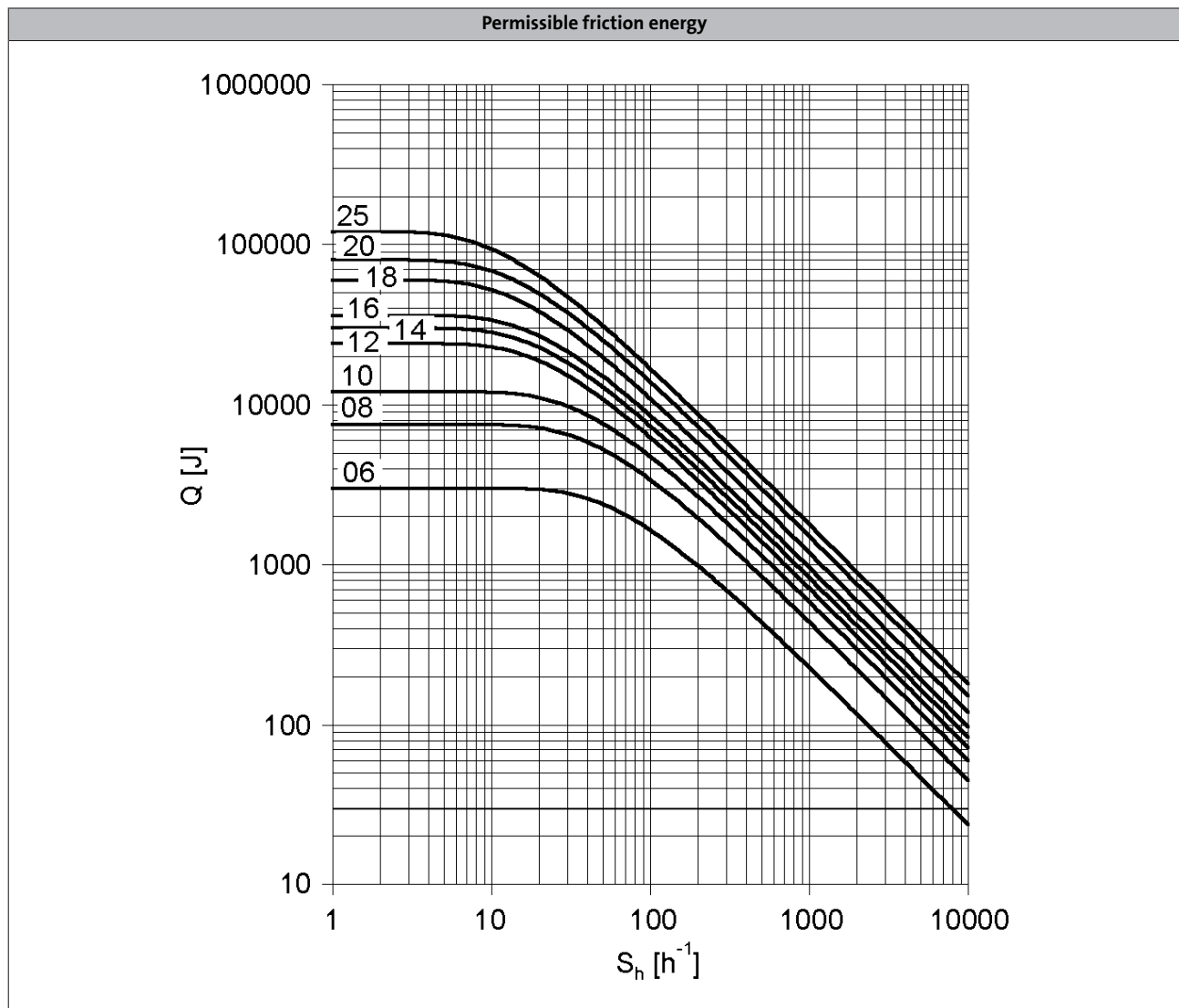
These features make this activation version particularly suitable for lifting applications. It is therefore only available in combination with a brake with increased braking torque.

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

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



Spring-applied brakes



Q = Switching energy per switching cycle

S_h = Operating frequency

Brake size = 06 to 25

MH three-phase AC motors

Accessories



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	[kgcm ²]	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 %.

MH three-phase AC motors

Accessories



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											
	$t_{\bar{u}}$	[ms]	300						1300		
Min. rest time											
	t	[ms]	900						3900		
Delay time											
Engaging	t_{11}	[ms]	12.0	22.0	35.0	49.0	61.0	114	83.0	126	304
Rise time											
Braking torque	t_{12}	[ms]	14.0	16.0	30.0	45.0	37.0	65.0	52.0	269	138
Engagement time											
	t_1	[ms]	26.0	38.0	66.0	93.0	97.0	180	134	395	443
Disengagement time											
	t_2	[ms]	35.0	37.0	57.0	65.0	148	169	230	207	269

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

MH three-phase AC motors

Accessories



Spring-applied 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											
	$S_{h\ddot{u}}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm ²]	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 %.

MH three-phase AC motors

Accessories



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.

MH three-phase AC motors

Accessories



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												
	$S_{h\ddot{u}}$	[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	[kgcm ²]	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

MH three-phase AC motors

Accessories



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	$t_{\ddot{u}}$	[ms]	300			1300						
Min. rest time	t	[ms]	900			3900						
Delay time												
Engaging	t_{11}	[ms]	24.0	27.0	17.0	41.0	21.0	60.0	69.0	17.0	123	85.0
Rise time												
Braking torque	t_{12}	[ms]	44.0	43.0	37.0	55.0	37.0	113	148	100	190	270
Engagement time	t_1	[ms]	68.0	70.0	54.0	97.0	57.0	173	217	334	313	355
Disengagement time	t_2	[ms]	109	193	308	297	435	356	378	470	451	532

