L-force catalogue

Automation systems
Drive solutions

Controls
Inverter
Motors
Gearboxes
Engineering Tools

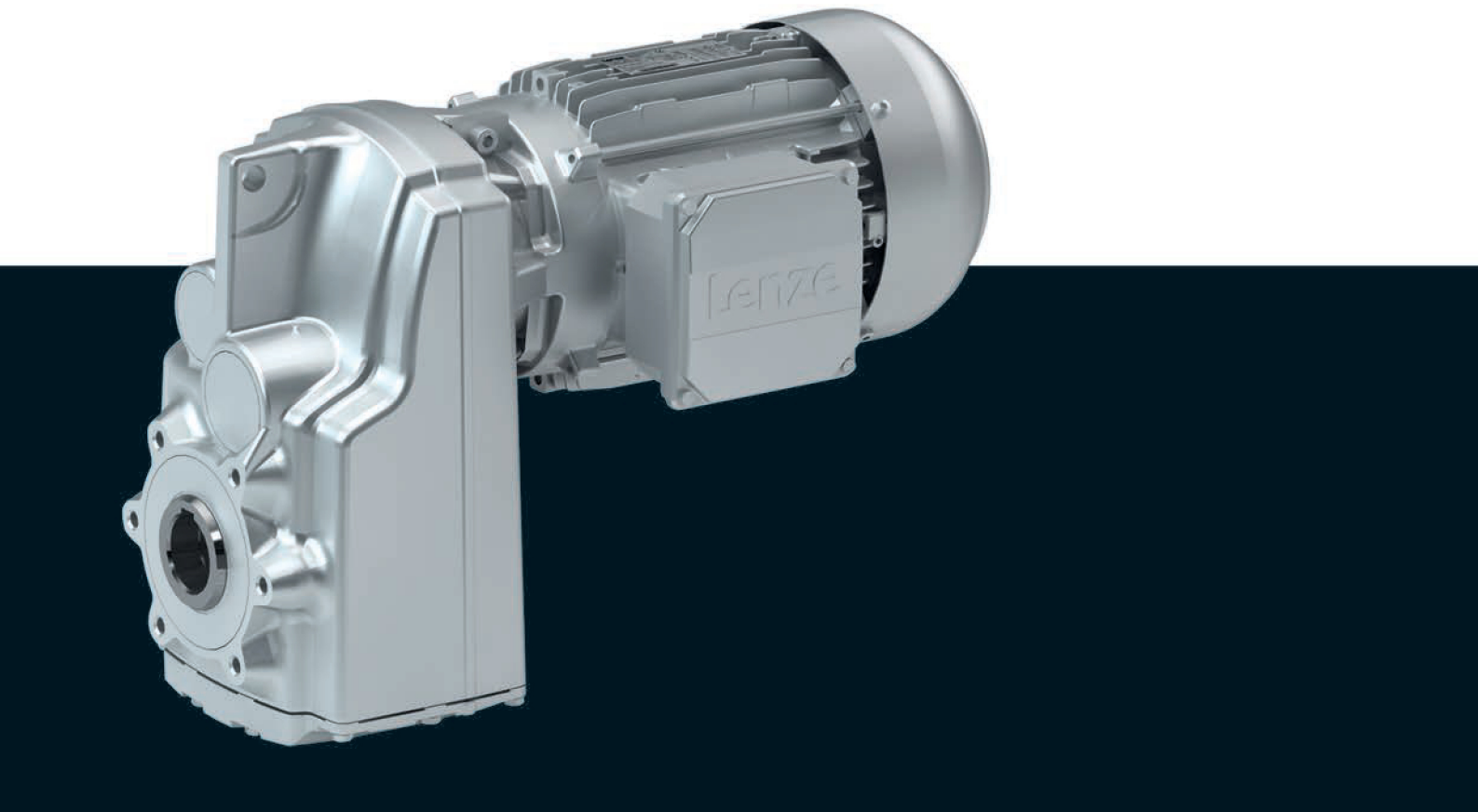
Motors: IE2 MH three-phase AC motors, IE1 MD three-phase AC motors

Gearboxes: g500-H helical gearboxes, g500-S shaft-mounted helical gearbox, g500-B bevel gearbox

Lenze
As easy as that.

g500-S shaft-mounted helical geared motors

0.12 ... 0.55 kW (efficiency class IE1)
0.75 ... 7.5 kW (efficiency class IE2)



g500-S shaft-mounted helical geared motors

Contents

List of abbreviations

α	[rad/s²]	Max. permissible angular acceleration
$\eta_{50\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{100\,\%}$	[%]	Efficiency
η_a		Efficiency
$\eta_{c=1}$		Efficiency
c		Load capacity
cos φ		Power factor
du/dt	[kV/µs]	Insulation resistance
$F_{ax,-}$	[N]	Min. axial force
$F_{ax,+}$	[N]	Max. axial force
$F_{ax,max}$	[N]	Max. axial force
$f_{in,max}$	[Hz]	Max. input frequency
f_{max}	[kHz]	Limit frequency
f_{max}	[kHz]	Max. switching frequency
f_N	[Hz]	Rated frequency
$F_{rad,max}$	[N]	Max. radial force
f_z		Additional radial force factor
H_{max}	[m]	Site altitude
I_0	[A]	Standstill current
i		Ratio
$I_{in,max}$	[A]	Max. input current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. short-time DC-bus current
I_{max}	[A]	Max. DC-bus current
I_N	[A]	Rated current
$I_{N,\Delta}$	[A]	Rated current
$I_{N,Y}$	[A]	Rated current
J	[kgcm²]	Moment of inertia
J_{MB}	[kgcm²]	Moment of inertia
$KE_{LL\,150\,°C}$	[V /(1000 r/min)]	Voltage constant
$Kt_{0\,150\,°C}$	[Nm/A]	Torque constant
L_{10}	[h]	Bearing service life
L	[mH]	Mutual inductance
$L_{1\sigma}$	[mH]	Stator leakage inductance
$L_{2\sigma}$	[mH]	Rotor leakage inductance
L_N	[mH]	Rated inductance
m	[kg]	Mass
M_2	[Nm]	Output torque
M_{22}	[Nm]	Output torque
M_0	[Nm]	Stall torque
$M_{0,max}$	[Nm]	Max. standstill torque
$M_{2,GM}$	[Nm]	Output torque
$M_{2,max}$	[Nm]	Max. output torque
$M_{2,not}$	[Nm]	Emergency off-torque

M_a	[Nm]	Starting torque
$M_{a\_,1}$	[Nm]	Starting torque
$M_{a\_,2}$	[Nm]	Starting torque
M_{av}	[Nm]	Average dynamic torque
M_b	[Nm]	Stalling torque
M_B	[Nm]	Braking torque
M_k	[Nm]	Rated torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_2	[r/min]	Output speed
n_{21}	[r/min]	Output speed
n_{22}	[r/min]	Output speed
$n_{1,max}$	[r/min]	Max. gearbox input speed
$n_{1,max\,50\%}$	[r/min]	Max. gearbox input speed
n_{eto}	[r/min]	Transition speed
n_k	[r/min]	Speed
n_{max}	[r/min]	Max. speed
n_N	[r/min]	Rated speed
P_{max}	[kW]	Max. power input
Q_{BW}	[MJ]	Friction energy
Q_E	[J]	Maximum switching energy
Q_E	[KJ]	Maximum switching energy
R_1	[Ω]	Stator impedance
R_2	[Ω]	Rotor impedance
R	[Ω]	Insulation resistance
R	[Ω]	Min. insulation resistance
$R_{UV\,150\,°C}$	[Ω]	Stator impedance
$R_{UV\,20\,°C}$	[Ω]	Stator impedance
$S_{hü}$	[1/h]	Transition operating frequency
t_1	[ms]	Engagement time
t_2	[ms]	Disengagement time
t_{11}	[ms]	Delay time
t_{12}	[ms]	Rise time
T	[°C]	Max. surface temperature
T	[°C]	Min. ambient temperature for transport
T	[°C]	Max. ambient temperature for transport
T	[°C]	Max. ambient temperature of bearing
T	[°C]	Min. ambient storage temperature
T	[°C]	Ambient temperature
T	[°C]	Operating temperature
T	[°C]	Rated temperature
t	[h]	Service life
T_{opr}		Ambient operating temperature
$T_{opr,max}$	[°C]	Max. ambient operating temperature
$T_{opr,min}$	[°C]	Min. ambient operating temperature
t_{re}	[s]	Recovery time
$t_ü$	[ms]	Overexcitation time
U_Δ	[V]	Voltage range
U_{AC}	[V]	Mains voltage range

List of abbreviations

U_{AC}	[V]	Mains voltage
$U_{in,max}$	[V]	Max. input voltage
$U_{in,min}$	[V]	Min. input voltage
U_{max}	[V]	Max. input voltage
U_{max}	[V]	Max. mains voltage
U_{min}	[V]	Min. mains voltage
$U_{N, \Delta}$	[V]	Rated voltage
$U_{N, AC}$	[V]	Rated voltage
$U_{N, DC}$	[V]	Rated voltage
$U_{N, Y}$	[V]	Rated voltage
z_g		Number of teeth
Z_{ro}	[Ω]	Rotor impedance
Z_{rs}	[Ω]	Impedance
Z_{so}	[Ω]	Stator impedance
z_t		Number of teeth

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

Product information

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

The slim shaft-mounted helical gearboxes feature high reliable radial forces, closely stepped gear reductions and a low backlash. They are available in 2-pole and 3-pole design with a torque up to 660 Nm and a ratio of up to i= 495.

Versions

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

The right three-phase AC motor for the application

In a power range from 0.06 to 45 kW, Lenze offers an easy-to-scale modular system of robust three-phase AC motors. This modular system comprises three-phase AC motors for the common efficiency classes as well as the m300 Lenze Smart motor.

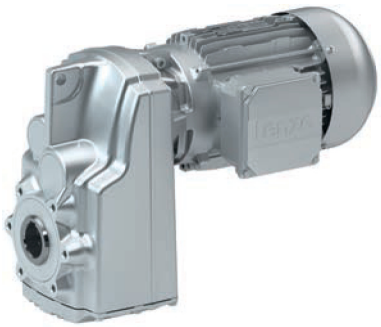
- IE1 motors up to a power of 0.55 kW
- IE2 motors from 0.75 to 45 kW
- IE3 motors from 7.5 kW to 45 kW,

and for optimum operation in the field of materials handling technology, the Lenze Smart Motor for 1.5 and 5 Nm, thus providing the optimum drives for mains operation.

The IE1, IE2 and IE3 motors are designed for operation on an inverter. The same modular system additionally provides an inverter-optimised motor in the power range up to 22 kW for a setting range of 1:24. A scaled modular system offering the optimum solution for each application and which, as decentralised drive solution, in the power range up to 7.5 kW can be equipped with the integrated 8400 motec inverter.

The product name

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



g500-S shaft-mounted helical gearbox with three-phase AC motor

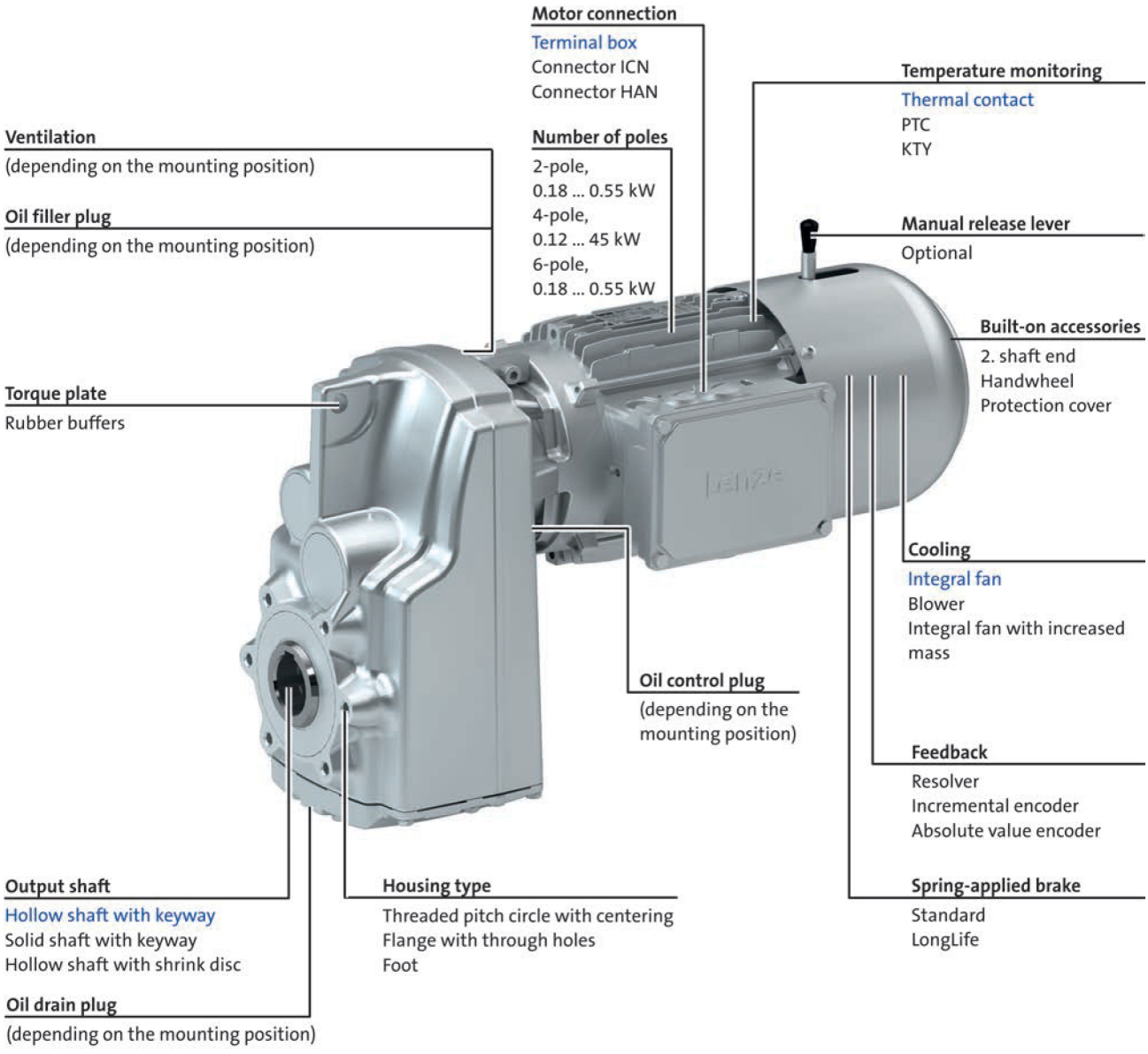
g500-S shaft-mounted helical gearbox with three-phase AC motor and motec

g500-S shaft-mounted helical gearbox with servo motor

Equipment

Overview

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



Standard design

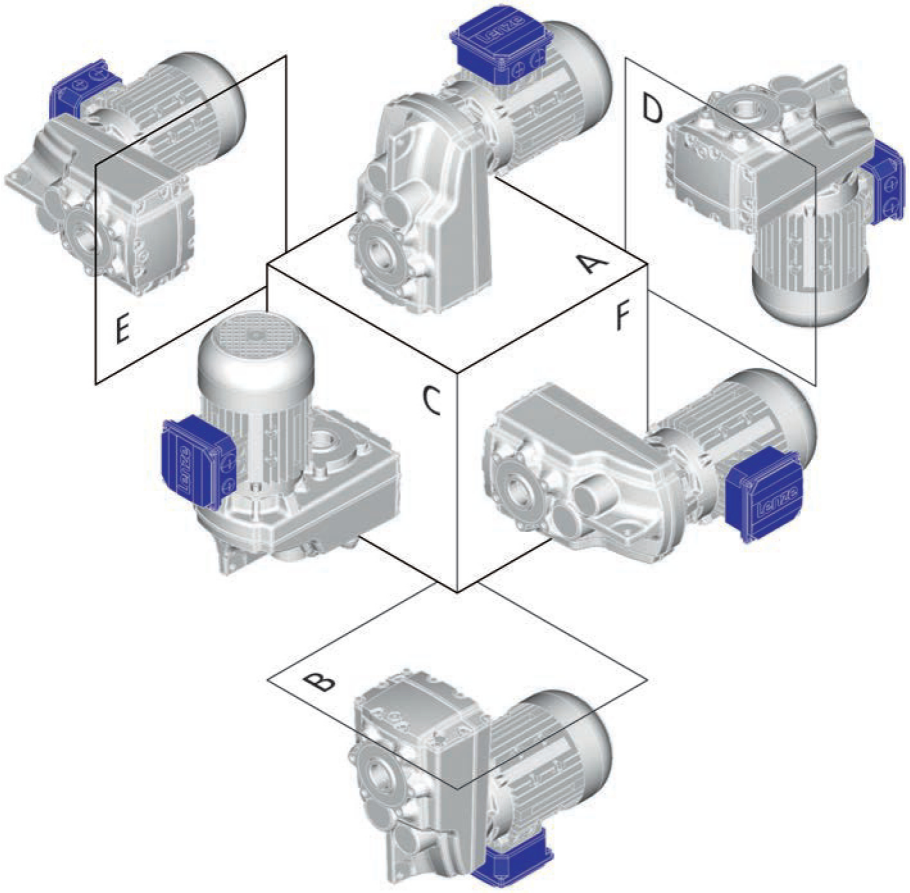
6.4

Equipment

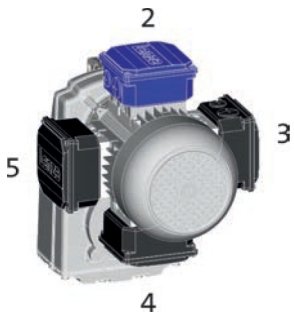
Mounting position, position of system components

- In the following graphics, the terminal box in position 2 is colour-coded.
  If the mounting position (A ... F) changes, the terminal box positions 2 ... 5 are rotated accordingly.
- To reduce the number of different versions, the gearboxes can also be ordered with combined mounting positions:
  - g500-S130 ... S660 in mounting position AEF

Mounting positions A ... F



Terminal box positions 2 ... 5

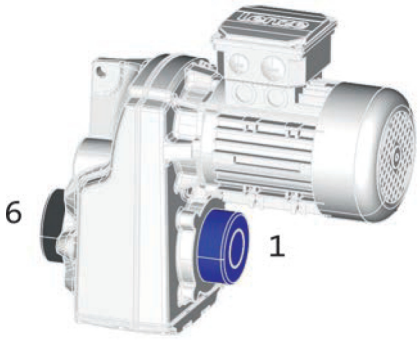


Cable entry positions 1 ... 5

- For details regarding the cable entry see motor chapter/product extensions.

Equipment

Mounting position, position of system components

Shrink disc position 1 or 6


► Solid shaft and flange are only possible in position 6.

The geared motor kit

Product				
Gearbox	g500-S130	g500-S220	g500-S400	g500-S660
Motor assignment min.	063	063	063	063
Motor assignment max.	090	100	112	132
Technical data				
Output torque max.	130 Nm	220 Nm	400 Nm	660 Nm
Drive power min.	0.12 kW	0.12 kW	0.12 kW	0.12 kW
Drive power max.	1.5 kW	3.0 kW	4 kW	7.5 kW
Dimensions [mm]				
Solid shaft with featherkey	25 x 50	25 x 50	30 x 60	35 x 70 40 x 80
Hollow shaft with keyway	25	25/30	30/35	40/45
Hollow shaft with shrink disc	25	25/30	35	40
Output flange	160	160	200	200/250

► Values printed in bold are standard versions.
Values not printed in bold are possible extensions, some for an additional charge.

Design	
Conformity	**CE** EAC
Approval	**Without** CCC/CSA/cURus
Degree of protection	**IP55** IP65/IP66
Surface and corrosion protection	**Without** Different types of OKS
Colour	**Not coated** Primed/RAL colours
Hollow shaft	**With keyway**
Hollow shaft with shrink disc	Without keyway
Solid shaft	With keyway
Shaft material	**Steel**
Shaft sealing ring material	**NBR** FKM or FPM (Viton)
Shaft bearings	**Normal**
Paste for shaft mounting	**Without** Enclosed
Gearbox type	**Housing (□DR)** With foot (VBR) With centering (□CR) With output flange (□CK)
Lubricant	**Mineral oil** Synthetic oil Food-compatible oil

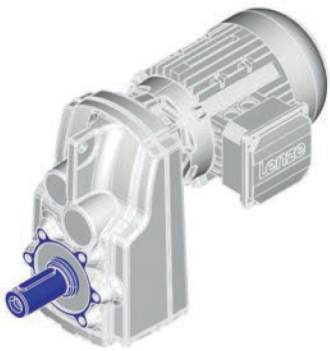
Design	
Mounting position	**A/B/C/D/E/F** Combined
Backlash	**Normal**
Power connection	**Terminal box** Plug connectors
Spring-applied brake	**Without** Brake design: Standard/Longlife Brake version: Standard/Overexcited/Cold Brake
Feedback	**Without** Resolver Absolute value encoder Incremental encoder
Cooling	**Integral fan** Blower Grey iron fan (increased centrifugal mass)
Temperature monitoring	**TKO thermal contact** PTC thermistor KTY thermal detector
Built-on accessories fan side	**Without** Protection cover 2nd shaft end/handwheel

The gearbox kit

Gearbox details

Solid shaft

Without centring (VDR)



With centering (VCR)

Flange with through holes (VCK)

Hollow shaft

Without centring (HDR)

With centering (HCR)

Flange with through holes (HCK)

The gearbox kit

Gearbox details

Hollow shaft with shrink disc

Without centring (SDR)

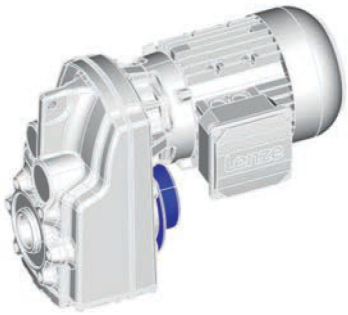
With centering (SCR)

Flange with through holes (SCK)

Accessories

Foot mounting (VBR)

With rubber buffer



Shrink disc cover

General information about the data provided in this catalogue

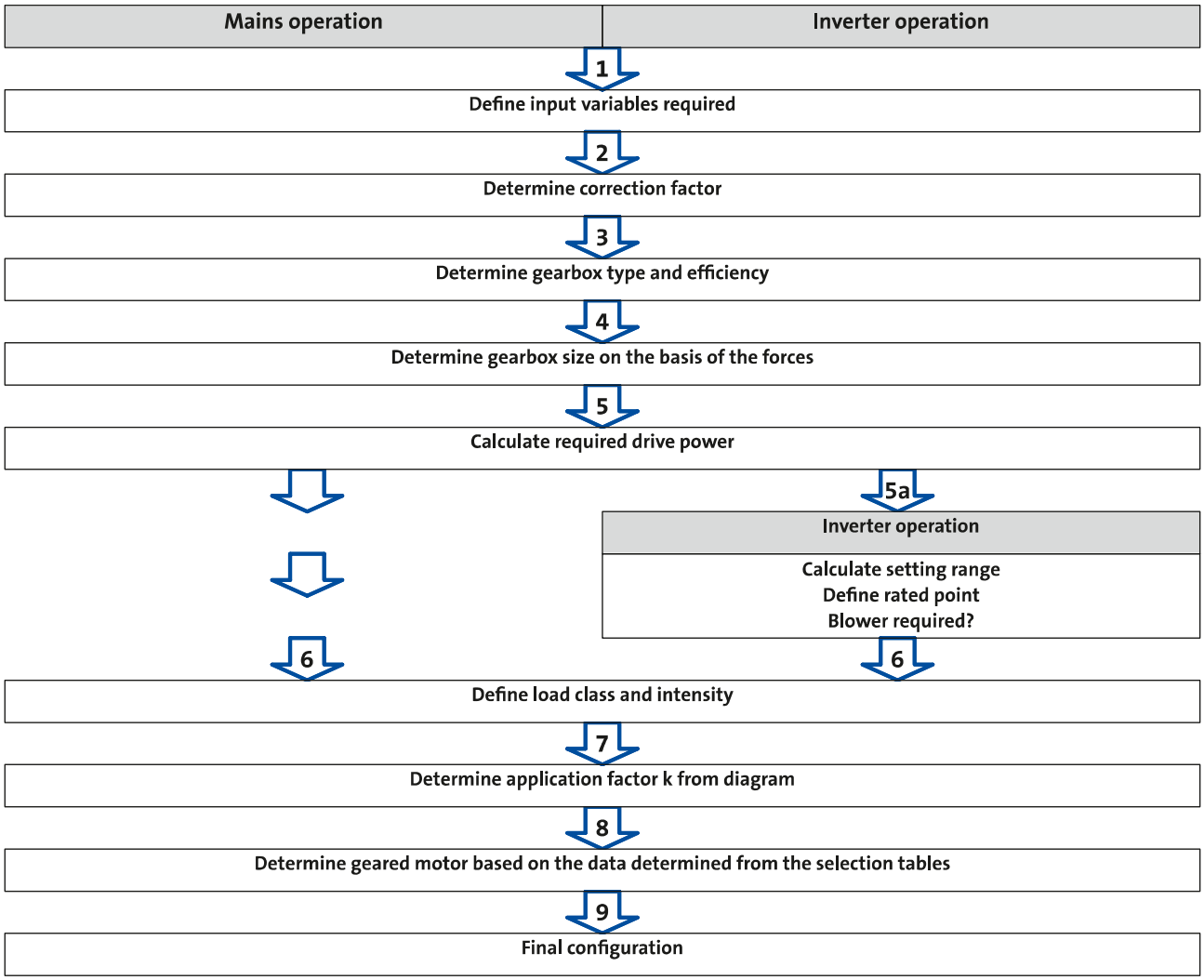
The powers, torques and speeds specified in this catalogue are rounded values and are valid under the following conditions:

- Operating time/day = 8 h (100% OT)
- Duty class I for up to 10 switching operations/h
- Mounting positions and designs in this catalogue
- Standard lubricant
- T_{amb} = 20 °C for gearboxes,
  T_{amb} = 40 °C for motors (in accordance with EN 60034)
- Site altitude < = 1000 m amsl
- The selection tables provide the permissible mechanical powers and torques. For notes on the thermal power limit, see chapter drive dimensioning.
- The rated power specified for motors and geared motors applies to operating mode S1 (in accordance with EN 60034).

Under different operating conditions, the values obtained may vary from those listed here.
In the case of extreme operating conditions, please consult your Lenze sales office.

Procedure of a configuration process

Workflow



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.

Procedure of a configuration process

1 required input variables

Load torque		$M_{L,max}$=	[Nm]
	In inverter operation	$M_{L,min}$=	[Nm]
Load speed		$n_{L,max}$=	[r/min]
	In inverter operation	$n_{L,min}$=	[r/min]
External moments of inertia		J_{ext}=	[kgcm^2]
Operating time / day		BD =	[h]
Switching operations per h		S_h=	[1/h]
Runtime for $M_{L,max}$	In inverter operation		[%]

2 determine correction factor

Operating modes and operating time						
S1	ED	[%]	100			
	k_L =		1.0			
S2	ED	[%]	10	30	60	90
	k_L =		1.4 - 1.5	1.15 - 1.2	1.07 - 1.1	1.0 - 1.05
S3	ED	[%]	15	25	40	60
	k_L =		1.4 - 1.5	1.3 - 1.4	1.15 - 1.2	1.05 - 1.1
S6	ED	[%]	15	25	40	60
	k_L =		1.5 - 1.6	1.4 - 1.5	1.3 - 1.4	1.15 - 1.2
Site altitude						
	H	[m]	≤ 1000	≤ 2000	≤ 3000	≤ 4000
	k_H =		1	0.95	0.9	0.8
Ambient temperature						
	T_U =	[°C]	≤ 40	≤ 45	≤ 50	≤ 55
	k_{TU} =		1	0.95	0.9	0.8

23 - Operating modes

Procedure of a configuration process

3 determine gearbox type and efficiency

Gearbox type			Axial gearboxes		Right-angle gearboxes
			Helical gearbox	Shaft-mounted	Bevel gearbox
Product			g500-H	g500-S	g500-B
Gearbox efficiency	2-stage gearboxes	η_G	0.96	0.96	0.96
	3-stage gearboxes	η_G	0.95	0.95	0.95

4 determine gearbox size based on the forces on the output

Transmission element		Gear wheels	Sprockets	Toothed belt pulleys (depending on the initial stress)	Narrow V-belt (depending on the initial stress)
Additional radial force factor	f_z =	≥ 17 teeth = 1.0 < 17 teeth = 1.15	≥ 20 teeth = 1.0 < 20 teeth = 1.25 < 13 teeth = 1.4	With belt tightener = 2.0 - 2.5 Without belt tightener = 2.5 - 3.0	1.5 - 2.0
		Calculation		**Check**	
Radial force	[N]	$F_{rad} = 2000 \times \frac{M_{L,max} \times f_z}{dw}$		$F_{rad} \le f_w \times F_{rad,max}$	
Axial force	[N]			$F_{ax} \le F_{rad,max} \times 0.5$	

44 - Permissible radial and axial forces at output

5 calculate drive power

		Calculation	
Drive power required	[kW]	$P_1 = \frac{M_{L,max} \times n_{L,max}}{9549 \times k_L \times k_H \times k_{Tu} \times \eta_g}$	

6.4

Procedure of a configuration process - mains operation

6 calculate intensity and determine duty class

Load class	Load type	Intensity
I	Smooth operation, small or light jolts	$F_I \leq 1.25$
II	Uneven operation, average jolts	$1.25 < F_I \leq 4$
III	Uneven operation, severe jolts and/or alternating load	$F_I > 4$

	Calculation	
Intensity	$F_I = \frac{\frac{J_L}{i^2} + J_M + J_B + J_Z}{J_M + J_B + J_Z}$	

i= gearbox ratio
J_L= moment of inertia of the load
J_M= moment of inertia of the motor
J_B= moment of inertia of the brake
J_Z= additional moment of inertia (handwheel, 2nd shaft end ...)

7 determine application factor k from diagram

27 - Load capacity and application factor

Procedure of a configuration process - mains operation

8 determine geared motor based on the data determined from the selection tables

Selection table		Check
Drive power P_N	[kW]	$P_1 \leq P_N$
Output speed n_2	[r/min]	$n_{L,max} \approx n_2$
Output torque M_2	[Nm]	$M_{L,max} \leq M_2$
Load factor c		$k \leq c$
Order information		**Example**
Number of stages		2
Ratio i		3.267
Product gearbox		g500-H140
Product motor		MDxMAxx090-32

27 - Load capacity and application factor

Example: structure of a selection table

50 Hz: P_N = 1.5 kW
87 Hz: P_N = 2.7 kW ← Rated power P_N

2-stage gearboxes ← Number of the gear stage

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
432	32	2.6	44	23	184	32	432	32	2.6	771	32	2.1	3.267	-H140	090-32	82
420	33	1.9	43	24	179	33	420	33	1.9	751	33	1.6	3.354	-H100	090-32	79

Output speed n_2 ↑ Output torque M_2 ↑ Load capacity c ↑ Ratio i ↑ Product Gearbox ↑ Product Motor ↑

Procedure of a configuration process - inverter operation

5a calculate range of adjustment and determine rated point

		Calculation	
Setting range		$V = \frac{n_{L,max}}{n_{L,min}}$	
Setting range	Motor with integral fan	≤ 2.5 (20 ... 50 Hz)	≤ 4.35 (20 ... 87 Hz)
	Motor with blower	≤ 10 (5 ... 50 Hz)	≤ 17.4 (5 ... 87 Hz)
Rated point at		50 Hz	87 Hz

6 calculate intensity and determine duty class

	Calculation		
Intensity	$M_I = \frac{M_{L,max}}{M_{L,min}}$	**For alternating load, select load class III!**	
Load class	Load type		Intensity
I	Smooth operation, small or light jolts		$M_I \leq 1.5$
II	Uneven operation, average jolts		$1.5 < M_I \leq 2$
III	Uneven operation, severe jolts and/or alternating load		$2 < M_I \leq 2.5$

24 - Duty classes

7 determine application factor k from diagram

27 - Load capacity and application factor

Procedure of a configuration process - inverter operation

8 determine geared motor based on the data determined from the selection tables

Selection table			Check	
Drive power P_N		[kW]	$P_1 \leq P_N$	
Max. output speed n_2		[r/min]	$n_{L,max} \approx n_2$	
Min. output speed n_{21}	Self-ventilated	[r/min]	$n_{L,min} \approx n_{21}$	Setting range 2.5 (50 Hz) Setting range ≤ 4.35 (87 Hz)
Min. output speed n_{22}	Forced-ventilated	[r/min]	$n_{L,min} \approx n_{22}$	Setting range ≤ 10 (50 Hz) Setting range ≤ 17.4 (87 Hz)
	Self-ventilated (Reduced output torque)	[r/min]	$n_{L,min} \approx n_{22}$	
Output torque M_2		[Nm]	$M_{L,max} \leq M_2$	
Load factor c			k ≤ c	

Order information	Example
Number of stages	2
Ratio i	3.267
Product gearbox	g500-H140
Product motor	MDxMAxx090-32

27 - Load capacity and application factor

30 - Torque derating at low motor frequencies

Example: structure of a selection table

50 Hz: P_N = 1.5 kW
87 Hz: P_N = 2.7 kW ← Rated power P_N

2-stage gearboxes ← Number of the gear stage

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
432	32	2.6	44	23	184	32	432	32	2.6	771	32	2.1	3.267	-H140	090-32	82
420	33	1.9	43	24	179	33	420	33	1.9	751	33	1.6	3.354	-H100	090-32	79

Min. Output speed n_{22}
Min. Output torque M_2
Min. Output speed n_{21}
Max. Output speed n_2
Max. Output torque M_2
Load capacity c
Ratio i
Product Gearbox
Product Motor

Procedure of a configuration process

9 Final configuration

More information regarding the final configuration can be found under: **- The modular geared motor system** **- Product extensions for gearboxes, motors**	
Check operating conditions	- Operating temperature (observe lubricant, material of shaft sealing ring) - Degree of protection - Supply voltage - Surface protection required - Approvals - Conformity
Check and define connection dimensions	- Driven shaft - Foot, output flange, centering with threaded pitch circle
Determine mounting position and position of the system blocks	- Mounting position A/B/C/D/E/F or combined - Terminal box position, shaft position, flange position
Select product extensions at the gearbox (differing depending on the gearbox type)	- Torque plate at the base, threaded pitch circle, rubber buffer - Hollow shaft cover, shrink disc cover
Select product extensions at the motor	- Connection type (terminal box, connector) - Brake - Blower (inverter operation) - Feedback - Temperature monitoring - Protection cover (for vertical operation) - Handwheel (for manual set-up) - 2. shaft end

Standards

Approvals

CCC	China Compulsory Certification documents the compliance with the legal product safety requirements of the PR of China - GB standards.
cCSAus	CSA certificate, tested according to US and Canada standards
CE	Communauté Européenne documents the declaration of the manufacturer that EC Directives are complied with.
CEL	China Energy Label documents the compliance with the legal energy efficiency requirements for motors, tested according to PR of China standards
CSA	Canadian Standards Association CSA - certificate, tested according to Canada standards
CSAULE	Energy Verified Certificate Determining the energy efficiency according to CSA C390 for products within the scope of energy efficiency requirements in the USA and Canada
cULus	UL certificate for products, tested according to US and Canada standards
cURus	UL certificate for components, tested according to US and Canada standards
EAC	Certificate of Russia-Belarus-Kazakhstan Customs Union documents the declaration of the manufacturer that the specifications for the Eurasian conformity (EAC) required for placing electronic and electromechanical products on the market of the entire territory of the Customs Union (Russia, Belarus, Kazakhstan) are complied with.
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product UL certificate for components, tested according to US standards

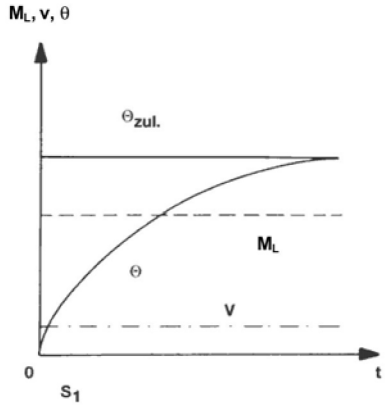
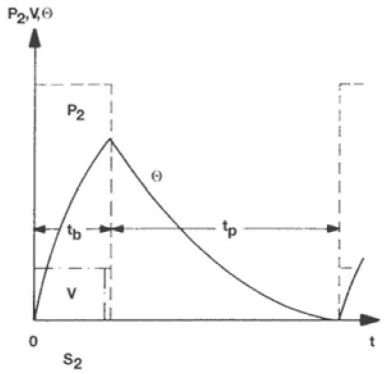
Standards

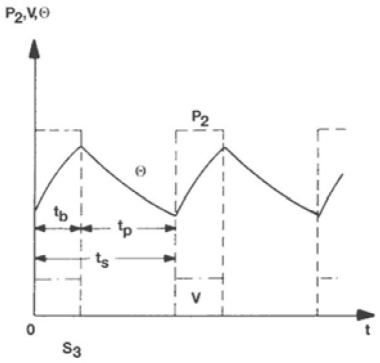
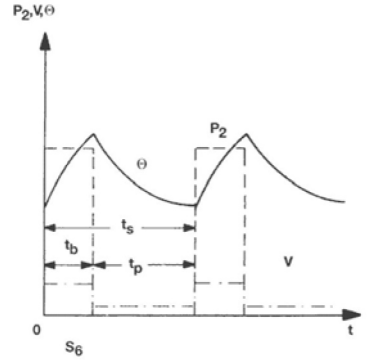
Operating modes

Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature limit. This behaviour is referred to as overload capacity.
Depending on the duration of the load and the resulting temperature rise, the required motor can be selected reduced by the overload capacity.

The most important operating modes

Continuous operation S1	Short-time operation S2
	
Operation with a constant load until the motor reaches the thermal steady state. The motor may be actuated continuously with its rated power.	Operation with constant load; however, the motor does not reach the thermal steady state. During the following standstill, the motor winding cools down to the ambient temperature again. The increase in power depends on the load duration.

Intermittent operation S3	Non-intermittent periodic operation S6
	
Sequence of identical duty cycles comprising operation with a constant load and subsequent standstill. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/downtime ratio.	Sequence of identical duty cycles comprising operation with a constant load and subsequent no-load operation. The motor cools down during the no-load phase. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/idle time ratio.

Standards

Duty classes

Depending on the load type, the duty classes or impacts are divided as follows:

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

In order to support you in classifying your driven machine regarding the right duty class, the following shows sample applications with the corresponding duty class. Depending on, for instance, the operating frequency, driven machines can also have a higher impact.
In case of uncertainties, please contact your Lenze sales office.

Drive	Duty class
Construction machines	II
Chemical industry	II
Conveyors	II
Fans	II
Plastics industry	II
Wood working	III
Hoists	III
Metal working	III
Food	II
Paper industry	III
Stones	III
Textile industry	II

Standards

Degrees of protection

The degree of protection indicates the suitability of a motor for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The degrees of protectionare classified by EN 60529.

The first code number after the code letters IP indicates the protection against the ingress of foreign particles and dust.
The second code number refers to the protection against the ingress of humidity.

Code number 1	Degree of protection	Code number 2	Degree of protection
0	No protection	0	No protection
1	Protection against the ingress of foreign particles d > 50 mm. No protection in the case of deliberate access	1	Protection against vertically dripping water (dripping water).
2	Protection against medium-sized foreign particles, d > 12 mm, keeping away fingers or similar	2	Protection against diagonally falling water (dripping water), 15 ° compared to normal service position.
3	Protection against small foreign particles d > 2.5 mm. Keeping away tools, wires and the like	3	Protection against spraying water, up to 60 ° to the vertical
4	Protection against granular foreign particles, d > 1 mm, keeping away tools, wires and the like	4	Protection against spraying water from all directions.
5	Protection against dust deposits (dust-protected), complete protection against contact.	5	Protection against water jets from all directions.
6	Protection against the ingress of dust (dust-proof), complete protection against contact.	6	Protection against choppy seas or heavy water jets (flood protection).

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

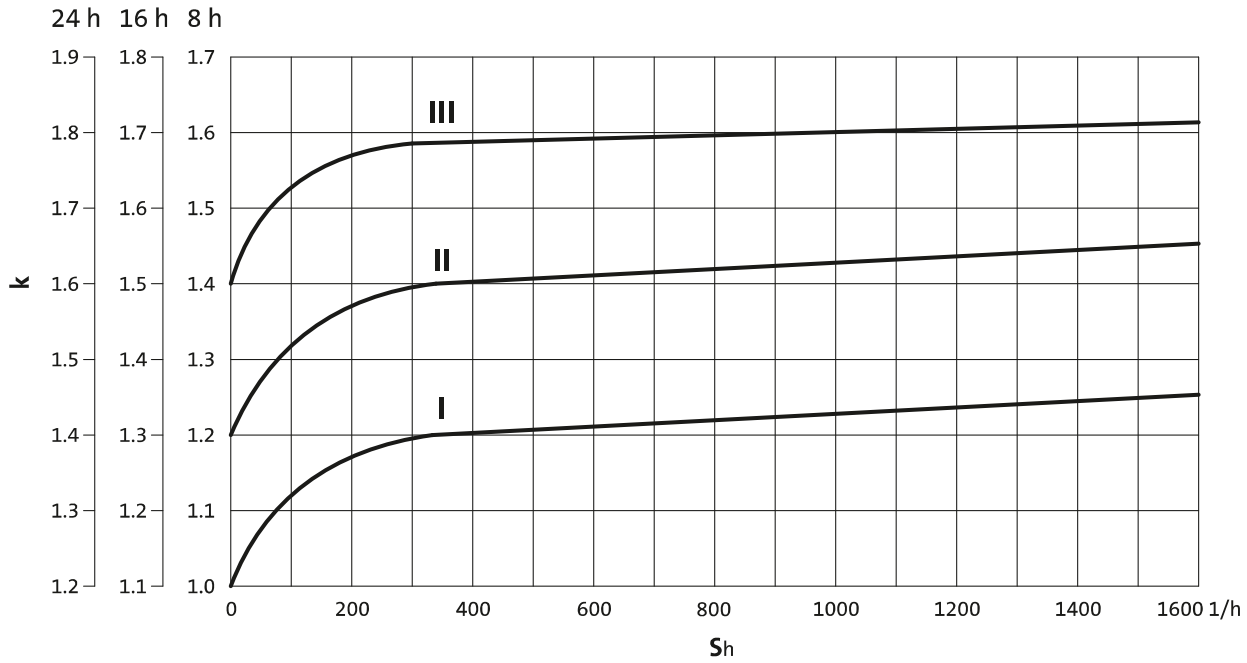
Load capacity and application factor

Load capacity c of gearboxes
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.

Required: c ≥ k

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

Application factor k



► S_h= switchings/h

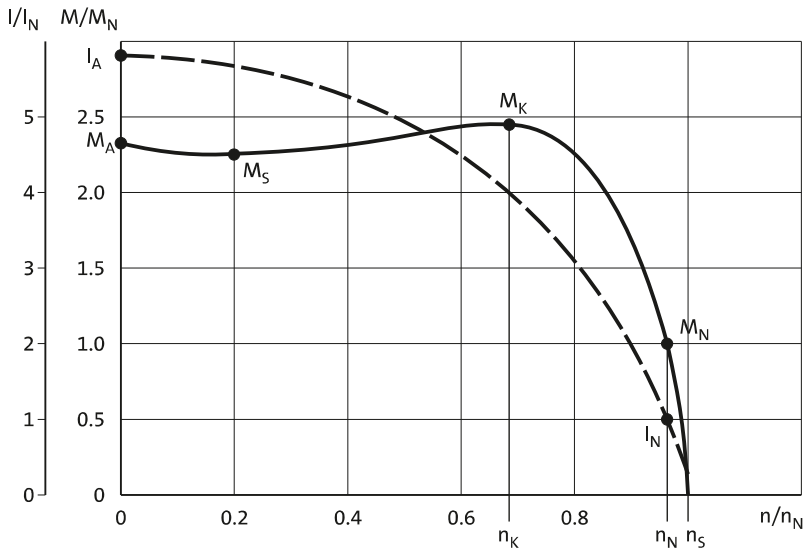
Operational performance of three-phase AC geared motors

The g500 geared motors can be actuated directly on the mains or via an inverter. When actuated in mains operation, the motor runs at a fixed speed, for inverter operation the speed is variable. Thanks to their high degree of protection, the robust three-phase drives can be basically used in a variety of applications.

Mains operation

During mains operation, when switched on, the three-phase AC motor starts up according to the speed-torque characteristic. It passes through this characteristic until it reaches its stable operating point. This operating point has been reached if the load torque or rated torque (M_N) is lower than the starting torque (M_A) and the pull-up torque (M_S). 2-, 4- and 6-pole motors are used. The rated speed (n_{rated}) of the drive is always lower than the calculated synchronous speed (n_S). The difference between rated speed and synchronous speed relating to the synchronous speed is referred to as the "slip".

Speed-torque characteristic



Operational performance of three-phase AC geared motors

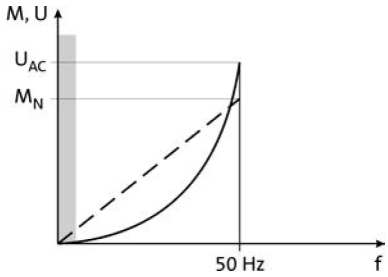
Operation on the inverter

An inverter enables energy-efficient operation of a system in virtually all application cases. The various operating modes, which can be created by making just a few simple settings, facilitate this. The following characteristics and corresponding specifications listed on the following pages can be used to calculate the optimum operating mode during the project planning phase.

Standard setting

In its initial state when delivered, the inverter is set up for basic operation with a three-phase AC motor with vector control. When operated in this mode, the rated torque of the motor is available in a setting range up to 50 Hz.

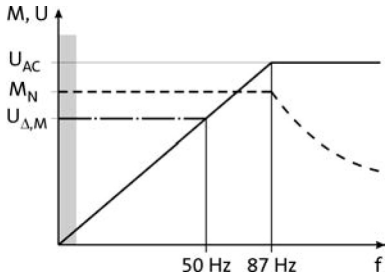
V/f at 50 Hz



Extended setting range up to 87 Hz

If the V/f reference point on the inverter is set to 87 Hz, the rated torque can be used across an extended setting range. Here, a 230/400V motor is for example used and operated in a delta layout with a 400V inverter. The setting range is then increased by 40 %. The inverter must be dimensioned for a rated motor current of 230 V.

V/f at 87 Hz

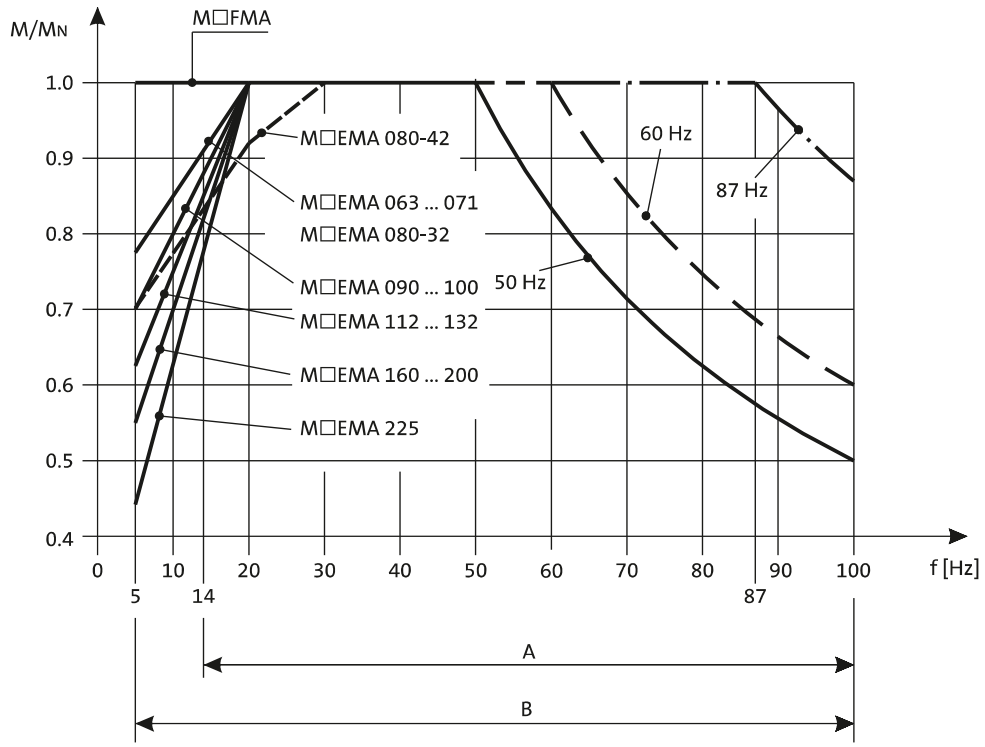


Operational performance of three-phase AC geared motors

Torque derating at low motor frequencies

The diagram shows the motor frame size-dependent torque reduction for self-ventilated motors, taking the thermal behaviour during actuation of the inverter into consideration.

Torque characteristics



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

Combinatorics of geared motors

The following tables contain the most important data of the gearbox with the motors that can be attached for an approximate dimensioning process of a geared motor. Detailed information can be found in the following chapters.

The data given in the tables apply to
- input speed n_1= 1400 r/min
- application factor c= 1.0

The data for the max. radial force refer to
- solid shaft without flange
- normal storage
- application factor c= 1.3

For further designs see the "Technical data" chapter.

► The rated torque can be gathered from the last digits of the product name e.g. g500-H45 (45 Nm).

