L-force catalogue

Automation systems
Drive solutions

Controls
Inverters
Motors
Gearboxes
Engineering Tools

Motors: MCS synchronous servo motors, MD□KS synchronous servo motors, MQA asynchronous servo motors, MCA asynchronous servo motors

Lenze
As easy as that.

Contents of the L-force catalogue

Selected portfolio

Additional portfolio

Lenze makes many things easy for you.

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

1

Developing ideas

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

2

Drafting concepts

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

3

Implementing solutions

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

4

Manufacturing machines

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

5

Ensuring productivity

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

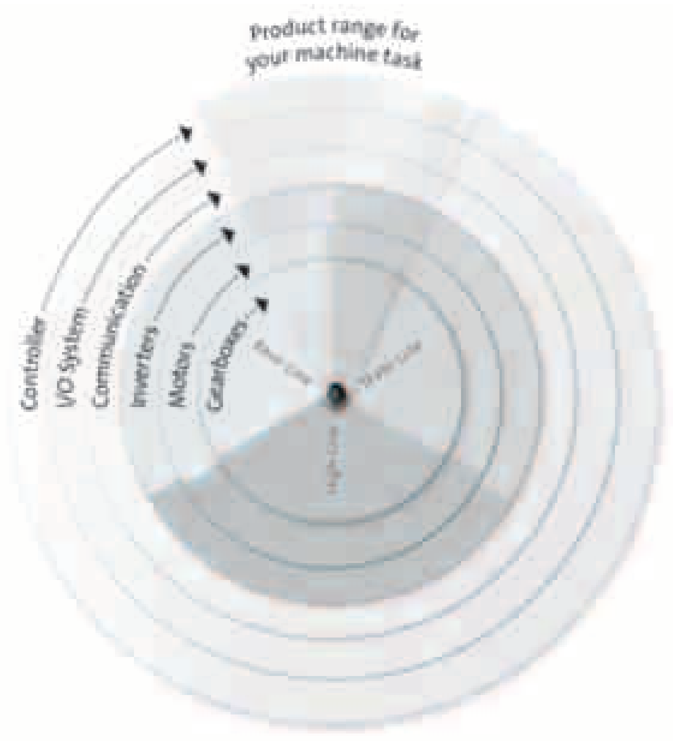
A matter of principle: the right products for every application.

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

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

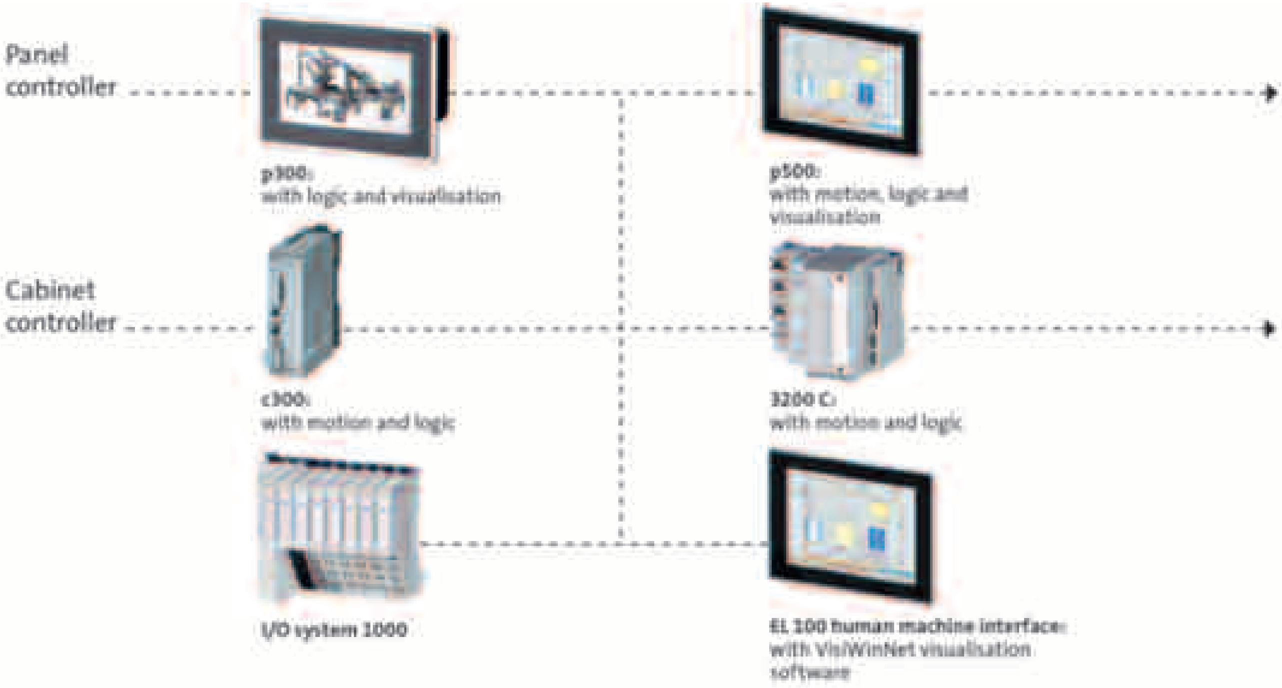
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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

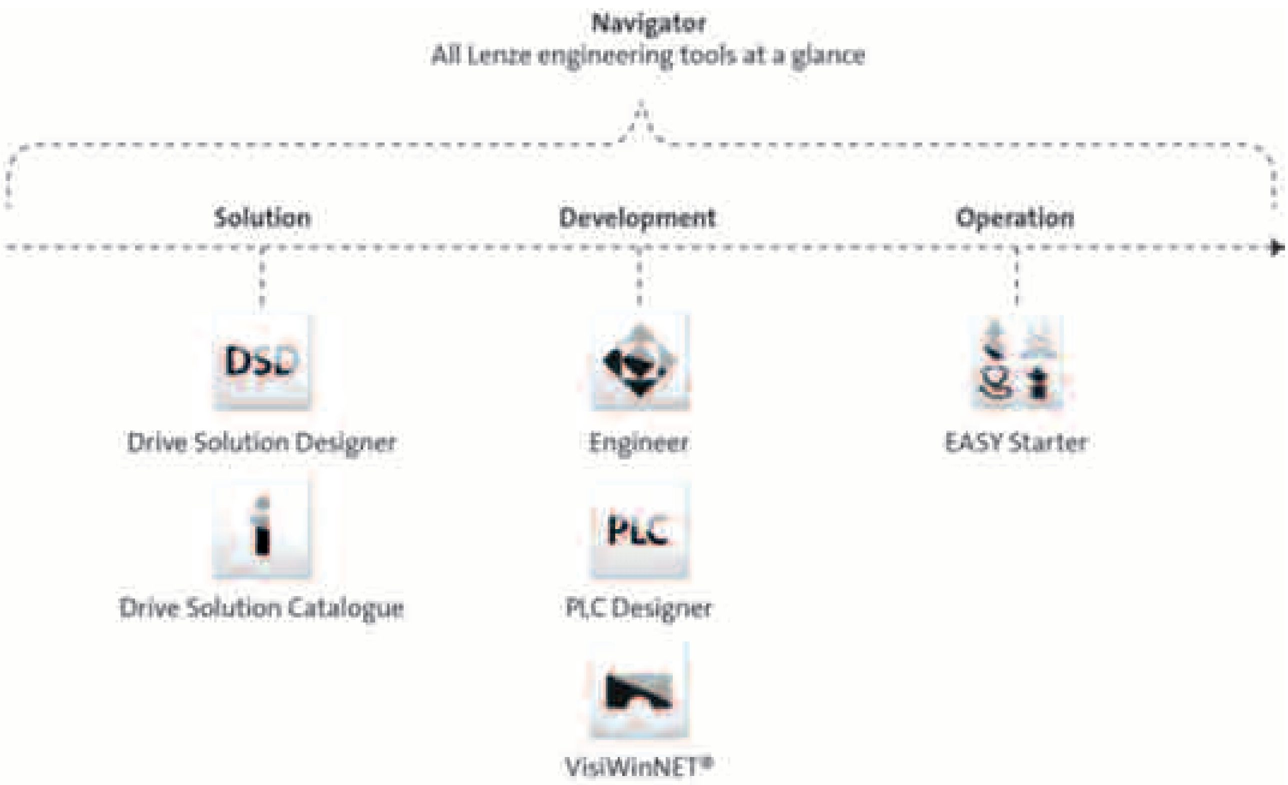


L-force product portfolio

Controls

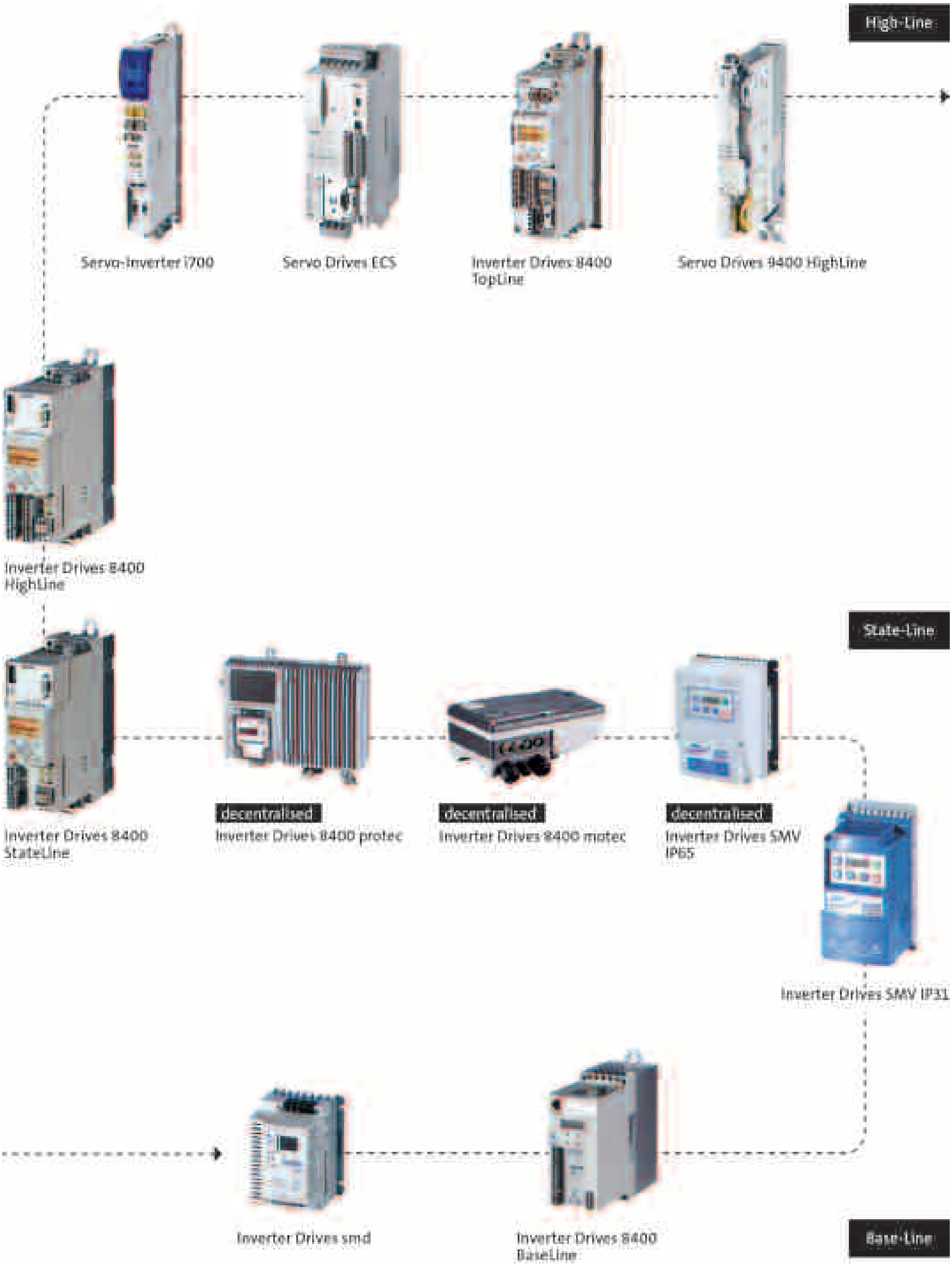


Engineering Tools



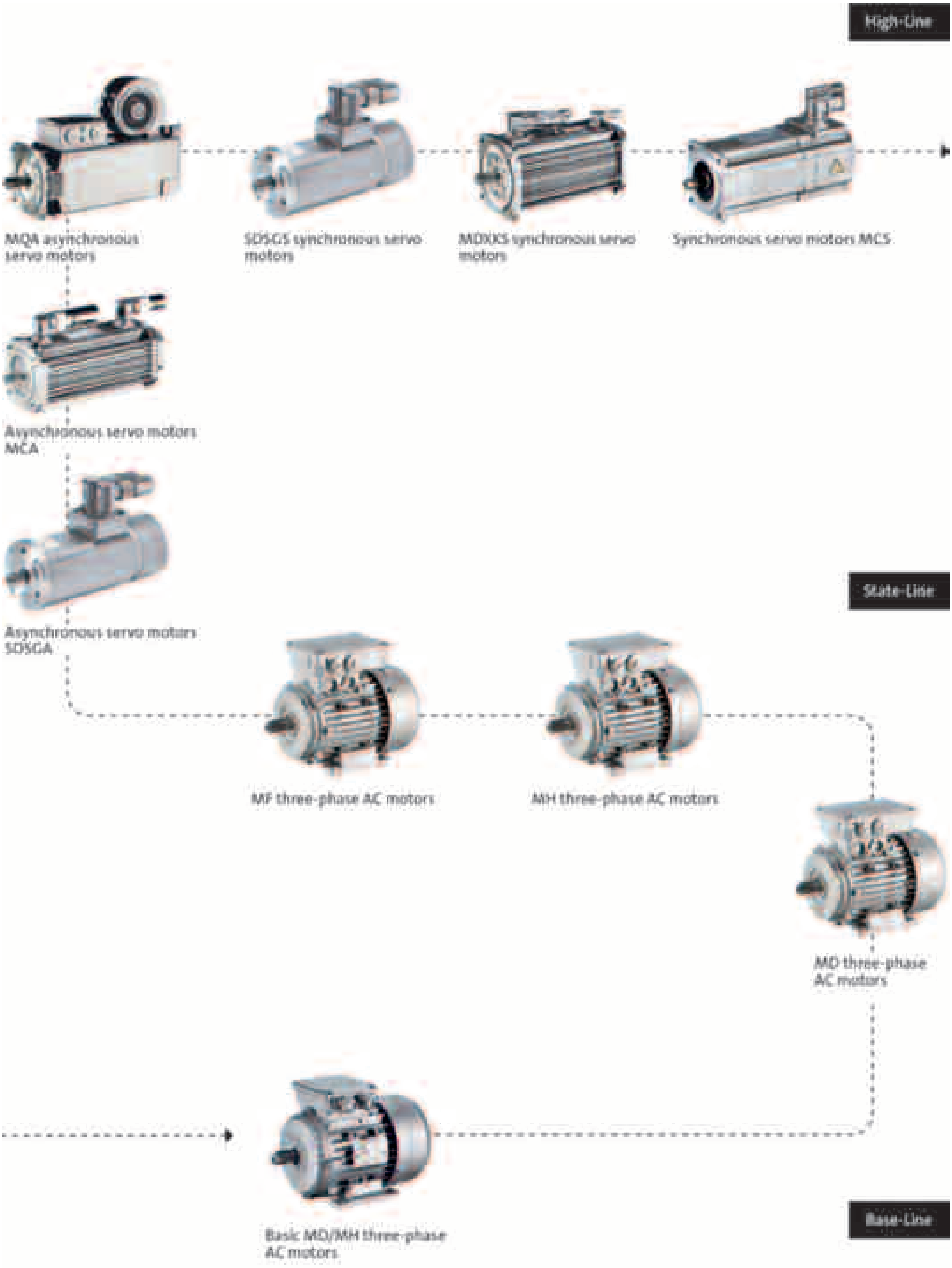
L-force product portfolio

Inverters



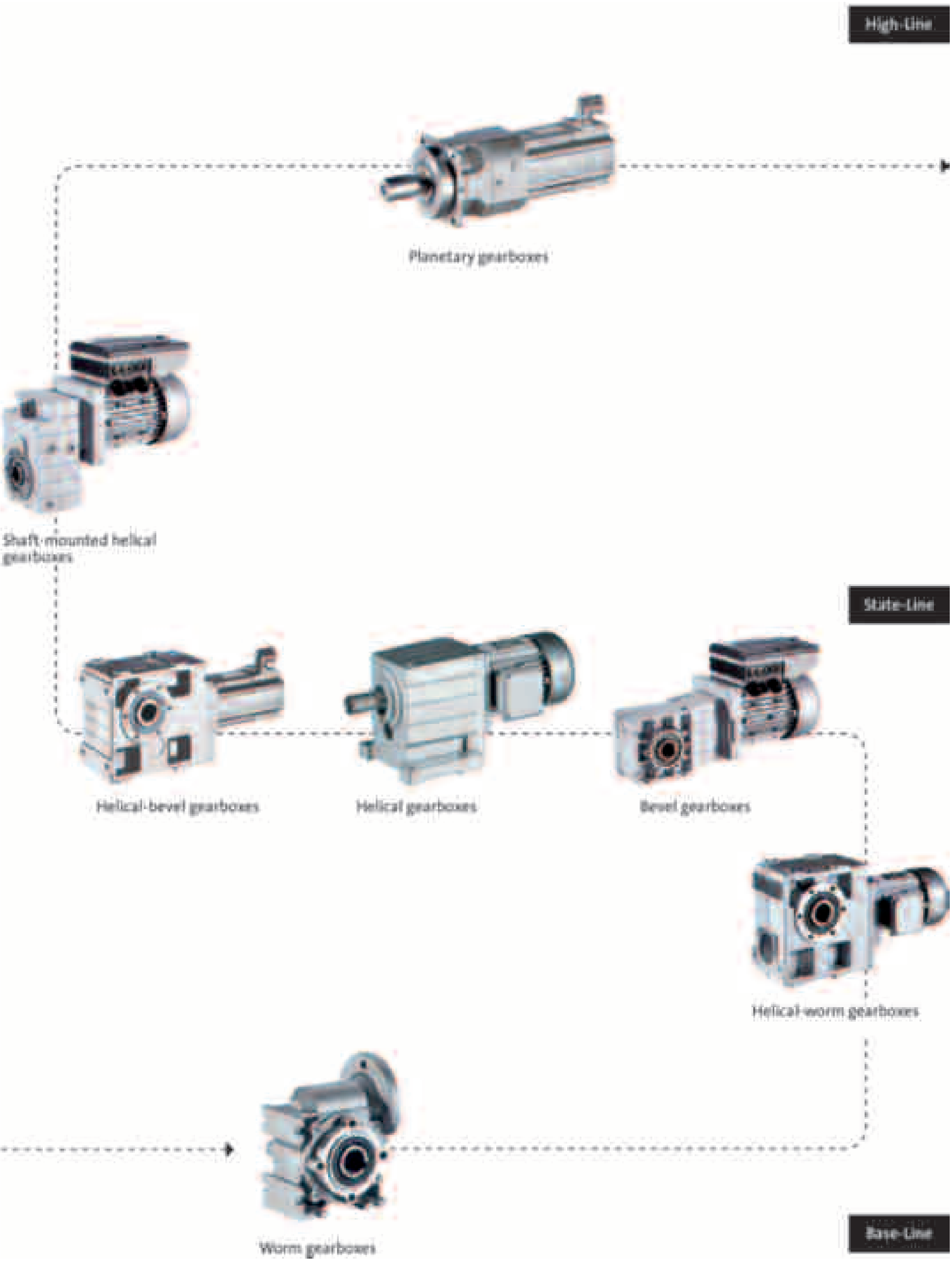
L-force product portfolio

Motors



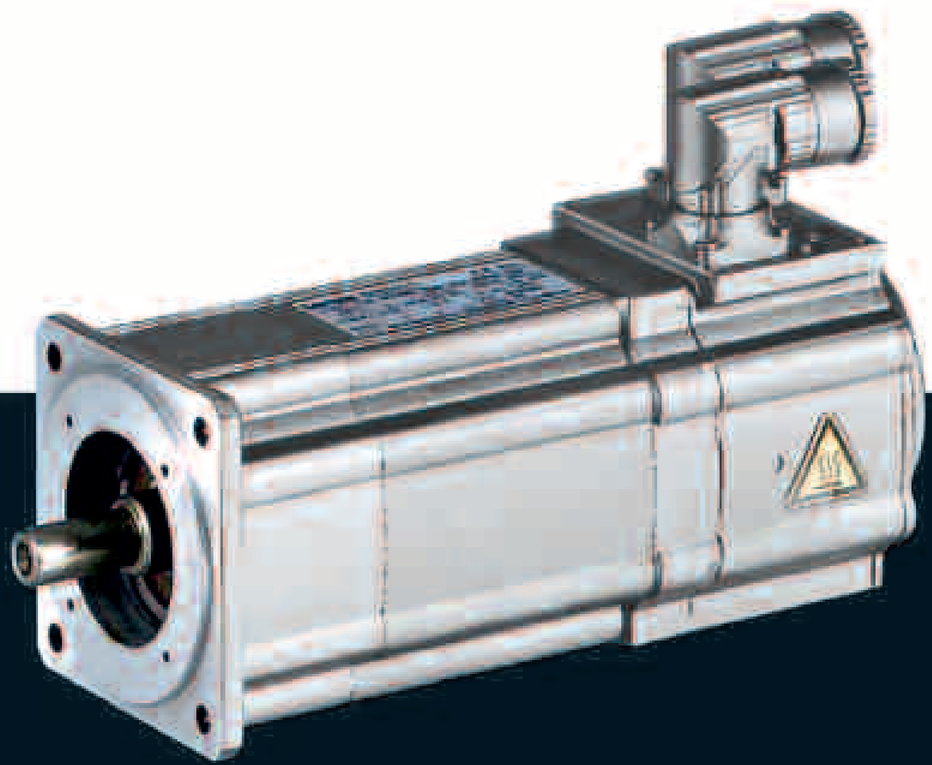
L-force product portfolio

Gearboxes



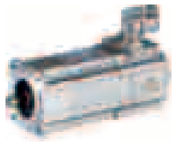
MCS synchronous servo motors

0.25 to 190 Nm



MCS synchronous servo motors

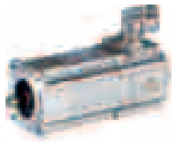
Contents



List of abbreviations

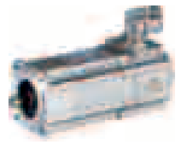
$\eta_{100\,\%}$	[%]	Efficiency
$\cos\phi$		Power factor
du/dt	[kV/µs]	Insulation resistance
$F_{ax,-}$	[N]	Min. axial force
$F_{ax,+}$	[N]	Max. axial force
$f_{in,max}$	[Hz]	Max. input frequency
f_{max}	[kHz]	Limit frequency
f_{max}	[kHz]	Max. switching frequency
f_N	[Hz]	Rated frequency
F_{rad}	[N]	Max. radial force
H_{max}	[m]	Site altitude
I_0	[A]	Standstill current
I_{max}	[A]	Max. short-time DC-bus current
I_{max}	[A]	Max. current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. DC-bus current
I_N	[A]	Rated current
J	[kgcm²]	Moment of inertia
J_{MB}	[kgcm²]	Moment of inertia
$KE_{LL\,150\,°C}$	[V /1000 rp]	Voltage constant
$Kt_{0\,150\,°C}$	[Nm/A]	Torque constant
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_0	[Nm]	Stall torque
$M_{0,\,max}$	[Nm]	Max. standstill torque
M_{av}	[Nm]	Average dynamic torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_{eto}	[r/min]	Transition speed
n_k	[r/min]	Speed
n_{max}	[r/min]	Max. speed

n_N	[r/min]	Rated speed
P_N	[kW]	Rated power
Q_E	[J]	Maximum switching energy
R	[Ω]	Insulation resistance
R	[Ω]	Min. insulation resistance
R_1	[Ω]	Stator impedance
R_2	[Ω]	Charging resistor
R_2	[Ω]	Rotor impedance
$R_{UV\,150\,°C}$	[Ω]	Stator impedance
$R_{UV\,20\,°C}$	[Ω]	Stator impedance
$S_{hü}$	[1/h]	Transition operating frequency
T	[°C]	Operating temperature
T	[°C]	Rated temperature
T	[°C]	Max. ambient temperature of bearing
T	[°C]	Max. surface temperature
T	[°C]	Max. ambient temperature for transport
T	[°C]	Min. ambient storage temperature
T	[°C]	Min. ambient temperature for transport
T	[°C]	Ambient temperature
t_1	[ms]	Engagement time
t_2	[ms]	Disengagement time
$T_{opr,max}$	[°C]	Max. ambient operating temperature
$T_{opr,min}$	[°C]	Min. ambient operating temperature
$U_{in,max}$	[V]	Max. input voltage
$U_{in,min}$	[V]	Min. input voltage
U_{max}	[V]	Max. mains voltage
U_{max}	[V]	Min. input voltage
U_{min}	[V]	Min. mains voltage
$U_{N,\,AC}$	[V]	Rated voltage
$U_{N,\,DC}$	[V]	Rated voltage
Z_{ro}	[Ω]	Rotor impedance
Z_{rs}	[Ω]	Impedance
Z_{so}	[Ω]	Stator impedance



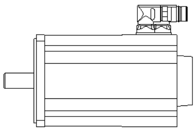
List of abbreviations

CE	Communauté Européenne
CSA	Canadian Standards Association
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
UkrSEPRO	Certificate for Ukraine
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)



Product key

Motor type	Motor size	Rated speed	Mains voltage	Speed/angle sensor	Brake	Standard design	Shaft diameter	Concentricity / vibration level
M C S	☐☐☐	☐☐	☐	☐☐☐	☐☐	☐	☐☐	☐
Synchronous servo motor	(Example: 14L)	value in 100 rpm (example: 2000 = 20)					(Example: 24)	



Mains voltage

- 400 V: -
- 230 V: L

Speed/angle sensor

- RS0: Resolver
- SRS: SinCos absolute encoder single- turn, Hiperface, AS1024-8V-H (SRS50)
- SRM: SinCos absolute encoder multi-turn, Hiperface, AM1024-8V-H (SRM50)
- SKM: SinCos absolute encoder multi-turn, Hiperface, AM128-8V-H (SKM36)
- ECN: SinCcos absolute encoder single- turn, EnDat, AS2048-5V-E (ECN 1313)
- EQN: SinCcos absolute encoder multi- turn, EnDat, AM2048-5V-E (EQN 1325)
- EQI: SinCos absolute encoder multi- turn, EnDat, AM32-5V-E (EQI 1331)
- C40: TTL incremental encoder with communications signal, IK4096-5V-T (Renco R35i)
- RV0: Safety resolver RV03
- SVS: Safety SinCos absolute encoder single-turn, Hiperface®, AS1024-8V-K2
- SVM: Safety SinCos absolute encoder multi-turn, Hiperface®, AM1024-8V-K2

Brake

- B0: No brake
- P1: PM brake DC 24V
- P2: PM brake DC 24V, heavy-duty

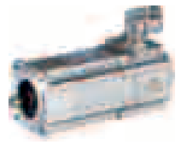
Standard design

- A: Standard flange form A / FF (B5), shaft without keyway
- B: Standard flange form A / FF (B5), shaft with keyway

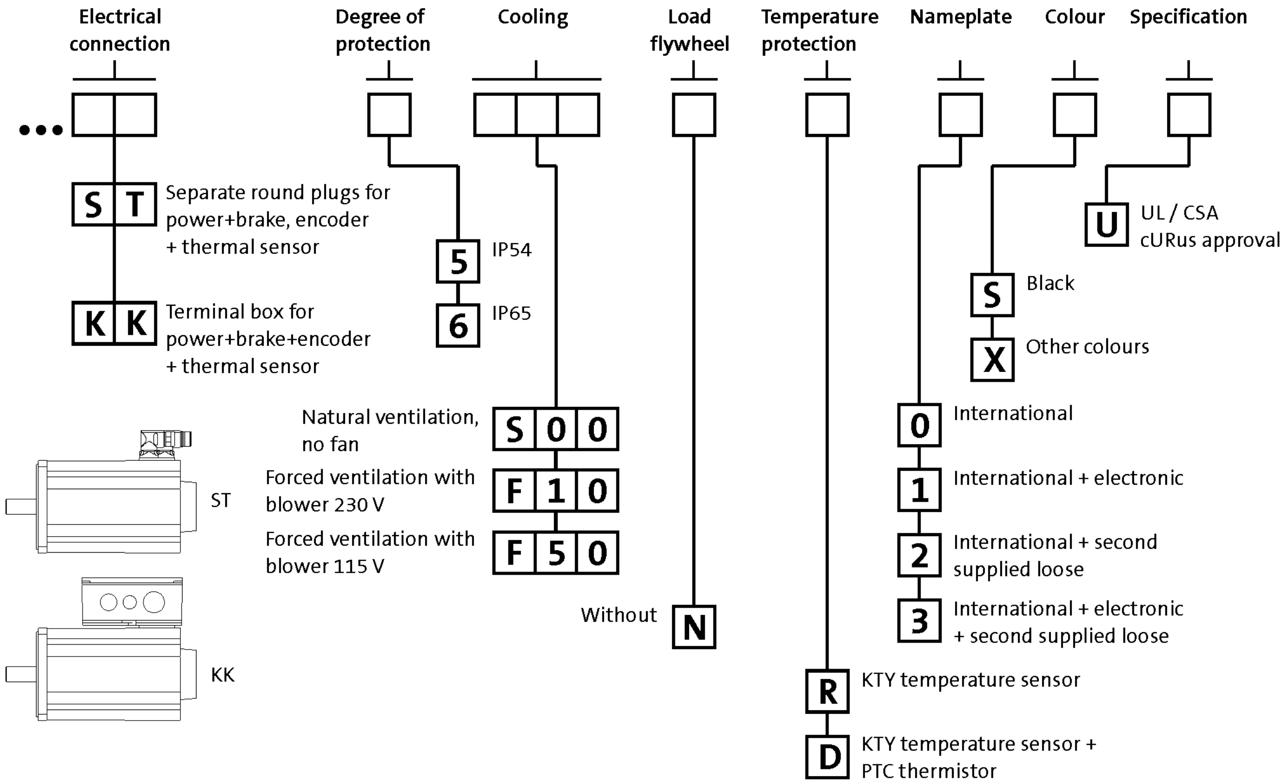
Concentricity / vibration level

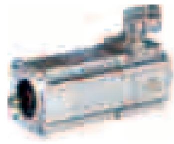
- N: normal vibrational severity standard bearing
- R: reduced vibrational severity standard bearing

5.1



Product key


Electrical connection
Degree of protection
Cooling
Load flywheel
Temperature protection
Nameplate
Colour
Specification
ST
Separate round plugs for power+brake, encoder + thermal sensor
KK
Terminal box for power+brake+encoder + thermal sensor
5
IP54
6
IP65
S00
Natural ventilation, no fan
F10
Forced ventilation with blower 230 V
F50
Forced ventilation with blower 115 V
N
Without
R
KTY temperature sensor
D
KTY temperature sensor + PTC thermistor
0
International
1
International + electronic
2
International + second supplied loose
3
International + electronic + second supplied loose
S
Black
X
Other colours
U
UL / CSA cURus approval
ST
KK



Product information

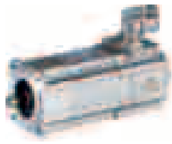
When space is limited, but strict requirements in terms of dynamics and precision still have to be met, the MCS synchronous servo motors are the right choice.

With a power range from 0.25 kW to 15.8 kW and a rated torque range from 0.5 Nm to 72 Nm and peak torques of up to 190 Nm, these motors leave nothing to be desired in installations requiring compact and dynamic drive technology.
The stator winding of the MCS motors employs innovative Single Element Pole Technology – SEPT – and is made up of individual coils. High-quality magnetic materials and specially developed pole shapes set the conditions for their excellent drive characteristics. This results in a significant increase in power density, while at the same time reducing moments of inertia. The minimum detent torques offer exceptional smooth running characteristics and thereby secure excellent control behaviour.

The robust mechanical structure with reinforced bearings, the high degree of protection and the full stator encapsulation increase operational reliability, even in harsh ambient conditions.

Advantages
- High dynamic performance thanks to low moments of inertia
- Compact size with high power density
- Cooling with or without axial external fan
- Robust regenerative resolver system as standard
- Alternatively sin/cos encoder for the highest precision
- Easy to install and service friendly thanks to use of SpeedTec connectors
- Optional terminal box
- Protection: IP54, IP65 optional
- cURus-approved, GOST-certified, CE, RoHS compliant
- Smooth surface
- Single Element Pole Technology
- Optimum rotation characteristics
- Virtually free of detent torque
- Electronic nameplate

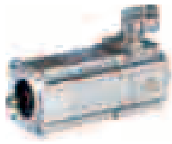
MCS09 synchronous servo motor



Functions and features

	MCS06	MCS09	MCS12	MCS14	MCS19
Design					
	B5-FF75	B5-FF100	B5-FF130	B5-FF165	B5-FF215
Shaft end (with and without keyway)					
	11 x 23	14 x 30	19 x 40	24 x 50	28 x 60
A end shield					
	Not oil-tight				
Brake					
Permanent magnetic brake	DC 24 V	DC 24 V 24 V DC, reinforced			
Speed and angle encoder					
	Resolver SinCos single-turn/multi-turn				
Cooling					
Without blower	Naturally ventilated				
Axial blower, 1 phase			230 V; 50 Hz 115 V; 60 Hz		
Thermal sensor					
Thermal detector	KTY				
PTC thermistor		2x PTC additional (3-phase monitoring)			
Motor connection: plug connector					
	Power + brake Encoder + thermal sensor		Power + brake Encoder + thermal sensor Blower		
Motor connection: terminal box					
		Power + brake + encoder + thermal sensor			
Shaft bearings					
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, sealing disc or cover plate				
Position of the locating bearing	Non-drive end				
Colour					
	RAL9005M				

► Terminal boxes not possible if blower is fitted.



Dimensioning

Speed-dependent safety functions

Single encoder concepts with resolvers

Servo motors can perform speed-dependent safety functions for safe speed and / or safe relative position monitoring in a drive system with the Servo Drives 9400. The SM301 safety module, which can be integrated in the Servo Drives 9400, is used to implement these functions. When planning systems/installations of this kind, the following must always be observed:

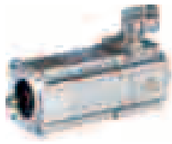
When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard IEC 61800-5-2 [Adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional] stipulates special requirements for the connection between feedback system and motor shaft. This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip".
As such, acceleration limit values must not be exceeded for the individual drive solutions. You can find the limit values in the corresponding feedback data of the individual motor ranges.

Speed-dependent safety functions in connection with the SM301 safety module

For the following speed-dependent safety functions, the motor-feedback system combinations listed in the following table are available:

- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely Limited Speed (SLS)
- Safe Maximum Speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI).

Encoder type	Encoder type	Product key	Feedback	Safe speed monitoring
			Design	
SinCos absolute value	Single-turn	AS1024-8V-K2		PL d/SIL 2
	Multi-turn	AM1024-8V-K2		
Resolver		RV03		PL e/SIL 3
			2-encoder concept	up to PL e / SIL 3



Dimensioning

Cooling effect of mounting flange

Mounting on a thermally conducting / insulating plate or machine chassis has an influence on heating up the motor, particularly when using naturally ventilated motors.

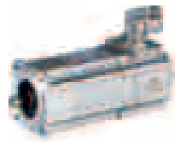
The motor rating data specified in the catalogue applies when mounting on a steel plate with free convection with the following dimensions:
- MCS06: 270 x 270 mm
- MCS09: 330 x 330 mm
- MCS12 / 14 / 19: 450 x 450 mm

Vibrational severity

		MCS06	MCS09	MCS12	MCS14	MCS19
Vibrational severity						
IEC/EN 60034-14		A				
Maximum r.m.s. value of the vibration velocity [1]	[mm/s]	1.60				

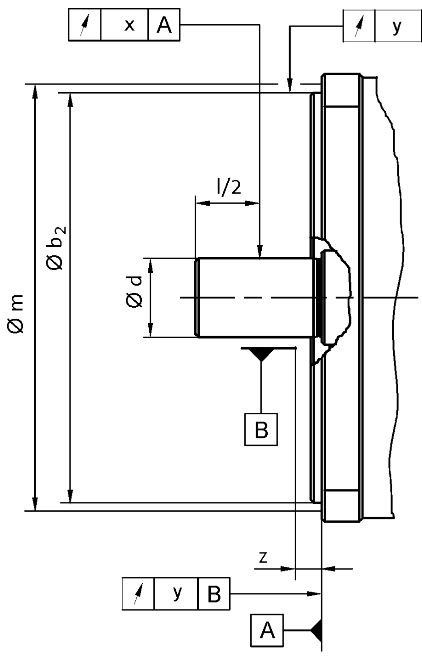
[1] Free suspension

► at n = 600 to 3,600 rpm



Dimensioning

Concentricity and axial run-out of the mounting flanges and smooth running of the shaft ends



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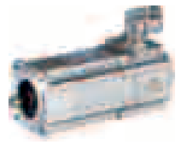
				MCS06	MCS09	MCS12	MCS14	MCS19
Flange size								
				FF75	FF100	FF130	FF165	FF215
Dimensions								
	b_2	j6	[mm]	60	80	110	130	180
	d	k6	[mm]	11	14	19	24	28
Distance								
Measuring diameter	m		[mm]	65.0	85.0	115	135	185
Dial gauge holder for flange check	z	+/- 1	[mm]	10.0				
Concentricity								
IEC 60072				Normal class				
Value	y		[mm]	0.080		0.10		
Linear movement								
IEC 60072				Normal class				
Value	y		[mm]	0.080		0.10		
Smooth running								
IEC 60072				Normal class				
Value	x		[mm]	0.035		0.040		

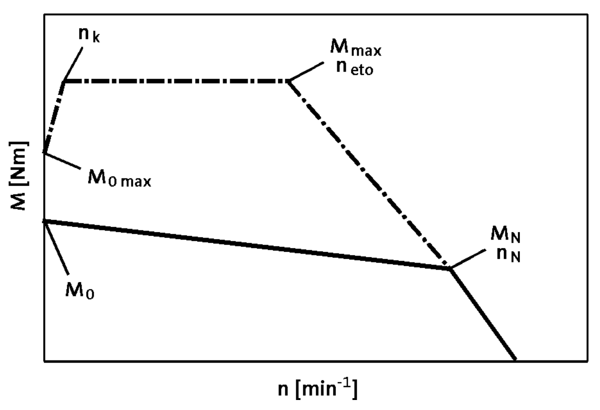
► Limit values for checking the smooth running of the shaft ends as well as the concentricity and axial run-out of the mounting flange to IEC 60072



Dimensioning

Notes on the selection tables

Graphical display of the operating points



	n_k
	[r/min]
MCS	75.0
MDSKS	100
MDFKS	

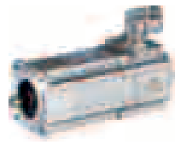
Further selection tables with different switching frequencies are available with the following codes:

- DS_ZT_MCS_0001
- DS_ZT_MCA_0001
- DS_ZT_MDSKS_0001
- DS_ZT_MDFKS_0001

Simply enter this code (e.g. DS_ZT_MCS_0001) as a search string at **www.lenze.de/dsc** and you will be given the information immediately in the form of a PDF format.