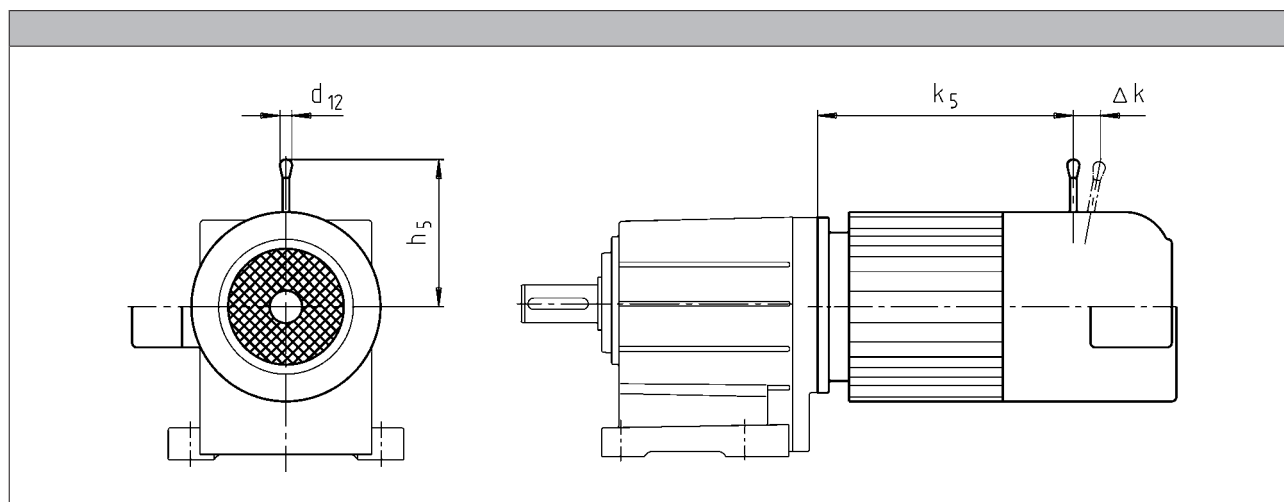
Design			Over-excitation									
Size			10	12	14	16	18	20	25			
Friction energy	Q _{BW}	[MJ]	264	706	761	966	1542	2322	3522			
Overexcitation time	t _ü	[ms]	300			1300						
Min. rest time	t	[ms]	900			3900						
Delay time	t ₁₁	[ms]	29.0	54.0	31.0	70.0	46.0	86.0	103	55.0	171	135
Rise time	t ₁₂	[ms]	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	207	29	107	13.0
	08	218	27	116	13.0
090-12	08	245	27	116	13.0
	10	256	28	132	13.0
100-12	10	279	28	132	13.0
	12	281	37	161	13.0
100-32	10	294	28	132	13.0
	12	296	37	161	13.0
112-22	12	292	37	161	13.0
	14	296	41	195	24.0
132-12	14	373	41	195	24.0
	16	373	55	240	24.0
160-22	16	420	55	240	24.0
	18	423	59	279	24.0
160-32	16	464	55	240	24.0
	18	467	59	279	24.0
180-12	18	539	59	279	24.0
	20	546	74	319	24.0
180-42	18	596	59	279	24.0
	20	603	74	319	24.0
225-12	25	785	103	445	24.0
	25	785	103	445	24.0

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

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

MH three-phase AC motors

Accessories



Resolver

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

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

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		$\pm 5 \%$		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

MH three-phase AC motors

Accessories



Incremental encoder and SinCos absolute value encoder

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

Encoder type			HTL incremental				TTL incremental			SinCos absolute value
Product key			IG128-24V-H	IG512-24V-H	IG1024-24V-H	IG2048-24V-H	IG512-5V-T	IG1024-5V-T	IG2048-5V-T	AM1024-8V-H
Encoder type										Multi-turn
Pulses										
			128	512	1024	2048	512	1024	2048	1024
Output signals			HTL				TTL			1 Vss
Interfaces										
			A, B track	A, B, N track and inverted						Hiperface
Absolute revolutions										
			0							4096
Accuracy										
		[°]	-22.5 ... 22.5	-2 ... 2						-0.8 ... 0.8
Min. input voltage										
DC	U _{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

MH three-phase AC motors

Accessories



Blowers

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

Rated data for 50 Hz

Size	Number of phases	Connection method						
Motor								
			U _{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	0.87	8.00
	3	Δ	200	303				
		Y	346	525				

MH three-phase AC motors

Accessories



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	3	Δ	200	400	0.28	1.10	15.0
		Y	346	525	0.17	0.35	

Rated data for 60 Hz

Size	Number of phases	Connection method					
Motor							
			U _{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	3	Δ	220	332	0.36	0.93	6.20
Y		380	575	0.56			
180		Δ	220	332		0.93	8.00
		Y	380	575		0.56	
200		Δ	220	332		0.93	8.00
		Y	380	575		0.56	
225	Δ	220	400	0.28	0.76	15.0	
	Y	380	575	0.26	0.43		

MH three-phase AC motors

Accessories



Temperature monitoring

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

TKO thermal contacts

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

PTC thermistor

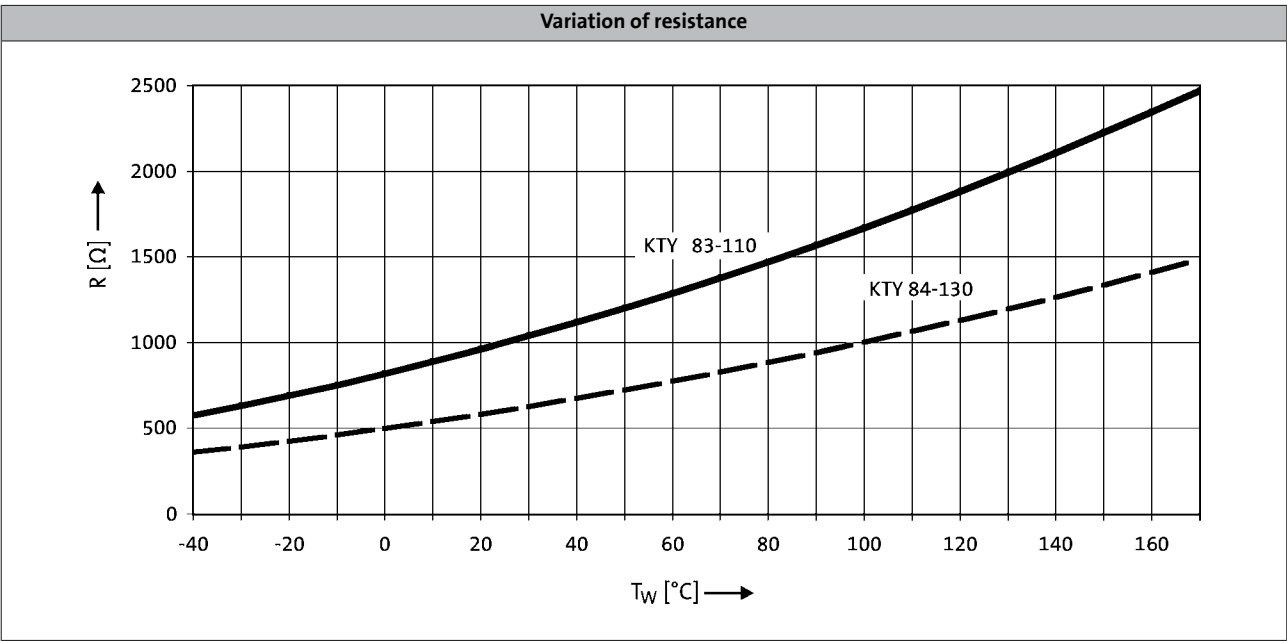
Function	Operating temperature	Rated resistance			Standard
		155 °C	-20 °C	140 °C	
	T	R_N	R_N	R_N	
	-5 ... 5 [°C]				
	[°C]	[Ω]	[Ω]	[Ω]	
Sudden change in resistance	150	550	30.0	250	DIN 44080 DIN VDE 0660 Part 303