In order to calculate the exact ratio, the number of teeth z_g (driven) can be divided by the number of teeth z_t (driving). These are cancelled values.

g500-S130, 2-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
382	63	2.60	3.661	637	174	1352	19.3	063-42 ... 090-32
279	76	2.29	5.021	728	145	1425	18.3	063-42 ... 090-32
199	92	1.98	7.029	5096	725	1532	17.6	063-32 ... 090-32
168	116	2.11	8.322	749	90	1601	13.0	063-42 ... 090-32
149	125	2.01	9.411	847	90	1660	12.4	063-42 ... 090-32
218	87	2.05	6.425	559	87	1500	17.9	063-42 ... 090-32
123	130	1.72	11.413	856	75	1994	12.6	063-42 ... 090-32
109	130	1.52	12.907	968	75	2103	12.0	063-42 ... 090-32
95.8	130	1.34	14.606	4601	315	2225	12.4	063-42 ... 090-32
87.6	130	1.23	15.979	5992	375	2320	12.3	063-32 ... 090-32
77.5	130	1.09	18.069	6776	375	2461	11.8	063-32 ... 080-42
68.7	130	0.96	20.381	428	21	2610	12.5	063-32 ... 080-42
60.7	130	0.85	23.048	484	21	2776	11.9	063-32 ... 080-32
56.1	130	0.79	24.967	749	30	2889	12.3	063-42 ... 080-32
49.6	130	0.70	28.233	847	30	3073	11.8	063-42 ... 080-32
44.6	130	0.63	31.387	2354	75	3240	12.2	063-12 ... 080-32
39.4	130	0.55	35.493	2662	75	3440	11.7	063-12 ... 071-42
34.6	130	0.49	40.422	1819	45	3656	12.1	063-12 ... 071-42
30.6	130	0.43	45.711	2057	45	3860	11.6	063-12 ... 071-32
27.3	130	0.38	51.230	8453	165	4043	11.8	063-12 ... 071-32
24.2	130	0.34	57.933	869	15	4225	11.3	063-12 ... 071-32
21.8	130	0.31	64.200	321	5	4357	11.7	063-12 ... 071-32
19.3	130	0.27	72.600	363	5	4500	11.3	063-12 ... 063-42
16.6	102	0.18	84.581	8881	105	4500	11.7	063-12 ... 063-32

Combinatorics of geared motors

g500-S220, 2-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
365	178	7.00	3.840	553	144	2360	15.9	071-42 ... 100-32
266	181	5.19	5.267	79	15	2650	15.9	080-42 ... 100-32
207	220	4.91	6.767	203	30	2900	12.5	071-42 ... 100-32
183	217	4.28	7.667	23	3	3050	12.0	071-42 ... 100-32
151	220	3.58	9.280	232	25	3250	12.5	080-42 ... 100-32
133	220	3.16	10.514	368	35	3400	12.0	080-42 ... 100-32
118	220	2.80	11.876	1247	105	3500	12.3	071-42 ... 100-32
108	220	2.56	12.992	1624	125	3550	12.2	063-42 ... 100-32
104	220	2.47	13.456	1978	147	3600	11.8	071-42 ... 100-32
95.1	220	2.26	14.720	368	25	3600	11.7	063-42 ... 100-12
84.5	220	2.01	16.571	116	7	3600	12.0	063-42 ... 100-12
74.6	220	1.77	18.776	920	49	3600	11.5	063-42 ... 100-12
69.0	220	1.64	20.300	203	10	3600	11.8	071-42 ... 090-32
60.9	220	1.45	23.000	23	1	3600	11.4	071-42 ... 090-32
53.0	220	1.26	26.422	1189	45	3600	11.7	063-42 ... 090-32
46.8	220	1.11	29.937	1886	63	3600	11.3	063-42 ... 080-42
42.6	220	1.01	32.867	493	15	3600	11.7	063-42 ... 080-42
37.6	220	0.89	37.238	782	21	3600	11.2	063-42 ... 080-42
32.9	220	0.78	42.533	638	15	3600	11.6	063-12 ... 080-32
29.1	220	0.69	48.190	1012	21	3600	11.1	063-12 ... 080-32
27.1	220	0.64	51.620	2581	50	3600	11.2	063-12 ... 080-32
23.9	220	0.57	58.486	2047	35	3600	10.8	063-12 ... 071-42
21.2	171	0.39	65.975	2639	40	3600	11.2	063-12 ... 071-32
18.7	194	0.39	74.750	299	4	3600	10.8	063-12 ... 071-32

Combinatorics of geared motors

g500-S220, 3-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2,\,max}$	$P_{1,\,max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
35.0	220	0.84	40.012	13804	345	3600	12.5	063-32 ... 071-32
30.9	220	0.74	45.333	136	3	3600	12.0	063-32 ... 071-32
26.6	220	0.64	52.587	3944	75	3600	12.4	063-12 ... 080-32
23.5	220	0.57	59.581	6256	105	3600	11.9	063-12 ... 071-42
20.8	220	0.50	67.298	21199	315	3600	12.3	063-12 ... 071-42
18.4	220	0.44	76.249	33626	441	3600	11.8	063-12 ... 071-42
16.3	220	0.39	86.079	5423	63	3600	12.2	063-12 ... 071-32
14.4	220	0.35	97.528	43010	441	3600	11.7	063-12 ... 071-32
12.5	220	0.30	111.747	8381	75	3600	12.2	063-12 ... 071-32
11.1	220	0.27	126.610	13294	105	3600	11.7	063-12 ... 063-42
9.80	220	0.24	143.205	30073	210	3600	12.2	063-12 ... 063-42
8.60	220	0.21	162.252	23851	147	3600	11.7	063-12 ... 063-42
7.60	220	0.18	185.249	30566	165	3600	12.1	063-12 ... 063-32
6.70	220	0.16	209.888	48484	231	3600	11.6	063-12 ... 063-32
5.80	220	0.14	241.022	10846	45	3600	12.1	063-12 ... 063-12
5.10	220	0.12	273.079	17204	63	3600	11.6	063-12 ... 063-12
4.50	220	0.11	312.233	9367	30	3600	12.1	063-12 ... 063-12
4.00	220	0.10	353.762	7429	21	3600	11.6	063-12 ... 063-12

Combinatorics of geared motors

g500-S400, 2-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
419	203	9.20	3.339	581	174	2360	16.0	071-42 ... 112-32
306	243	8.03	4.579	664	145	2560	15.9	080-42 ... 112-32
239	258	6.64	5.860	3569	609	2750	12.5	071-42 ... 112-32
218	261	6.16	6.411	4648	725	2820	12.0	063-42 ... 112-32
188	365	7.38	7.467	112	15	2980	12.5	071-42 ... 112-32
166	380	6.80	8.436	329	39	3150	12.0	071-42 ... 112-32
137	400	5.90	10.240	256	25	3450	12.3	080-42 ... 112-32
121	400	5.22	11.569	752	65	3650	12.2	080-42 ... 112-32
107	400	4.61	13.105	1376	105	3900	11.8	071-42 ... 112-32
97.7	400	4.22	14.336	1792	125	4000	11.7	063-42 ... 112-22
94.6	400	4.08	14.806	4042	273	4100	12.0	071-42 ... 112-22
86.4	400	3.73	16.197	5264	325	4200	11.5	063-42 ... 112-22
76.6	400	3.31	18.286	128	7	4400	11.8	063-42 ... 112-22
67.8	400	2.93	20.659	1880	91	4650	11.4	063-42 ... 100-32
62.5	400	2.70	22.400	112	5	4800	11.7	071-42 ... 100-32
55.3	400	2.39	25.308	329	13	5100	11.3	071-42 ... 100-32
48.0	400	2.07	29.156	1312	45	5500	11.7	063-42 ... 090-32
42.5	400	1.83	32.940	3854	117	5750	11.2	063-42 ... 090-32
38.6	400	1.67	36.267	544	15	5850	11.6	063-42 ... 090-32
34.2	400	1.48	40.974	1598	39	5980	11.1	063-42 ... 090-32
29.8	314	1.01	46.933	704	15	6100	11.2	063-12 ... 080-32
26.4	348	0.99	53.026	2068	39	6200	10.8	063-12 ... 080-32
24.6	268	0.71	56.960	1424	25	6200	11.2	063-12 ... 080-32
21.8	303	0.71	64.354	4183	65	6200	10.8	063-12 ... 080-32

Combinatorics of geared motors

g500-S400, 3-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
24.1	400	1.06	58.027	4352	75	6200	11.0	063-32 ... 080-42
21.4	400	0.94	65.559	12784	195	6200	10.9	063-32 ... 080-42
18.9	400	0.83	74.260	23392	315	6200	11.0	063-32 ... 080-32
16.7	400	0.73	83.900	68714	819	6200	10.8	063-32 ... 080-32
14.7	400	0.65	94.984	5984	63	6200	10.9	063-12 ... 080-32
13.0	399	0.57	107.314	87890	819	6200	10.7	063-12 ... 071-42
11.4	400	0.50	123.307	9248	75	6200	10.9	063-12 ... 071-42
10.0	399	0.44	139.313	27166	195	6200	10.7	063-12 ... 071-42
8.90	400	0.39	158.019	16592	105	6200	10.9	063-12 ... 071-32
7.80	400	0.34	178.531	48739	273	6200	10.7	063-12 ... 071-32
6.80	400	0.30	204.412	33728	165	6200	10.8	063-12 ... 071-32
6.10	396	0.26	230.946	99076	429	6200	10.6	063-12 ... 063-42
5.30	388	0.22	265.956	11968	45	6200	10.8	063-12 ... 063-42
4.70	400	0.20	300.479	35156	117	6200	10.7	063-12 ... 063-32
4.10	330	0.15	344.533	5168	15	6200	10.8	063-12 ... 063-12
3.60	373	0.15	389.256	15181	39	6200	10.7	063-12 ... 063-12

Combinatorics of geared motors

g500-S660, 2-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
357	419	16.1	3.920	98	25	3320	13.9	100-12 ... 132-32
260	492	13.8	5.376	672	125	3580	12.7	100-12 ... 132-32
218	601	14.2	6.417	77	12	3660	11.0	100-12 ... 132-32
204	496	10.9	6.880	172	25	3690	12.5	080-42 ... 132-32
192	593	12.3	7.311	329	45	3720	10.5	100-12 ... 132-32
159	638	11.0	8.800	44	5	3900	10.3	100-12 ... 132-32
140	625	9.42	10.027	752	75	4200	9.9	100-12 ... 132-32
124	660	8.86	11.262	473	42	4500	10.1	080-42 ... 132-32
114	660	8.10	12.320	308	25	4750	10.0	080-42 ... 132-32
109	660	7.77	12.832	4042	315	4850	9.7	080-42 ... 132-32
99.7	660	7.10	14.037	5264	375	5100	9.6	080-42 ... 132-22
89.1	660	6.35	15.714	110	7	5450	9.9	071-42 ... 132-22
78.2	660	5.57	17.905	376	21	5800	9.5	071-42 ... 112-32
72.7	660	5.18	19.250	77	4	6000	9.8	080-42 ... 112-32
63.8	660	4.55	21.933	329	15	6450	9.4	080-42 ... 112-32
55.9	578	3.49	25.056	451	18	7050	9.7	071-42 ... 112-22
49.0	660	3.49	28.548	3854	135	7700	9.3	071-42 ... 112-22
44.9	660	3.20	31.167	187	6	8100	9.6	071-42 ... 100-32
39.4	660	2.81	35.511	1598	45	8500	9.3	071-42 ... 100-32
34.7	545	2.04	40.333	121	3	8750	9.6	063-42 ... 090-32
30.5	620	2.04	45.956	2068	45	8850	9.2	063-42 ... 090-32
28.6	446	1.38	48.950	979	20	8900	9.6	063-42 ... 090-32
25.1	508	1.38	55.773	4183	75	9000	9.2	063-42 ... 090-32

Combinatorics of geared motors

g500-S660, 3-stage gearboxes

Output speed	Max. output torque	Max. drive power	Ratio	Number of teeth		Max. radial force	Backlash	Size
							Standard	Motor
n_2	$M_{2, max}$	$P_{1, max}$	i	z_g	z_t	$F_{rad,max}$		
							± 20 %	
[r/min]	[Nm]	[kW]				[N]	[arcmin]	
28.1	625	1.92	49.867	748	15	9000	10.4	063-42 ... 090-32
24.6	650	1.76	56.818	12784	225	9000	9.9	063-42 ... 090-32
21.9	660	1.59	63.817	8041	126	9000	10.4	063-42 ... 090-32
20.1	660	1.45	69.813	5236	75	9000	10.3	063-32 ... 090-32
19.3	660	1.39	72.713	68714	945	9000	9.9	063-42 ... 090-32
17.6	660	1.27	79.545	89488	1125	9000	9.9	063-32 ... 090-32
15.7	660	1.14	89.048	1870	21	9000	10.4	063-32 ... 080-42
13.8	660	1.00	101.460	6392	63	9000	9.9	063-32 ... 080-42
12.8	660	0.93	109.083	1309	12	9000	10.3	063-42 ... 080-42
11.3	660	0.81	124.289	5593	45	9000	9.9	063-42 ... 080-32
10.2	660	0.74	137.133	2057	15	9000	10.3	063-12 ... 080-32
9.00	660	0.65	156.249	35156	225	9000	9.8	063-12 ... 080-32
7.90	660	0.57	176.611	3179	18	9000	10.3	063-12 ... 071-42
7.00	660	0.50	201.230	27166	135	9000	9.8	063-12 ... 071-42
6.30	660	0.45	223.833	1343	6	9000	10.2	063-12 ... 071-32
5.50	660	0.40	255.034	126242	495	9000	9.8	063-12 ... 071-32
5.00	603	0.33	280.500	561	2	9000	10.2	063-12 ... 071-32
4.40	660	0.32	319.600	1598	5	9000	9.8	063-12 ... 071-32
3.80	447	0.19	369.548	15521	42	9000	10.2	063-12 ... 063-32
3.30	511	0.19	421.060	132634	315	9000	9.8	063-12 ... 063-32

Surface and corrosion protection

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

Various surface coatings combined with other protective measures ensure that the geared motors operate reliably even at high air humidity, in outdoor installations or in the presence of atmospheric impurities. Any colour from the RAL Classic collection can be chosen for the top coat. The geared motors are also available unpainted (no surface and corrosion protection).

Surface and corrosion protection	Applications	Measures
OKS-G (primed)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey) • Zinc-coated screws • Rust-free breather elements Optional measures • Stainless steel nameplate
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating corresponding to corrosivity category C1 (subject to 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 corresponding to corrosivity category C2 (subject to 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 corresponding to corrosivity category C3 (subject to 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
OKS-XL (extra Large) [1)]	• External installation • Air humidity above 95 % • Chemical industry plants • Food industry • Coastal areas with moderate salinity	• Surface coating corresponding to corrosivity category C4 (subject to EN 12944-2) Additional measures for surface and corrosion protection system L: • Rotor package and stator in the inner area primed with finishing varnish • Feedback in protection class IP65

6.4

[1)] On request

Surface and corrosion protection

Structure of surface coating

Surface and corrosion protection	Corrosivity category	Surface coating	Colour	Coating thickness
	DIN EN ISO 12944-2	Structure		
Without OKS(uncoated)		• Dipping primer of the grey iron parts		30 ... 50 µm
OKS-G (primed)		• Dipping primer of the grey iron parts • 2K PUR priming coat		60 ... 90 µm
OKS-S (small)	Comparable to C1	• Dipping primer of the grey iron parts • 2K-PUR top coat	• Standard: RAL 7012 • Optional: RAL Classic	80 ... 120 µm
OKS-M (medium)	Comparable to C2	• Dipping primer of the grey iron parts • 2K PUR priming coat • 2K-PUR top coat		110 ... 160 µm
OKS-L (large)	Comparable to C3			140 ... 200 µm
OKS-XL (extra Large) [1)]	Comparable to C4	• Dipping primer of the grey iron parts • 2K-EP priming coat (two times) • 2K-PUR top coat		160 ... 240 µm

[1)] On request

Lubricants

Gearboxes and geared motors of Lenze come supplied with a lubricant specifically adapted to the drive and design. When placing the order, the mounting position and design are decisive for the lubricant amount.
The lubricant amount and type contained in the gearbox are indicated on the nameplate.

The following gearboxes are lubricated for life:
- Helical gearbox g500-H45 ... 140
- Shaft-mounted helical gearbox g500-S130
- Bevel gearbox g500-B45 ... 240

The lubricants listed in the lubricant table are approved for 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	
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	
bremer & leguil			Cassida Fluid GL 220

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

Shaft sealing rings

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

Please consider this in your order.

Ventilation

Non-ventilated gearboxes

No ventilation is required for gearboxes g500-S130 to S220.

Ventilated gearboxes

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

Gearbox in combined mounting position

For reducing the number of versions, the gearboxes can also be ordered in a combined mounting position:

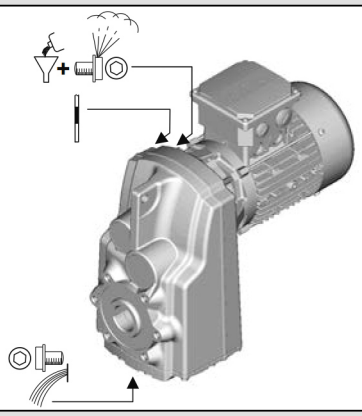
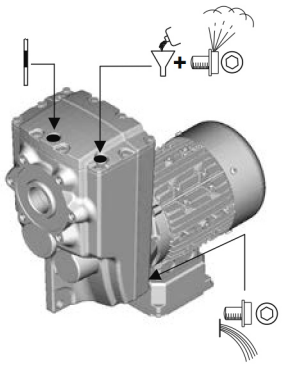
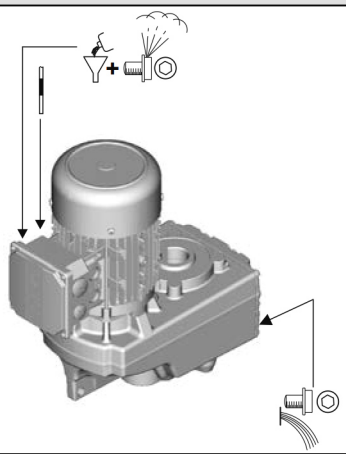
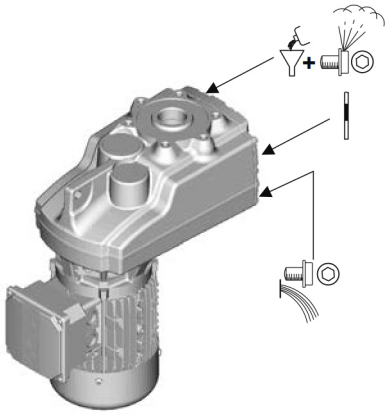
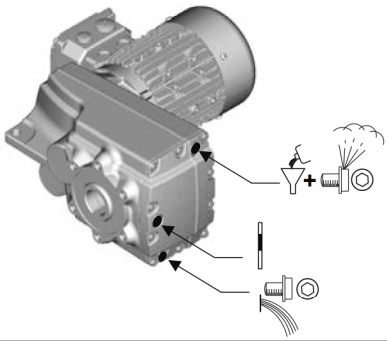
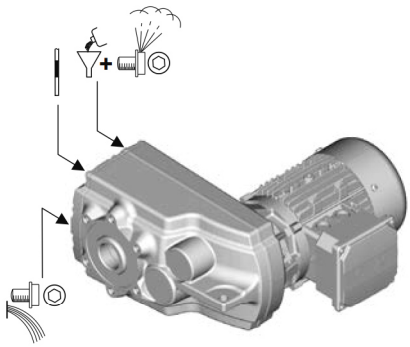
- g500-S130 ... S660 in mounting position AEF

In these gearboxes, the lubricant amount has been optimised for the use in different mounting positions. -H45 in mounting position AB-CDEFg500-H100 ... H450 in mounting position AEF In these gearboxes, the lubricant amount has been optimised for the use in different mounting positions. The breather elements are loosely enclosed and have to be mounted before commissioning depending on the mounting position.
A gearbox can be used for several mounting positions.

Ventilation

Position of ventilation, sealing elements and oil level check

► **A ... F** mounting position

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

	Filling		Drain
	Ventilation		Check

Standards and operating conditions

Geared motor data

Degree of protection			
EN 60529			IP65 [1] IP55 [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 CU 004/2011)
Approval			
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".

Permissible radial and axial forces at output

Permissible radial force

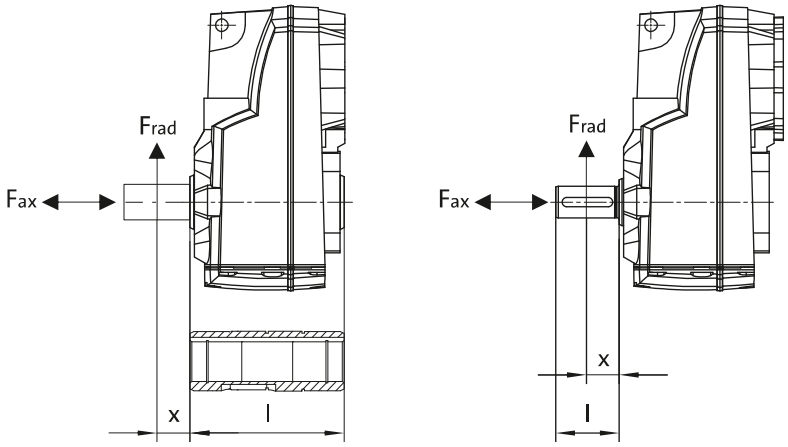
$F_{rad,perm} = f_w \times F_{rad,max}$

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

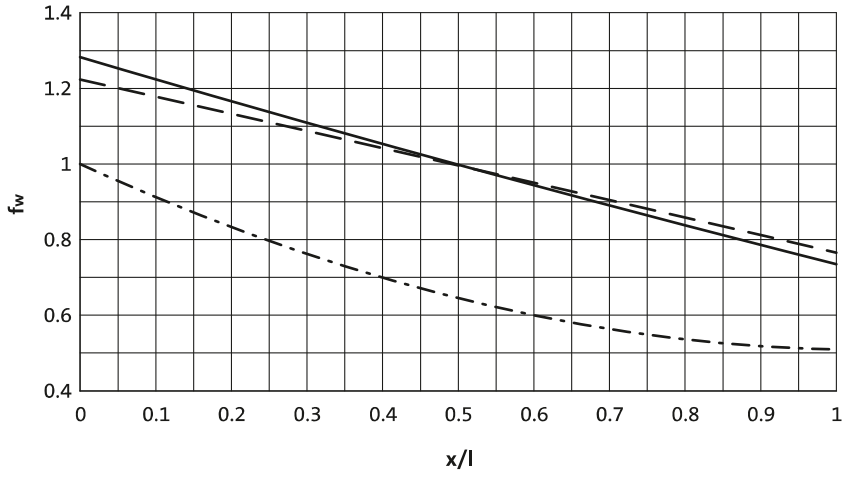
Permissible axial force

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

Application of forces



Additional load factor f_w at output shaft



6.4

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

Permissible radial and axial forces at output

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

► Neither radial nor axial forces are permissible for the hollow shaft with shrink disc.

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

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

	Max. radial force, Hollow shaft									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
g500-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	2100	2700	2800	3200	3800	4600	5500	6300	7000	7000
g500-S400	1800	2400	3000	3400	4100	5000	6000	7100	8000	8000
g500-S660	2400	3300	4300	4700	5000	6600	8500	10800	12000	12000

	Max. radial force, Solid shaft without flange									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
g500-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	1650	2100	2300	2700	3200	3600	3600	3600	3600	3600
g500-S400	1400	1900	2400	2700	3200	4000	4800	5800	6200	6200
g500-S660	1850	2500	3200	3600	3900	5100	6500	8400	9000	9000

	Max. radial force, Solid shaft with flange									
	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$	$F_{rad,max}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
g500-S130	1000	1150	1350	1500	1650	2200	2750	3450	4200	4500
g500-S220	2300	2800	3200	3700	4400	4600	4600	4600	4600	4600
g500-S400	2900	3700	4300	5100	5900	6800	7000	7000	7000	7000
g500-S660	4000	5000	6100	7000	7800	9600	10000	10000	10000	10000

Selection tables, notes

Notes on the selection tables with 4-pole motors

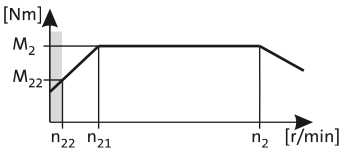
The selection tables show the available combinations of gearbox type, number of stages, ratio and motor. They are used only to provide basic orientation.
The following legend indicates the structure of the selection tables.

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

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

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

Torque diagram



Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 30 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
38	266	1.5	4.0	154	25	266	38	266	1.5	69	269	1.5	36.267	-S400	080-42	73
35	296	1.8	3.6	171	22	296	35	296	1.8	62	299	1.8	40.333	-S660	080-42	77

Product Gearbox | **Product Motor** | **Ratio i** | **Page number for dimensions**

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

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

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

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

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

Motor voltages

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

Operation at 87 Hz

In 87 Hz operation, the three-phase AC motor (which is designed for a voltage of Δ 230 V / Y 400 V at 50 Hz) is operated on an inverter with 400 V rated voltage in a delta connection. It is important to note here that the inverter must be configured for 87Hz output.
This offers the following advantages over 50 Hz operation:
- the setting range of the motor is increased by a factor of 1.73.
- the motor can then provide around 1.73 times greater output, which in turn allows a smaller and more affordable motor to be selected for the application.
- the efficiency of the motor is also improved.

Selection tables, notes

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

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

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

50 Hz: P_N = 0.18 kW

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

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
68	25	5.3	40.422	-S130	063-11	85
60	28	4.7	45.711	-S130	063-11	85

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

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

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

Ratio i

Product Gearbox

Product Motor

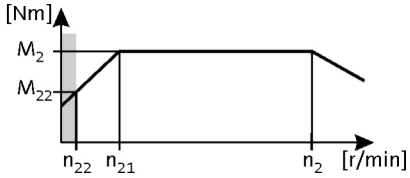
Page number for dimensions

Motor voltages

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

6.4

Selection tables, 4-pole motors



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

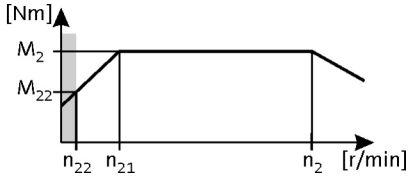
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
45	24	5.3	4.6	19	19	24	45	24	5.3	81	24	5.4	31.387	-S130	063-12	86
40	28	4.7	4.1	21	17	27	40	28	4.7	71	27	4.8	35.493	-S130	063-12	86
35	32	4.1	3.6	24	15	31	35	32	4.1	63	31	4.2	40.422	-S130	063-12	86
31	36	3.7	3.2	28	13	35	31	36	3.7	56	35	3.7	45.711	-S130	063-12	86
28	40	3.3	2.8	31	12	39	28	40	3.3	50	39	3.3	51.230	-S130	063-12	86
25	45	2.9	2.5	35	10	44	25	45	2.9	44	44	2.9	57.933	-S130	063-12	86
22	50	2.6	2.3	39	9.3	49	22	50	2.6	40	49	2.6	64.200	-S130	063-12	86
22	51	3.1	2.2	40	9.1	51	22	51	3.1	38	51	3.2	65.975	-S220	063-12	90
20	57	2.3	2.0	44	8.3	56	20	57	2.3	35	56	2.3	72.600	-S130	063-12	86
19	58	3.1	1.9	45	8.0	57	19	58	3.1	34	57	3.2	74.750	-S220	063-12	90
17	66	1.6	1.7	51	7.1	65	17	66	1.6	30	65	1.6	84.581	-S130	063-12	86
15	75	1.5	1.5	58	6.3	73	15	75	1.5	27	73	1.6	95.648	-S130	063-12	86

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
15	75	2.9	1.5	58	6.2	74	15	75	2.9	26	74	3.0	97.528	-S220	063-12	90
13	86	2.6	1.3	66	5.4	84	13	86	2.6	23	84	2.6	111.747	-S220	063-12	90
11	97	2.3	1.1	75	4.7	96	11	97	2.3	20	96	2.3	126.610	-S220	063-12	90
10	110	2.0	1.0	85	4.2	108	10	110	2.0	18	108	2.0	143.205	-S220	063-12	90
8.8	125	1.8	0.9	96	3.7	123	8.8	125	1.8	16	123	1.8	162.252	-S220	063-12	90
8.0	137	2.9	0.8	106	3.4	135	8.0	137	2.9	14	135	3.0	178.531	-S400	063-12	94
7.7	142	1.6	0.8	110	3.2	140	7.7	142	1.6	14	140	1.6	185.248	-S220	063-12	90
7.0	157	2.6	0.7	121	2.9	155	7.0	157	2.6	12	155	2.6	204.412	-S400	063-12	94
6.8	161	1.4	0.7	124	2.9	159	6.8	161	1.4	12	159	1.4	209.887	-S220	063-12	90
6.2	177	2.2	0.6	137	2.6	175	6.2	177	2.2	11	175	2.3	230.946	-S400	063-12	94
5.9	185	1.2	0.6	143	2.5	182	5.9	185	1.2	11	182	1.2	241.022	-S220	063-12	90
5.4	204	1.9	0.5	157	2.3	201	5.4	204	1.9	9.5	201	1.9	265.956	-S400	063-12	94
5.2	210	1.1	0.5	162	2.2	206	5.2	210	1.1	9.3	206	1.1	273.079	-S220	063-12	90
5.1	216	2.8	0.5	166	2.1	212	5.1	216	2.8	9.0	212	2.8	280.500	-S660	063-12	98
4.7	231	1.7	0.5	178	2.0	227	4.7	231	1.7	8.4	227	1.8	300.479	-S400	063-12	94
4.6	240	0.9	0.5	185	1.9	236	4.6	240	0.9	8.1	236	0.9	312.233	-S220	063-12	90
4.5	246	2.7	0.5	189	1.9	242	4.5	246	2.7	7.9	242	2.7	319.600	-S660	063-12	98
4.1	265	1.3	0.4	204	1.7	260	4.1	265	1.3	7.4	260	1.3	344.533	-S400	063-12	94
4.0	272	0.8	0.4	209	1.7	267	4.0	272	0.8	7.2	267	0.8	353.762	-S220	063-12	90
3.9	284	1.6	0.4	219	1.6	279	3.9	284	1.6	6.9	279	1.6	369.548	-S660	063-12	98
3.7	299	1.3	0.4	230	1.5	294	3.7	299	1.3	6.5	294	1.3	389.256	-S400	063-12	94
3.4	324	1.6	0.3	249	1.4	318	3.4	324	1.6	6.0	318	1.6	421.060	-S660	063-12	98

Selection tables, 4-pole motors



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

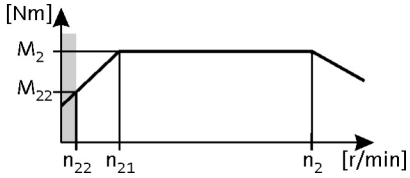
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product g500	Product MD□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				
194	9.0	4.5	21	6.6	85	9.0	194	9.0	4.5	352	9.0	3.7	7.029	-S130	063-32	86
85	20	4.5	9.1	15	38	20	85	20	4.5	155	20	3.7	15.979	-S130	063-32	86
76	22	4.5	8.0	17	33	22	76	22	4.5	137	22	4.2	18.069	-S130	063-32	86
67	25	4.1	7.1	19	29	25	67	25	4.1	121	25	3.9	20.381	-S130	063-32	86
59	28	4.1	6.3	22	26	28	59	28	4.1	107	28	3.9	23.048	-S130	063-32	86
44	38	3.4	4.6	30	19	38	44	38	3.4	79	39	3.4	31.387	-S130	063-32	86
39	43	3.0	4.1	33	17	43	39	43	3.0	70	44	3.0	35.493	-S130	063-32	86
34	49	2.6	3.6	38	15	49	34	49	2.6	61	50	2.6	40.422	-S130	063-32	86
32	52	2.9	3.4	40	14	52	32	52	2.9	58	53	2.9	42.533	-S220	063-32	90
30	56	2.3	3.2	43	13	56	30	56	2.3	54	56	2.3	45.711	-S130	063-32	86
29	57	2.9	3.1	44	13	57	29	57	2.9	53	58	2.9	46.933	-S400	063-32	94
28	59	2.9	3.0	45	13	59	28	59	2.9	51	60	2.9	48.190	-S220	063-32	90
27	63	2.1	2.8	48	12	63	27	63	2.1	48	63	2.1	51.230	-S130	063-32	86
26	63	2.6	2.8	49	12	63	26	63	2.6	48	64	2.5	51.620	-S220	063-32	90
26	65	2.9	2.7	50	11	65	26	65	2.9	47	66	2.9	53.026	-S400	063-32	94
24	70	2.6	2.5	54	11	70	24	70	2.6	44	70	2.5	56.960	-S400	063-32	94
24	71	1.8	2.5	55	10	71	24	71	1.8	43	72	1.8	57.933	-S130	063-32	86
23	71	2.6	2.5	55	10	71	23	71	2.6	42	72	2.5	58.486	-S220	063-32	90
21	78	1.7	2.3	60	9.3	78	21	78	1.7	39	79	1.6	64.200	-S130	063-32	86
21	79	2.6	2.3	61	9.3	79	21	79	2.6	39	79	2.5	64.354	-S400	063-32	94
21	81	2.0	2.2	62	9.1	81	21	81	2.0	38	82	2.0	65.975	-S220	063-32	90
19	89	1.5	2.0	68	8.3	89	19	89	1.5	34	90	1.5	72.600	-S130	063-32	86
18	91	2.0	1.9	70	8.0	91	18	91	2.0	33	92	2.0	74.750	-S220	063-32	90
16	103	1.0	1.7	80	7.1	103	16	103	1.0	29	104	1.0	84.581	-S130	063-32	86
14	117	1.0	1.5	90	6.3	117	14	117	1.0	26	118	1.0	95.648	-S130	063-32	86

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product g500	Product MD□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				
23	72	3.1	2.4	55	10	72	23	72	3.1	42	72	2.9	59.581	-S220	063-32	90
20	81	2.7	2.2	62	8.9	81	20	81	2.7	37	82	2.6	67.298	-S220	063-32	90
18	92	2.4	1.9	71	7.9	92	18	92	2.4	33	93	2.4	76.249	-S220	063-32	90
16	104	2.1	1.7	80	7.0	104	16	104	2.1	29	105	2.1	86.079	-S220	063-32	90
14	117	1.9	1.5	90	6.2	117	14	117	1.9	25	119	1.9	97.528	-S220	063-32	90
13	129	3.1	1.4	99	5.6	129	13	129	3.1	23	131	3.1	107.314	-S400	063-32	94
12	134	1.6	1.3	104	5.4	134	12	134	1.6	22	136	1.6	111.747	-S220	063-32	90
11	148	2.7	1.2	114	4.9	148	11	148	2.7	20	150	2.7	123.307	-S400	063-32	94
11	152	1.4	1.1	117	4.7	152	11	152	1.4	20	154	1.4	126.610	-S220	063-32	90
9.8	168	2.4	1.0	129	4.3	168	9.8	168	2.4	18	170	2.4	139.313	-S400	063-32	94

Selection tables, 4-pole motors

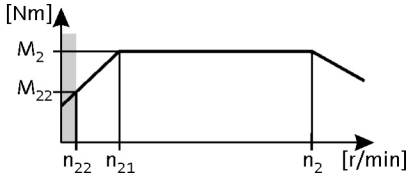


50 Hz: P_N = 0.18 kW
87 Hz: P_N = 0.33 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
9.5	172	1.3	1.0	133	4.2	172	9.5	172	1.3	17	174	1.3	143.205	-S220	063-32	90
8.6	190	2.1	0.9	146	3.8	190	8.6	190	2.1	16	192	2.1	158.019	-S400	063-32	94
8.4	195	1.1	0.9	150	3.7	195	8.4	195	1.1	15	197	1.1	162.252	-S220	063-32	90
7.7	213	2.9	0.8	164	3.4	213	7.7	213	2.9	14	215	2.9	176.611	-S660	063-32	98
7.6	215	1.9	0.8	165	3.4	215	7.6	215	1.9	14	217	1.8	178.531	-S400	063-32	94
7.4	223	1.0	0.8	172	3.2	223	7.4	223	1.0	13	225	1.0	185.248	-S220	063-32	90
6.8	242	2.7	0.7	187	3.0	242	6.8	242	2.7	12	245	2.7	201.230	-S660	063-32	98
6.7	246	1.6	0.7	189	2.9	246	6.7	246	1.6	12	249	1.6	204.412	-S400	063-32	94
6.5	253	0.9	0.7	195	2.9	253	6.5	253	0.9	12	255	0.9	209.887	-S220	063-32	90
6.1	269	2.5	0.6	207	2.7	269	6.1	269	2.5	11	272	2.4	223.833	-S660	063-32	98
5.9	278	1.4	0.6	214	2.6	278	5.9	278	1.4	11	281	1.4	230.946	-S400	063-32	94
5.4	307	2.2	0.6	236	2.4	307	5.4	307	2.2	9.7	310	2.1	255.034	-S660	063-32	98
5.1	320	1.2	0.5	246	2.3	320	5.1	320	1.2	9.3	324	1.2	265.956	-S400	063-32	94
4.9	338	1.8	0.5	260	2.1	338	4.9	338	1.8	8.8	341	1.8	280.500	-S660	063-32	98
4.5	362	1.1	0.5	278	2.0	362	4.5	362	1.1	8.2	366	1.1	300.479	-S400	063-32	94
4.3	385	1.7	0.5	296	1.9	385	4.3	385	1.7	7.7	389	1.7	319.600	-S660	063-32	98
3.7	445	1.0	0.4	342	1.6	445	3.7	445	1.0	6.7	450	1.0	369.548	-S660	063-32	98
3.2	507	1.0	0.3	390	1.4	507	3.2	507	1.0	5.9	512	1.0	421.060	-S660	063-32	98

Selection tables, 4-pole motors

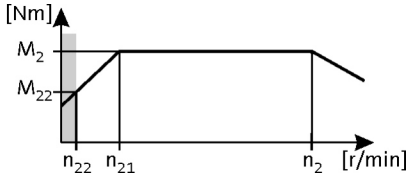


50 Hz: P_N = 0.25 kW
87 Hz: P_N = 0.45 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
374	6.0	5.6	40	4.8	164	6.0	374	6.0	5.6	677	6.0	4.8	3.661	-S130	063-42	86
273	8.0	5.6	29	6.5	120	8.0	273	8.0	5.6	494	8.0	4.8	5.021	-S130	063-42	86
213	11	5.2	23	8.4	93	11	213	11	5.2	386	11	4.4	6.425	-S130	063-42	86
195	12	5.2	21	9.2	85	12	195	12	5.2	353	12	4.4	7.029	-S130	063-42	86
165	14	5.6	17	11	72	14	165	14	5.6	298	14	4.8	8.322	-S130	063-42	86
146	16	5.6	15	12	64	16	146	16	5.6	264	16	4.8	9.411	-S130	063-42	86
120	19	5.6	13	15	53	19	120	19	5.6	217	19	4.8	11.413	-S130	063-42	86
106	22	5.6	11	17	47	22	106	22	5.6	192	22	4.8	12.907	-S130	063-42	86
94	25	5.2	9.9	19	41	25	94	25	5.2	170	25	4.4	14.606	-S130	063-42	86
86	27	4.8	9.1	21	38	27	86	27	4.8	155	27	4.1	15.979	-S130	063-42	86
76	31	4.3	8.0	24	33	30	76	31	4.3	137	30	4.1	18.069	-S130	063-42	86
67	34	3.8	7.1	27	29	34	67	34	3.8	122	34	3.7	20.381	-S130	063-42	86
59	39	3.3	6.3	30	26	39	59	39	3.3	108	39	3.2	23.048	-S130	063-42	86
55	42	3.1	5.8	33	24	42	55	42	3.1	99	42	3.0	24.967	-S130	063-42	86
49	48	2.7	5.1	37	21	47	49	48	2.7	88	47	2.6	28.233	-S130	063-42	86
44	53	2.5	4.6	41	19	53	44	53	2.5	79	53	2.5	31.387	-S130	063-42	86
39	60	2.2	4.1	46	17	60	39	60	2.2	70	60	2.2	35.493	-S130	063-42	86
34	68	1.9	3.6	53	15	68	34	68	1.9	61	68	1.9	40.422	-S130	063-42	86
32	72	3.1	3.4	55	14	72	32	72	3.1	58	72	3.1	42.533	-S220	063-42	90
30	77	1.7	3.2	60	13	77	30	77	1.7	54	77	1.7	45.711	-S130	063-42	86
28	81	2.7	3.0	63	13	81	28	81	2.7	52	81	2.7	48.190	-S220	063-42	90
28	83	3.2	3.0	64	12	82	28	83	3.2	51	82	3.2	48.950	-S660	063-42	98
27	87	1.5	2.8	67	12	86	27	87	1.5	48	86	1.5	51.230	-S130	063-42	86
27	87	2.5	2.8	67	12	87	27	87	2.5	48	87	2.5	51.620	-S220	063-42	90
25	94	3.2	2.6	73	11	94	25	94	3.2	45	94	3.2	55.773	-S660	063-42	98
24	96	2.8	2.5	74	11	96	24	96	2.8	44	96	2.8	56.960	-S400	063-42	94
24	98	1.3	2.5	75	10	97	24	98	1.3	43	97	1.3	57.933	-S130	063-42	86
23	99	2.2	2.5	76	10	98	23	99	2.2	42	98	2.2	58.486	-S220	063-42	90
21	109	1.2	2.3	84	9.3	108	21	109	1.2	39	108	1.2	64.200	-S130	063-42	86
21	109	2.8	2.3	84	9.3	108	21	109	2.8	39	108	2.8	64.354	-S400	063-42	94
21	112	1.4	2.2	86	9.1	111	21	112	1.4	38	111	1.4	65.975	-S220	063-42	90
19	123	1.1	2.0	95	8.3	122	19	123	1.1	34	122	1.1	72.600	-S130	063-42	86
18	126	1.4	1.9	97	8.0	126	18	126	1.4	33	126	1.4	74.750	-S220	063-42	90

Selection tables, 4-pole motors

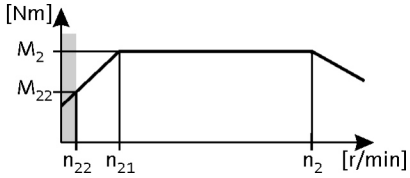


50 Hz: P_N = 0.25 kW
87 Hz: P_N = 0.45 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
30	75	2.9	3.2	58	13	75	30	75	2.9	55	75	2.5	45.333	-S220	063-42	90
26	88	2.5	2.8	67	11	87	26	88	2.5	47	87	2.4	52.587	-S220	063-42	90
23	99	2.2	2.4	76	10	99	23	99	2.2	42	99	2.1	59.581	-S220	063-42	90
20	112	2.0	2.2	86	8.9	111	20	112	2.0	37	111	1.9	67.298	-S220	063-42	90
18	124	3.2	2.0	95	8.1	123	18	124	3.2	33	123	3.3	74.260	-S400	063-42	94
18	127	1.7	1.9	98	7.9	126	18	127	1.7	33	126	1.7	76.249	-S220	063-42	90
16	140	2.9	1.7	108	7.2	139	16	140	2.9	30	139	2.9	83.900	-S400	063-42	94
16	143	1.5	1.7	110	7.0	143	16	143	1.5	29	143	1.5	86.079	-S220	063-42	90
14	158	2.5	1.5	122	6.3	157	14	158	2.5	26	157	2.5	94.984	-S400	063-42	94
14	162	1.4	1.5	125	6.2	161	14	162	1.4	25	161	1.4	97.528	-S220	063-42	90
13	179	2.2	1.4	138	5.6	178	13	179	2.2	23	178	2.3	107.314	-S400	063-42	94
12	186	1.2	1.3	143	5.4	185	12	186	1.2	22	185	1.2	111.747	-S220	063-42	90
11	205	2.0	1.2	158	4.9	204	11	205	2.0	20	204	2.0	123.307	-S400	063-42	94
11	207	3.2	1.2	159	4.8	206	11	207	3.2	20	206	3.2	124.289	-S660	063-42	98
11	211	1.0	1.1	162	4.7	210	11	211	1.0	20	210	1.1	126.610	-S220	063-42	90
10	228	2.9	1.1	176	4.4	227	10	228	2.9	18	227	2.9	137.133	-S660	063-42	98
9.8	232	1.7	1.0	179	4.3	231	9.8	232	1.7	18	231	1.7	139.313	-S400	063-42	94
9.6	238	0.9	1.0	184	4.2	237	9.6	238	0.9	17	237	0.9	143.205	-S220	063-42	90
8.8	260	2.5	0.9	200	3.8	259	8.8	260	2.5	16	259	2.6	156.249	-S660	063-42	98
8.7	263	1.5	0.9	203	3.8	262	8.7	263	1.5	16	262	1.5	158.019	-S400	063-42	94
8.4	270	0.8	0.9	208	3.7	269	8.4	270	0.8	15	269	0.8	162.252	-S220	063-42	90
7.8	294	2.2	0.8	227	3.4	292	7.8	294	2.2	14	292	2.3	176.611	-S660	063-42	98
7.7	297	1.3	0.8	229	3.4	296	7.7	297	1.3	14	296	1.4	178.531	-S400	063-42	94
6.8	335	2.0	0.7	258	3.0	333	6.8	335	2.0	12	333	2.0	201.230	-S660	063-42	98
6.7	340	1.2	0.7	262	2.9	338	6.7	340	1.2	12	338	1.2	204.412	-S400	063-42	94
6.1	373	1.8	0.6	287	2.7	371	6.1	373	1.8	11	371	1.8	223.833	-S660	063-42	98
5.9	385	1.0	0.6	296	2.6	382	5.9	385	1.0	11	382	1.0	230.946	-S400	063-42	94
5.4	425	1.6	0.6	327	2.4	422	5.4	425	1.6	9.7	422	1.6	255.034	-S660	063-42	98
5.2	443	0.9	0.5	341	2.3	440	5.2	443	0.9	9.3	440	0.9	265.956	-S400	063-42	94
4.9	467	1.2	0.5	360	2.1	464	4.9	467	1.2	8.8	464	1.2	280.500	-S660	063-42	98
			0.5	385	2.0	498				8.3	498	0.8	300.479	-S400	063-42	94
4.3	532	1.2	0.5	410	1.9	529	4.3	532	1.2	7.8	529	1.2	319.600	-S660	063-42	98

Selection tables, 4-pole motors

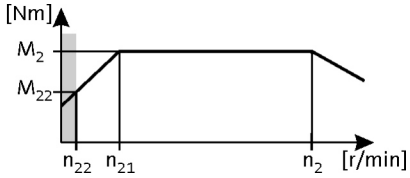


50 Hz: P_N = 0.37 kW
87 Hz: P_N = 0.66 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
385	9.0	4.9	40	6.9	164	9.0	385	9.0	4.9				3.661	-S130	071-32	86
281	12	4.9	29	9.4	120	12	281	12	4.9				5.021	-S130	071-32	86
219	16	4.5	23	12	93	16	219	16	4.5				6.425	-S130	071-32	86
201	17	4.5	21	13	85	17	201	17	4.5				7.029	-S130	071-32	86
169	20	4.9	17	16	72	20	169	20	4.9				8.322	-S130	071-32	86
150	23	4.9	15	18	64	23	150	23	4.9				9.411	-S130	071-32	86
124	28	4.7	13	21	53	28	124	28	4.7				11.413	-S130	071-32	86
109	31	4.1	11	24	47	31	109	31	4.1				12.907	-S130	071-32	86
97	36	3.7	9.9	27	41	36	97	36	3.7				14.606	-S130	071-32	86
88	39	3.4	9.1	30	38	39	88	39	3.4				15.979	-S130	071-32	86
78	44	3.0	8.0	34	33	44	78	44	3.0	140	44	2.8	18.069	-S130	071-32	86
69	50	2.6	7.1	38	29	49	69	50	2.6	124	49	2.5	20.381	-S130	071-32	86
61	56	2.3	6.3	43	26	56	61	56	2.3	109	56	2.2	23.048	-S130	071-32	86
57	61	2.1	5.8	47	24	61	57	61	2.1	101	61	2.1	24.967	-S130	071-32	86
50	69	1.9	5.1	53	21	69	50	69	1.9	89	69	1.8	28.233	-S130	071-32	86
47	73	3.0	4.8	56	20	73	47	73	3.0	84	73	2.9	29.937	-S220	071-32	90
45	76	1.7	4.6	59	19	76	45	76	1.7	80	76	1.7	31.387	-S130	071-32	86
43	80	2.8	4.4	62	18	80	43	80	2.8	77	80	2.8	32.867	-S220	071-32	90
40	86	1.5	4.1	66	17	86	40	86	1.5	71	86	1.5	35.493	-S130	071-32	86
39	88	3.2	4.0	68	17	88	39	88	3.2				36.267	-S400	071-32	94
38	91	2.4	3.9	70	16	90	38	91	2.4	68	90	2.4	37.238	-S220	071-32	90
35	98	3.2	3.6	76	15	98	35	98	3.2				40.333	-S660	071-32	98
35	98	1.3	3.6	76	15	98	35	98	1.3	62	98	1.3	40.422	-S130	071-32	86
34	100	3.2	3.5	77	15	100	34	100	3.2				40.974	-S400	071-32	94
33	103	2.1	3.4	80	14	103	33	103	2.1	59	103	2.1	42.533	-S220	071-32	90
31	111	1.2	3.2	86	13	111	31	111	1.2	55	111	1.2	45.711	-S130	071-32	86
31	112	3.2	3.2	86	13	112	31	112	3.2				45.956	-S660	071-32	98
30	114	2.8	3.1	88	13	114	30	114	2.8	54	114	2.8	46.933	-S400	071-32	94
29	117	1.9	3.0	90	13	117	29	117	1.9	52	117	1.9	48.190	-S220	071-32	90
29	119	2.8	3.0	92	12	119	29	119	2.8	52	119	2.8	48.950	-S660	071-32	98
28	125	1.0	2.8	96	12	124	28	125	1.0	49	124	1.1	51.230	-S130	071-32	86
27	126	1.8	2.8	97	12	125	27	126	1.8	49	125	1.8	51.620	-S220	071-32	90
27	129	2.7	2.7	99	11	129	27	129	2.7	48	129	2.7	53.026	-S400	071-32	94
25	136	2.8	2.6	104	11	135	25	136	2.8	45	135	2.8	55.773	-S660	071-32	98
25	138	1.9	2.5	107	11	138	25	138	1.9	44	138	1.9	56.960	-S400	071-32	94

Selection tables, 4-pole motors



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

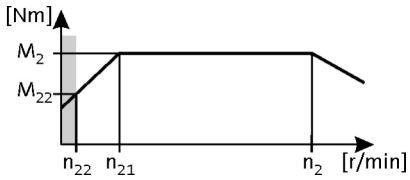
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
24	141	0.9	2.5	109	10	141	24	141	0.9	44	141	0.9	57.933	-S130	071-32	86
24	142	1.6	2.5	110	10	142	24	142	1.6	43	142	1.6	58.486	-S220	071-32	90
22	156	0.8	2.3	120	9.3	156	22	156	0.8	39	156	0.8	64.200	-S130	071-32	86
22	156	1.9	2.3	121	9.3	156	22	156	1.9	39	156	1.9	64.354	-S400	071-32	94
21	160	1.1	2.2	124	9.1	160	21	160	1.1	38	160	1.1	65.975	-S220	071-32	90
19	182	1.1	1.9	140	8.0	181	19	182	1.1	34	181	1.1	74.750	-S220	071-32	90