Please note:

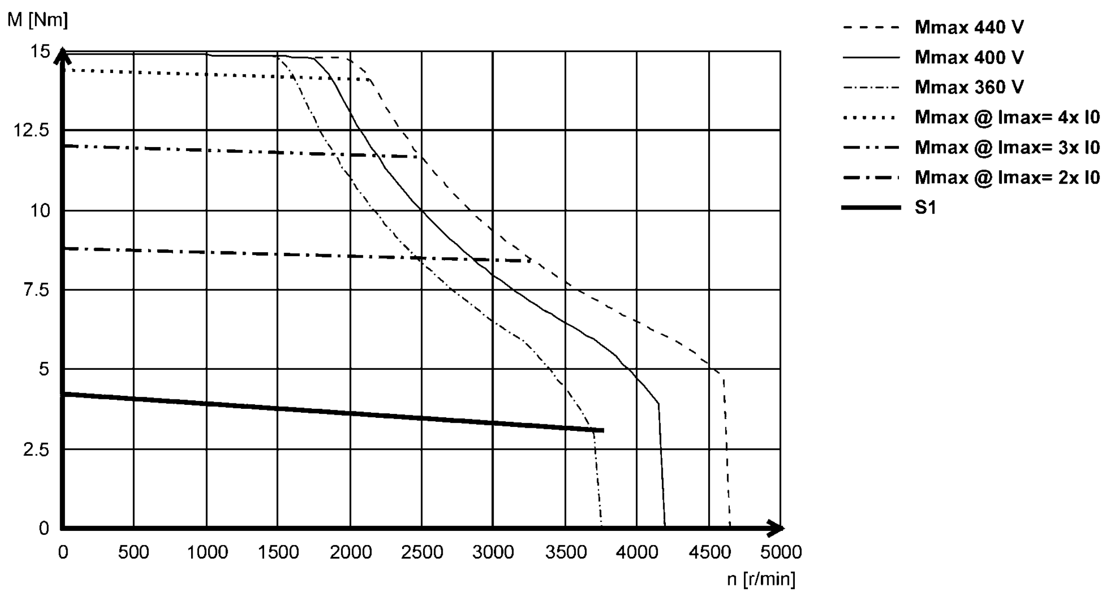
- In case of an active load (e.g. vertical drive axes, hoists, test benches, unwinders), $M_{0\,max}$ has to be considered
- In case of a passive load (e.g. horizontal drive axes), M_{max} can be usually used
- In case of a speed < n_k and inverter-specifically, the achievable torque $M_{0\,max}$ is smaller than M_{max}
- In case of a speed n = 0, the standstill torque M_0 and the standstill current I_0 have to be reduced by 30% after 2 seconds. In case of applications which require a longer holding of M_0, we recommend the drive to be held via the holding brake and reduce the current, e.g. by controller inhibit.
- In case of servo inverters, the switching frequency dependent overload capacity is considered in the default setting. For more information, see the servo inverter catalogue.



Dimensioning

Notes on the torque characteristics

Graph of the torque characteristics



With synchronous servo motors, the limit torque characteristics that result from the selection of servo inverters with maximum currents are also shown alongside the characteristics for continuous operation (S1). These correspond to a multiple of the motor standstill current (2x I0 to 4x I0).

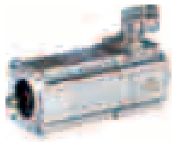
Characteristics in the Internet

You can find the torque characteristic for inverter-motor combinations on the Internet at **www.lenze.de/dsc**. This lists all useful combinations with the servo inverters 9400, 9300, ECS and Inverter Drives 8400 TopLine. These characteristics are each determined using the factory default settings of the inverters:

- 9400 with variables switching frequency.
  This means that up to 6-fold overcurrent can be applied in borderline cases.
- 9300 and ECS with fixed switching frequency.
- 8400 TopLine with variables switching frequency.

The continuous operation characteristics (S1) show the inverter-independent motor rating values

Further information on the terms switching frequency and factory default settings can be found in the operating manual of the respective servo inverter.



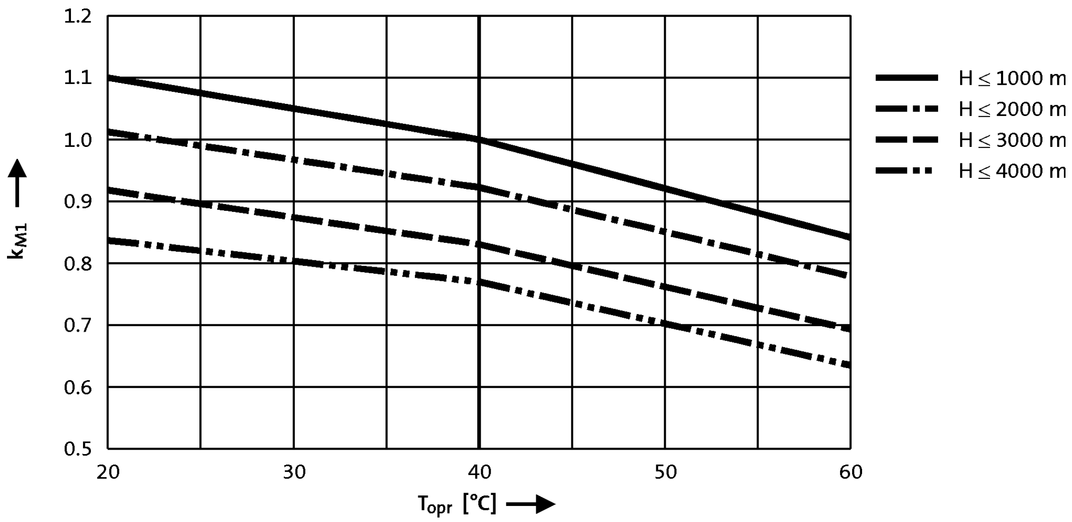
Dimensioning

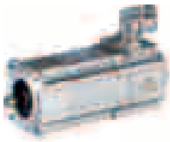
Influence of ambient temperature and site altitude

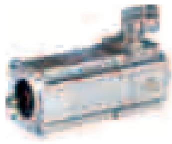
The information relating to the servo motors in the tables and graphs is valid for a maximum ambient temperature (T_{opr}) of 40 °C and a site altitude (H) up to 1000 m above sea level. The torque correction factor (k_{M1}) shall be applied to the S1 torque characteristic (M_0...M_N) in the event of differing installation conditions.

► The maximum permissible ambient temperature (T_{opr}) for servo motors with blowers is 40 °C

Torque correction factor k_{m1}

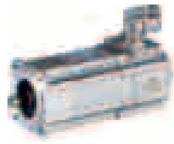






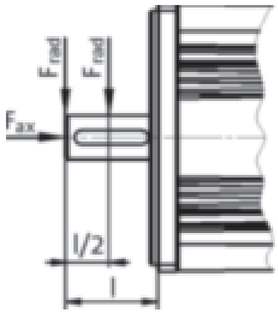
Standards and operating conditions

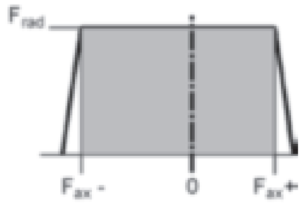
			MCS	
Cooling type				
			Naturally ventilated	Blower
Enclosure				
EN 60529			IP54 IP65	IP54
Temperature class				
IEC/EN 60034-1; utilisation			F	
IEC/EN 60034-1; insulation system (enamel-insulated wire)			H	
Conformity				
CE			Low-Voltage Directive	
			2006/95/EC	
EAC			TP TC 004/2011 (TR C	
Approval				
			UkrSEPRO	
CSA			CSA 22.2 No. 100	
cURus			UL 1004-1 UL 1004-6 Power Conversion Equipment (File-No. E210321)	
Max. voltage load				
IEC/TS 60034-25			Pulse voltage limiting curve A	
Smooth running				
IEC 60072			Normal class	
Linear movement				
IEC 60072			Normal class	
Concentricity				
IEC 60072			Normal class	
Mechanical ambient conditions (vibration)				
IEC/EN 60721-3-3			3M6	
Min. ambient operating temperature				
Without brake	$T_{opr,min}$	[°C]	-20	-15
With brake	$T_{opr,min}$	[°C]	-10	
Max. ambient temperature for operation				
	$T_{opr,max}$	[°C]	40	
Max. surface temperature				
	T	[°C]	140	110
Mechanical tolerance				
Flange centring diameter			$b_2 \leq 230$ mm = j6 $b_2 > 230$ mm = h6	
Shaft diameter			d ≤ 50 mm = k6 d > 50 mm = m6	
Site altitude				
Amsl	H_{max}	[m]	4000	



Permissible radial and axial forces

Application of forces





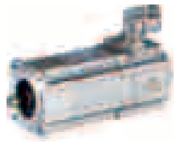
Application of force at l/2

Bearing service life L_{10}	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MCS06	740	-260	140	590	-210	80	470	-170	40	410	-150	30	340	-140	10
MCS09	1040	-700	470	830	-550	310	660	-440	200	580	-380	150	490	-330	90
MCS12	1030	-880	560	820	-690	370	650	-550	230	570	-490	160	480	-420	100
MCS14	1830	-1150	720	1450	-900	470	1150	-720	290	1010	-640	200	850	-550	120
MCS19	3840	-1550	950	3050	-1210	620	2430	-960	360	2120	-840	250	1790	-730	130

Application of force at l

<table>
<tr><th colspan="16">Bearing service life L_{10}</th></tr>
<tr><th></th><th colspan="3">5000 h</th><th colspan="3">10000 h</th><th colspan="3">20000 h</th><th colspan="3">30000 h</th><th colspan="3">50000 h</th></tr>
<tr><td></td><td>F_{rad}</td><td>$F_{ax,-}$</td><td>$F_{ax,+}$</td><td>F_{rad}</td><td>$F_{ax,-}$</td><td>$F_{ax,+}$</td><td>F_{rad}</td><td>$F_{ax,-}$</td><td>$F_{ax,+}$</td><td>F_{rad}</td><td>$F_{ax,-}$</td><td>$F_{ax,+}$</td><td>F_{rad}</td><td>$F_{ax,-}$</td><td>$F_{ax,+}$</td></tr>
<tr><td></td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td><td>[N]</td></tr>
<tr><td>MCS06</td><td>630</td><td>-210</td><td>90</td><td>500</td><td>-170</td><td>50</td><td>400</td><td>-140</td><td>20</td><td>350</td><td>-130</td><td>0</td><td>290</td><td>-120</td><td>-10</td></tr>
<tr><td>MCS09</td><td>900</td><td>-630</td><td>400</td><td rowspan="2">710</td><td>-500</td><td>260</td><td>570</td><td>-400</td><td>160</td><td>500</td><td>-350</td><td>120</td><td rowspan="2">420</td><td>-300</td><td rowspan="3">70</td></tr>
<tr><td>MCS12</td><td>890</td><td>-820</td><td>490</td><td>-640</td><td>320</td><td>560</td><td>-520</td><td>190</td><td>490</td><td>-460</td><td>130</td><td>-400</td></tr>
<tr><td>MCS14</td><td>1590</td><td>-1040</td><td>610</td><td>1260</td><td>-820</td><td>390</td><td>1000</td><td>-660</td><td>230</td><td>880</td><td>-580</td><td>150</td><td>740</td><td>-510</td></tr>
<tr><td>MCS19</td><td>3330</td><td>-1320</td><td>730</td><td>2650</td><td>-1040</td><td>450</td><td>2100</td><td>-830</td><td>240</td><td>1840</td><td>-740</td><td>140</td><td>1550</td><td>-640</td><td>40</td></tr>
</table>

► The values for the bearing service life L_{10} refer to an average speed of 4000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.



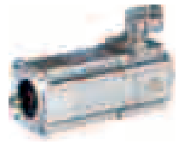
Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS06C41-	4050	0.80	0.60	2.40	0.25	1.30	1.30	5.40	225	270
MCS06C60-	6000	0.80	0.50	2.40	0.31	2.50	2.40	10.8	135	400
MCS06F41-	4050	1.50	1.20	4.40	0.51	1.50	1.50	5.30	320	270
MCS06F60-	6000	1.50	0.90	4.40	0.57	2.90	2.50	10.5	180	400
MCS06I41-	4050	2.00	1.50	6.20	0.64	1.70	1.60	5.90	325	270
MCS06I60-	6000	2.00	1.20	6.20	0.75	3.40	2.90	11.8	190	400
MCS09D41-	4050	3.30	2.30	9.50	1.00	2.60	2.30	10.0	320	270
MCS09D60-	6000	3.30	1.80	9.50	1.10	5.30	3.80	20.0	210	400
MCS09F38-	3750	4.20	3.10	15.0	1.20	3.00	2.50	15.0	330	250
MCS09F60-	6000	4.20	2.40	15.0	1.50	6.00	4.50	30.0	230	400
MCS09H41-	4050	5.50	3.80	20.0	1.60	4.30	3.40	20.0	300	270
MCS09H60-	6000	5.50	3.00	20.0	1.90	8.50	6.00	40.0	190	400
MCS09L41-	4050	7.50	4.50	32.0	1.90	6.20	4.20	32.0	295	270
MCS09L51-	5100	7.50	3.60	32.0	1.90	12.4	6.90	64.0	180	340

	$\eta_{100\,\%}$	J [1]	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} [2]	m [1]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS06C41-	65.0	0.14	36.6	27.1	36.5	51.0	0.66	8000	1.80
MCS06C60-	70.0	0.14	18.3	6.80	9.10	12.8	0.33	8000	1.80
MCS06F41-	77.0	0.22	60.1	21.9	29.5	63.5	1.05	8000	2.20
MCS06F60-	81.0	0.22	30.0	5.50	7.40	15.9	0.53	8000	2.20
MCS06I41-	81.0	0.30	73.4	18.8	25.4	60.2	1.21	8000	2.90
MCS06I60-	84.0	0.30	36.7	4.70	6.30	15.1	0.60	8000	2.90
MCS09D41-	87.0	1.10	71.2	7.00	9.40	25.1	1.25	7000	4.30
MCS09D60-	87.0	1.10	35.6	1.80	2.40	6.30	0.62	7000	4.30
MCS09F38-	91.0	1.50	79.8	5.20	7.00	24.6	1.40	7000	5.20
MCS09F60-	91.0	1.50	39.9	1.30	1.80	6.20	0.70	7000	5.20
MCS09H41-	91.0	1.90	75.7	3.20	4.30	16.1	1.29	7000	6.10
MCS09H60-	91.0	1.90	37.8	0.80	1.10	4.00	0.65	7000	6.10
MCS09L41-	91.0	2.80	71.7	1.80	2.40	9.90	1.21	7000	7.90
MCS09L51-	91.0	2.80	35.9	0.44	0.59	2.50	0.60	7000	7.90

[1] Without brake.
[2] Mechanically permissible maximum speed.



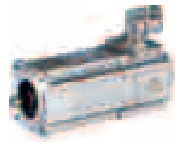
Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS12D20-	1950	6.40	5.50	18.0	1.10	2.70	2.60	10.0	345	130
MCS12D41-	4050	6.40	4.30	18.0	1.80	5.50	4.50	20.0	310	270
MCS12H15-	1500	11.4	10.0	29.0	1.60	4.10	3.80	12.0	300	100
MCS12H35-	3525	11.4	7.50	29.0	2.80	8.20	5.70	24.0	325	235
MCS12L20-	1950	15.0	13.5	56.0	2.80	6.20	5.90	28.0	330	130
MCS12L41-	4050	15.0	11.0	56.0	4.70	12.4	10.2	57.0	300	270
MCS14D15-	1500	11.0	9.20	29.0	1.45	5.00	4.50	17.0	305	100
MCS14D36-	3600	11.0	7.50	29.0	2.80	10.0	7.50	33.0	295	240
MCS14H15-	1500	21.0	16.0	55.0	2.50	8.50	6.60	26.0	325	100
MCS14H32-	3225	21.0	14.0	55.0	4.70	16.9	11.9	52.0	295	215
MCS14L15-	1500	28.0	23.0	77.0	3.60	12.0	9.70	37.0	315	100
MCS14L32-	3225	28.0	17.2	77.0	5.80	24.0	15.0	75.0	275	215
MCS14P14-	1350	37.0	30.0	105	4.20	12.2	10.8	46.0	340	90
MCS14P32-	3225	37.0	21.0	105	7.10	24.3	15.6	92.0	315	215

	$\eta_{100\,\%}$	J [1)]	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} [2)]	m [1)]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS12D20-	79.0	4.00	137	8.70	11.8	52.2	2.34	6000	6.40
MCS12D41-	84.0	4.00	68.6	2.20	2.90	13.0	1.17	6000	6.40
MCS12H15-	88.0	7.30	173	5.70	7.70	42.1	2.79	6000	9.50
MCS12H35-	91.0	7.30	86.5	1.40	1.90	10.5	1.40	6000	9.50
MCS12L20-	90.0	10.6	149	2.20	3.00	21.8	2.42	6000	12.6
MCS12L41-	91.0	10.6	74.6	0.55	0.75	5.50	1.21	6000	12.6
MCS14D15-	88.0	8.10	129	4.00	5.40	49.8	2.19	6000	10.7
MCS14D36-	92.0	8.10	64.2	1.00	1.35	12.5	1.09	6000	10.7
MCS14H15-	92.0	14.2	153	2.08	2.81	34.1	2.48	6000	15.5
MCS14H32-	93.0	14.2	76.3	0.52	0.70	8.50	1.24	6000	15.5
MCS14L15-	90.0	23.4	152	1.21	1.64	22.0	2.33	6000	20.1
MCS14L32-	93.0	23.4	76.2	0.30	0.41	5.50	1.16	6000	20.1
MCS14P14-	90.0	34.7	179	1.10	1.49	23.9	3.04	6000	24.9
MCS14P32-	93.0	34.7	89.4	0.28	0.37	6.00	1.52	6000	24.9

1) Without brake.
2) Mechanically permissible maximum speed.



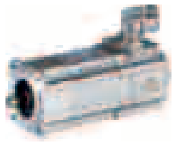
Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS19F14-	1425	32.0	27.0	86.0	4.00	9.90	8.60	31.0	335	95
MCS19F30-	3000	32.0	21.0	86.0	6.60	19.8	14.0	63.0	300	200
MCS19J14-	1425	51.0	40.0	129	6.00	15.2	12.3	45.0	330	95
MCS19J30-	3000	51.0	29.0	129	9.10	30.5	18.5	90.0	300	200
MCS19P14-	1350	64.0	51.0	190	7.20	17.5	14.3	60.0	330	90
MCS19P30-	3000	64.0	32.0	190	10.0	34.9	19.0	120	320	200

	$\eta_{100\,\%}$	J 1)	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} 2)	m 1)
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS19F14-	92.0	65.0	195	1.30	1.75	20.8	3.23	4000	23.0
MCS19F30-	93.0	65.0	97.2	0.32	0.44	5.20	1.62	4000	23.0
MCS19J14-	92.0	105	199	0.65	0.88	12.8	3.31	4000	30.0
MCS19J30-	93.0	105	99.5	0.16	0.22	3.20	1.65	4000	30.0
MCS19P14-	92.0	160	216	0.54	0.73	9.60	3.66	4000	40.0
MCS19P30-	93.0	160	108	0.14	0.18	2.40	1.83	4000	40.0

1) Without brake.
2) Mechanically permissible maximum speed.



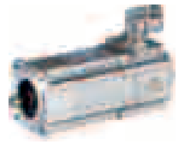
Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 230 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS06C41L	4050	0.80	0.60	2.40	0.25	2.50	2.50	10.8	125	270
MCS06C60L	6000	0.80	0.50	2.40	0.31	4.30	4.00	18.5	85	400
MCS06F41L	4050	1.50	1.20	4.40	0.51	2.90	2.90	10.5	165	270
MCS06F60L	6000	1.50	0.90	4.40	0.57	3.80	3.40	16.5	125	400
MCS06I41L	4050	2.00	1.50	6.20	0.64	3.10	2.90	11.8	175	270
MCS06I60L	6000	2.00	1.20	6.20	0.75	4.20	3.60	16.0	150	400
MCS09D41L	4050	3.30	2.30	9.50	1.00	5.30	4.60	20.0	165	270
MCS09D60L	6000	3.30	1.80	9.50	1.10	10.3	7.00	39.0	110	400
MCS09F38L	3750	4.20	3.10	15.0	1.20	6.00	5.00	30.0	160	250
MCS09F60L	6000	4.20	2.40	15.0	1.50	10.5	7.90	53.0	125	400
MCS09H41L	4050	5.50	3.80	20.0	1.60	8.50	6.80	40.0	160	270
MCS09H60L	6000	5.50	3.00	20.0	1.90	12.0	8.00	57.0	145	400
MCS09L41L	4050	7.50	4.50	32.0	1.90	12.4	8.40	64.0	145	270

	$\eta_{100\,\%}$	J [1]	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} [2]	m [1]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS06C41L	65.0	0.14	21.5	6.00	8.00	12.8	0.33	8000	1.80
MCS06C60L	70.0	0.14	12.5	2.20	2.90	4.30	0.19	8000	1.80
MCS06F41L	81.0	0.22	34.5	5.50	7.40	15.9	0.62	8000	2.20
MCS06F60L	82.0	0.22	22.2	2.30	3.00	6.90	0.40	8000	2.20
MCS06I41L	81.0	0.30	38.0	4.70	6.20	15.1	0.64	8000	2.90
MCS06I60L	84.0	0.30	28.5	2.50	3.40	9.30	0.48	8000	2.90
MCS09D41L	87.0	1.10	35.6	1.80	2.40	6.30	0.62	7000	4.30
MCS09D60L	87.0	1.10	18.3	0.45	0.61	1.70	0.32	7000	4.30
MCS09F38L	90.0	1.50	39.9	1.30	1.80	6.20	0.70	7000	5.20
MCS09F60L	91.0	1.50	22.8	0.42	0.56	2.00	0.40	7000	5.20
MCS09H41L	91.0	1.90	37.8	0.80	1.10	4.00	0.65	7000	6.10
MCS09H60L	91.0	1.90	26.6	0.36	0.48	2.00	0.46	7000	6.10
MCS09L41L	91.0	2.80	35.9	0.44	0.59	2.50	0.60	7000	7.90

[1] Without brake.
[2] Mechanically permissible maximum speed.



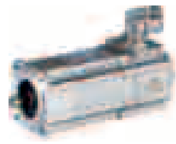
Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 230 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS12D20L	1950	6.40	5.50	18.0	1.10	5.50	5.20	20.0	175	130
MCS12D41L	4050	6.40	4.30	18.0	1.80	10.7	8.80	40.0	155	270
MCS12H15L	1500	11.4	10.0	29.0	1.60	8.20	7.80	24.0	158	100
MCS12H30L	3000	11.4	8.00	29.0	2.50	13.5	10.5	39.0	165	200
MCS12L20L	1950	15.0	13.5	56.0	2.80	12.4	11.8	57.0	165	130

	$\eta_{100\,\%}$	J [1)]	$KE_{LL\ 150\ °C}$	$R_{UV\ 20\ °C}$	$R_{UV\ 150\ °C}$	L_N	$Kt_{0\ 150\ °C}$	n_{max} [2)]	m [1)]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS12D20L	79.0	4.00	68.6	2.20	2.90	13.0	1.17	6000	6.40
MCS12D41L	84.0	4.00	35.0	0.55	0.75	3.40	0.60	6000	6.40
MCS12H15L	82.0	7.30	86.5	1.41	1.90	10.5	1.40	6000	9.50
MCS12H30L	87.0	7.30	53.0	0.50	0.67	4.00	0.86	6000	9.50
MCS12L20L	90.0	10.6	76.9	0.55	0.75	5.50	1.21	6000	12.6

1) Without brake.
2) Mechanically permissible maximum speed.



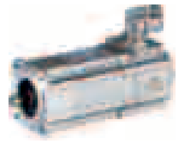
Rated data, forced ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS12D17-	1650	7.50	7.00	17.7	1.20	3.20	3.00	10.0	330	110
MCS12D35-	3525	7.50	6.00	17.7	2.20	6.40	5.60	20.0	300	235
MCS12H14-	1350	12.8	12.0	29.0	1.70	4.30	4.10	12.0	310	90
MCS12H34-	3375	12.8	10.5	29.0	3.70	8.50	7.50	24.0	320	225
MCS12L17-	1650	19.0	17.0	56.4	2.90	7.20	6.70	28.0	300	110
MCS12L39-	3900	19.0	14.0	56.4	5.70	14.4	11.7	57.0	295	260
MCS14D14-	1350	12.5	12.0	29.0	1.70	5.70	5.40	17.0	345	90
MCS14D30-	3000	12.5	10.5	29.0	3.30	11.4	9.70	33.0	325	200
MCS14H12-	1200	25.5	23.5	54.8	3.00	9.30	8.30	26.0	335	80
MCS14H28-	2775	25.5	20.5	54.8	6.00	18.4	15.0	52.0	325	185
MCS14L14-	1350	34.5	30.5	77.1	4.30	13.4	11.8	37.0	335	90
MCS14L30-	3000	34.5	25.5	77.1	8.00	26.7	20.8	75.0	310	200
MCS14P11-	1050	43.5	42.0	105	4.60	14.1	13.4	46.0	330	70
MCS14P26-	2625	43.5	33.0	105	9.10	28.3	21.9	92.0	325	175

	$\eta_{100\,\%}$	J 1)	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} 2)	m 1)
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS12D17-	75.0	4.00	137	8.72	11.8	52.2	2.34	6000	8.50
MCS12D35-	82.0	4.00	68.6	2.18	2.94	13.0	1.17	6000	8.50
MCS12H14-	80.0	7.30	173	5.72	7.72	42.1	2.98	6000	11.6
MCS12H34-	86.0	7.30	86.5	1.39	1.88	10.5	1.51	6000	11.6
MCS12L17-	90.0	10.6	149	2.22	2.99	21.8	2.64	6000	14.7
MCS12L39-	94.0	10.6	74.6	0.55	0.75	5.50	1.32	6000	14.7
MCS14D14-	84.0	8.10	129	4.00	5.40	49.8	2.19	6000	14.5
MCS14D30-	92.0	8.10	64.2	1.00	1.35	12.5	1.09	6000	14.5
MCS14H12-	87.0	14.2	153	2.08	2.81	34.1	2.75	6000	19.5
MCS14H28-	93.0	14.2	76.3	0.52	0.70	8.50	1.39	6000	19.5
MCS14L14-	88.0	23.4	152	1.21	1.64	22.0	2.57	6000	24.0
MCS14L30-	92.0	23.4	76.2	0.30	0.41	5.50	1.29	6000	24.0
MCS14P11-	86.0	34.7	179	1.10	1.49	23.9	3.08	6000	29.0
MCS14P26-	92.0	34.7	89.4	0.28	0.37	6.00	1.54	6000	29.0

1) Without brake.
2) Mechanically permissible maximum speed.



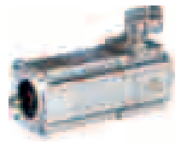
Rated data, forced ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MCS19F12-	1200	41.5	38.0	86.0	4.80	12.2	11.3	31.0	320	80
MCS19F29-	2850	41.5	32.5	86.0	9.70	24.5	20.1	63.0	320	190
MCS19J12-	1200	70.5	62.5	129	7.90	20.3	18.3	45.0	320	80
MCS19J29-	2850	70.5	50.5	129	15.1	40.6	31.0	90.0	315	190
MCS19P12-	1200	86.0	72.0	190	9.00	22.4	21.3	60.0	310	80
MCS19P29-	2850	86.0	53.0	190	15.8	44.7	29.5	120	315	190

	$\eta_{100\,\%}$	J [1)]	$KE_{LL\,150\,°C}$	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	L_N	$Kt_{0\,150\,°C}$	n_{max} [2)]	m [1)]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MCS19F12-	90.4	65.0	195	1.30	1.75	20.8	3.40	4000	29.0
MCS19F29-	94.7	65.0	97.2	0.32	0.44	5.20	1.69	4000	29.0
MCS19J12-	89.3	105	199	0.65	0.88	12.8	3.47	4000	36.0
MCS19J29-	92.8	105	99.5	0.16	0.22	3.20	1.74	4000	36.0
MCS19P12-	90.3	160	216	0.54	0.73	9.60	3.84	4000	46.0
MCS19P29-	93.4	160	108	0.14	0.18	2.40	1.92	4000	46.0

1) Without brake.
2) Mechanically permissible maximum speed.



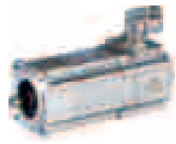
Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
06C41-	0.6	4050	1.3	0.25	M_0	0.8										
					M_N	0.6										
					$M_{0,max}$	2.4										
					M_{max}	2.4										
					n_{eto}	-										
06C60-	0.5	6000	2.4	0.31	M_0	0.6	0.8									
					M_N	0.4	0.5									
					$M_{0,max}$	1.5	2.3									
					M_{max}	1.5	2.3									
					n_{eto}	-	-									
06F41-	1.2	4050	1.5	0.51	M_0	1.5										
					M_N	1.2										
					$M_{0,max}$	4.4										
					M_{max}	4.4										
					n_{eto}	-										
06F60-	0.9	6000	2.5	0.57	M_0	1.0	1.5									
					M_N	0.7	0.9									
					$M_{0,max}$	3.0	4.3									
					M_{max}	3.0	4.3									
					n_{eto}	-	-									
06I41-	1.5	4050	1.6	0.64	M_0	2.0										
					M_N	1.5										
					$M_{0,max}$	6.2										
					M_{max}	6.2										
					n_{eto}	-										
06I60-	1.2	6000	2.9	0.75	M_0	1.1	1.8	2.0								
					M_N	0.8	1.2	1.2								
					$M_{0,max}$	3.3	5.5	6.2								
					M_{max}	3.3	5.5	6.2								
					n_{eto}	-	-	-								
09D41-	2.3	4050	2.3	1.00	M_0	2.4	3.3									
					M_N	1.9	2.3									
					$M_{0,max}$	6.3	9.5									
					M_{max}	6.3	9.5									
					n_{eto}	-	-									
09D60-	1.8	6000	3.8	1.10	M_0			3.1	3.3							
					M_N			1.8	1.8							
					$M_{0,max}$			8.0	9.5							
					M_{max}			8.0	9.5							
					n_{eto}			-	-							
09F38-	3.1	3750	2.5	1.20	M_0		4.2	4.2								
					M_N		3.1	3.1								
					$M_{0,max}$		11.6	14.9								
					M_{max}		11.6	14.9								
					n_{eto}		-	-								

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Drives 9400 HighLine

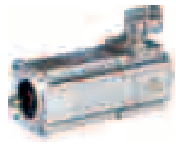
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
09F60-	2.4	6000	4.5	1.50	M_0			3.5	4.2	4.2	4.2					
					M_N			2.4	2.4	2.4	2.4					
					$M_{0,max}$			9.8	12.0	14.4	14.9					
					M_{max}			9.8	12.0	14.4	14.9					
					n_{eto}			-	-	-	-					
09H41-	3.8	4050	3.4	1.60	M_0		4.0	5.5	5.5							
					M_N		3.5	3.8	3.8							
					$M_{0,max}$		12.0	17.5	20.4							
					M_{max}		12.0	17.5	20.4							
					n_{eto}		-	-	-							
09H60-	3.0	6000	6.0	1.90	M_0				5.5	5.5	5.5	5.5				
					M_N				3.0	3.0	3.0	3.0				
					$M_{0,max}$				12.5	15.8	20.1	20.4				
					M_{max}				12.5	15.8	20.1	20.4				
					n_{eto}				-	-	-	-				
09L41-	4.5	4050	4.2	1.90	M_0			6.0	7.5	7.5						
					M_N			4.5	4.5	4.5						
					$M_{0,max}$			17.4	22.2	28.5						
					M_{max}			17.4	22.2	28.5						
					n_{eto}			-	-	-						
09L51-	3.6	5100	6.9	1.90	M_0				5.3	7.0	7.5	7.5	7.5			
					M_N				3.6	3.6	3.6	3.6	3.6			
					$M_{0,max}$				11.9	15.5	20.9	25.8	29.7			
					M_{max}				11.9	15.5	20.9	25.8	29.7			
					n_{eto}				-	-	-	-	-			
12D20-	5.5	1950	2.6	1.10	M_0	4.4	6.4									
					M_N	4.0	5.5									
					$M_{0,max}$	11.8	17.7									
					M_{max}	11.8	17.7									
					n_{eto}	-	-									
12D41-	4.3	4050	4.5	1.80	M_0			5.9	6.4							
					M_N			4.3	4.3							
					$M_{0,max}$			14.7	17.7							
					M_{max}			14.7	17.7							
					n_{eto}			-	-							
12H15-	10.0	1500	3.8	1.60	M_0		8.7	11.4								
					M_N		8.2	10.0								
					$M_{0,max}$		24.6	29.0								
					M_{max}		24.6	29.0								
					n_{eto}		-	-								
12H35-	7.5	3525	5.7	2.80	M_0			7.0	11.4	11.4	11.4					
					M_N			6.6	7.5	7.5	7.5					
					$M_{0,max}$			20.1	25.8	29.0	29.0					
					M_{max}			20.1	25.8	29.0	29.0					
					n_{eto}			-	-	-	-					

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



Selection tables, Servo Drives 9400 HighLine

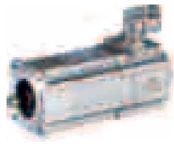
Non-ventilated motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
12L20-	13.5	1950	5.9	2.80	M_0			12.1	15.0	15.0	15.0					
					M_N			11.4	13.5	13.5	13.5					
					$M_{0,max}$			35.5	44.6	55.7	56.4					
					M_{max}			35.5	44.6	55.7	56.4					
					n_{eto}			-	-	-	-					
12L41-	11.0	4050	10.2	4.70	M_0				10.6	14.0	15.0	15.0	15.0			
					M_N				9.5	11.0	11.0	11.0	11.0			
					$M_{0,max}$				24.4	31.6	41.9	50.8	56.4			
					M_{max}				24.4	31.6	41.9	50.8	56.4			
					n_{eto}				-	-	-	-	-			
14D15-	9.2	1500	4.5	1.45	M_0			11.0	11.0							
					M_N			9.2	9.2							
					$M_{0,max}$			28.3	29.0							
					M_{max}			28.3	29.0							
					n_{eto}			-	-							
14D36-	7.5	3600	7.5	2.80	M_0				9.6	11.0	11.0					
					M_N				7.5	7.5	7.5					
					$M_{0,max}$				20.2	25.6	29.0					
					M_{max}				20.2	25.6	29.0					
					n_{eto}				-	-	-					
14H15-	16.0	1500	6.6	2.50	M_0			12.4	21.0	21.0	21.0					
					M_N			12.1	16.0	16.0	16.0					
					$M_{0,max}$			37.1	46.6	54.8	54.8					
					M_{max}			37.1	46.6	54.8	54.8					
					n_{eto}			-	-	-	-					
14H32-	14.0	3225	11.9	4.70	M_0					14.4	20.3	21.0	21.0			
					M_N					13.6	14.0	14.0	14.0			
					$M_{0,max}$					33.0	43.9	53.2	54.8			
					M_{max}					33.0	43.9	53.2	54.8			
					n_{eto}					-	-	-	-			
14L15-	23.0	1500	9.7	3.60	M_0				20.5	27.1	28.0					
					M_N				20.9	23.0	23.0					
					$M_{0,max}$				48.0	61.4	77.1					
					M_{max}				48.0	61.4	77.1					
					n_{eto}				-	-	-					
14L32-	17.2	3225	15.0	5.80	M_0						19.0	24.0	28.0	28.0	28.0	
					M_N						17.2	17.2	17.2	17.2	17.2	
					$M_{0,max}$						45.0	55.3	63.9	77.1	77.1	
					M_{max}						45.0	55.3	63.9	77.1	77.1	
					n_{eto}						-	-	-	-	-	
14P14-	30.0	1350	10.8	4.20	M_0				26.7	35.2	37.0	37.0				
					M_N				24.4	30.0	30.0	30.0				
					$M_{0,max}$				56.1	71.7	93.3	105.1				
					M_{max}				56.1	71.7	93.3	105.1				
					n_{eto}				-	-	-	-				

- ► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



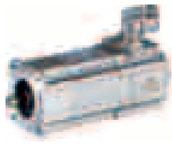
Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
14P32-	21.0	3225	15.6	7.10	M_0						24.8	31.4	37.0	37.0	37.0	
					M_N						21.0	21.0	21.0	21.0	21.0	
					$M_{0,max}$						52.5	64.6	74.7	92.2	105.1	
					M_{max}						52.5	64.6	74.7	92.2	105.1	
					n_{eto}						-	-	-	-	-	
19F14-	27.0	1425	8.6	4.00	M_0				28.4	32.0	32.0					
					M_N				27.0	27.0	27.0					
					$M_{0,max}$				62.1	78.9	86.0					
					M_{max}				62.1	78.9	86.0					
					n_{eto}				-	-	-					
19F30-	21.0	3000	14.0	6.60	M_0						26.3	32.0	32.0	32.0		
					M_N						21.0	21.0	21.0	21.0		
					$M_{0,max}$						56.6	70.2	81.6	86.0		
					M_{max}						56.6	70.2	81.6	86.0		
					n_{eto}						-	-	-	-		
19J14-	40.0	1425	12.3	6.00	M_0					38.9	51.0	51.0				
					M_N					37.7	40.0	40.0				
					$M_{0,max}$					85.0	114.4	129.0				
					M_{max}					85.0	114.4	129.0				
					n_{eto}					-	-	-				
19J30-	29.0	3000	18.5	9.10	M_0						27.3	34.4	49.2	51.0	51.0	
					M_N						25.6	29.0	29.0	29.0	29.0	
					$M_{0,max}$						60.8	75.9	88.9	112.9	129.0	
					M_{max}						60.8	75.9	88.9	112.9	129.0	
					n_{eto}						-	-	-	-	-	
19P14-	51.0	1350	14.3	7.20	M_0						59.6	64.0	64.0	64.0		
					M_N						51.0	51.0	51.0	51.0		
					$M_{0,max}$						128.4	159.9	186.6	190.0		
					M_{max}						128.4	159.9	186.6	190.0		
					n_{eto}						-	-	-	-		
19P30-	32.0	3000	19.0	10.00	M_0						29.9	37.8	53.9	64.0	64.0	64.0
					M_N						27.5	32.0	32.0	32.0	32.0	32.0
					$M_{0,max}$						65.7	83.6	98.5	126.6	152.5	187.2
					M_{max}						65.7	83.6	98.5	126.6	152.5	187.2
					n_{eto}						-	-	-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

- ► The data applies to a mains connection voltage of 3x230V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
06C41L	0.6	4050	2.6	0.25	M_0	0.6	0.8							
					M_N	0.5	0.6							
					$M_{0,max}$	1.5	2.3							
					M_{max}	1.5	2.3							
					n_{eto}	-	-							
06C60L	0.5	6000	4.0	0.31	M_0		0.6	0.8	0.8					
					M_N		0.4	0.5	0.5					
					$M_{0,max}$		1.5	2.2	2.4					
					M_{max}		1.5	2.2	2.4					
					n_{eto}		-	-	-					
06F41L	1.2	4050	2.9	0.51	M_0	1.0	1.5	1.5						
					M_N	0.8	1.2	1.2						
					$M_{0,max}$	2.7	4.2	4.4						
					M_{max}	2.7	4.2	4.4						
					n_{eto}	-	-	-						
06F60L	0.9	6000	3.8	0.57	M_0		1.2	1.5	1.5					
					M_N		0.8	0.9	0.9					
					$M_{0,max}$		3.1	4.3	4.4					
					M_{max}		3.1	4.3	4.4					
					n_{eto}		-	-	-					
06I41L	1.5	4050	3.2	0.64	M_0		2.0	2.0						
					M_N		1.5	1.5						
					$M_{0,max}$		5.4	6.2						
					M_{max}		5.4	6.2						
					n_{eto}		-	-						
06I60L	1.2	6000	3.8	0.75	M_0		1.5	2.0						
					M_N		1.0	1.2						
					$M_{0,max}$		4.4	6.2						
					M_{max}		4.4	6.2						
					n_{eto}		-	-						
09D41L	2.3	4050	4.6	1.00	M_0			3.1	3.3					
					M_N			2.3	2.3					
					$M_{0,max}$			8.0	9.5					
					M_{max}			8.0	9.5					
					n_{eto}			-	-					
09D60L	1.8	6000	7.0	1.10	M_0				2.8	3.3	3.3			
					M_N				1.8	1.8	1.8			
					$M_{0,max}$				5.7	7.3	9.5			
					M_{max}				5.7	7.3	9.5			
					n_{eto}				-	-	-			
09F38L	3.1	3750	5.0	1.20	M_0			3.5	4.2	4.2	4.2			
					M_N			3.1	3.1	3.1	3.1			
					$M_{0,max}$			9.8	12.0	13.8	15.0			
					M_{max}			9.8	12.0	13.8	15.0			
					n_{eto}			-	-	-	-			

- ► I... [A], M... [Nm], n... [r/min], P... [kW]

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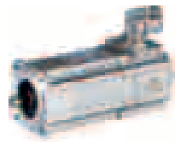

Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3x230V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
09F60L	2.4	6000	7.9	1.50	M_0				3.5	4.2	4.2	4.2	4.2	
					M_N				2.4	2.4	2.4	2.4	2.4	
					$M_{0,max}$				7.8	9.8	12.6	14.5	15.0	
					M_{max}				7.8	9.8	12.6	14.5	15.0	
					n_{eto}				-	-	-	-	-	
09H41L	3.8	4050	6.8	1.60	M_0				5.5	5.3	5.5	5.5		
					M_N				3.8	3.0	3.8	3.8		
					$M_{0,max}$				12.4	11.8	19.7	20.0		
					M_{max}				12.4	11.8	19.7	20.0		
					n_{eto}				-	-	-	-		
09H60L	3.0	6000	8.0	1.90	M_0				4.0	5.5	5.5	5.5	5.5	
					M_N				3.0	3.8	3.0	3.0	3.0	
					$M_{0,max}$				9.2	15.6	15.4	18.3	20.0	
					M_{max}				9.2	15.6	15.4	18.3	20.0	
					n_{eto}				-	-	-	-	-	
09L41L	4.5	4050	8.4	1.90	M_0				5.3	7.0	7.5	7.5	7.5	7.5
					M_N				4.5	4.5	4.5	4.5	4.5	4.5
					$M_{0,max}$				11.9	15.5	20.9	25.8	29.7	31.9
					M_{max}				11.9	15.5	20.9	25.8	29.7	31.9
					n_{eto}				-	-	-	-	-	-
12D20L	5.5	1950	5.2	1.10	M_0			5.9	6.4					
					M_N			5.3	5.5					
					$M_{0,max}$			14.9	17.7					
					M_{max}			14.9	17.7					
					n_{eto}			-	-					
12D41L	4.3	4050	8.8	1.80	M_0				5.3	6.4	6.4	6.4		
					M_N				4.3	4.3	4.3	4.3		
					$M_{0,max}$				10.6	13.6	17.7	17.9		
					M_{max}				10.6	13.6	17.7	17.9		
					n_{eto}				-	-	-	-		
12H15L	10.0	1500	7.6	1.60	M_0				11.4	11.4	10.0			
					M_N				10.0	10.0	11.4			
					$M_{0,max}$				25.8	29.0	29.0			
					M_{max}				25.8	29.0	29.0			
					n_{eto}				-	-	-			
12H30L	8.0	3000	10.5	2.50	M_0				7.4	9.8	11.4			
					M_N				6.7	8.0	8.0			
					$M_{0,max}$				16.4	21.5	29.0			
					M_{max}				16.4	21.5	29.0			
					n_{eto}				-	-	-			
12L20L	13.5	1950	11.8	2.80	M_0				10.6	14.0	15.0	15.0	15.0	
					M_N				10.1	13.3	13.5	13.5	13.5	
					$M_{0,max}$				24.4	31.5	41.8	50.5	56.0	
					M_{max}				24.4	31.5	41.8	50.5	56.0	
					n_{eto}				-	-	-	-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]

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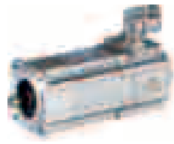


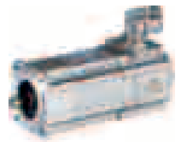
Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
12D17-	7.0	1650	3.0	1.20	M_0	4.4	7.3									
					M_N	4.0	7.0									
					$M_{0,max}$	11.8	17.7									
					M_{max}	11.8	17.7									
					n_{eto}	-	-									
12D35-	6.0	3525	5.6	2.20	M_0			5.9	7.5							
					M_N			5.4	6.0							
					$M_{0,max}$			14.7	17.7							
					M_{max}			14.7	17.7							
					n_{eto}			-	-							
12H14-	12.0	1350	4.1	1.70	M_0		8.7	12.8								
					M_N		8.2	12.0								
					$M_{0,max}$		24.6	29.0								
					M_{max}		24.6	29.0								
					n_{eto}		-	-								
12H34-	10.5	3375	7.5	3.70	M_0			7.0	12.8	12.8	12.8					
					M_N			6.6	10.5	10.5	10.5					
					$M_{0,max}$			20.1	25.8	29.0	29.0					
					M_{max}			20.1	25.8	29.0	29.0					
					n_{eto}			-	-	-	-					
12L17-	17.0	1650	6.7	2.90	M_0			12.1	19.0	19.0	19.0					
					M_N			11.4	17.0	17.0	17.0					
					$M_{0,max}$			35.5	44.6	55.7	56.4					
					M_{max}			35.5	44.6	55.7	56.4					
					n_{eto}			-	-	-	-					
12L39-	14.0	3900	11.7	5.70	M_0				10.6	15.3	19.0	19.0	19.0			
					M_N				9.5	13.9	14.0	14.0	14.0			
					$M_{0,max}$				24.4	31.6	41.9	50.8	56.4			
					M_{max}				24.4	31.6	41.9	50.8	56.4			
					n_{eto}				-	-	-	-	-			
14D14-	12.0	1350	5.4	1.70	M_0			11.0	12.5							
					M_N			11.0	12.0							
					$M_{0,max}$			28.3	29.0							
					M_{max}			28.3	29.0							
					n_{eto}			-	-							
14D30-	10.5	3000	9.7	3.30	M_0				9.6	12.5	12.5					
					M_N				9.5	10.5	10.5					
					$M_{0,max}$				20.2	25.6	29.0					
					M_{max}				20.2	25.6	29.0					
					n_{eto}				-	-	-					
14H12-	23.5	1200	8.3	3.00	M_0			12.4	24.1	25.5	25.5					
					M_N			12.1	23.5	23.5	23.5					
					$M_{0,max}$			37.1	46.6	54.8	54.8					
					M_{max}			37.1	46.6	54.8	54.8					
					n_{eto}			-	-	-	-					

► I... [A], M... [Nm], n... [r/min], P... [kW]



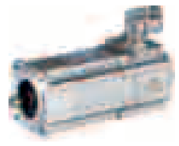
Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
14H28-	20.5	2775	15.0	6.00	M_0					16.1	20.5	25.5	25.5			
					M_N					15.9	20.5	20.5	20.5			
					$M_{0,max}$					33.0	43.9	53.2	54.8			
					M_{max}					33.0	43.9	53.2	54.8			
					n_{eto}					-	-	-	-			
14L14-	30.5	1350	11.8	4.30	M_0				20.5	30.0	34.5					
					M_N				20.5	30.0	30.5					
					$M_{0,max}$				48.0	61.4	77.1					
					M_{max}				48.0	61.4	77.1					
					n_{eto}				-	-	-					
14L30-	25.5	3000	20.8	8.00	M_0						21.0	26.6	34.5	34.5	34.5	
					M_N						20.0	25.3	25.5	25.5	25.5	
					$M_{0,max}$						45.0	55.3	63.9	77.1	77.1	
					M_{max}						45.0	55.3	63.9	77.1	77.1	
					n_{eto}						-	-	-	-	-	
14P11-	42.0	1050	13.4	4.60	M_0				26.7	36.4	43.5	43.5				
					M_N				24.4	36.4	42.0	42.0				
					$M_{0,max}$				56.1	71.7	93.3	105.1				
					M_{max}				56.1	71.7	93.3	105.1				
					n_{eto}				-	-	-	-				
14P26-	33.0	2625	21.9	9.10	M_0						24.8	31.4	43.5	43.5	43.5	
					M_N						24.6	31.0	33.0	33.0	33.0	
					$M_{0,max}$						52.5	64.6	74.7	92.2	105.1	
					M_{max}						52.5	64.6	74.7	92.2	105.1	
					n_{eto}						-	-	-	-	-	
19F12-	38.0	1200	11.3	4.80	M_0				29.9	39.5	41.5					
					M_N				29.3	38.0	38.0					
					$M_{0,max}$				62.1	78.9	86.0					
					M_{max}				62.1	78.9	86.0					
					n_{eto}				-	-	-					
19F29-	32.5	2850	20.1	9.70	M_0						26.3	34.9	41.5	41.5		
					M_N						26.0	32.5	32.5	32.5		
					$M_{0,max}$						56.6	70.2	81.6	86.0		
					M_{max}						56.6	70.2	81.6	86.0		
					n_{eto}						-	-	-	-		
19J12-	62.5	1200	18.3	7.90	M_0						56.6	70.5				
					M_N						55.7	62.5				
					$M_{0,max}$						114.4	129.0				
					M_{max}						114.4	129.0				
					n_{eto}						-	-				
19J29-	50.5	2850	31.0	15.10	M_0								49.2	66.7	70.5	
					M_N								47.9	50.5	50.5	
					$M_{0,max}$								88.9	112.9	129.0	
					M_{max}								88.9	112.9	129.0	
					n_{eto}								-	-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	**E0024**	**E0034**	**E0044**	**E0074**	**E0094**	**E0134**	**E0174**	**E0244**	**E0324**	**E0474**	**E0594**
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
MCS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0
19P12-	72.0	1200	21.3	9.00	M_0							79.1	86.0	86.0		
					M_N							69.6	72.0	72.0		
					$M_{0,max}$							159.9	186.6	190.0		
					M_{max}							159.9	186.6	190.0		
					n_{eto}							-	-	-		
19P29-	53.0	2850	29.5	15.80	M_0								56.5	73.9	86.0	86.0
					M_N								52.8	53.0	53.0	53.0
					$M_{0,max}$								98.5	126.6	152.5	187.2
					M_{max}								98.5	126.6	152.5	187.2
					n_{eto}								-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

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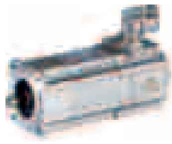

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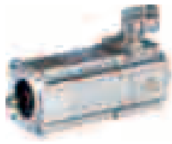


Selection tables, Inverter Drives 8400 TopLine

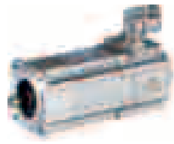
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□3714	□5514	□7514	□1124	□1524	□2224	□3024
					I_N	1.3	1.8	2.4	3.2	3.9	5.9	7.3
					$I_{0,max}$	2.0	2.7	3.6	4.8	5.9	8.4	11.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.6	3.6	4.8	6.4	7.8	11.8	14.6
					M_0	0.8	0.8	0.8	0.8	0.8		
					M_N	0.6	0.6	0.6	0.6	0.6		
06C41-	0.6	4050	1.3	0.25	$M_{0,max}$	1.4	1.7	2.3	2.4	2.4		
					M_{max}	1.4	1.7	2.3	2.4	2.4		
					n_{eto}	-	-	-	-	-		
					M_0			0.8	0.8	0.8	0.8	0.8
					M_N			0.5	0.5	0.5	0.5	0.5
06C60-	0.5	6000	2.4	0.31	$M_{0,max}$			1.3	1.6	2.0	2.4	2.4
					M_{max}			1.3	1.6	2.0	2.4	2.4
					n_{eto}			-	-	-	-	-
					M_0	1.3	1.5	1.5	1.5	1.5		
					M_N	1.0	1.2	1.2	1.2	1.2		
06F41-	1.2	4050	1.5	0.51	$M_{0,max}$	2.3	3.2	4.3	4.4	4.4		
					M_{max}	2.3	3.2	4.3	4.4	4.4		
					n_{eto}	-	-	-	-	-		
					M_0			1.2	1.5	1.5	1.5	1.5
					M_N			0.9	0.9	0.9	0.9	0.9
06F60-	0.9	6000	2.5	0.57	$M_{0,max}$			2.1	3.3	4.0	4.4	4.4
					M_{max}			2.1	3.3	4.0	4.4	4.4
					n_{eto}			-	-	-	-	-
					M_0	1.6	2.0	2.0	2.0	2.0		
					M_N	1.2	1.5	1.5	1.5	1.5		
06I41-	1.5	4050	1.6	0.64	$M_{0,max}$	2.9	4.0	5.3	6.2	6.2		
					M_{max}	2.9	4.0	5.3	6.2	6.2		
					n_{eto}	-	-	-	-	-		
					M_0				2.0	2.0	2.0	2.0
					M_N				1.2	1.2	1.2	1.2
06I60-	1.2	6000	2.9	0.75	$M_{0,max}$				3.6	4.4	5.7	5.7
					M_{max}				3.6	4.4	5.7	5.7
					n_{eto}				-	-	-	-
					M_0		2.2	3.1	3.3	3.3	3.3	3.3
					M_N		1.7	2.3	2.3	2.3	2.3	2.3
09D41-	2.3	4050	2.3	1.00	$M_{0,max}$		4.0	5.3	6.7	8.2	9.4	9.4
					M_{max}		4.0	5.3	6.7	8.2	9.4	9.4
					n_{eto}		-	-	-	-	-	-
					M_0				2.0	2.4	3.3	3.3
					M_N				1.5	1.8	1.8	1.8
09D60-	1.8	6000	3.8	1.10	$M_{0,max}$				3.5	4.2	6.3	7.8
					M_{max}				3.5	4.2	6.3	7.8
					n_{eto}				-	-	-	-
					M_0			3.4	4.2	4.2	4.2	4.2
					M_N			3.0	3.1	3.1	3.1	3.1
09F38-	3.1	3750	2.5	1.20	$M_{0,max}$			6.6	8.4	10.2	12.0	12.0
					M_{max}			6.6	8.4	10.2	12.0	12.0
					n_{eto}			-	-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



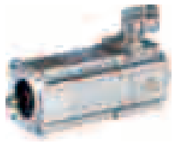
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034	E84AVTC					
9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0	I_N					
14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5	$I_{0,max}$					
19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0	I_{max}	P_N	I_N	n_N	M_N	MCS
								M_0	0.25	1.3	4050	0.6	06C41-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	0.31	2.4	6000	0.5	06C60-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	0.51	1.5	4050	1.2	06F41-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	0.57	2.5	6000	0.9	06F60-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	0.64	1.6	4050	1.5	06I41-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	0.75	2.9	6000	1.2	06I60-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
								M_0	1.00	2.3	4050	2.3	09D41-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
3.3	3.3							M_0	1.10	3.8	6000	1.8	09D60-
1.8	1.8							M_N					
9.1	9.3							$M_{0,max}$					
9.1	9.3							M_{max}					
-	-							n_{eto}					
								M_0	1.20	2.5	3750	3.1	09F38-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					

► I... [A], M... [Nm], n... [r/min], P... [kW]



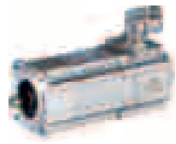
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□3714	□5514	□7514	□1124	□1524	□2224	□3024
					I_N	1.3	1.8	2.4	3.2	3.9	5.9	7.3
					$I_{0,max}$	2.0	2.7	3.6	4.8	5.9	8.4	11.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.6	3.6	4.8	6.4	7.8	11.8	14.6
09F60-	2.4	6000	4.5	1.50	M_0						4.2	4.2
					M_N						2.4	2.4
					$M_{0,max}$						7.8	9.6
					M_{max}						7.8	9.6
					n_{eto}						-	-
09H41-	3.8	4050	3.4	1.60	M_0				4.7	5.0	5.5	5.5
					M_N				3.6	3.8	3.8	3.8
					$M_{0,max}$				8.1	9.9	14.0	17.4
					M_{max}				8.1	9.9	14.0	17.4
					n_{eto}				-	-	-	-
09H60-	3.0	6000	6.0	1.90	M_0						4.4	4.5
					M_N						3.0	3.0
					$M_{0,max}$						7.5	9.3
					M_{max}						7.5	9.3
					n_{eto}						-	-
09L41-	4.5	4050	4.2	1.90	M_0				3.9	4.7	7.5	7.5
					M_N				3.4	4.2	4.5	4.5
					$M_{0,max}$				7.3	8.9	13.1	16.3
					M_{max}				7.3	8.9	13.1	16.3
					n_{eto}				-	-	-	-
09L51-	3.6	5100	6.9	1.90	M_0							4.2
					M_N							3.6
					$M_{0,max}$							8.3
					M_{max}							8.3
					n_{eto}							-
12D20-	5.5	1950	2.6	1.10	M_0			5.7	6.4	6.4	6.4	6.4
					M_N			5.1	5.5	5.5	5.5	5.5
					$M_{0,max}$			9.6	12.6	15.3	17.7	17.7
					M_{max}			9.6	12.6	15.3	17.7	17.7
					n_{eto}			-	-	-	-	-
12D41-	4.3	4050	4.5	1.80	M_0				3.8	4.6	6.4	6.4
					M_N				3.0	3.7	4.3	4.3
					$M_{0,max}$				6.4	7.8	11.4	14.0
					M_{max}				6.4	7.8	11.4	14.0
					n_{eto}				-	-	-	-
12H15-	10.0	1500	3.8	1.60	M_0				9.2	10.9	11.4	11.4
					M_N				8.4	10.0	10.0	10.0
					$M_{0,max}$				16.4	20.0	29.0	29.0
					M_{max}				16.4	20.0	29.0	29.0
					n_{eto}				-	-	-	-
12H35-	7.5	3525	5.7	2.80	M_0						9.8	9.8
					M_N						7.5	7.5
					$M_{0,max}$						15.2	18.8
					M_{max}						15.2	18.8
					n_{eto}						-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]



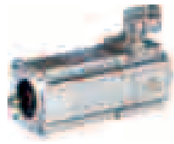
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034	E84AVTC					
9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0	I_N					
14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5	$I_{0,max}$					
19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0	I_{max}	P_N	I_N	n_N	M_N	MCS
4.2	4.2							M_0	1.50	4.5	6000	2.4	09F60-
2.4	2.4							M_N					
11.1	11.4							$M_{0,max}$					
11.1	11.4							M_{max}					
-	-							n_{eto}					
5.5	5.5							M_0	1.60	3.4	4050	3.8	09H41-
3.8	3.8							M_N					
19.6	20.1							$M_{0,max}$					
19.6	20.1							M_{max}					
-	-							n_{eto}					
5.5	5.5							M_0	1.90	6.0	6000	3.0	09H60-
3.0	3.0							M_N					
11.4	11.7							$M_{0,max}$					
11.4	11.7							M_{max}					
-	-							n_{eto}					
7.5	7.5							M_0	1.90	4.2	4050	4.5	09L41-
4.5	4.5							M_N					
20.3	20.8							$M_{0,max}$					
20.3	20.8							M_{max}					
-	-							n_{eto}					
7.5	7.5	7.5	7.5					M_0	1.90	6.9	5100	3.6	09L51-
3.6	3.6	3.6	3.6					M_N					
10.8	19.1	19.1	19.1					$M_{0,max}$					
10.8	19.1	19.1	19.1					M_{max}					
-	-	-	-					n_{eto}					
								M_0	1.10	2.6	1950	5.5	12D20-
								M_N					
								$M_{0,max}$					
								M_{max}					
								n_{eto}					
6.4	6.4							M_0	1.80	4.5	4050	4.3	12D41-
4.3	4.3							M_N					
16.9	17.3							$M_{0,max}$					
16.9	17.3							M_{max}					
-	-							n_{eto}					
11.4	11.4							M_0	1.60	3.8	1500	10.0	12H15-
10.0	10.0							M_N					
28.3	29.0							$M_{0,max}$					
28.3	29.0							M_{max}					
-	-							n_{eto}					
11.4	11.4							M_0	2.80	5.7	3525	7.5	12H35-
7.5	7.5							M_N					
23.5	24.1							$M_{0,max}$					
23.5	24.1							M_{max}					
-	-							n_{eto}					

- ► I... [A], M... [Nm], n... [r/min], P... [kW]



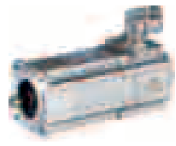
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□3714	□5514	□7514	□1124	□1524	□2224	□3024
					I_N	1.3	1.8	2.4	3.2	3.9	5.9	7.3
					$I_{0,max}$	2.0	2.7	3.6	4.8	5.9	8.4	11.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.6	3.6	4.8	6.4	7.8	11.8	14.6
12L20-	13.5	1950	5.9	2.80	M_0						15.0	15.0
					M_N						13.5	13.5
					$M_{0,max}$						27.4	33.9
					M_{max}						27.4	33.9
					n_{eto}						-	-
12L41-	11.0	4050	10.2	4.70	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
14D15-	9.2	1500	4.5	1.45	M_0				7.0	8.5	11.0	11.0
					M_N				6.6	8.0	9.2	9.2
					$M_{0,max}$				13.1	16.0	22.7	28.1
					M_{max}				13.1	16.0	22.7	28.1
					n_{eto}				-	-	-	-
14D36-	7.5	3600	7.5	2.80	M_0							8.0
					M_N							7.3
					$M_{0,max}$							15.2
					M_{max}							15.2
					n_{eto}							-
14H15-	16.0	1500	6.6	2.50	M_0							17.3
					M_N							16.0
					$M_{0,max}$							35.3
					M_{max}							35.3
					n_{eto}							-
14H32-	14.0	3225	11.9	4.70	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
14L15-	23.0	1500	9.7	3.60	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
14L32-	17.2	3225	15.0	5.80	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
14P14-	30.0	1350	10.8	4.20	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							

► I... [A], M... [Nm], n... [r/min], P... [kW]



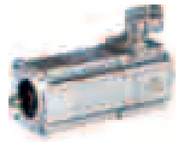
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034	E84AVTC					
9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0	I_N					
14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5	$I_{0,max}$					
19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0	I_{max}	P_N	I_N	n_N	M_N	MCS
15.0	15.0							M_0					
13.5	13.5							M_N					
40.8	41.9							$M_{0,max}$	2.80	5.9	1950	13.5	12L20-
40.8	41.9							M_{max}					
-	-							n_{eto}					
14.0	15.0	15.0	15.0	15.0				M_0					
10.2	11.0	11.0	11.0	11.0				M_N					
22.2	30.4	35.5	35.5	35.5				$M_{0,max}$	4.70	10.2	4050	11.0	12L41-
22.2	30.4	49.6	49.6	49.6				M_{max}					
-	-	-	-	-				n_{eto}					
11.0	11.0							M_0					
9.2	9.2							M_N					
28.3	29.0							$M_{0,max}$	1.45	4.5	1500	9.2	14D15-
28.3	29.0							M_{max}					
-	-							n_{eto}					
11.0	11.0	11.0	11.0					M_0					
7.5	7.5	7.5	7.5					M_N					
18.5	25.3	29.0	29.0					$M_{0,max}$	2.80	7.5	3600	7.5	14D36-
18.5	22.2	22.2	22.2					M_{max}					
-	-	-	-					n_{eto}					
21.0	21.0							M_0					
16.0	16.0							M_N					
42.8	43.9							$M_{0,max}$	2.50	6.6	1500	16.0	14H15-
42.8	43.9							M_{max}					
-	-							n_{eto}					
12.9	16.2	21.0	21.0	21.0				M_0					
11.2	14.0	14.0	14.0	14.0				M_N					
23.2	31.7	37.1	37.1	37.1				$M_{0,max}$	4.70	11.9	3225	14.0	14H32-
23.2	31.7	51.9	51.9	51.9				M_{max}					
-	-	-	-	-				n_{eto}					
27.4	28.0	28.0	28.0					M_0					
22.5	23.0	23.0	23.0					M_N					
43.8	52.9	52.9	52.9					$M_{0,max}$	3.60	9.7	1500	23.0	14L15-
43.8	60.0	73.8	73.8					M_{max}					
-	-	-	-					n_{eto}					
	15.2	27.4	27.4	28.0	28.0	28.0		M_0					
	14.9	17.2	17.2	17.2	17.2	17.2		M_N					
	31.3	39.7	52.9	52.9	52.9	52.9		$M_{0,max}$	5.80	15.0	3225	17.2	14L32-
	31.3	57.6	73.9	73.9	73.9	73.9		M_{max}					
	-	-	-	-	-	-		n_{eto}					
32.5	37.0	37.0	37.0	37.0				M_0					
26.4	30.0	30.0	30.0	30.0				M_N					
51.2	70.0	80.0	80.0	80.0				$M_{0,max}$	4.20	10.8	1350	30.0	14P14-
51.2	70.0	105.1	105.1	105.1				M_{max}					
-	-	-	-	-				n_{eto}					

► I... [A], M... [Nm], n... [r/min], P... [kW]



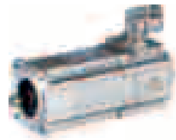
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□3714	□5514	□7514	□1124	□1524	□2224	□3024
					I_N	1.3	1.8	2.4	3.2	3.9	5.9	7.3
					$I_{0,max}$	2.0	2.7	3.6	4.8	5.9	8.4	11.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.6	3.6	4.8	6.4	7.8	11.8	14.6
14P32-	21.0	3225	15.6	7.10	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
19F14-	27.0	1425	8.6	4.00	M_0							23.6
					M_N							22.9
					$M_{0,max}$							45.9
					M_{max}							45.9
					n_{eto}							-
19F30-	21.0	3000	14.0	6.60	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
19J14-	40.0	1425	12.3	6.00	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
19J30-	29.0	3000	18.5	9.10	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
19P14-	51.0	1350	14.3	7.20	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							
19P30-	32.0	3000	19.0	10.00	M_0							
					M_N							
					$M_{0,max}$							
					M_{max}							
					n_{eto}							

► I... [A], M... [Nm], n... [r/min], P... [kW]



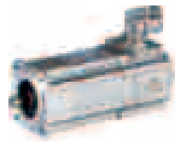
Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034	E84AVTC					
9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0	I_N					
14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5	$I_{0,max}$					
19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0	I_{max}	P_N	I_N	n_N	M_N	MCS
	19.8	35.8	35.8	37.0	37.0	37.0		M_0					
	17.5	21.0	21.0	21.0	21.0	21.0		M_N					
	36.5	46.3	61.8	61.8	61.8	61.8		$M_{0,max}$	7.10	15.6	3225	21.0	14P32-
	36.5	67.3	86.4	86.4	86.4	86.4		M_{max}					
	-	-	-	-	-	-		n_{eto}					
32.0	32.0	32.0	32.0					M_0					
27.0	27.0	27.0	27.0					M_N					
56.7	68.3	68.3	68.3					$M_{0,max}$	4.00	8.6	1425	27.0	19F14-
56.7	77.6	86.0	86.0					M_{max}					
-	-	-	-					n_{eto}					
	21.0	32.0	32.0	32.0				M_0					
	19.5	21.0	21.0	21.0				M_N					
	47.2	47.2	47.2	47.2				$M_{0,max}$	6.60	14.0	3000	21.0	19F30-
	38.9	68.3	68.3	68.3				M_{max}					
	-	-	-	-				n_{eto}					
	43.6	51.0	51.0	51.0				M_0					
	40.0	40.0	40.0	40.0				M_N					
	81.1	96.0	96.0	96.0				$M_{0,max}$	6.00	12.3	1425	40.0	19J14-
	81.1	129.0	129.0	129.0				M_{max}					
	-	-	-	-				n_{eto}					
			39.3	51.0	51.0	51.0	51.0	M_0					
			29.0	29.0	29.0	29.0	29.0	M_N					
			73.6	79.5	79.5	79.5	79.5	$M_{0,max}$	9.10	18.5	3000	29.0	19J30-
			110.4	127.6	127.6	127.6	127.6	M_{max}					
			-	-	-	-	-	n_{eto}					
	47.5	64.0	64.0	64.0				M_0					
	46.4	51.0	51.0	51.0				M_N					
	92.7	106.7	106.7	106.7				$M_{0,max}$	7.20	14.3	1350	51.0	19P14-
	92.7	155.5	155.5	155.5				M_{max}					
	-	-	-	-				n_{eto}					
			43.1	58.7	64.0	64.0	64.0	M_0					
			32.0	32.0	32.0	32.0	32.0	M_N					
			79.2	87.6	87.6	87.6	87.6	$M_{0,max}$	10.00	19.0	3000	32.0	19P30-
			118.6	144.3	144.3	144.3	144.3	M_{max}					
			-	-	-	-	-	n_{eto}					

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034
					I_N	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0
					$I_{0,max}$	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5
MCS	M_N	n_N	I_N	P_N	I_{max}	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0
12D17-	7.0	1650	3.0	1.20	M_0	7.5	7.5	7.5	7.5								
					M_N	7.0	7.0	7.0	7.0								
					$M_{0,max}$	12.6	15.3	17.7	17.7								
					M_{max}	12.6	15.3	17.7	17.7								
					n_{eto}	-	-	-	-								
12D35-	6.0	3525	5.6	2.20	M_0		4.6	7.5	7.5	7.5	7.5						
					M_N		3.7	6.0	6.0	6.0	6.0						
					$M_{0,max}$		7.8	11.4	14.0	16.9	17.3						
					M_{max}		7.8	11.4	14.0	16.9	17.3						
					n_{eto}		-	-	-	-	-						
12H14-	12.0	1350	4.1	1.70	M_0	8.9	10.9	12.8	12.8	12.8	12.8						
					M_N	8.5	10.3	12.0	12.0	12.0	12.0						
					$M_{0,max}$	16.4	20.0	29.0	29.0	28.3	29.0						
					M_{max}	16.4	20.0	29.0	29.0	28.3	29.0						
					n_{eto}	-	-	-	-	-	-						
12H34-	10.5	3375	7.5	3.70	M_0				10.2	12.8	12.8						
					M_N				10.0	10.5	10.5						
					$M_{0,max}$				18.8	23.5	24.1						
					M_{max}				18.8	23.5	24.1						
					n_{eto}				-	-	-						
12L17-	17.0	1650	6.7	2.90	M_0				18.5	19.0	19.0						
					M_N				17.0	17.0	17.0						
					$M_{0,max}$				33.9	40.8	41.9						
					M_{max}				33.9	40.8	41.9						
					n_{eto}				-	-	-						
12L39-	14.0	3900	11.7	5.70	M_0					17.2	17.2	19.0	19.0	19.0			
					M_N					14.0	14.0	14.0	14.0	14.0			
					$M_{0,max}$					22.2	30.4	35.5	35.5	35.5			
					M_{max}					22.2	30.4	49.6	49.6	49.6			
					n_{eto}					-	-	-	-	-			
14D14-	12.0	1350	5.4	1.70	M_0		8.5	12.5	12.5	12.5	12.5						
					M_N		8.0	12.0	12.0	12.0	12.0						
					$M_{0,max}$		16.0	22.7	28.1	28.3	29.0						
					M_{max}		16.0	22.7	28.1	28.3	29.0						
					n_{eto}		-	-	-	-	-						
14D30-	10.5	3000	9.7	3.30	M_0				7.7	12.2	12.5	12.5	12.5				
					M_N				7.0	9.8	10.0	10.0	10.0				
					$M_{0,max}$				15.2	18.5	25.3	29.0	29.0				
					M_{max}				15.2	18.5	22.2	22.2	22.2				
					n_{eto}				-	-	-	-	-				
14H12-	23.5	1200	8.3	3.00	M_0				18.0	25.5	25.5						
					M_N				17.9	23.5	23.5						
					$M_{0,max}$				35.3	42.8	43.9						
					M_{max}				35.3	42.8	43.9						
					n_{eto}				-	-	-						