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



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

MH three-phase AC motors

Accessories



Terminal box

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

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

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

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

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

Motor type	M□□MAXX	M□□MARS 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			

MH three-phase AC motors

Accessories



Terminal box

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

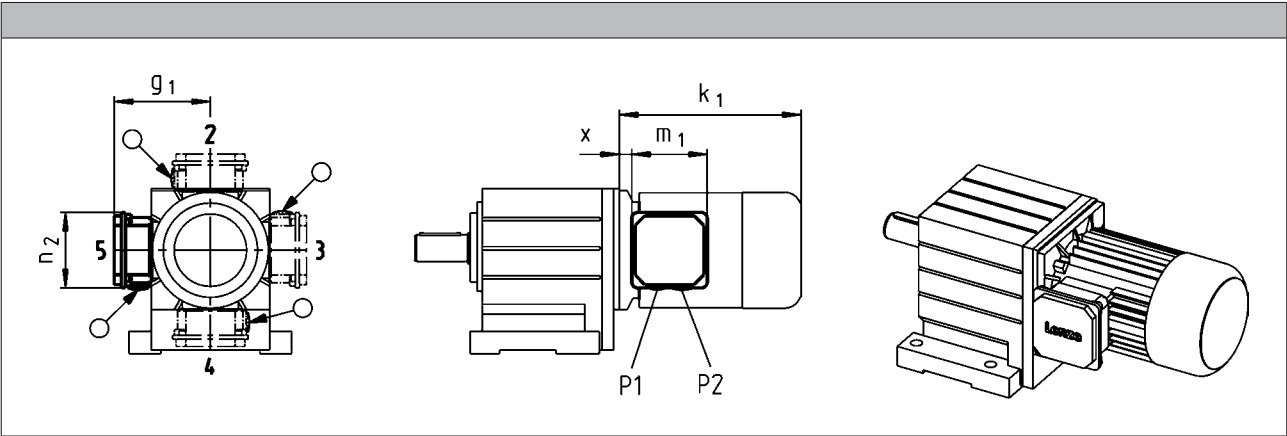
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size	Terminal box			
063-02 063-22	KK2	KK3		
063-12 063-32 063-42	KK2	KK3		
071-32 071-42 071-13 071-33	KK2	KK3	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK3	KK2	KK2
090-12 090-32	KK2	KK3	KK2	KK2
100-12 100-32	KK2	KK3	KK2	KK2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



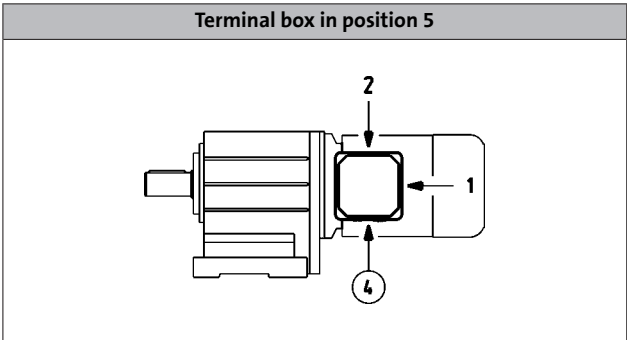
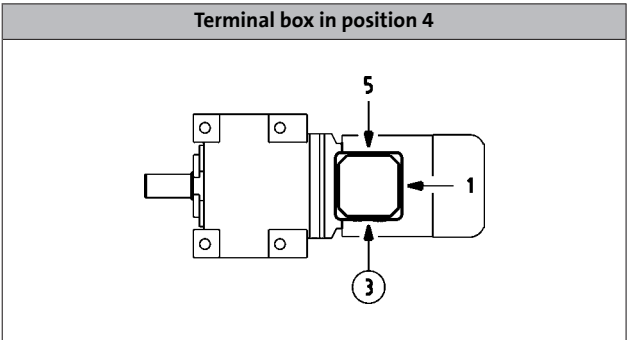
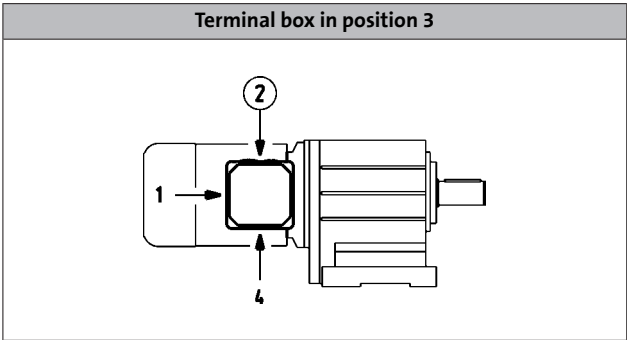
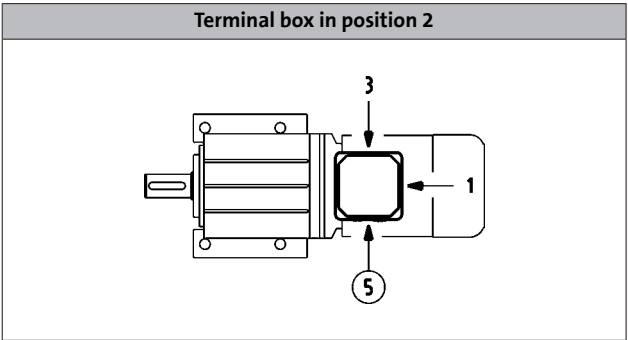
Size						
Motor						
	x	g ₁	m ₁	n ₂	P ₁	P ₂
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	21	100	75.0 93.0 ¹⁾	75.0 93.0 ¹⁾	M16x1.5 M20x1.5 ¹⁾	M20x1.5 M20x1.5
071	12 ¹⁾	117 ¹⁾				
	24	109	115	115	M20x1.5	M25x1.5
080	15 ¹⁾	126 ¹⁾				
090	14	150				
100	19	157				
112	20	166				
132	22	176				
	33	195	122	122	M32x1.5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