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
35	96	2.3	3.6	74	15	96	35	96	2.3	63	96	1.9	40.012	-S220	071-32	90
31	109	2.0	3.2	84	13	108	31	109	2.0	56	108	1.7	45.333	-S220	071-32	90
27	126	1.8	2.8	97	11	126	27	126	1.8	48	126	1.7	52.587	-S220	071-32	90
24	139	2.9	2.5	107	10	139	24	139	2.9	43	139	2.8	58.027	-S400	071-32	94
24	143	1.5	2.4	110	10	142	24	143	1.5	42	142	1.5	59.581	-S220	071-32	90
22	157	2.6	2.2	121	9.2	157	22	157	2.6	38	157	2.4	65.559	-S400	071-32	94
21	161	1.4	2.2	124	8.9	161	21	161	1.4	37	161	1.3	67.298	-S220	071-32	90
19	178	2.3	2.0	137	8.1	177	19	178	2.3	34	177	2.3	74.260	-S400	071-32	94
19	183	1.2	1.9	141	7.9	182	19	183	1.2	33	182	1.2	76.249	-S220	071-32	90
17	201	2.0	1.7	155	7.2	201	17	201	2.0	30	201	2.0	83.900	-S400	071-32	94
16	206	1.1	1.7	159	7.0	206	16	206	1.1	29	206	1.1	86.079	-S220	071-32	90
16	213	3.1	1.6	164	6.7	213	16	213	3.1	28	213	3.1	89.048	-S660	071-32	98
15	227	1.8	1.5	175	6.3	227	15	227	1.8	27	227	1.8	94.984	-S400	071-32	94
15	234	0.9	1.5	180	6.2	233	15	234	0.9	26	233	0.9	97.528	-S220	071-32	90
14	243	2.7	1.4	187	5.9	243	14	243	2.7	25	243	2.7	101.460	-S660	071-32	98
13	257	1.6	1.4	198	5.6	256	13	257	1.6	24	256	1.6	107.314	-S400	071-32	94
13	261	2.5	1.3	201	5.5	261	13	261	2.5	23	261	2.5	109.083	-S660	071-32	98
13	268	0.8	1.3	206	5.4	267	13	268	0.8	23	267	0.8	111.747	-S220	071-32	90
11	295	1.4	1.2	227	4.9	295	11	295	1.4	20	295	1.4	123.307	-S400	071-32	94
11	298	2.2	1.2	229	4.8	297	11	298	2.2	20	297	2.2	124.289	-S660	071-32	98
10	328	2.0	1.1	253	4.4	328	10	328	2.0	18	328	2.0	137.133	-S660	071-32	98
10	334	1.2	1.0	257	4.3	333	10	334	1.2	18	333	1.2	139.313	-S400	071-32	94
9.0	374	1.8	0.9	288	3.8	373	9.0	374	1.8	16	373	1.8	156.249	-S660	071-32	98
8.9	378	1.1	0.9	291	3.8	378	8.9	378	1.1	16	378	1.1	158.019	-S400	071-32	94
8.0	423	1.6	0.8	326	3.4	422	8.0	423	1.6	14	422	1.6	176.611	-S660	071-32	98
7.9	428	0.9	0.8	329	3.4	427	7.9	428	0.9	14	427	0.9	178.531	-S400	071-32	94
7.0	482	1.4	0.7	371	3.0	481	7.0	482	1.4	13	481	1.4	201.230	-S660	071-32	98
6.9	490	0.8	0.7	377	2.9	489	6.9	490	0.8	12	489	0.8	204.412	-S400	071-32	94
6.3	536	1.2	0.6	413	2.7	535	6.3	536	1.2	11	535	1.2	223.833	-S660	071-32	98

Selection tables, 4-pole motors

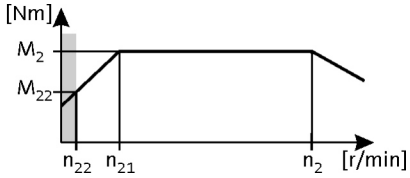


50 Hz: P_N = 0.37 kW
87 Hz: P_N = 0.66 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
5.5	611	1.1	0.6	470	2.4	610	5.5	611	1.1	9.9	610	1.1	255.034	-S660	071-32	98
5.0	672	0.9	0.5	517	2.1	670	5.0	672	0.9	9.0	670	0.9	280.500	-S660	071-32	98
4.4	765	0.9	0.5	589	1.9	764	4.4	765	0.9	7.9	764	0.9	319.600	-S660	071-32	98

Selection tables, 4-pole motors

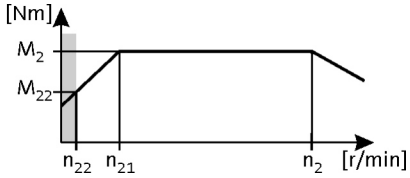


50 Hz: P_N = 0.55 kW
87 Hz: P_N = 1.0 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
384	13	4.5	40	10	164	13	384	13	4.5				3.661	-S130	071-42	86
280	18	4.2	29	14	120	18	280	18	4.2				5.021	-S130	071-42	86
240	21	4.5	25	16	102	21	240	21	4.5				5.860	-S400	071-42	94
219	23	3.7	23	18	93	23	219	23	3.7				6.425	-S130	071-42	86
200	25	3.6	21	20	85	25	200	25	3.6				7.029	-S130	071-42	86
169	30	3.8	17	23	72	30	169	30	3.8				8.322	-S130	071-42	86
149	34	3.7	15	26	64	34	149	34	3.7				9.411	-S130	071-42	86
123	41	3.1	13	32	53	41	123	41	3.1	220	42	2.6	11.413	-S130	071-42	86
109	47	2.8	11	36	47	47	109	47	2.8	195	48	2.3	12.907	-S130	071-42	86
96	53	2.5	9.9	41	41	53	96	53	2.5	172	54	2.0	14.606	-S130	071-42	86
95	54	4.5	9.8	41	41	54	95	54	4.5				14.806	-S400	071-42	94
88	58	2.2	9.1	45	38	58	88	58	2.2	157	59	1.9	15.979	-S130	071-42	86
78	66	2.0	8.0	51	33	66	78	66	2.0	139	67	1.9	18.069	-S130	071-42	86
75	68	3.2	7.7	52	32	68	75	68	3.2	134	69	3.0	18.776	-S220	071-42	90
69	74	3.0	7.1	57	30	74	69	74	3.0	124	75	2.8	20.300	-S220	071-42	90
69	74	1.8	7.1	57	29	74	69	74	1.8	123	75	1.7	20.381	-S130	071-42	86
61	83	2.6	6.3	64	26	83	61	83	2.6	109	85	2.5	23.000	-S220	071-42	90
61	84	1.6	6.3	64	26	84	61	84	1.6	109	85	1.5	23.048	-S130	071-42	86
56	91	1.4	5.8	70	24	91	56	91	1.4	101	92	1.4	24.967	-S130	071-42	86
53	96	2.3	5.5	74	23	96	53	96	2.3	95	97	2.2	26.422	-S220	071-42	90
50	102	1.3	5.1	79	21	102	50	102	1.3	89	104	1.2	28.233	-S130	071-42	86
47	109	2.0	4.8	84	20	109	47	109	2.0	84	110	1.9	29.937	-S220	071-42	90
45	113	3.2	4.7	87	19	113	45	113	3.2	81	115	3.1	31.167	-S660	071-42	98
45	114	1.1	4.6	88	19	114	45	114	1.1	80	116	1.1	31.387	-S130	071-42	86
43	119	1.9	4.4	92	18	119	43	119	1.9	77	121	1.8	32.867	-S220	071-42	90
40	129	1.0	4.1	99	17	129	40	129	1.0	71	131	1.0	35.493	-S130	071-42	86
40	129	3.2	4.1	99	17	129	40	129	3.2	71	131	3.1	35.511	-S660	071-42	98
39	132	2.9	4.0	101	17	132	39	132	2.9	69	134	2.8	36.267	-S400	071-42	94
38	135	1.6	3.9	104	16	135	38	135	1.6	68	137	1.6	37.238	-S220	071-42	90
35	146	2.9	3.6	113	15	146	35	146	2.9	62	149	2.8	40.333	-S660	071-42	98
35	147	0.9	3.6	113	15	147	35	147	0.9	62	149	0.9	40.422	-S130	071-42	86
34	149	2.7	3.5	114	15	149	34	149	2.7	61	151	2.7	40.974	-S400	071-42	94
33	154	1.4	3.4	119	14	154	33	154	1.4	59	157	1.4	42.533	-S220	071-42	90
31	167	2.9	3.2	128	13	167	31	167	2.9	55	169	2.8	45.956	-S660	071-42	98
30	170	1.9	3.1	131	13	170	30	170	1.9	54	173	1.8	46.933	-S400	071-42	94

Selection tables, 4-pole motors



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

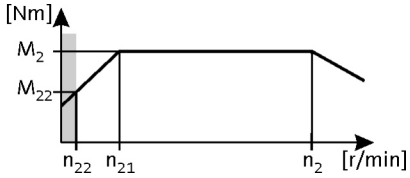
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
29	175	1.3	3.0	135	13	175	29	175	1.3	52	178	1.2	48.190	-S220	071-42	90
29	178	2.4	3.0	137	12	178	29	178	2.4	51	180	2.4	48.950	-S660	071-42	98
27	187	1.2	2.8	144	12	187	27	187	1.2	49	190	1.2	51.620	-S220	071-42	90
27	192	1.8	2.7	148	11	192	27	192	1.8	47	195	1.8	53.026	-S400	071-42	94
25	202	2.4	2.6	156	11	202	25	202	2.4	45	205	2.4	55.773	-S660	071-42	98
25	207	1.3	2.5	159	11	207	25	207	1.3	44	210	1.3	56.960	-S400	071-42	94
24	212	1.0	2.5	163	10	212	24	212	1.0	43	215	1.0	58.486	-S220	071-42	90
22	233	1.3	2.3	180	9.3	233	22	233	1.3	39	237	1.3	64.354	-S400	071-42	94

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
25	203	3.2	2.6	156	11	203	25	203	3.2	44	206	3.0	56.818	-S660	071-42	98
24	207	1.9	2.5	160	10	207	24	207	1.9	43	211	1.8	58.027	-S400	071-42	94
22	228	2.9	2.3	176	9.4	228	22	228	2.9	39	232	2.7	63.817	-S660	071-42	98
21	234	1.7	2.2	180	9.2	234	21	234	1.7	38	238	1.6	65.559	-S400	071-42	94
20	249	2.7	2.1	192	8.6	249	20	249	2.7	36	253	2.5	69.813	-S660	071-42	98
19	260	2.5	2.0	200	8.3	260	19	260	2.5	35	264	2.5	72.713	-S660	071-42	98
19	265	1.5	2.0	204	8.1	265	19	265	1.5	34	269	1.5	74.260	-S400	071-42	94
18	284	2.3	1.8	219	7.5	284	18	284	2.3	32	289	2.3	79.545	-S660	071-42	98
17	300	1.3	1.7	231	7.2	300	17	300	1.3	30	304	1.3	83.900	-S400	071-42	94
16	318	2.1	1.6	245	6.7	318	16	318	2.1	28	323	2.0	89.048	-S660	071-42	98
15	339	1.2	1.5	261	6.3	339	15	339	1.2	27	345	1.2	94.984	-S400	071-42	94
14	362	1.8	1.4	279	5.9	362	14	362	1.8	25	368	1.8	101.460	-S660	071-42	98
13	383	1.0	1.4	295	5.6	383	13	383	1.0	23	389	1.0	107.314	-S400	071-42	94
13	390	1.7	1.3	300	5.5	390	13	390	1.7	23	396	1.7	109.083	-S660	071-42	98
11	441	0.9	1.2	339	4.9	441	11	441	0.9	20	447	0.9	123.307	-S400	071-42	94
11	444	1.5	1.2	342	4.8	444	11	444	1.5	20	451	1.5	124.289	-S660	071-42	98
10	490	1.4	1.1	377	4.4	490	10	490	1.4	18	498	1.3	137.133	-S660	071-42	98
10	498	0.8	1.0	383	4.3	498	10	498	0.8				139.313	-S400	071-42	94
9.0	558	1.2	0.9	430	3.8	558	9.0	558	1.2	16	567	1.2	156.249	-S660	071-42	98
8.0	631	1.1	0.8	486	3.4	631	8.0	631	1.1	14	641	1.0	176.611	-S660	071-42	98
7.0	719	0.9	0.7	554	3.0	719	7.0	719	0.9	13	730	0.9	201.230	-S660	071-42	98

Selection tables, 4-pole motors

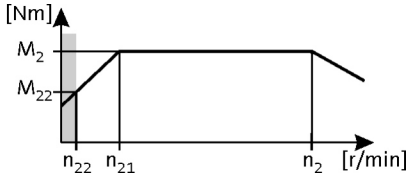


50 Hz: P_N = 0.75 kW
87 Hz: P_N = 1.35 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
385	18	3.5	40	14	164	18	385	18	3.5				3.661	-S130	080-32	86
281	25	3.1	29	19	120	25	281	25	3.1	502	25	2.6	5.021	-S130	080-32	86
241	29	4.1	25	22	102	29	241	29	4.1	430	29	3.5	5.860	-S400	080-32	94
219	32	2.8	23	24	93	32	219	32	2.8	392	32	2.3	6.425	-S130	080-32	86
201	35	2.7	21	27	85	35	201	35	2.7	359	35	2.2	7.029	-S130	080-32	86
169	41	2.8	17	32	72	41	169	41	2.8	303	41	2.4	8.322	-S130	080-32	86
150	46	2.7	15	36	64	46	150	46	2.7	268	47	2.3	9.411	-S130	080-32	86
124	56	2.3	13	43	53	56	124	56	2.3	221	57	1.9	11.413	-S130	080-32	86
109	64	2.0	11	49	47	64	109	64	2.0	195	64	1.7	12.907	-S130	080-32	86
97	72	1.8	9.9	55	41	72	97	72	1.8	173	72	1.5	14.606	-S130	080-32	86
96	73	3.0	9.9	56	41	73	96	73	3.0	171	73	2.5	14.720	-S220	080-32	90
95	73	4.1	9.8	56	41	73	95	73	4.1				14.806	-S400	080-32	94
88	79	1.7	9.1	61	38	79	88	79	1.7	158	79	1.4	15.979	-S130	080-32	86
85	82	2.7	8.8	63	36	82	85	82	2.7	152	82	2.3	16.571	-S220	080-32	90
78	89	1.5	8.0	69	33	89	78	89	1.5	140	90	1.4	18.069	-S130	080-32	86
75	93	2.4	7.7	71	32	93	75	93	2.4	134	93	2.3	18.776	-S220	080-32	90
70	100	2.2	7.1	77	30	100	70	100	2.2	124	101	2.1	20.300	-S220	080-32	90
69	100	1.3	7.1	77	29	100	69	100	1.3	124	101	1.2	20.381	-S130	080-32	86
61	113	1.9	6.3	87	26	113	61	113	1.9	110	114	1.8	23.000	-S220	080-32	90
61	114	1.1	6.3	87	26	114	61	114	1.1	109	114	1.1	23.048	-S130	080-32	86
57	123	1.1	5.8	95	24	123	57	123	1.1	101	124	1.0	24.967	-S130	080-32	86
56	125	3.2	5.7	96	24	125	56	125	3.2	100	126	3.0	25.308	-S400	080-32	94
53	130	1.7	5.5	100	23	130	53	130	1.7	95	131	1.6	26.422	-S220	080-32	90
50	139	0.9	5.1	107	21	139	50	139	0.9	89	140	0.9	28.233	-S130	080-32	86
48	144	2.8	5.0	111	21	144	48	144	2.8	86	145	2.6	29.156	-S400	080-32	94
47	148	1.5	4.8	114	20	148	47	148	1.5	84	149	1.4	29.937	-S220	080-32	90
45	154	2.9	4.7	118	19	154	45	154	2.9				31.167	-S660	080-32	98
45	155	0.8	4.6	119	19	155	45	155	0.8	80	156	0.8	31.387	-S130	080-32	86
43	162	1.4	4.4	125	18	162	43	162	1.4	77	163	1.4	32.867	-S220	080-32	90
43	162	2.5	4.4	125	18	162	43	162	2.5	77	163	2.5	32.940	-S400	080-32	94
40	175	2.9	4.1	135	17	175	40	175	2.9				35.511	-S660	080-32	98
39	179	2.2	4.0	138	17	179	39	179	2.2	70	180	2.2	36.267	-S400	080-32	94
38	184	1.2	3.9	141	16	184	38	184	1.2	68	185	1.2	37.238	-S220	080-32	90
35	199	2.6	3.6	153	15	199	35	199	2.6	63	200	2.6	40.333	-S660	080-32	98
34	202	2.0	3.5	155	15	202	34	202	2.0	62	203	2.0	40.974	-S400	080-32	94

Selection tables, 4-pole motors



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

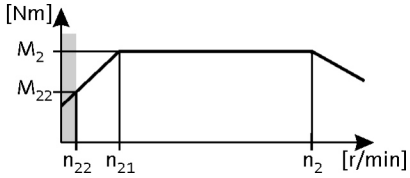
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
33	210	1.1	3.4	161	14	210	33	210	1.1	59	211	1.0	42.533	-S220	080-32	90
31	226	2.6	3.2	174	13	226	31	226	2.6	55	228	2.6	45.956	-S660	080-32	98
30	231	1.4	3.1	178	13	231	30	231	1.4	54	233	1.4	46.933	-S400	080-32	94
29	237	0.9	3.0	183	13	237	29	237	0.9	52	239	0.9	48.190	-S220	080-32	90
29	241	1.9	3.0	186	12	241	29	241	1.9	52	243	1.8	48.950	-S660	080-32	98
27	254	0.9	2.8	196	12	254	27	254	0.9	49	256	0.9	51.620	-S220	080-32	90
27	261	1.3	2.7	201	11	261	27	261	1.3	48	263	1.3	53.026	-S400	080-32	94
25	275	1.9	2.6	212	11	275	25	275	1.9	45	277	1.8	55.773	-S660	080-32	98
25	281	1.0	2.5	216	11	281	25	281	1.0	44	283	1.0	56.960	-S400	080-32	94
22	317	1.0	2.3	244	9.3	317	22	317	1.0	39	319	1.0	64.354	-S400	080-32	94

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
28	242	2.6	2.9	186	12	242	28	242	2.6	51	244	2.5	49.867	-S660	080-32	98
27	255	0.9	2.8	197	11	255	27	255	0.9	48	257	0.8	52.587	-S220	080-32	90
25	276	2.4	2.6	212	11	276	25	276	2.4	44	278	2.2	56.818	-S660	080-32	98
24	282	1.4	2.5	217	10	282	24	282	1.4	43	284	1.4	58.027	-S400	080-32	94
22	310	2.1	2.3	239	9.4	310	22	310	2.1	40	312	2.0	63.817	-S660	080-32	98
22	318	1.3	2.2	245	9.2	318	22	318	1.3	38	321	1.2	65.559	-S400	080-32	94
20	339	2.0	2.1	261	8.6	339	20	339	2.0	36	341	1.9	69.813	-S660	080-32	98
19	353	1.9	2.0	272	8.3	353	19	353	1.9	35	355	1.9	72.713	-S660	080-32	98
19	360	1.1	2.0	278	8.1	360	19	360	1.1	34	363	1.1	74.260	-S400	080-32	94
18	386	1.7	1.8	297	7.5	386	18	386	1.7	32	389	1.7	79.545	-S660	080-32	98
17	407	1.0	1.7	314	7.2	407	17	407	1.0	30	410	1.0	83.900	-S400	080-32	94
16	432	1.5	1.6	333	6.7	432	16	432	1.5	28	435	1.5	89.048	-S660	080-32	98
15	461	0.9	1.5	355	6.3	461	15	461	0.9	27	464	0.9	94.984	-S400	080-32	94
14	493	1.3	1.4	379	5.9	493	14	493	1.3	25	496	1.3	101.460	-S660	080-32	98
13	530	1.3	1.3	408	5.5	530	13	530	1.3	23	533	1.2	109.083	-S660	080-32	98
11	603	1.1	1.2	464	4.8	603	11	603	1.1	20	608	1.1	124.289	-S660	080-32	98
10	666	1.0	1.1	512	4.4	666	10	666	1.0	18	670	1.0	137.133	-S660	080-32	98
9.0	758	0.9	0.9	584	3.8	758	9.0	758	0.9	16	764	0.9	156.249	-S660	080-32	98

Selection tables, 4-pole motors

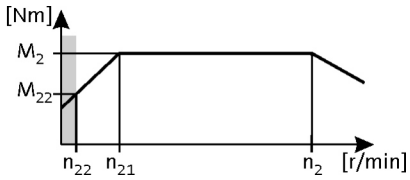


50 Hz: P_N = 1.1 kW
87 Hz: P_N = 2.0 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
391	26	2.4	40	18	164	26	391	26	2.4	694	27	2.0	3.661	-S130	090-12	86
312	33	5.8	32	23	131	33	312	33	5.8				4.579	-S400	090-12	94
285	36	2.1	29	25	120	36	285	36	2.1	506	37	1.7	5.021	-S130	090-12	86
244	42	5.4	25	29	102	42	244	42	5.4				5.860	-S400	090-12	94
223	46	1.9	23	32	93	46	223	46	1.9	395	47	1.6	6.425	-S130	090-12	86
203	50	1.8	21	35	85	50	203	50	1.8	361	51	1.5	7.029	-S130	090-12	86
172	59	2.0	17	42	72	59	172	59	2.0	305	61	1.6	8.322	-S130	090-12	86
152	67	1.9	15	47	64	67	152	67	1.9	270	69	1.5	9.411	-S130	090-12	86
136	75	2.9	14	53	57	75	136	75	2.9	242	77	2.4	10.514	-S220	090-12	90
125	81	1.6	13	57	53	81	125	81	1.6	223	83	1.3	11.413	-S130	090-12	86
120	85	2.6	12	59	51	85	120	85	2.6	214	87	2.1	11.876	-S220	090-12	90
111	92	1.4	11	64	47	92	111	92	1.4	197	94	1.2	12.907	-S130	090-12	86
110	93	2.4	11	65	46	93	110	93	2.4	196	95	2.0	12.992	-S220	090-12	90
106	96	2.3	11	67	45	96	106	96	2.3	189	98	1.9	13.456	-S220	090-12	90
98	104	1.3	9.9	73	41	104	98	104	1.3	174	107	1.0	14.606	-S130	090-12	86
97	105	2.1	9.9	73	41	105	97	105	2.1	173	107	1.7	14.720	-S220	090-12	90
97	106	3.8	9.8	74	41	106	97	106	3.8				14.806	-S400	090-12	94
90	114	1.1	9.1	80	38	114	90	114	1.1	159	117	0.9	15.979	-S130	090-12	86
86	118	1.9	8.8	83	36	118	86	118	1.9	153	121	1.5	16.571	-S220	090-12	90
79	129	1.0	8.0	90	33	129	79	129	1.0	141	132	0.9	18.069	-S130	090-12	86
78	130	3.1	7.9	91	33	130	78	130	3.1	139	133	2.9	18.286	-S400	090-12	94
76	134	1.6	7.7	94	32	134	76	134	1.6	135	137	1.5	18.776	-S220	090-12	90
70	145	1.5	7.1	101	30	145	70	145	1.5	125	148	1.4	20.300	-S220	090-12	90
70	145	0.9	7.1	102	29	145	70	145	0.9	125	149	0.8	20.381	-S130	090-12	86
69	147	2.7	7.0	103	29	147	69	147	2.7	123	151	2.5	20.659	-S400	090-12	94
64	160	2.5	6.5	112	27	160	64	160	2.5	113	163	2.3	22.400	-S400	090-12	94
62	164	1.3	6.3	115	26	164	62	164	1.3	110	168	1.3	23.000	-S220	090-12	90
57	179	3.2	5.8	125	24	179	57	179	3.2	101	183	3.0	25.056	-S660	090-12	98
57	180	2.2	5.7	126	24	180	57	180	2.2	100	185	2.1	25.308	-S400	090-12	94
54	188	1.2	5.5	132	23	188	54	188	1.2	96	193	1.1	26.422	-S220	090-12	90
50	203	3.2	5.1	142	21	203	50	203	3.2	89	208	3.0	28.548	-S660	090-12	98
49	208	1.9	5.0	146	21	208	49	208	1.9	87	213	1.8	29.156	-S400	090-12	94
48	213	1.0	4.8	149	20	213	48	213	1.0	85	218	1.0	29.937	-S220	090-12	90
46	222	3.0	4.7	156	19	222	46	222	3.0	82	227	2.9	31.167	-S660	090-12	98
44	234	0.9	4.4	164	18	234	44	234	0.9	77	240	0.9	32.867	-S220	090-12	90

Selection tables, 4-pole motors



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

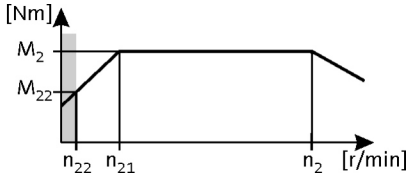
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
43	235	1.7	4.4	164	18	235	43	235	1.7	77	240	1.7	32.940	-S400	090-12	94
40	253	2.6	4.1	177	17	253	40	253	2.6	72	259	2.6	35.511	-S660	090-12	98
39	258	1.6	4.0	181	17	258	39	258	1.6	70	265	1.5	36.267	-S400	090-12	94
38	265	0.8	3.9	186	16	265	38	265	0.8	68	272	0.8	37.238	-S220	090-12	90
36	287	1.9	3.6	201	15	287	36	287	1.9	63	294	1.9	40.333	-S660	090-12	98
35	292	1.4	3.5	204	15	292	35	292	1.4	62	299	1.3	40.974	-S400	090-12	94
31	328	1.9	3.2	229	13	328	31	328	1.9	55	335	1.9	45.956	-S660	090-12	98
29	349	1.3	3.0	244	12	349	29	349	1.3	52	357	1.3	48.950	-S660	090-12	98
26	397	1.3	2.6	278	11	397	26	397	1.3	46	407	1.3	55.773	-S660	090-12	98

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
29	350	1.8	2.9	245	12	350	29	350	1.8	51	358	1.7	49.867	-S660	090-12	98
25	399	1.6	2.6	279	11	399	25	399	1.6	45	408	1.5	56.818	-S660	090-12	98
22	448	1.5	2.3	314	9.4	448	22	448	1.5	40	459	1.4	63.817	-S660	090-12	98
21	490	1.4	2.1	343	8.6	490	21	490	1.4	36	502	1.3	69.813	-S660	090-12	98
20	510	1.3	2.0	357	8.3	510	20	510	1.3	35	523	1.3	72.713	-S660	090-12	98
18	558	1.2	1.8	391	7.5	558	18	558	1.2	32	572	1.2	79.545	-S660	090-12	98
16	625	1.1	1.6	438	6.7	625	16	625	1.1	29	640	1.0	89.048	-S660	090-12	98
14	712	0.9	1.4	499	5.9	712	14	712	0.9	25	729	0.9	101.460	-S660	090-12	98
13	766	0.9	1.3	536	5.5	766	13	766	0.9	23	784	0.8	109.083	-S660	090-12	98

Selection tables, 4-pole motors

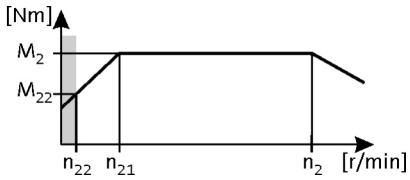


50 Hz: P_N = 1.5 kW
87 Hz: P_N = 2.7 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
392	35	1.8	40	25	164	35	392	35	1.8	695	36	1.5	3.661	-S130	090-32	86
313	44	4.3	32	31	131	44	313	44	4.3				4.579	-S400	090-32	94
286	49	1.6	29	34	120	49	286	49	1.6	507	49	1.3	5.021	-S130	090-32	86
245	57	4.0	25	40	102	57	245	57	4.0				5.860	-S400	090-32	94
223	62	1.4	23	44	93	62	223	62	1.4	396	63	1.2	6.425	-S130	090-32	86
204	68	1.4	21	48	85	68	204	68	1.4	362	69	1.1	7.029	-S130	090-32	86
187	74	2.9	19	52	78	74	187	74	2.9	332	75	2.4	7.667	-S220	090-32	90
172	81	1.4	17	56	72	81	172	81	1.4				8.322	-S130	090-32	86
155	90	2.5	16	63	65	90	155	90	2.5	274	91	2.0	9.280	-S220	090-32	90
153	91	1.4	15	64	64	91	153	91	1.4				9.411	-S130	090-32	86
137	102	2.2	14	71	57	102	137	102	2.2	242	103	1.8	10.514	-S220	090-32	90
126	111	1.2	13	77	53	111	126	111	1.2				11.413	-S130	090-32	86
121	115	1.9	12	81	51	115	121	115	1.9	214	117	1.6	11.876	-S220	090-32	90
111	125	1.0	11	88	47	125	111	125	1.0				12.907	-S130	090-32	86
111	126	1.8	11	88	46	126	111	126	1.8	196	128	1.4	12.992	-S220	090-32	90
110	127	3.2	11	89	46	127	110	127	3.2	194	129	2.6	13.105	-S400	090-32	94
107	130	1.7	11	91	45	130	107	130	1.7	189	132	1.4	13.456	-S220	090-32	90
100	139	2.9	10	97	42	139	100	139	2.9	178	141	2.4	14.336	-S400	090-32	94
98	141	0.9	9.9	99	41	141	98	141	0.9				14.606	-S130	090-32	86
98	143	1.5	9.9	100	41	143	98	143	1.5	173	145	1.3	14.720	-S220	090-32	90
97	143	2.8	9.8	100	41	143	97	143	2.8	172	146	2.3	14.806	-S400	090-32	94
90	155	0.8	9.1	108	38	155	90	155	0.8				15.979	-S130	090-32	86
89	157	2.6	9.0	110	37	157	89	157	2.6	157	159	2.1	16.197	-S400	090-32	94
87	160	1.4	8.8	112	36	160	87	160	1.4	154	163	1.1	16.571	-S220	090-32	90
79	177	2.3	7.9	124	33	177	79	177	2.3	139	180	2.1	18.286	-S400	090-32	94
76	182	1.2	7.7	127	32	182	76	182	1.2	136	185	1.1	18.776	-S220	090-32	90
71	197	1.1	7.1	138	30	197	71	197	1.1	125	200	1.1	20.300	-S220	090-32	90
70	200	2.0	7.0	140	29	200	70	200	2.0	123	203	1.9	20.659	-S400	090-32	94
65	212	3.1	6.6	149	27	212	65	212	3.1	116	216	2.9	21.933	-S660	090-32	98
64	217	1.8	6.5	152	27	217	64	217	1.8	114	220	1.7	22.400	-S400	090-32	94
62	223	1.0	6.3	156	26	223	62	223	1.0	111	226	0.9	23.000	-S220	090-32	90
57	243	2.4	5.8	170	24	243	57	243	2.4	102	246	2.2	25.056	-S660	090-32	98
57	245	1.6	5.7	172	24	245	57	245	1.6	101	249	1.5	25.308	-S400	090-32	94
54	256	0.9	5.5	179	23	256	54	256	0.9	96	260	0.8	26.422	-S220	090-32	90
50	276	2.4	5.1	194	21	276	50	276	2.4	89	281	2.2	28.548	-S660	090-32	98

Selection tables, 4-pole motors



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

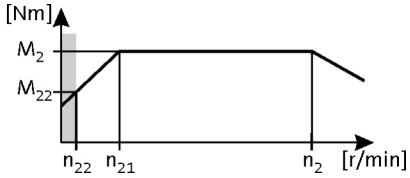
2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
49	282	1.4	5.0	198	21	282	49	282	1.4	87	287	1.3	29.156	-S400	090-32	94
46	302	2.2	4.7	211	19	302	46	302	2.2	82	306	2.2	31.167	-S660	090-32	98
44	319	1.3	4.4	223	18	319	44	319	1.3	77	324	1.2	32.940	-S400	090-32	94
40	344	1.9	4.1	241	17	344	40	344	1.9	72	349	1.9	35.511	-S660	090-32	98
40	351	1.1	4.0	246	17	351	40	351	1.1	70	356	1.1	36.267	-S400	090-32	94
36	391	1.4	3.6	273	15	391	36	391	1.4	63	396	1.4	40.333	-S660	090-32	98
35	397	1.0	3.5	278	15	397	35	397	1.0	62	403	1.0	40.974	-S400	090-32	94
31	445	1.4	3.2	312	13	445	31	445	1.4	55	452	1.4	45.956	-S660	090-32	98
			3.0	332	12	481				52	481	0.9	48.950	-S660	090-32	98
			2.6	378	11	548				46	548	0.9	55.773	-S660	090-32	98

3-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
29	476	1.3	2.9	333	12	476	29	476	1.3	51	483	1.2	49.867	-S660	090-32	98
25	542	1.2	2.6	379	11	542	25	542	1.2	45	550	1.1	56.818	-S660	090-32	98
23	609	1.1	2.3	426	9.4	609	23	609	1.1	40	618	1.0	63.817	-S660	090-32	98
21	666	1.0	2.1	466	8.6	666	21	666	1.0	37	676	0.9	69.813	-S660	090-32	98
20	694	1.0	2.0	486	8.3	694	20	694	1.0	35	704	0.9	72.713	-S660	090-32	98
18	759	0.9	1.8	531	7.5	759	18	759	0.9	32	770	0.9	79.545	-S660	090-32	98

Selection tables, 4-pole motors

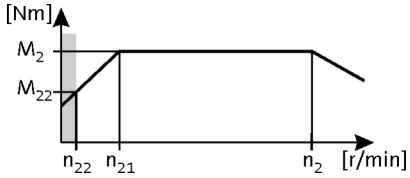


50 Hz: P_N = 2.2 kW
87 Hz: P_N = 3.9 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
376	54	3.3	38	38	156	54	376	54	3.3	665	54	2.7	3.840	-S220	100-12	90
369	55	5.6	37	39	153	55	369	55	5.6				3.920	-S660	100-12	98
316	65	3.8	32	45	131	65	316	65	3.8	558	65	3.2	4.579	-S400	100-12	94
274	74	2.4	28	52	114	74	274	74	2.4	485	74	2.0	5.267	-S220	100-12	90
247	83	3.1	25	58	102	83	247	83	3.1	436	83	2.6	5.860	-S400	100-12	94
225	90	2.9	23	63	94	90	225	90	2.9	399	91	2.4	6.411	-S400	100-12	94
214	95	2.3	21	67	89	95	214	95	2.3				6.767	-S220	100-12	90
194	105	3.5	19	74	80	105	194	105	3.5	342	106	2.9	7.467	-S400	100-12	94
189	108	2.0	19	76	78	108	189	108	2.0				7.667	-S220	100-12	90
171	119	3.2	17	83	71	119	171	119	3.2	303	119	2.7	8.436	-S400	100-12	94
156	131	1.7	16	91	65	131	156	131	1.7				9.280	-S220	100-12	90
141	144	2.8	14	101	59	144	141	144	2.8	250	145	2.3	10.240	-S400	100-12	94
137	148	1.5	14	104	57	148	137	148	1.5				10.514	-S220	100-12	90
125	163	2.5	13	114	52	163	125	163	2.5	221	164	2.1	11.569	-S400	100-12	94
122	168	1.3	12	117	51	168	122	168	1.3				11.876	-S220	100-12	90
111	183	1.2	11	128	46	183	111	183	1.2				12.992	-S220	100-12	90
110	185	2.2	11	129	46	185	110	185	2.2	195	185	1.8	13.105	-S400	100-12	94
107	190	1.2	11	133	45	190	107	190	1.2				13.456	-S220	100-12	90
101	202	2.0	10	141	42	202	101	202	2.0	178	203	1.7	14.336	-S400	100-12	94
98	208	1.1	9.9	145	41	208	98	208	1.1				14.720	-S220	100-12	90
98	209	1.9	9.8	146	41	209	98	209	1.9	173	209	1.6	14.806	-S400	100-12	94
92	222	3.0	9.2	155	38	222	92	222	3.0	163	222	2.5	15.714	-S660	100-12	98
89	228	1.8	9.0	160	37	228	89	228	1.8	158	229	1.5	16.197	-S400	100-12	94
87	234	0.9	8.8	163	36	234	87	234	0.9				16.571	-S220	100-12	90
81	253	2.6	8.1	176	34	253	81	253	2.6	143	253	2.2	17.905	-S660	100-12	98
79	258	1.6	7.9	180	33	258	79	258	1.6	140	259	1.5	18.286	-S400	100-12	94
77	265	0.8	7.7	185	32	265	77	265	0.8				18.776	-S220	100-12	90
75	272	2.4	7.5	190	31	272	75	272	2.4	133	272	2.3	19.250	-S660	100-12	98
70	291	1.4	7.0	203	29	291	70	291	1.4	124	292	1.3	20.659	-S400	100-12	94
66	309	2.1	6.6	216	27	309	66	309	2.1	117	310	2.0	21.933	-S660	100-12	98
65	316	1.3	6.5	221	27	316	65	316	1.3	114	317	1.2	22.400	-S400	100-12	94
58	353	1.6	5.8	247	24	353	58	353	1.6	102	354	1.6	25.056	-S660	100-12	98
57	357	1.1	5.7	249	24	357	57	357	1.1	101	358	1.1	25.308	-S400	100-12	94
51	403	1.6	5.1	281	21	403	51	403	1.6	90	404	1.6	28.548	-S660	100-12	98
46	440	1.5	4.7	307	19	440	46	440	1.5	82	441	1.5	31.167	-S660	100-12	98

Selection tables, 4-pole motors

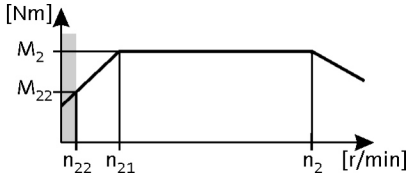


50 Hz: P_N = 2.2 kW
87 Hz: P_N = 3.9 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
41	501	1.3	4.1	350	17	501	41	501	1.3	72	502	1.3	35.511	-S660	100-12	98

Selection tables, 4-pole motors

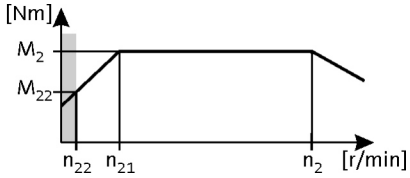


50 Hz: P_N = 3.0 kW
87 Hz: P_N = 5.4 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
433	64	3.2	43	45	180	64	433	64	3.2	765	65	2.6	3.339	-S400	100-32	94
376	74	2.4	38	52	156	74	376	74	2.4				3.840	-S220	100-32	90
369	75	4.1	37	53	153	75	369	75	4.1				3.920	-S660	100-32	98
316	88	2.8	32	62	131	88	316	88	2.8	558	90	2.3	4.579	-S400	100-32	94
274	101	1.8	28	71	114	101	274	101	1.8				5.267	-S220	100-32	90
247	113	2.3	25	79	102	113	247	113	2.3	436	115	1.9	5.860	-S400	100-32	94
225	123	2.1	23	86	94	123	225	123	2.1	399	126	1.7	6.411	-S400	100-32	94
214	130	1.7	21	91	89	130	214	130	1.7				6.767	-S220	100-32	90
194	144	2.5	19	100	80	144	194	144	2.5				7.467	-S400	100-32	94
189	147	1.5	19	103	78	147	189	147	1.5				7.667	-S220	100-32	90
171	162	2.3	17	113	71	162	171	162	2.3				8.436	-S400	100-32	94
156	179	1.2	16	125	65	179	156	179	1.2				9.280	-S220	100-32	90
144	193	3.2	15	135	60	193	144	193	3.2	255	196	2.7	10.027	-S660	100-32	98
141	197	2.0	14	138	59	197	141	197	2.0	250	201	1.7	10.240	-S400	100-32	94
137	202	1.1	14	141	57	202	137	202	1.1				10.514	-S220	100-32	90
128	217	3.1	13	151	53	217	128	217	3.1	227	221	2.5	11.262	-S660	100-32	98
125	223	1.8	13	156	52	223	125	223	1.8				11.569	-S400	100-32	94
122	228	1.0	12	160	51	228	122	228	1.0				11.876	-S220	100-32	90
117	237	2.8	12	166	49	237	117	237	2.8	207	241	2.3	12.320	-S660	100-32	98
113	247	2.7	11	173	47	247	113	247	2.7	199	251	2.2	12.832	-S660	100-32	98
111	250	0.9	11	175	46	250	111	250	0.9				12.992	-S220	100-32	90
110	252	1.6	11	176	46	252	110	252	1.6	195	257	1.3	13.105	-S400	100-32	94
107	259	0.9	11	181	45	259	107	259	0.9				13.456	-S220	100-32	90
103	270	2.4	10	189	43	270	103	270	2.4	182	275	2.0	14.037	-S660	100-32	98
101	276	1.5	10	193	42	276	101	276	1.5	178	281	1.2	14.336	-S400	100-32	94
98	285	1.4	9.8	199	41	285	98	285	1.4				14.806	-S400	100-32	94
92	302	2.2	9.2	211	38	302	92	302	2.2	163	308	1.8	15.714	-S660	100-32	98
89	312	1.3	9.0	218	37	312	89	312	1.3	158	317	1.1	16.197	-S400	100-32	94
81	344	1.9	8.1	241	34	344	81	344	1.9	143	351	1.6	17.905	-S660	100-32	98
79	352	1.1	7.9	246	33	352	79	352	1.1	140	358	1.1	18.286	-S400	100-32	94
75	370	1.8	7.5	259	31	370	75	370	1.8	133	377	1.7	19.250	-S660	100-32	98
70	397	1.0	7.0	278	29	397	70	397	1.0	124	405	0.9	20.659	-S400	100-32	94
66	422	1.6	6.6	295	27	422	66	422	1.6	117	429	1.5	21.933	-S660	100-32	98
65	431	0.9	6.5	301	27	431	65	431	0.9	114	439	0.9	22.400	-S400	100-32	94
58	482	1.2	5.8	337	24	482	58	482	1.2	102	491	1.1	25.056	-S660	100-32	98

Selection tables, 4-pole motors

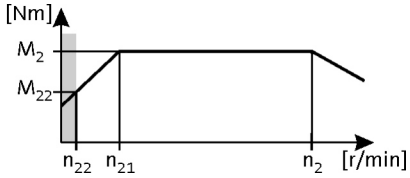


50 Hz: P_N = 3.0 kW
87 Hz: P_N = 5.4 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
57	487	0.8	5.7	340	24	487	57	487	0.8				25.308	-S400	100-32	94
51	549	1.2	5.1	384	21	549	51	549	1.2	90	559	1.1	28.548	-S660	100-32	98
46	599	1.1	4.7	419	19	599	46	599	1.1	82	610	1.1	31.167	-S660	100-32	98
41	683	1.0	4.1	478	17	683	41	683	1.0	72	695	1.0	35.511	-S660	100-32	98

Selection tables, 4-pole motors

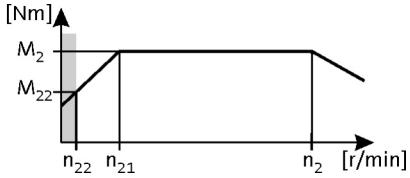


50 Hz: P_N = 4.0 kW
87 Hz: P_N = 7.1 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
436	85	2.4	43	53	180	85	436	85	2.4				3.339	-S400	112-22	94
371	100	3.4	37	63	153	100	371	100	3.4				3.920	-S660	112-22	98
318	117	2.1	32	73	131	117	318	117	2.1	560	117	1.7	4.579	-S400	112-22	94
248	149	1.7	25	94	102	149	248	149	1.7	438	150	1.4	5.860	-S400	112-22	94
227	163	1.6	23	102	94	163	227	163	1.6	400	164	1.3	6.411	-S400	112-22	94
212	175	2.8	21	110	87	175	212	175	2.8	373	176	2.4	6.880	-S660	112-22	98
199	186	3.2	20	117	82	186	199	186	3.2				7.311	-S660	112-22	98
195	190	1.9	19	119	80	190	195	190	1.9				7.467	-S400	112-22	94
173	215	1.8	17	135	71	215	173	215	1.8				8.436	-S400	112-22	94
165	224	2.9	17	140	68	224	165	224	2.9				8.800	-S660	112-22	98
145	255	2.5	15	160	60	255	145	255	2.5				10.027	-S660	112-22	98
142	261	1.5	14	163	59	261	142	261	1.5				10.240	-S400	112-22	94
129	287	2.3	13	180	53	287	129	287	2.3	228	289	1.9	11.262	-S660	112-22	98
126	295	1.4	13	185	52	295	126	295	1.4				11.569	-S400	112-22	94
118	314	2.1	12	197	49	314	118	314	2.1	208	316	1.8	12.320	-S660	112-22	98
113	327	2.0	11	205	47	327	113	327	2.0	200	329	1.7	12.832	-S660	112-22	98
111	334	1.2	11	209	46	334	111	334	1.2				13.105	-S400	112-22	94
104	358	1.9	10	224	43	358	104	358	1.9				14.037	-S660	112-22	98
102	365	1.1	10	229	42	365	102	365	1.1				14.336	-S400	112-22	94
98	377	1.1	9.8	236	41	377	98	377	1.1				14.806	-S400	112-22	94
93	400	1.7	9.2	251	38	400	93	400	1.7	163	403	1.4	15.714	-S660	112-22	98
90	413	1.0	9.0	258	37	413	90	413	1.0				16.197	-S400	112-22	94
81	456	1.5	8.1	286	34	456	81	456	1.5	143	459	1.2	17.905	-S660	112-22	98
80	466	0.9	7.9	292	33	466	80	466	0.9				18.286	-S400	112-22	94
76	490	1.4	7.5	307	31	490	76	490	1.4	133	494	1.3	19.250	-S660	112-22	98
66	559	1.2	6.6	350	27	559	66	559	1.2	117	562	1.1	21.933	-S660	112-22	98
58	638	0.9	5.8	400	24	638	58	638	0.9	102	643	0.9	25.056	-S660	112-22	98
51	727	0.9	5.1	455	21	727	51	727	0.9	90	732	0.9	28.548	-S660	112-22	98

Selection tables, 4-pole motors

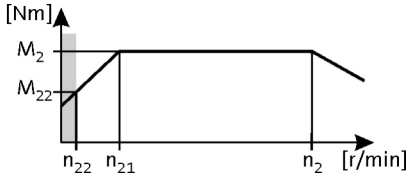


50 Hz: P_N = 5.5 kW
87 Hz: P_N = 9.7 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
375	136	3.1	37	85	153	136	375	136	3.1				3.920	-S660	132-12	98
273	186	2.6	27	116	112	186	273	186	2.6				5.376	-S660	132-12	98
229	222	2.7	23	139	94	222	229	222	2.7				6.417	-S660	132-12	98
214	238	2.1	21	149	87	238	214	238	2.1				6.880	-S660	132-12	98
201	253	2.3	20	158	82	253	201	253	2.3				7.311	-S660	132-12	98
167	305	2.1	17	191	68	305	167	305	2.1				8.800	-S660	132-12	98
147	348	1.8	15	217	60	348	147	348	1.8				10.027	-S660	132-12	98
131	390	1.7	13	244	53	390	131	390	1.7				11.262	-S660	132-12	98
119	427	1.6	12	267	49	427	119	427	1.6				12.320	-S660	132-12	98
115	445	1.5	11	278	47	445	115	445	1.5				12.832	-S660	132-12	98
105	487	1.4	10	304	43	487	105	487	1.4				14.037	-S660	132-12	98
94	545	1.2	9.2	340	38	545	94	545	1.2				15.714	-S660	132-12	98
82	621	1.1	8.1	388	34	621	82	621	1.1				17.905	-S660	132-12	98
76	667	1.0	7.5	417	31	667	76	667	1.0				19.250	-S660	132-12	98
67	760	0.9	6.6	475	27	760	67	760	0.9				21.933	-S660	132-12	98

Selection tables, 4-pole motors



50 Hz: P_N = 7.5 kW
87 Hz: P_N = 13.2 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			Inverter operation 5 Hz -		- 20 Hz		- 50 Hz (1:10)			- 87 Hz (1:17.4)			i	Product		
n_2 [r/min]	M_2 [Nm]	c	n_{22} [r/min]	M_{22} [Nm]	n_{21} [r/min]	M_2 [Nm]	n_2 [r/min]	M_2 [Nm]	c	n_2 [r/min]	M_2 [Nm]	c		g500	MH□MA□□	
372	187	2.3	37	117	153	187	372	187	2.3				3.920	-S660	132-22	98
272	256	1.9	27	160	112	256	272	256	1.9				5.376	-S660	132-22	98
228	305	2.0	23	191	94	305	228	305	2.0				6.417	-S660	132-22	98
212	327	1.5	21	205	87	327	212	327	1.5				6.880	-S660	132-22	98
200	348	1.7	20	218	82	348	200	348	1.7				7.311	-S660	132-22	98
166	419	1.5	17	262	68	419	166	419	1.5				8.800	-S660	132-22	98
146	477	1.3	15	299	60	477	146	477	1.3				10.027	-S660	132-22	98
130	536	1.2	13	335	53	536	130	536	1.2				11.262	-S660	132-22	98
119	586	1.1	12	367	49	586	119	586	1.1				12.320	-S660	132-22	98
114	611	1.1	11	382	47	611	114	611	1.1				12.832	-S660	132-22	98
104	668	1.0	10	418	43	668	104	668	1.0				14.037	-S660	132-22	98
93	748	0.9	9.2	468	38	748	93	748	0.9				15.714	-S660	132-22	98

Selection tables, 2-pole motors

50 Hz: P_N = 0.18 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
68	25	5.3	40.422	-S130	063-11	106
60	28	4.7	45.711	-S130	063-11	106
54	31	4.2	51.230	-S130	063-11	106
47	35	3.7	57.933	-S130	063-11	106
43	39	3.3	64.200	-S130	063-11	106
38	44	2.9	72.600	-S130	063-11	106
32	51	2.0	84.581	-S130	063-11	106
29	58	2.0	95.648	-S130	063-11	106

Selection tables, 2-pole motors

50 Hz: P_N = 0.25 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
386	6.0	5.2	7.029	-S130	063-31	106
170	14	5.2	15.979	-S130	063-31	106
150	15	5.9	18.069	-S130	063-31	106
133	17	5.5	20.381	-S130	063-31	106
118	20	5.5	23.048	-S130	063-31	106
108	27	4.9	31.387	-S130	063-31	106
76	30	4.3	35.493	-S130	063-31	106
67	35	3.8	40.422	-S130	063-31	106
59	39	3.3	45.711	-S130	063-31	106
53	44	3.0	51.230	-S130	063-31	106
47	50	2.6	57.933	-S130	063-31	106
42	55	2.4	64.200	-S130	063-31	106
41	56	2.8	65.975	-S220	063-31	110
37	62	2.1	72.600	-S130	063-31	106
36	64	2.8	74.750	-S220	063-31	110
32	72	1.4	84.581	-S130	063-31	106
28	82	1.4	95.648	-S130	063-31	106

Selection tables, 2-pole motors

50 Hz: P_N = 0.37 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
186	18	5.8	14.606	-S130	071-11	106
170	20	5.3	15.979	-S130	071-11	106
151	23	5.3	18.069	-S130	071-11	106
134	26	4.7	20.381	-S130	071-11	106
118	29	4.2	23.048	-S130	071-11	106
109	31	3.9	24.967	-S130	071-11	106
119	36	3.4	28.233	-S130	071-11	106
107	40	3.3	31.387	-S130	071-11	106
77	45	2.9	35.493	-S130	071-11	106
67	51	2.6	40.422	-S130	071-11	106
60	58	2.3	45.711	-S130	071-11	106
53	65	2.0	51.230	-S130	071-11	106
47	73	1.8	57.933	-S130	071-11	106
47	74	3.0	58.486	-S220	071-11	110
42	81	1.6	64.200	-S130	071-11	106
41	83	2.1	65.975	-S220	071-11	110
38	91	1.4	72.600	-S130	071-11	106
36	94	2.1	74.750	-S220	071-11	110

Selection tables, 2-pole motors

50 Hz: P_N = 0.55 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
718	7.0	5.1	3.661	-S130	071-31	106
524	10	5.1	5.021	-S130	071-31	106
409	12	4.7	6.425	-S130	071-31	106
374	14	4.7	7.029	-S130	071-31	106
316	16	5.1	8.322	-S130	071-31	106
280	18	5.1	9.411	-S130	071-31	106
230	22	4.9	11.413	-S130	071-31	106
204	25	4.3	12.907	-S130	071-31	106
180	28	3.8	14.606	-S130	071-31	106
165	31	3.5	15.979	-S130	071-31	106
146	35	3.5	18.069	-S130	071-31	106
129	39	3.1	20.381	-S130	071-31	106
114	45	2.7	23.048	-S130	071-31	106
105	48	2.5	24.967	-S130	071-31	106
115	55	2.2	28.233	-S130	071-31	106
103	61	2.1	31.387	-S130	071-31	106
74	69	1.9	35.493	-S130	071-31	106
71	72	3.1	37.238	-S220	071-31	110
65	78	1.7	40.422	-S130	071-31	106
62	82	2.7	42.533	-S220	071-31	110
58	89	1.5	45.711	-S130	071-31	106
55	93	2.4	48.190	-S220	071-31	110
51	99	1.3	51.230	-S130	071-31	106
51	100	2.2	51.620	-S220	071-31	110
46	110	2.4	56.960	-S400	071-31	114
45	112	1.2	57.933	-S130	071-31	106
45	113	1.9	58.486	-S220	071-31	110
41	124	1.1	64.200	-S130	071-31	106
41	125	2.4	64.354	-S400	071-31	114
40	128	1.3	65.975	-S220	071-31	110
36	141	0.9	72.600	-S130	071-31	106
35	145	1.3	74.750	-S220	071-31	110