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

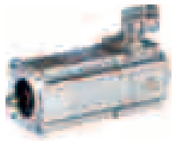
Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034
					I_N	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0
					$I_{0,max}$	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5
MCS	M_N	n_N	I_N	P_N	I_{max}	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0
14H28-	20.5	2775	15.0	6.00	M_0						16.2	25.5	25.5	25.5			
					M_N						16.1	20.5	20.5	20.5			
					$M_{0,max}$						31.7	37.1	37.1	37.1			
					M_{max}						31.7	51.9	51.9	51.9			
					n_{eto}						-	-	-	-			
14L14-	30.5	1350	11.8	4.30	M_0					26.9	33.4	34.5	34.5				
					M_N					24.6	30.5	30.5	30.5				
					$M_{0,max}$					43.8	52.9	52.9	52.9				
					M_{max}					43.8	60.0	73.8	73.8				
					n_{eto}					-	-	-	-				
14L30-	25.5	3000	20.8	8.00	M_0								27.4	34.5	34.5	34.5	
					M_N								25.5	25.5	25.5	25.5	
					$M_{0,max}$								52.9	52.9	52.9	52.9	
					M_{max}								73.9	73.9	73.9	73.9	
					n_{eto}								-	-	-	-	
14P11-	42.0	1050	13.4	4.60	M_0						38.9	43.5	43.5	43.5			
					M_N						38.8	42.0	42.0	42.0			
					$M_{0,max}$						70.0	80.0	80.0	80.0			
					M_{max}						70.0	105.1	105.1	105.1			
					n_{eto}						-	-	-	-			
14P26-	33.0	2625	21.9	9.10	M_0								35.8	43.5	43.5	43.5	
					M_N								33.0	33.0	33.0	33.0	
					$M_{0,max}$								66.0	86.4	86.4	86.4	
					M_{max}								86.4	86.4	86.4	86.4	
					n_{eto}								-	-	-	-	
19F12-	38.0	1200	11.3	4.80	M_0				23.6	34.9	41.5	41.5	41.5				
					M_N				22.9	31.9	38.0	38.0	38.0				
					$M_{0,max}$				45.9	56.7	68.3	68.3	68.3				
					M_{max}				45.9	56.7	77.6	86.0	86.0				
					n_{eto}				-	-	-	-	-				
19F29-	32.5	2850	20.1	9.70	M_0								39.9	41.5			
					M_N								32.5	32.5			
					$M_{0,max}$								47.2	47.2			
					M_{max}								68.3	68.3			
					n_{eto}								-	-			
19J12-	62.5	1200	18.3	7.90	M_0						43.6		70.5	70.5			
					M_N						43.4		62.5	62.5			
					$M_{0,max}$						81.1		96.0	96.0			
					M_{max}						81.1		129.0	129.0			
					n_{eto}						-		-	-			
19J29-	50.5	2850	31.0	15.10	M_0									55.5	70.5	70.5	70.5
					M_N									50.5	50.5	50.5	50.5
					$M_{0,max}$									87.6	87.6	87.6	87.6
					M_{max}									127.6	127.6	127.6	127.6
					n_{eto}									-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



Selection tables, Inverter Drives 8400 TopLine

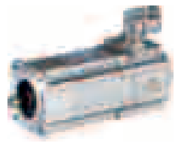
Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534	□1834	□2234	□3034
					I_N	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0	39.0	47.0	61.0
					$I_{0,max}$	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2	60.0	70.5	91.5
MCS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0	78.0	94.0	122.0
19P12-	72.0	1200	21.3	9.00	M_0						47.5		86.0	86.0			
					M_N						46.4		72.0	72.0			
					$M_{0,max}$						92.7		106.7	106.7			
					M_{max}						92.7		155.5	155.5			
					n_{eto}						-		-	-			
19P29-	53.0	2850	29.5	15.80	M_0									58.7	86.0	86.0	86.0
					M_N									53.0	53.0	53.0	53.0
					$M_{0,max}$									87.6	87.6	87.6	87.6
					M_{max}									144.3	144.3	144.3	144.3
					n_{eto}									-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



Selection tables, Servo Drives ECS

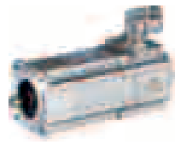
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
06C41-	0.6	4050	1.3	0.25	M_0	0.8					
					M_N	0.6					
					$M_{0,max}$	1.2					
					M_{max}	1.9					
					n_{eto}	2747					
06C60-	0.5	6000	2.4	0.31	M_0	0.6	0.8				
					M_N	0.4	0.5				
					$M_{0,max}$	0.6	1.2				
					M_{max}	1.0	1.9				
					n_{eto}	7000	6814				
06F41-	1.2	4050	1.5	0.51	M_0	1.5					
					M_N	1.2					
					$M_{0,max}$	2.0					
					M_{max}	3.6					
					n_{eto}	1902					
06F60-	0.9	6000	2.5	0.57	M_0	1.0	1.5				
					M_N	0.7	0.9				
					$M_{0,max}$	1.0	2.0				
					M_{max}	1.8	3.7				
					n_{eto}	7000	4602				
06I41-	1.5	4050	1.6	0.64	M_0	2.0	2.0				
					M_N	1.5	1.5				
					$M_{0,max}$	2.6	5.0				
					M_{max}	4.4	6.2				
					n_{eto}	1898	1384				
06I60-	1.2	6000	2.9	0.75	M_0	1.2	2.0	2.0			
					M_N	0.8	1.2	1.2			
					$M_{0,max}$	1.3	2.6	5.2			
					M_{max}	2.2	4.7	6.2			
					n_{eto}	6407	4200	3157			
09D41-	2.3	4050	2.3	1.00	M_0		3.3	3.3			
					M_N		2.3	2.3			
					$M_{0,max}$		5.0	8.8			
					M_{max}		8.0	9.4			
					n_{eto}		2361	2008			
09D60-	1.8	6000	3.8	1.10	M_0		2.5	3.3			
					M_N		1.8	1.8			
					$M_{0,max}$		2.5	4.9			
					M_{max}		4.4	8.0			
					n_{eto}		7000	5217			
09F38-	3.1	3750	2.5	1.20	M_0		4.2	4.2			
					M_N		3.1	3.1			
					$M_{0,max}$		6.2	10.8			
					M_{max}		9.8	14.9			
					n_{eto}		2589	1737			

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



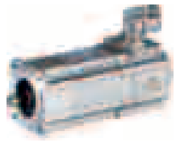
Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
09F60-	2.4	6000	4.5	1.50	M_0		2.8	4.2	4.2		
					M_N		2.1	2.4	2.4		
					$M_{0,max}$		3.2	6.1	10.8		
					M_{max}		5.4	9.8	14.9		
					n_{eto}		7000	5906	3715		
09H41-	3.8	4050	3.4	1.60	M_0		5.2	5.5			
					M_N		3.8	3.8			
					$M_{0,max}$		5.9	11.1			
					M_{max}		9.9	17.5			
					n_{eto}		3675	2231			
09H60-	3.0	6000	6.0	1.90	M_0			5.2	5.5	5.5	
					M_N			3.0	3.0	3.0	
					$M_{0,max}$			5.9	11.0	15.5	
					M_{max}			9.9	17.5	20.4	
					n_{eto}			7000	5061	4375	
09L41-	4.5	4050	4.2	1.90	M_0		4.8	7.5	7.5		
					M_N		4.3	4.5	4.5		
					$M_{0,max}$		5.2	10.3	19.5		
					M_{max}		9.1	17.4	31.9		
					n_{eto}		4450	3188	1878		
09L51-	3.6	5100	6.9	1.90	M_0			4.8	7.5	7.5	7.5
					M_N			3.6	3.6	3.6	3.6
					$M_{0,max}$			5.2	10.3	15.1	19.6
					M_{max}			9.1	17.5	25.1	31.9
					n_{eto}			7000	7000	5647	4076
12D20-	5.5	1950	2.6	1.10	M_0	4.7	6.4	6.4			
					M_N	4.2	5.5	5.5			
					$M_{0,max}$	4.6	9.1	17.0			
					M_{max}	8.0	15.3	17.7			
					n_{eto}	1730	1089	919			
12D41-	4.3	4050	4.5	1.80	M_0		4.7	6.4			
					M_N		3.8	4.3			
					$M_{0,max}$		4.6	8.8			
					M_{max}		7.8	14.7			
					n_{eto}		3902	2433			
12H15-	10.0	1500	3.8	1.60	M_0		11.2	11.4			
					M_N		10.0	10.0			
					$M_{0,max}$		11.9	22.6			
					M_{max}		20.1	29.0			
					n_{eto}		1220	918			
12H35-	7.5	3525	5.7	2.80	M_0		5.6	11.2	11.4		
					M_N		5.3	7.5	7.5		
					$M_{0,max}$		6.0	11.8	22.5		
					M_{max}		10.4	20.1	29.0		
					n_{eto}		3850	2838	2092		

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Drives ECS

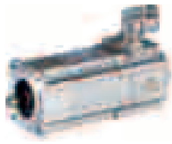
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
12L20-	13.5	1950	5.9	2.80	M_0			15.0	15.0		
					M_N			13.5	13.5		
					$M_{0,max}$			21.4	39.4		
					M_{max}			35.5	56.4		
					n_{eto}			1324	863		
12L41-	11.0	4050	10.2	4.70	M_0			9.7	15.0	15.0	15.0
					M_N			8.6	11.0	11.0	11.0
					$M_{0,max}$			10.8	21.3	30.8	39.5
					M_{max}			19.0	35.5	49.6	56.4
					n_{eto}			4450	3013	2236	1907
14D15-	9.2	1500	4.5	1.45	M_0		8.8	11.0			
					M_N		8.2	9.2			
					$M_{0,max}$		9.6	17.9			
					M_{max}		15.9	28.3			
					n_{eto}		1141	689			
14D36-	7.5	3600	7.5	2.80	M_0			8.8	11.0		
					M_N			7.5	7.5		
					$M_{0,max}$			9.5	17.8		
					M_{max}			15.9	28.3		
					n_{eto}			2496	1614		
14H15-	16.0	1500	6.6	2.50	M_0			19.8	21.0		
					M_N			16.0	16.0		
					$M_{0,max}$			22.3	41.2		
					M_{max}			37.1	54.8		
					n_{eto}			920	667		
14H32-	14.0	3225	11.9	4.70	M_0				15.8	21.0	21.0
					M_N				14.0	14.0	14.0
					$M_{0,max}$				22.2	32.1	41.3
					M_{max}				37.1	51.9	54.8
					n_{eto}				1953	1471	1409
14L15-	23.0	1500	9.7	3.60	M_0			18.7	28.0	28.0	
					M_N			19.0	23.0	23.0	
					$M_{0,max}$			21.9	42.1	59.9	
					M_{max}			37.6	68.5	77.1	
					n_{eto}			1284	828	767	
14L32-	17.2	3225	15.0	5.80	M_0				14.8	19.8	23.3
					M_N				14.6	17.2	17.2
					$M_{0,max}$				21.8	32.4	42.2
					M_{max}				37.6	53.9	68.5
					n_{eto}				2801	2096	1757
14P14-	30.0	1350	10.8	4.20	M_0				37.0	37.0	37.0
					M_N				30.0	30.0	30.0
					$M_{0,max}$				49.1	70.0	88.4
					M_{max}				80.0	105.1	105.1
					n_{eto}				710	573	573

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



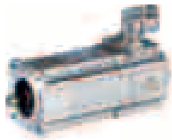
Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
14P32-	21.0	3225	15.6	7.10	M_0				19.3	25.9	30.5
					M_N				17.1	21.0	21.0
					$M_{0,max}$				25.4	37.9	49.3
					M_{max}				43.9	63.0	80.0
					n_{eto}				2469	1829	1495
19F14-	27.0	1425	8.6	4.00	M_0			25.9	32.0		
					M_N			25.1	27.0		
					$M_{0,max}$			28.6	54.6		
					M_{max}			48.9	86.0		
					n_{eto}			1204	746		
19F30-	21.0	3000	14.0	6.60	M_0				20.5	27.5	32.0
					M_N				19.0	21.0	21.0
					$M_{0,max}$				27.2	40.5	53.0
					M_{max}				47.2	68.3	86.0
					n_{eto}				2774	2033	1653
19J14-	40.0	1425	12.3	6.00	M_0				42.6	51.0	
					M_N				40.0	40.0	
					$M_{0,max}$				58.9	82.8	
					M_{max}				96.0	129.0	
					n_{eto}				1063	839	
19J30-	29.0	3000	18.5	9.10	M_0					28.4	33.4
					M_N					26.6	29.0
					$M_{0,max}$					42.6	56.9
					M_{max}					73.8	96.0
					n_{eto}					2850	2323
19P14-	51.0	1350	14.3	7.20	M_0				46.4	62.2	64.0
					M_N				45.3	51.0	51.0
					$M_{0,max}$				64.6	91.5	120.1
					M_{max}				106.7	155.5	190.0
					n_{eto}				1227	996	870
19P30-	32.0	3000	19.0	10.00	M_0					31.2	36.7
					M_N					28.6	32.0
					$M_{0,max}$					45.8	61.1
					M_{max}					81.2	106.7
					n_{eto}					2938	2715

► I... [A], M... [Nm], n... [r/min], P... [kW]



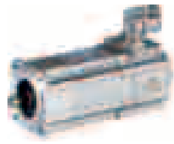
Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3x230V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
06C41L	0.6	4050	2.6	0.25	M_0	0.6	0.8				
					M_N	0.5	0.6				
					$M_{0,max}$	0.6	1.1				
					M_{max}	1.0	1.9				
					n_{eto}	6298	2835				
06C60L	0.5	6000	4.0	0.31	M_0		0.7	0.8			
					M_N		0.5	0.5			
					$M_{0,max}$		0.7	1.3			
					M_{max}		1.2	2.2			
					n_{eto}		7000	1149			
06F41L	1.2	4050	2.9	0.51	M_0	1.0	1.5	1.5			
					M_N	0.8	1.2	1.2			
					$M_{0,max}$	1.2	2.1	3.9			
					M_{max}	1.9	3.5	4.4			
					n_{eto}	3838	2118	2831			
06F60L	0.9	6000	3.8	0.57	M_0		1.5	1.5			
					M_N		0.9	0.9			
					$M_{0,max}$		1.5	2.9			
					M_{max}		2.6	4.3			
					n_{eto}		6138	3182			
06I41L	1.5	4050	3.2	0.64	M_0	1.3	2.0	2.0			
					M_N	1.0	1.5	1.5			
					$M_{0,max}$	1.4	2.8	5.0			
					M_{max}	2.4	4.4	6.2			
					n_{eto}	3549	1947	2831			
06I60L	1.2	6000	3.8	0.75	M_0		1.9	2.0			
					M_N		1.2	1.2			
					$M_{0,max}$		2.1	4.1			
					M_{max}		3.6	6.2			
					n_{eto}		3417	1149			
09D41L	2.3	4050	4.6	1.00	M_0		2.5	3.3	3.3		
					M_N		2.0	2.3	2.3		
					$M_{0,max}$		2.5	4.9	8.8		
					M_{max}		4.4	8.0	9.5		
					n_{eto}		4091	2547	2170		
09D60L	1.8	6000	7.0	1.10	M_0			2.6	3.3	3.3	
					M_N			1.8	1.8	1.8	
					$M_{0,max}$			2.6	5.0	7.1	
					M_{max}			4.5	8.1	9.5	
					n_{eto}			7000	5373	4626	
09F38L	3.1	3750	5.0	1.20	M_0			4.2	4.2		
					M_N			3.1	3.1		
					$M_{0,max}$			6.1	10.8		
					M_{max}			9.8	15.0		
					n_{eto}			1149	1951		

► I... [A], M... [Nm], n... [r/min], P... [kW]



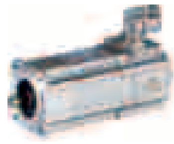
Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3x230V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
09F60L	2.4	6000	7.9	1.50	M_0			3.2	4.2	4.2	4.2
					M_N			2.4	2.4	2.4	2.4
					$M_{0,max}$			3.6	6.8	9.6	11.9
					M_{max}			6.1	10.9	14.3	15.0
					n_{eto}			6985	3448	2612	2397
09H41L	3.8	4050	6.8	1.60	M_0			5.2	5.5	5.5	
					M_N			3.8	3.8	3.8	
					$M_{0,max}$			5.9	11.0	15.3	
					M_{max}			9.9	17.2	20.0	
					n_{eto}			1149	2138	1852	
09H60L	3.0	6000	8.0	1.90	M_0			3.7	5.5	5.5	5.5
					M_N			3.0	3.0	3.0	3.0
					$M_{0,max}$			4.1	8.0	11.5	14.5
					M_{max}			7.2	13.2	17.9	20.0
					n_{eto}			1149	4081	2984	2695
09L41L	4.5	4050	8.4	1.90	M_0			4.8	7.5	7.5	7.5
					M_N			4.3	4.5	4.5	4.5
					$M_{0,max}$			5.2	10.3	15.1	19.6
					M_{max}			9.1	17.5	25.1	31.9
					n_{eto}			4562	3243	2497	1909
12D20L	5.5	1950	5.2	1.10	M_0		4.7	6.4			
					M_N		4.2	5.5			
					$M_{0,max}$		4.6	9.0			
					M_{max}		8.0	14.9			
					n_{eto}		1878	1181			
12D41L	4.3	4050	8.8	1.80	M_0			4.8	6.4	6.4	
					M_N			3.9	4.3	4.3	
					$M_{0,max}$			4.6	9.2	13.3	
					M_{max}			8.1	15.2	17.9	
					n_{eto}			4102	2535	2187	
12H15L	10.0	1500	7.6	1.60	M_0			11.2	11.4		
					M_N			10.0	10.0		
					$M_{0,max}$			11.8	22.5		
					M_{max}			20.1	29.0		
					n_{eto}			1098	827		
12H30L	8.0	3000	10.5	2.50	M_0			6.8	10.7	11.4	
					M_N			6.1	8.0	8.0	
					$M_{0,max}$			7.2	14.3	20.9	
					M_{max}			12.7	24.3	29.0	
					n_{eto}			2831	1849	1591	
12L20L	13.5	1950	11.8	2.80	M_0				15.0	15.0	15.0
					M_N				13.5	13.5	13.5
					$M_{0,max}$				21.3	30.7	39.4
					M_{max}				35.4	49.3	56.0
					n_{eto}				1307	1004	866

► I... [A], M... [Nm], n... [r/min], P... [kW]



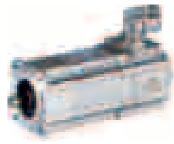
Selection tables, Servo Drives ECS

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
12D17-	7.0	1650	3.0	1.20	M_0	4.7	7.5	7.5			
					M_N	4.2	7.0	7.0			
					$M_{0,max}$	4.6	9.1	17.0			
					M_{max}	8.0	15.3	17.7			
					n_{eto}	1730	1089	919			
12D35-	6.0	3525	5.6	2.20	M_0		4.7	7.5			
					M_N		3.8	6.0			
					$M_{0,max}$		4.6	8.8			
					M_{max}		7.8	14.7			
					n_{eto}		3902	2433			
12H14-	12.0	1350	4.1	1.70	M_0		11.2	12.8			
					M_N		10.6	12.0			
					$M_{0,max}$		11.9	22.6			
					M_{max}		20.1	29.0			
					n_{eto}		1220	918			
12H34-	10.5	3375	7.5	3.70	M_0		5.6	11.2	12.8		
					M_N		5.3	10.0	7.5		
					$M_{0,max}$		6.0	11.8	22.5		
					M_{max}		10.4	20.1	29.0		
					n_{eto}		3850	2838	2092		
12L17-	17.0	1650	6.7	2.90	M_0			19.0	19.0		
					M_N			17.0	17.0		
					$M_{0,max}$			21.4	39.4		
					M_{max}			35.5	56.4		
					n_{eto}			1324	863		
12L39-	14.0	3900	11.7	5.70	M_0			9.7	16.7	19.0	19.0
					M_N			8.6	14.0	14.0	14.0
					$M_{0,max}$			10.8	21.3	30.8	39.5
					M_{max}			19.0	35.5	49.6	56.4
					n_{eto}			4450	3013	2236	1907
14D14-	12.0	1350	5.4	1.70	M_0		8.8	12.5			
					M_N		8.2	12.0			
					$M_{0,max}$		9.6	17.9			
					M_{max}		15.9	28.3			
					n_{eto}		1141	689			
14D30-	10.5	3000	9.7	3.30	M_0			8.8	11.4		
					M_N			8.6	9.7		
					$M_{0,max}$			9.5	17.8		
					M_{max}			15.9	28.3		
					n_{eto}			2496	1614		
14H12-	23.5	1200	8.3	3.00	M_0			19.8	25.5		
					M_N			19.6	23.5		
					$M_{0,max}$			22.3	41.2		
					M_{max}			37.1	54.8		
					n_{eto}			920	667		

► I... [A], M... [Nm], n... [r/min], P... [kW]



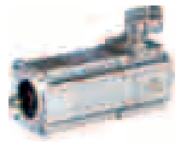
Selection tables, Servo Drives ECS

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	M_N	n_N	I_N	P_N	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
14H28-	20.5	2775	15.0	6.00	M_0				15.8	23.5	25.5
					M_N				15.6	20.5	20.5
					$M_{0,max}$				22.2	32.1	41.3
					M_{max}				37.1	51.9	54.8
					n_{eto}				1953	1471	1409
14L14-	30.5	1350	11.8	4.30	M_0			18.7	32.7	34.5	
					M_N			19.0	30.5	30.5	
					$M_{0,max}$			21.9	42.1	59.9	
					M_{max}			37.6	68.5	77.1	
					n_{eto}			1284	828	767	
14L30-	25.5	3000	20.8	8.00	M_0					19.8	23.3
					M_N					19.7	23.3
					$M_{0,max}$					32.4	42.2
					M_{max}					53.9	68.5
					n_{eto}					2096	1757
14P11-	42.0	1050	13.4	4.60	M_0				39.1	43.5	43.5
					M_N				38.9	42.0	42.0
					$M_{0,max}$				49.1	70.0	88.4
					M_{max}				80.0	105.1	105.1
					n_{eto}				710	573	573
14P26-	33.0	2625	21.9	9.10	M_0					25.9	30.5
					M_N					25.6	30.1
					$M_{0,max}$					37.9	49.3
					M_{max}					63.0	80.0
					n_{eto}					1829	1495
19F12-	38.0	1200	11.3	4.80	M_0			25.9	41.5		
					M_N			25.1	38.0		
					$M_{0,max}$			28.6	54.6		
					M_{max}			48.9	86.0		
					n_{eto}			1204	746		
19F29-	32.5	2850	20.1	9.70	M_0					27.5	33.9
					M_N					27.4	32.5
					$M_{0,max}$					40.5	53.0
					M_{max}					68.3	86.0
					n_{eto}					2033	1653
19J12-	62.5	1200	18.3	7.90	M_0					59.0	69.4
					M_N					58.1	62.5
					$M_{0,max}$					82.8	82.8
					M_{max}					129.0	129.0
					n_{eto}					839	839
19J29-	50.5	2850	31.0	15.10	M_0						34.3
					M_N						32.6
					$M_{0,max}$						56.9
					M_{max}						96.0
					n_{eto}						2323

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Drives ECS

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	004C□B	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	2.0	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	2.3	4.6	9.1	18.1	27.2	36.3
MCS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	4.0	8.0	16.0	32.0	48.0	64.0
19P12-	72.0	1200	21.3	9.00	M_0					62.2	76.8
					M_N					57.5	67.6
					$M_{0,max}$					91.5	120.1
					M_{max}					155.5	190.0
					n_{eto}					996	870
19P29-	53.0	2850	29.5	15.80	M_0						36.7
					M_N						35.9
					$M_{0,max}$						61.1
					M_{max}						106.7
					n_{eto}						2715

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1

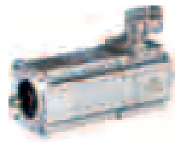
Selection tables, Servo Inverter 9300

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9321-E□	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	1.5	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	2.3	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.3	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
06C41-	0.6	4050	1.3	0.25	M_0	0.8	0.8	0.8						
					M_N	0.6	0.6	0.6						
					$M_{0,max}$	1.2	1.8	2.4						
					M_{max}	1.2	1.8	2.4						
					n_{eto}	4635	2871	2019						
06C60-	0.5	6000	2.4	0.31	M_0		0.8	0.8	0.8					
					M_N		0.5	0.5	0.5					
					$M_{0,max}$		1.0	1.5	2.4					
					M_{max}		1.0	1.5	2.4					
					n_{eto}		7000	7000	5368					
06F41-	1.2	4050	1.5	0.51	M_0	1.5	1.5	1.5						
					M_N	1.2	1.2	1.2						
					$M_{0,max}$	2.0	3.4	4.4						
					M_{max}	2.0	3.4	4.4						
					n_{eto}	2819	1973	1562						
06F60-	0.9	6000	2.5	0.57	M_0		1.3	1.5	1.5					
					M_N		0.9	0.9	0.9					
					$M_{0,max}$		1.7	3.0	4.4					
					M_{max}		1.7	3.0	4.4					
					n_{eto}		7000	5714	3773					
06I41-	1.5	4050	1.6	0.64	M_0	1.8	2.0	2.0						
					M_N	1.4	1.5	1.5						
					$M_{0,max}$	2.6	4.2	6.2						
					M_{max}	2.6	4.2	6.2						
					n_{eto}	2994	1980	1384						
06I60-	1.2	6000	2.9	0.75	M_0		1.5	2.0	2.0					
					M_N		1.0	1.2	1.2					
					$M_{0,max}$		2.1	3.3	5.7					
					M_{max}		2.1	3.3	5.7					
					n_{eto}		7000	5486	3414					
09D41-	2.3	4050	2.3	1.00	M_0		3.1	3.3	3.3					
					M_N		2.3	2.3	2.3					
					$M_{0,max}$		4.2	6.2	9.4					
					M_{max}		4.2	6.2	9.4					
					n_{eto}		4895	2937	2008					
09D60-	1.8	6000	3.8	1.10	M_0			2.4	3.3	3.3				
					M_N			1.8	1.8	1.8				
					$M_{0,max}$			3.2	5.6	9.3				
					M_{max}			3.2	5.6	9.3				
					n_{eto}			7000	7000	4492				
09F38-	3.1	3750	2.5	1.20	M_0		3.5	4.2	4.2					
					M_N		3.1	3.1	3.1					
					$M_{0,max}$		5.2	7.7	12.0					
					M_{max}		5.2	7.7	12.0					
					n_{eto}		4000	3250	2173					

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Inverter 9300

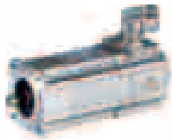
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9321-E□	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	1.5	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	2.3	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.3	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
09F60-	2.4	6000	4.5	1.50	M_0				4.2	4.2				
					M_N				2.4	2.4				
					$M_{0,max}$				6.9	11.4				
					M_{max}				6.9	11.4				
					n_{eto}				7000	5035				
09H41-	3.8	4050	3.4	1.60	M_0			5.0	5.5	5.5				
					M_N			3.8	3.8	3.8				
					$M_{0,max}$			7.5	12.5	20.1				
					M_{max}			7.5	12.5	20.1				
					n_{eto}			4250	2977	1988				
09H60-	3.0	6000	6.0	1.90	M_0				4.5	5.5				
					M_N				3.0	3.0				
					$M_{0,max}$				6.7	11.7				
					M_{max}				6.7	11.7				
					n_{eto}				7000	7000				
09L41-	4.5	4050	4.2	1.90	M_0			4.7	7.5	7.5				
					M_N			4.2	4.5	4.5				
					$M_{0,max}$			6.7	11.7	20.8				
					M_{max}			6.7	11.7	20.8				
					n_{eto}			4450	4154	2796				
09L51-	3.6	5100	6.9	1.90	M_0				4.2	7.5	7.5			
					M_N				3.6	3.6	3.6			
					$M_{0,max}$				6.0	11.1	13.2			
					M_{max}				6.0	11.1	19.1			
					n_{eto}				7000	7000	7000			
12D20-	5.5	1950	2.6	1.10	M_0		5.9	6.4	6.4					
					M_N		5.3	5.5	5.5					
					$M_{0,max}$		7.6	11.6	17.7					
					M_{max}		7.6	11.6	17.7					
					n_{eto}		1790	1358	919					
12D41-	4.3	4050	4.5	1.80	M_0			4.6	6.4	6.4				
					M_N			3.7	4.3	4.3				
					$M_{0,max}$			5.9	10.1	17.3				
					M_{max}			5.9	10.1	17.3				
					n_{eto}			4344	3275	2116				
12H15-	10.0	1500	3.8	1.60	M_0			10.9	11.4	11.4				
					M_N			10.0	10.0	10.0				
					$M_{0,max}$			15.1	25.8	29.0				
					M_{max}			15.1	25.8	29.0				
					n_{eto}			1676	1013	918				
12H35-	7.5	3525	5.7	2.80	M_0				9.8	11.4				
					M_N				7.5	7.5				
					$M_{0,max}$				13.5	24.1				
					M_{max}				13.5	24.1				
					n_{eto}				3618	2447				

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



Selection tables, Servo Inverter 9300

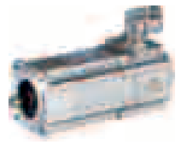
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9321-E□	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	1.5	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	2.3	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.3	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
12L20-	13.5	1950	5.9	2.80	M_0				15.0	15.0				
					M_N				13.5	13.5				
					$M_{0,max}$				24.4	41.9				
					M_{max}				24.4	41.9				
					n_{eto}				1718	1158				
12L41-	11.0	4050	10.2	4.70	M_0					15.0	15.0	15.0		
					M_N					11.0	11.0	11.0		
					$M_{0,max}$					22.8	27.0	35.5		
					M_{max}					22.8	38.5	49.6		
					n_{eto}					4287	2799	2236		
14D15-	9.2	1500	4.5	1.45	M_0			8.5	11.0	11.0				
					M_N			8.0	9.2	9.2				
					$M_{0,max}$			12.1	20.2	29.0				
					M_{max}			12.1	20.2	29.0				
					n_{eto}			1437	928	676				
14D36-	7.5	3600	7.5	2.80	M_0				7.7	11.0	11.0			
					M_N				7.0	7.5	7.5			
					$M_{0,max}$				10.9	19.0	22.2			
					M_{max}				10.9	19.0	29.0			
					n_{eto}				3479	2159	1593			
14H15-	16.0	1500	6.6	2.50	M_0				17.3	21.0				
					M_N				16.0	16.0				
					$M_{0,max}$				25.4	43.9				
					M_{max}				25.4	43.9				
					n_{eto}				1247	800				
14H32-	14.0	3225	11.9	4.70	M_0					16.2	21.0	21.0		
					M_N					14.0	14.0	14.0		
					$M_{0,max}$					23.8	28.2	37.1		
					M_{max}					23.8	40.2	51.9		
					n_{eto}					2875	1817	1471		
14L15-	23.0	1500	9.7	3.60	M_0					28.0	28.0			
					M_N					23.0	23.0			
					$M_{0,max}$					45.0	52.9			
					M_{max}					45.0	73.8			
					n_{eto}					1126	788			
14L32-	17.2	3225	15.0	5.80	M_0					15.2	27.4	28.0	28.0	
					M_N					14.9	17.2	17.2	17.2	
					$M_{0,max}$					23.5	28.3	37.6	52.9	
					M_{max}					23.5	41.0	53.9	73.9	
					n_{eto}					3953	2608	2096	1672	
14P14-	30.0	1350	10.8	4.20	M_0					37.0	37.0	37.0		
					M_N					30.0	30.0	30.0		
					$M_{0,max}$					52.5	61.8	80.0		
					M_{max}					52.5	86.3	105.1		
					n_{eto}					998	668	573		

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



Selection tables, Servo Inverter 9300

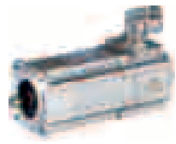
Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9321-E□	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	1.5	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	2.3	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	2.3	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
14P32-	21.0	3225	15.6	7.10	M_0					19.8	35.8	37.0	37.0	
					M_N					17.5	21.0	21.0	21.0	
					$M_{0,max}$					27.4	33.0	43.9	61.8	
					M_{max}					27.4	47.9	63.0	86.4	
					n_{eto}					3300	2299	1829	1404	
19F14-	27.0	1425	8.6	4.00	M_0				22.6	32.0	32.0			
					M_N				22.0	27.0	27.0			
					$M_{0,max}$				33.0	58.2	68.3			
					M_{max}				33.0	58.2	86.0			
					n_{eto}				1459	1056	746			
19F30-	21.0	3000	14.0	6.60	M_0					21.0	32.0	32.0		
					M_N					19.5	21.0	21.0		
					$M_{0,max}$					29.2	35.2	47.2		
					M_{max}					29.2	51.5	68.3		
					n_{eto}					3352	2573	2033		
19J14-	40.0	1425	12.3	6.00	M_0					43.6	51.0	51.0		
					M_N					40.0	40.0	40.0		
					$M_{0,max}$					60.8	72.4	96.0		
					M_{max}					60.8	104.5	129.0		
					n_{eto}					1376	996	839		
19J30-	29.0	3000	18.5	9.10	M_0						39.3	51.0	51.0	51.0
					M_N						29.0	29.0	29.0	29.0
					$M_{0,max}$						36.8	50.2	72.4	79.5
					M_{max}						55.2	73.8	104.7	127.6
					n_{eto}						3150	2850	2162	1817
19P14-	51.0	1350	14.3	7.20	M_0					47.5	64.0	64.0		
					M_N					46.4	51.0	51.0		
					$M_{0,max}$					69.5	79.6	106.7		
					M_{max}					69.5	116.7	155.5		
					n_{eto}					1400	1187	996		
19P30-	32.0	3000	19.0	10.00	M_0						43.1	58.7	64.0	64.0
					M_N						32.0	32.0	32.0	32.0
					$M_{0,max}$						39.6	53.9	79.6	87.6
					M_{max}						59.3	81.2	116.9	144.3
					n_{eto}						3000	2938	2638	2298

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1



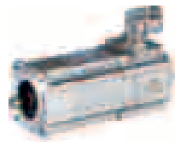
Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
12D17-	7.0	1650	3.0	1.20	M_0	5.9	7.5	7.5					
					M_N	5.3	7.0	7.0					
					$M_{0,max}$	7.6	11.6	17.7					
					M_{max}	7.6	11.6	17.7					
					n_{eto}	1790	1358	919					
12D35-	6.0	3525	5.6	2.20	M_0		4.6	7.5	7.5				
					M_N		3.7	6.0	6.0				
					$M_{0,max}$		5.9	10.1	17.3				
					M_{max}		5.9	10.1	17.3				
					n_{eto}		4344	3275	2116				
12H14-	12.0	1350	4.1	1.70	M_0		10.9	12.8	12.8				
					M_N		10.3	12.0	12.0				
					$M_{0,max}$		15.1	25.8	29.0				
					M_{max}		15.1	25.8	29.0				
					n_{eto}		1676	1013	918				
12H34-	10.5	3375	7.5	3.70	M_0			9.8	12.8				
					M_N			9.6	10.5				
					$M_{0,max}$			13.5	24.1				
					M_{max}			13.5	24.1				
					n_{eto}			3618	2447				
12L17-	17.0	1650	6.7	2.90	M_0			18.5	19.0				
					M_N			17.0	17.0				
					$M_{0,max}$			24.4	41.9				
					M_{max}			24.4	41.9				
					n_{eto}			1718	1158				
12L39-	14.0	3900	11.7	5.70	M_0				17.2	19.0	19.0		
					M_N				14.0	14.0	14.0		
					$M_{0,max}$				22.8	27.0	35.5		
					M_{max}				22.8	38.5	49.6		
					n_{eto}				4287	2799	2236		
14D14-	12.0	1350	5.4	1.70	M_0		8.5	12.5	12.5				
					M_N		8.0	12.0	12.0				
					$M_{0,max}$		12.1	20.2	29.0				
					M_{max}		12.1	20.2	29.0				
					n_{eto}		1437	928	676				
14D30-	10.5	3000	9.7	3.30	M_0			7.7	12.5	12.5			
					M_N			7.0	10.0	10.0			
					$M_{0,max}$			10.9	19.0	22.2			
					M_{max}			10.9	19.0	29.0			
					n_{eto}			3479	2159	1593			
14H12-	23.5	1200	8.3	3.00	M_0			17.3	25.5				
					M_N			17.2	23.5				
					$M_{0,max}$			25.4	43.9				
					M_{max}			25.4	43.9				
					n_{eto}			1247	800				

► I... [A], M... [Nm], n... [r/min], P... [kW]



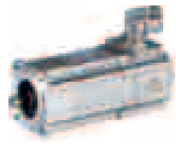
Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
14H28-	20.5	2775	15.0	6.00	M_0				16.2	25.5	25.5		
					M_N				16.1	20.5	20.5		
					$M_{0,max}$				23.8	28.2	37.1		
					M_{max}				23.8	40.2	51.9		
					n_{eto}				2875	1817	1471		
14L14-	30.5	1350	11.8	4.30	M_0				33.4	34.5			
					M_N				30.5	30.5			
					$M_{0,max}$				45.0	52.9			
					M_{max}				45.0	73.8			
					n_{eto}				1126	788			
14L30-	25.5	3000	20.8	8.00	M_0					27.4	34.5	34.5	
					M_N					25.5	25.5	25.5	
					$M_{0,max}$					28.3	37.6	52.9	
					M_{max}					41.0	53.9	73.9	
					n_{eto}					2608	2096	1672	
14P11-	42.0	1050	13.4	4.60	M_0				40.1	43.5	43.5		
					M_N				40.0	42.0	42.0		
					$M_{0,max}$				52.5	61.8	80.0		
					M_{max}				52.5	86.3	105.1		
					n_{eto}				998	668	573		
14P26-	33.0	2625	21.9	9.10	M_0					35.8	43.5	43.5	
					M_N					33.0	33.0	33.0	
					$M_{0,max}$					33.0	43.9	61.8	
					M_{max}					47.9	63.0	86.4	
					n_{eto}					2299	1829	1404	
19F12-	38.0	1200	11.3	4.80	M_0			22.6	41.5	41.5			
					M_N			22.0	38.0	38.0			
					$M_{0,max}$			33.0	58.2	68.3			
					M_{max}			33.0	58.2	86.0			
					n_{eto}			1459	1056	746			
19F29-	32.5	2850	20.1	9.70	M_0					39.9	41.5		
					M_N					32.5	32.5		
					$M_{0,max}$					35.2	47.2		
					M_{max}					51.5	68.3		
					n_{eto}					2573	2033		
19J12-	62.5	1200	18.3	7.90	M_0				43.6	70.5	70.5		
					M_N				43.4	62.5	62.5		
					$M_{0,max}$				60.8	72.4	96.0		
					M_{max}				60.8	104.5	129.0		
					n_{eto}				1376	996	839		
19J29-	50.5	2850	31.0	15.10	M_0						55.5	70.5	70.5
					M_N						50.5	50.5	50.5
					$M_{0,max}$						50.2	72.4	79.5
					M_{max}						73.8	104.7	127.6
					n_{eto}						2850	2162	1817