¹⁾ UL/CSA approval: cURus



Terminal box

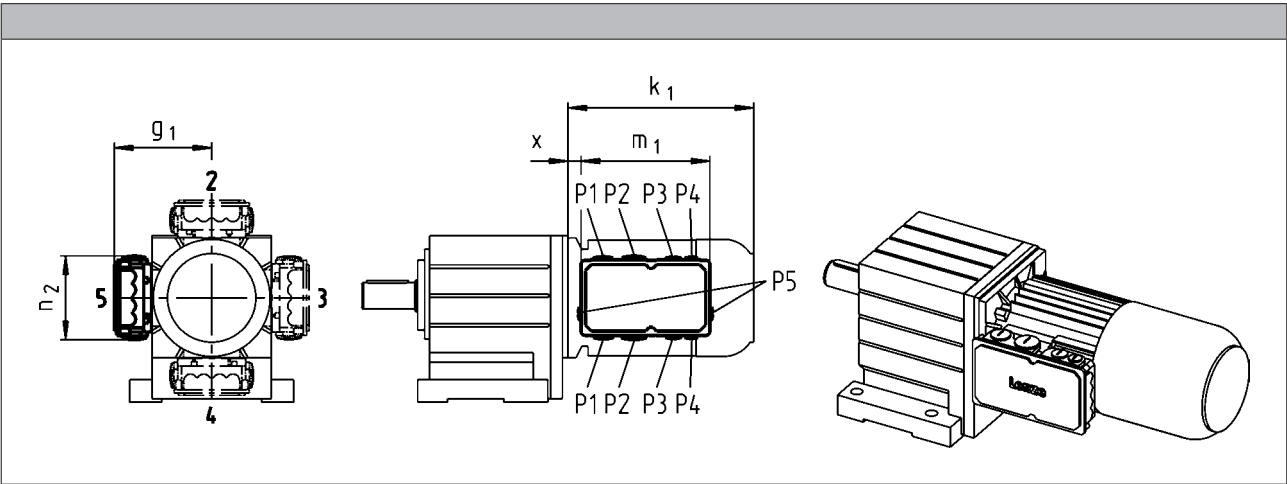
Cable entry position when using KK1





Terminal box

Dimensions of KK2

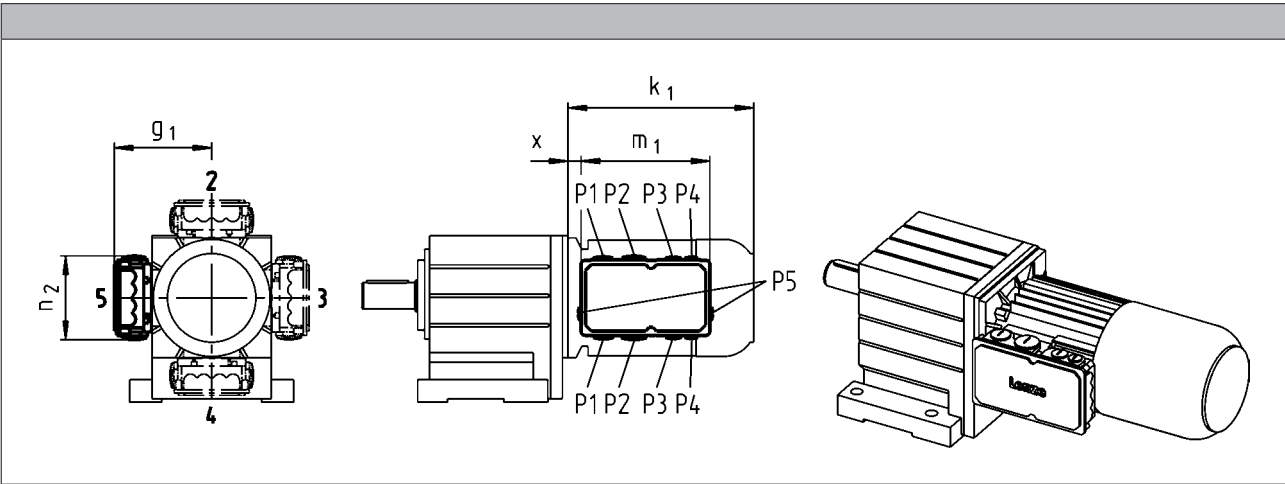


Size						
Motor						
	x	g ₁	m ₁	n ₂	P ₁	P ₂
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	M16x1.5	M20x1.5
071	15	118				
080	17	132				
090	22	137	152	121	M20x1.5	M25x1.5
100	23	147				
112	25	158				



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	226	127	M50x1.5	M16x1.5	M20x1.5	M16x1.5	
160	35	210							
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.

MH three-phase AC motors

Accessories

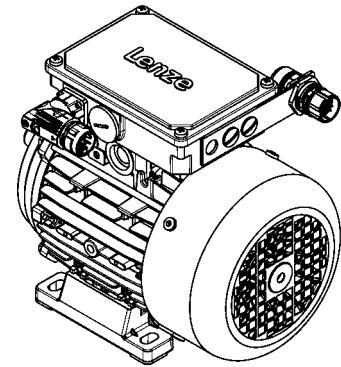


Plug connectors

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

ICN connector

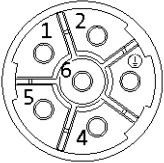
A connector is used for power, brake and temperature monitoring. The connections to the feedback system and the blower each employ a separate connector.



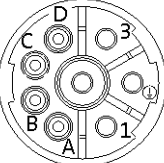
Connection for power, brake and temperature monitoring

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

► ICN 6-pole

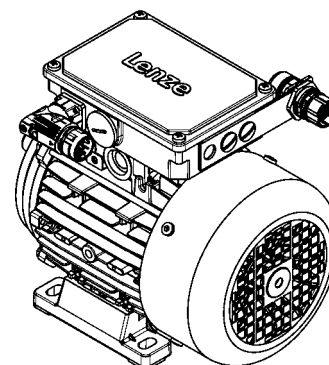
Pin assignment			
Contact	Designation	Meaning	
1	BD1 / BA1	Brake +/AC	
2	BD2 / BA2	Brake /AC	
PE	PE	PE conductor	
4	U	Phase U power	
5	V	Phase V power	
6	W	Phase W power	

► ICN 8-pole

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

ICN connector

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.