Selection tables, 6-pole motors

50 Hz: P_N = 0.18 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
72	23	5.6	12.907	-S130	071-13	106
64	26	5.0	14.606	-S130	071-13	106
58	29	4.5	15.979	-S130	071-13	106
52	32	4.0	18.069	-S130	071-13	106
46	37	3.6	20.381	-S130	071-13	106
40	41	3.2	23.048	-S130	071-13	106
37	45	2.9	24.967	-S130	071-13	106
33	51	2.6	28.233	-S130	071-13	106
30	56	2.3	31.387	-S130	071-13	106
26	64	2.0	35.493	-S130	071-13	106
23	72	1.8	40.422	-S130	071-13	106
22	76	2.9	42.533	-S220	071-13	110
20	82	1.6	45.711	-S130	071-13	106
19	86	2.6	48.190	-S220	071-13	110
18	92	1.4	51.230	-S130	071-13	106
18	93	2.4	51.620	-S220	071-13	110
16	102	2.6	56.960	-S400	071-13	114
16	104	1.3	57.933	-S130	071-13	106
16	105	2.1	58.486	-S220	071-13	110
15	115	1.1	64.200	-S130	071-13	106
15	115	2.6	64.354	-S400	071-13	114
14	118	1.5	65.975	-S220	071-13	110
13	130	1.0	72.600	-S130	071-13	106
12	134	1.5	74.750	-S220	071-13	110

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
23	71	3.1	40.012	-S220	071-13	110
21	80	2.8	45.333	-S220	071-13	110
18	93	2.4	52.587	-S220	071-13	110
16	105	2.1	59.581	-S220	071-13	110
14	119	1.9	67.298	-S220	071-13	110
13	131	3.1	74.260	-S400	071-13	114
12	135	1.6	76.249	-S220	071-13	110
11	148	2.7	83.900	-S400	071-13	114
11	152	1.5	86.079	-S220	071-13	110
12	168	2.4	94.984	-S400	071-13	114
12	172	1.3	97.528	-S220	071-13	110
11	190	2.1	107.314	-S400	071-13	114
10	197	1.1	111.747	-S220	071-13	110

Selection tables, 6-pole motors

50 Hz: P_N = 0.18 kW

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
7.5	218	1.8	123.307	-S400	071-13	114
7.5	220	3.0	124.289	-S660	071-13	118
7.3	224	1.0	126.610	-S220	071-13	110
6.8	242	2.7	137.133	-S660	071-13	118
6.7	246	1.6	139.313	-S400	071-13	114
6.5	253	0.9	143.205	-S220	071-13	110
6.0	276	2.4	156.249	-S660	071-13	118
5.9	279	1.4	158.019	-S400	071-13	114
5.3	312	2.1	176.611	-S660	071-13	118
5.2	315	1.3	178.531	-S400	071-13	114
4.6	355	1.9	201.230	-S660	071-13	118
4.5	361	1.1	204.412	-S400	071-13	114
4.2	395	1.7	223.833	-S660	071-13	118
4.0	408	1.0	230.946	-S400	071-13	114
3.6	450	1.5	255.034	-S660	071-13	118
3.5	470	0.8	265.956	-S400	071-13	114
3.3	495	1.2	280.500	-S660	071-13	118
2.9	565	1.2	319.600	-S660	071-13	118

Selection tables, 6-pole motors

50 Hz: P_N = 0.25 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
254	9.0	4.7	3.661	-S130	071-33	106
185	13	4.7	5.021	-S130	071-33	106
145	16	4.4	6.425	-S130	071-33	106
132	18	4.4	7.029	-S130	071-33	106
112	21	4.7	8.322	-S130	071-33	106
121	23	4.7	9.411	-S130	071-33	106
82	28	4.6	11.413	-S130	071-33	106
72	32	4.0	12.907	-S130	071-33	106
64	36	3.6	14.606	-S130	071-33	106
58	40	3.3	15.979	-S130	071-33	106
52	45	2.9	18.069	-S130	071-33	106
46	51	2.6	20.381	-S130	071-33	106
40	57	2.3	23.048	-S130	071-33	106
37	62	2.1	24.967	-S130	071-33	106
33	70	1.9	28.233	-S130	071-33	106
31	75	3.0	29.937	-S220	071-33	110
30	78	1.7	31.387	-S130	071-33	106
28	82	2.7	32.867	-S220	071-33	110
26	88	1.5	35.493	-S130	071-33	106
26	90	3.1	36.267	-S400	071-33	114
25	93	2.4	37.238	-S220	071-33	110
23	100	3.1	40.333	-S660	071-33	118
23	101	1.3	40.422	-S130	071-33	106
23	102	3.1	40.974	-S400	071-33	114
22	106	2.1	42.533	-S220	071-33	110
20	114	1.1	45.711	-S130	071-33	106
20	114	3.1	45.956	-S660	071-33	118
20	117	2.7	46.933	-S400	071-33	114
19	120	1.8	48.190	-S220	071-33	110
19	122	2.7	48.950	-S660	071-33	118
18	128	1.0	51.230	-S130	071-33	106
18	129	1.7	51.620	-S220	071-33	110
18	132	2.6	53.026	-S400	071-33	114
17	139	2.7	55.773	-S660	071-33	118
16	142	1.9	56.960	-S400	071-33	114
16	144	0.9	57.933	-S130	071-33	106
16	146	1.5	58.486	-S220	071-33	110

Selection tables, 6-pole motors

50 Hz: P_N = 0.25 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
15	160	1.9	64.354	-S400	071-33	114
14	164	1.0	65.975	-S220	071-33	110
12	186	1.0	74.750	-S220	071-33	110

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
23	98	2.2	40.012	-S220	071-33	110
21	111	2.0	45.333	-S220	071-33	110
18	129	1.7	52.587	-S220	071-33	110
16	142	2.8	58.027	-S400	071-33	114
16	146	1.5	59.581	-S220	071-33	110
14	161	2.5	65.559	-S400	071-33	114
14	165	1.3	67.298	-S220	071-33	110
13	182	2.2	74.260	-S400	071-33	114
12	187	1.2	76.249	-S220	071-33	110
11	206	1.9	83.900	-S400	071-33	114
11	211	1.0	86.079	-S220	071-33	110
10	218	3.0	89.048	-S660	071-33	118
12	233	1.7	94.984	-S400	071-33	114
12	239	0.9	97.528	-S220	071-33	110
11	249	2.7	101.460	-S660	071-33	118
11	263	1.5	107.314	-S400	071-33	114
11	268	2.5	109.083	-S660	071-33	118
10	274	0.8	111.747	-S220	071-33	110
7.5	302	1.3	123.307	-S400	071-33	114
7.5	305	2.2	124.289	-S660	071-33	118
6.8	336	2.0	137.133	-S660	071-33	118
6.7	342	1.2	139.313	-S400	071-33	114
6.0	383	1.7	156.249	-S660	071-33	118
5.9	388	1.0	158.019	-S400	071-33	114
5.3	433	1.5	176.611	-S660	071-33	118
5.2	438	0.9	178.531	-S400	071-33	114
4.6	494	1.3	201.230	-S660	071-33	118
4.2	549	1.2	223.833	-S660	071-33	118
3.6	626	1.1	255.034	-S660	071-33	118

Selection tables, 6-pole motors

50 Hz: P_N = 0.37 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
260	13	4.8	3.661	-S130	080-13	106
189	18	4.2	5.021	-S130	080-13	106
162	21	5.7	5.860	-S400	080-13	114
148	23	3.8	6.425	-S130	080-13	106
135	25	3.6	7.029	-S130	080-13	106
114	30	3.9	8.322	-S130	080-13	106
101	34	3.7	9.411	-S130	080-13	106
102	41	3.2	11.413	-S130	080-13	106
74	47	2.8	12.907	-S130	080-13	106
65	53	2.5	14.606	-S130	080-13	106
64	53	5.7	14.806	-S400	080-13	114
60	58	2.3	15.979	-S130	080-13	106
53	65	2.0	18.069	-S130	080-13	106
51	68	3.3	18.776	-S220	080-13	110
47	73	3.0	20.300	-S220	080-13	110
47	74	1.8	20.381	-S130	080-13	106
41	83	2.7	23.000	-S220	080-13	110
41	83	1.6	23.048	-S130	080-13	106
38	90	1.4	24.967	-S130	080-13	106
36	95	2.3	26.422	-S220	080-13	110
34	102	1.3	28.233	-S130	080-13	106
32	108	2.0	29.937	-S220	080-13	110
30	113	1.2	31.387	-S130	080-13	106
29	119	1.9	32.867	-S220	080-13	110
27	128	1.0	35.493	-S130	080-13	106
26	131	3.1	36.267	-S400	080-13	114
26	134	1.6	37.238	-S220	080-13	110
24	146	0.9	40.422	-S130	080-13	106
23	148	2.7	40.974	-S400	080-13	114
22	153	1.4	42.533	-S220	080-13	110
20	169	1.9	46.933	-S400	080-13	114
20	174	1.3	48.190	-S220	080-13	110
19	177	2.5	48.950	-S660	080-13	118
18	186	1.2	51.620	-S220	080-13	110
18	191	1.8	53.026	-S400	080-13	114
17	201	2.5	55.773	-S660	080-13	118
17	206	1.3	56.960	-S400	080-13	114

Selection tables, 6-pole motors

50 Hz: P_N = 0.37 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
16	211	1.0	58.486	-S220	080-13	110
15	232	1.3	64.354	-S400	080-13	114

3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
18	187	1.2	52.587	-S220	080-13	110
17	202	3.2	56.818	-S660	080-13	118
16	206	1.9	58.027	-S400	080-13	114
16	212	1.0	59.581	-S220	080-13	110
15	227	2.9	63.817	-S660	080-13	118
15	233	1.7	65.559	-S400	080-13	114
14	239	0.9	67.298	-S220	080-13	110
14	248	2.7	69.813	-S660	080-13	118
13	258	2.6	72.713	-S660	080-13	118
13	264	1.5	74.260	-S400	080-13	114
13	271	0.8	76.249	-S220	080-13	110
12	283	2.3	79.545	-S660	080-13	118
11	298	1.3	83.900	-S400	080-13	114
11	317	2.1	89.048	-S660	080-13	118
10	338	1.2	94.984	-S400	080-13	114
11	361	1.8	101.460	-S660	080-13	118
11	381	1.1	107.314	-S400	080-13	114
11	388	1.7	109.083	-S660	080-13	118
7.7	438	0.9	123.307	-S400	080-13	114
7.6	442	1.5	124.289	-S660	080-13	118
6.9	487	1.4	137.133	-S660	080-13	118
6.8	495	0.8	139.313	-S400	080-13	114
6.1	555	1.2	156.249	-S660	080-13	118
5.4	628	1.1	176.611	-S660	080-13	118
4.7	715	0.9	201.230	-S660	080-13	118

Selection tables, 6-pole motors

50 Hz: P_N = 0.55 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
254	20	3.1	3.661	-S130	080-33	106
185	28	2.8	5.021	-S130	080-33	106
159	32	3.7	5.860	-S400	080-33	114
145	35	2.5	6.425	-S130	080-33	106
132	39	2.4	7.029	-S130	080-33	106
112	46	2.5	8.322	-S130	080-33	106
121	52	2.4	9.411	-S130	080-33	106
82	63	2.1	11.413	-S130	080-33	106
72	71	1.8	12.907	-S130	080-33	106
72	71	3.1	12.992	-S220	080-33	110
69	74	3.0	13.456	-S220	080-33	110
64	80	1.6	14.606	-S130	080-33	106
63	81	2.7	14.720	-S220	080-33	110
63	81	3.7	14.806	-S400	080-33	114
58	88	1.5	15.979	-S130	080-33	106
56	91	2.4	16.571	-S220	080-33	110
52	99	1.3	18.069	-S130	080-33	106
50	103	2.1	18.776	-S220	080-33	110
46	111	2.0	20.300	-S220	080-33	110
46	112	1.2	20.381	-S130	080-33	106
42	123	3.1	22.400	-S400	080-33	114
40	126	1.8	23.000	-S220	080-33	110
40	126	1.0	23.048	-S130	080-33	106
37	137	1.0	24.967	-S130	080-33	106
37	137	3.1	25.056	-S660	080-33	118
37	139	2.9	25.308	-S400	080-33	114
35	145	1.5	26.422	-S220	080-33	110
33	155	0.8	28.233	-S130	080-33	106
33	156	3.1	28.548	-S660	080-33	118
32	160	2.5	29.156	-S400	080-33	114
31	164	1.3	29.937	-S220	080-33	110
30	171	2.6	31.167	-S660	080-33	118
28	180	1.2	32.867	-S220	080-33	110
28	180	2.2	32.940	-S400	080-33	114
26	195	2.6	35.511	-S660	080-33	118
26	199	2.0	36.267	-S400	080-33	114
25	204	1.1	37.238	-S220	080-33	110

Selection tables, 6-pole motors

50 Hz: P_N = 0.55 kW

2-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
23	221	2.4	40.333	-S660	080-33	118
23	225	1.8	40.974	-S400	080-33	114
22	233	0.9	42.533	-S220	080-33	110
20	252	2.4	45.956	-S660	080-33	118
20	257	1.2	46.933	-S400	080-33	114
19	264	0.8	48.190	-S220	080-33	110
19	268	1.7	48.950	-S660	080-33	118
18	291	1.2	53.026	-S400	080-33	114
17	306	1.7	55.773	-S660	080-33	118
16	312	0.9	56.960	-S400	080-33	114
15	353	0.9	64.354	-S400	080-33	114

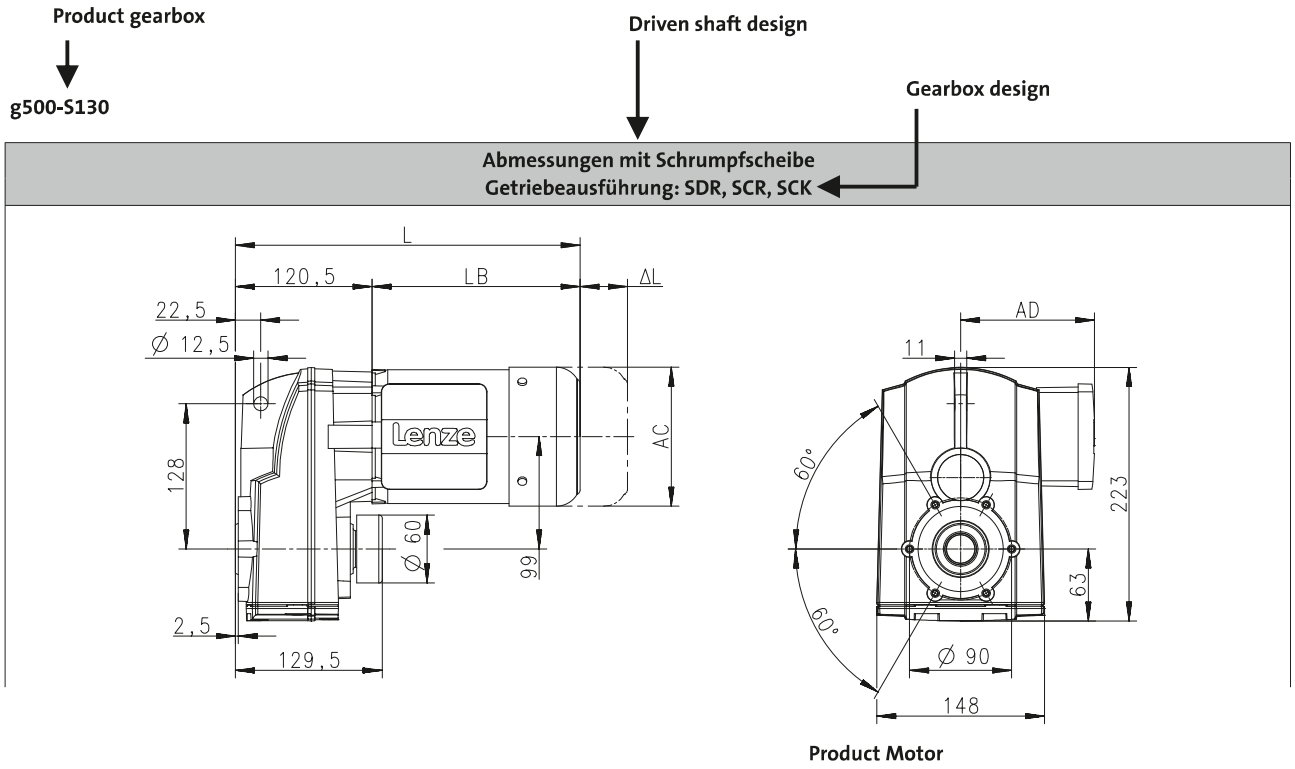
3-stage gearboxes

Mains operation 400 V, 50 Hz			i	Product		
n_2 [r/min]	M_2 [Nm]	c		g500	MD□MA□□	
19	269	2.3	49.867	-S660	080-33	118
16	307	2.1	56.818	-S660	080-33	118
16	313	1.3	58.027	-S400	080-33	114
15	344	1.9	63.817	-S660	080-33	118
14	354	1.1	65.559	-S400	080-33	114
13	377	1.8	69.813	-S660	080-33	118
13	392	1.7	72.713	-S660	080-33	118
13	401	1.0	74.260	-S400	080-33	114
12	429	1.5	79.545	-S660	080-33	118
11	453	0.9	83.900	-S400	080-33	114
10	481	1.4	89.048	-S660	080-33	118
11	548	1.2	101.460	-S660	080-33	118
11	589	1.1	109.083	-S660	080-33	118
7.5	671	1.0	124.289	-S660	080-33	118
6.8	740	0.9	137.133	-S660	080-33	118

Dimensions, notes

Notes on the dimensions

The following legend shows the layout of the dimension sheets.



Produkt			MD□MA□□							
			063-12	063-32	063-42	071-32	071-42	080-32	080-42	090-32
Abmessungen										
Gesamtlänge	**L**	**[mm]**	304			324		347		380
Länge Motor	**LB**	**[mm]**	183			203		226		259
Länge Motoranbauten	**Δ L**	**[mm]**	170			165		183		181
Motordurchmesser	**AC**	**[mm]**	123			139		156		176
Abstand Motor/Anschluss	**AD**	**[mm]**	100			109		150		157

Distance of motor centre to the end of terminal box

Total length of the drive without built-on accessories

Motor diameter

Motor length without built-on accessories

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

Dimensions, notes

Gearbox designs

Hollow shaft

Without centring (HDR)

With centering (HCR)

Flange with through holes (HCK)

Hollow shaft with shrink disc

Without centring (SDR)

With centering (SCR)

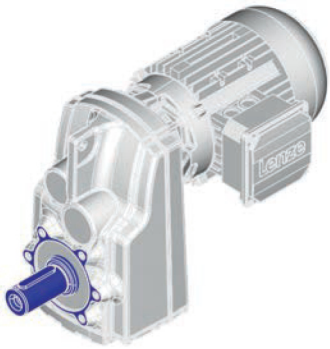
Flange with through holes (SCK)

Dimensions, notes

Gearbox designs

Solid shaft

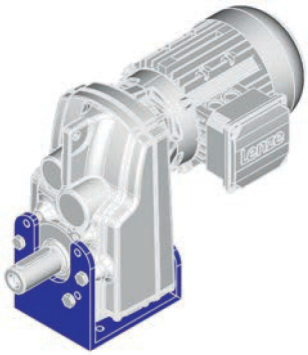
Without centring (VDR)



With centering (VCR)

Flange with through holes (VCK)

Solid shaft

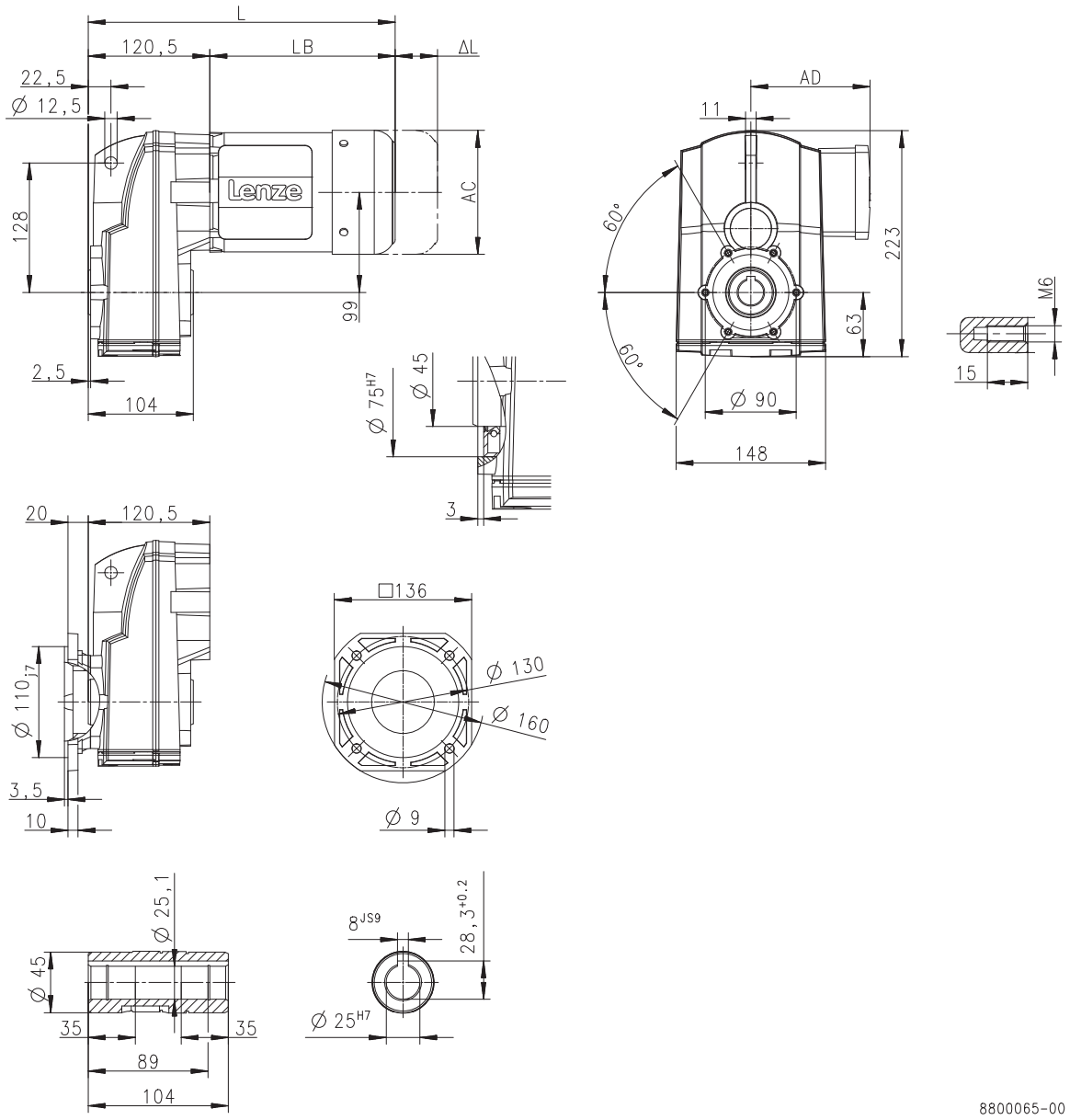


Foot mounting (VBR)

Dimensions, 4-pole motors

g500-S130

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

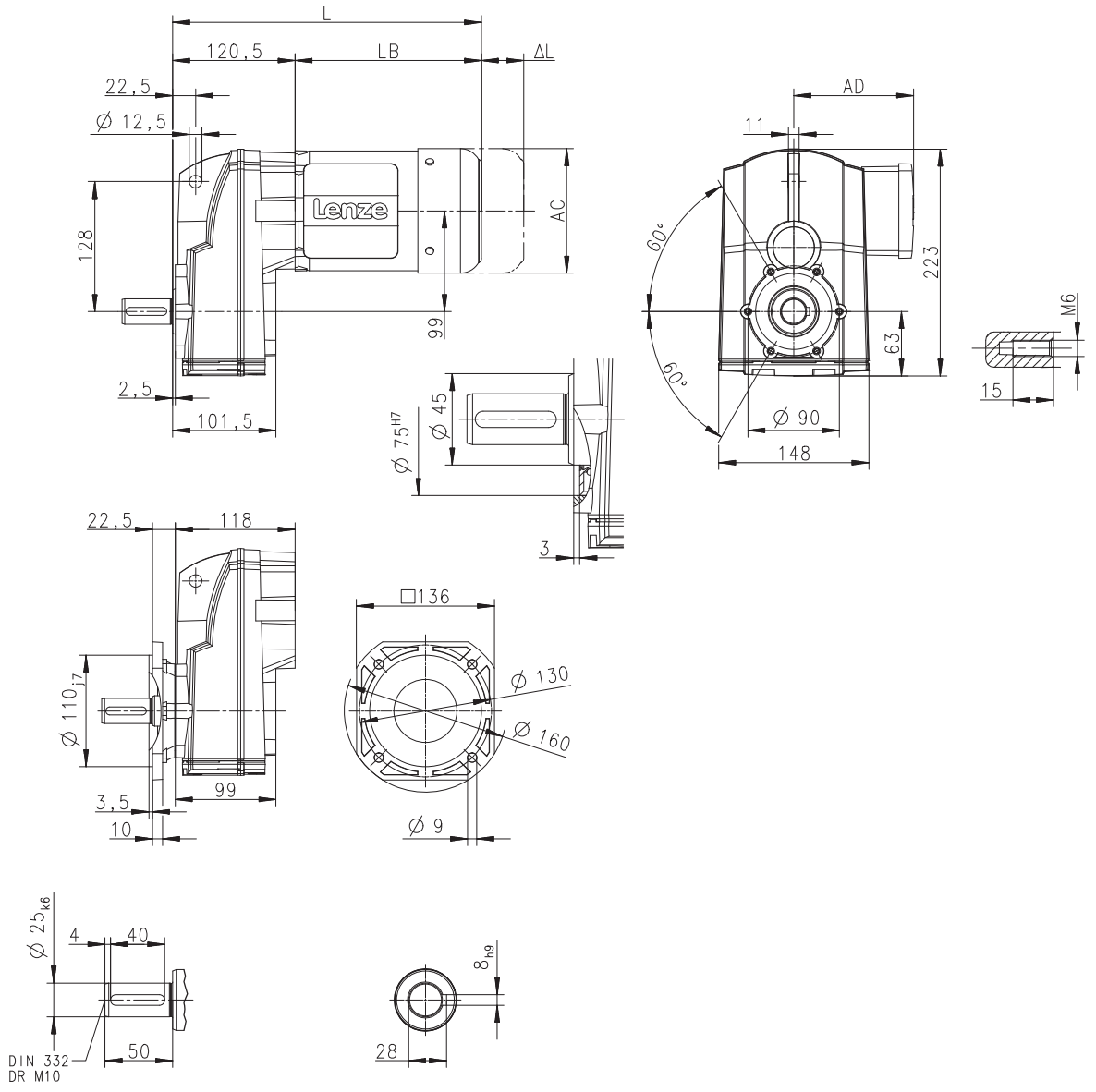


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	304			324		347	406	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

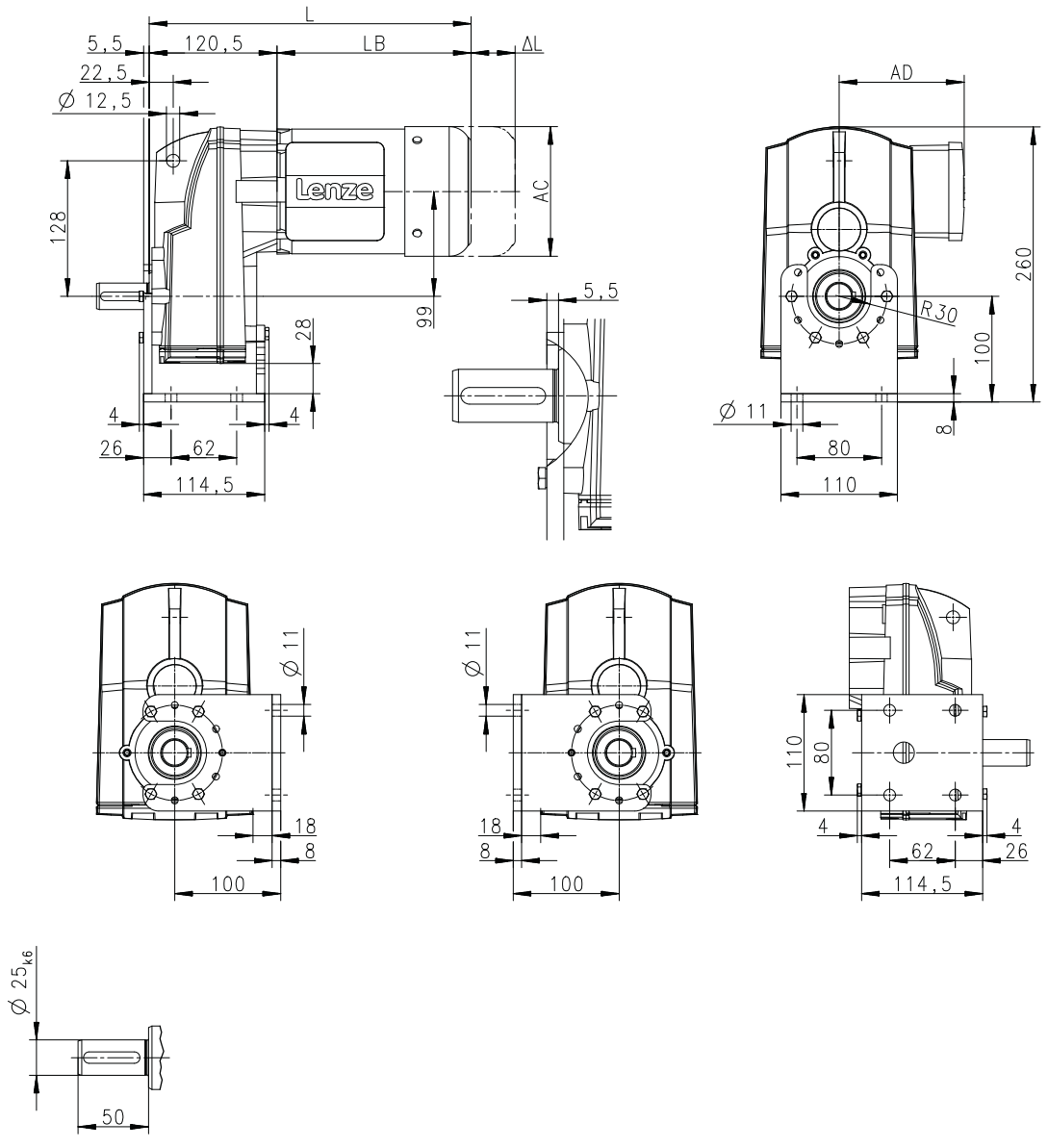


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	304			324		347	406	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with solid shaft
Gearbox design: VBR

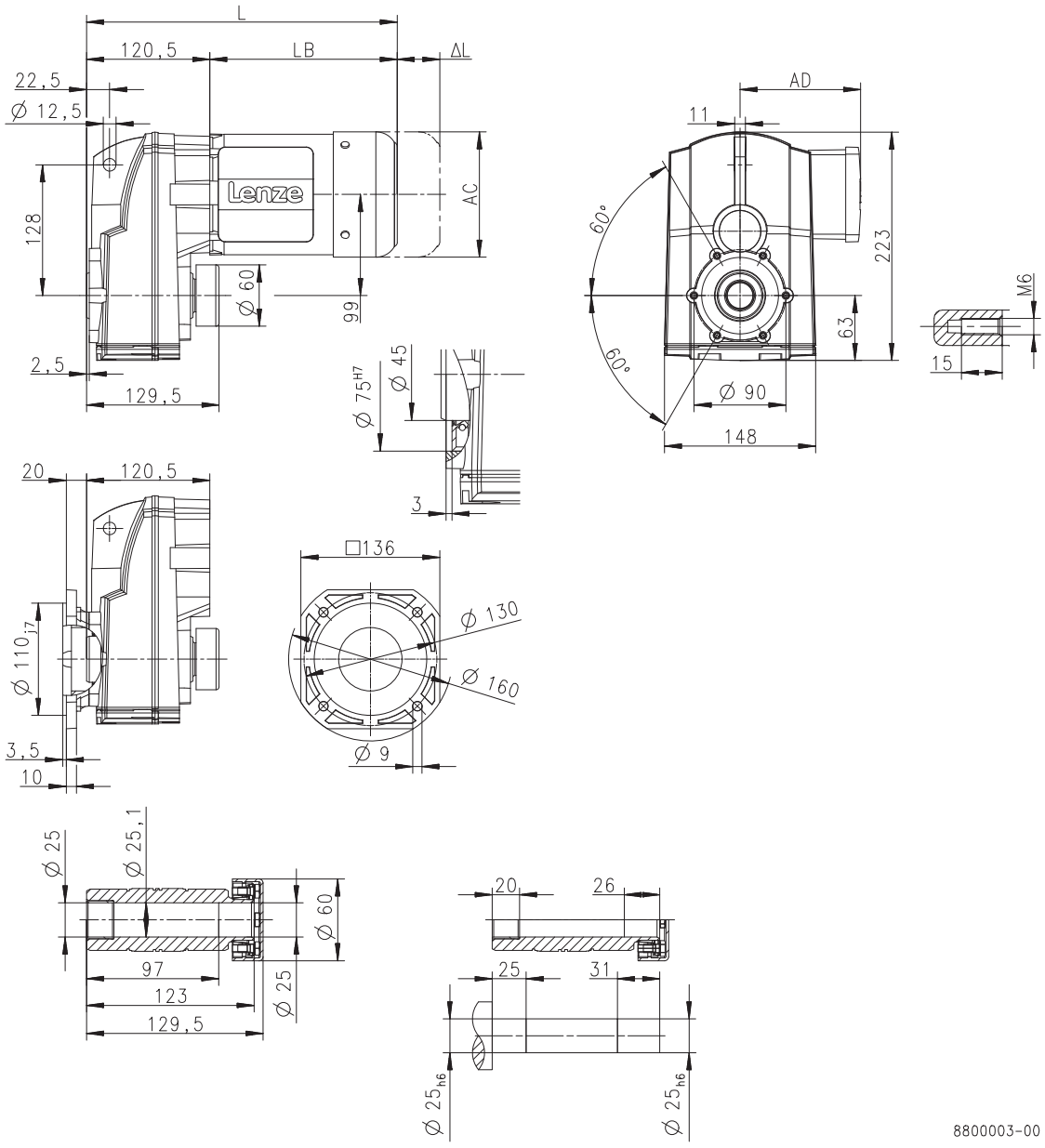


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	304			324		347	406	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-S130

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

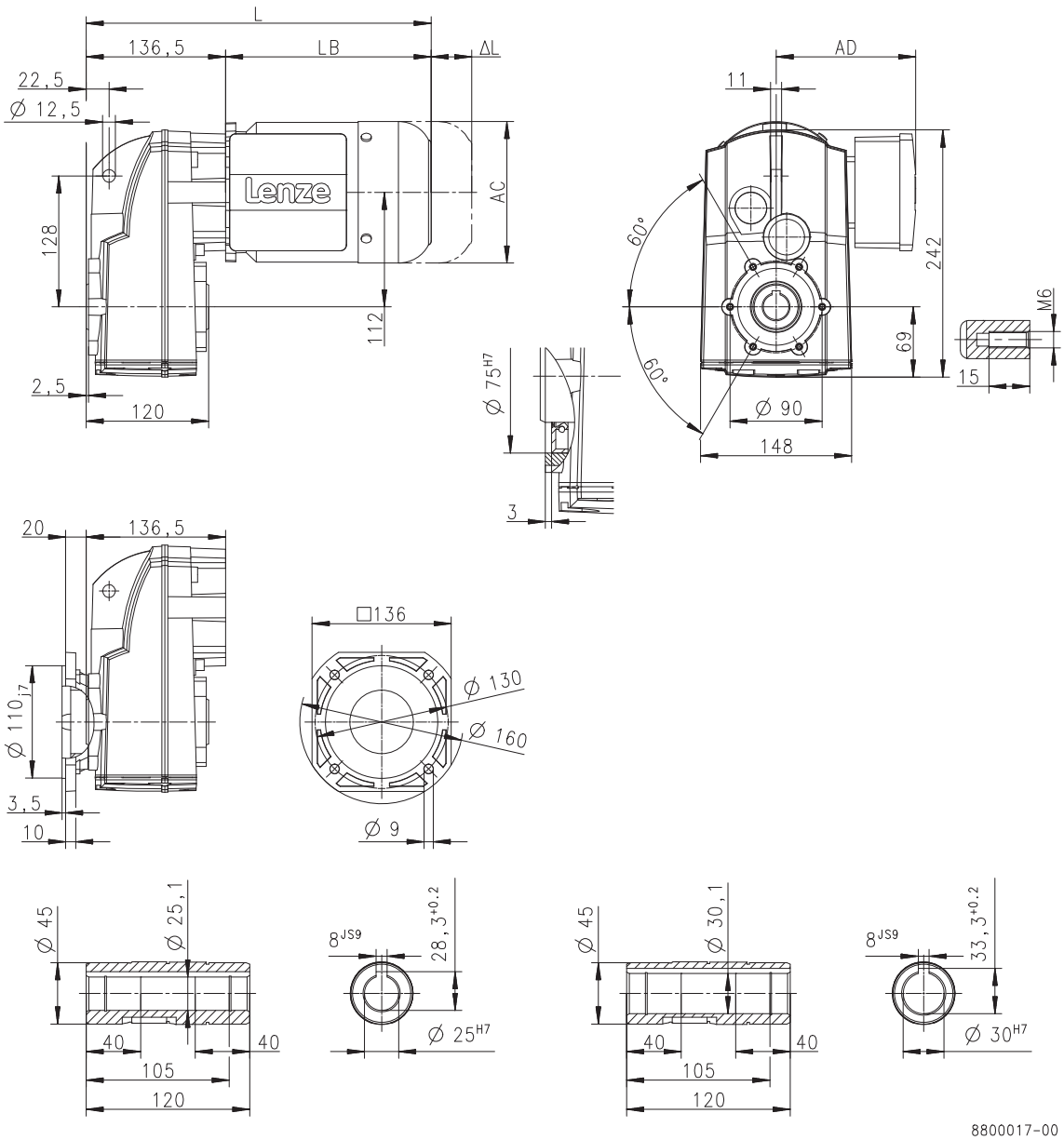


Product			MD□MA□□					MH□MA□□		
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32
Dimensions										
Total length	**L**	**[mm]**	304			324		347	406	
Motor length	**LB**	**[mm]**	183			203		226	285	
Length of motor options	**Δ L**	**[mm]**	170			165		183	181	
Motor diameter	**AC**	**[mm]**	123			139		156	176	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157

Dimensions, 4-pole motors

g500-S220

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

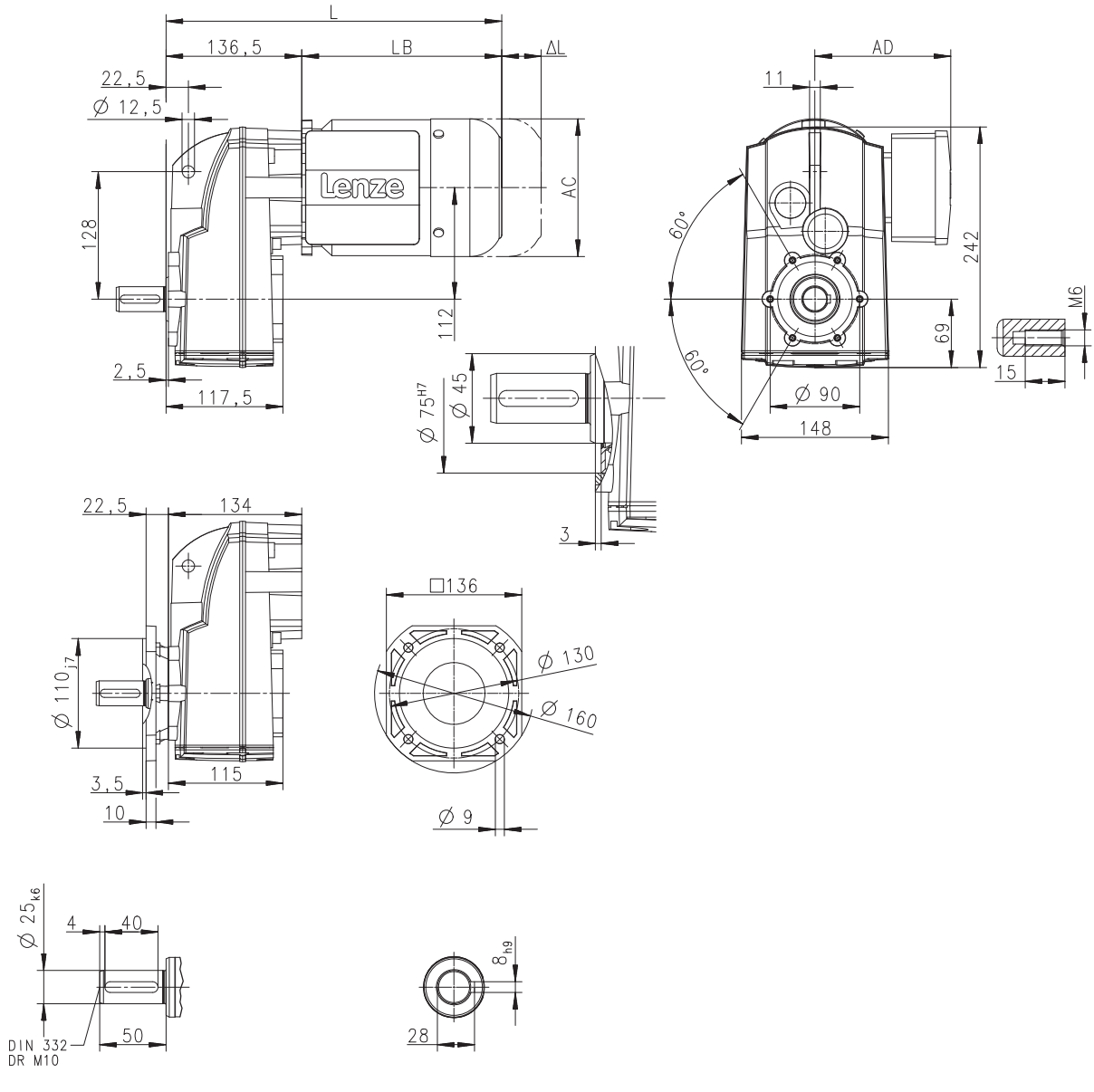


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	320			340		363	422		458	474
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

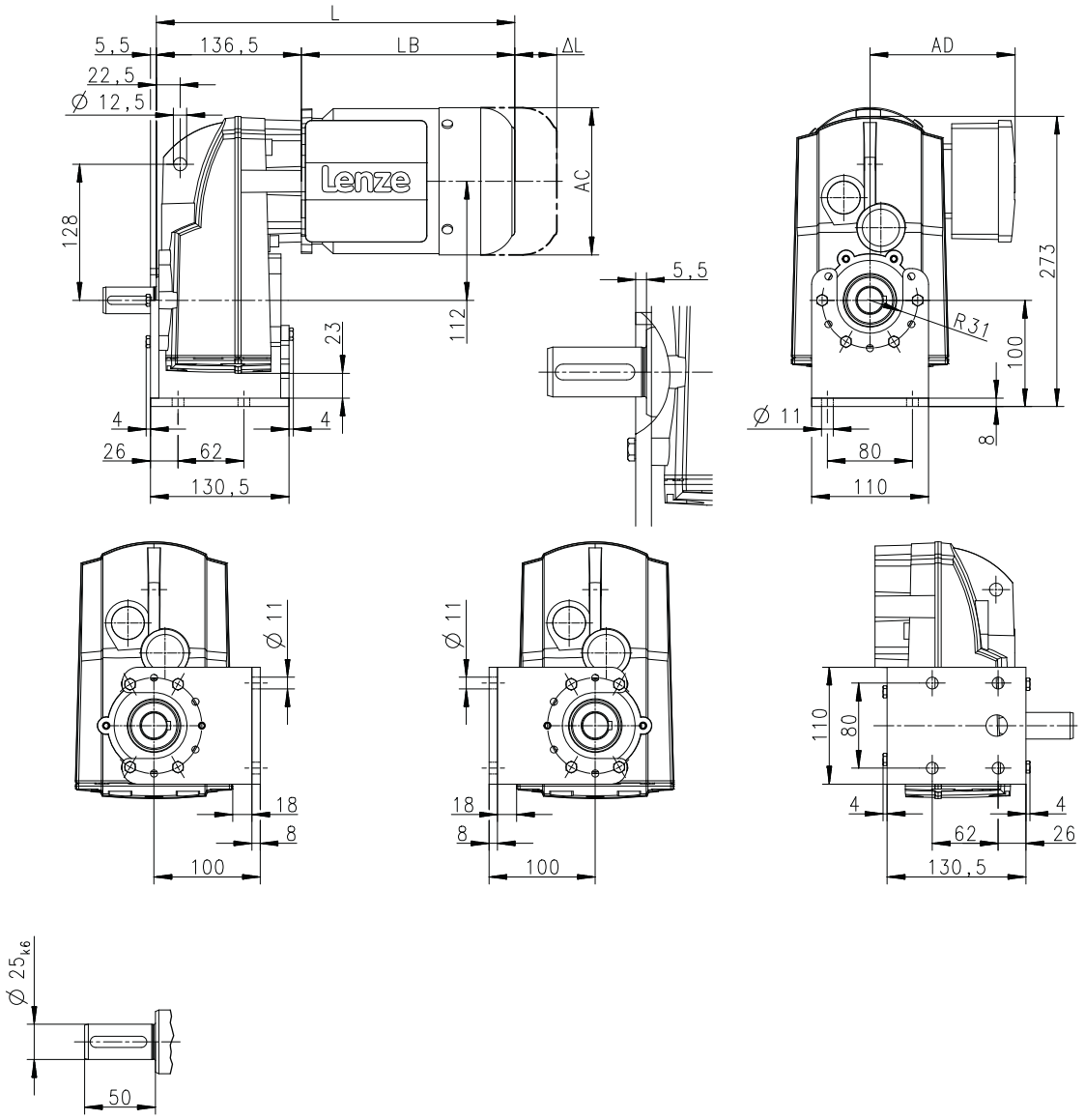


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	320			340		363	422		458	474
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with solid shaft
Gearbox design: VBR



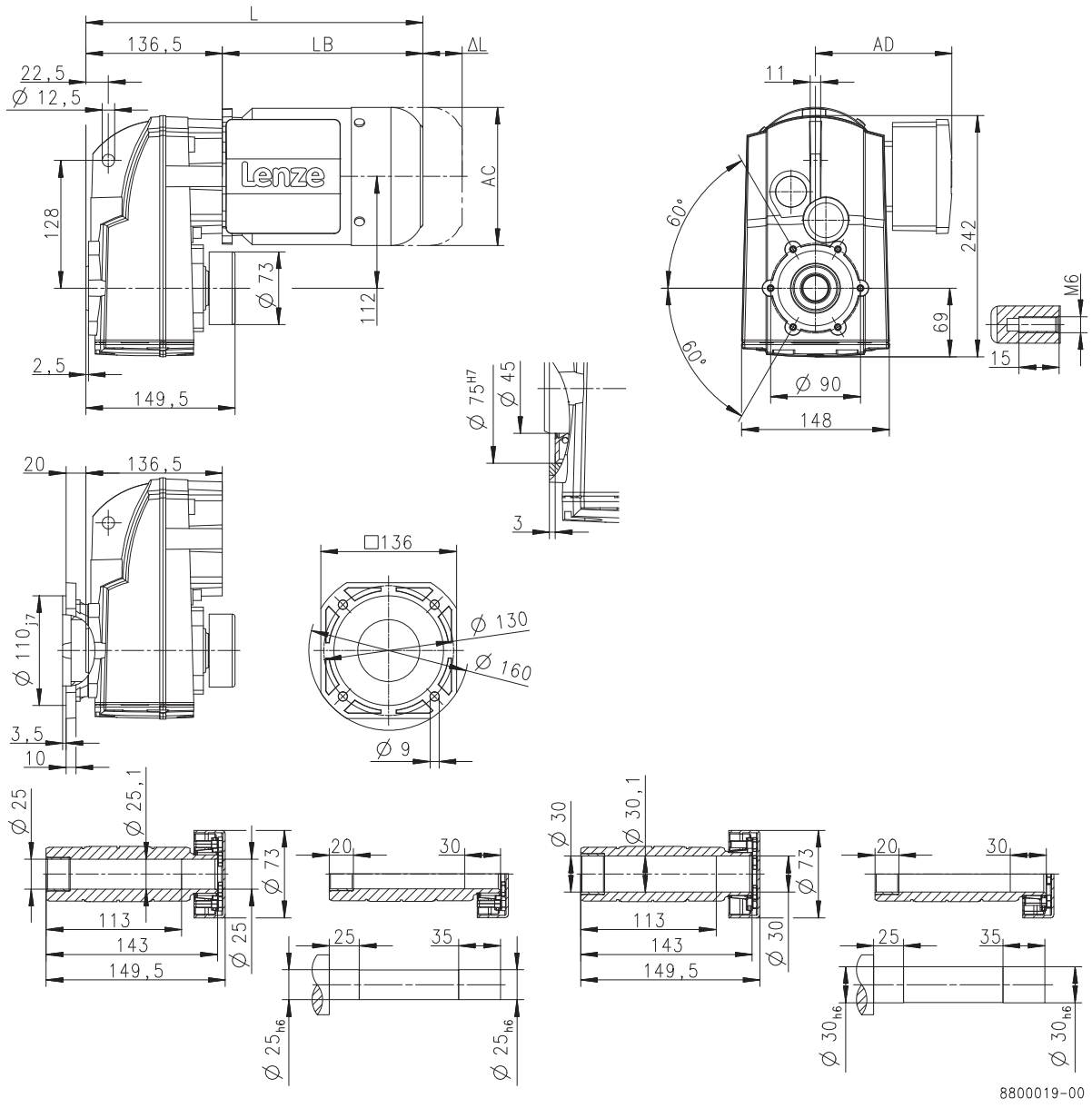
8800020-00

Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	320			340		363	422		458	474
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-S220