► I... [A], M... [Nm], n... [r/min], P... [kW]



Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCS	M_N	n_N	I_N	P_N	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
19P12-	72.0	1200	21.3	9.00	M_0				47.5	86.0	86.0		
					M_N				46.4	72.0	72.0		
					$M_{0,max}$				69.5	79.6	106.7		
					M_{max}				69.5	116.7	155.5		
					n_{eto}				1400	1187	996		
19P29-	53.0	2850	29.5	15.80	M_0						58.7	86.0	86.0
					M_N						53.0	53.0	53.0
					$M_{0,max}$						53.9	79.6	87.6
					M_{max}						81.2	116.9	144.3
					n_{eto}						2938	2638	2298

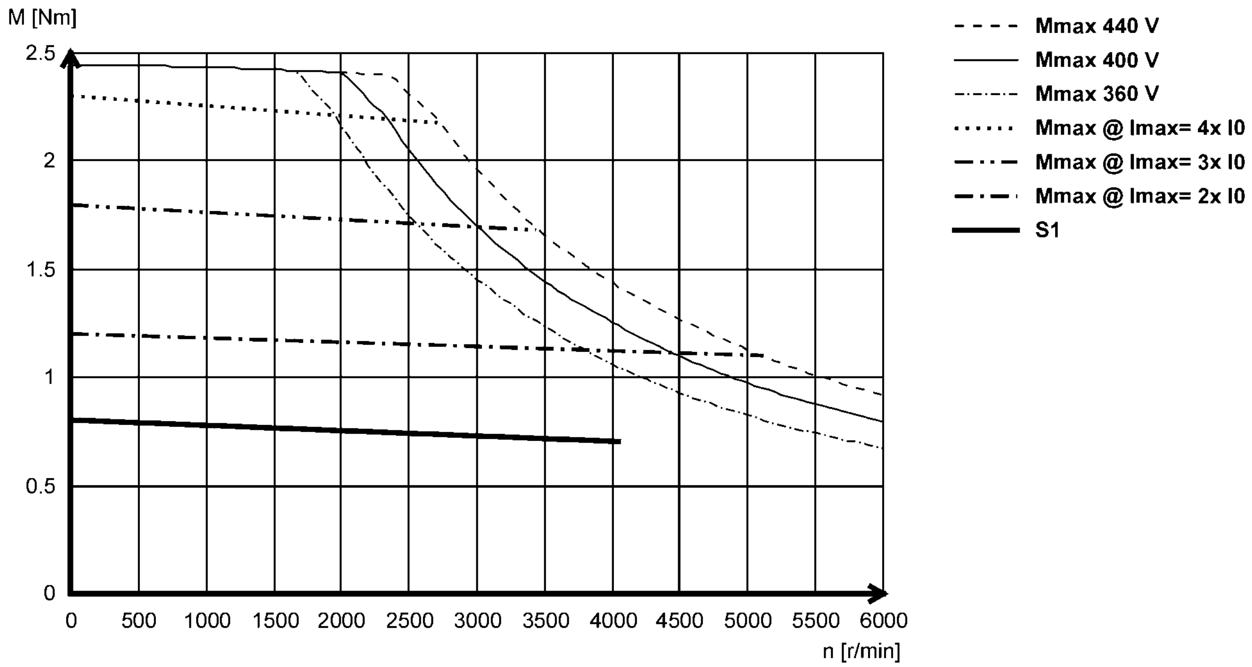
► I... [A], M... [Nm], n... [r/min], P... [kW]

5.1

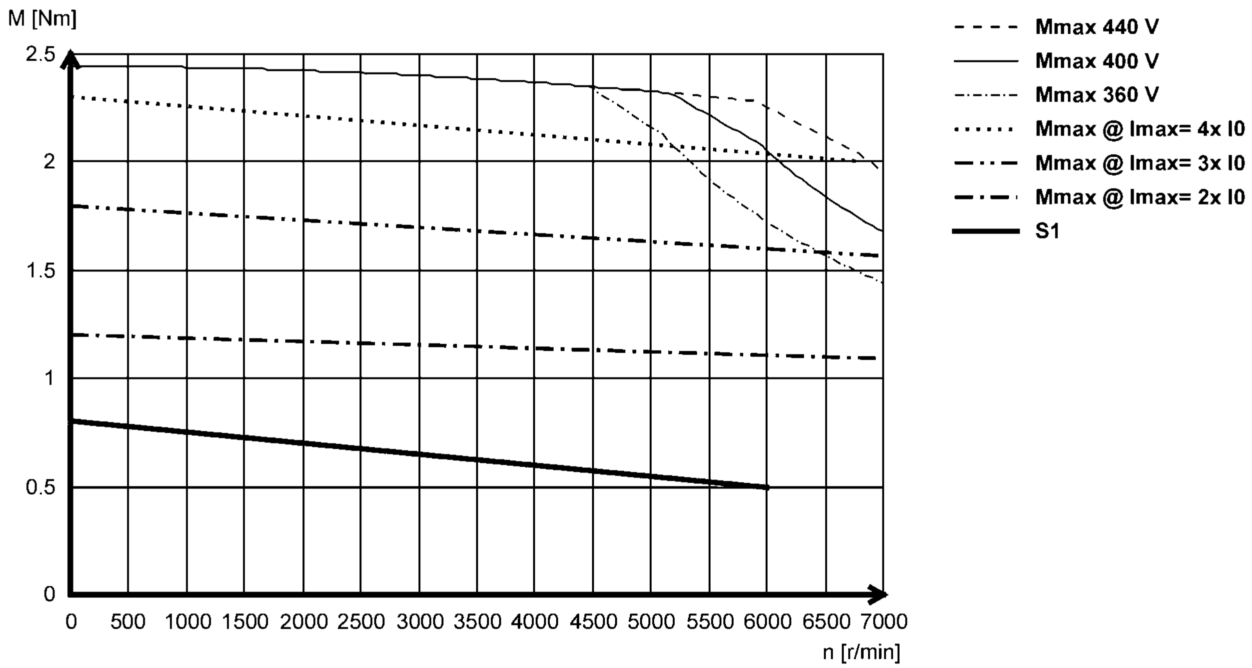
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

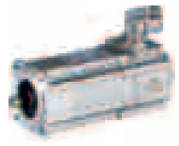
MCS06C41- (non-ventilated)



MCS06C60- (non-ventilated)



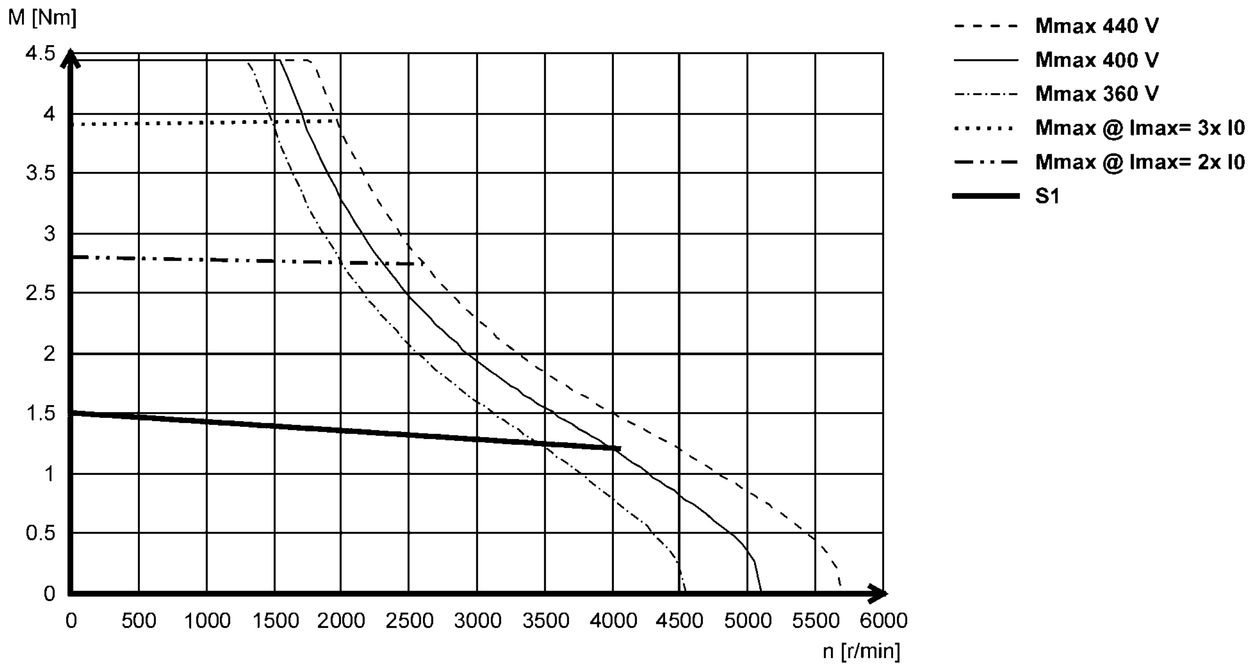
5.1



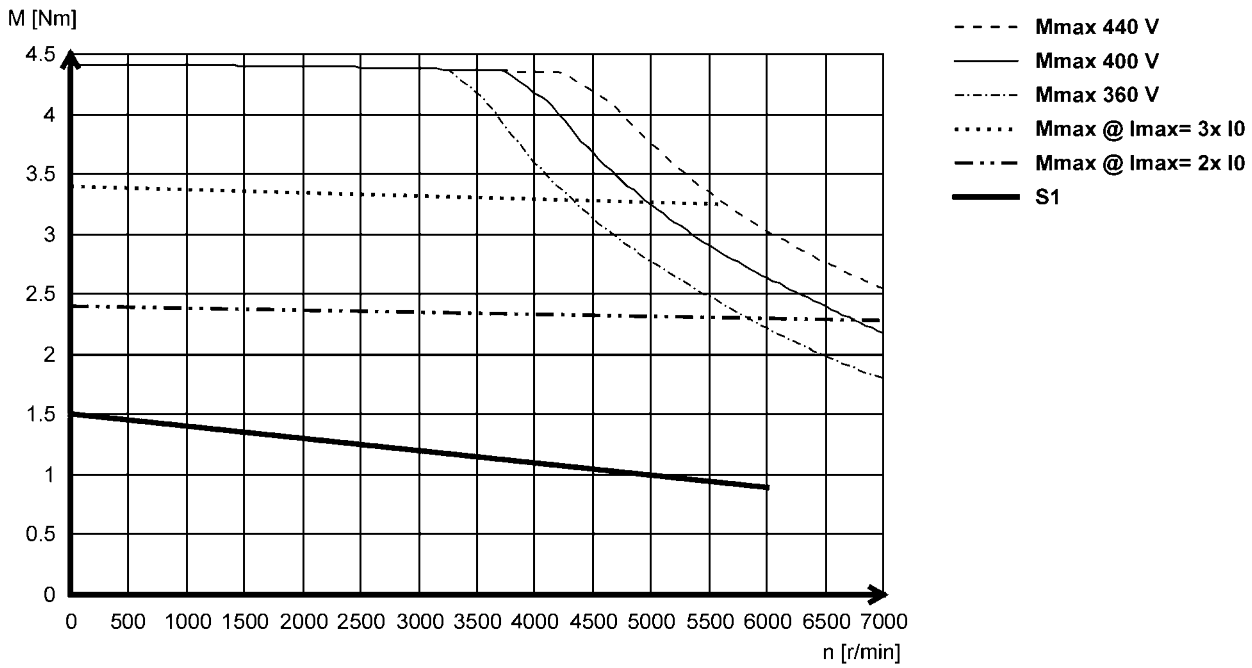
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS06F41- (non-ventilated)



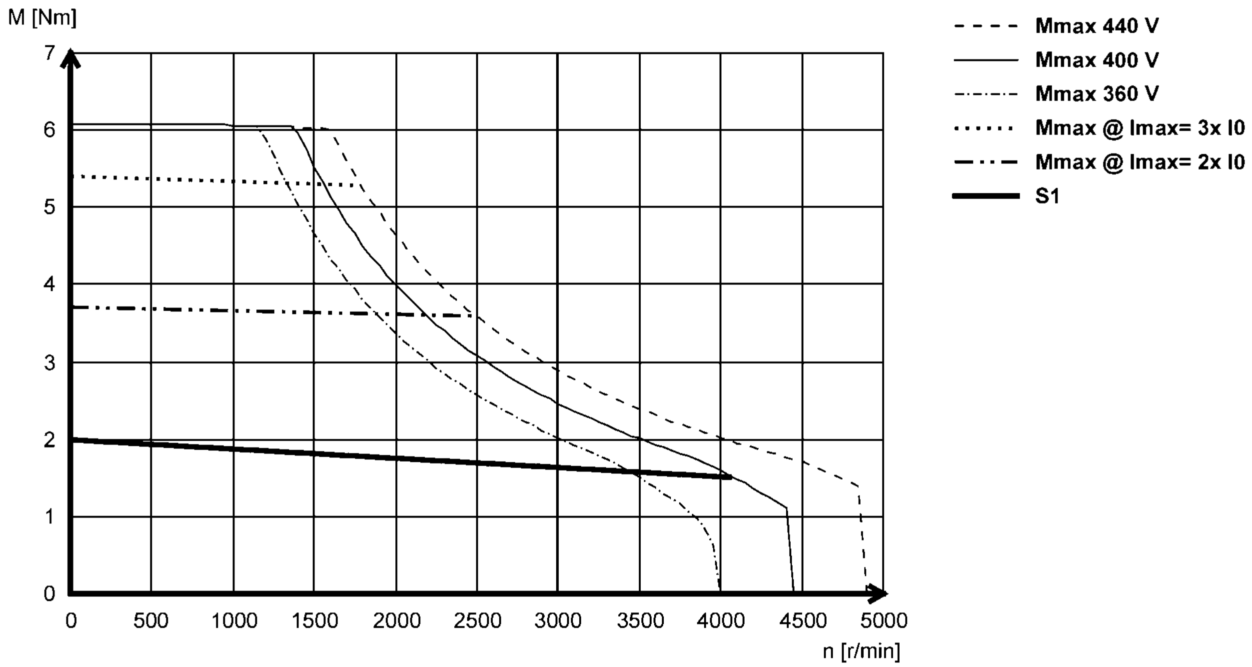
MCS06F60- (non-ventilated)



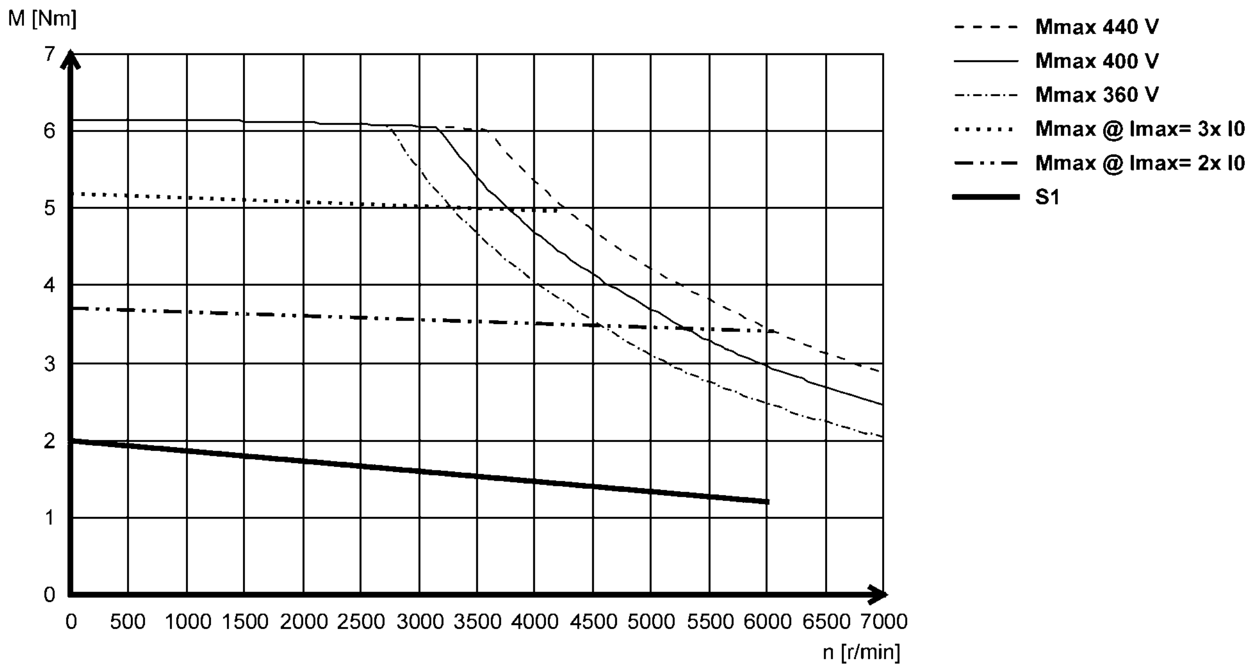
Torque characteristics

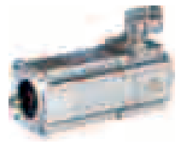
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS06I41- (non-ventilated)



MCS06I60- (non-ventilated)

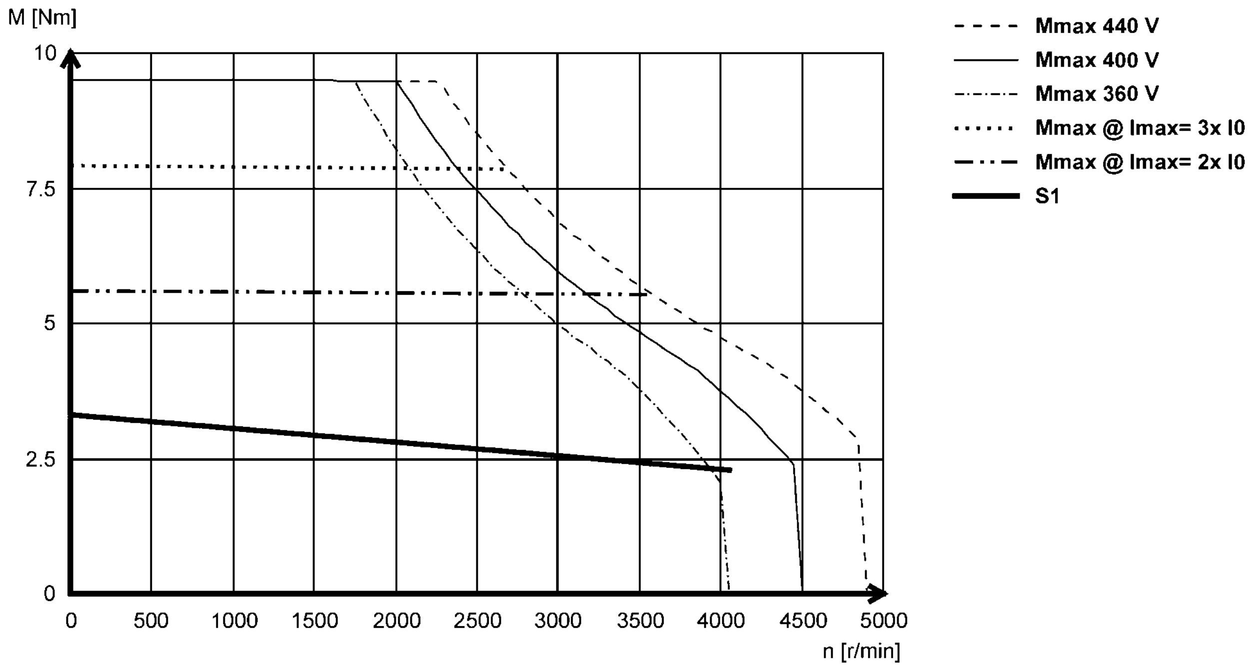




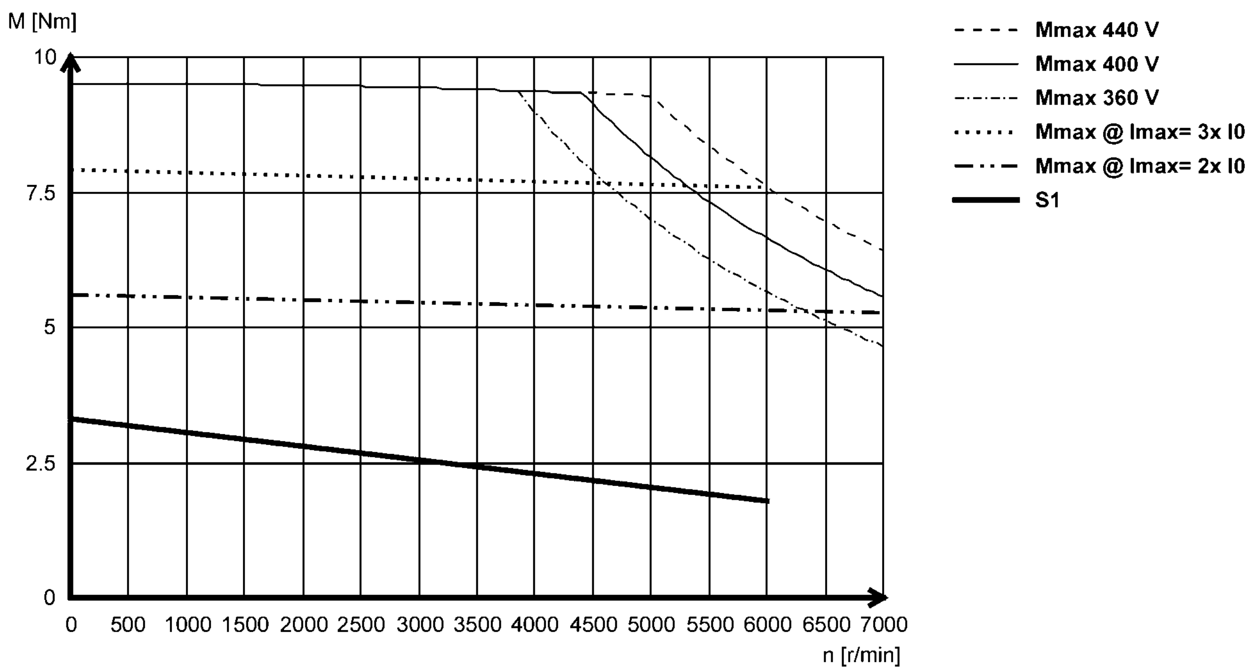
Torque characteristics

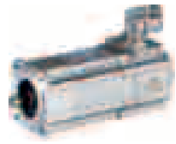
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09D41- (non-ventilated)



MCS09D60- (non-ventilated)

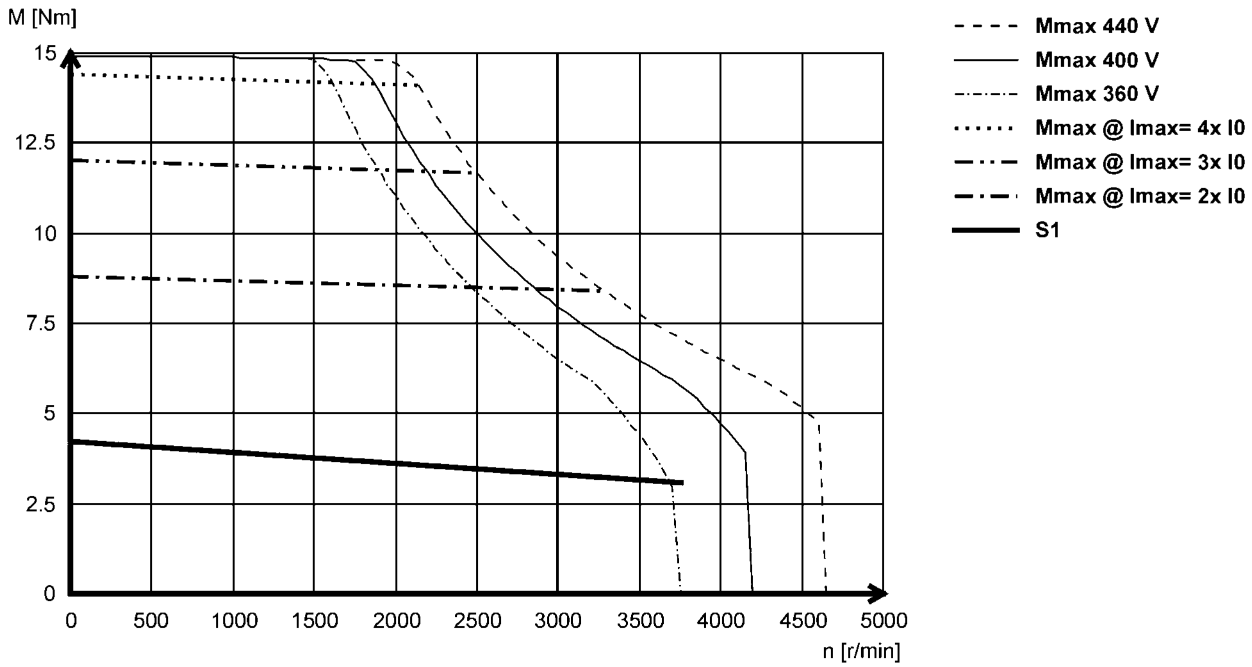




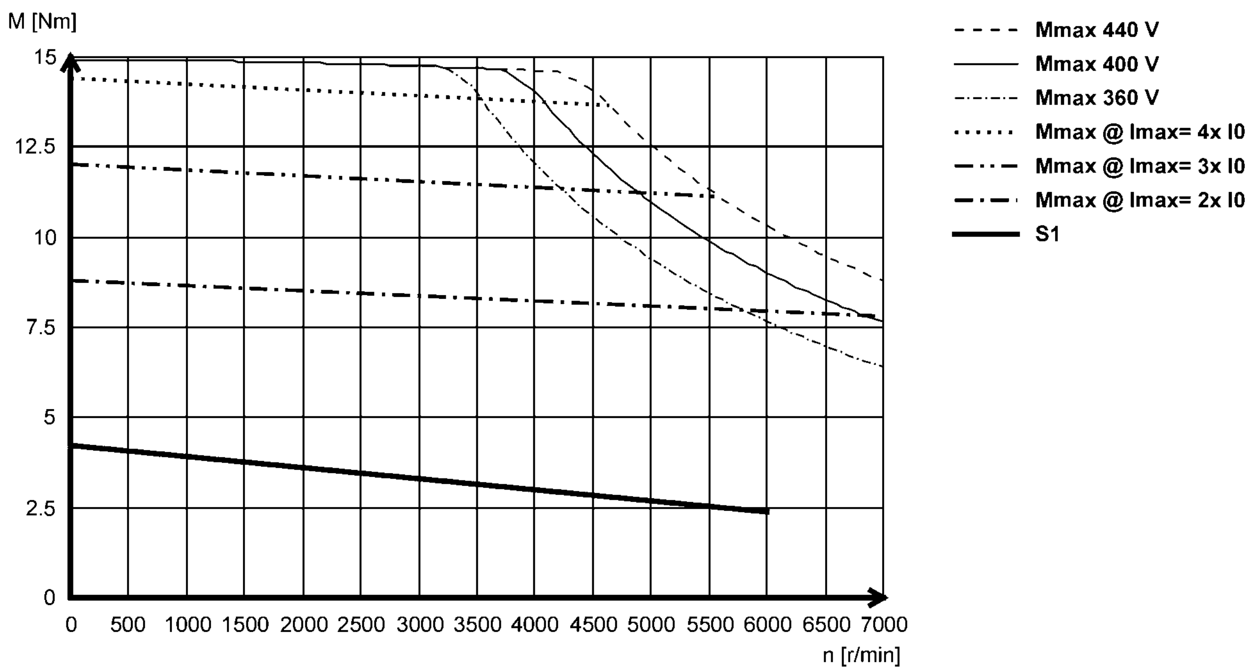
Torque characteristics

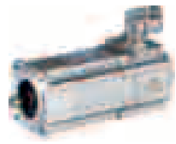
- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09F38- (non-ventilated)



MCS09F60- (non-ventilated)

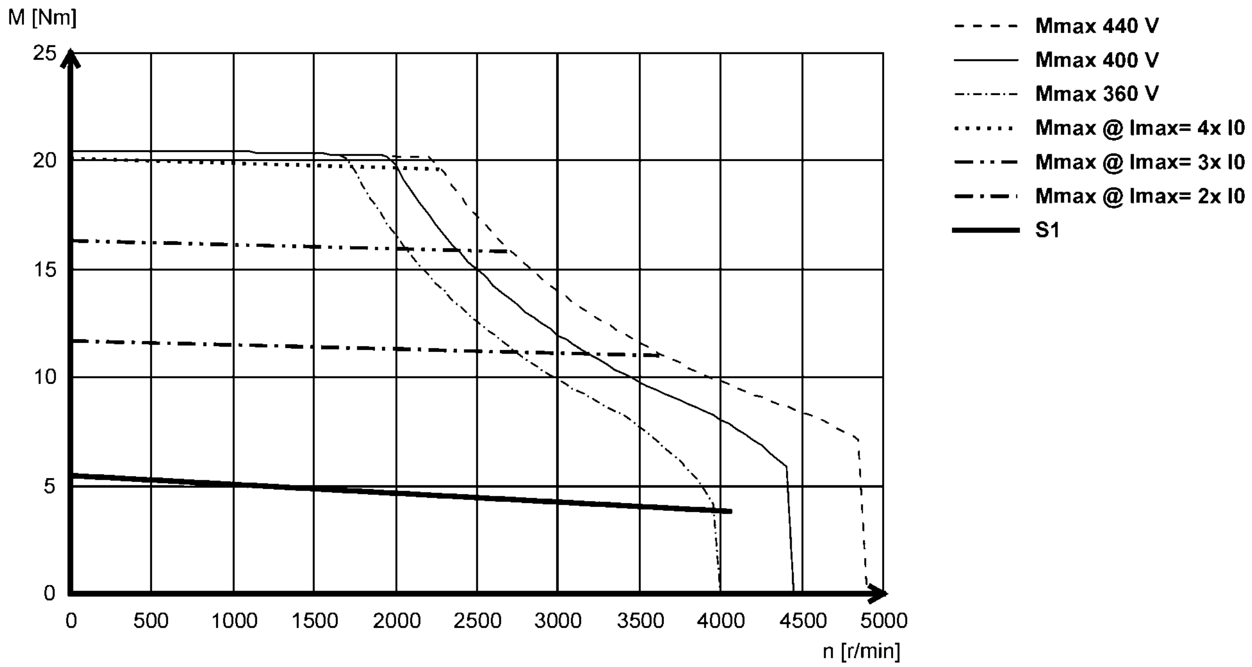




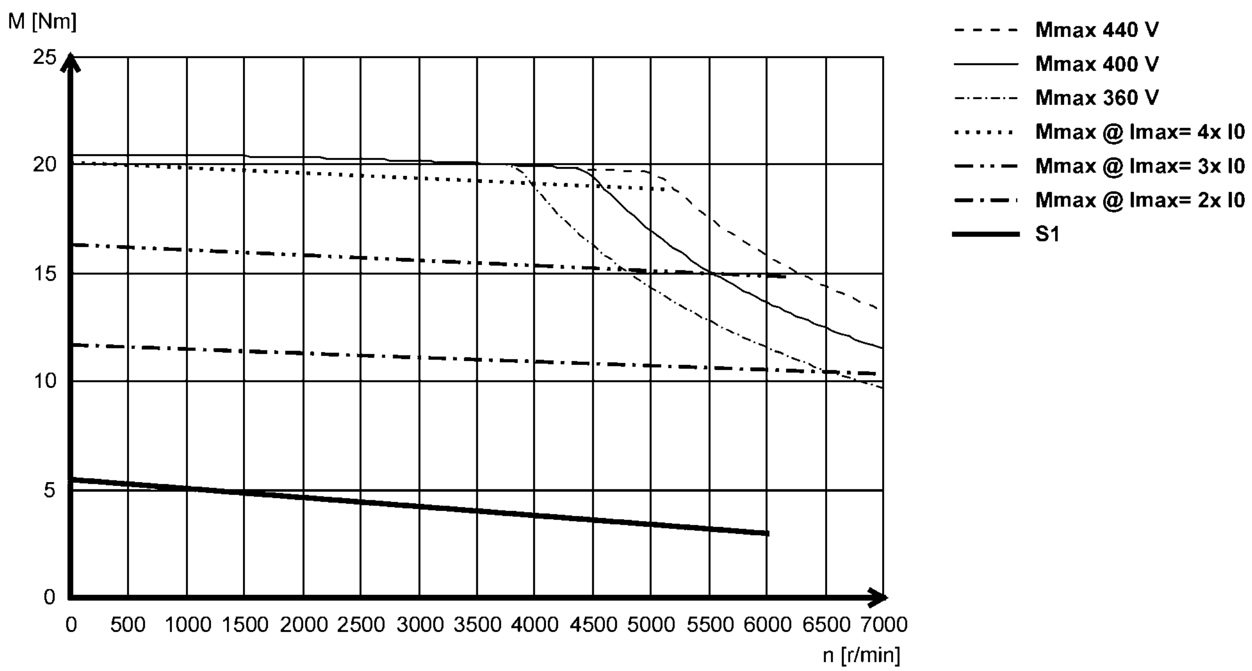
Torque characteristics

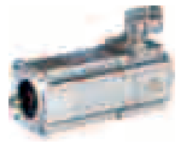
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09H41- (non-ventilated)



MCS09H60- (non-ventilated)

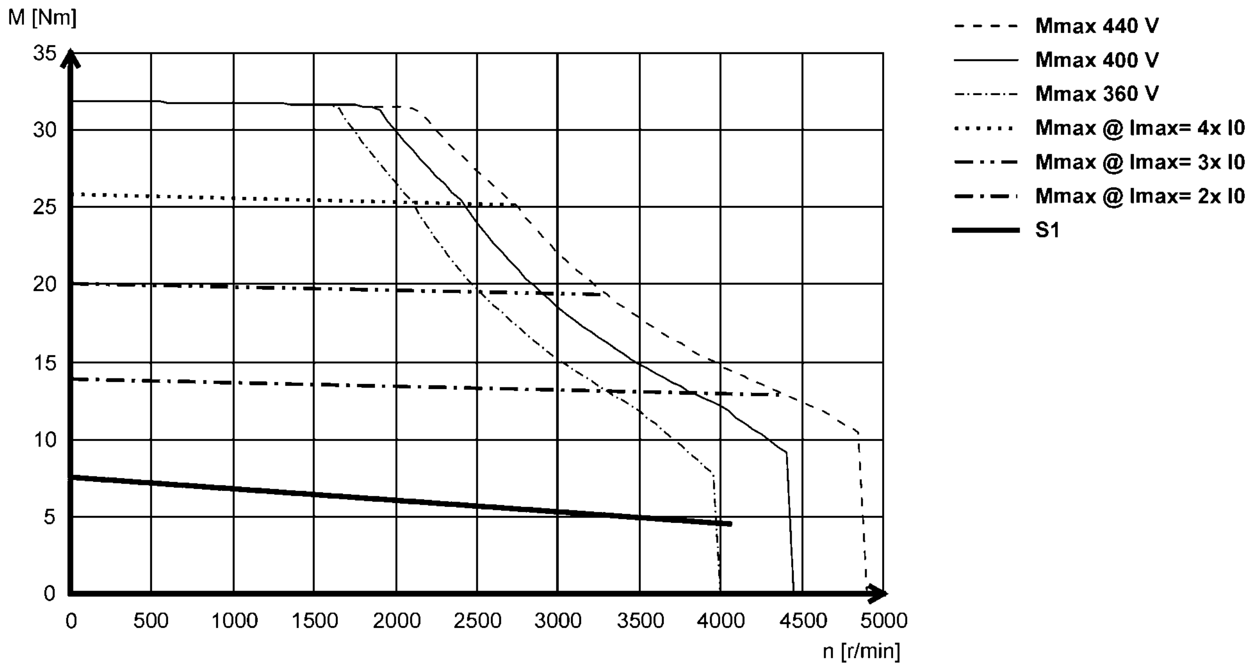




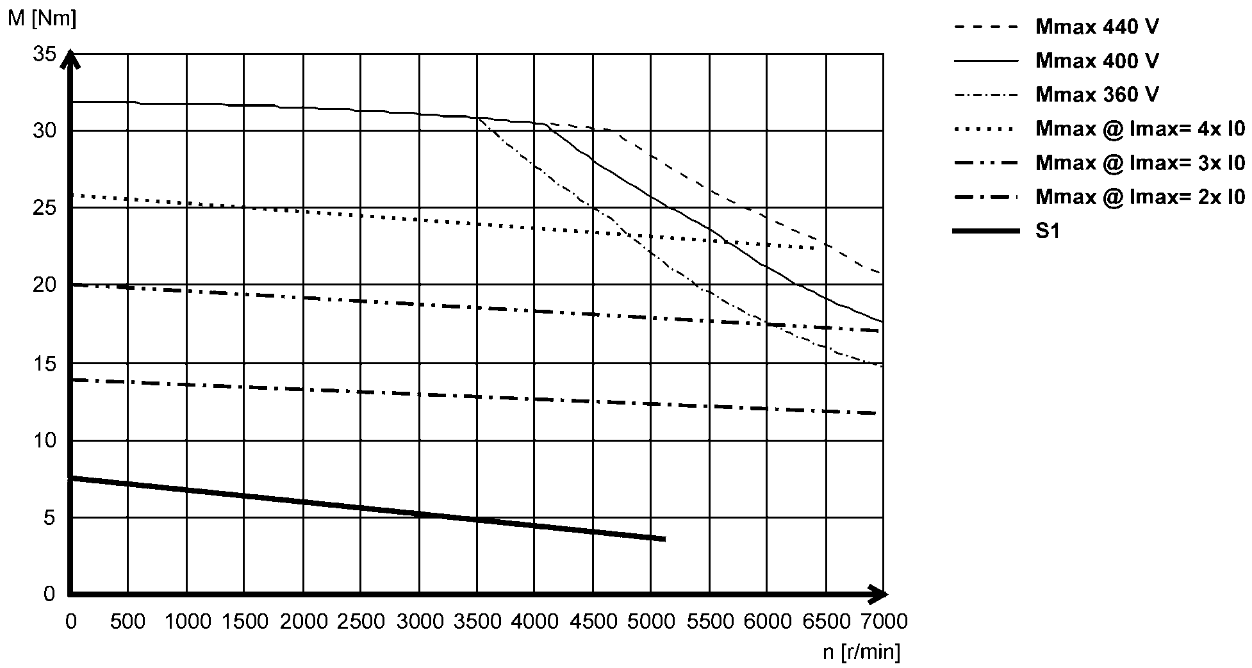
Torque characteristics

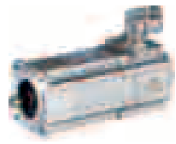
- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09L41- (non-ventilated)