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

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	

MH three-phase AC motors

Accessories



ICN connector

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

Motor type	M□□MAXX	M□□MARS 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

MH three-phase AC motors

Accessories



ICN connector

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

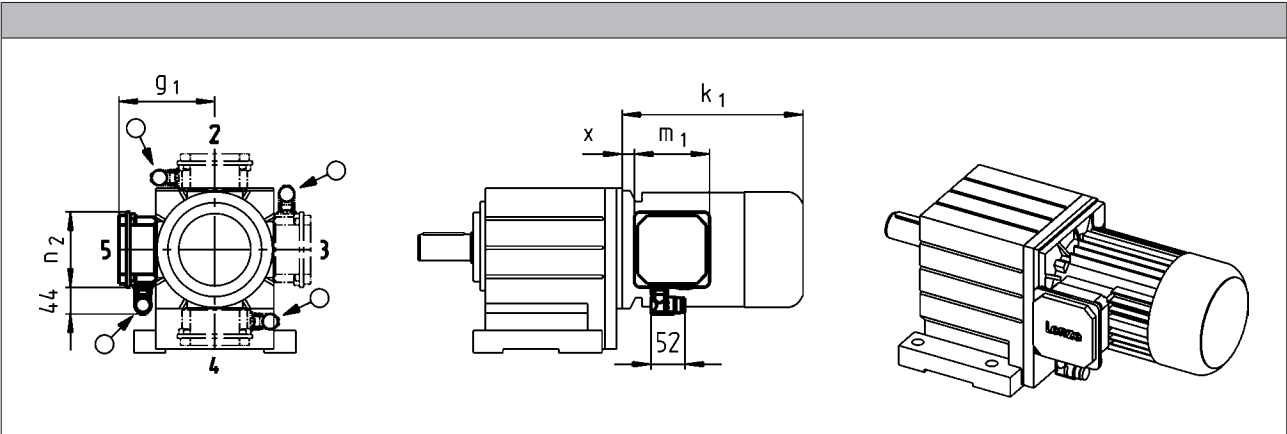
Motor type	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABZ M□□MABH	M□□MABL
Motor frame size	Terminal box with ICN connector			
063-02 063-22	KK2	KK2		
063-12 063-32 063-42	KK2	KK2		
071-32 071-42 071-13 071-33	KK2	KK2	KK2	KK2
080-13 080-32 080-33 080-42	KK2	KK2	KK2	KK2
090-12 090-32	KK2	KK2	KK2	KK2
100-12 100-32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



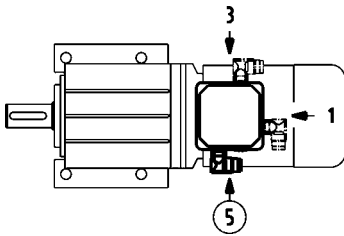
Size				
Motor				
	x	g ₁	m ₁	n ₂
	[mm]	[mm]	[mm]	[mm]
063	12	117	93.0	93.0
071	15	126		
080	14	150	115	115
090	19	157		
100	20	166		
112	22	176		
132	33	195	122	122



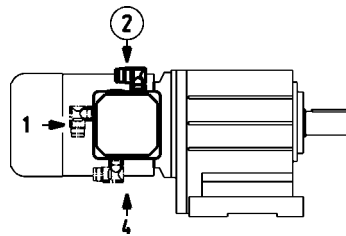
ICN connector

Connector position when using KK1

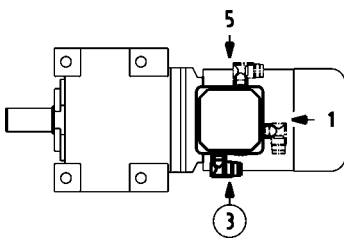
Terminal box in position 2



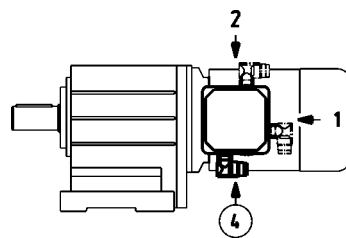
Terminal box in position 3



Terminal box in position 4



Terminal box in position 5

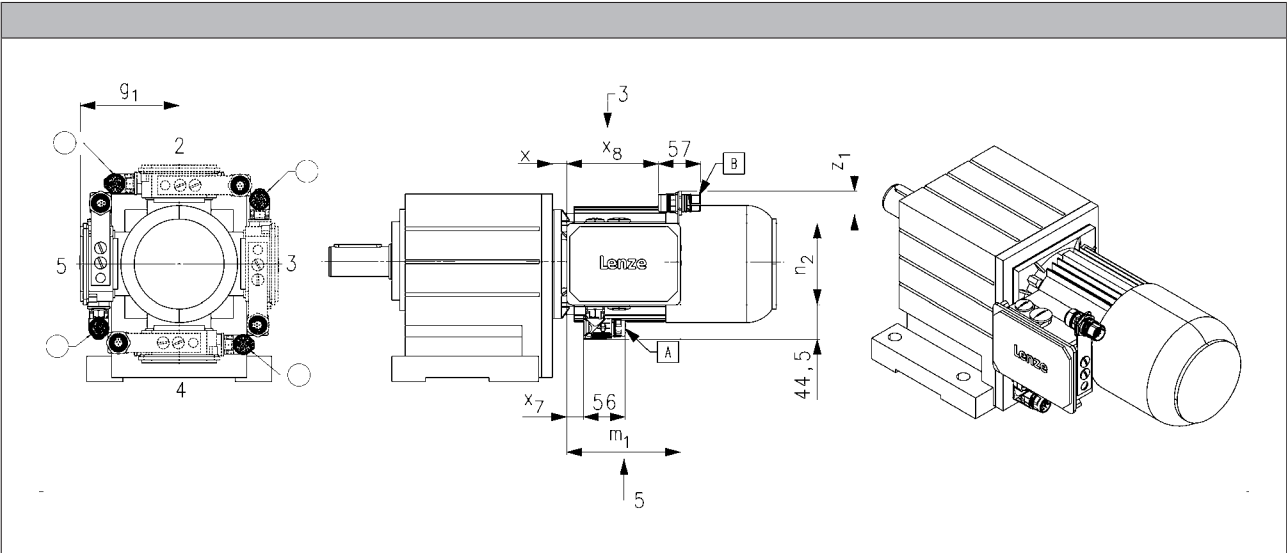




ICN connector

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.

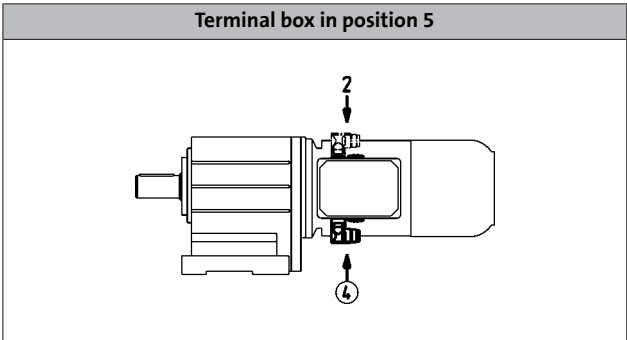
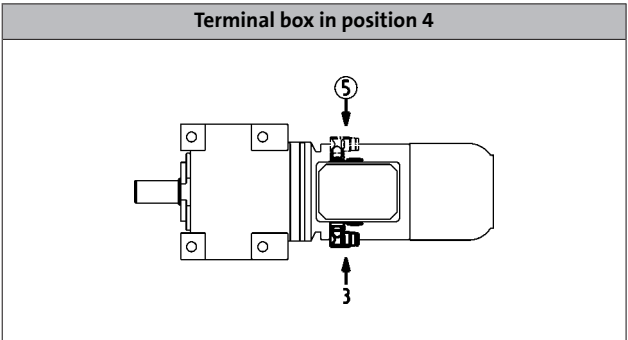
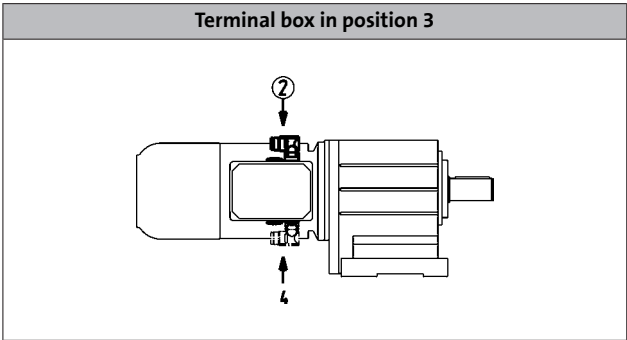
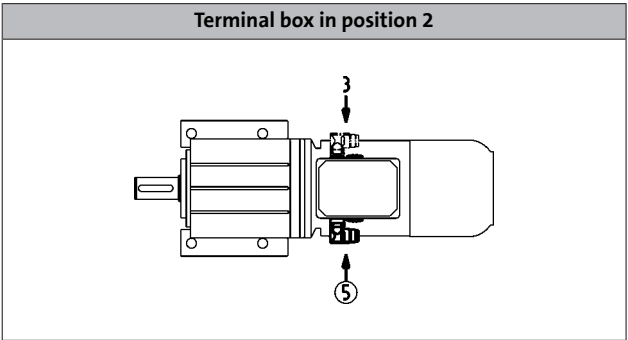