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

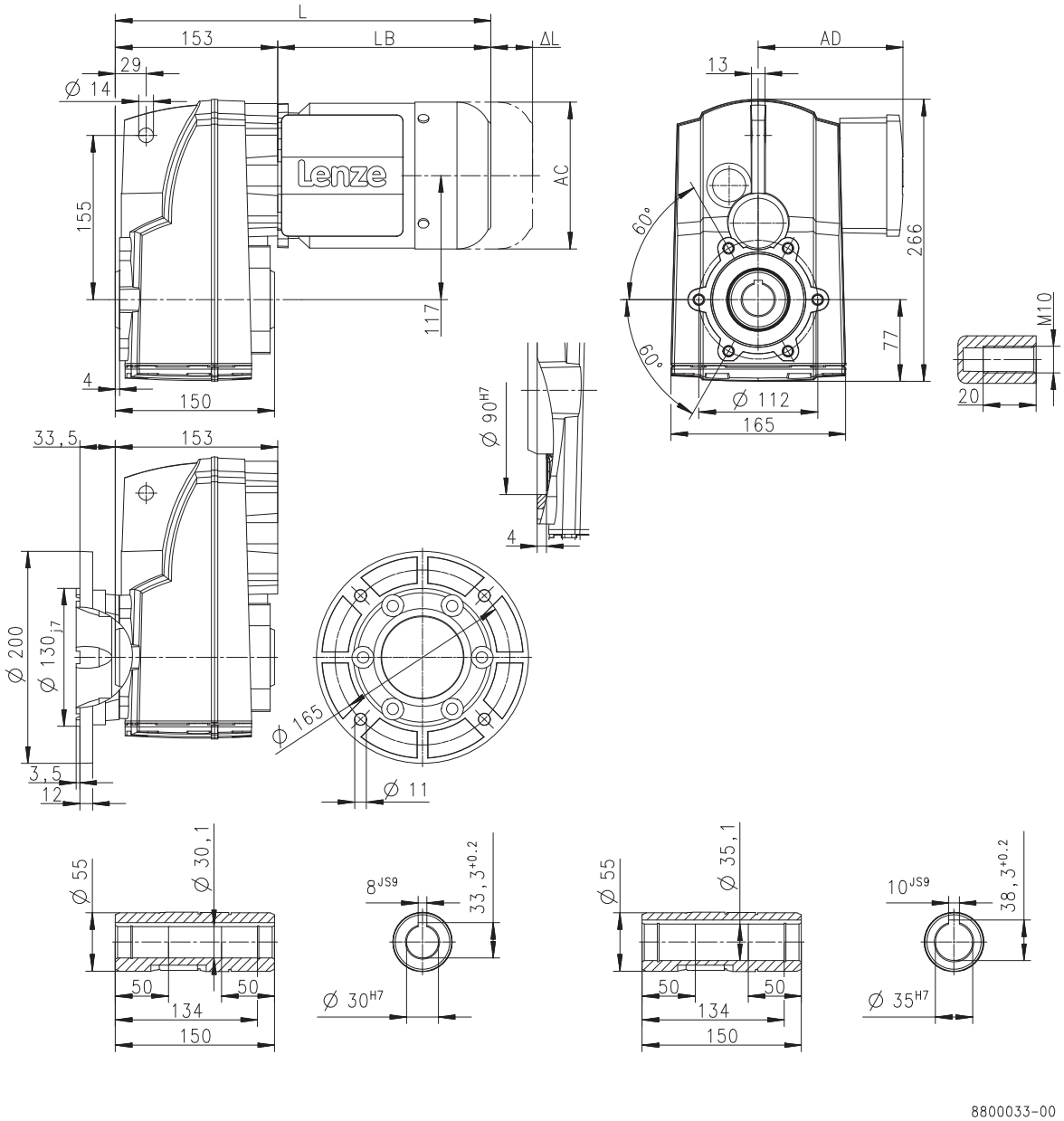


Product			MD□MA□□					MH□MA□□				
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32
Dimensions												
Total length	**L**	**[mm]**	320			340		363	422		458	474
Motor length	**LB**	**[mm]**	183			203		226	285		321	337
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170	
Motor diameter	**AC**	**[mm]**	123			139		156	176		194	
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166	

Dimensions, 4-pole motors

g500-S400

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

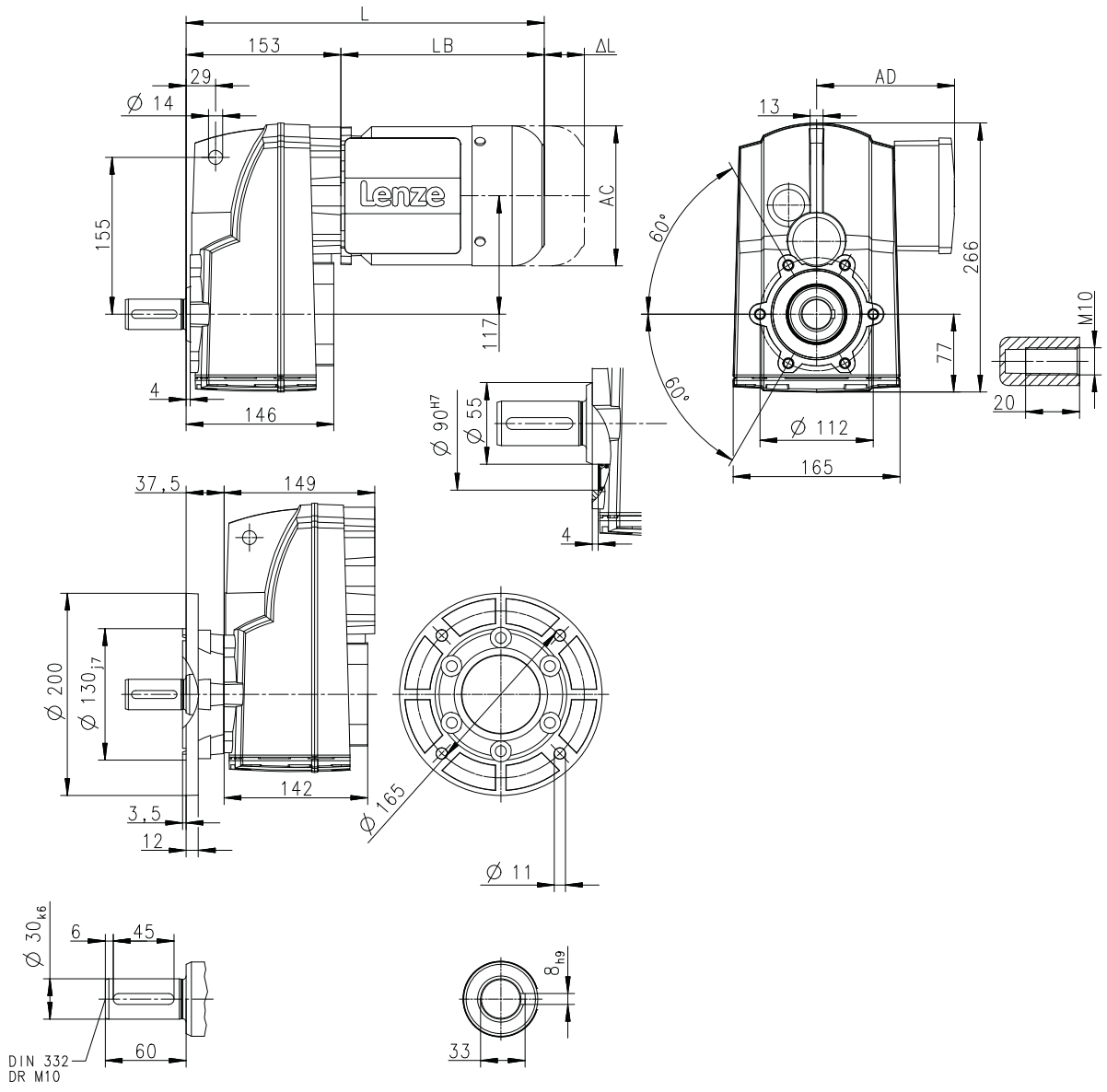


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	336			356		379	438		474	490	533
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

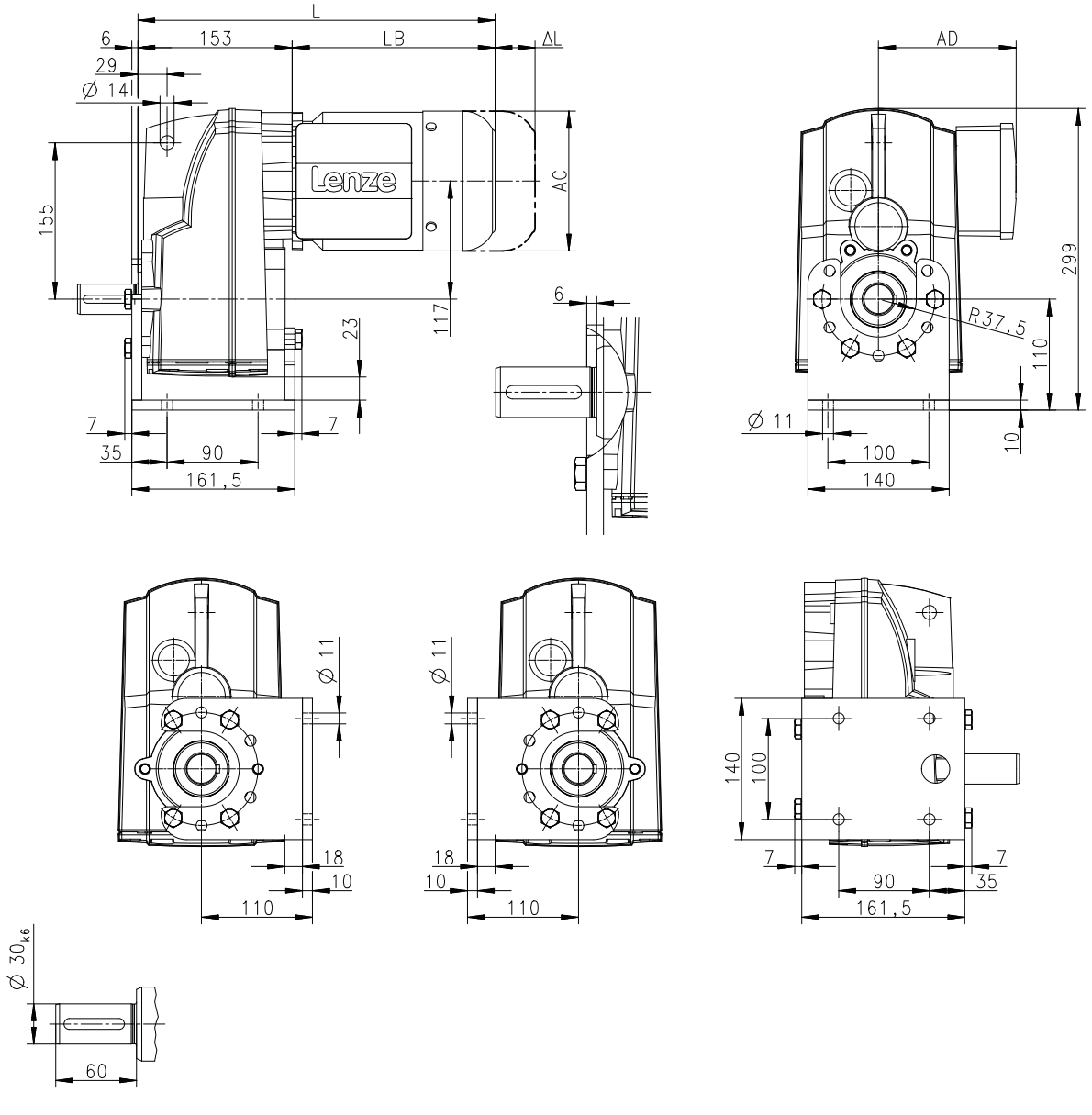


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	336			356		379	438		474	490	533
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with solid shaft
Gearbox design: VBR

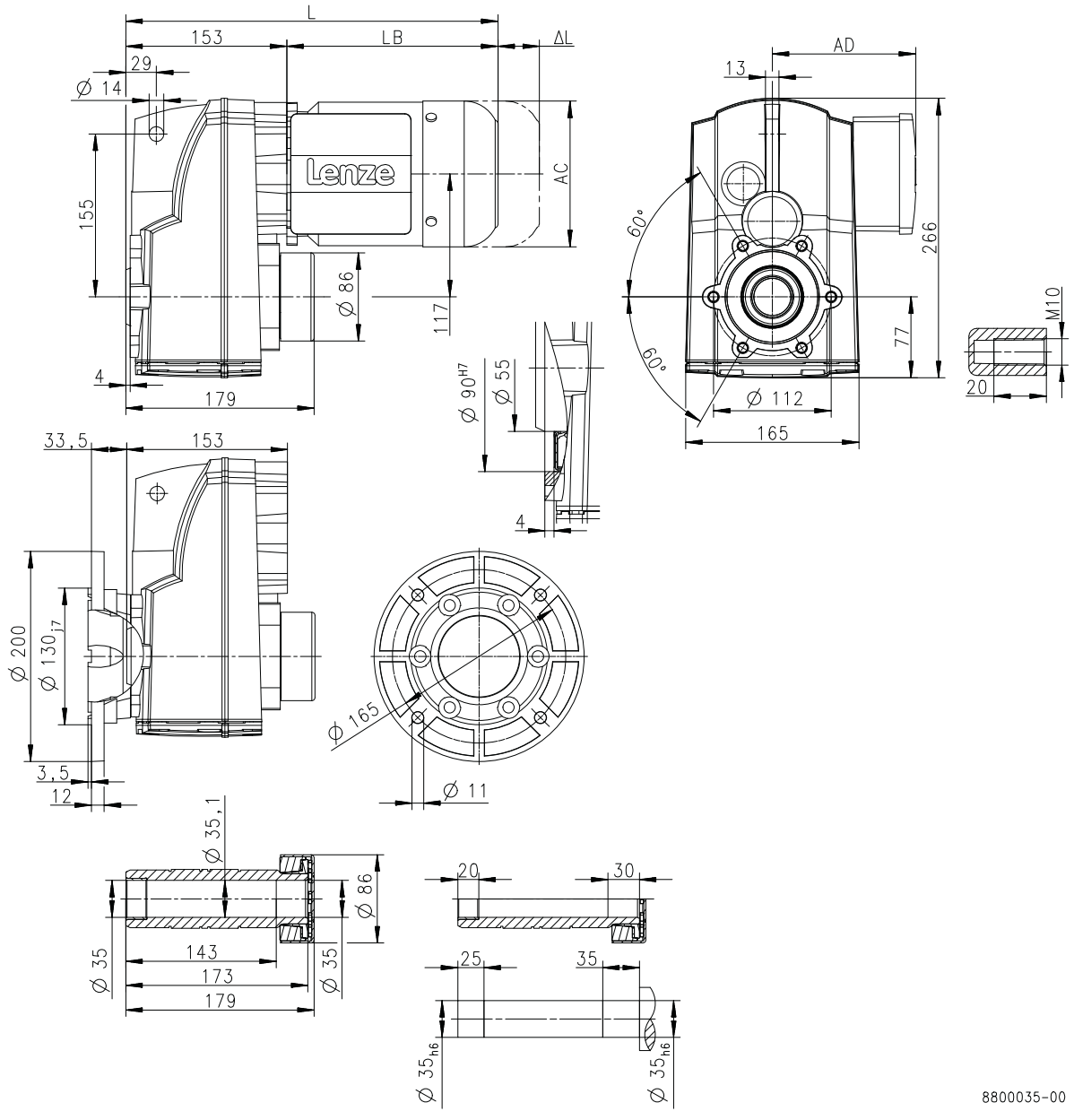


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	336			356		379	438		474	490	533
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-S400

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

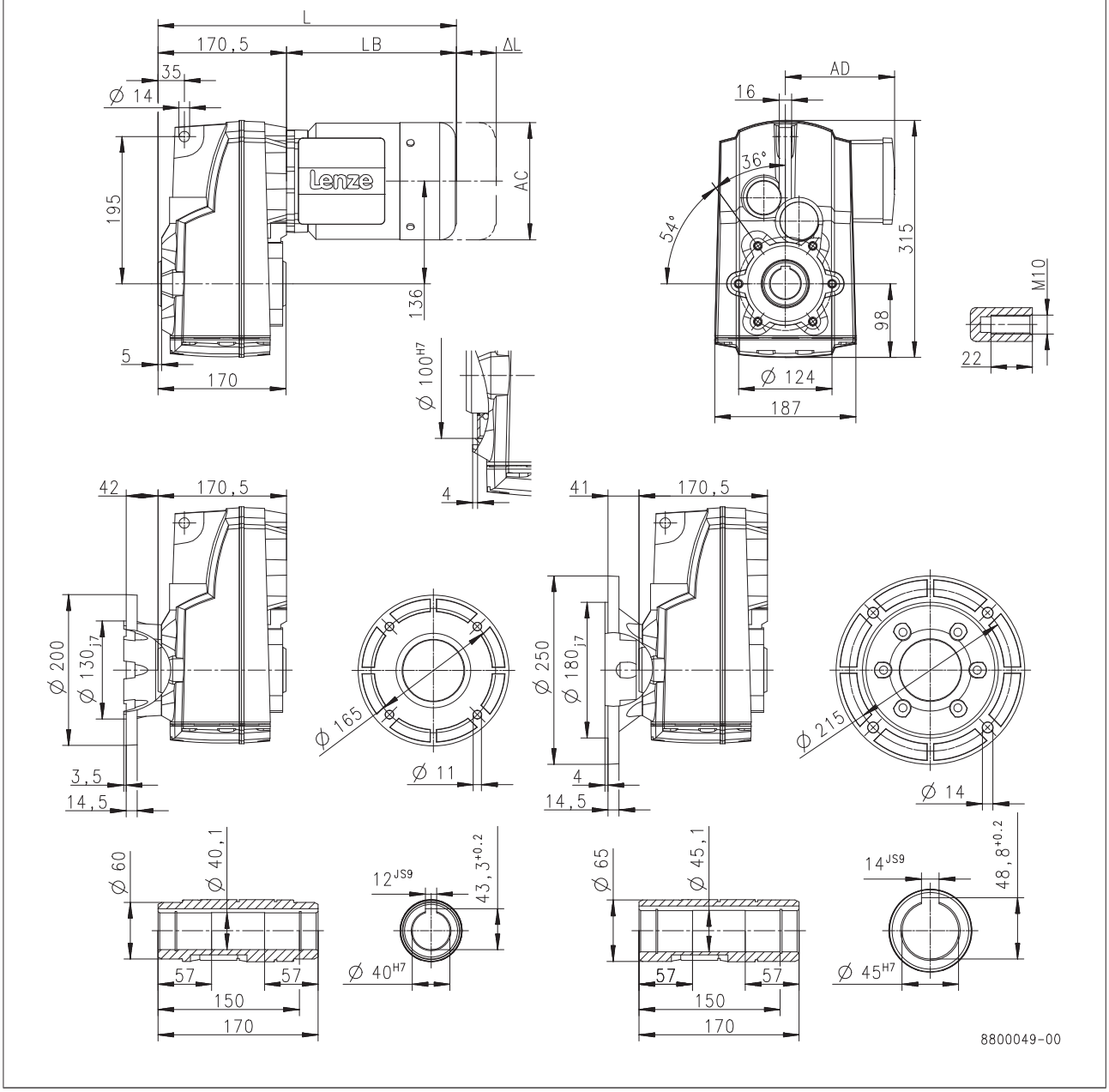


Product			MD□MA□□					MH□MA□□					
			063-12	063-32	063-42	071-32	071-42	080-32	090-12	090-32	100-12	100-32	112-22
Dimensions													
Total length	**L**	**[mm]**	336			356		379	438		474	490	533
Motor length	**LB**	**[mm]**	183			203		226	285		321	337	380
Length of motor options	**Δ L**	**[mm]**	170			165		183	181		170		183
Motor diameter	**AC**	**[mm]**	123			139		156	176		194		218
Distance motor/connection	**AD**	**[mm]**	100			109		150	152	157	166		176

Dimensions, 4-pole motors

g500-S660

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

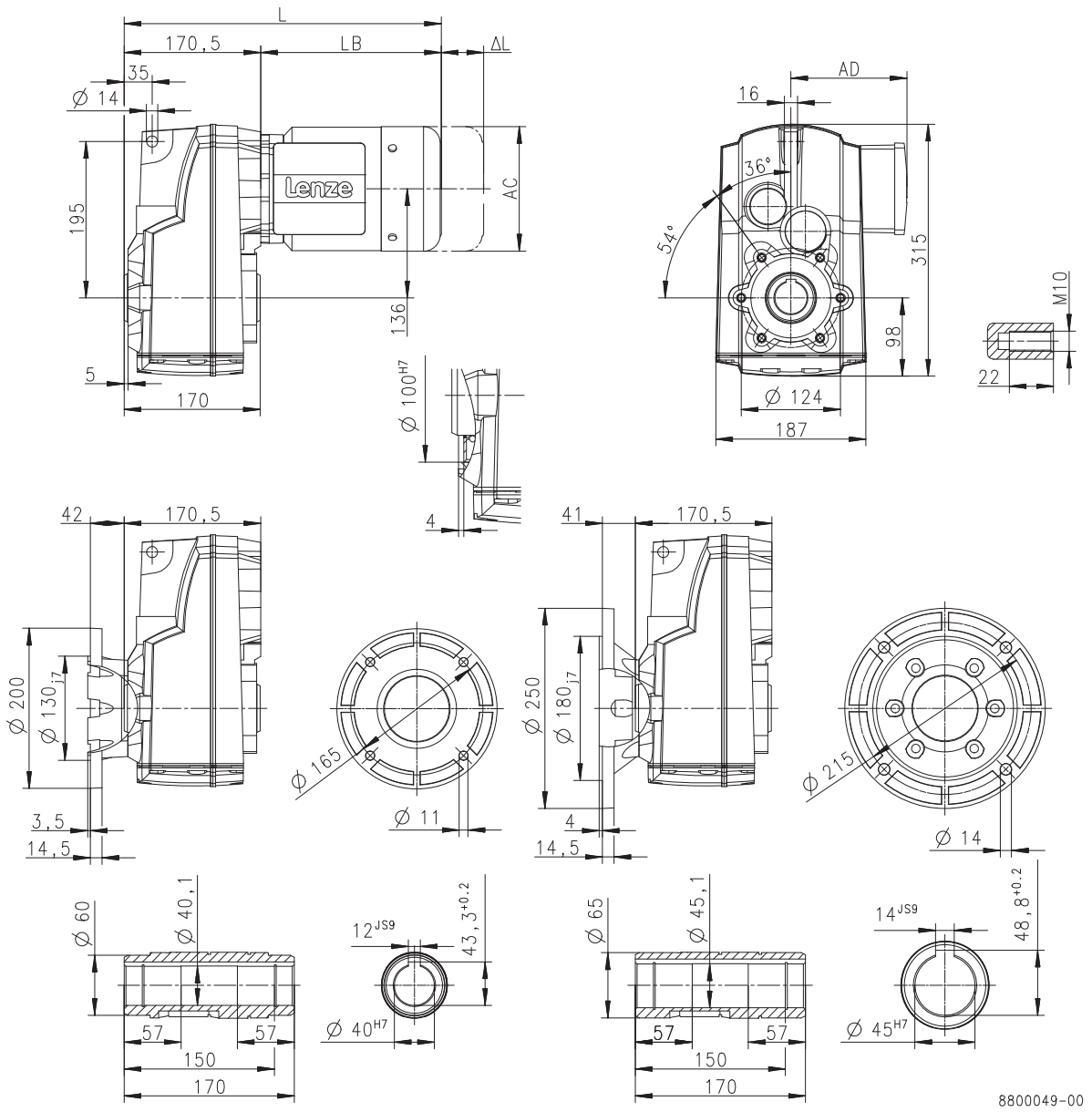


Product			MD□MA□□					MH□MA□□
			063-12	063-32	063-42	071-32	071-42	080-32
Dimensions								
Total length	**L**	**[mm]**	354			374		397
Motor length	**LB**	**[mm]**	183			203		226
Length of motor options	**Δ L**	**[mm]**	170			165		183
Motor diameter	**AC**	**[mm]**	123			139		156
Distance motor/connection	**AD**	**[mm]**	100			109		150

Dimensions, 4-pole motors

g500-S660

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

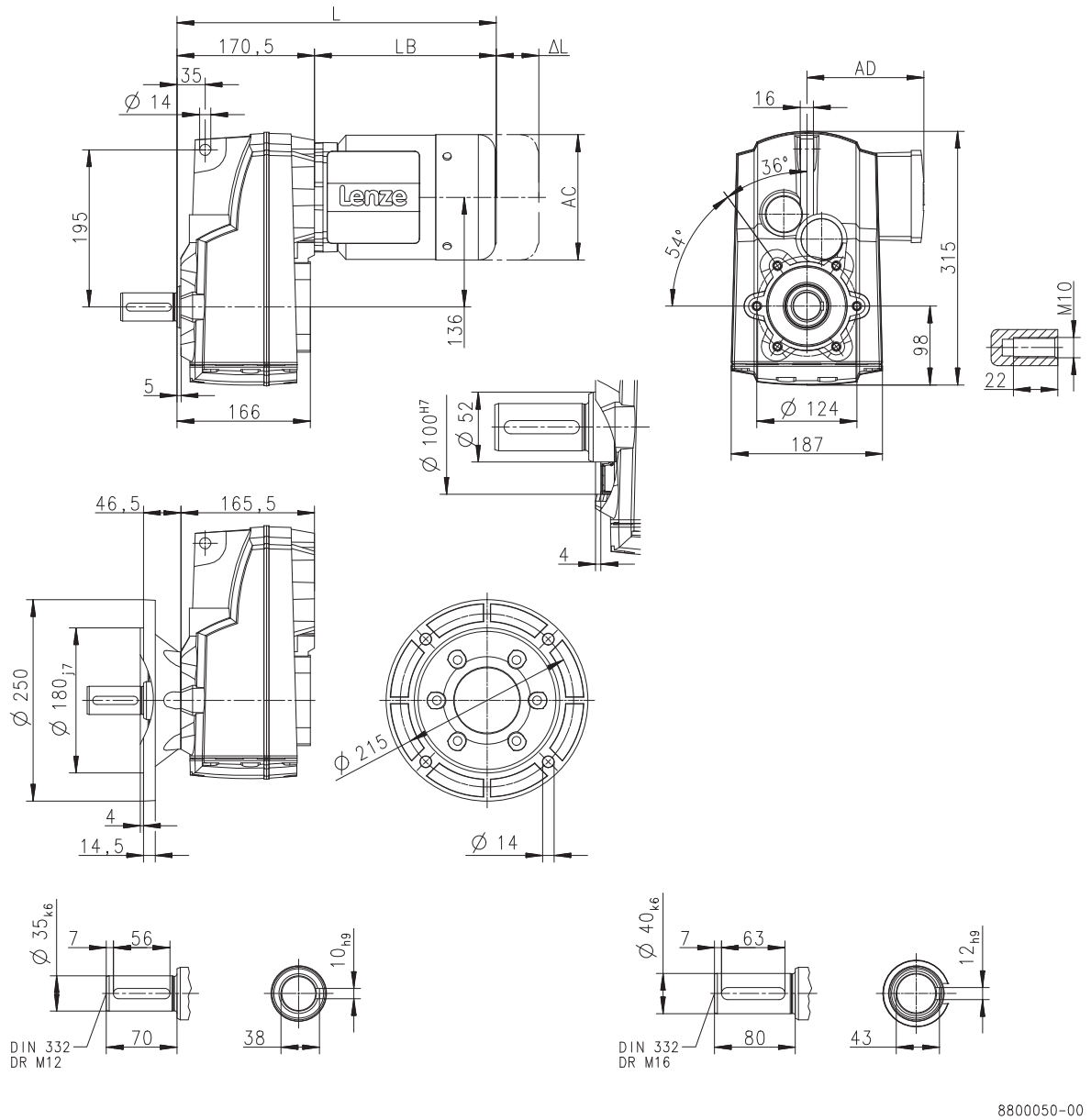


Product			MH□MA□□						
			090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions									
Total length	**L**	**[mm]**	456		492	508	551	599	
Motor length	**LB**	**[mm]**	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	181		170		183	202	
Motor diameter	**AC**	**[mm]**	176		194		218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

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK



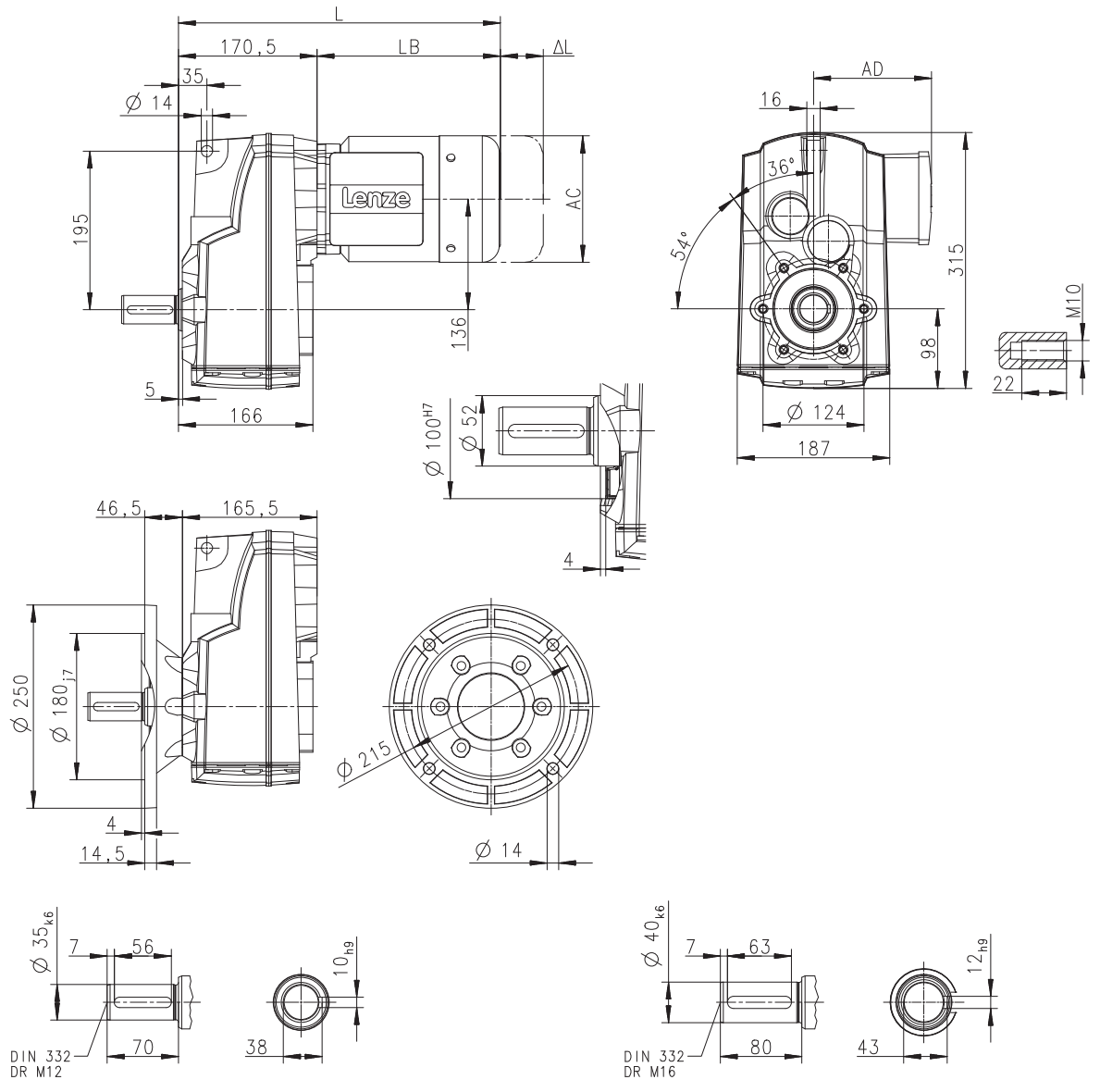
Product			MD□MA□□					MH□MA□□
			063-12	063-32	063-42	071-32	071-42	080-32
Dimensions								
Total length	**L**	**[mm]**	354			374		397
Motor length	**LB**	**[mm]**	183			203		226
Length of motor options	**Δ L**	**[mm]**	170			165		183
Motor diameter	**AC**	**[mm]**	123			139		156
Distance motor/connection	**AD**	**[mm]**	100			109		150

6.4

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

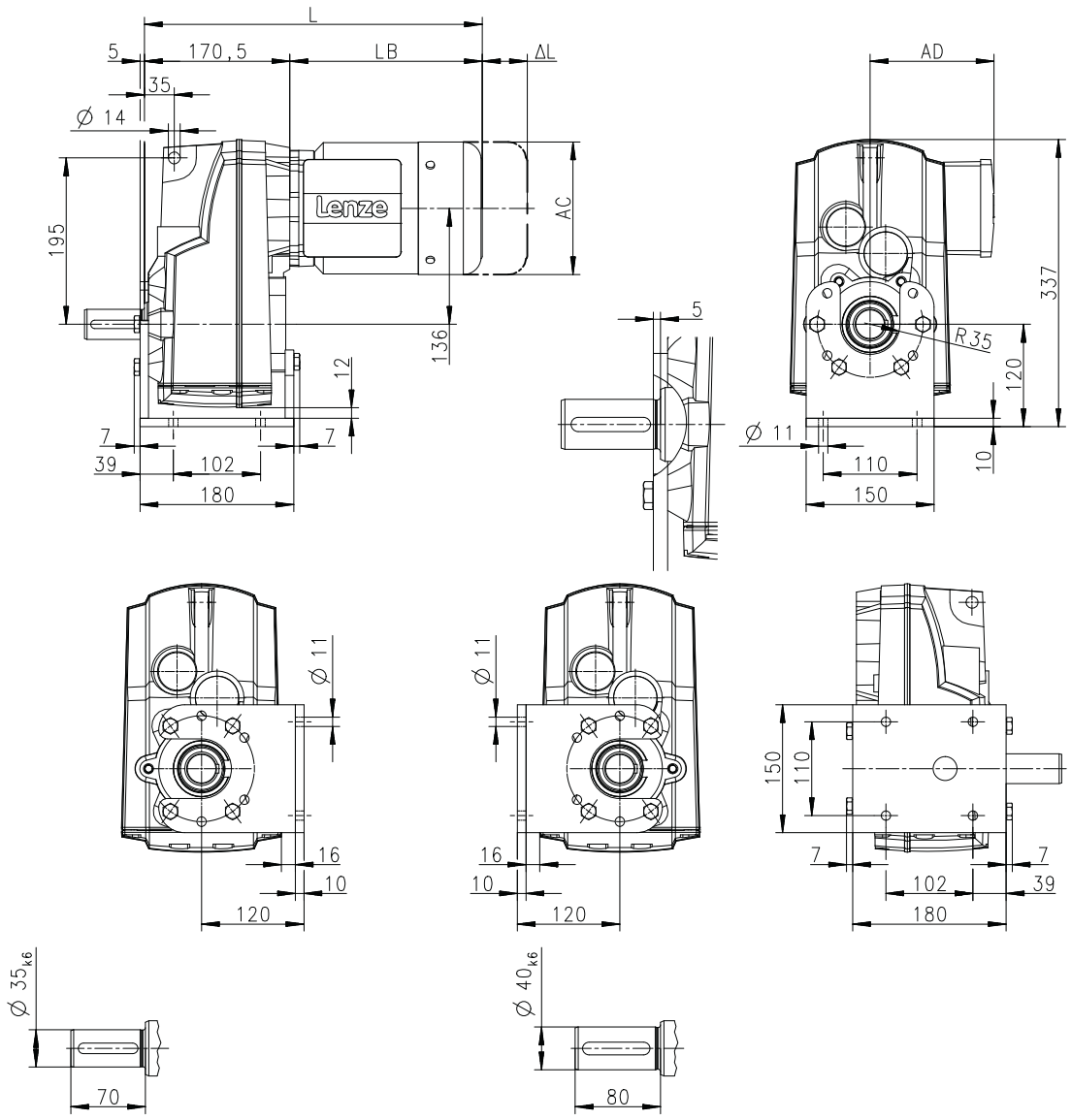


Product			MH□MA□□						
			090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions									
Total length	**L**	**[mm]**	456		492	508	551	599	
Motor length	**LB**	**[mm]**	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	181		170		183	202	
Motor diameter	**AC**	**[mm]**	176		194		218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

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VBR

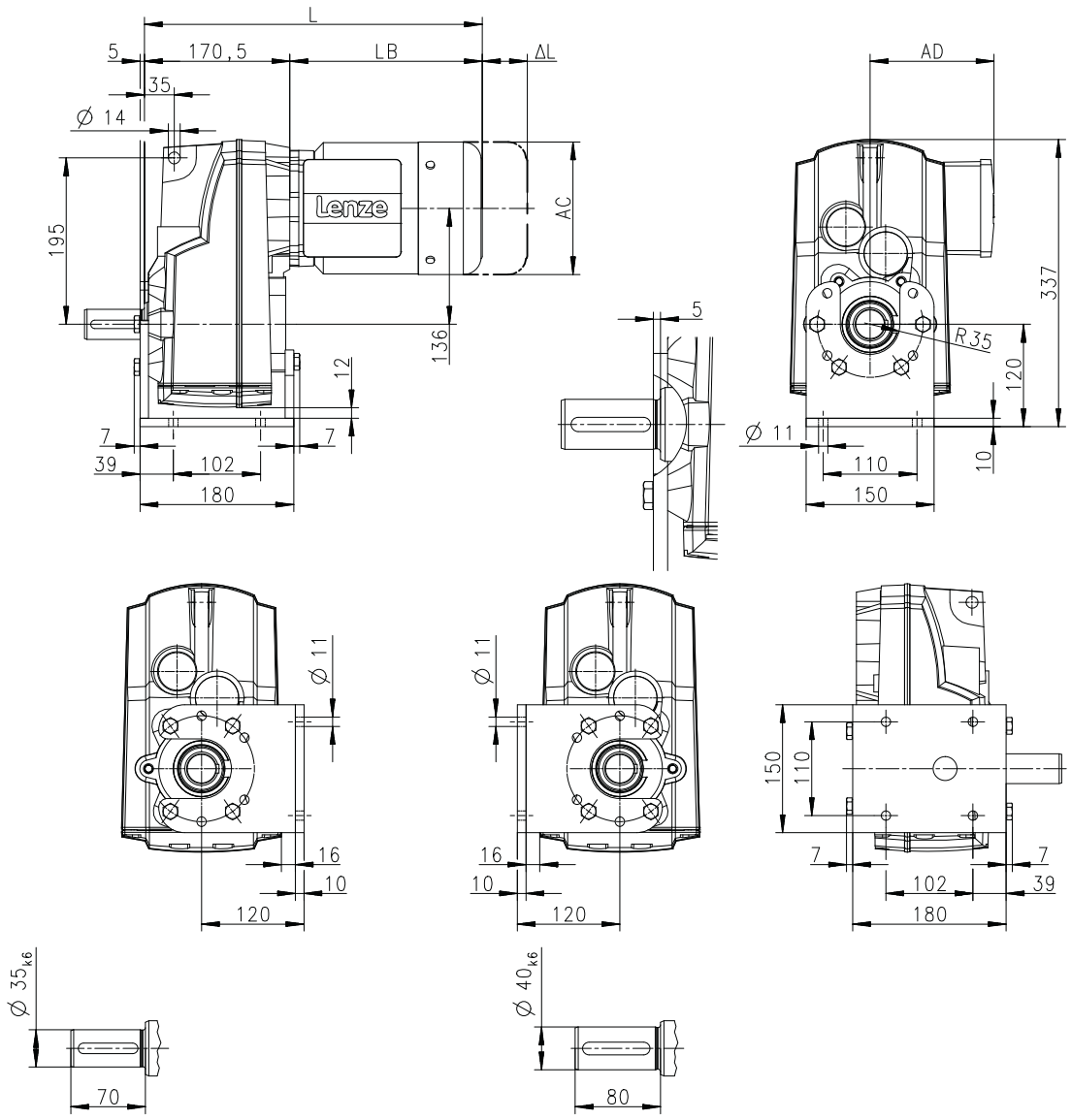


Product			MD□MA□□					MH□MA□□
			063-12	063-32	063-42	071-32	071-42	080-32
Dimensions								
Total length	**L**	**[mm]**	354			374		397
Motor length	**LB**	**[mm]**	183			203		226
Length of motor options	**Δ L**	**[mm]**	170			165		183
Motor diameter	**AC**	**[mm]**	123			139		156
Distance motor/connection	**AD**	**[mm]**	100			109		150

Dimensions, 4-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VBR



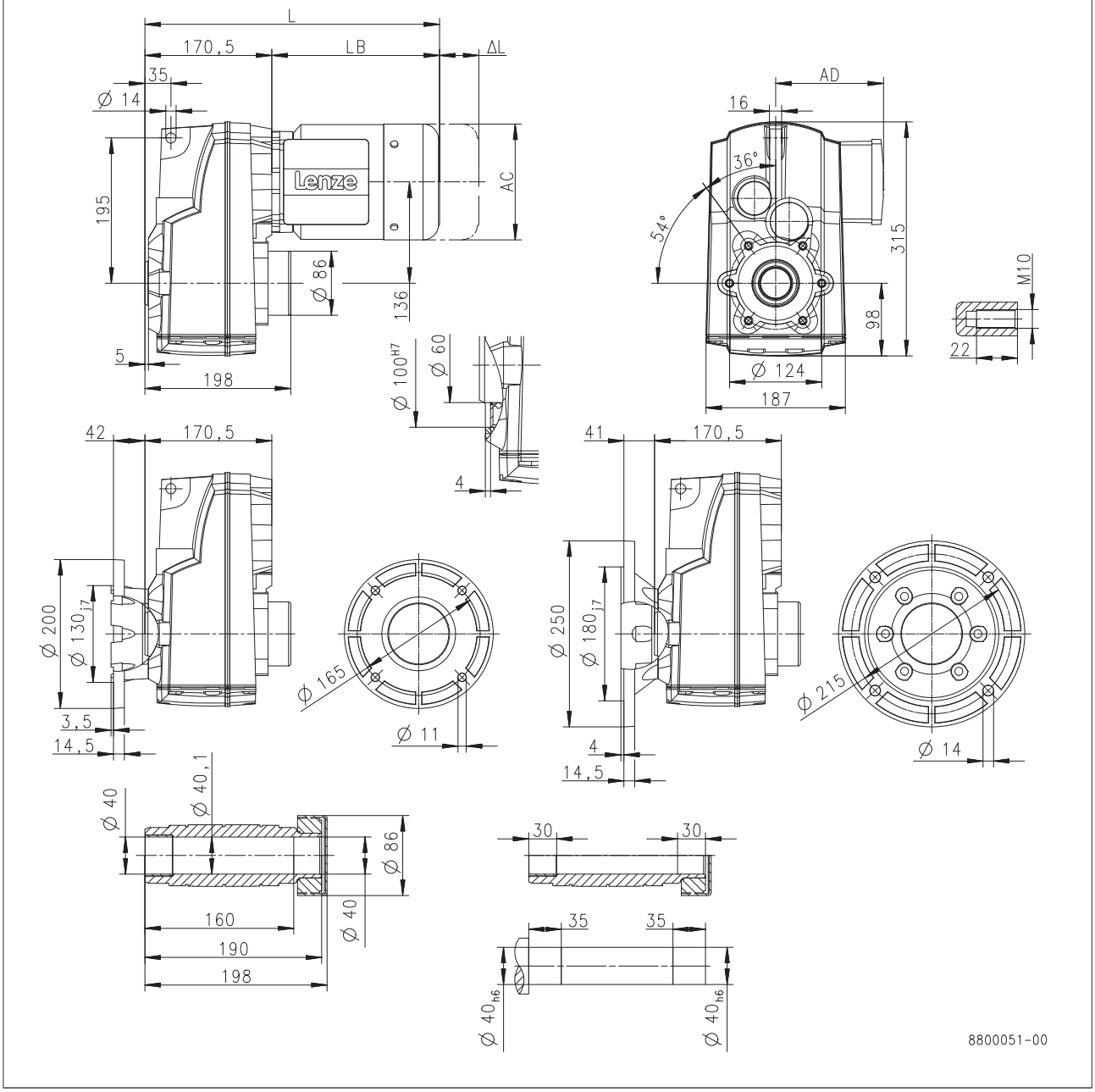
8800052-00

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

Dimensions, 4-pole motors

g500-S660

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

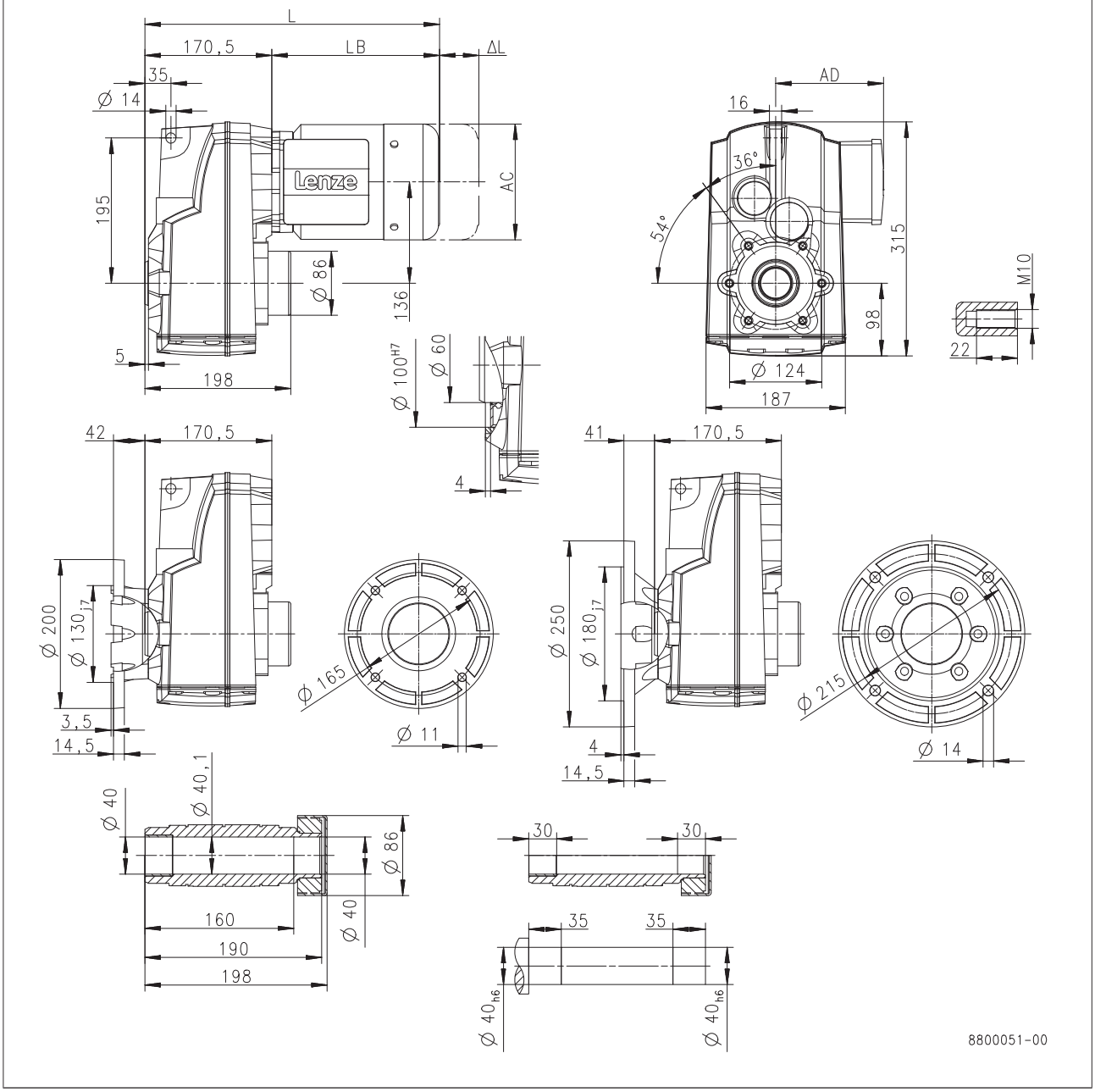


Product			MD□MA□□					MH□MA□□
			063-12	063-32	063-42	071-32	071-42	080-32
Dimensions								
Total length	**L**	**[mm]**	354			374		397
Motor length	**LB**	**[mm]**	183			203		226
Length of motor options	**Δ L**	**[mm]**	170			165		183
Motor diameter	**AC**	**[mm]**	123			139		156
Distance motor/connection	**AD**	**[mm]**	100			109		150

Dimensions, 4-pole motors

g500-S660

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

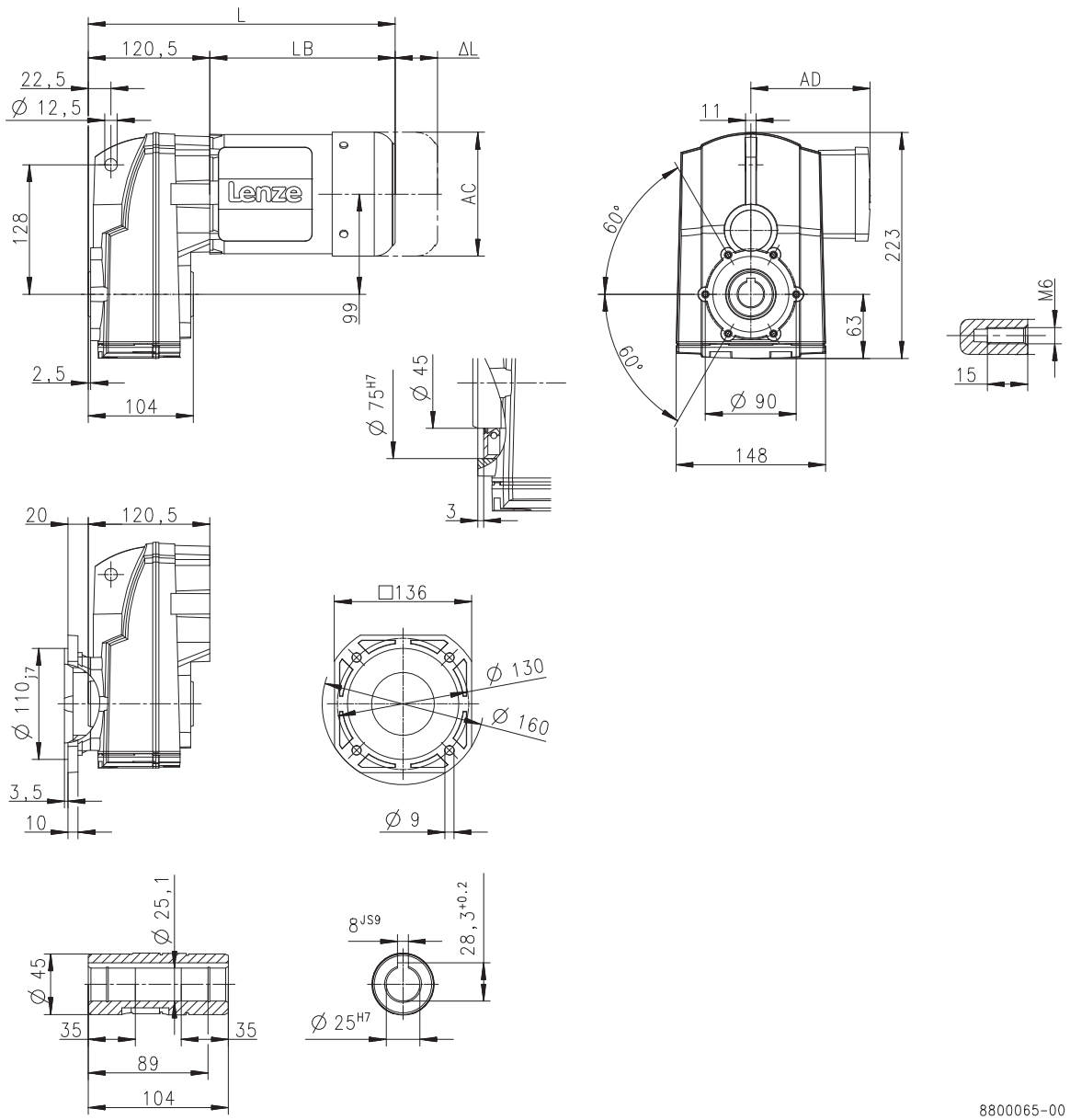


Product			MH□MA□□						
			090-12	090-32	100-12	100-32	112-22	132-12	132-22
Dimensions									
Total length	**L**	**[mm]**	456		492	508	551	599	
Motor length	**LB**	**[mm]**	285		321	337	380	428	
Length of motor options	**Δ L**	**[mm]**	181		170		183	202	
Motor diameter	**AC**	**[mm]**	176		194		218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