MCS09L51- (non-ventilated)

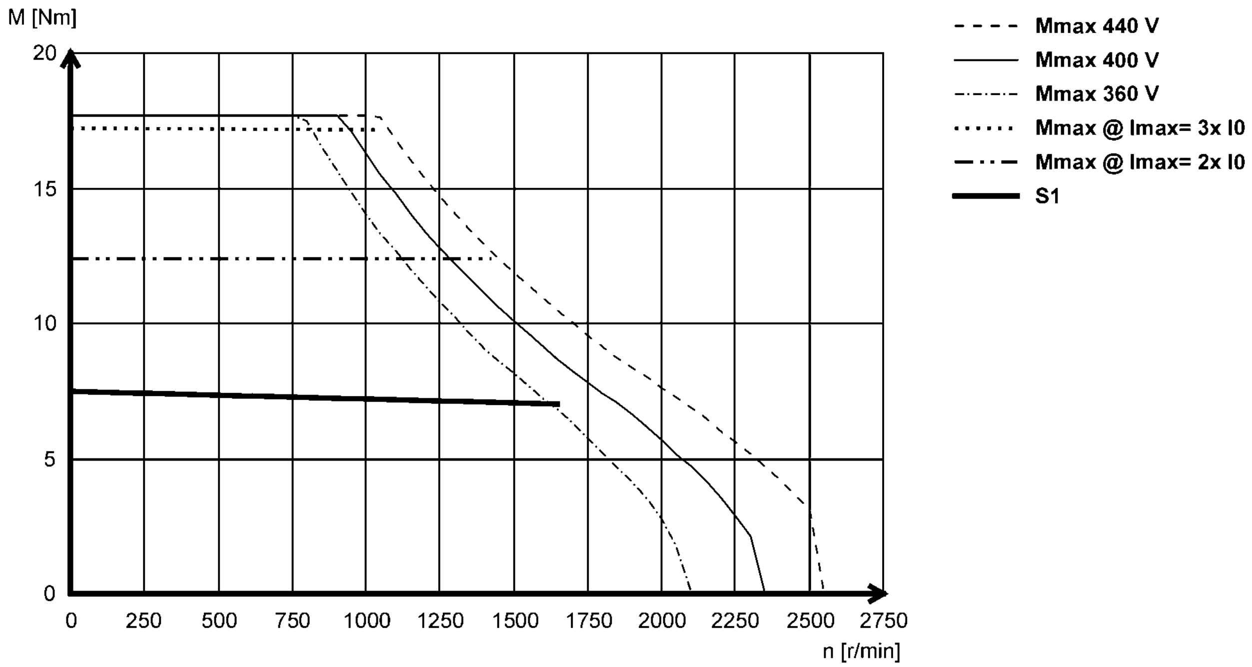




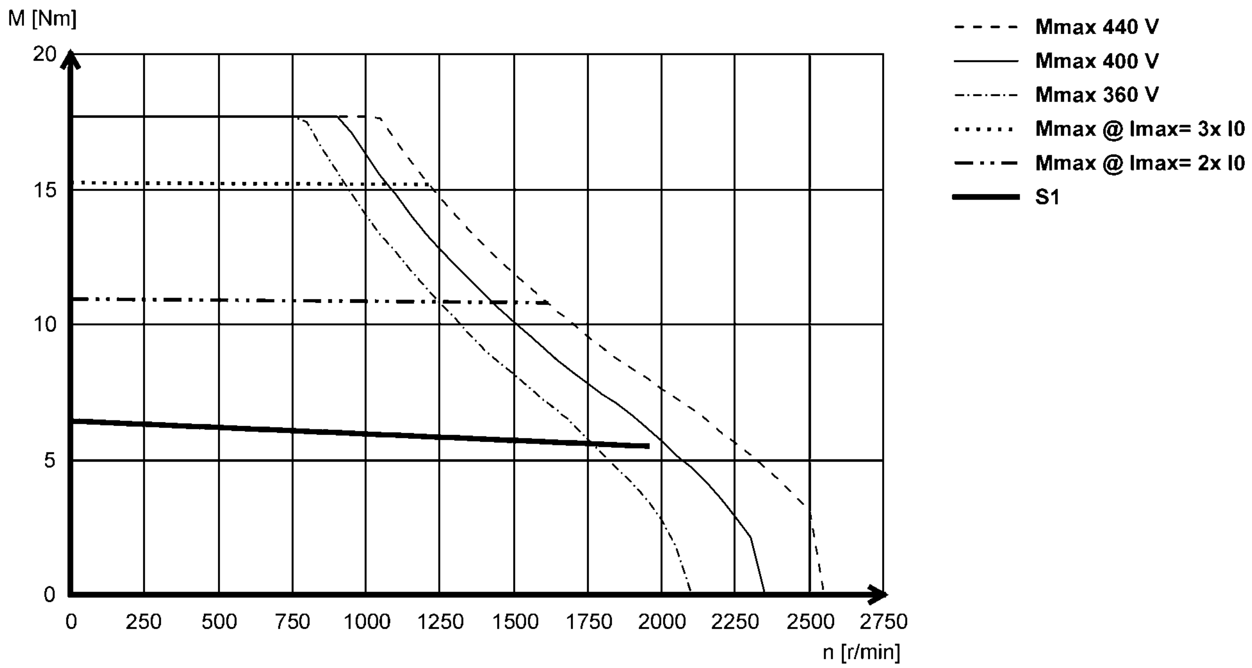
Torque characteristics

► The data applies to a mains connection voltage of 3 x 400 V.
► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12D17 (forced ventilated)



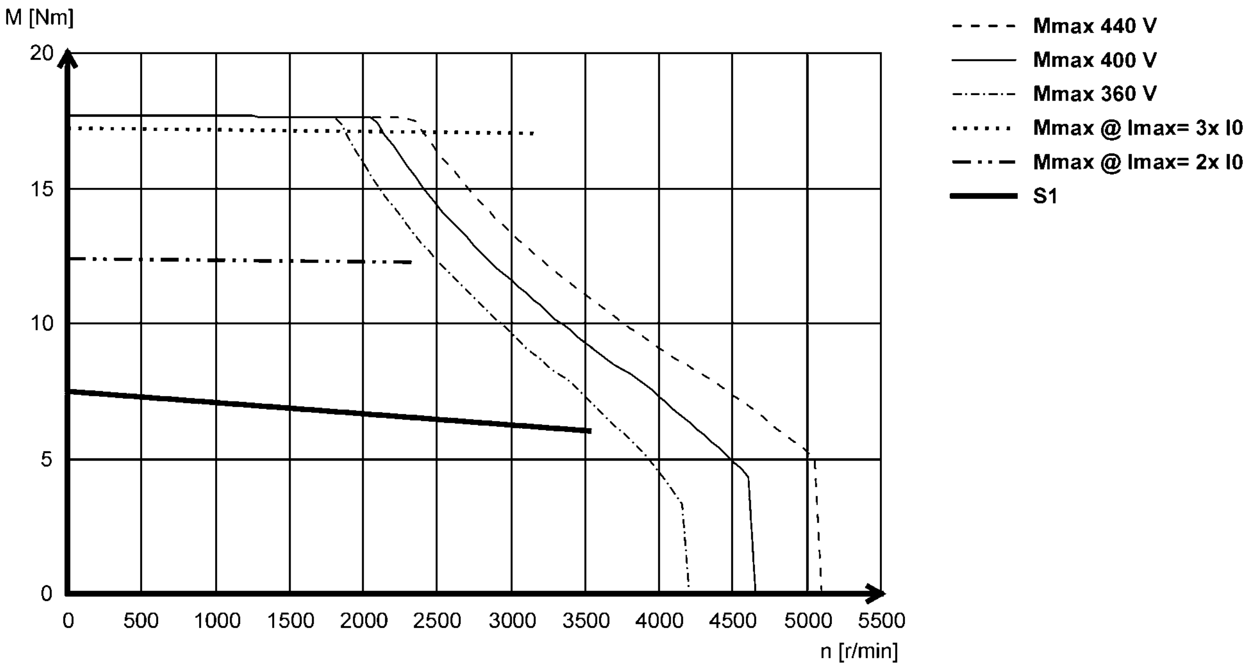
MCS12D20- (non-ventilated)



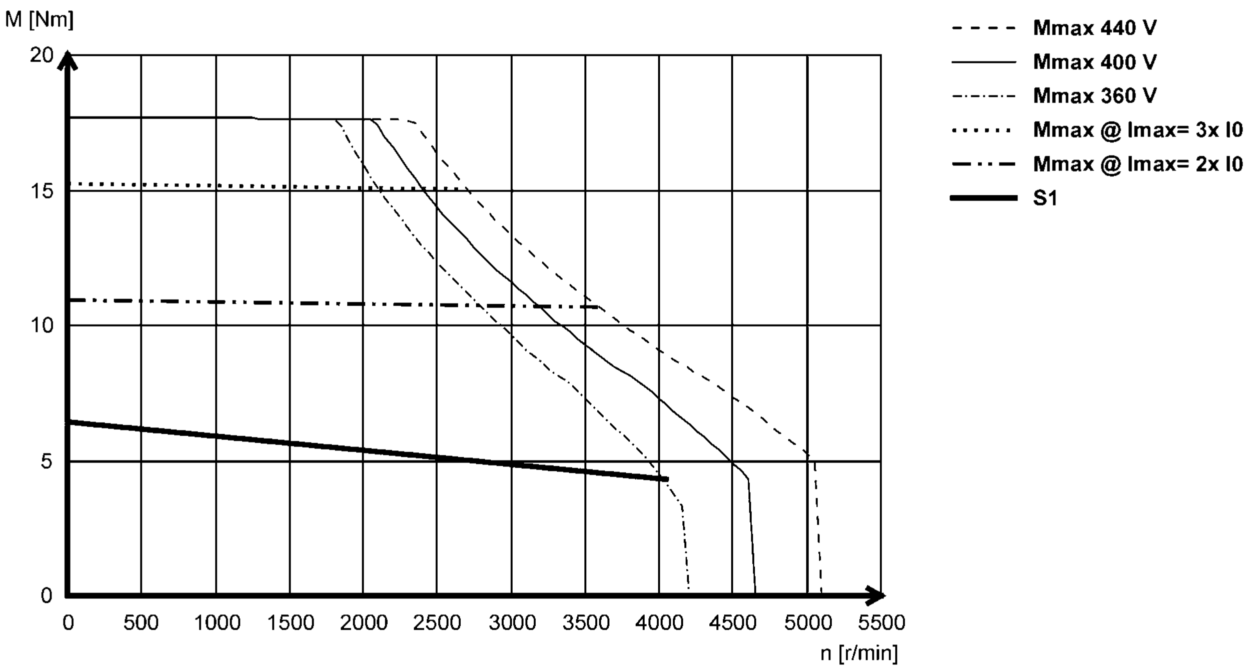
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12D35- (forced ventilated)



MCS12D41- (non-ventilated)



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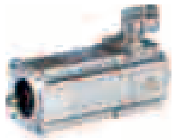
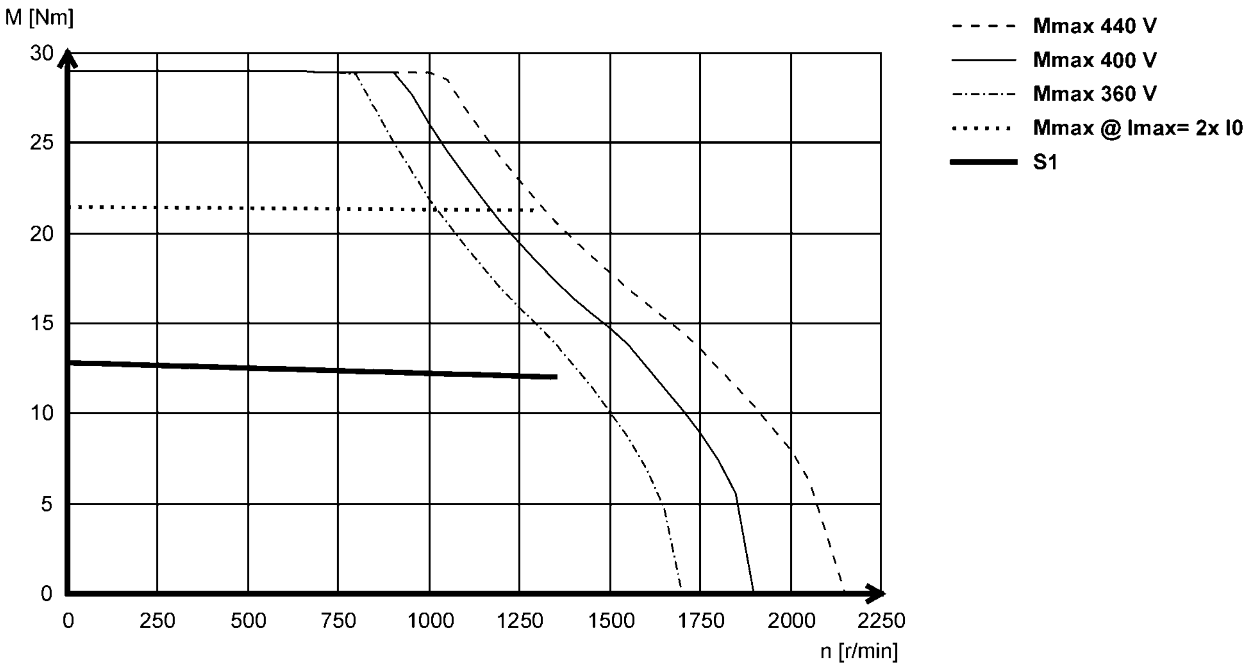


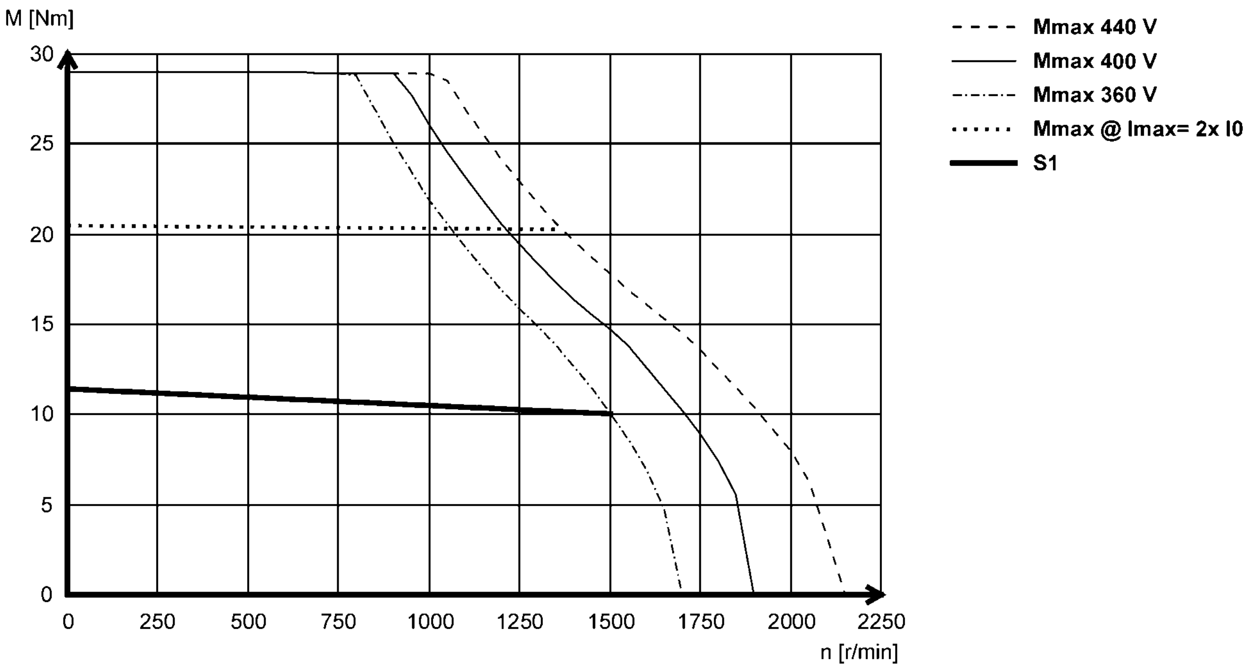
Torque characteristics

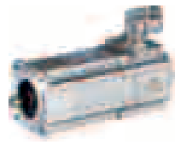
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12H14- (forced ventilated)



MCS12H15- (non-ventilated)

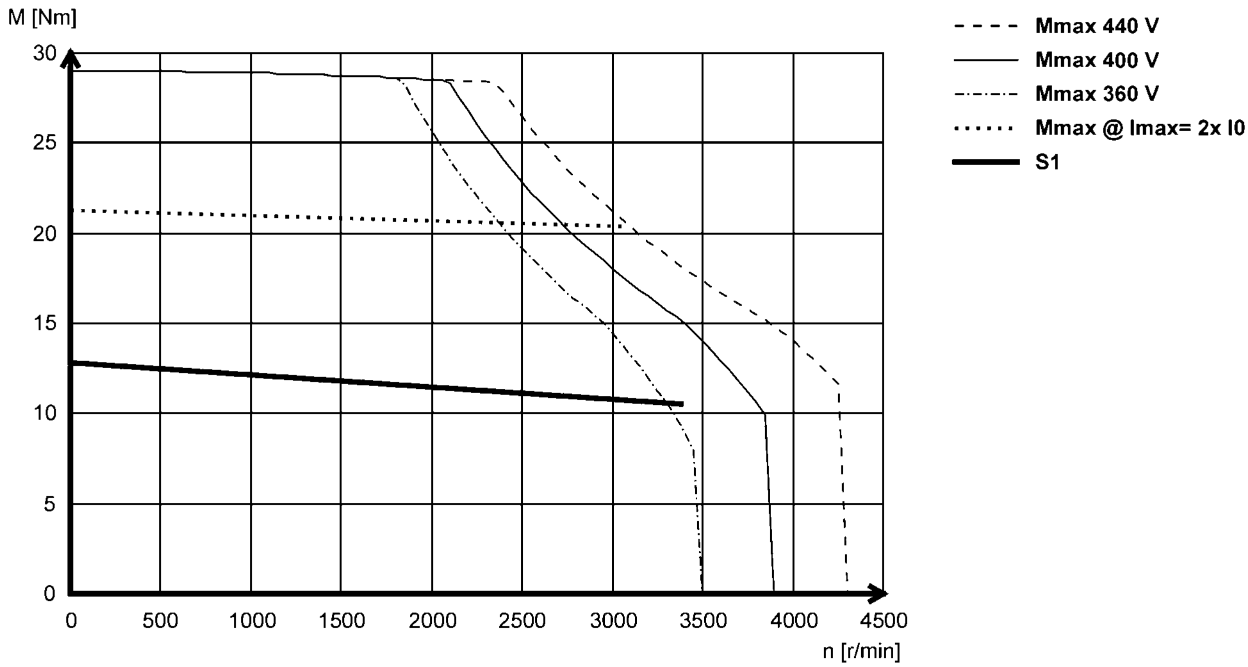




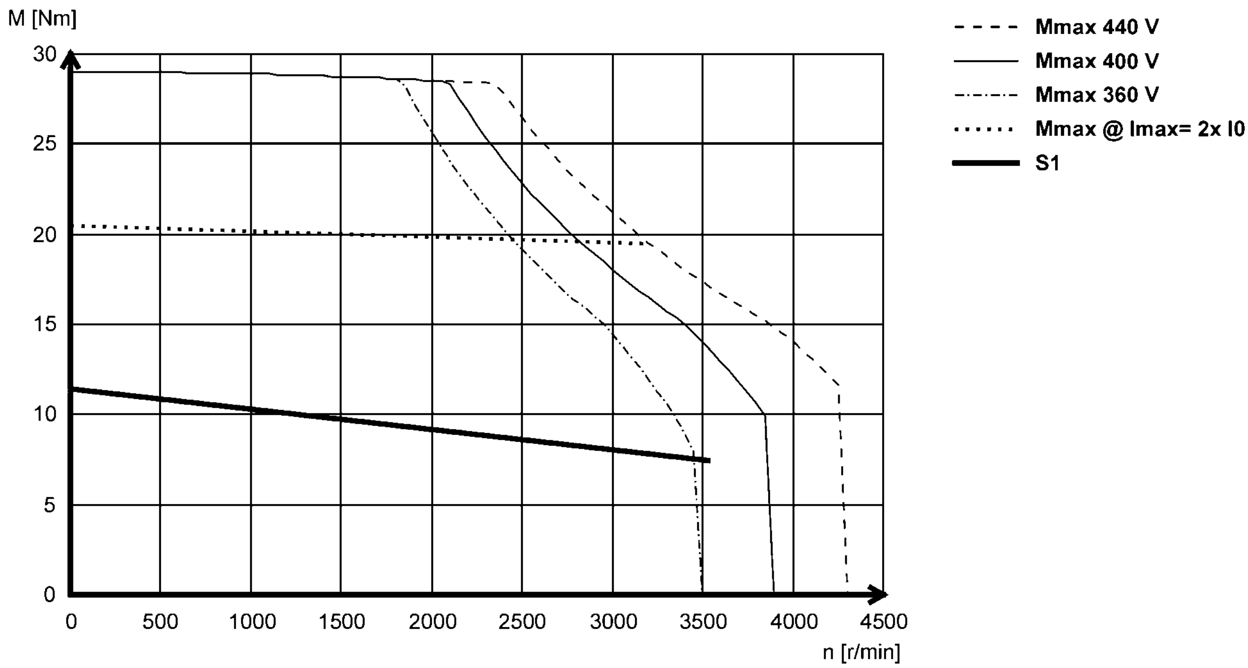
Torque characteristics

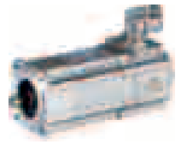
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12H34- (forced ventilated)



MCS12H35- (non-ventilated)

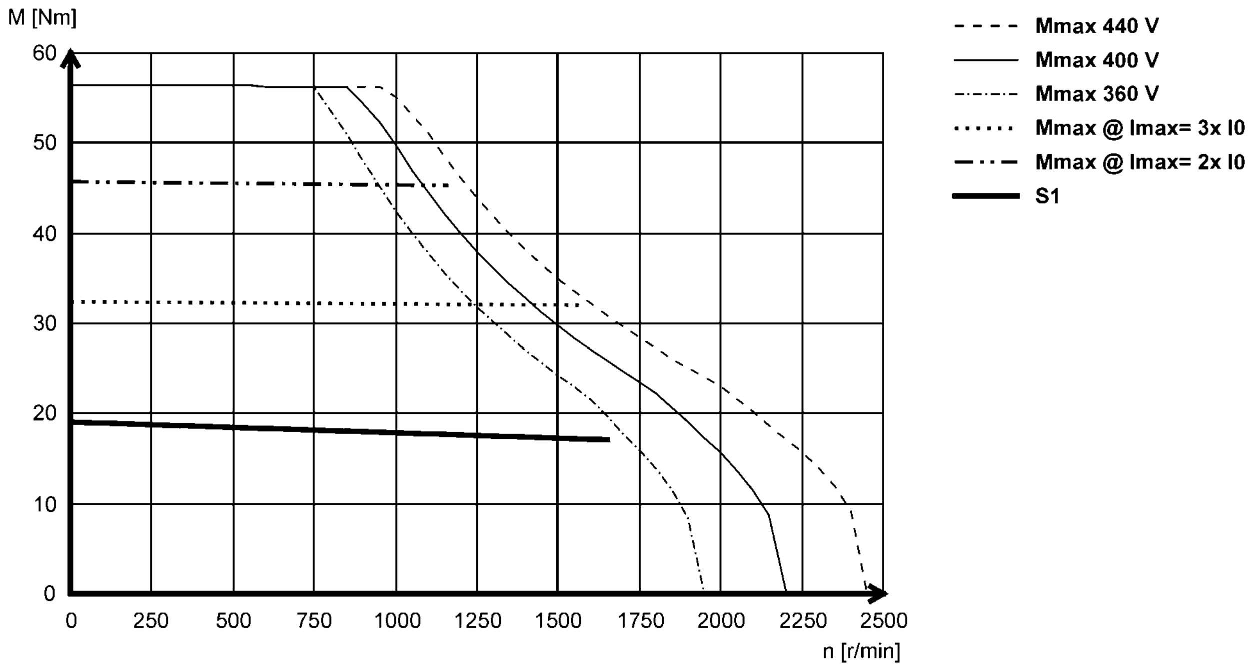




Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12L17- (forced ventilated)



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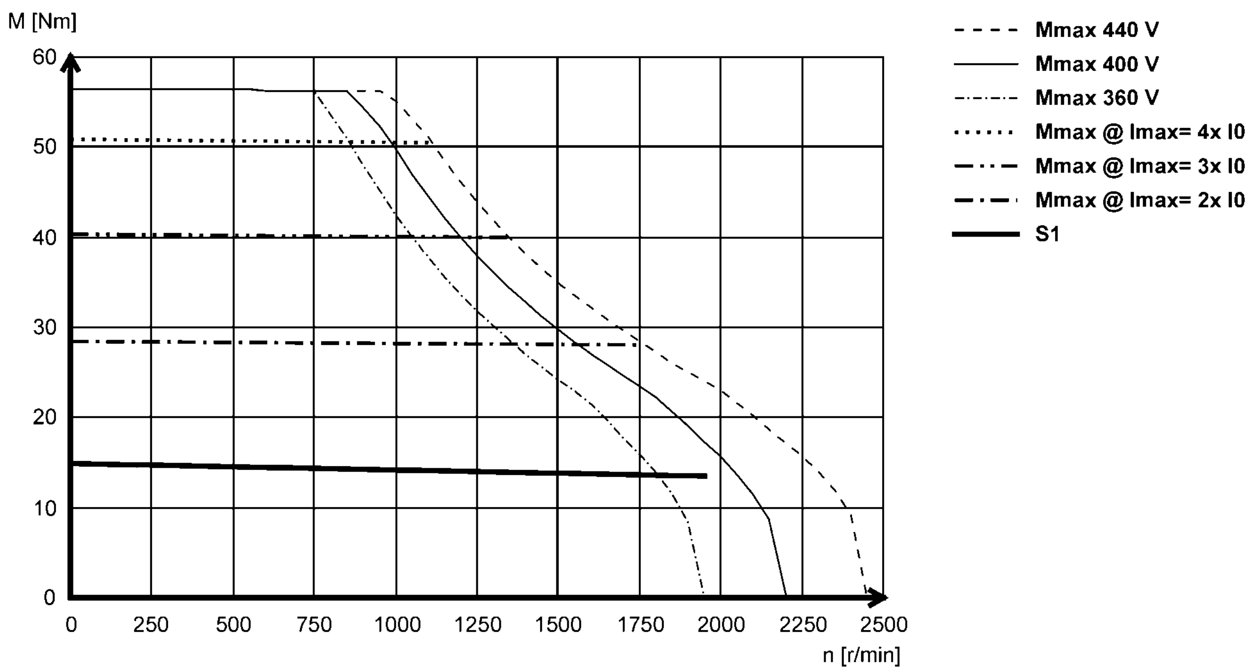
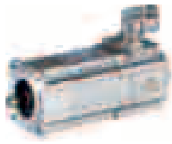
MCS12L20- (non-ventilated)

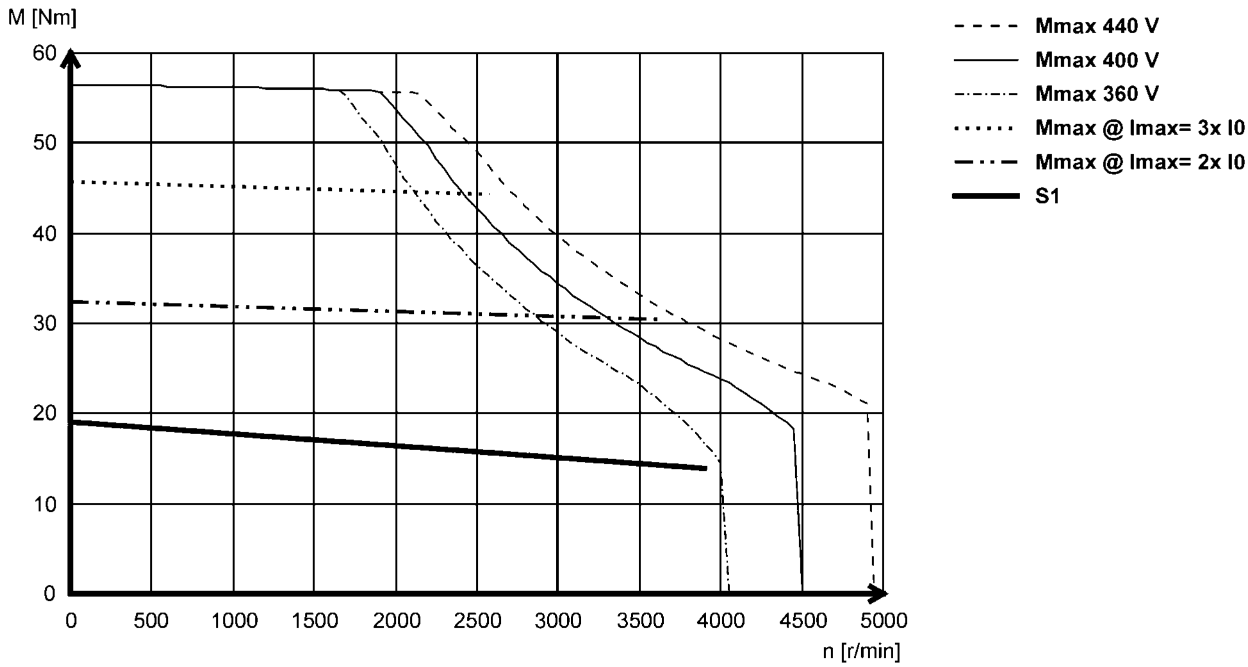




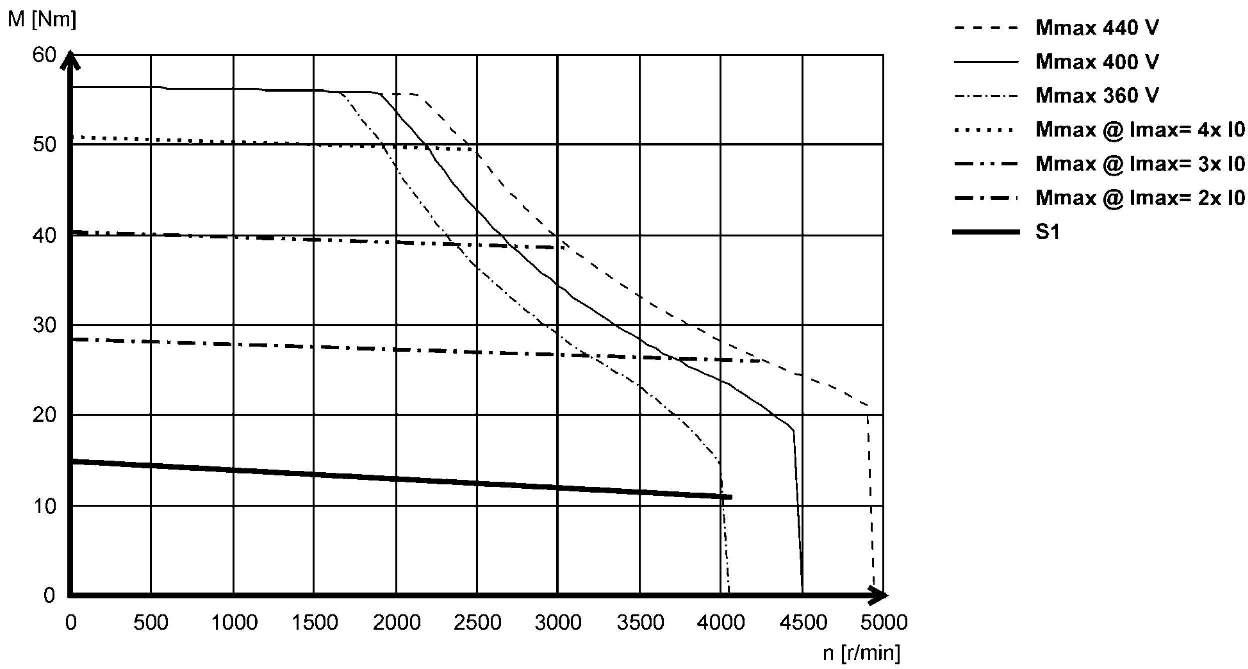
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12L39- (forced ventilated)



MCS12L41- (non-ventilated)



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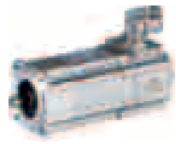
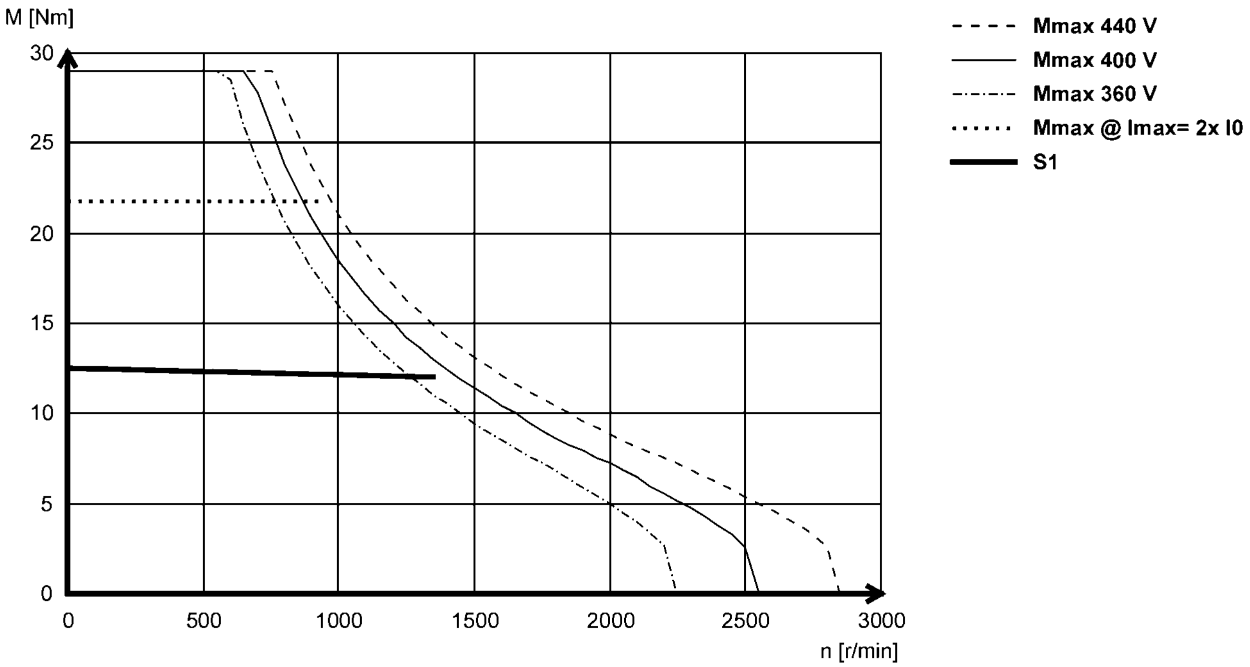