Size							
Motor							
	x	g ₁	m ₁	n ₂	x ₇	x ₈	z _{1, max}
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	13	107	136	103	16	109	43
071	15	118					
080	17	132	152	121	23	125	41
090	22	137					
100	23	147					
112	25	158	195	125	27	166	71
132	38	187					



ICN connector

Connector position when using KK2/KK3

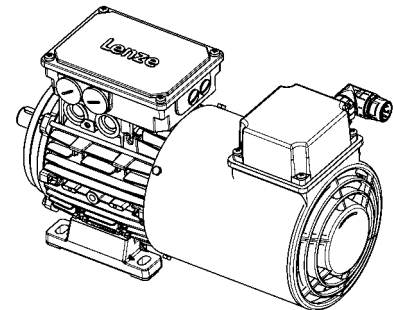




ICN connector

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			

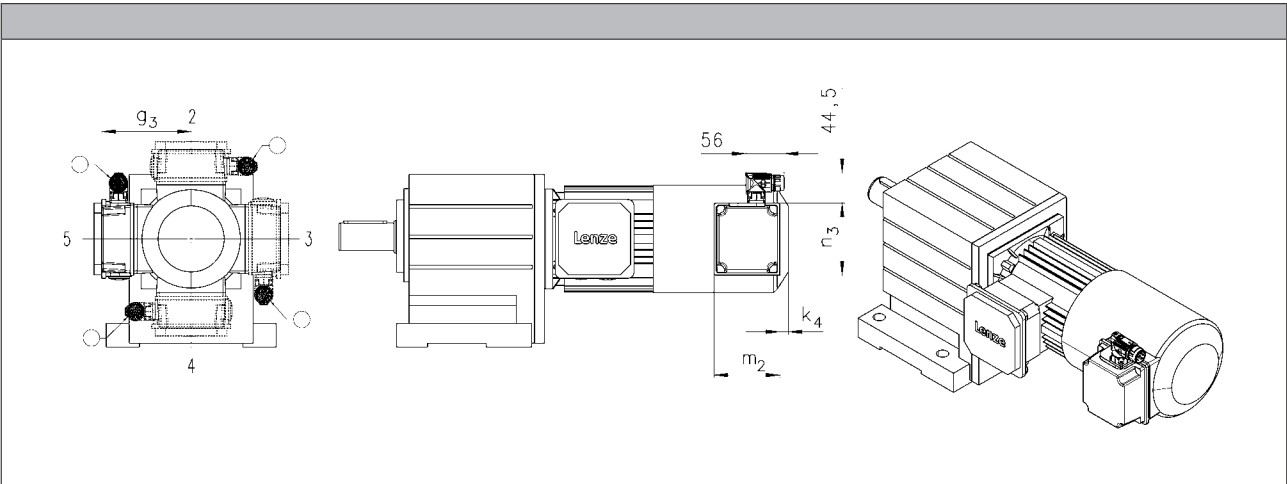
► Blower 3-ph

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		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	

MH three-phase AC motors

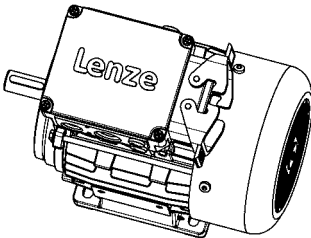
Accessories



HAN connector

10E

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



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

MH three-phase AC motors

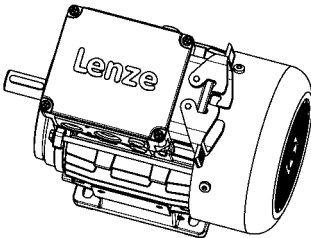
Accessories



HAN connector

Modular

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



► HAN modular 16 A

Pin assignment		
Module	Contact	Meaning
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

The diagram illustrates a 16-pin terminal block layout. It is divided into three main sections: 'a' (left), 'b' (middle), and 'c' (right). Section 'a' contains 6 pins (1-6), section 'b' contains 6 pins (1-6), and section 'c' contains 4 pins (1-4). Arrows 'a', 'b', and 'c' point to the respective sections. The diagram also shows the internal wiring connections between the sections.