Dimensions, 2-pole and 6-pole motors

g500-S130

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

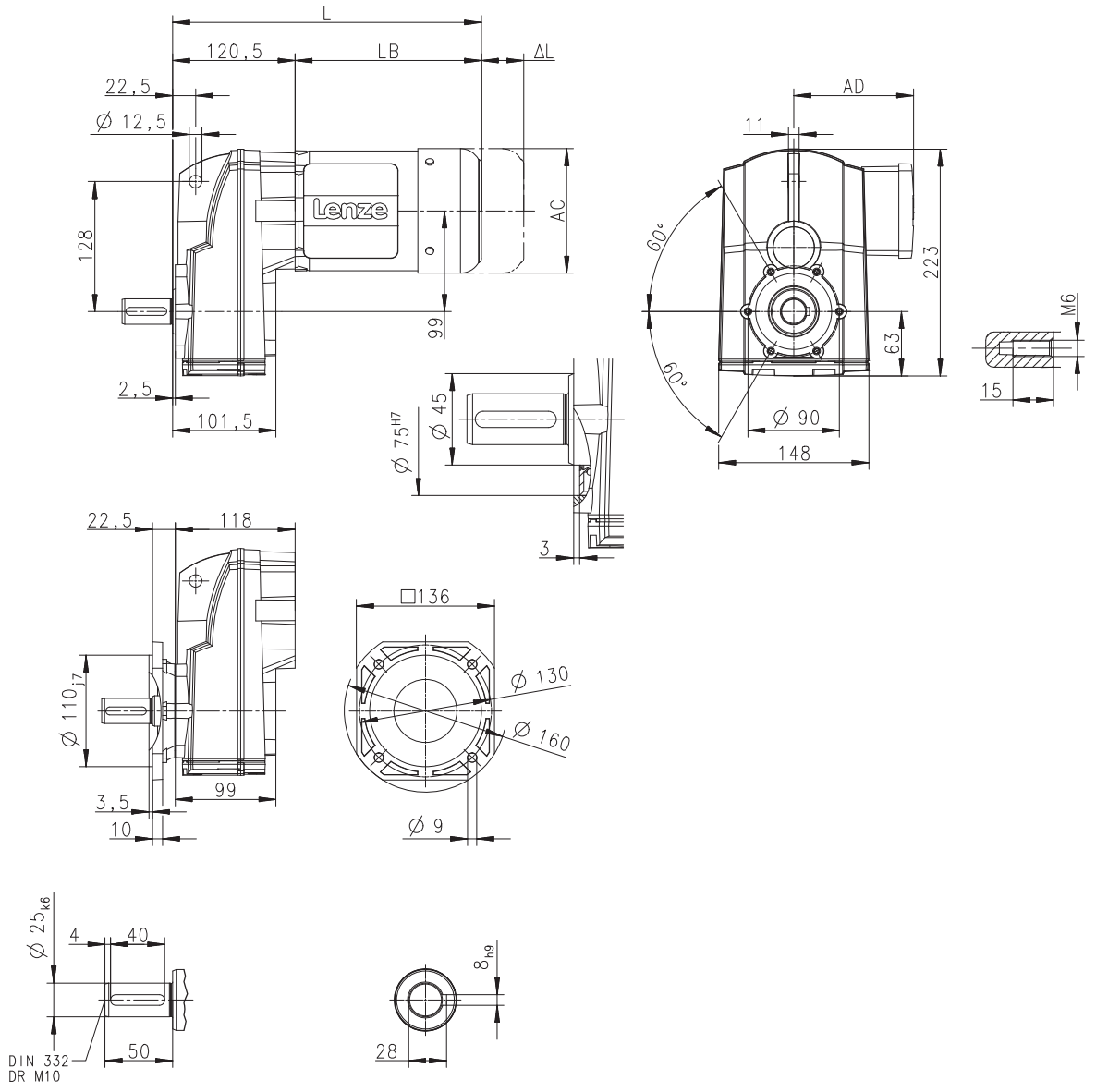


Product			MD□MA□□							
			063-11	063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions										
Total length	**L**	**[mm]**	304		324				347	
Motor length	**LB**	**[mm]**	183		203				226	
Length of motor options	**Δ L**	**[mm]**	170		165				183	
Motor diameter	**AC**	**[mm]**	123		139				156	
Distance motor/connection	**AD**	**[mm]**	100		109				150	

Dimensions, 2-pole and 6-pole motors

g500-S130

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

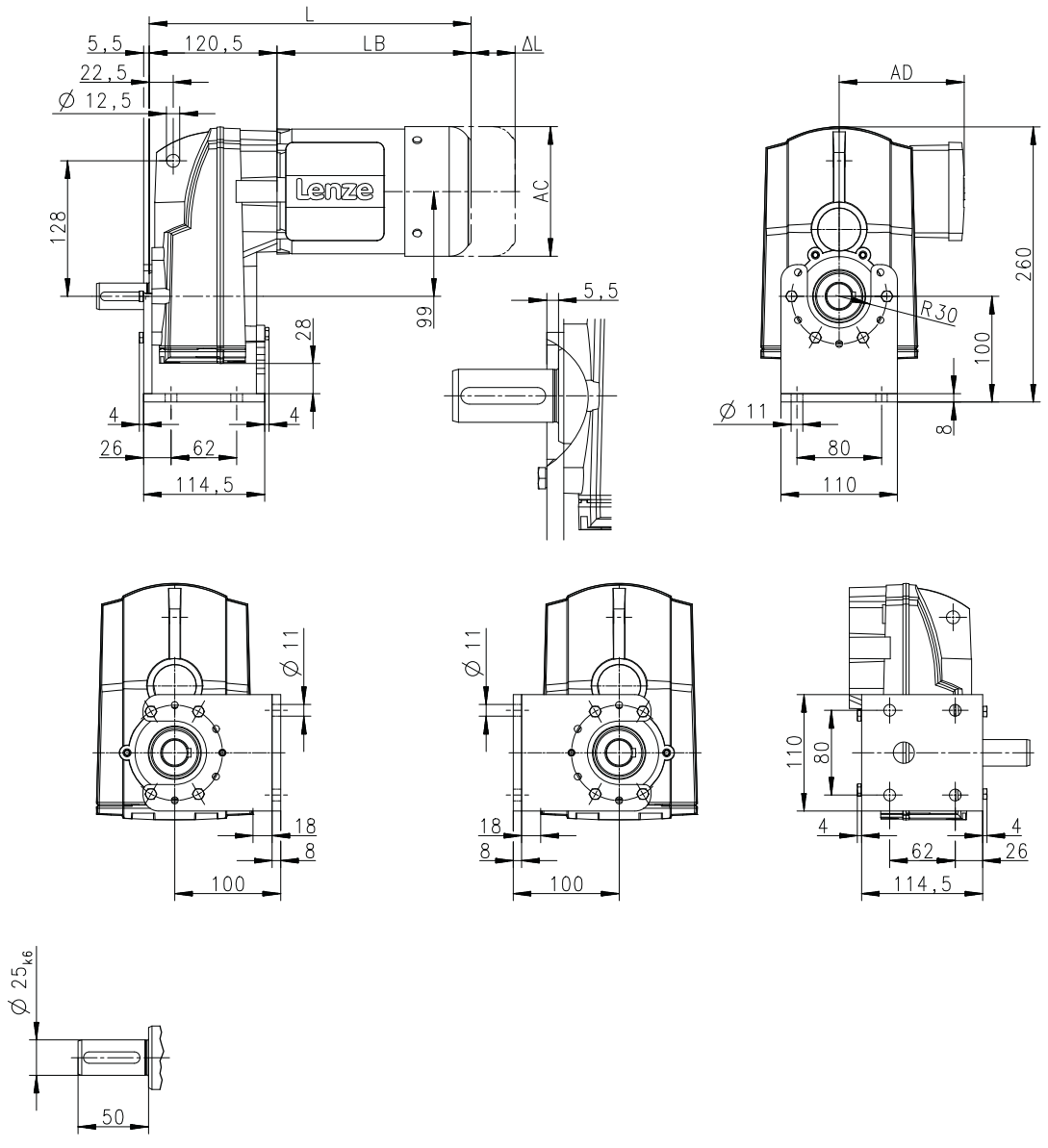


Product			MD□MA□□							
			063-11	063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions										
Total length	**L**	**[mm]**	304		324				347	
Motor length	**LB**	**[mm]**	183		203				226	
Length of motor options	**Δ L**	**[mm]**	170		165				183	
Motor diameter	**AC**	**[mm]**	123		139				156	
Distance motor/connection	**AD**	**[mm]**	100		109				150	

Dimensions, 2-pole and 6-pole motors

g500-S130

Dimensions with solid shaft
Gearbox design: VBR

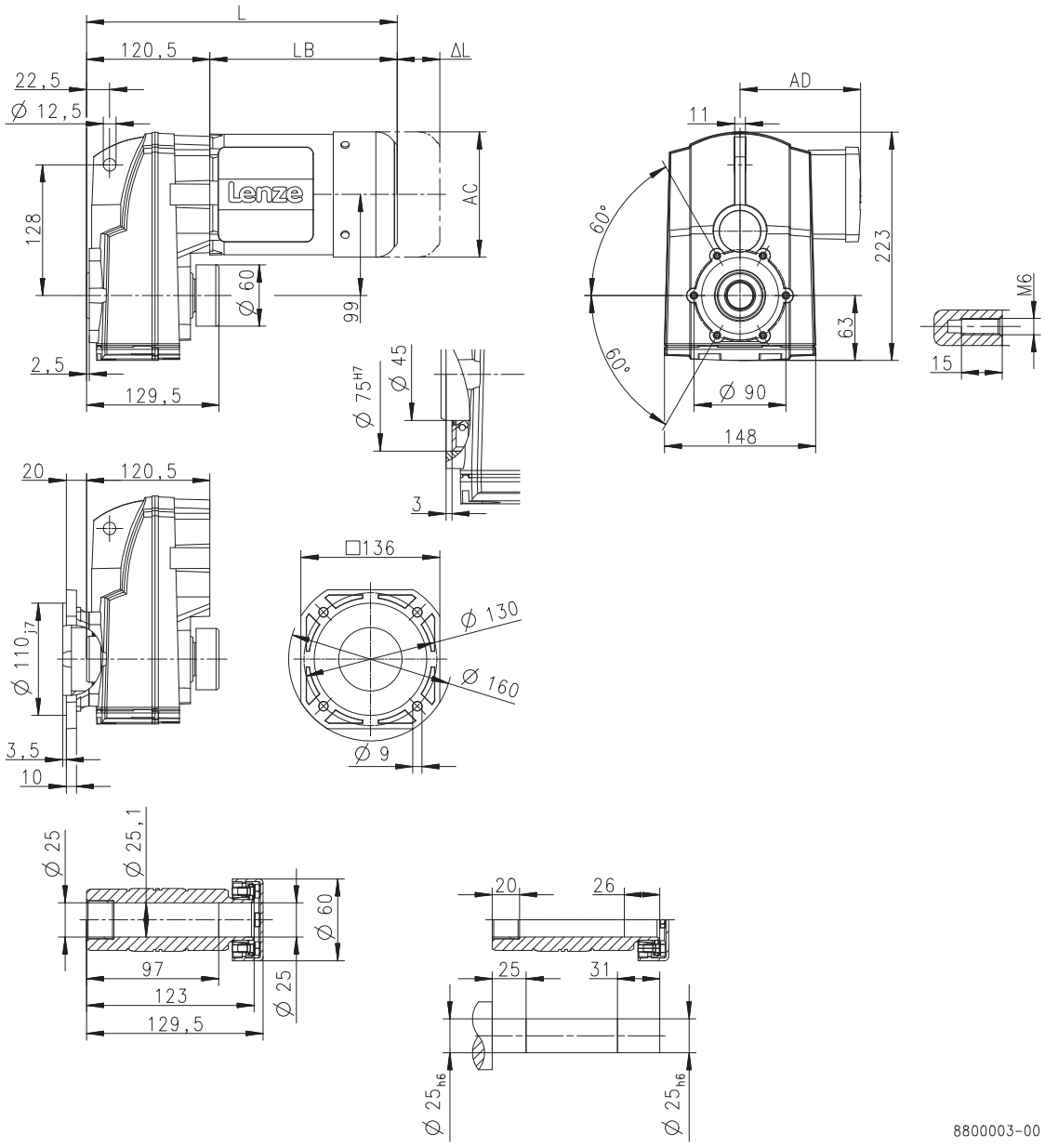


Product			MD□MA□□							
			063-11	063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions										
Total length	**L**	**[mm]**	304		324				347	
Motor length	**LB**	**[mm]**	183		203				226	
Length of motor options	**Δ L**	**[mm]**	170		165				183	
Motor diameter	**AC**	**[mm]**	123		139				156	
Distance motor/connection	**AD**	**[mm]**	100		109				150	

Dimensions, 2-pole and 6-pole motors

g500-S130

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

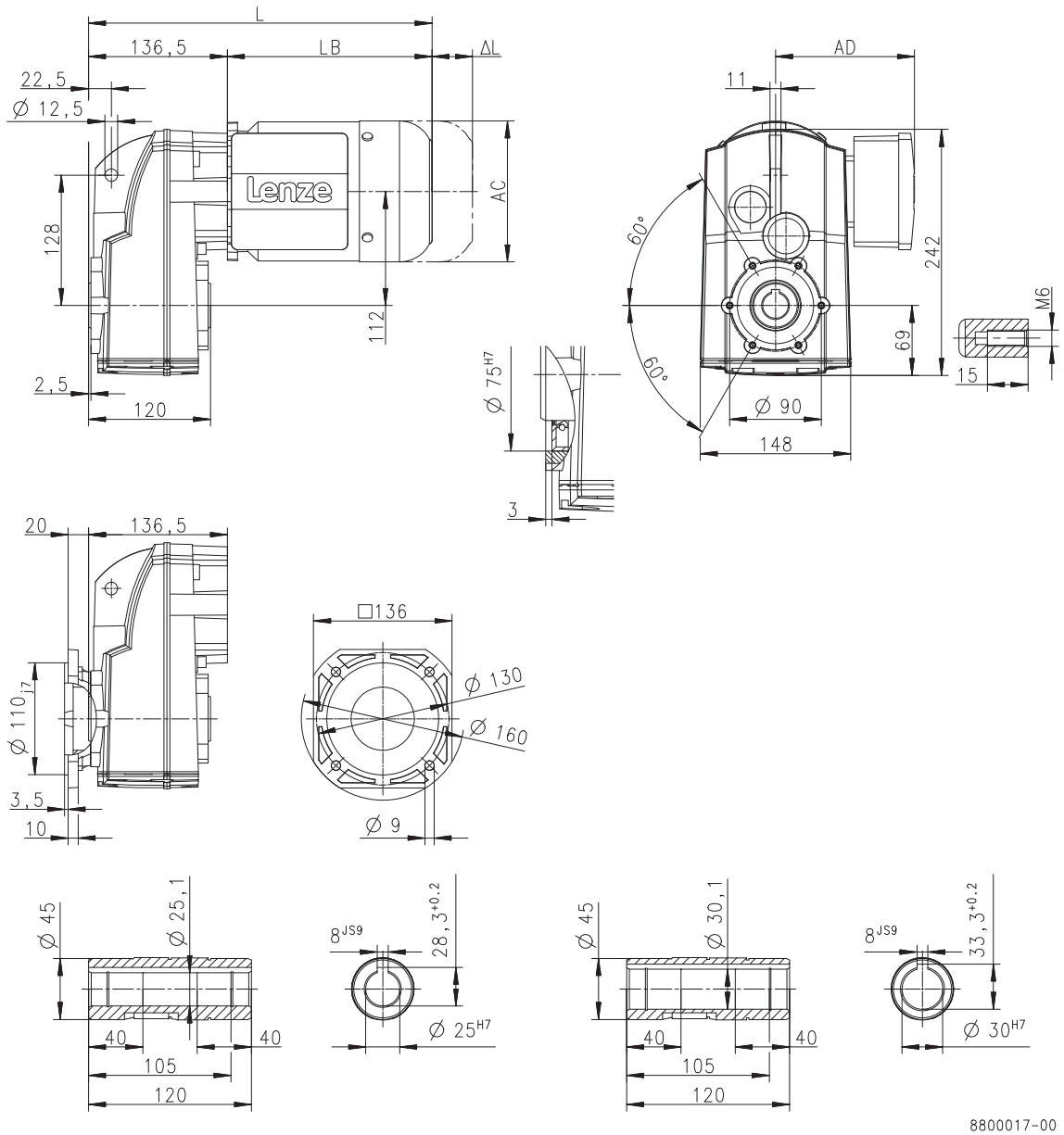


Product			MD□MA□□							
			063-11	063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions										
Total length	**L**	**[mm]**	304		324				347	
Motor length	**LB**	**[mm]**	183		203				226	
Length of motor options	**Δ L**	**[mm]**	170		165				183	
Motor diameter	**AC**	**[mm]**	123		139				156	
Distance motor/connection	**AD**	**[mm]**	100		109				150	

Dimensions, 2-pole and 6-pole motors

g500-S220

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

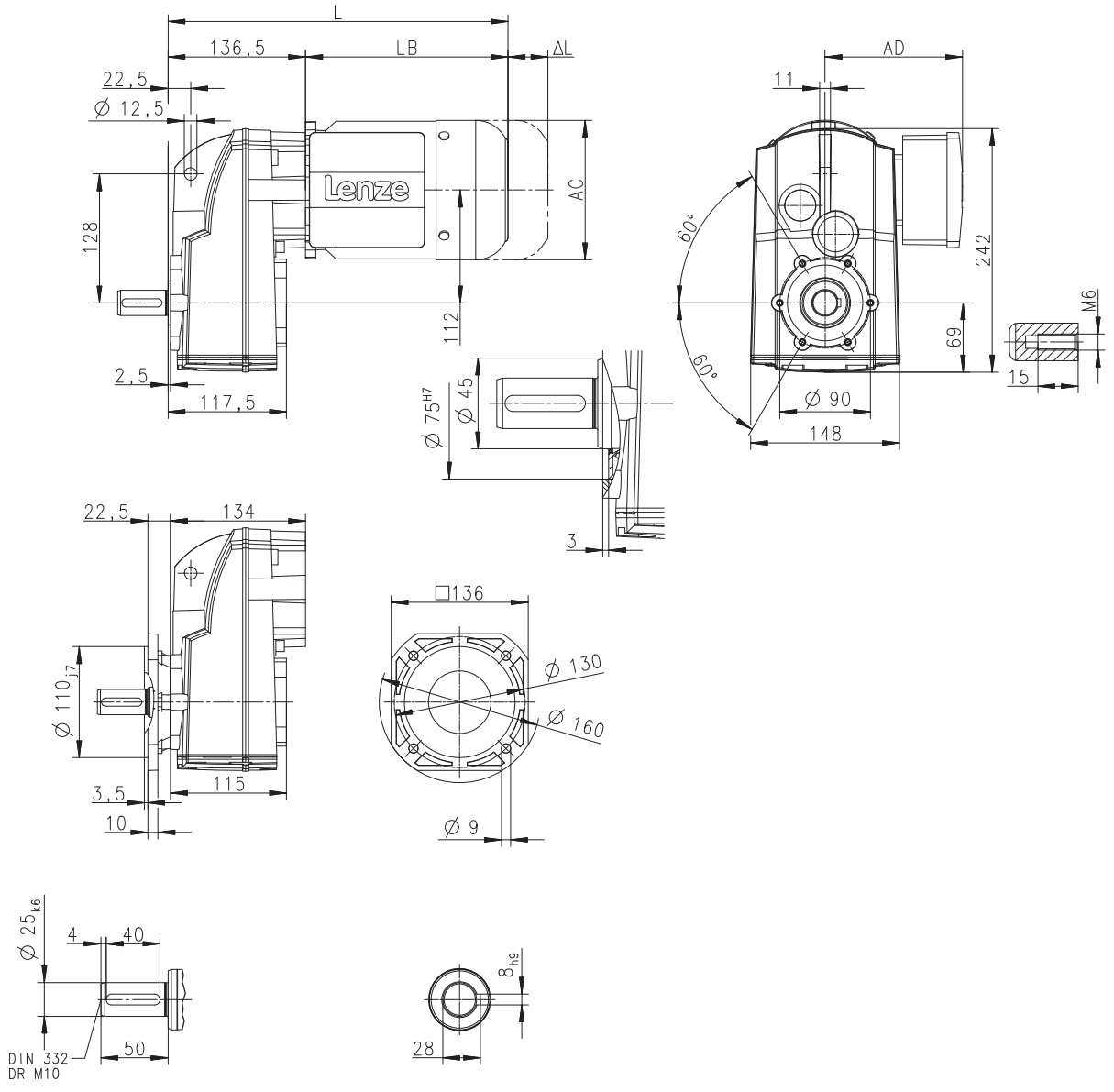


Product			MD□MA□□						
			063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions									
Total length	**L**	**[mm]**	320	340				363	
Motor length	**LB**	**[mm]**	183	203				226	
Length of motor options	**Δ L**	**[mm]**	170	165				183	
Motor diameter	**AC**	**[mm]**	123	139				156	
Distance motor/connection	**AD**	**[mm]**	100	109				150	

Dimensions, 2-pole and 6-pole motors

g500-S220

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

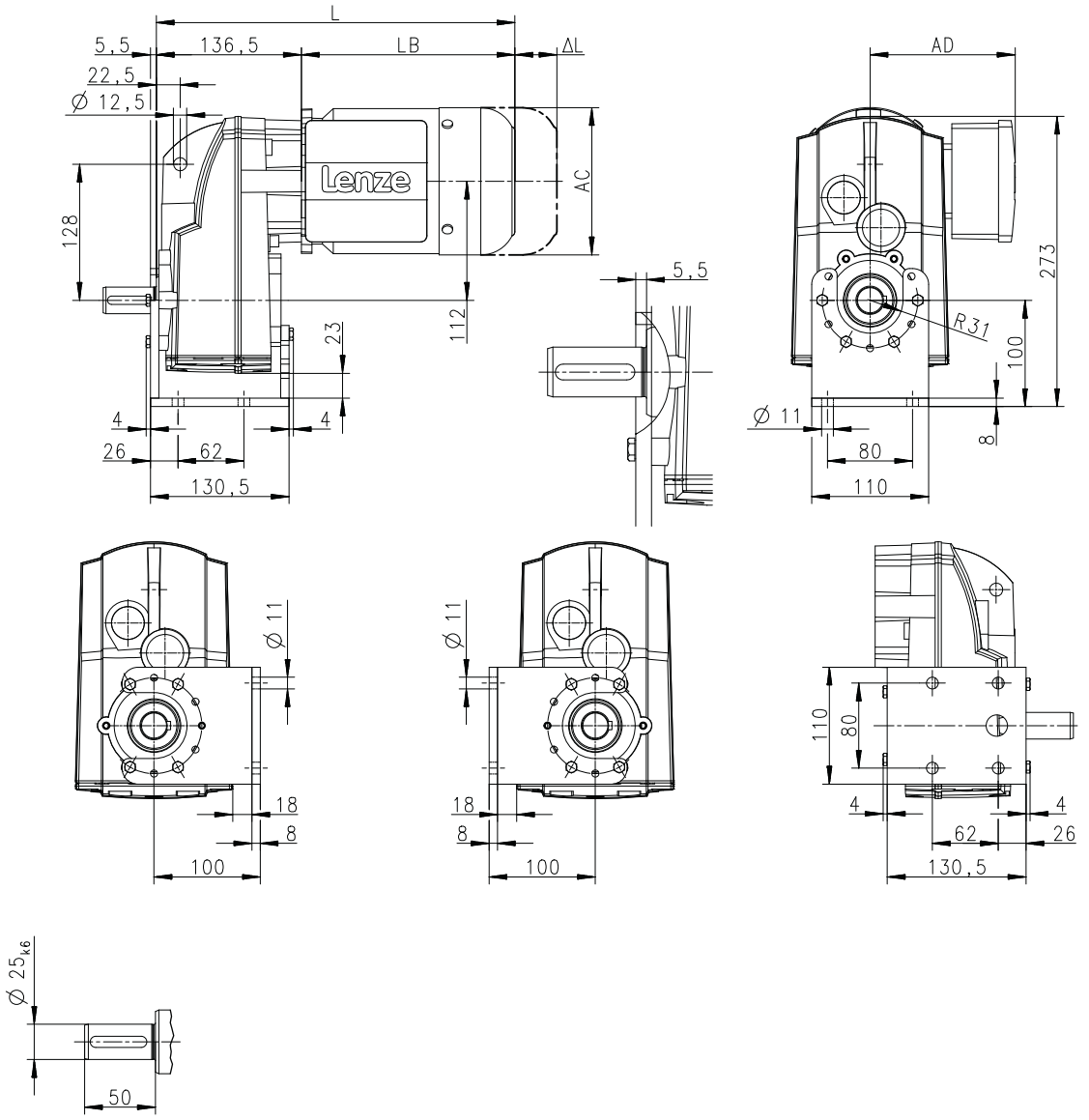


Product			MD□MA□□						
			063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions									
Total length	**L**	**[mm]**	320	340				363	
Motor length	**LB**	**[mm]**	183	203				226	
Length of motor options	**Δ L**	**[mm]**	170	165				183	
Motor diameter	**AC**	**[mm]**	123	139				156	
Distance motor/connection	**AD**	**[mm]**	100	109				150	

Dimensions, 2-pole and 6-pole motors

g500-S220

Dimensions with solid shaft
Gearbox design: VBR

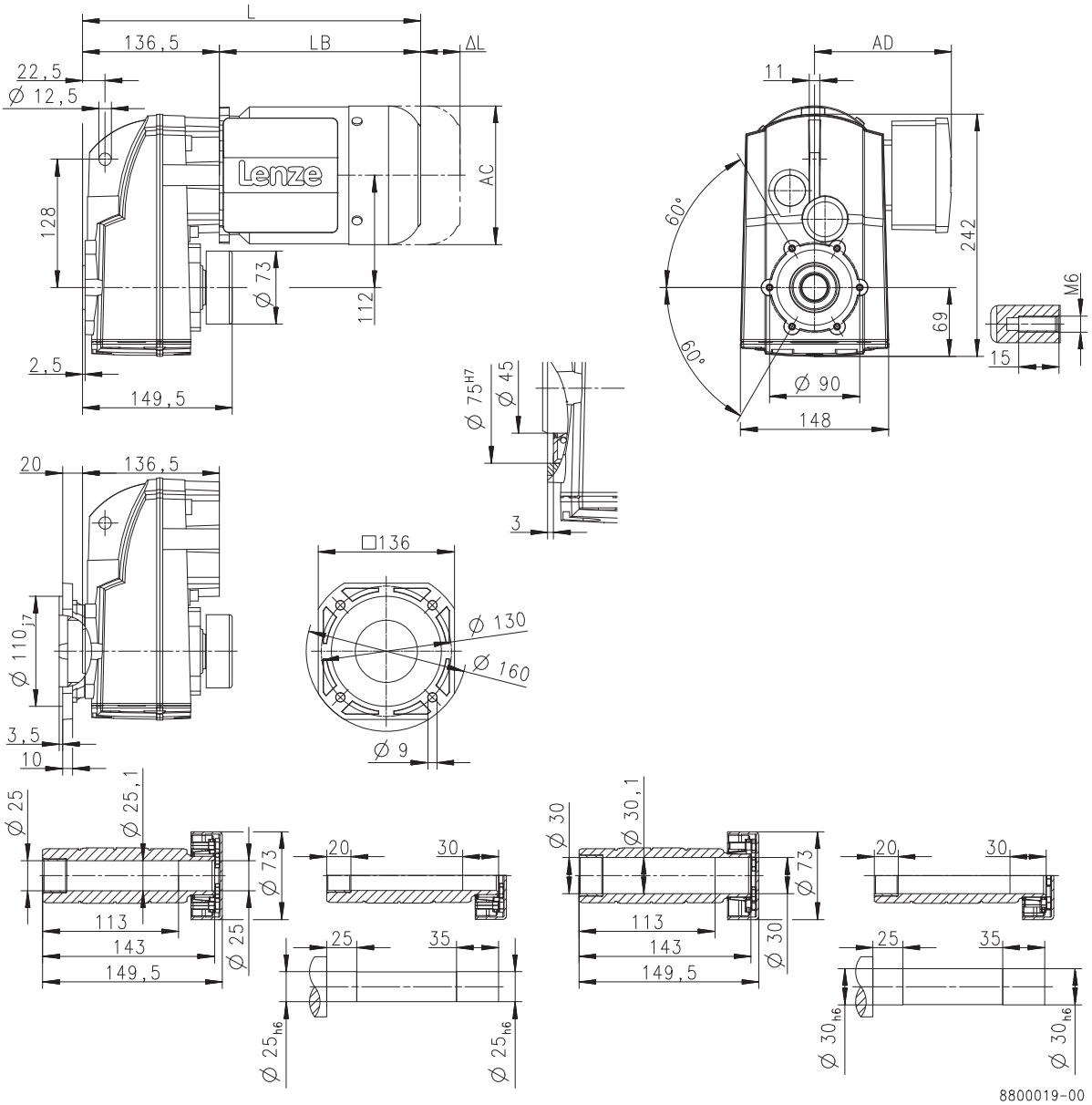


Product			MD□MA□□						
			063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions									
Total length	**L**	**[mm]**	320	340				363	
Motor length	**LB**	**[mm]**	183	203				226	
Length of motor options	**Δ L**	**[mm]**	170	165				183	
Motor diameter	**AC**	**[mm]**	123	139				156	
Distance motor/connection	**AD**	**[mm]**	100	109				150	

Dimensions, 2-pole and 6-pole motors

g500-S220

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

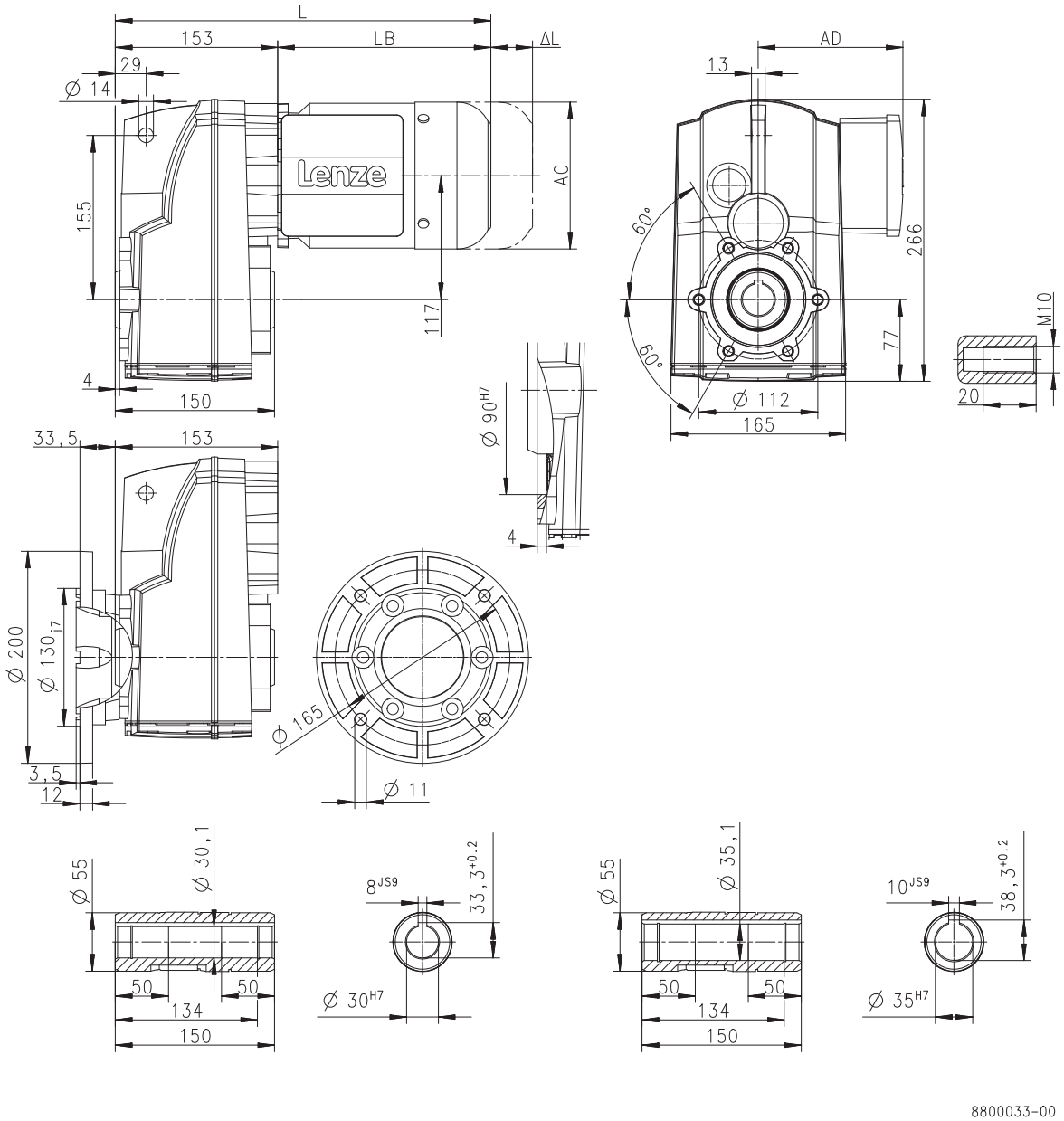


Product			MD□MA□□						
			063-31	071-11	071-13	071-31	071-33	080-13	080-33
Dimensions									
Total length	**L**	**[mm]**	320	340				363	
Motor length	**LB**	**[mm]**	183	203				226	
Length of motor options	**Δ L**	**[mm]**	170	165				183	
Motor diameter	**AC**	**[mm]**	123	139				156	
Distance motor/connection	**AD**	**[mm]**	100	109				150	

Dimensions, 2-pole and 6-pole motors

g500-S400

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

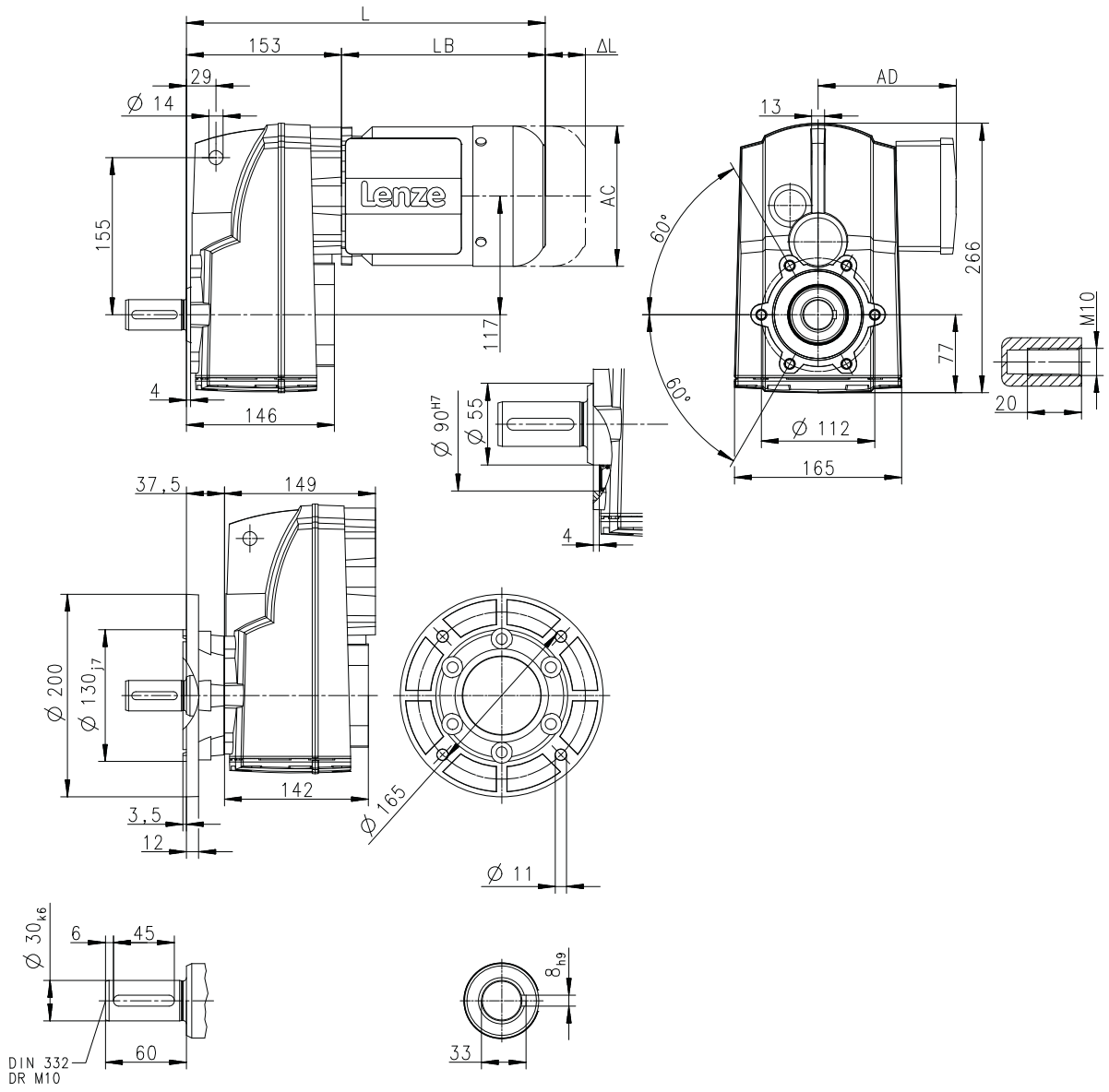


Product			MD□MA□□				
			071-13	071-31	071-33	080-13	080-33
Dimensions							
Total length	**L**	**[mm]**	356			379	
Motor length	**LB**	**[mm]**	203			226	
Length of motor options	**Δ L**	**[mm]**	165			183	
Motor diameter	**AC**	**[mm]**	139			156	
Distance motor/connection	**AD**	**[mm]**	109			150	

Dimensions, 2-pole and 6-pole motors

g500-S400

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

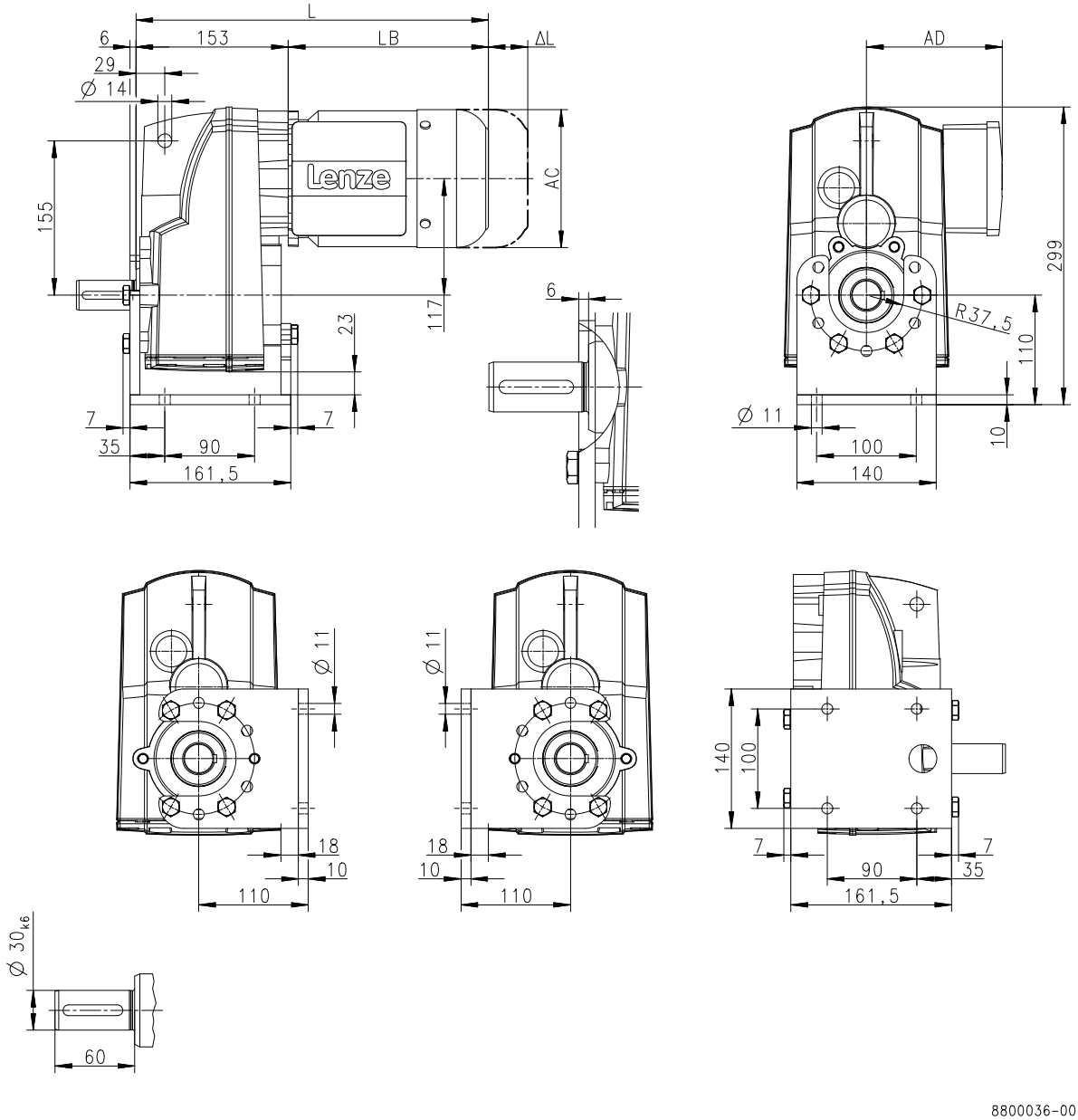


Product			MD□MA□□				
			071-13	071-31	071-33	080-13	080-33
Dimensions							
Total length	**L**	**[mm]**	356			379	
Motor length	**LB**	**[mm]**	203			226	
Length of motor options	**Δ L**	**[mm]**	165			183	
Motor diameter	**AC**	**[mm]**	139			156	
Distance motor/connection	**AD**	**[mm]**	109			150	

Dimensions, 2-pole and 6-pole motors

g500-S400

Dimensions with solid shaft
Gearbox design: VBR

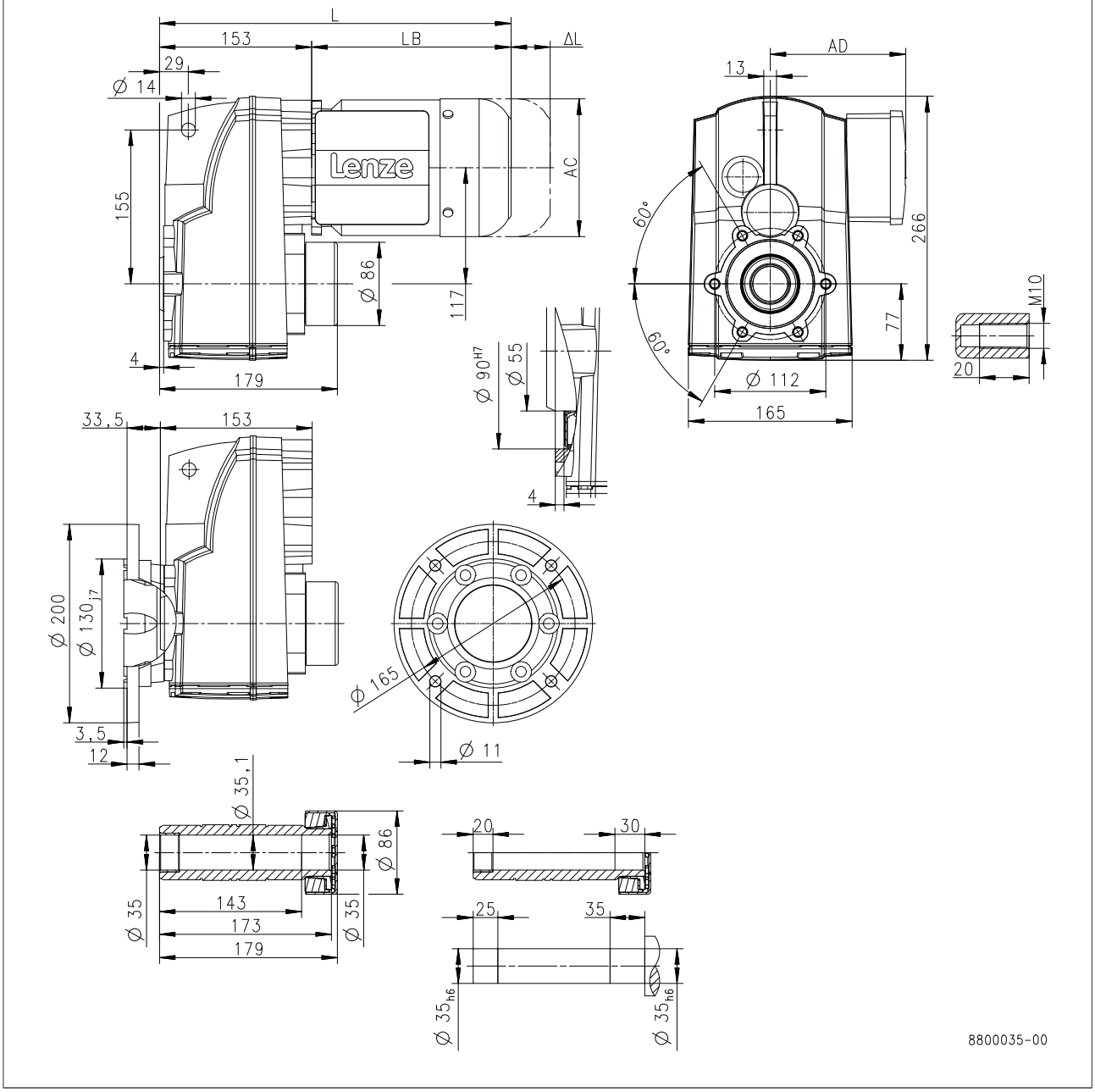


Product			MD□MA□□				
			071-13	071-31	071-33	080-13	080-33
Dimensions							
Total length	**L**	**[mm]**	356			379	
Motor length	**LB**	**[mm]**	203			226	
Length of motor options	**Δ L**	**[mm]**	165			183	
Motor diameter	**AC**	**[mm]**	139			156	
Distance motor/connection	**AD**	**[mm]**	109			150	

Dimensions, 2-pole and 6-pole motors

g500-S400

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK

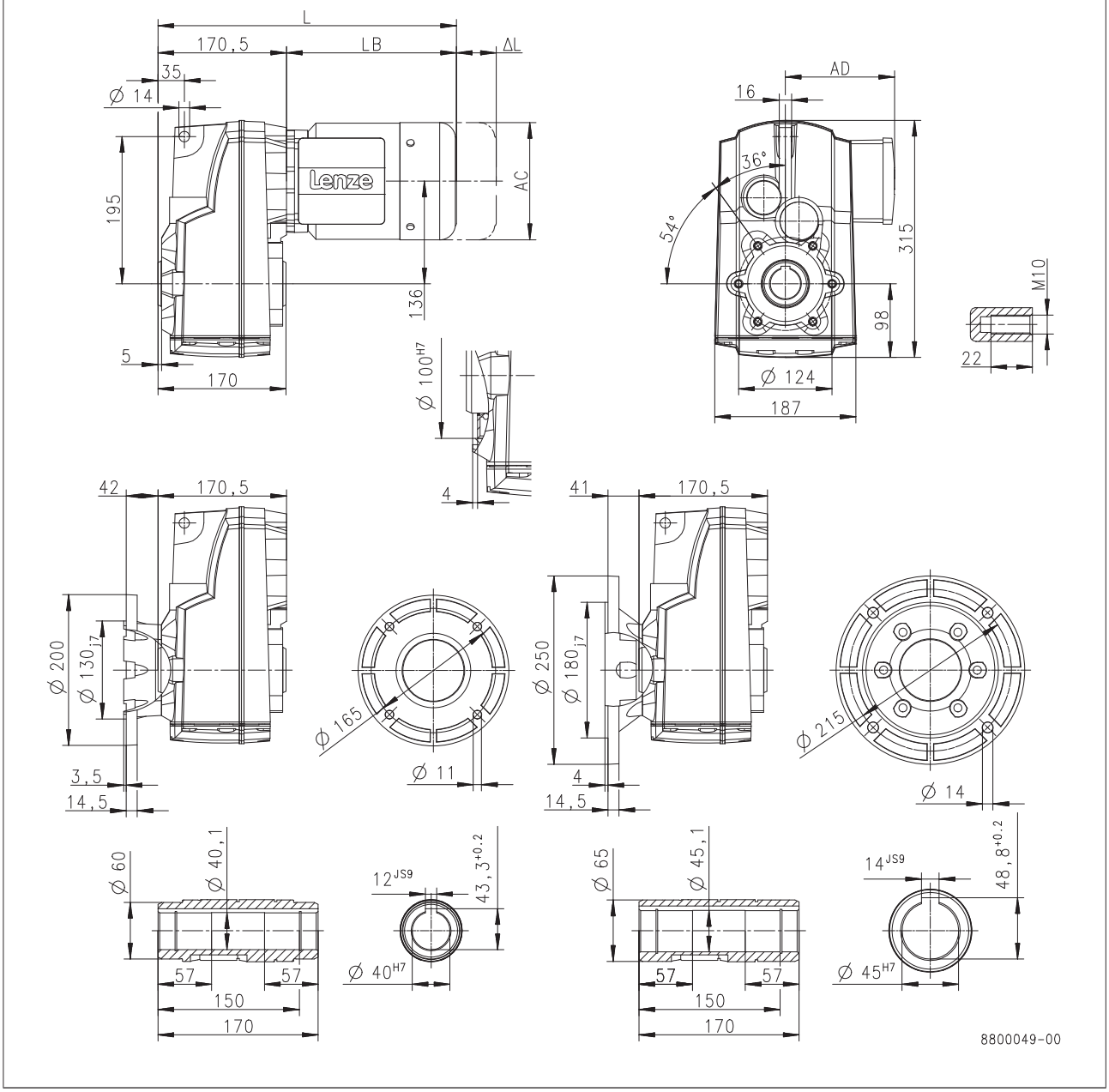


Product			MD□MA□□				
			071-13	071-31	071-33	080-13	080-33
Dimensions							
Total length	**L**	**[mm]**	356			379	
Motor length	**LB**	**[mm]**	203			226	
Length of motor options	**Δ L**	**[mm]**	165			183	
Motor diameter	**AC**	**[mm]**	139			156	
Distance motor/connection	**AD**	**[mm]**	109			150	