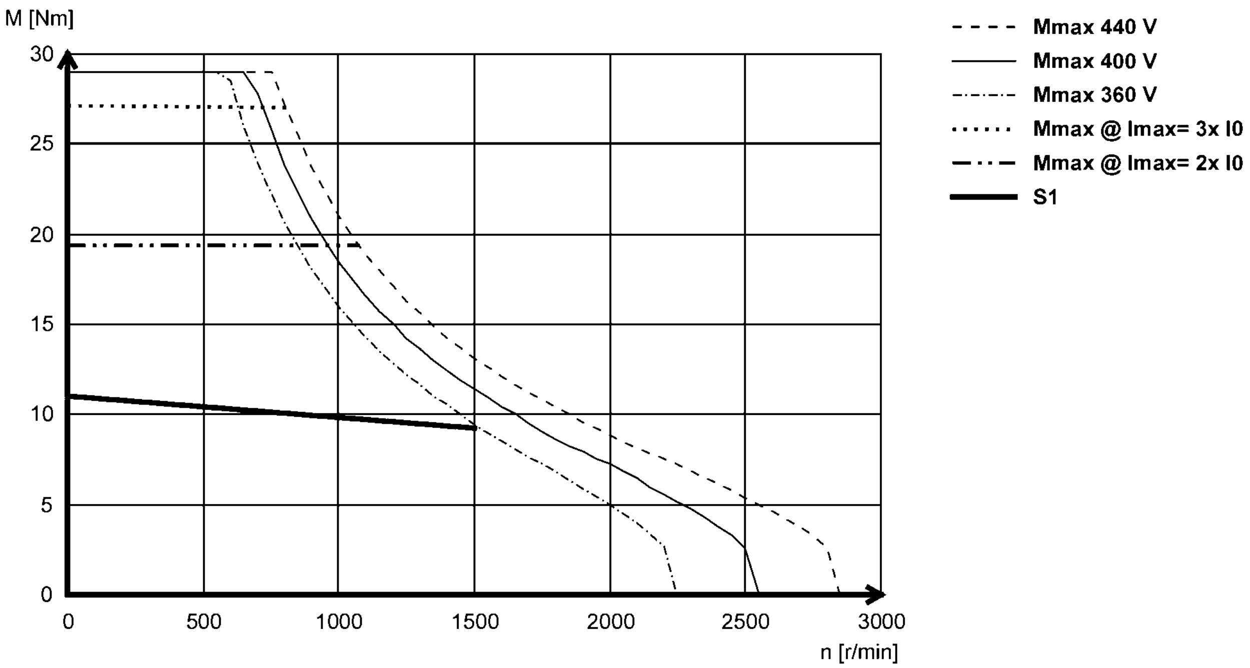
Torque characteristics

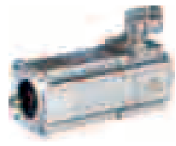
- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14D14- (forced ventilated)



MCS14D15- (non-ventilated)

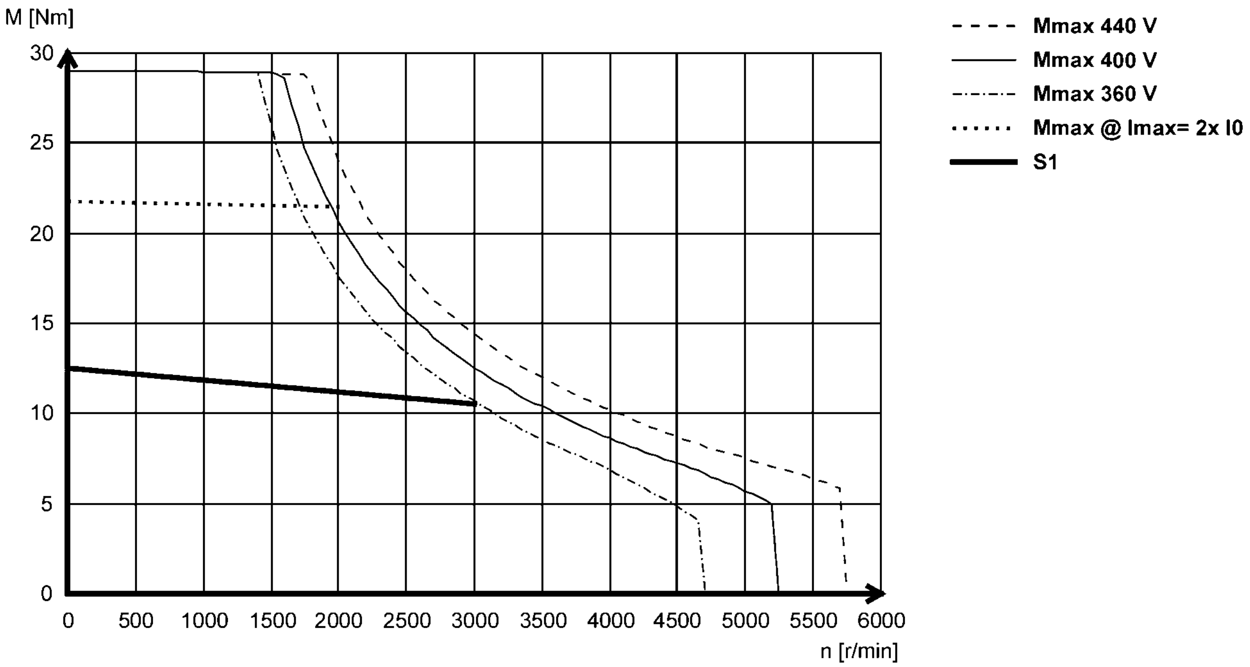




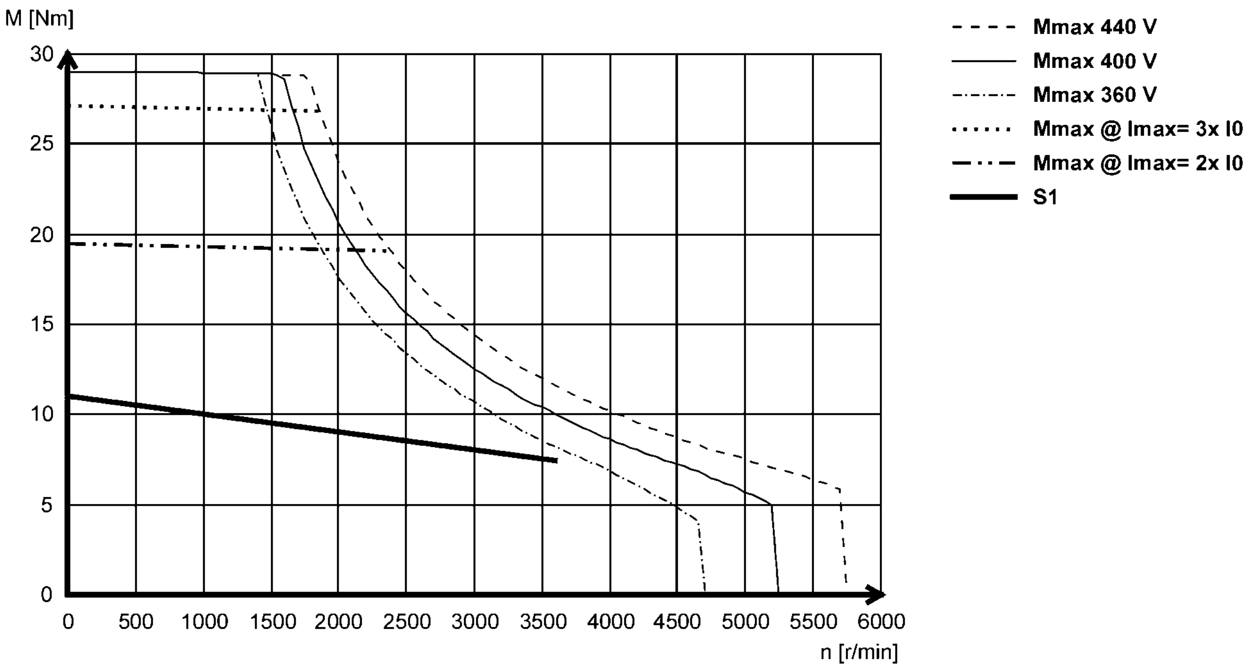
Torque characteristics

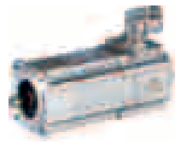
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14D30 (forced ventilated)



MCS14D36- (non-ventilated)

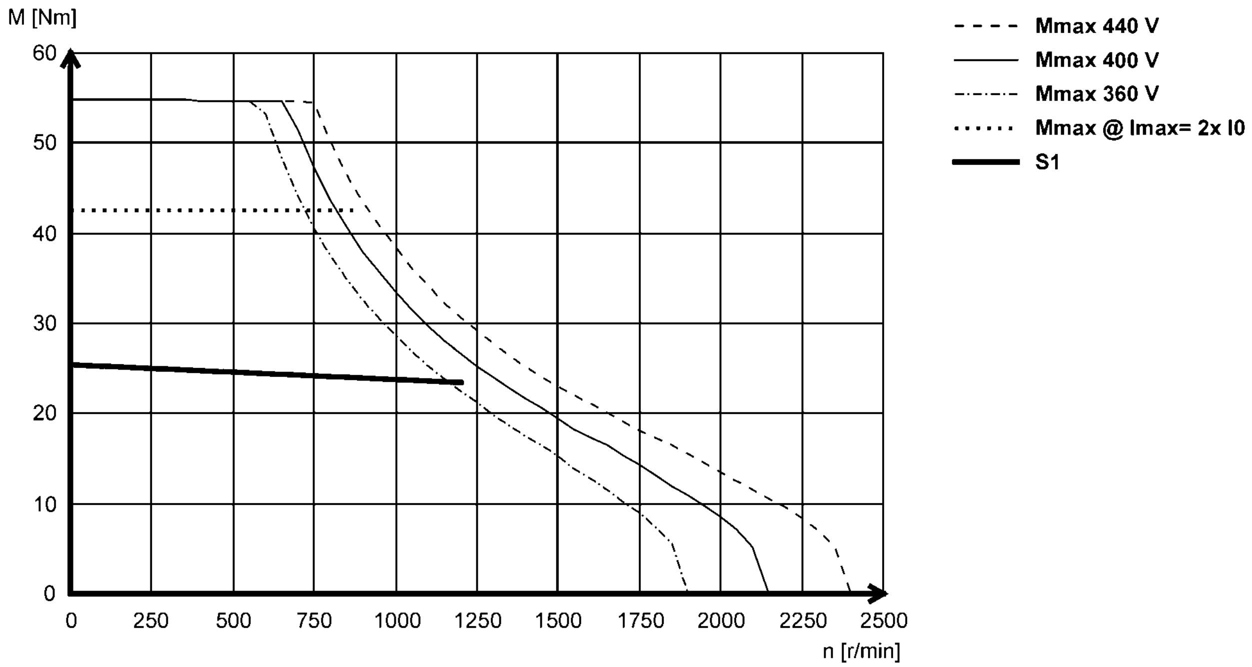




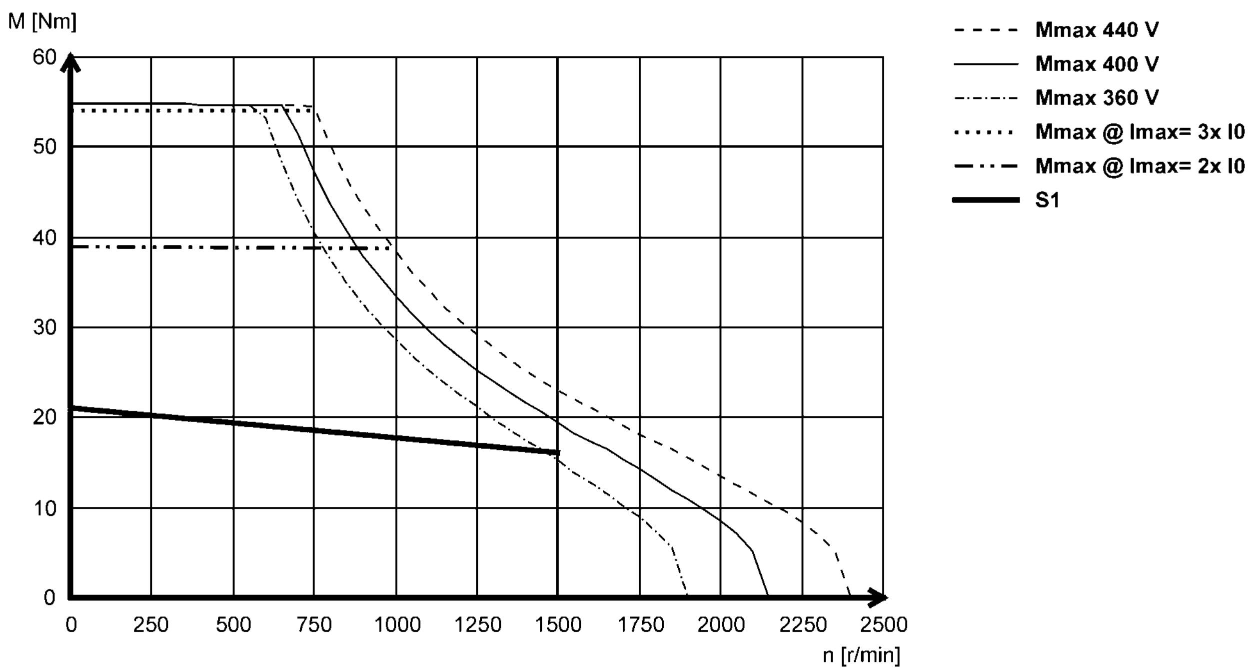
Torque characteristics

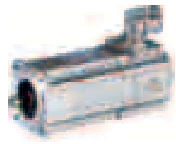
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14H12- (forced ventilated)



MCS14H15- (non-ventilated)

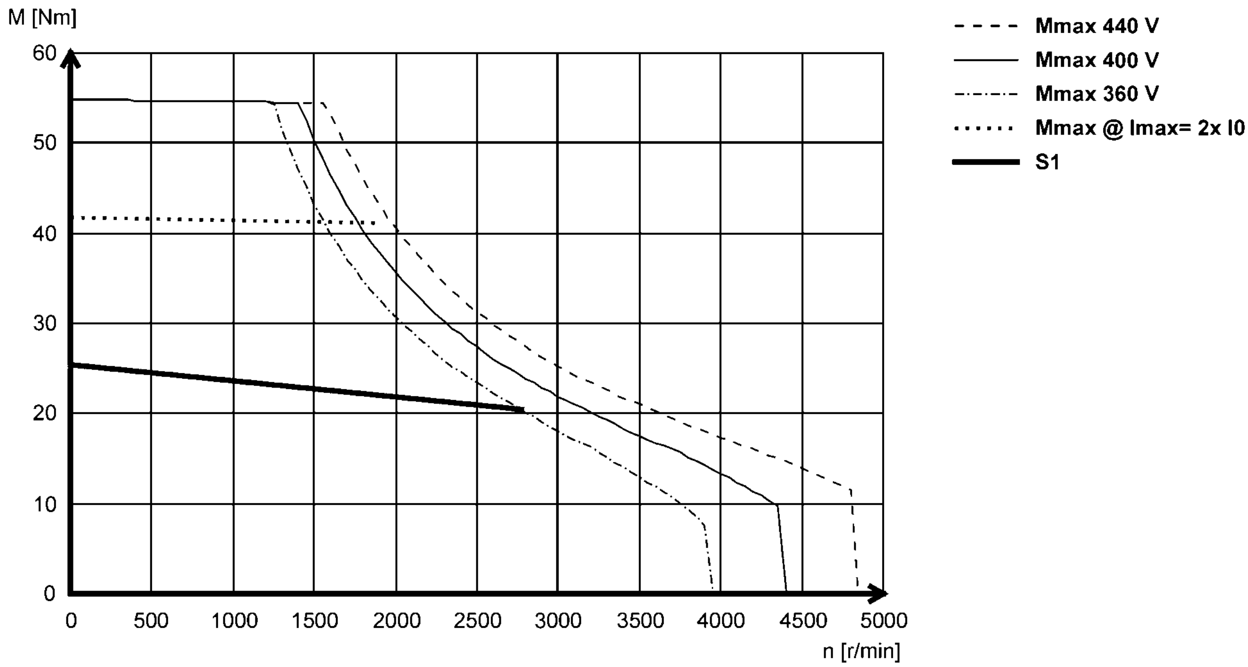




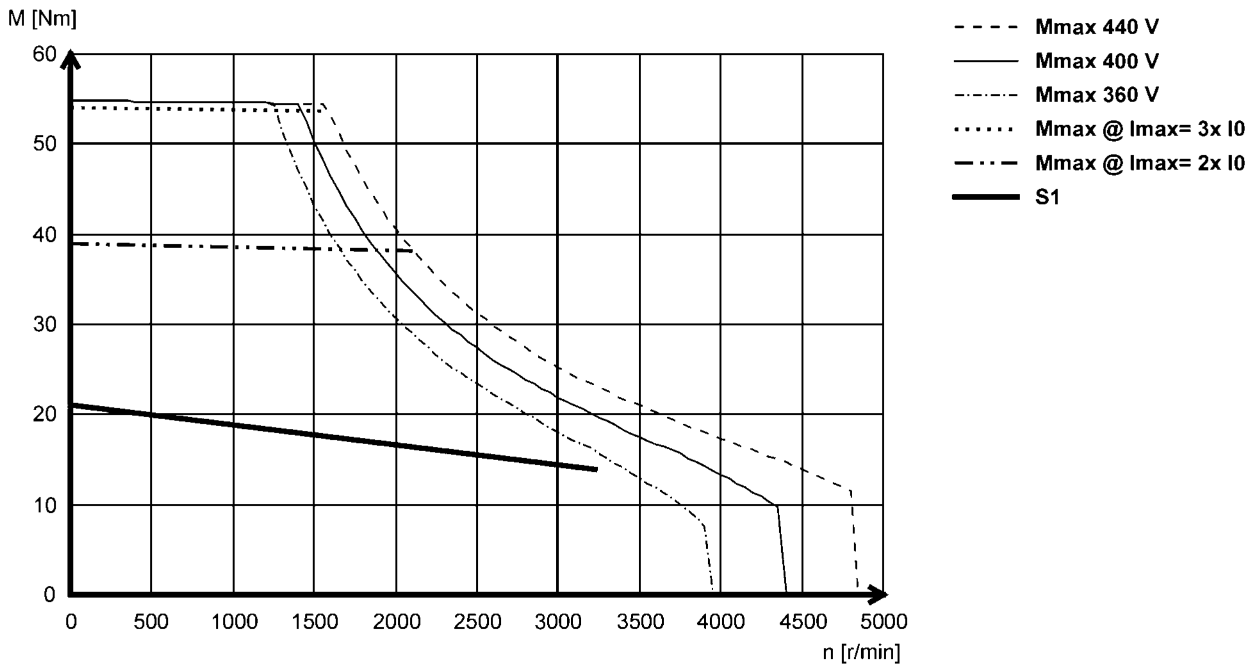
Torque characteristics

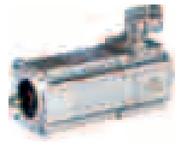
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14H28- (forced ventilated)



MCS14H32- (non-ventilated)

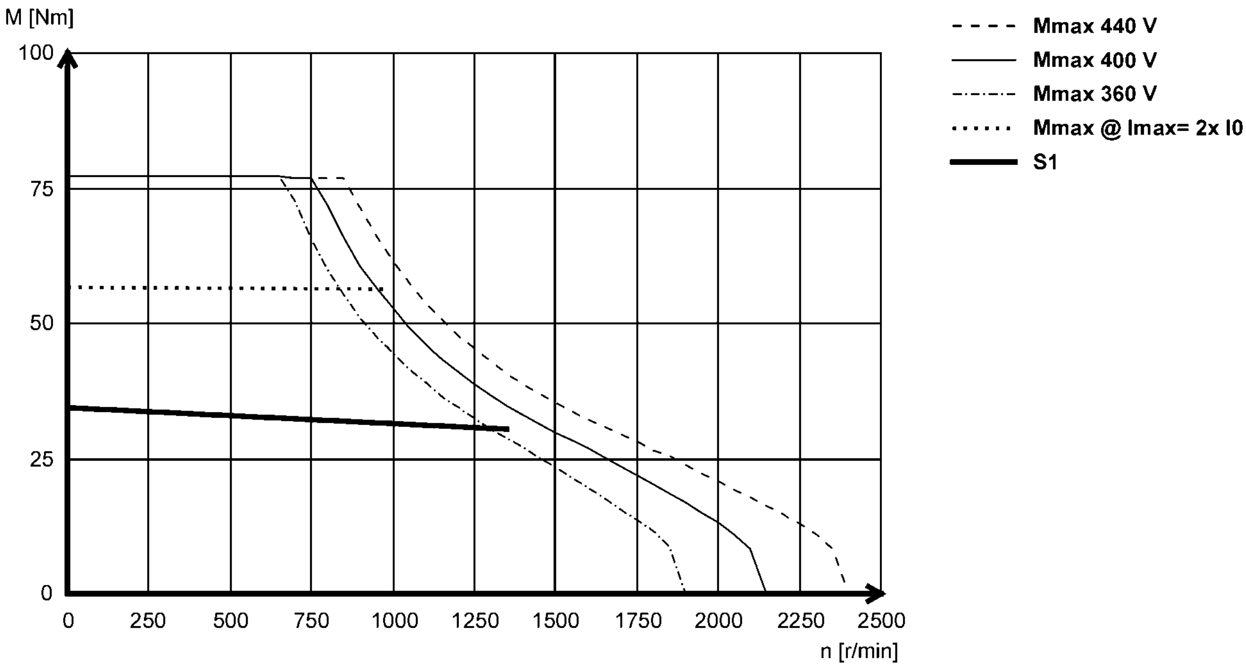




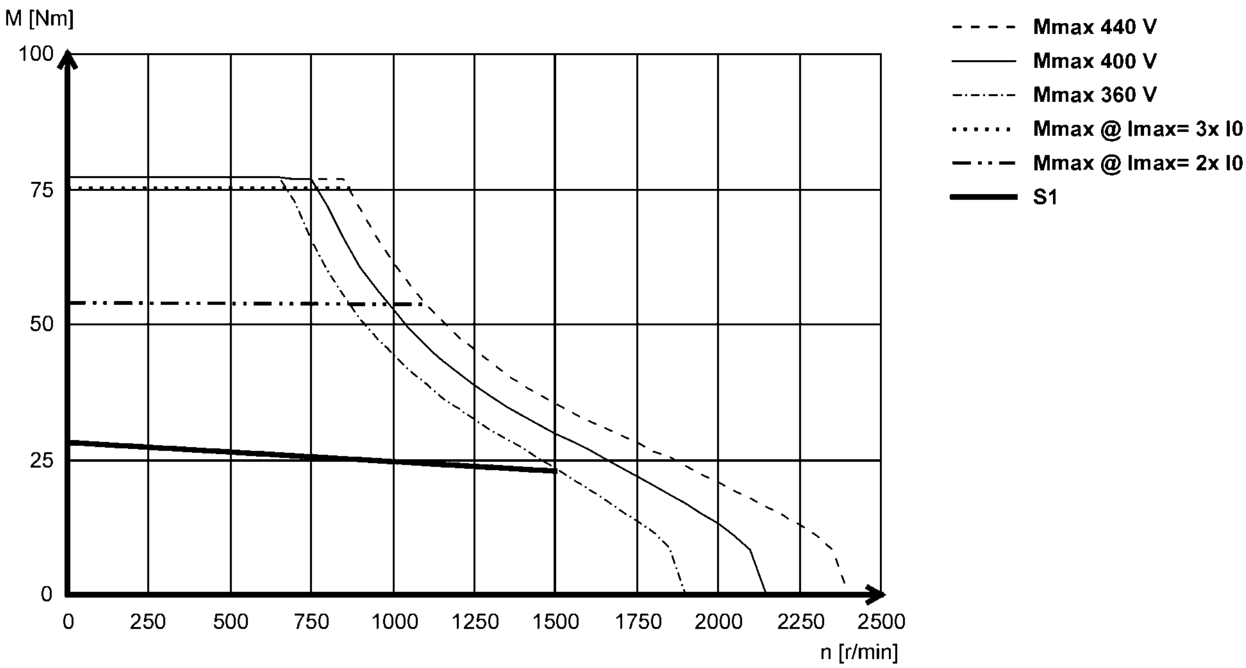
Torque characteristics

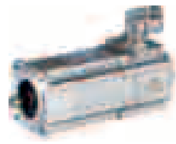
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14L14- (forced ventilated)



MCS14L15- (non-ventilated)

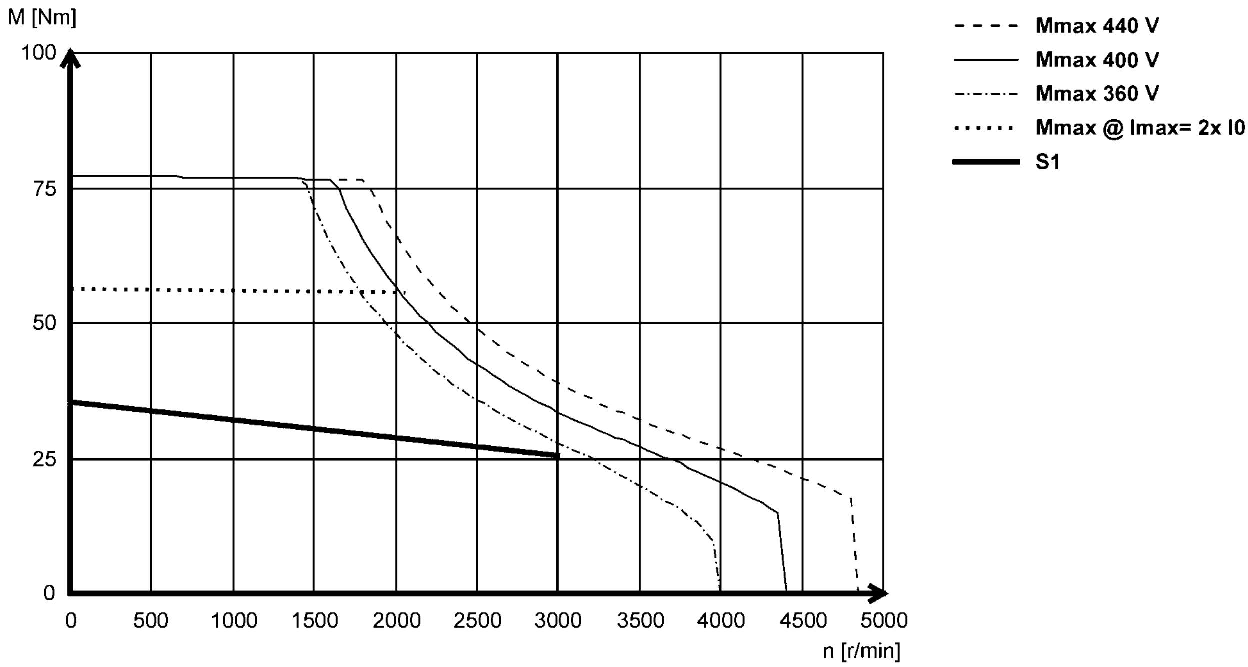




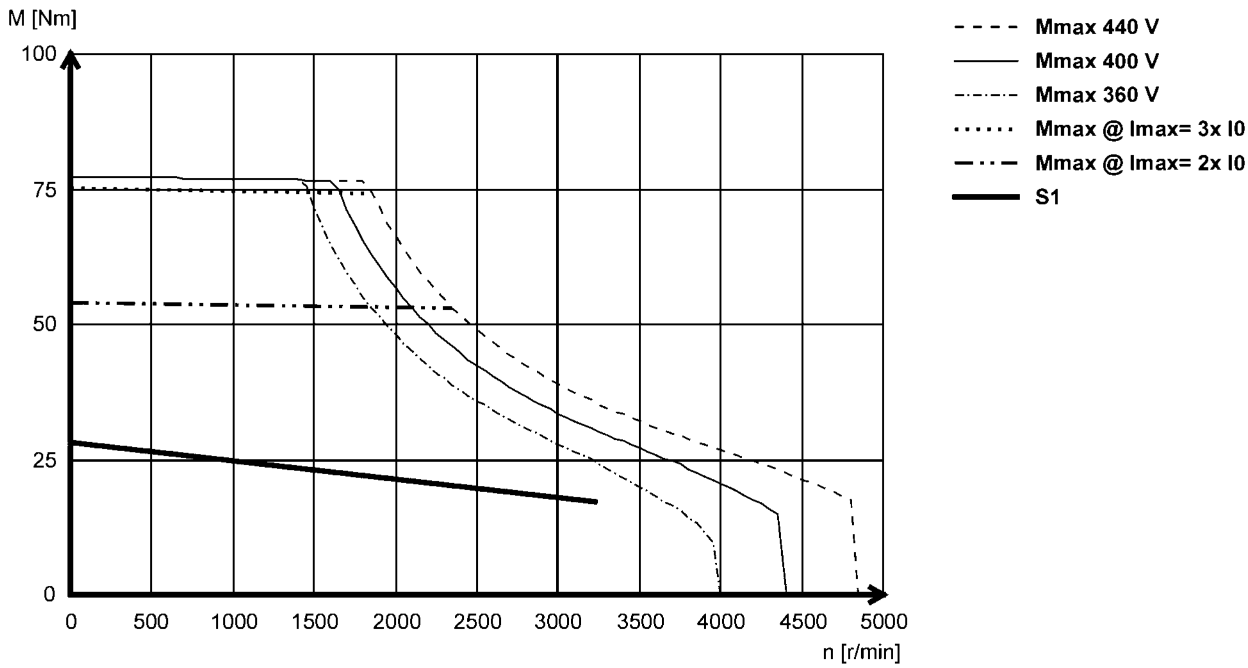
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14L30- (forced ventilated)



MCS14L32- (non-ventilated)



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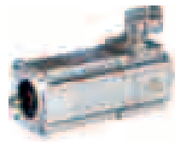
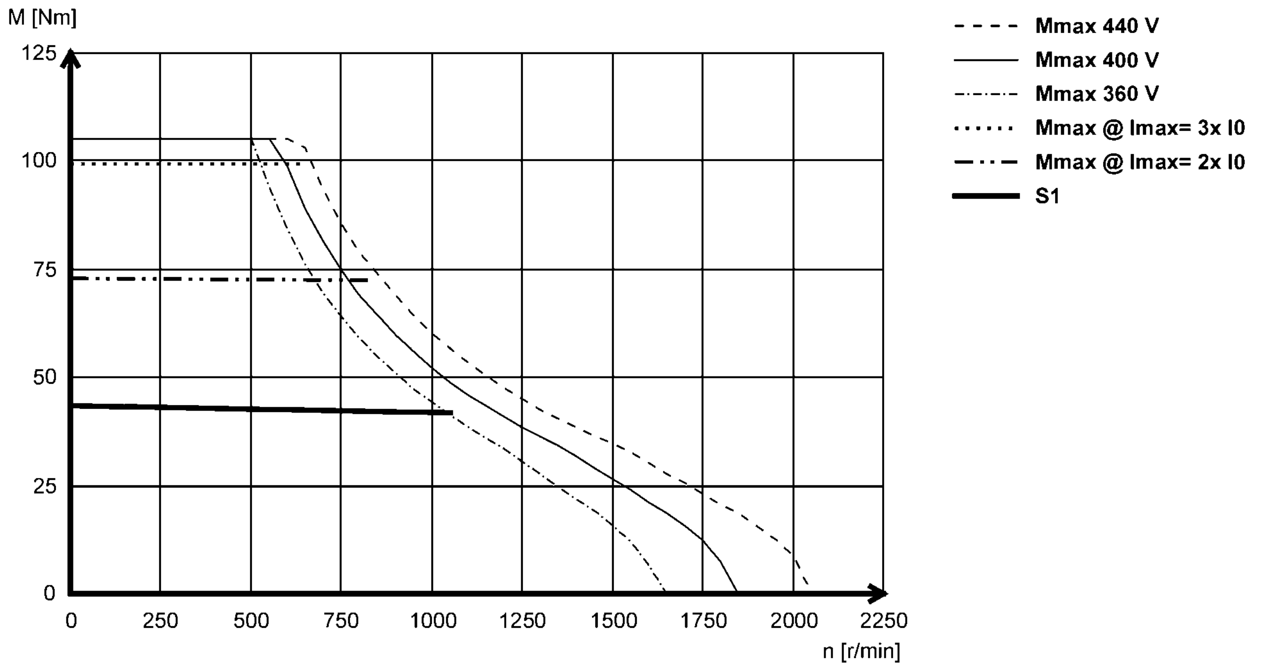


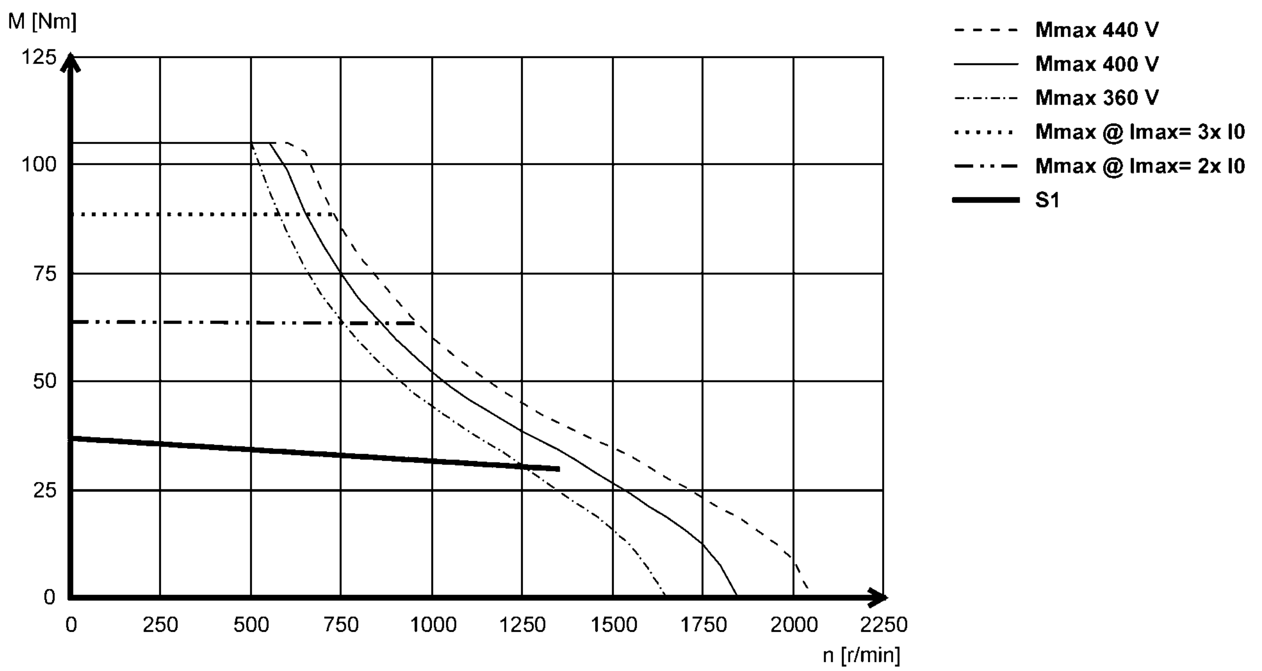
Torque characteristics

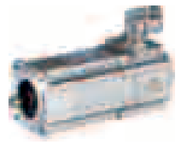
► The data applies to a mains connection voltage of 3 x 400 V.
► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14P11- (forced ventilated)



MCS14P14- (non-ventilated)

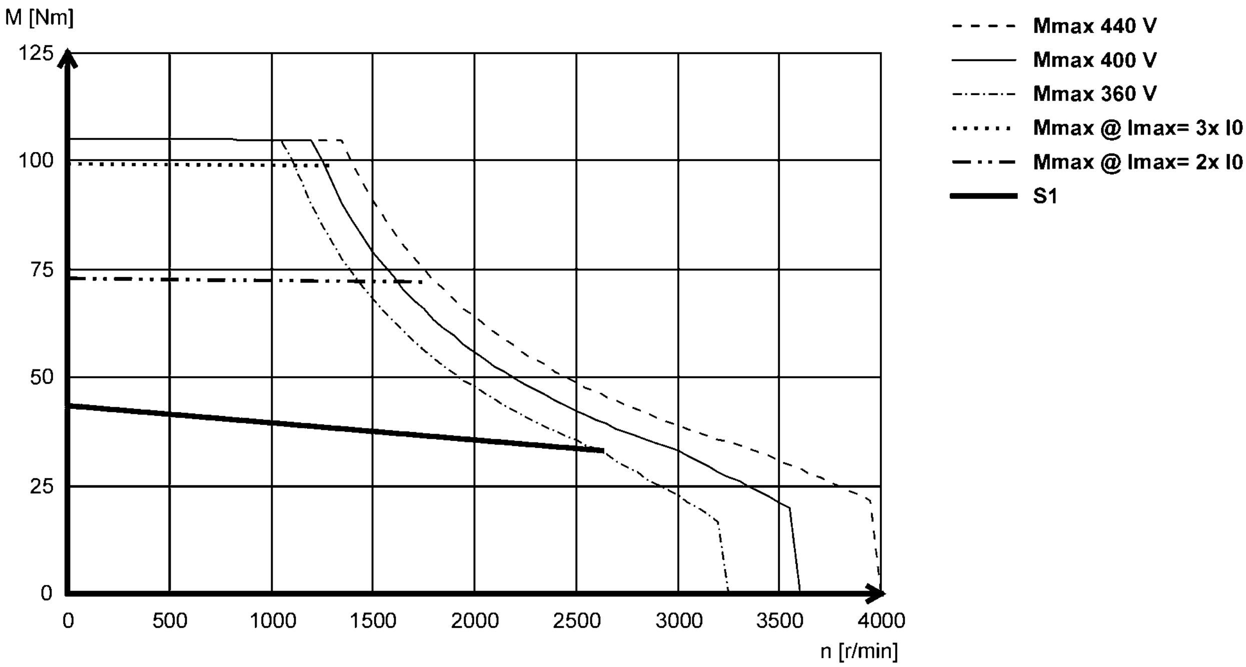




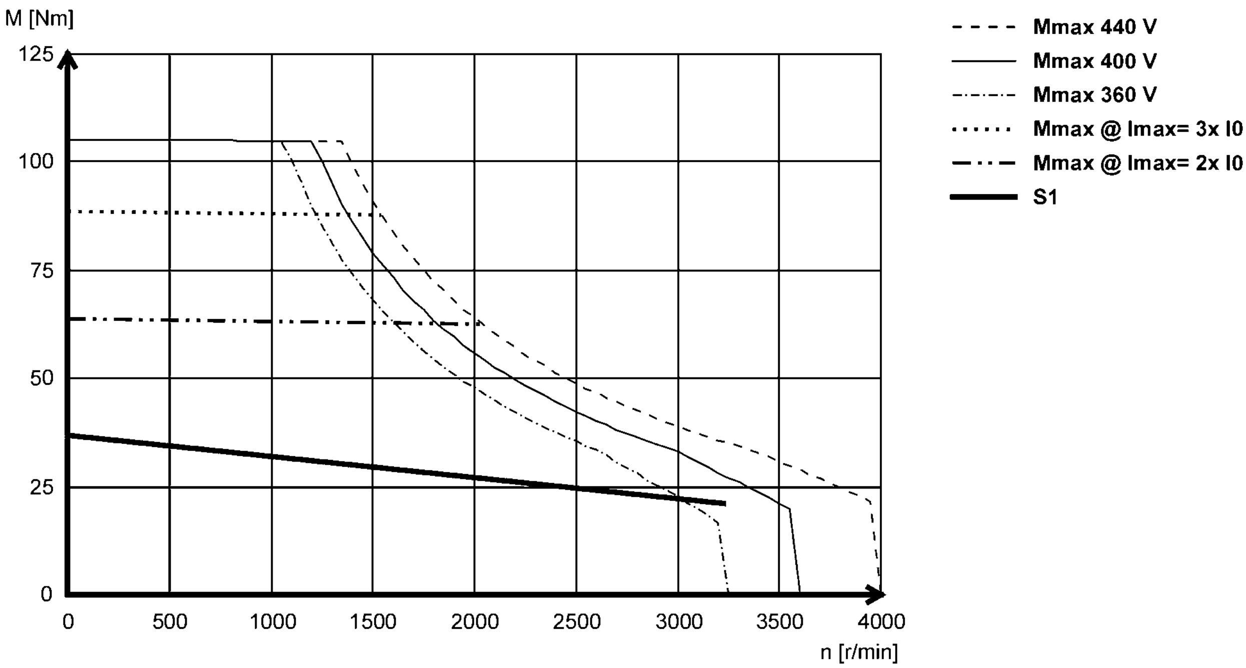
Torque characteristics

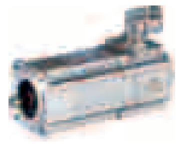
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS14P26- (forced ventilated)