► HAN modular 40 A

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

MH three-phase AC motors

Accessories



HAN connector

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

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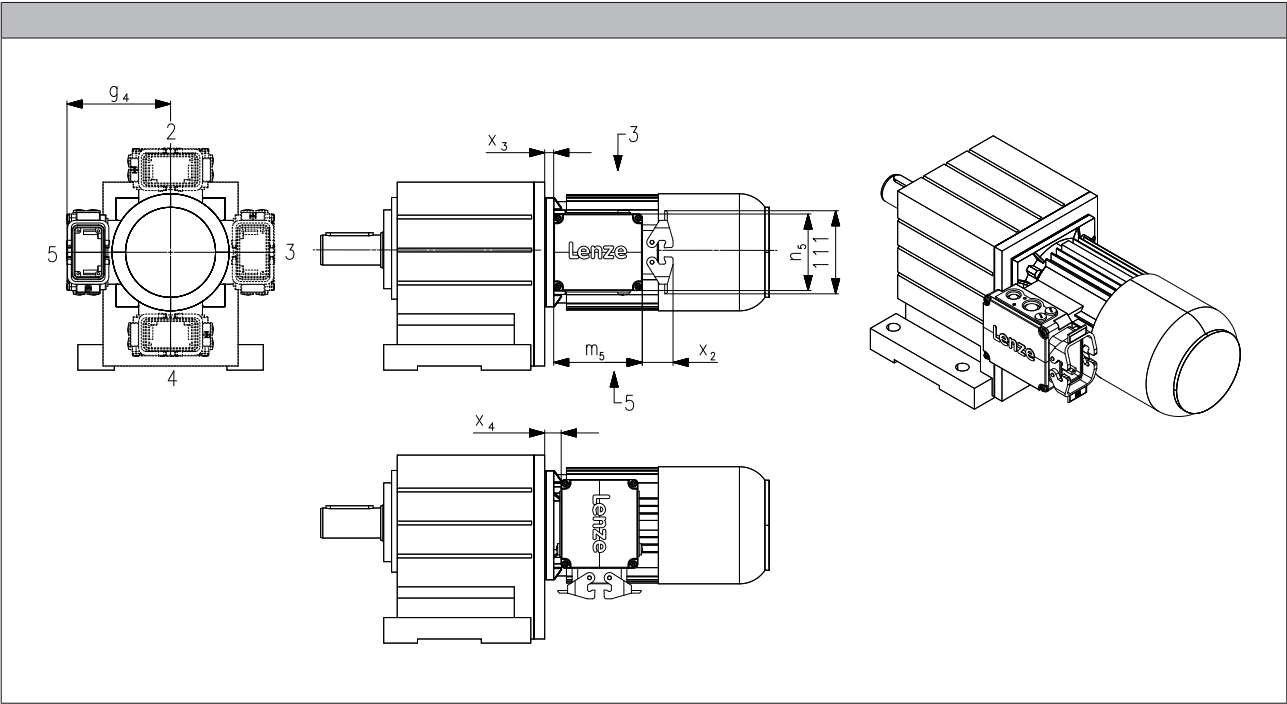
Motor frame size	Terminal box with HAN connector			
063-02 063-22	HAN-10E HAN modular			
063-12 063-32 063-42	HAN-10E HAN modular			
071-32 071-42 071-13 071-33	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
080-13 080-32 080-33 080-42	HAN-10E HAN modular	HAN-10E HAN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

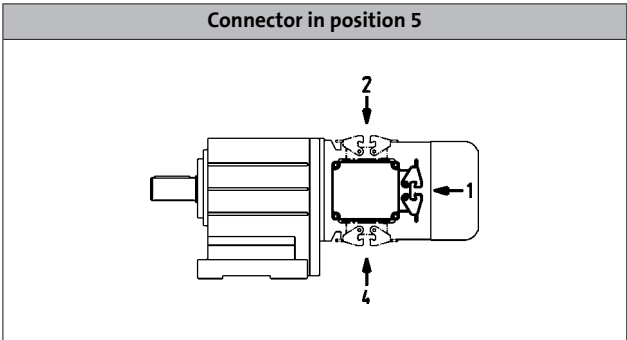
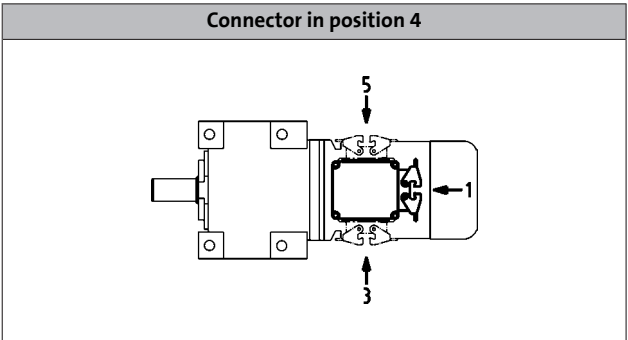
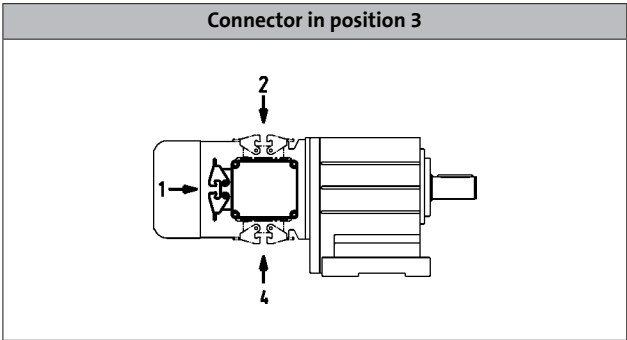
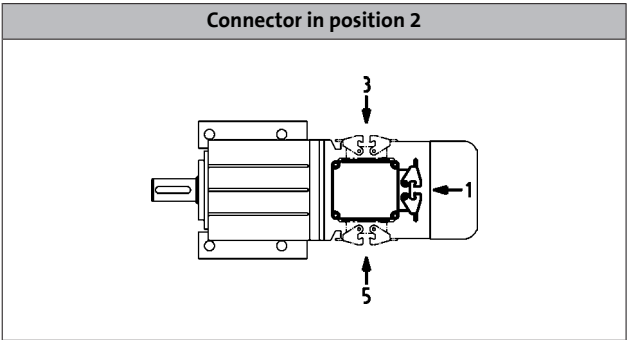


Size			
Motor			
	g ₄	x ₃	x ₄
	[mm]	[mm]	[mm]
063	120	5.00	6.00
071	129	7.00	8.00
080	138	11.0	19.0
090	143	15.0	23.0
100	154	16.0	24.0
112	164	13.5	21.5
132	233	34.5	4.50
160	248	39.0	9.00



HAN connector

Position of connector



MH three-phase AC motors

Accessories



Handwheel

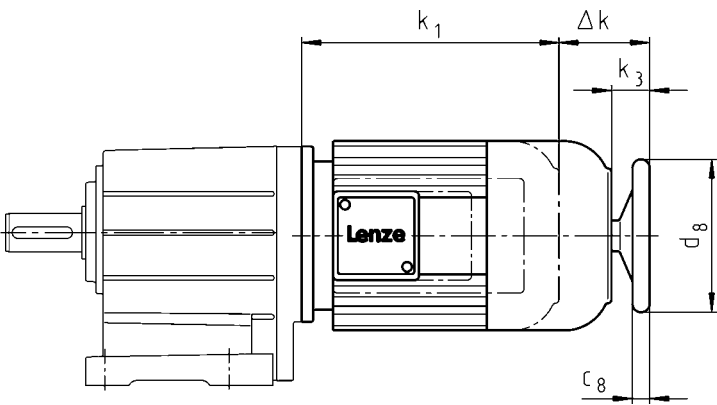
Design	Handwheel made from alloy, smooth wheel surface
Function	Manual operation: • Emergency operation • Setting-up operation for machines/systems
Note	The increased moment of inertia must be taken into account during project planning! For frequent switching operations, in particular if the direction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

Size	Moment of inertia	Mass
Motor	Additional	Additional
	J	m
	[kgcm ²]	[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	M□□MAHA M□□MABH M□□MALH
Built-on accessories	

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

Motor frame size	Moment of inertia	Mass
	Additional	Additional
	J [kgcm ²]	m [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

Technical drawing of a Lenze motor showing three views: front, side, and end view. The front view shows the motor body with the brand name "Lenze" on the terminal box. Dimensions include k_1 (total length), Δk (flange offset), k_3 (flange thickness), and d_4 (flange diameter). The side view shows the motor's profile with dimensions l_7 (total length), l_4 (terminal box length), c_4 (terminal box mounting distance), and l_8 (motor body length). The end view shows the motor's circular profile with dimensions t_2 (terminal box thickness), u_2 (terminal box mounting distance), d_5 (motor body diameter), d_4 (flange diameter), and d_7 (motor body diameter).