Dimensions, 2-pole and 6-pole motors

g500-S660

Dimensions with hollow shaft
Gearbox design: HDR, HCR, HCK

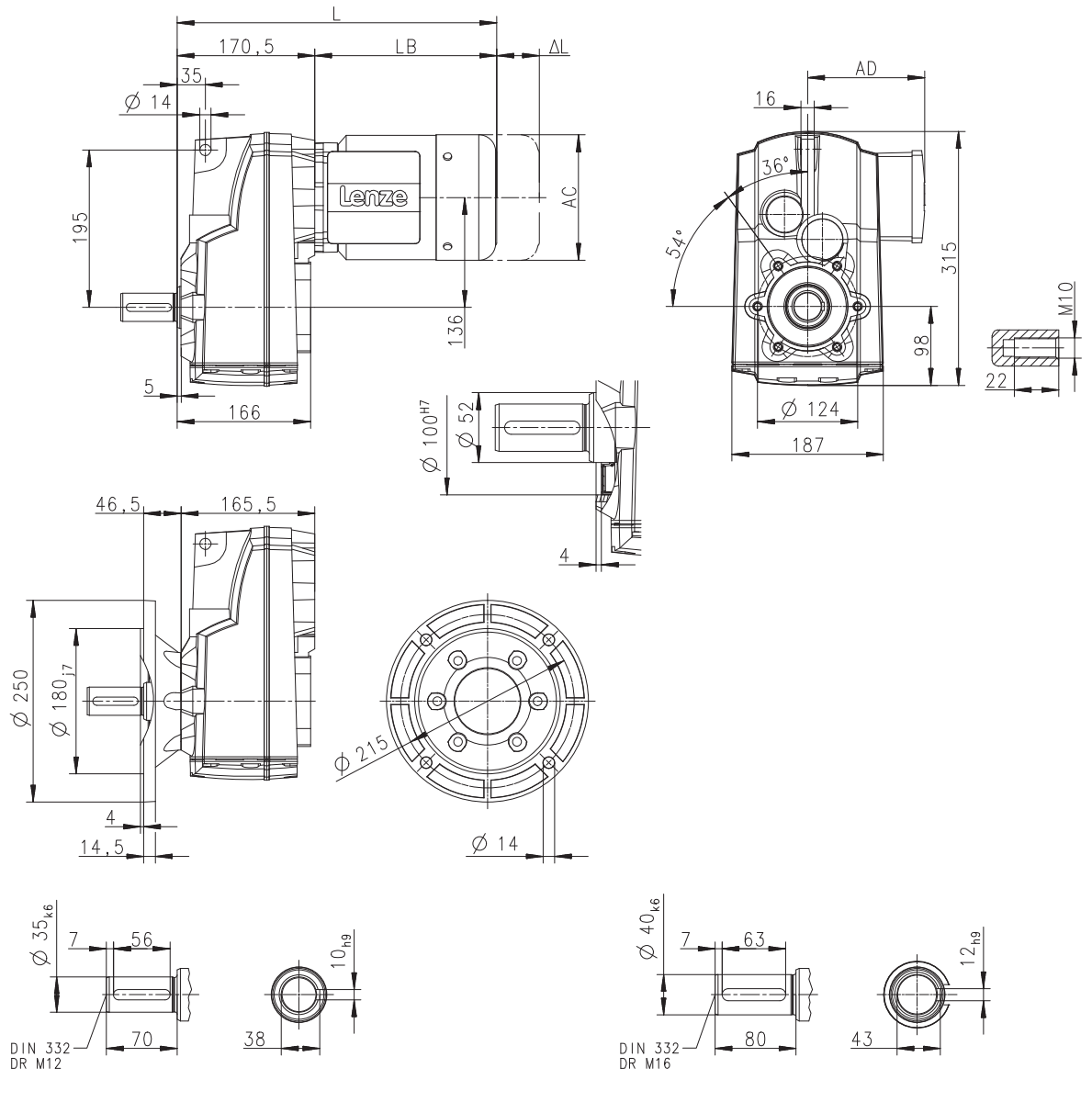


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	374		397	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 2-pole and 6-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VDR, VCR, VCK

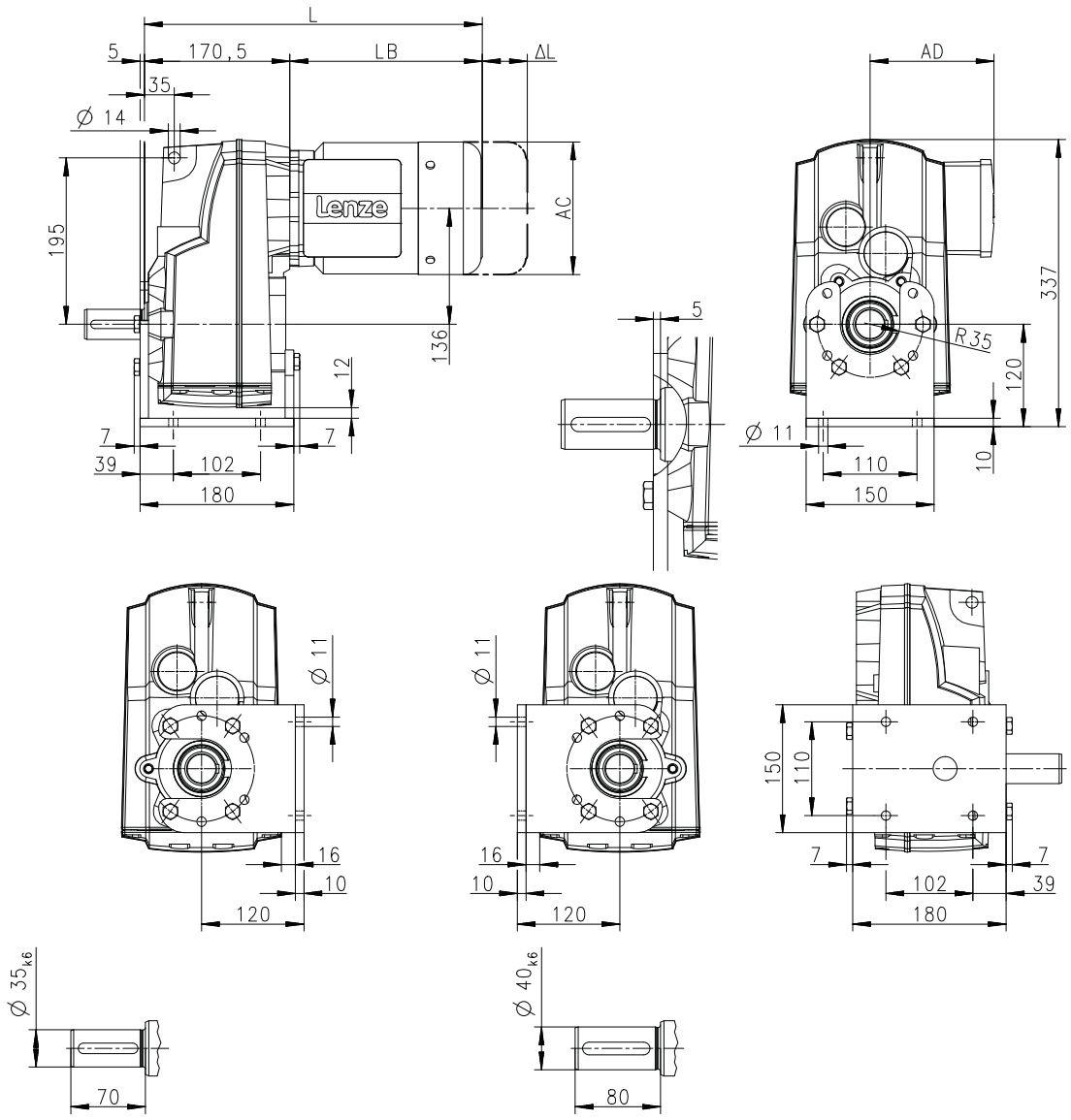


Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	374		397	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 2-pole and 6-pole motors

g500-S660

Dimensions with solid shaft
Gearbox design: VBR



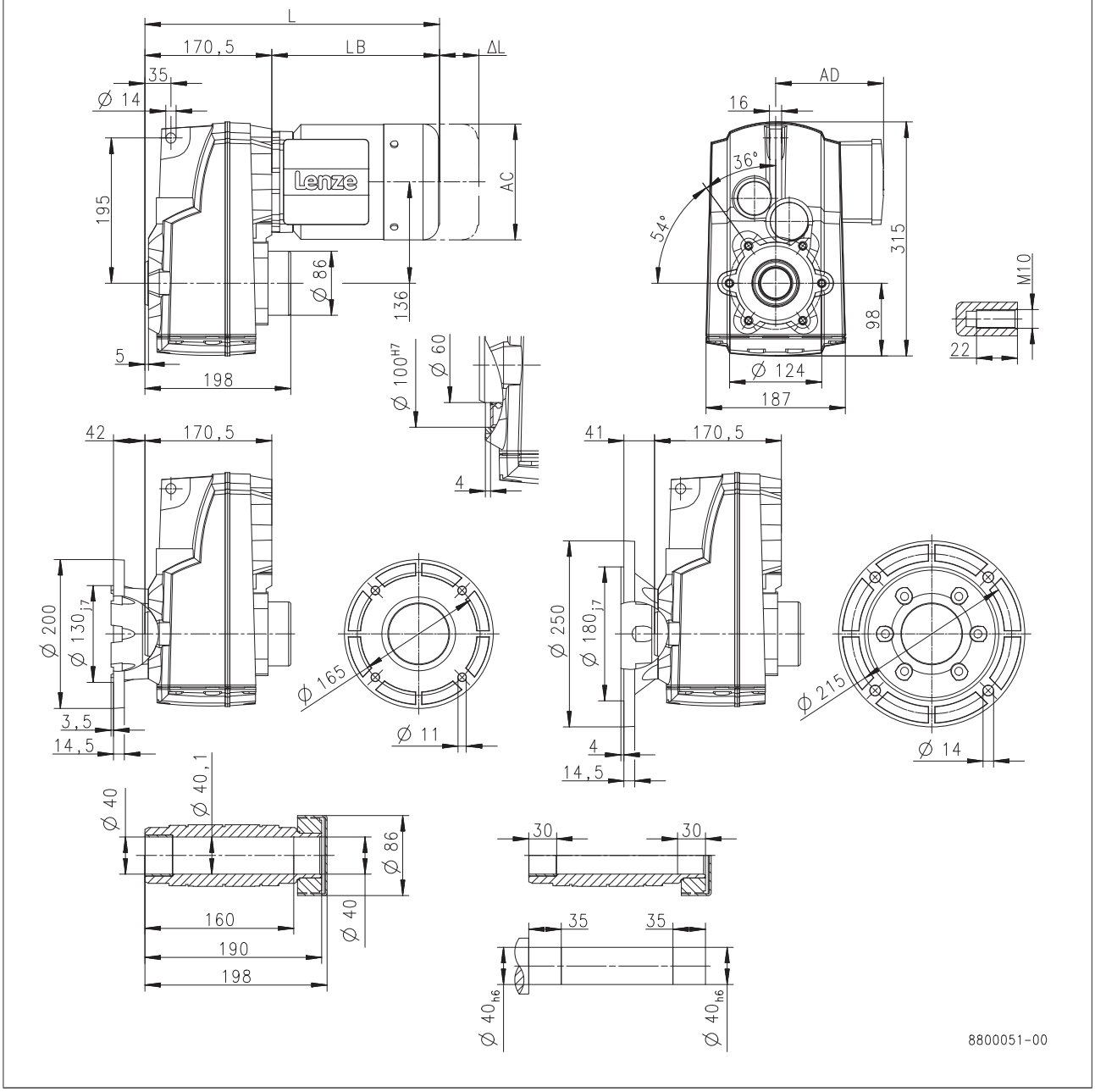
8800052-00

Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	374		397	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Dimensions, 2-pole and 6-pole motors

g500-S660

Dimensions with shrink disc
Gearbox design: SDR, SCR, SCK



Product			MD□MA□□			
			071-13	071-33	080-13	080-33
Dimensions						
Total length	**L**	**[mm]**	374		397	
Motor length	**LB**	**[mm]**	203		226	
Length of motor options	**Δ L**	**[mm]**	165		183	
Motor diameter	**AC**	**[mm]**	139		156	
Distance motor/connection	**AD**	**[mm]**	109		150	

Additional length of the built-on accessories

Dimensions, self-ventilated (4-pole)

Product			MD□MA□□			MH□MA□□				
			063-02 063-22	063-12 063-32 063-42	071-32 071-42	080-32	090-12 090-32	100-12 100-32	112-22	132-12 132-22
Built-on accessories										
Brake										
	Δ L	[mm]	71.0	40.0	52.0	73.0	68.0	76.0	90.0	110
Feedback										
	Δ L	[mm]	71.0	56.0	52.0	111	87.0	81.0	80.0	103
Handwheel										
	Δ L	[mm]			70.0	91.0	80.0	94.0	107	126
2. shaft end										
	Δ L	[mm]			47.0	68.0	57.0	71.0	84.0	101
Grey iron fan										
	Δ L	[mm]			0.000	4.00	0.000	76.0	0.000	
Brake + Feedback										
	Δ L	[mm]	135	103	96.0	111	105	101	120	125
Brake + Handwheel										
	Δ L	[mm]			70.0	91.0	80.0	94.0	107	126
Brake + 2. shaft end										
	Δ L	[mm]			47.0	68.0	57.0	71.0	84.0	101
Brake + Grey iron fan										
	Δ L	[mm]			52.0	73.0	68.0	76.0	90.0	110

Dimensions, self-ventilated (2-pole)

Product			MD□MA□□	
			063-11 063-31	071-11 071-31
Built-on accessories				
Brake				
	Δ L	[mm]	40.0	52.0
Grey iron fan				
	Δ L	[mm]		0.000
Brake + 2. shaft end				
	Δ L	[mm]		47.0
Brake + Grey iron fan				
	Δ L	[mm]		52.0

Further dimensions on the handwheel, 2nd shaft end and protection cover can be found in the motor chapter under product extensions.

Additional length of the built-on accessories

Dimensions, self-ventilated (6-pole)

Product			MD□MA□□	
			071-13 071-33	080-13 080-33
Built-on accessories				
Brake				
	Δ L	[mm]	52.0	73.0
Feedback				
	Δ L	[mm]	52.0	111
Handwheel				
	Δ L	[mm]	70.0	91.0
2. shaft end				
	Δ L	[mm]	47.0	68.0
Grey iron fan				
	Δ L	[mm]	0.000	4.00
Brake + Feedback				
	Δ L	[mm]	96.0	111
Brake + Handwheel				
	Δ L	[mm]	70.0	91.0
Brake + 2. shaft end				
	Δ L	[mm]	47.0	68.0
Brake + Grey iron fan				
	Δ L	[mm]	52.0	73.0

Further dimensions on the handwheel, 2nd shaft end and protection cover can be found in the motor chapter under product extensions.

Dimensions, forced ventilated (4-pole)

Product			MD□MA□□		MH□MA□□				
			063-12 063-32 063-42	071-32 071-42	080-32	090-12 090-32	100-12 100-32	112-22	132-12 132-22
Built-on accessories									
Blower									
	Δ L	[mm]	128				109	102	115
Brake									
	Δ L	[mm]	170	165	183	181	170	183	202
Feedback									
	Δ L	[mm]	128				109	183	202
Brake + Feedback									
	Δ L	[mm]	170	165	183	181	170	183	202

Further dimensions for the blower can be found in the motor chapter under product extensions.

Weights, 4-pole motors

2-stage gearboxes

				MD□MA□□					MH□MA□□	
				063-12	063-32	063-42	071-32	071-42	080-32	090-12
g500	-S130	m	[kg]	9.2		9.5	11	12	16	21
	-S220	m	[kg]	11			12	13	17	22
	-S400	m	[kg]		14		15	16	20	25
	-S660	m	[kg]			18	20		25	30

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

3-stage gearboxes

				MD□MA□□				MH□MA□□		
				063-12 063-32	063-42	071-32	071-42	080-32	090-12	090-32
g500	-S220	m	[kg]	11		12		18		
	-S400	m	[kg]	14		16		21		
	-S660	m	[kg]	18	19	20	21	25	30	32

Weights, 2-pole motors

2-stage gearboxes

				MD□MA□□			
				063-11	063-31	071-11	071-31
g500	-S130	m	[kg]	9.0	8.9	11	12
	-S220	m	[kg]		10	12	13
	-S400	m	[kg]				16

Weights, 6-pole motors

2-stage gearboxes

				MD□MA□□		
				071-13	**071-33**	**080-13 080-33**
g500	**-S130**	m	[kg]	12		16
	-S220	m	[kg]	13		17
	-S400	m	[kg]	16		20
	-S660	m	[kg]		20	25

3-stage gearboxes

				MD□MA□□		
				071-13 071-33	**080-13**	**080-33**
g500	**-S220**	m	[kg]	13	18	
	-S400	m	[kg]	16	21	
	-S660	m	[kg]	21	25	

Additional weights for gearboxes

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

Additional weights for motors

4-pole motors

Product			MD□MA□□			MH□MA□□				
			063-02 063-22	063-12 063-32 063-42	071-32 071-42	080-32	090-12 090-32	100-12 100-32	112-22	132-12 132-22
Built-on accessories										
Brake			06		06 08	08 10		10 12	12	14 16
	m	[kg]	0.9		0.9 1.5	1.5 2.6		2.6 4.2	4.2	5.8 8.7
Blower										
	m	[kg]		2.0	2.1	2.3	2.7	3.0	3.1	4.2
Grey iron fan										
	m	[kg]			1.2	1.4	2.0	2.5	3.8	6.0
Handwheel										
	m	[kg]					0.6			1.8

2-pole motors

Product			MD□MA□□	
			063-11 063-31	071-11 071-31
Built-on accessories				
Brake			06	06 08
	m	[kg]	0.9	0.9 1.5
Grey iron fan				
	m	[kg]		1.2

Additional weights for motors

6-pole motors

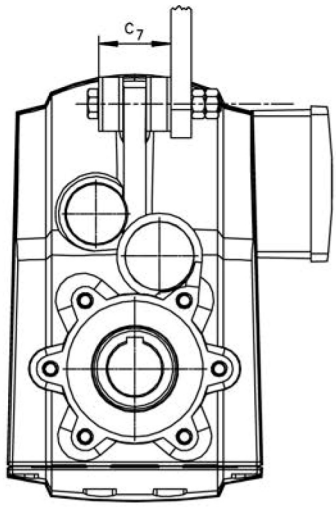
Product			MD□MA□□	
			071-13 071-33	080-13 080-33
Built-on accessories				
Brake			06 08	08 10
	m	[kg]	0.9 1.5	1.5 2.6
Grey iron fan				
	m	[kg]	1.2	1.4
Handwheel				
	m	[kg]	0.6	

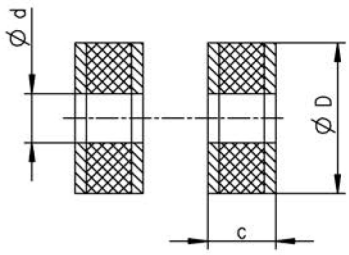
Torque plate

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

The rubber buffers can be ordered optionally.

Rubber buffer for torque plate



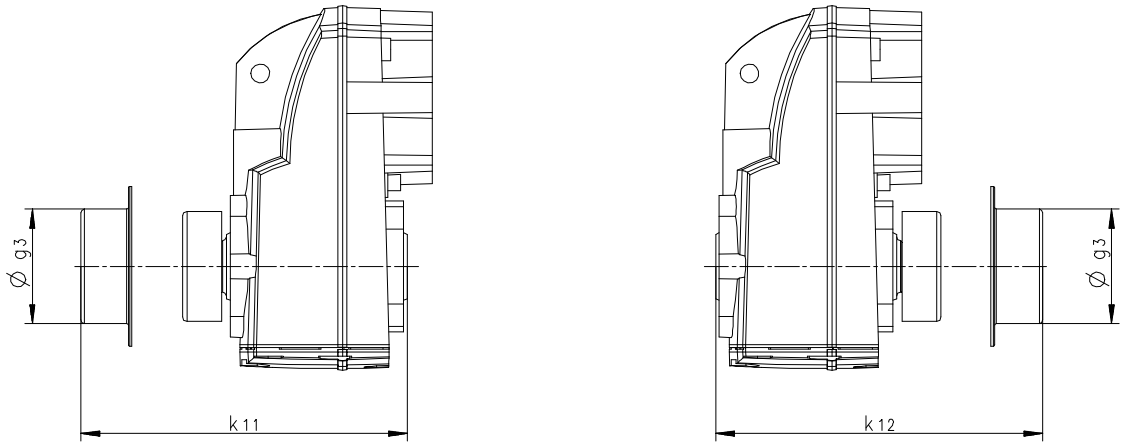


Product	Dimensions				Mass
	d	D	c	c_7	m
	[mm]	[mm]	[mm]	[mm]	[kg]
g500-S130	11.0	30.0	17.0	45.0	0.1
g500-S220	11.0	30.0	17.0	45.0	0.1
g500-S400	13.0	40.0	18.0	49.0	0.1
g500-S660	13.0	40.0	18.0	52.0	0.1

Shaft cover

Shrink disc cover

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



Product	Dimensions			Mass
	g_3	k_{11}	k_{12}	m
	[mm]	[mm]	[mm]	[kg]
g500-S130	63.0	132	132	0.1
g500-S220	76.0	152	152	0.1
g500-S400	90.0	182	182	0.1
g500-S660	90.0	200	202	0.1

Gearbox code

Example	G	50	A	S	113	M	H	D	R	2	C

Meaning	Variant											
Product family		G	50									
Generation				A								
Gearbox type	Shaft-mounted helical gearbox				S							
Output torque	130 Nm					113						
	220 Nm					122						
	400 Nm					140						
	660 Nm					166						
Mounting	Motor						M					
Shaft type	Solid shaft with feather key							V				
	Hollow shaft with keyway							H				
	Hollow shaft with shrink disc							S				
Housing type	Foot mounting + centering								A			
	Foot mounting								B			
	Centering								C			
	Threaded pitch circle								D			
Flange mounting	Without flange									R		
	Flange with through holes									k		
Number of stages	2-stage										2	
	3-stage										3	
Motor mounting	Integrated											C
	IEC motor											N

Motor code

Example	M	D	E	MA	XX	063	-	4	2	C1	C

Meaning	Variant	Motor code
Product family		M
Efficiency class	IE1	D
	IE2	H
Cooling	Natural ventilation	S
	Integral fan	E
	Blower	F
Internal key		MA
Built-on accessories	Without built-on accessories	XX
	Brake	BR
	Brake + resolver	BS
	Brake + incremental encoder	BI
	Brake + SinCos absolute value encoder	BA
	Brake + 2. shaft end	BZ
	Brake + handwheel	BH
	Brake + grey iron fan	BL
	Resolver	RS
	Incremental encoder	IG
	SinCos absolute value encoder	AG
	2nd shaft end	ZE
	Handwheel	HA
	Grey iron fan	LL
	Grey iron fan + 2. shaft end	LZ
	Grey iron fan + handwheel	LH
Size		063
		071
		080
		090
		100
		112
		132
		160
		180
		200
		225
Overall length		0
		1
		- 2
		3
		4
Number of pole pairs	4-pole motors	2
	2-pole motors	1
	6-pole motors	3
Internal key		C1
Approval	CE	C
	cURus	U
	CCC	3

Motor data

Motor data

Contents

Rated data for 50 Hz

2-pole motors

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

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

4-pole motors

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

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

[1] Without accessories

[2] Operation at 87 Hz is possible with 4-pole motors whose rated data at 50 Hz displays the voltage values Δ 230 V.
With motor frame sizes 132-12 to 225-22, the required voltage must also be specified in your order.

Rated data for 50 Hz

4-pole motors

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

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

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

Rated data for 50 Hz

6-pole motors

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

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

[1] Without accessories

Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos φ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
					± 10 %							
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-02	0.11	2535	0.40	1.60	400	0.42	0.55		62.0	67.0	3.30	3.90
MD□□□□□063-22	0.16	2485	0.63	2.50	400	0.48	0.67		66.0	70.0	3.30	3.90
MD□□□□□063-12	0.21	2535	0.80	3.20	400	0.85	0.52		61.0	66.0	3.30	4.10
MD□□□□□063-32	0.33	2475	1.26	5.00	400	1.00	0.65		68.0	71.0	3.30	4.10
MD□□□□□063-42	0.45	2480	1.74	7.00	400	1.40	0.63		66.0	73.0	3.70	4.40
MD□□□□□071-32	0.66	2520	2.51	10.0	400	1.60	0.72		76.0	78.0	10.7	5.80
MD□□□□□071-42	1.00	2515	3.74	15.0	400	2.40	0.74		79.0	80.0	12.8	6.40
MH□□□□□080-32	1.35	2520	5.12	20.0	400	3.10	0.84	77.3	81.6	83.5	28.0	11.0
MH□□□□□090-12	2.00	2540	7.52	30.0	400	4.60	0.78	80.4	84.9	86.5	32.0	16.0
MH□□□□□090-32	2.70	2545	10.1	40.0	400	5.80	0.76	82.3	85.5	86.0	36.0	18.0
MH□□□□□100-12	3.90	2555	14.6	60.0	400	8.60	0.83	85.7	89.6	90.0	61.0	24.0
MH□□□□□100-32	5.40	2555	20.2	80.0	400	12.1	0.76	84.7	87.9	88.5	66.0	26.5
MH□□□□□112-22	7.10	2565	26.4	106	400	14.5	0.83	87.4	90.2	90.9	135	38.0
MH□□□□□132-12	9.70	2580	35.9	144	400	20.6	0.82	88.2	91.4	91.8	290	59.0
MH□□□□□132-22	13.2	2570	49.1	196	400	27.0	0.82	88.2	90.1	90.7	336	66.0
MH□□□□□160-22	19.4	2580	71.8	287	400	37.7	0.81	90.6	91.0	91.6	570	109
MH□□□□□160-32	26.4	2580	97.7	391	400	50.3	0.81	91.4	91.0	91.6	760	124
MH□□□□□180-12	32.5	2585	120	480	400	58.8	0.86	92.0	92.2	92.8	1390	175
MH□□□□□180-32	38.7	2580	143	573	400	68.9	0.87	92.1	92.9	93.4	1440	180
MH□□□□□180-42	52.7	2575	196	782	400	92.6	0.87	92.6	92.7	93.2	1850	200
MH□□□□□225-12	64.0	2593	236	920	400	113	0.87	93.0	94.4	94.8	4610	395
MH□□□□□225-22	78.0	2590	288	1150	400	137	0.85	93.5	94.3	94.7	5300	415

[1] Without accessories

Motor – inverter assignment

Rated frequency 50/60 Hz

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

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

Motor – inverter assignment

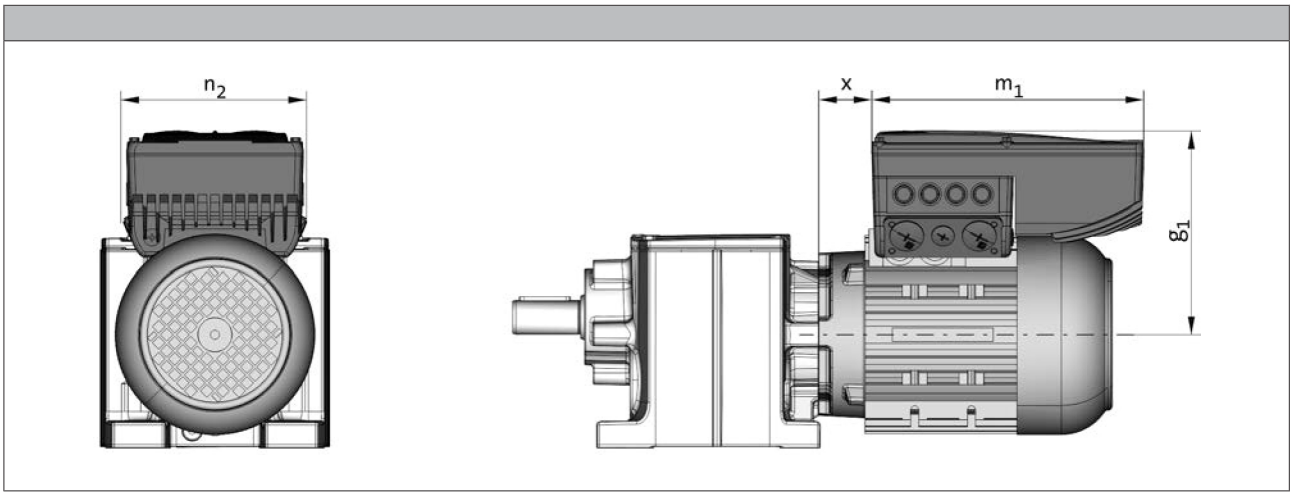
Rated frequency 87 Hz

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

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

Dimensions, 8400 motec inverter

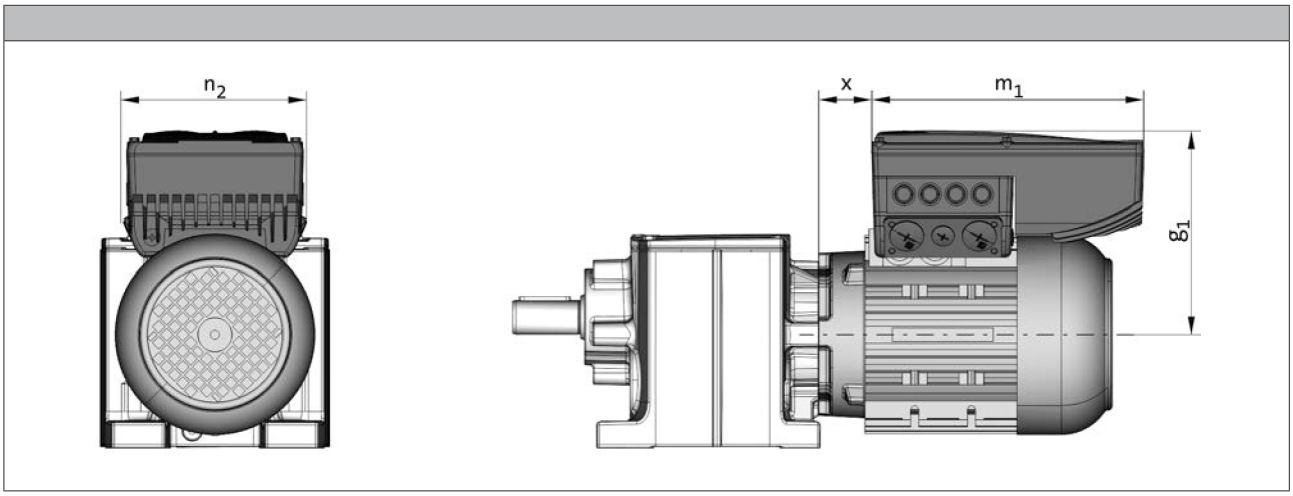
Rated frequency 50/60 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□071-32	E84DVB□3714S□□□2□	163	241	161	17.0
MD□□□□□071-42	E84DVB□5514S□□□2□				
MH□□□□□080-32	E84DVB□7514S□□□2□	172			26.5
MH□□□□□090-12	E84DVB□1124S□□□2□	177			39.8
MH□□□□□090-32	E84DVB□1524S□□□2□				
MH□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	40.6
MH□□□□□100-32	E84DVB□3024S□□□2□				
MH□□□□□112-22	E84DVB□4024S□□□2□	282	325	195	36.0
MH□□□□□132-12	E84DVB□5524S□□□2□	301			59.5
MH□□□□□132-22	E84DVB□7524S□□□2□				

Dimensions, 8400 motec inverter

Rated frequency 87 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 87Hz}$	$m_{1,\ 87Hz}$	$n_{2,\ 87Hz}$	x_{87Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□063-32	E84DVB□3714S□□□2□	154	241	161	14.8
MD□□□□□063-42	E84DVB□5514S□□□2□				
MD□□□□□071-32	E84DVB□7514S□□□2□	163			17.0
MD□□□□□071-42	E84DVB□1124S□□□2□				
MH□□□□□080-32	E84DVB□1524S□□□2□	172			26.5
MH□□□□□090-12	E84DVB□2224S□□□2□	206	260	176	38.8
MH□□□□□090-32	E84DVB□3024S□□□2□				
MH□□□□□100-12	E84DVB□4024S□□□2□	272	325	195	28.1
MH□□□□□100-32	E84DVB□5524S□□□2□				
MH□□□□□112-22	E84DVB□7524S□□□2□	282			36.0

Motor connection

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

The standard connection is implemented via a terminal box. Furthermore ICN and HAN connectors are provided to quickly carry out commissioning or maintenance operations.

Overview of the connection options

Product	MD□MA□□				MH□MA□□							
Motor frame size	063-02 063-22 063-12 063-32 063-42	071-32 071-42	063-11 063-31 071-11 071-31	071-13 071-33 080-13 080-33	080-32	090-12 090-32	100-12 100-32	112-22	132-12 132-22	160-22 160-32	180-12 180-32 180-42	225-12 225-22
Power connection/brake connection												
Terminal box	●	●	●	●	●	●	●	●	●	●	●	●
ICN connector	●	●	●	●	●	●	●	●	●			
HAN-10E connector	●	●	●	●	●	●	●	●				
HAN modular connector	●	●	●	●	●	●	●	●	●	●		
Feedback connection												
Terminal box	●	●			●	●	●	●	●	●	●	●
ICN connector	●	●			●	●	●	●	●			
Blower connection												
Terminal box	●	●			●	●	●	●	●	●	●	●
ICN connector	●	●			●	●	●	●	●	●	●	●
Temperature sensor connection												
Terminal box	●	●	●	●	●	●	●	●	●	●	●	●
ICN connector [1)]	●	●	●	●	●	●	●	●	●			
HAN-10E connector	●	●	●	●	●	●	●	●				
HAN modular connector	●	●	●	●	●	●	●	●	●	●		

[1)] TCO or PTC connected in the power connection and KTY connected in the feedback connection.

Motor connection

Assignment: motor terminal box - built-on accessories

► Depending on the motor version, terminal boxes of different sizes (KK1 ... KK3) are used.

Product	MD□MA□□					MH□MA□□	
Motor frame size	063-02 063-22 063-12 063-32 063-42	071-32 071-42	063-11 063-31	071-31 071-31	071-13 071-33 080-13 080-33	080-32	090-12 090-32
Built-on accessories							
Without							
	KK1	KK1	KK1	KK1	KK1	KK1	KK1
	KK1 + ICN	KK1 + ICN	KK1 + ICN	KK1 + ICN	KK1 + ICN	KK1 + ICN	KK1 + ICN
	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Brake							
	KK2	KK2	KK2	KK2	KK2	KK2	KK2
	KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN
	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Feedback							
	KK2	KK2			KK2	KK2	KK2
	KK2 + ICN	KK2 + ICN			KK2 + ICN	KK2 + ICN	KK2 + ICN
Handwheel							
		KK2			KK2	KK2	KK2
		KK2 + ICN			KK2 + ICN	KK2 + ICN	KK2 + ICN
		HAN-10E HAN modular			HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
2. shaft end							
		KK2		KK2	KK2	KK2	KK2
		KK2 + ICN		KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN
		HAN-10E HAN modular		HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Grey iron fan							
		KK1		KK1	KK1	KK1	KK1
		KK1 + ICN		KK1 + ICN	KK1 + ICN	KK1 + ICN	KK1 + ICN
		HAN-10E HAN modular		HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Brake + Feedback							
	KK3	KK3			KK3	KK3	KK3
	KK2 + ICN	KK2 + ICN			KK2 + ICN	KK2 + ICN	KK2 + ICN
Brake + Handwheel							
		KK2			KK2	KK2	KK2
		KK2 + ICN			KK2 + ICN	KK2 + ICN	KK2 + ICN
		HAN-10E HAN modular			HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Brake + 2. shaft end							
		KK2		KK2	KK2	KK2	KK2
		KK2 + ICN		KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN
		HAN-10E HAN modular		HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular
Brake + Grey iron fan							
		KK2		KK2	KK2	KK2	KK2
		KK2 + ICN		KK2 + ICN	KK2 + ICN	KK2 + ICN	KK2 + ICN
		HAN-10E HAN modular		HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular	HAN-10E HAN modular

Motor connection

Assignment: motor terminal box - built-on accessories

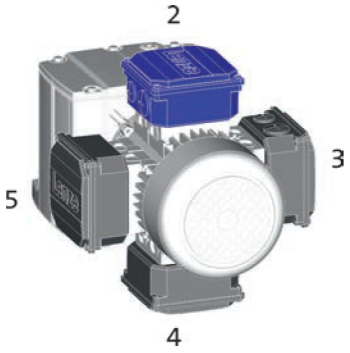
Product	MH□MA□□					
Motor frame size	100-12 100-32	112-22	132-22 132-22	160-22 160-32	180-12 180-32 180-42	225-12 225-22
Built-on accessories						
Without						
	KK1	KK1	KK1	KK3	KK3	KK3
	KK1 + ICN	KK1 + ICN	KK1 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular	HAN modular		
Brake						
	KK2	KK2	KK3	KK3	KK3	KK3
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular	HAN modular		
Feedback						
	KK2	KK2	KK3	KK3	KK3	KK3
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
Handwheel						
	KK2	KK2	KK3			
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			
2. shaft end						
	KK2	KK2	KK3			
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			
Grey iron fan						
	KK2	KK1	KK1			
	KK2 + ICN	KK1 + ICN	KK1 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			
Brake + Feedback						
	KK3	KK3	KK3	KK3	KK3	KK3
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
Brake + Handwheel						
	KK2	KK2	KK3			
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			
Brake + 2. shaft end						
	KK2	KK2	KK3			
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			
Brake + Grey iron fan						
	KK2	KK2	KK3			
	KK2 + ICN	KK2 + ICN	KK3 + ICN			
	HAN-10E HAN modular	HAN-10E HAN modular	HAN modular			

Motor connection

Position of cable entry/connector

For geared motors, the position of the cable entry must be selected as a function of the terminal box position.

Terminal box positions 2 ... 5



Cable entry positions 1 ... 5

Terminal box position	2	3	4	5
	Cable entry positions			
KK1	1/3/5*	1/2*/4	1/3*/5	1/2/4*
KK2	3+5	2+4	3+5	2+4
KK3 [1)]	3+5	2+4	3+5	2+4
HAN	1/3/5	1/2/4	1/3/5	1/2/4
	Connector position			
KK1 + ICN	1/3/5*	1/2*/4	1/3*/5	1/2/4*
KK2 + ICN	3/5*	2*/4	3/5*	2/4*

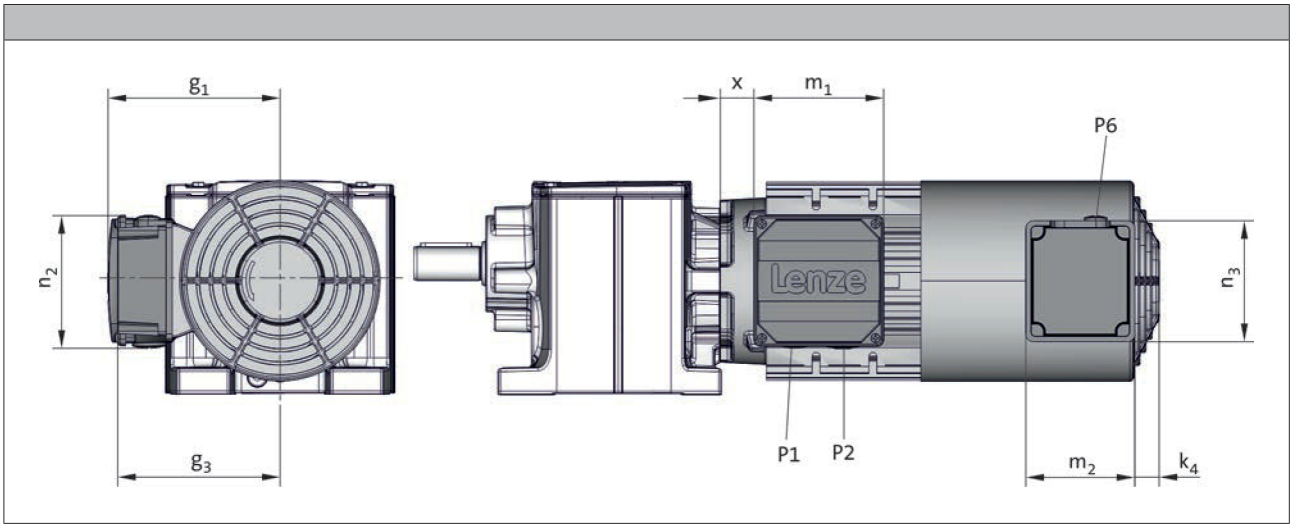
[1)] In case of motor frame size 225, only one cable entry position per terminal box position is provided:
Terminal box position/cable entry position
2/5 - 3/2 - 4/3 - 5/4)

► If preferred positions are not specified in the order, the connector will be positioned as indicated by * on the diagram below.

Connection via terminal box

Dimensions of KK1

The connection in the terminal box is implemented by means of conventional cable glands.

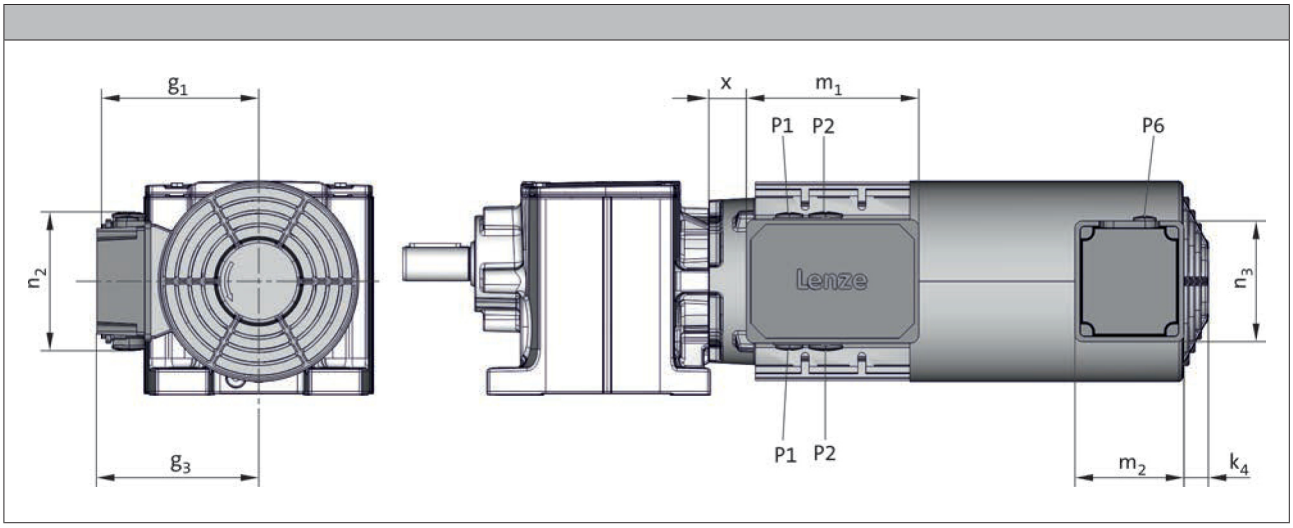


Size									
Motor			063	071	080	090	100	112	132
Dimensions									
	x	[mm]	17.0	20.0	15.0	30.0	31.0	39.0	58.0
	g_1	[mm]	100	109	150	157	166	176	195
	m_1	[mm]	75.0	75.0	115	115	115	115	122
	n_2	[mm]	75.0	75.0	115	115	115	115	122
	P_1	[mm]	M16x1.5	M16x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M32x1.5
	P_2	[mm]	M20x1.5	M20x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M32x1.5
	k_4	[mm]	12	12	13	22	22	22	32
	g_3	[mm]	115	122	132	141	150	162	182
	m_2	[mm]	95	95	96	95	95	95	95
	n_3	[mm]	105	105	106	105	105	105	105
	P_6	[mm]	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5

Connection via terminal box

Dimensions of KK2

The connection in the terminal box is implemented by means of conventional cable glands.

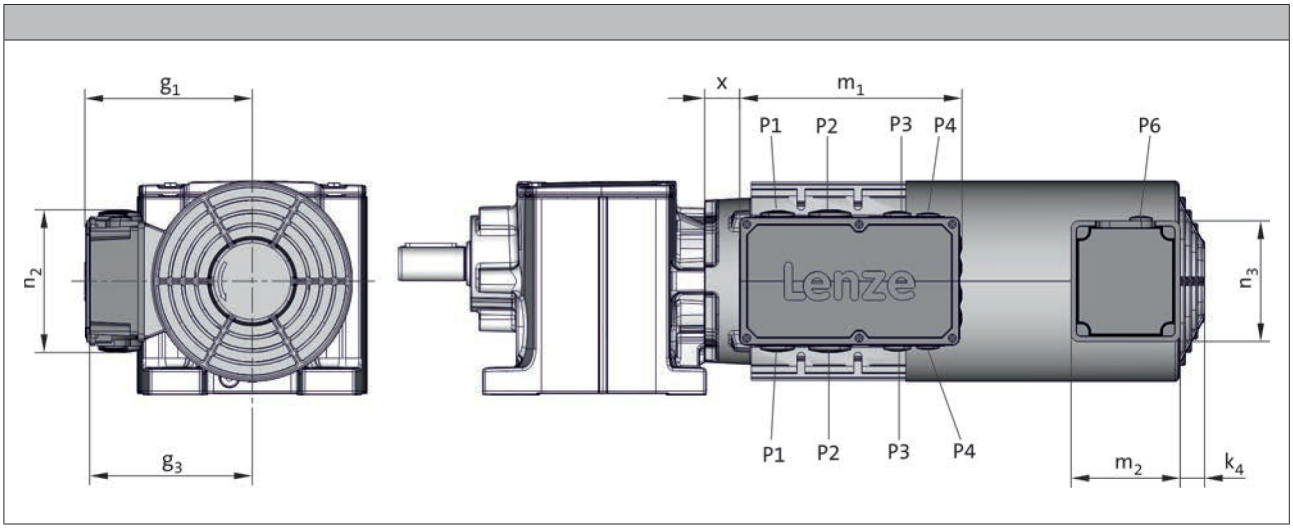


Size								
Motor			063	071	080	090	100	112
Dimensions								
	x	[mm]	9.00	11.0	18.0	33.0	34.0	42.0
	g_1	[mm]	107	118	132	137	147	158
	m_1	[mm]	136	136	152	152	152	152
	n_2	[mm]	103	103	121	121	121	121
	P_1	[mm]	M16x1.5	M16x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
	P_2	[mm]	M20x1.5	M20x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5
	k_4	[mm]	12	12	13	22	22	22
	g_3	[mm]	115	122	132	141	150	162
	m_2	[mm]	95	95	96	95	95	95
	n_3	[mm]	105	105	106	105	105	105
	P_6	[mm]	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5

Connection via terminal box

Dimensions of KK3

The connection in the terminal box is implemented by means of conventional cable glands.



Size									
Motor			063	071	080	090	100	112	132
Dimensions									
	x	[mm]	-2.000	1.00	16.0	31.0	32.0	40.0	63.0
	g_1	[mm]	124	133	142	147	158	168	187
	m_1	[mm]	195	195	195	195	195	195	195
	n_2	[mm]	125	125	125	125	125	125	125
	P_1	[mm]	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5
	P_2	[mm]	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5
	P_3	[mm]	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
	P_4	[mm]	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
	k_4	[mm]	12	12	13	22	22	22	32
	g_3	[mm]	115	122	132	141	150	162	182
	m_2	[mm]	95	95	96	95	95	95	95
	n_3	[mm]	105	105	106	105	105	105	105
	P_6	[mm]	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5	1x M16x1.5

Connections via ICN connectors

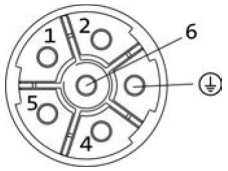
A connector is used for the power connection, connection of the brake, and the temperature monitoring connection.
The feedback and blower connections are implemented via a separate connector in each case.

Connection for power, brake and temperature monitoring

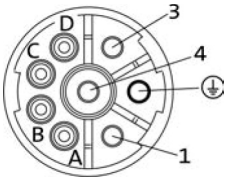
For the power connection of the connector, a max. rated motor current of 16 A is permissible.
The connectors can be rotated by 270° and are equipped with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional box nuts, existing mating connectors can still be used without difficulty. The motor connection is determined in the terminal box.

► ICN 6-pole

No connection of temperature monitoring possible!

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	W	Phase W power	
4	V	Phase V power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake -/AC	

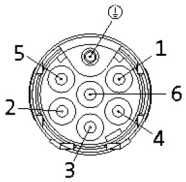
Connections via ICN connectors

Blower connection

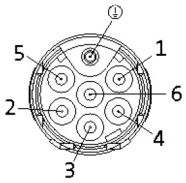
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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

For the blower, the terminal box cover including the connector can be rotated by 90 ° step by step, if required.

► 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

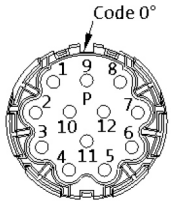
Pin assignment			
Contact	Designation	Meaning	
PE	PE	PE conductor	
1	U	Phase U power	
2		Not assigned	
3	V	Phase V power	
4		Not assigned	
5			
6	W	Phase W power	

Connections via ICN connectors

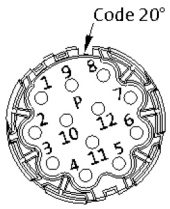
Feedback connection

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

► Resolver

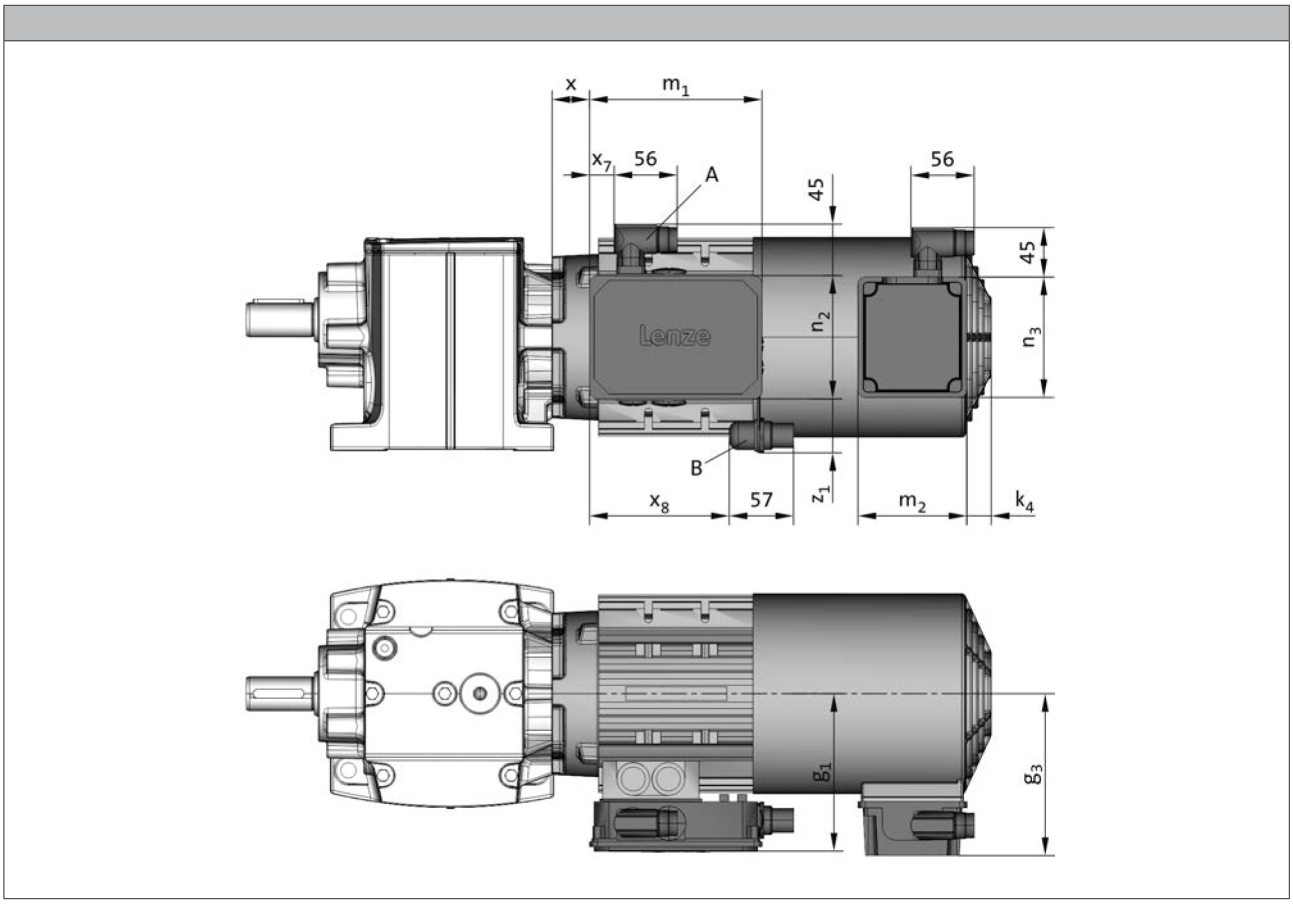
Pin assignment			
Contact	Designation	Meaning	
1	+Ref	Transformer windings	
2	-Ref		
3	+VCC ETS	Supply: Electronic nameplate	
4	+COS	Cosine stator windings	
5	-COS		
6	+SIN	Sine stator windings	
7	-SIN		
8		Not assigned	
9			
10			
11	+KTY	KTY temperature sensor	
12	-KTY		

► Hiperface incremental encoder and SinCos absolute value encoder

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

Connections via ICN connectors

Dimensions KK1+ICN

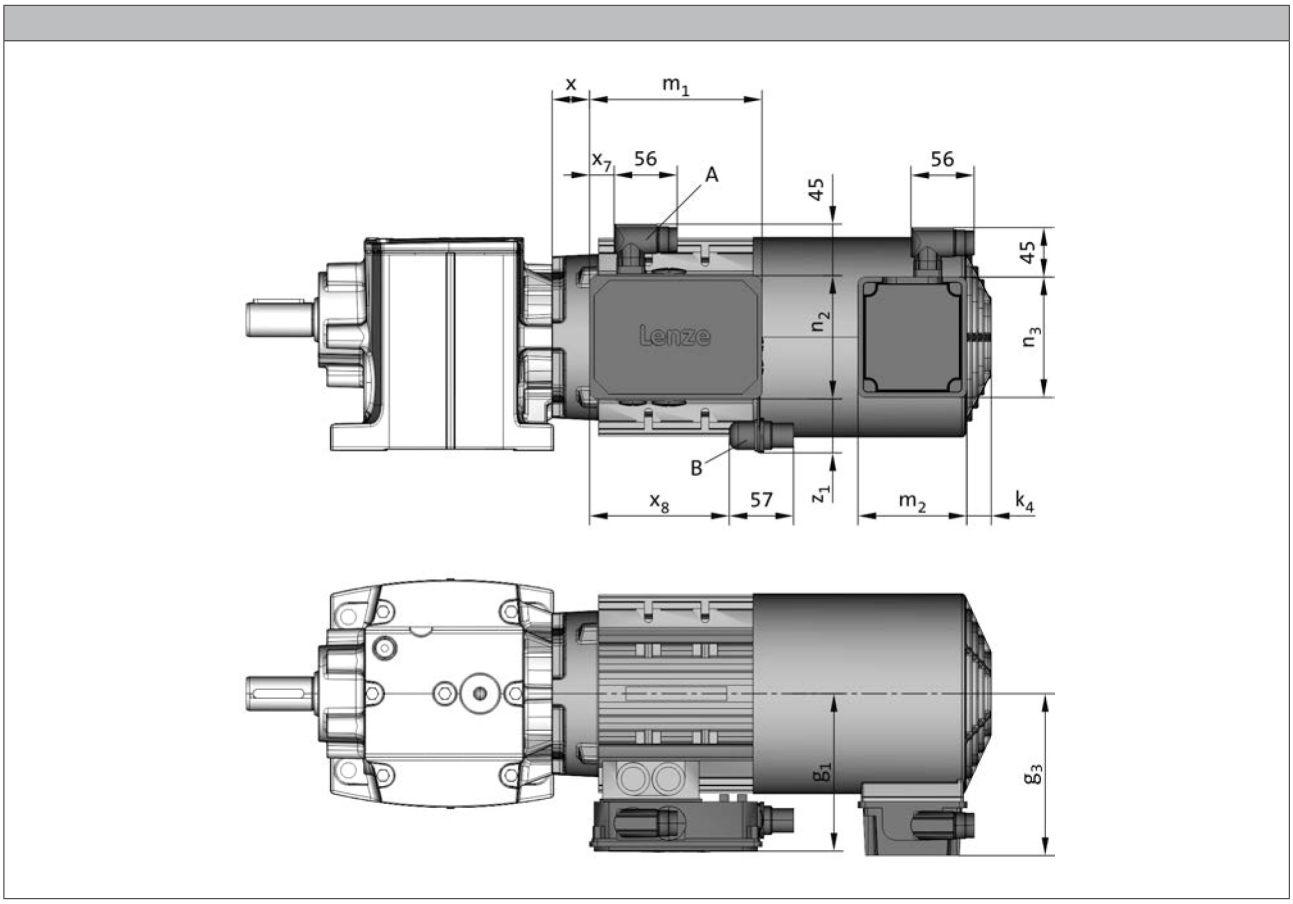


Size									
Motor			063	071	080	090	100	112	132
Dimensions									
	x	[mm]	8.00	11.0	15.0	30.0	31.0	39.0	58.0
	g_1	[mm]	117	126	150	157	166	176	195
	m_1	[mm]	93.0	93.0	115	115	115	115	122
	n_2	[mm]	93.0	93.0	115	115	115	115	122
	x_7	[mm]	16	16	23	23	23	23	27
	k_4	[mm]	12	12	13	22	22	22	32
	g_3	[mm]	115	122	132	141	150	162	182
	m_2	[mm]	95	95	96	95	95	95	95
	n_3	[mm]	105	105	106	105	105	105	105

A= power connection
B= feedback connection (not for KK1)

Connections via ICN connectors

Dimensions KK2+ICN and KK3+ICN



Size									
Motor			063	071	080	090	100	112	132
Dimensions									
	x	[mm]	9.00	11.0	18.0	33.0	34.0	42.0	63.0
	g_1	[mm]	107	118	132	137	147	158	187
	m_1	[mm]	136	136	152	152	152	152	195
	n_2	[mm]	103	103	121	121	121	121	125
	x_7	[mm]	16	16	23	23	23	23	27
	x_8	[mm]	109	109	125	125	125	125	166
	$z_{1, max}$	[mm]	43	43	41	41	41	41	71
	k_4	[mm]	12	12	13	22	22	22	32
	g_3	[mm]	115	122	132	141	150	162	182
	m_2	[mm]	95	95	96	95	95	95	95
	n_3	[mm]	105	105	106	105	105	105	105

A= power connection
B= feedback connection (not for KK1)

Connection via M12 connector

IG128-24V-H incremental encoder connection

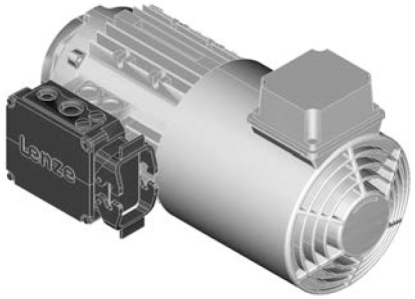
As a standard this incremental encoder is equipped with a connection cable of about 0.5 m length and with a common industry standard M12 connector at its end.

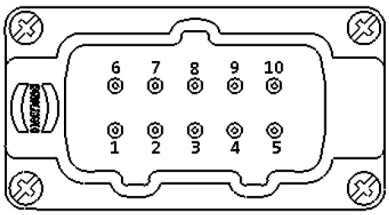
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

Connections via HAN connectors

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.

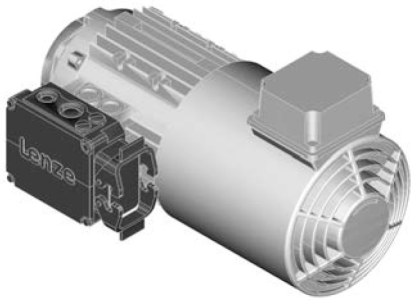


Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	

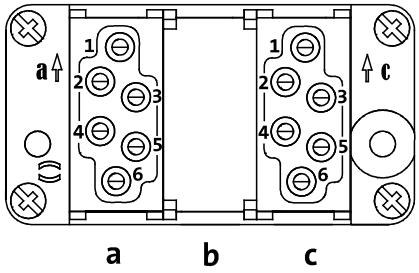
Connections via HAN connectors

HAN modular

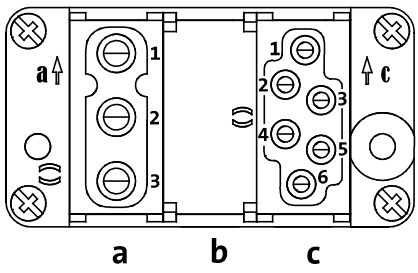
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.



► HAN modular 16 A

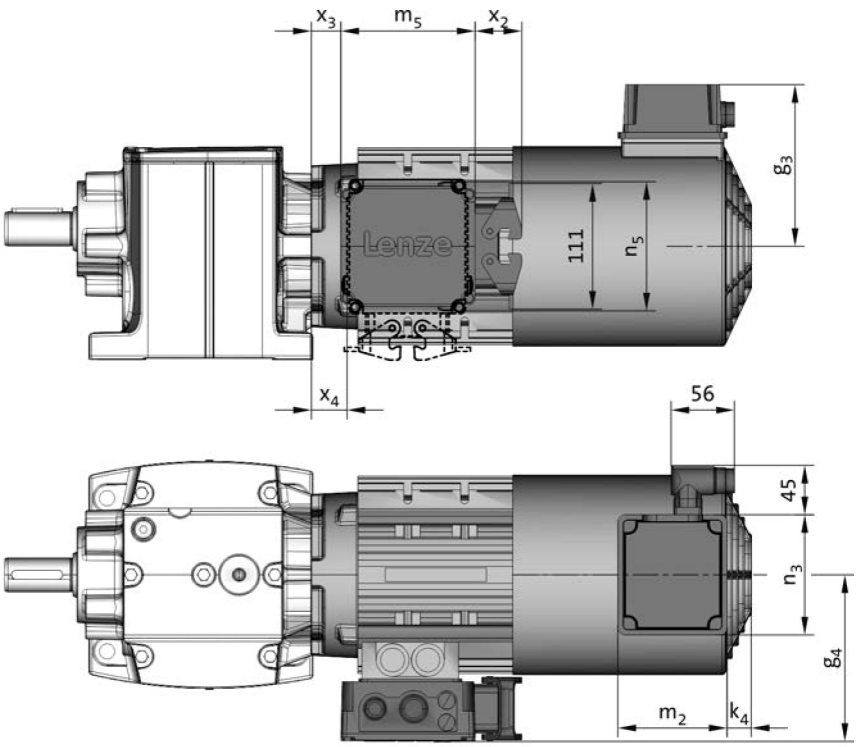
Pin assignment			
Module	Contact	Meaning	
A	1	Terminal board: U1	
	2	Terminal board: V1	
	3	Terminal board: W1	
B		Dummy module	
C	1	Thermal sensor: +KTY/PTC/TKO	
	2	Brake +/AC	
	3	Brake -/AC	
	4	Rectifier: Switching contact	
	5		
	6	Thermal sensor: KTY/PTC/TKO	

► HAN modular 40 A

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

Connections via HAN connectors

Dimensions



Size									
Motor			063	071	080	090	100	112	132
Dimensions									
	g_4	[mm]	120	129	138	143	154	164	233
	x_3	[mm]	1.00	3.00	12.0	26.0	27.0	30.5	59.5
	x_4	[mm]	2.00	4.00	20.0	34.0	35.0	38.5	29.5
	k_4	[mm]	12	12	13	22	22	22	32
	g_3	[mm]	115	122	132	141	150	162	182
	m_2	[mm]	95	95	96	95	95	95	95
	n_3	[mm]	105	105	106	105	105	105	105

Spring-applied brake

Three-phase AC motors can be fitted with a spring-applied brake. This is activated after the supply voltage is switched off (closed-circuit principle). For optimum adjustment of the brake motor to the application, a range of braking torques and control modes is available for every motor frame size. For applications with very high operating frequencies the brake is also available in a LongLife version, with reinforced mechanical brake components.

Features

Versions
- **Standard**
  - 1 x 10^6 repeating switching cycles
  - 1 x 10^6 reversing switching cycles
- **LongLife**
  - 10 x 10^6 repeating switching cycles
  - 15 x 10^6 reversing switching cycles

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

Degree of protection
- Without manual release IP55
- With manual release IP54

Friction lining
- Non-asbestos, low wearing

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

Assignment of 2-pole motors and brakes

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

Spring-applied brake

Assignment of 4-pole motors and brakes

Design	Standard		LongLife	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-02 063-12 063-22 063-32 063-42	06 06	2.50 4.00	06	4.00
071-12 071-32	06 06 08	2.50 4.00 3.50	06 08	4.00 3.50
071-42	06 06 08 08	2.50 4.00 3.50 8.00	06 08 08	4.00 3.50 8.00
080-32	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
090-12 090-32	08 08 10 10 10	3.50 8.00 7.00 16.0 23.0	08 10 10	8.00 7.00 16.0
100-12	10 10 12 12	7.00 16.0 14.0 32.0	10 12 12	16.0 14.0 32.0
100-32	10 10 12 12 12	7.00 16.0 14.0 32.0 46.0		

Spring-applied brake

Assignment of 4-pole motors and brakes

Design	Standard		LongLife	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
112-22	12 12 14 14	14.0 32.0 35.0 60.0		
132-12	14 14 16 16	35.0 60.0 60.0 80.0		
132-22	14 14 16 16 16	35.0 60.0 60.0 80.0 100		
160-22	16 16 18 18	60.0 80.0 80.0 150		
160-32	18 18 18	80.0 150 200		
180-12	18 18 20 20	80.0 150 145 260		
180-32	18 18 20 20 20	80.0 150 145 260 315		
200-32	18 18 20 20 20 20	80.0 150 145 260 315 400		
225-12	25 25 25	265 400 490		
225-22	25 25 25 25	265 400 490 600		

Spring-applied brake

Assignment of 6-pole motors and brakes

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

Spring-applied brake

Direct connection without rectifier

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

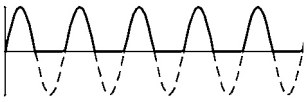
- Supply voltages
  DC 24 V
  DC 180 V
  DC 205 V

Connection via mains voltage with brake rectifier

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

Half-wave rectifier, 6-pole

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



Bridge rectifier, 6-pole

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

Bridge/half-wave rectifier, 6-pole

- Supply voltage / brake coil voltage ratio
  up to the overexcitation time = 1.11
  From the overexcitation time = 2.22
- Supply voltages
  AC 230 V
  AC 400 V

Spring-applied brake

Connection via mains voltage with brake rectifier

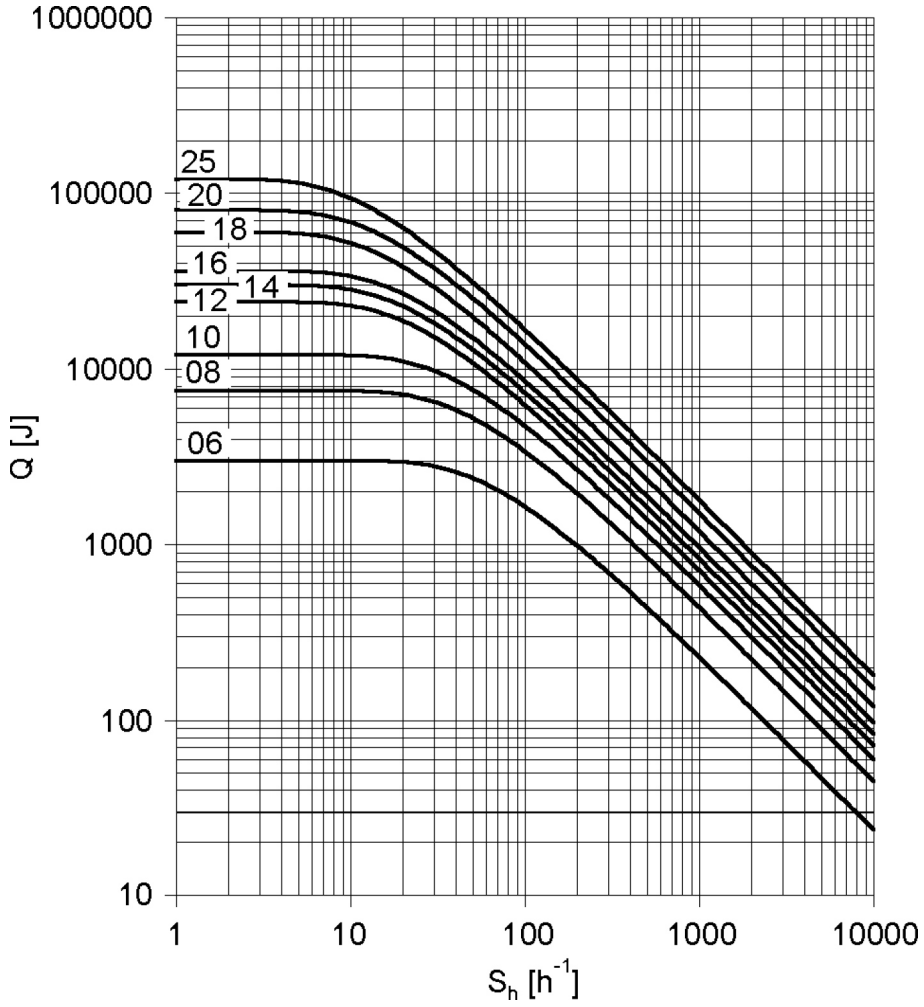
Bridge/half-wave rectifier, 6-pole
- Supply voltage / brake coil voltage ratio
  up to the overexcitation time = 1.11
  From the overexcitation time = 2.22
- Supply voltages
  AC 230 V
  AC 400 V

During the switching operation the bridge/half-wave rectifier functions as a bridge rectifier for the overexcitation time $t_{ü}$ and then as a half-wave rectifier. This combination optimises the performance of the brake – depending on the assignment of brake coil voltage and supply voltage:

- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_{ü}$ with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.
  These features make this activation version particularly suitable for lifting applications. It is therefore only available in combination with a brake with increased braking torque.
- **Holding current reduction (cold brake)**
  By reducing the holding current, the bridge/half-wave rectifier is able to reduce the power input to the open brake. As the brake heats up less, this type of activation is known as "cold brake".

Spring-applied brake

Permissible friction energy



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

Spring-applied brake

Rated data with reduced braking torque

► Please enquire for braking torques and maximum switching work values not listed here.

Size			06	08	10	12	14	16	18	20	25
Power input											
	P_{in}	[kW]	0.020	0.025	0.030	0.040	0.050	0.055	0.085	0.10	0.11
Braking torque											
100	M_B	[Nm]	2.50	3.50	7.00	14.0	35.0	60.0	80.0	145	265
1000	M_B	[Nm]	2.30	3.10	6.10	12.0	30.0	50.0	65.0	115	203
1200	M_B	[Nm]	2.30	3.10	6.00	12.0	29.0	48.0	63.0	112	199
1500	M_B	[Nm]	2.20	3.00	5.80	11.0	28.0	47.0	61.0	109 [1)]	193 [1)]
1800	M_B	[Nm]	2.10	2.90	5.70	11.0	28.0	46.0	60.0 [1)]		
3000	M_B	[Nm]	2.00	2.80	5.30	10.0	26.0 [1)]	43.0 [1)]			
3600	M_B	[Nm]	2.00	2.70	5.20	10.0 [1)]					
Maximum switching energy											
100	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1000	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1200	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1500	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	24.0 [1)]	36.0 [1)]
1800	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	36.0 [1)]		
3000	Q_E	[KJ]	3.00	7.50	12.0	24.0	18.0 [1)]	11.0 [1)]			
3600	Q_E	[KJ]	3.00	7.50	12.0	7.00 [1)]					
Transition operating frequency											
	$S_{hü}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm²]	0.015	0.061	0.20	0.45	0.63	1.50	2.90	7.30	20.0
Mass											
	m	[kg]	0.90	1.50	2.60	4.20	5.80	8.70	12.6	19.5	31.0

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

Spring-applied brake

Rated data with reduced braking torque

► Activation via half-wave or bridge rectifier

Size			06	08	10	12	14	16	18	20	25
Friction energy											
	Q_{BW}	[MJ]	113	210	264	706	761	966	1542	2322	3522
Delay time											
Engaging	t_{11}	[ms]	11.0	14.0	20.0	21.0	37.0	53.0	32.0	47.0	264
Rise time											
Braking torque	t_{12}	[ms]	13.0	10.0	17.0	19.0	22.0	30.0	20.0	100	120
Engagement time											
	t_1	[ms]	24.0		37.0	40.0	59.0	83.0	52.0	147	384
Disengagement time											
	t_2	[ms]	35.0	37.0	57.0	65.0	148	169	230	207	269

► Activation via bridge/half-wave rectifier

Design			Holding current reduction (cold brake)								
Size			06	08	10	12	14	16	18	20	25
Friction energy											
	Q_{BW}	[MJ]	113	210	264	706	761	966	1542	2322	3522
Overexcitation time											
	$t_{ü}$	[ms]	300				1300				
Min. rest time											
	t	[ms]	900				3900				
Delay time											
Engaging	t_{11}	[ms]	12.0	22.0	35.0	49.0	61.0	114	83.0	126	304
Rise time											
Braking torque	t_{12}	[ms]	14.0	16.0	30.0	45.0	37.0	65.0	52.0	269	138
Engagement time											
	t_1	[ms]	26.0	38.0	66.0	93.0	97.0	180	134	395	443
Disengagement time											
	t_2	[ms]	35.0	37.0	57.0	65.0	148	169	230	207	269

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

Spring-applied brake

Rated data with standard braking torque

► Please enquire for braking torques and maximum switching work values not listed here.

Size			06	08	10	12	14	16	18	20	25
Power input											
	P_{in}	[kW]	0.020	0.025	0.030	0.040	0.050	0.055	0.085	0.10	0.11
Braking torque											
100	M_B	[Nm]	4.00	8.00	16.0	32.0	60.0	80.0	150	260	400
1000	M_B	[Nm]	3.70	7.20	14.0	27.0	51.0	66.0	121	206	307
1200	M_B	[Nm]	3.60	7.00	14.0	27.0	50.0	65.0	118	201	300
1500	M_B	[Nm]	3.50	6.80	13.0	26.0	48.0	63.0	115	195 [1)]	291 [1)]
1800	M_B	[Nm]	3.40	6.70	13.0	26.0	47.0	61.0	112 [1)]		
3000	M_B	[Nm]	3.20	6.30	12.0	24.0	44.0 [1)]	57.0 [1)]			
3600	M_B	[Nm]	3.20	6.10	12.0	23.0 [1)]					
Maximum switching energy											
100	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1000	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1200	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	80.0	120
1500	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	60.0	24.0 [1)]	36.0 [1)]
1800	Q_E	[KJ]	3.00	7.50	12.0	24.0	30.0	36.0	36.0 [1)]		
3000	Q_E	[KJ]	3.00	7.50	12.0	24.0	18.0 [1)]	11.0 [1)]			
3600	Q_E	[KJ]	3.00	7.50	12.0	7.00 [1)]					
Transition operating frequency											
	$S_{hü}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm²]	0.015	0.061	0.20	0.45	0.63	1.50	2.90	7.30	20.0
Mass											
	m	[kg]	0.90	1.50	2.60	4.20	5.80	8.70	12.6	19.5	31.0

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

Spring-applied brake

Rated data with standard braking torque

► Activation via half-wave or bridge rectifier

Size			06	08	10	12	14	16	18	20	25
Friction energy											
	Q_{BW}	[MJ]	85.0	158	264	530	571	966	1542	2322	3522
Delay time											
Engaging	t_{11}	[ms]	15.0		28.0		17.0	27.0	33.0	65.0	110
Rise time											
Braking torque	t_{12}	[ms]	13.0	16.0	19.0	25.0		30.0	45.0	100	120
Engagement time											
	t_1	[ms]	28.0	31.0	47.0	53.0	42.0	57.0	78.0	165	230
Disengagement time											
	t_2	[ms]	45.0	57.0	76.0	115	210	220	270	340	390

► Activation via bridge/half-wave rectifier

Design			Holding current reduction (cold brake)								
Size			06	08	10	12	14	16	18	20	25
Friction energy											
	Q_{BW}	[MJ]	85.0	158	264	530	571	966	1542	2322	3522
Overexcitation time											
	$t_{ü}$	[ms]	300				1300				
Min. rest time											
	t	[ms]	900				3900				
Delay time											
Engaging	t_{11}	[ms]	16.0	25.0	31.0	48.0	33.0	58.0	80.0	102	154
Rise time											
Braking torque	t_{12}	[ms]	14.0	27.0	21.0	43.0	49.0	64.0	109	157	168
Engagement time											
	t_1	[ms]	30.0	52.0		90.0	82.0	122	189	259	322
Disengagement time											
	t_2	[ms]	45.0	57.0	76.0	115	210	220	270	340	390

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

Spring-applied brake

Rated data with increased braking torque

► Please enquire for braking torques and maximum switching work values not listed here.

Size			10	12	14	16	16	18	20	20	25	25
Power input												
	P_{in}	[kW]	0.030	0.040	0.050	0.055	0.055	0.085	0.10	0.10	0.11	0.11
Braking torque												
100	M_B	[Nm]	23.0	46.0	75.0	100	125	200	315	400	490	600
1000	M_B	[Nm]	20.0	39.0	64.0	83.0	103	162	249	317	376	461
1200	M_B	[Nm]	20.0	39.0	62.0	81.0	101	158	244	309	367	449
1500	M_B	[Nm]	19.0	38.0	60.0	78.0	98.0	153	237 [1]	300 [1]	356 [1]	436 [1]
1800	M_B	[Nm]	19.0	37.0	59.0	77.0	96.0	150 [1]				
3000	M_B	[Nm]	17.0	34.0	55.0 [1]	71.0 [1]	89.0 [1]					
3600	M_B	[Nm]	17.0	33.0 [1]								
Maximum switching energy												
100	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	60.0	80.0	80.0	120	120
1000	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	60.0	80.0	80.0	120	120
1200	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	60.0	80.0	80.0	120	120
1500	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	60.0	24.0 [1]	24.0 [1]	36.0 [1]	36.0 [1]
1800	Q_E	[KJ]	12.0	24.0	30.0	36.0	36.0	36.0 [1]				
3000	Q_E	[KJ]	12.0	24.0	18.0 [1]	11.0 [1]	11.0 [1]					
3600	Q_E	[KJ]	12.0	7.00 [1]								
Transition operating frequency												
	$S_{hü}$	[1/h]	40.0	30.0	28.0	27.0	27.0	20.0	19.0	19.0	15.0	15.0
Moment of inertia												
	J	[kgcm²]	0.20	0.45	0.63	1.50	1.50	2.90	7.30	7.30	20.0	20.0
Mass												
	m	[kg]	2.60	4.20	5.80	8.70	8.70	12.6	19.5	19.5	31.0	31.0

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

► Activation via half-wave or bridge rectifier

Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Delay time												
Engaging	t_{11}	[ms]	10.0	16.0	11.0	22.0	17.0	24.0	46.0	17.0	77.0	38.0
Rise time												
Braking torque	t_{12}	[ms]	19.0	25.0		30.0		45.0	100		120	
Engagement time												
	t_1	[ms]	29.0	41.0	36.0	52.0	47.0	69.0	146	117	197	158
Disengagement time												
	t_2	[ms]	109	193	308	297	435	356	378	470	451	532

Spring-applied brake

Rated data with increased braking torque

► Activation via bridge/half-wave rectifier

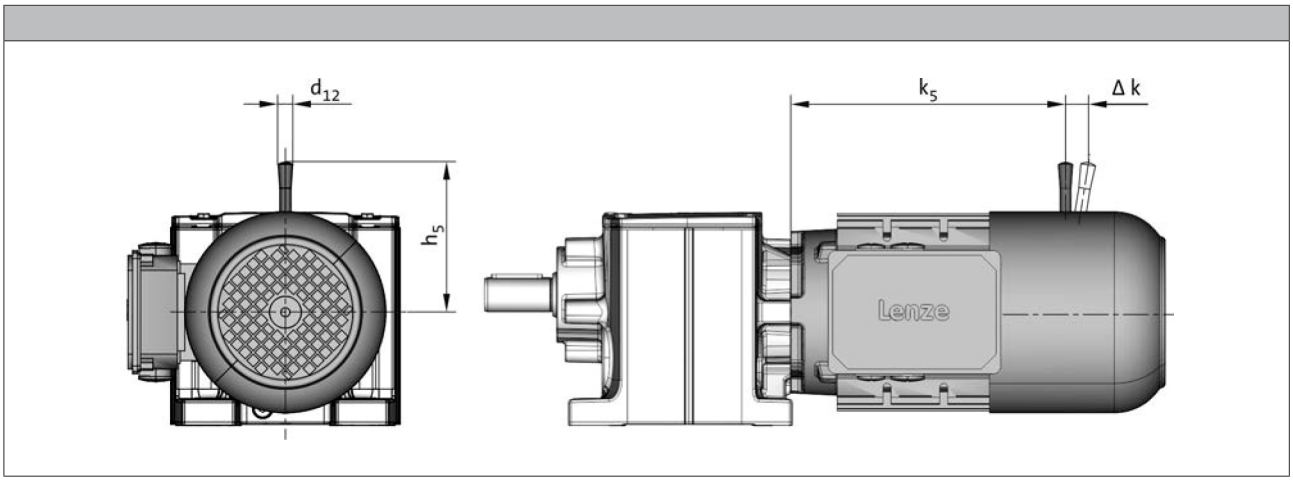
Design			Holding current reduction (cold brake)									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Overexcitation time												
	$t_{ü}$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
Engaging	t_{11}	[ms]	24.0	27.0	17.0	41.0	21.0	60.0	69.0	17.0	123	85.0
Rise time												
Braking torque	t_{12}	[ms]	44.0	43.0	37.0	55.0	37.0	113	148	100	190	270
Engagement time												
	t_1	[ms]	68.0	70.0	54.0	97.0	57.0	173	217	334	313	355
Disengagement time												
	t_2	[ms]	109	193	308	297	435	356	378	470	451	532

Design			Over-excitation									
Size			10	12	14	16		18	20		25	
Friction energy												
	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time												
	$t_{ü}$	[ms]	300			1300						
Min. rest time												
	t	[ms]	900			3900						
Delay time												
Engaging	t_{11}	[ms]	29.0	54.0	31.0	70.0	46.0	86.0	103	55.0	171	135
Rise time												
Braking torque	t_{12}	[ms]	53.0	87.0	68.0	93.0	83.0	160	222	319	266	430
Engagement time												
	t_1	[ms]	82.0	141	99.0	163	129	246	325	374	437	565
Disengagement time												
	t_2	[ms]	53.0	81.0	117	141	168	151	160	167	184	204

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

Spring-applied brake

Manual release lever



Motor frame size			Size				
			Brake				
				k_5	Δ k	h_5	d_{12}
				[mm]	[mm]	[mm]	[mm]
	063-02 063-22		06	185	29	107	13.0
063-11 063-31	063-12 063-32 063-42		06	169	29	107	13.0
071-11 071-31	071-32 071-42	071-13 071-33	06 08	182 183	29 27	107 116	13.0 13.0
	080-32	080-13 080-33	06 08	208 219	29 27	107 116	13.0 13.0
	090-12 090-32		08 10	256 267	27 28	116 132	13.0 13.0
	100-12		10 12	290 292	28 37	132 161	13.0 13.0
	100-32		10 12	305 307	28 37	132 161	13.0 13.0
	112-22		12 14	309 313	37 41	161 195	13.0 24.0
	132-12 132-22		14 16	398 398	41 55	195 240	24.0 24.0

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

6.6

Feedback

Resolver

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

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

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

Feedback

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

Blower

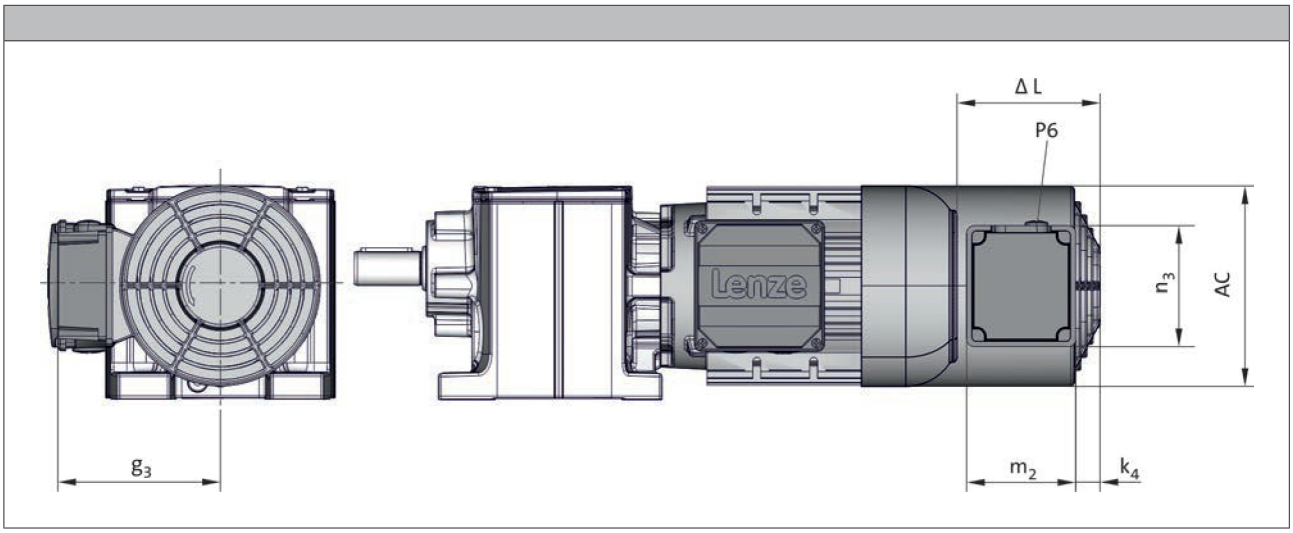
► The use of a blower enables operation below 20 Hz without torque derating.

Rated data for 50 Hz

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

Blower

Dimensions, 4-pole motors



Built-on accessories					
	Without	Brake	Brake + Feedback	Feedback	

Size	Dimensions				
Motor					
	Δ L	Δ L	Δ L	Δ L	AC
	[mm]	[mm]	[mm]	[mm]	[mm]
063	128	170	170	128	123
071		165	165		138
080		183	183		156
090		181	181		176
100	109	170	170	109	194
112	102	183	183	183	218
132	115	202	202	202	257
160	149	179	237	224	309

Size	Dimensions				
Motor					
	k_4	g_3	m_2	n_3	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]
063	12	115	95	105	1x M16x1.5
071		122			
080	13	132	96	106	
090	22	141	95	105	
100		150			
112		162			
132	32	182			
160	31	209	96	106	

Temperature monitoring

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

TKO thermal contacts

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

PTC thermistor

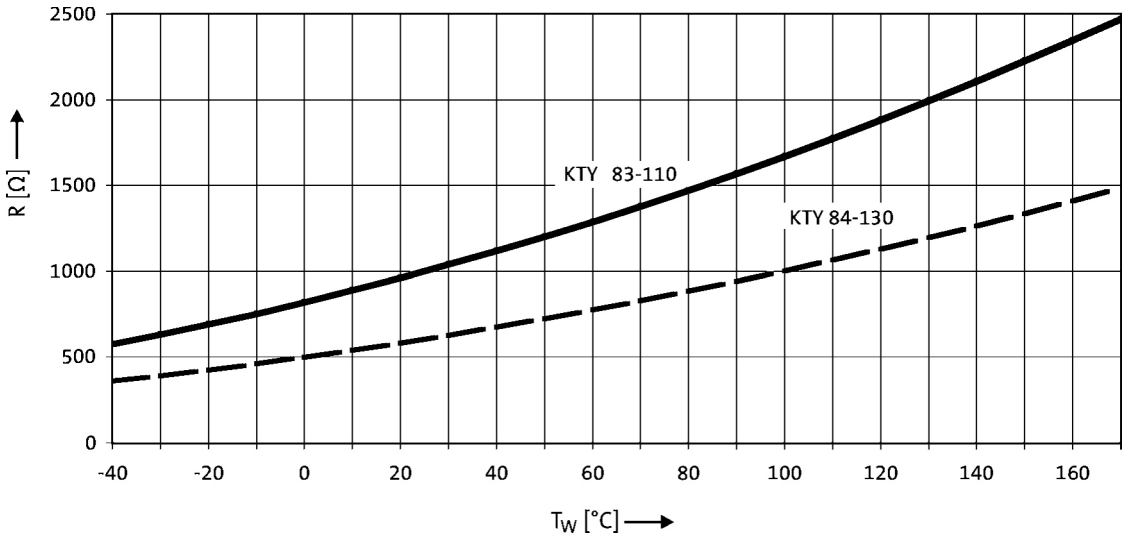
Function	Operating temperature	Rated resistance			Standard
		155 °C	-20 °C	140 °C	
	T	R_N	R_N	R_N	
	-5 ... 5				
	[°C]	[Ω]	[Ω]	[Ω]	
Sudden change in resistance	150	550	30.0	250	DIN 44080 DIN VDE 0660 Part 303

Temperature monitoring

KTY temperature sensor

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

Variation of resistance



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

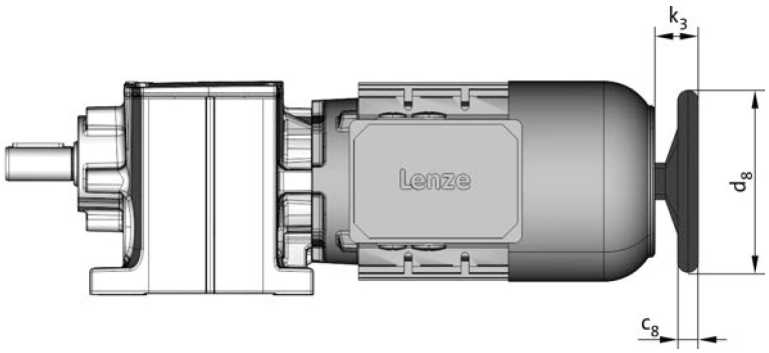
Handwheel

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

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

Handwheel

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



Size	Dimensions		
Motor			
	k_3	c_8	d_8
	[mm]	[mm]	[mm]
071	34.0	18.0	160
080	34.0	18.0	160
090	32.0	18.0	160
100	42.0	18.0	160
112	39.0	18.0	160
132	50.0	26.0	250

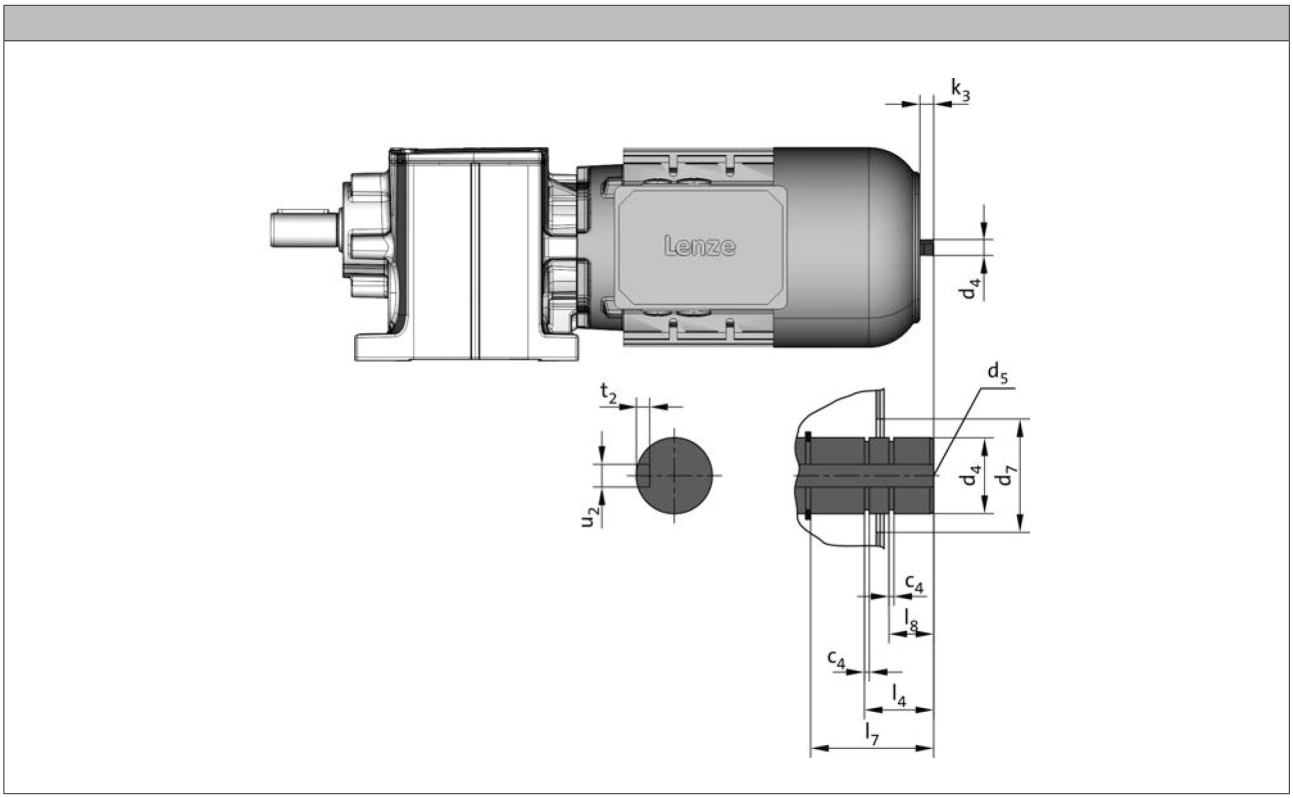
Centrifugal mass

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

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

2nd shaft end

Dimensions, self-ventilated (2-pole)

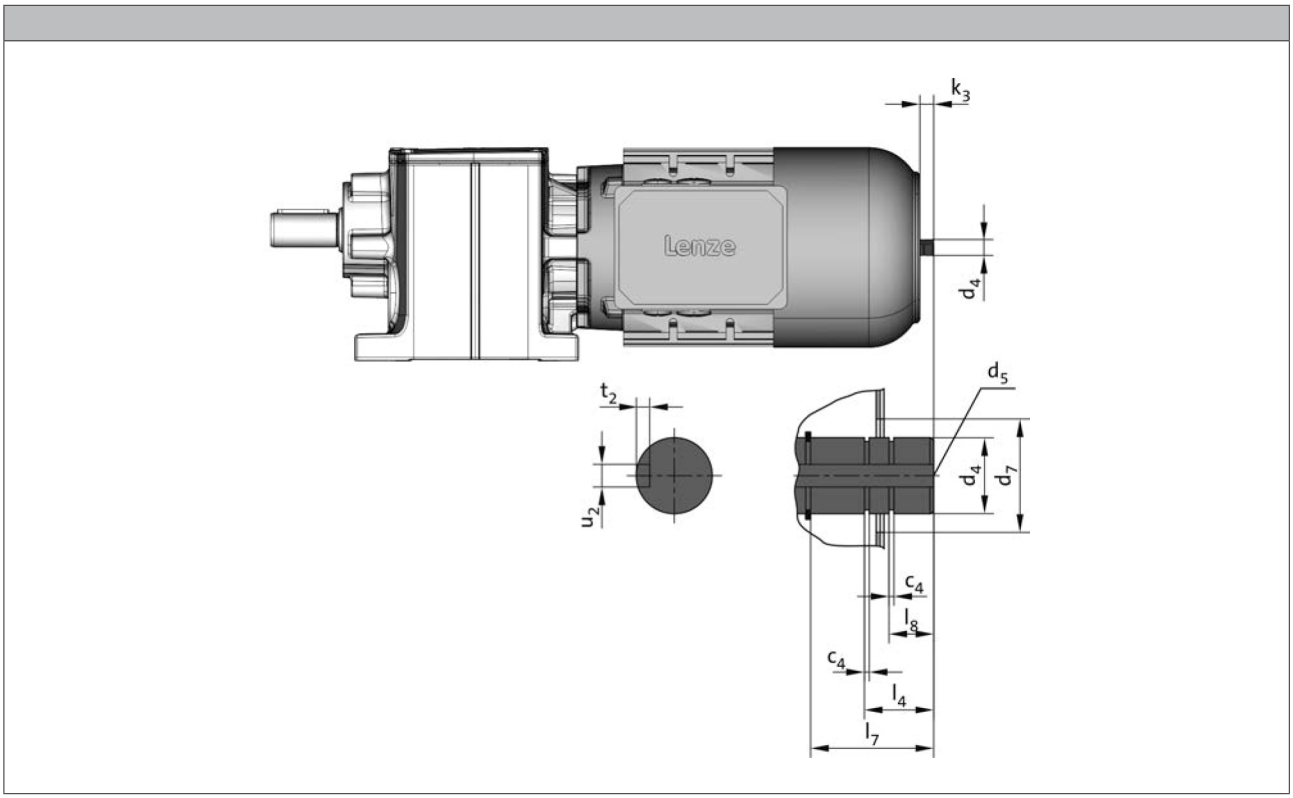


Size	Dimensions										
Motor											
	k_3	c_4	d_4	d_4	d_5	d_7 [1)]	l_4	l_7	l_8	u_2	t_2
			h6	j6							
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071	11.0	1.10	14.0		M5	34.0		19.0	3.00	5.00	3.00
080	9.00	1.30	19.0		M6	34.0		19.0	4.50	6.00	3.20
090	9.00	1.30		20.0	M6	34.0		19.5	5.50	6.00	3.50
100	18.5	1.30		25.0	M10	34.0	17.0	32.5	10.5	8.00	4.00
112	16.0	1.30		25.0	M10	34.0	17.0	28.5	7.00	8.00	4.00
132	24.5	1.60		30.0	M10	48.0	24.5	42.0	8.50	8.00	4.00

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

2nd shaft end

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

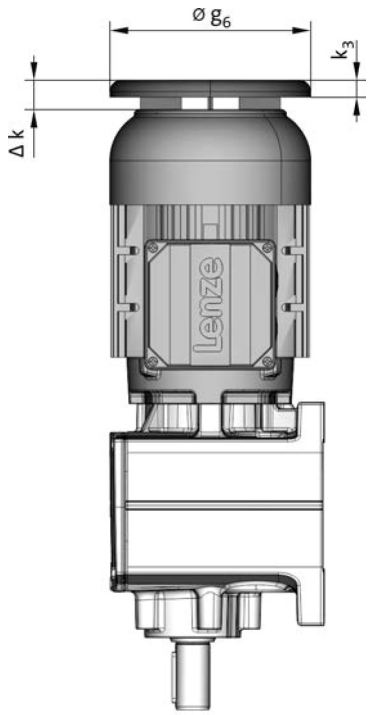


Size	Dimensions										
Motor											
	k_3	c_4	d_4	d_4	d_5	d_7 [1)]	l_4	l_7	l_8	u_2	t_2
			h6	j6							
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
071	11.0	1.10	14.0		M5	34.0		19.0	3.00	5.00	3.00
080	9.00	1.10	14.0		M5	34.0		19.0	4.50	5.00	3.00
090	9.00	1.10	14.0		M5	34.0		19.0	5.00	5.00	3.00
100	18.5	1.30		20.0	M6	34.0	17.0	32.5	10.5	6.00	3.50
112	16.0	1.30		20.0	M6	34.0	17.0	28.5	7.00	6.00	3.50
132	24.5	1.60		30.0	M10	46.0	24.5	42.0	8.50	8.00	4.00

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

Protection cover

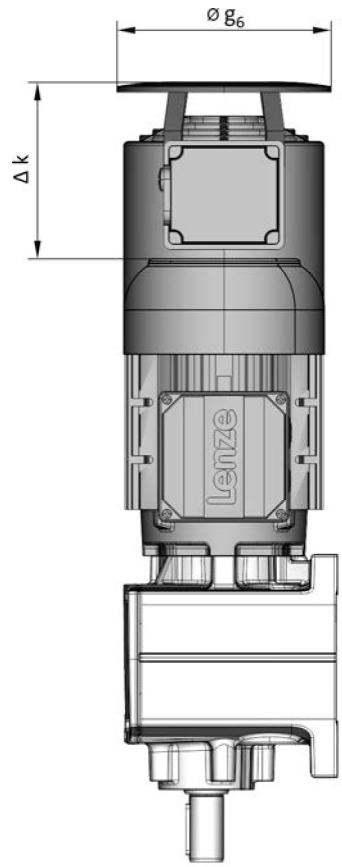
Dimensions, self-ventilated



Size	Dimensions		
Motor			
	Δ k	k_3	g_6
	[mm]	[mm]	[mm]
063	26	11.0	123
071	26	12.0	138
080	26	16.0	156
090	26	15.0	176
100	31	17.0	194
112	31	18.0	218
132	31	20.0	257
160	37	25.0	310

Protection cover

Dimensions, forced ventilated (4/6-pole)



Built-on accessories					
	Without	Brake	Brake + Feedback	Feedback	

Size	Dimensions				
Motor					
	Δ k	Δ k	Δ k	Δ k	g_6
	[mm]	[mm]	[mm]	[mm]	[mm]
063	169	209	209	169	133
071	165	202	202	165	150
080	168	224	224	168	170
090	157	210	210	157	188
100	137	198	198	137	210
112	135	216	216	216	249
132	140	226	226	226	300
160	155	267	267	267	338

13494697

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

www.Lenze.com