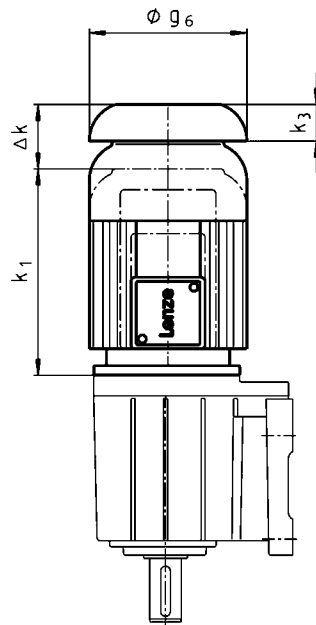
Motor frame size												
	Δk	k_3	c_4	d_4	d_4	d_5	$d_7^{(1)}$	l_4	l_7	l_8	u_2	t_2
				h_6	j_6							
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071-32 071-42 071-13 071-33	47	11.0	1.10	14.0		M5	34.0		19.0	3.00	5.00	3.00
080-32 080-42 080-13 080-33	68	9.00	1.10	14.0		M5	34.0		19.0	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

6.11 - 66



Protection cover

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



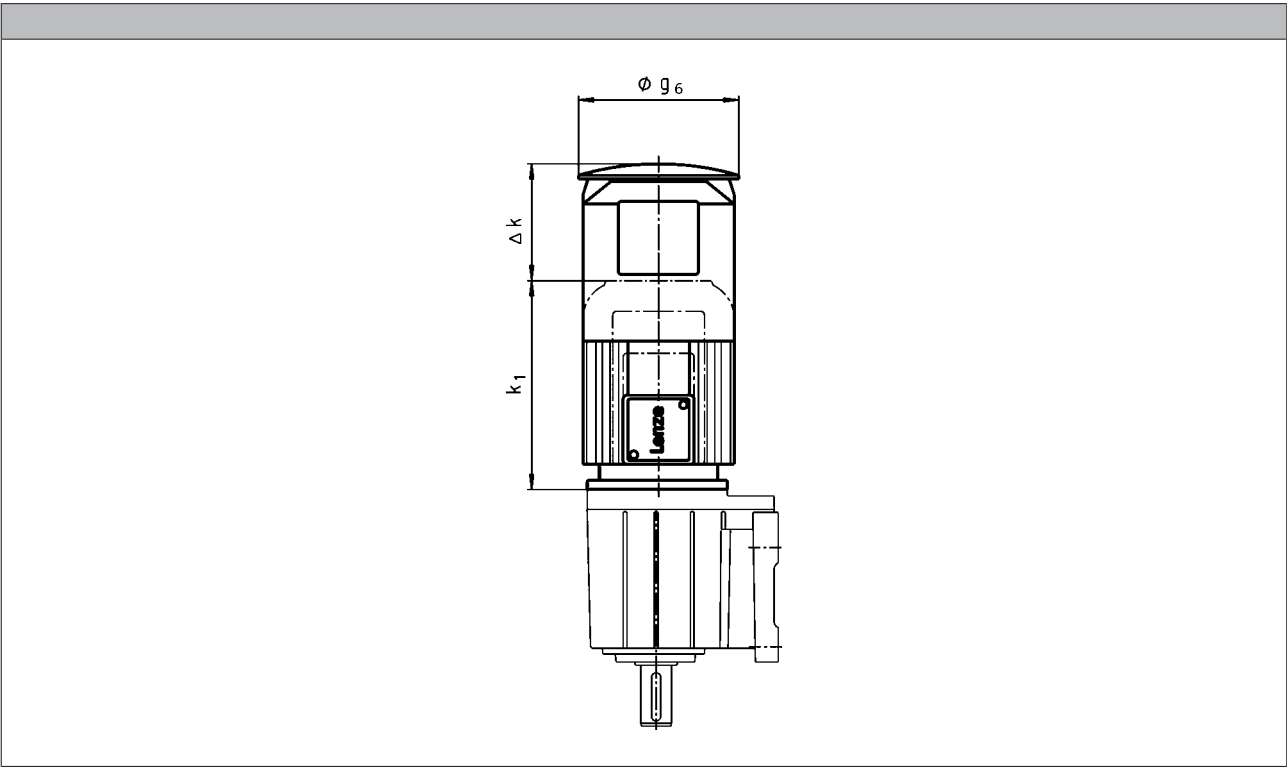
Motor type								
	M□□MAXX	M□□MABR	M□□MABS M□□MABI M□□MABA	M□□MABL	M□□MARS M□□MAIG M□□MAAG	M□□MALL		

Motor frame size								
	Δ k	Δ k	Δ k	Δ k	Δ k	Δ k	k ₃	g ₆
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063-02 063-22		97	160		97		11.0	123
063-12 063-32 063-42	26	66	129		82		11.0	123
071-32 071-42 071-13 071-33	26	78	122	78	78	26	12.0	138
080-32 080-42 080-13 080-33	26	99	137	99	127	30	16.0	156
090-12 090-32	26	94	131	94	113	26	15.0	176
100-12 100-32	31	107	132	107	112	107	17.0	194
112-22 112-32	31	121	151	121	111	31	18.0	218
132-12 132-22 132-32	31	141	156	141	134	31	20.0	257
160-22 160-32	37	142	228		120		25.0	310



Protection cover

Dimensions, forced ventilated (4/6-pole)



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

Motor frame size				
	Δ k	Δ k	Δ k	g ₆
	[mm]	[mm]	[mm]	[mm]
063-12 063-32 063-42	169	209	209	133
071-32 071-42 071-13 071-33	165	202	202	150
080-32 080-42 080-13 080-33	168	224	224	170
090-12 090-32	157	210	210	188
100-12 100-32	137	198	198	210
112-22 112-32	135	216	216	249
132-12 132-22 132-32	140	226	226	300
160-22 160-32	155	267	267	338

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