MCS14P32- (non-ventilated)

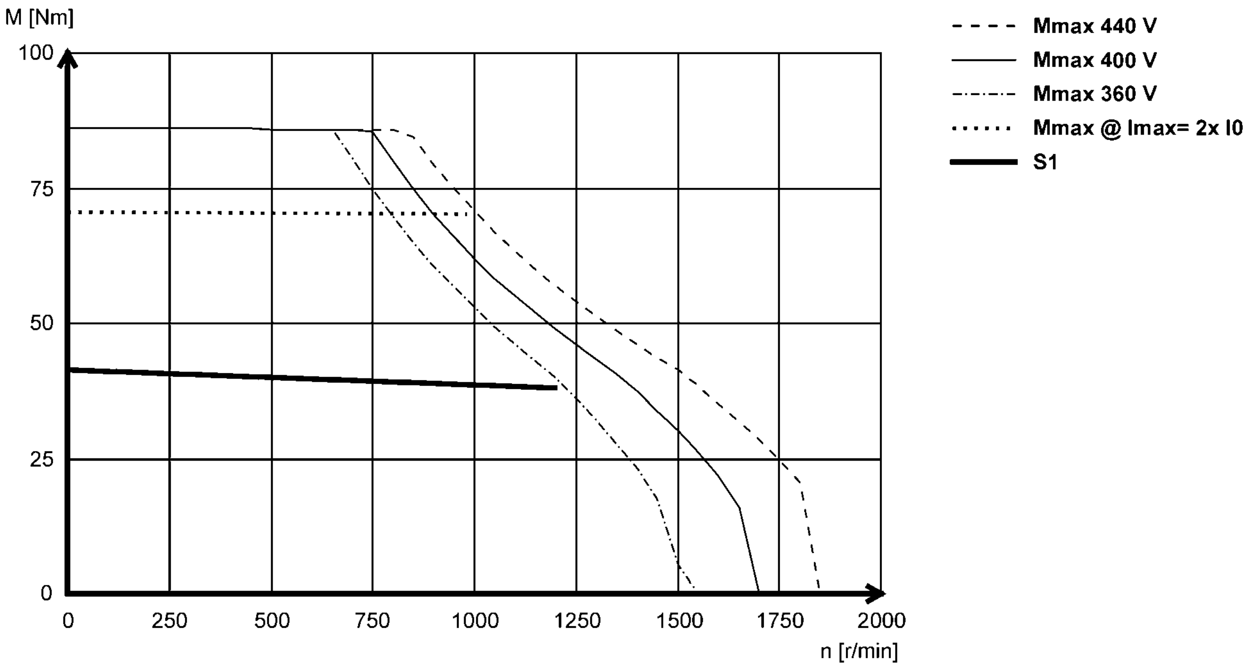




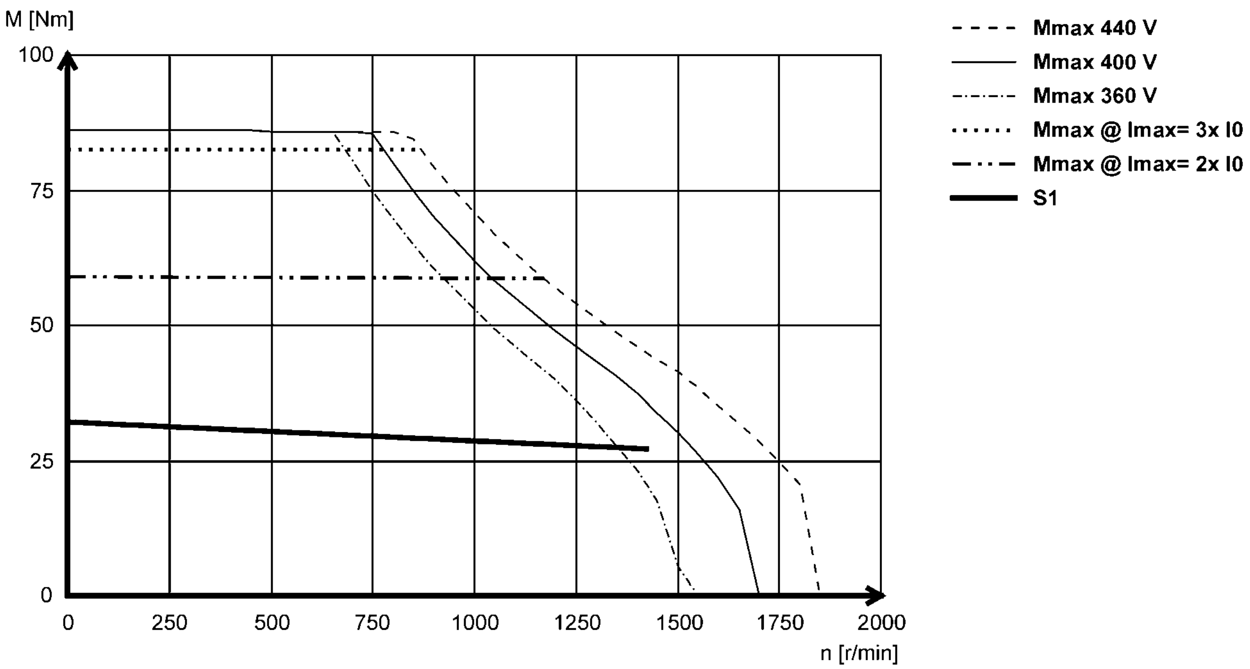
Torque characteristics

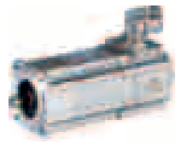
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19F12- (forced ventilated)



MCS19F14- (non-ventilated)

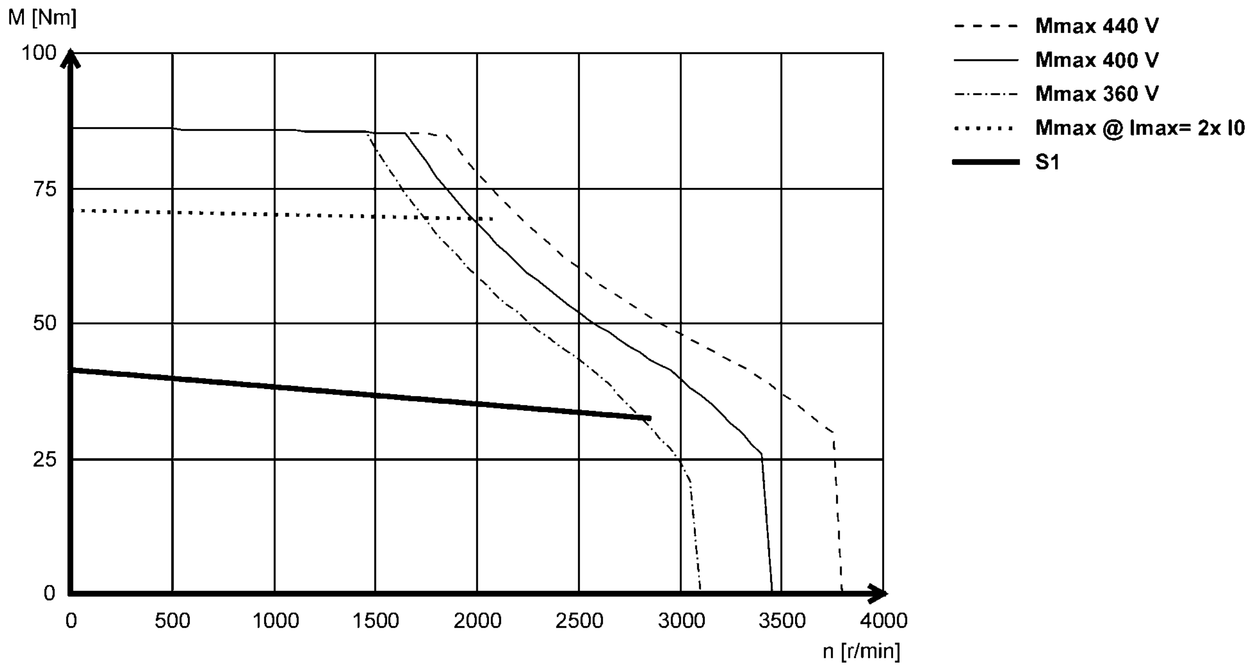




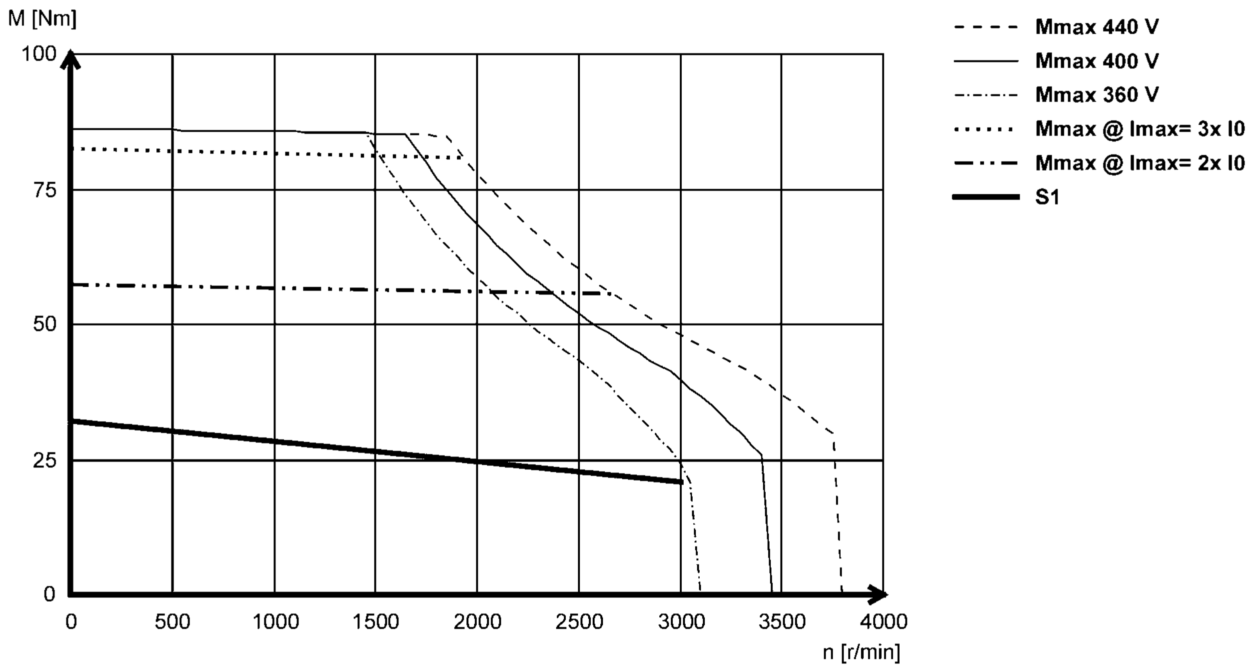
Torque characteristics

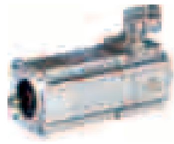
- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19F29- (forced ventilated)



MCS19F30- (non-ventilated)

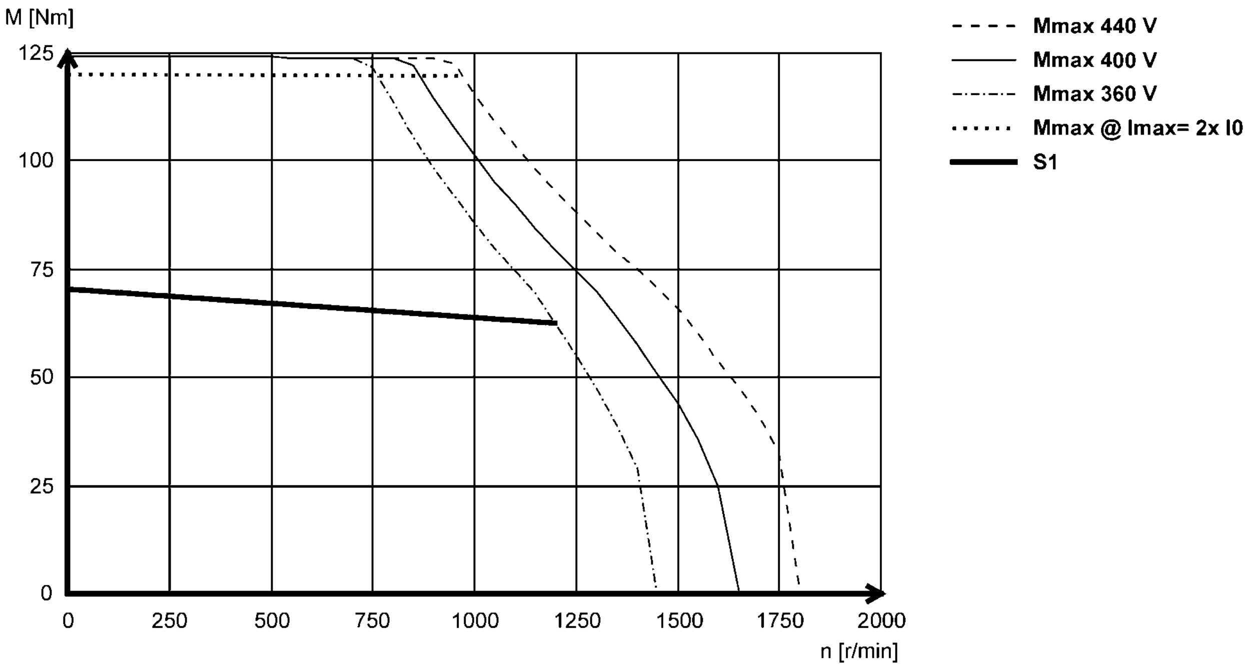




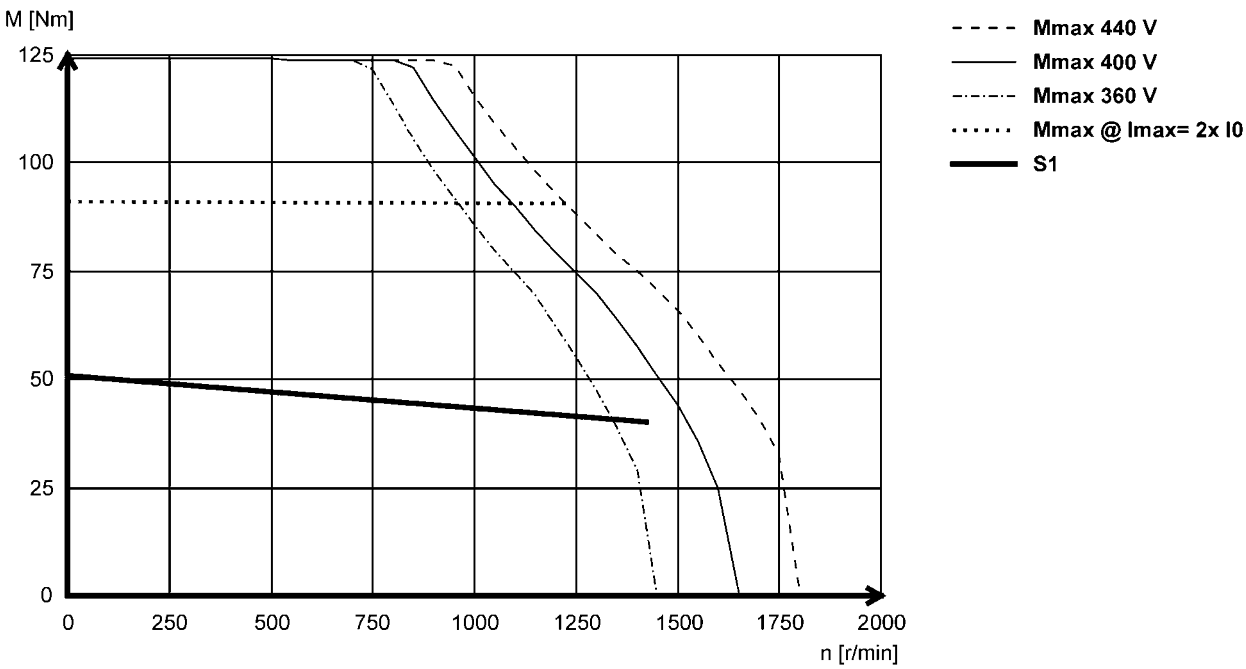
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19J12- (forced ventilated)



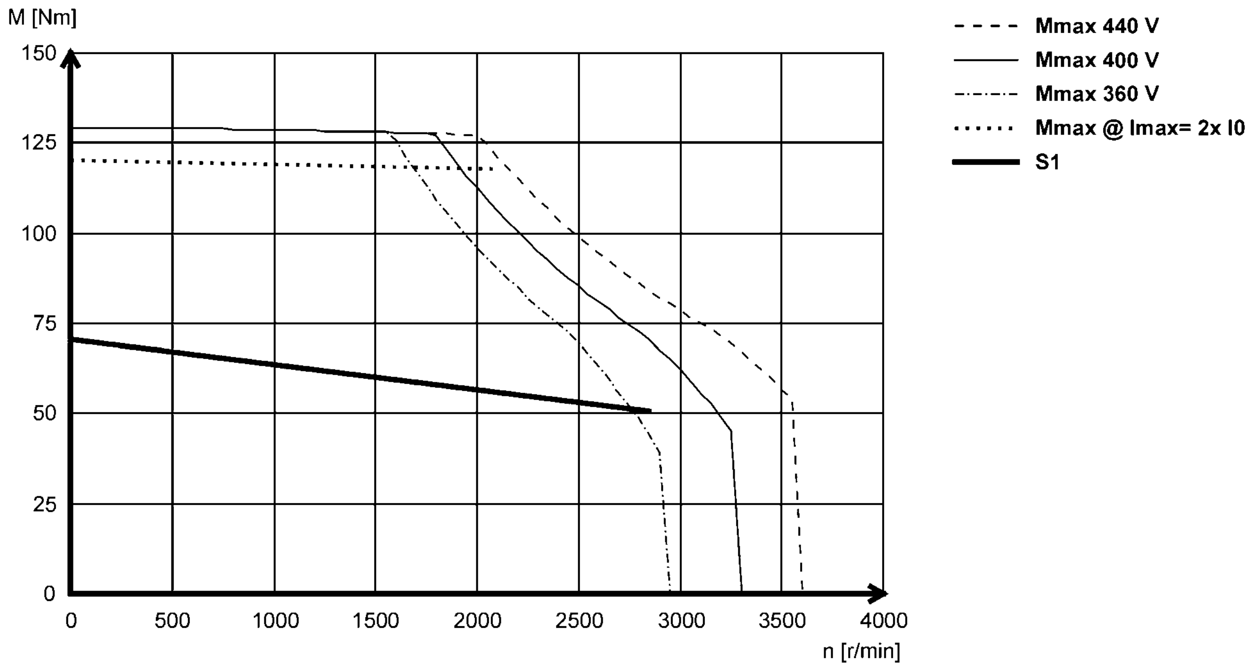
MCS19J14- (non-ventilated)



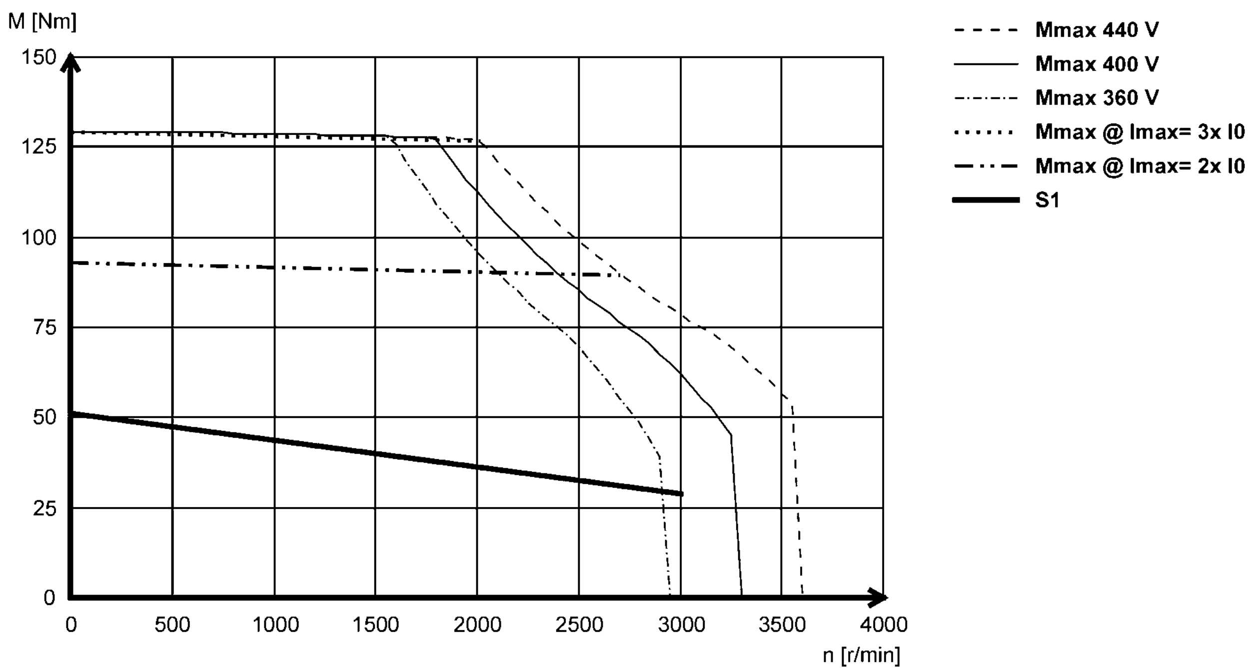
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19J29- (forced ventilated)



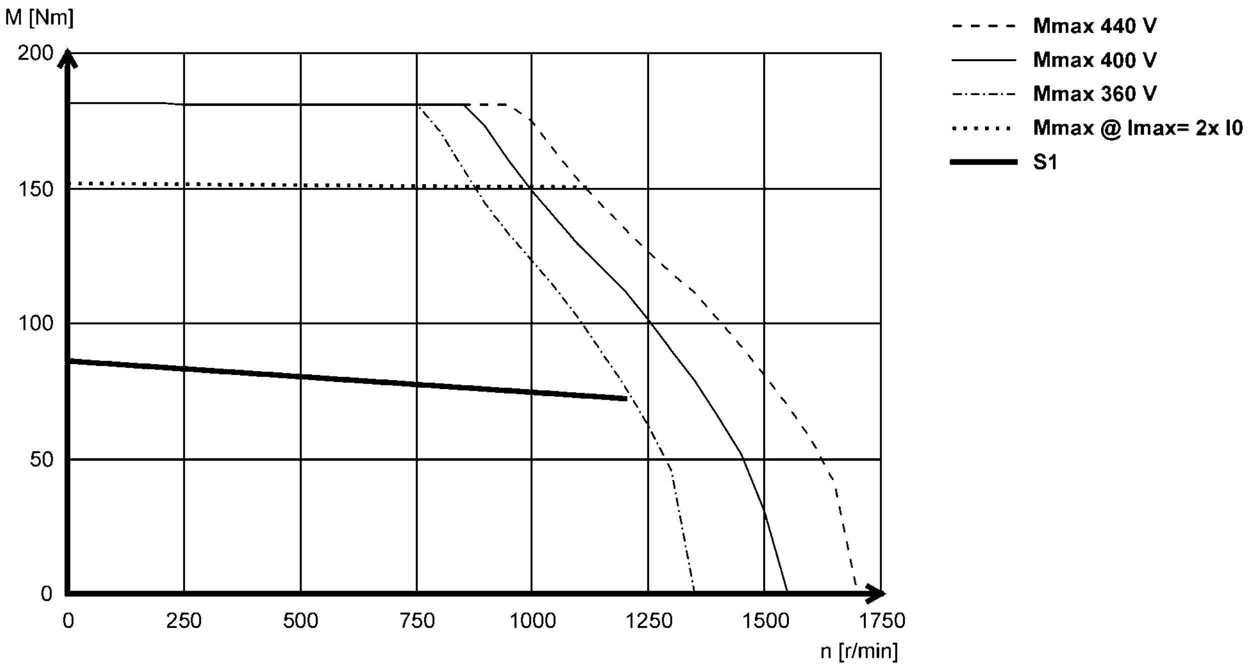
MCS19J30- (non-ventilated)



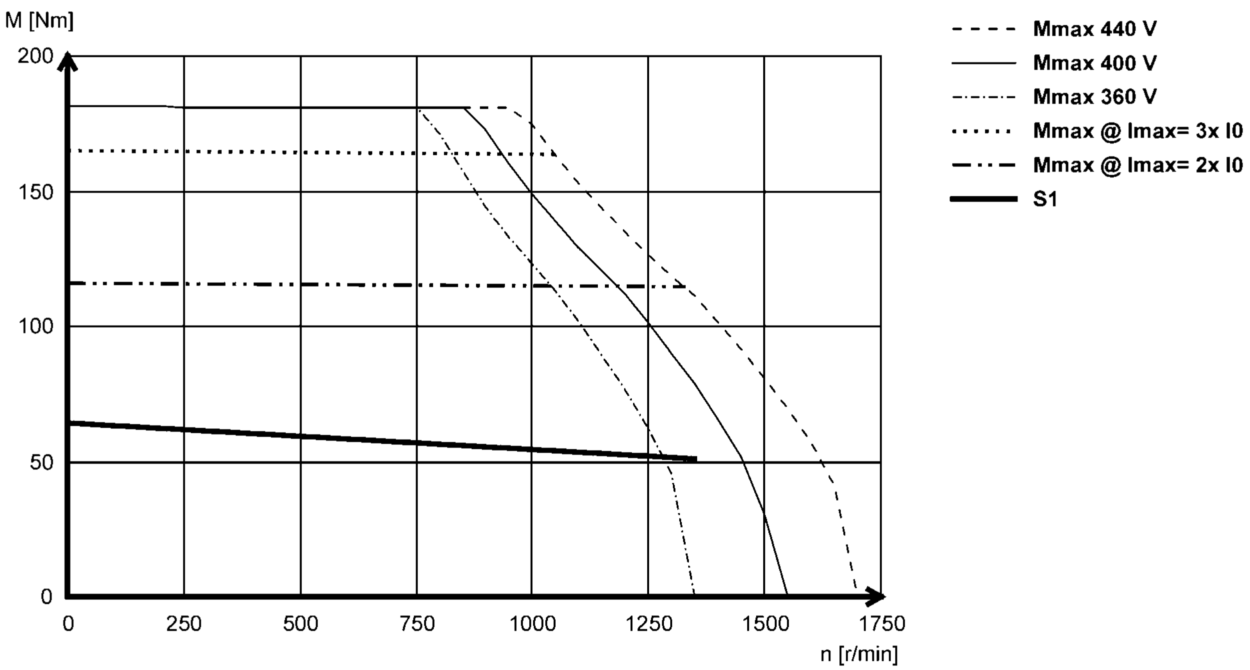
Torque characteristics

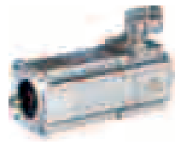
- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19P12 (forced ventilated)



MCS19P14- (non-ventilated)

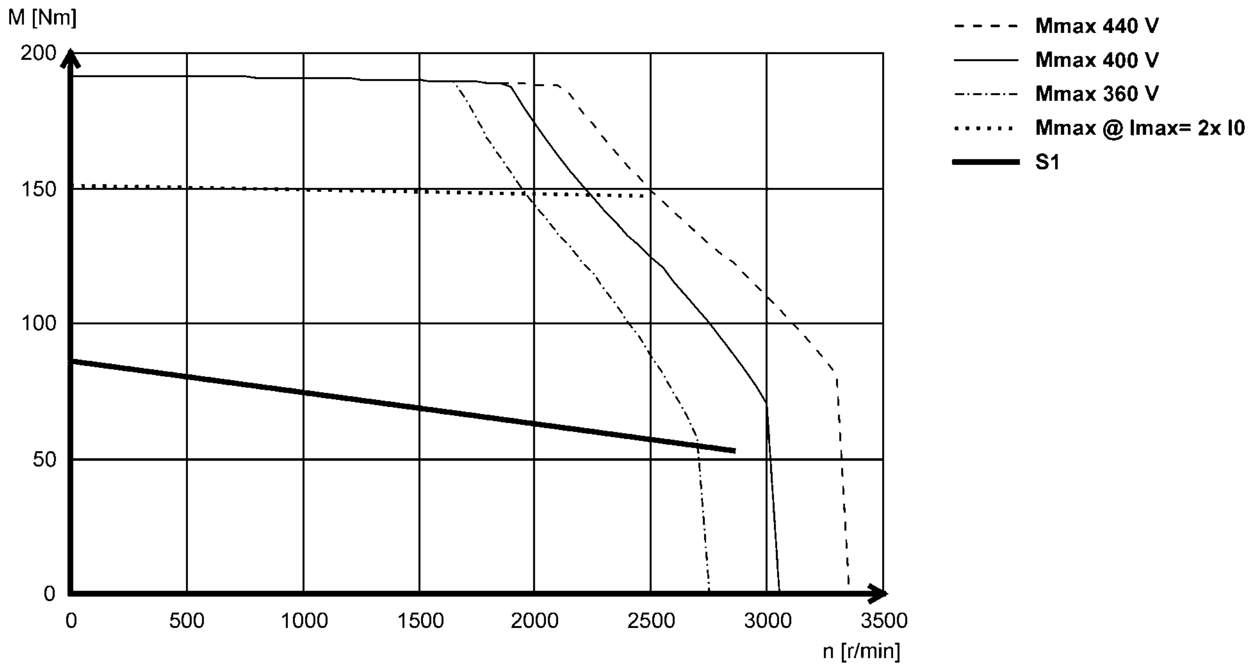




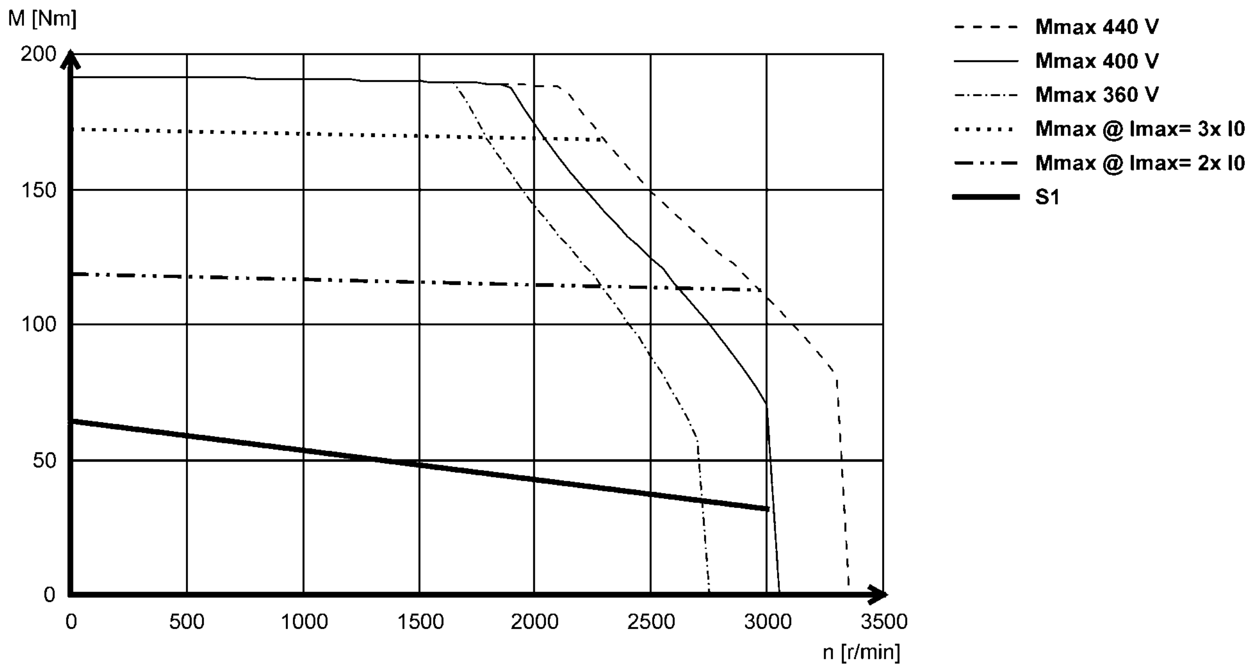
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS19P29- (forced ventilated)



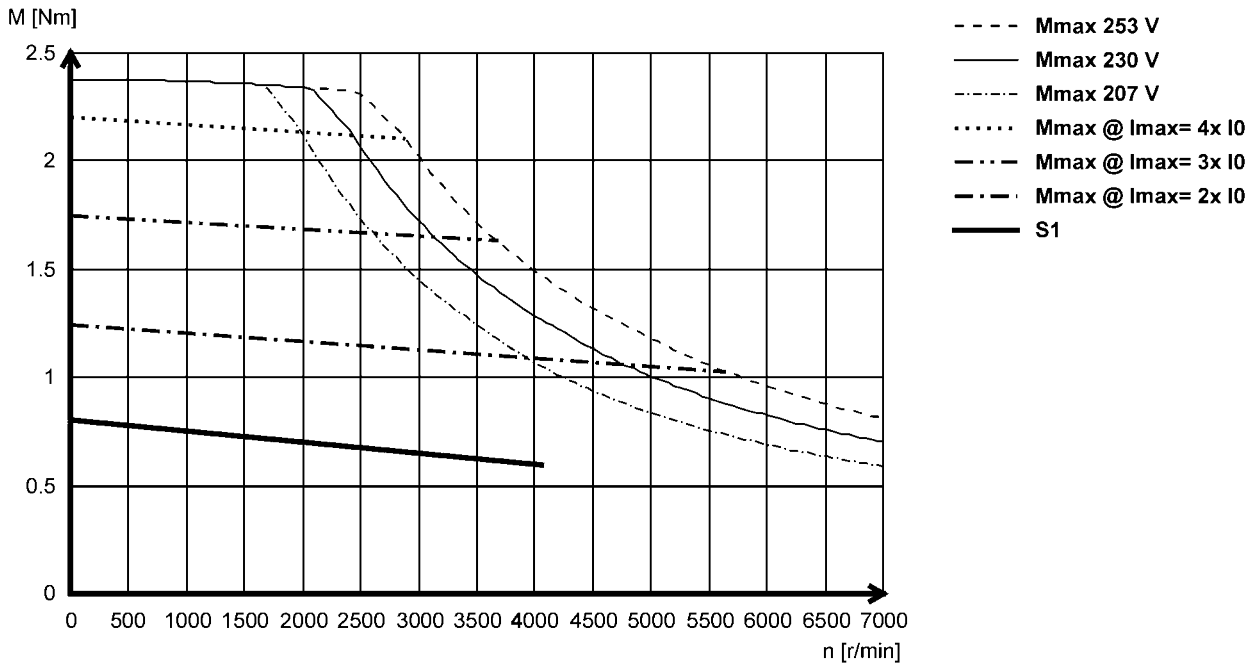
MCS19P30- (non-ventilated)



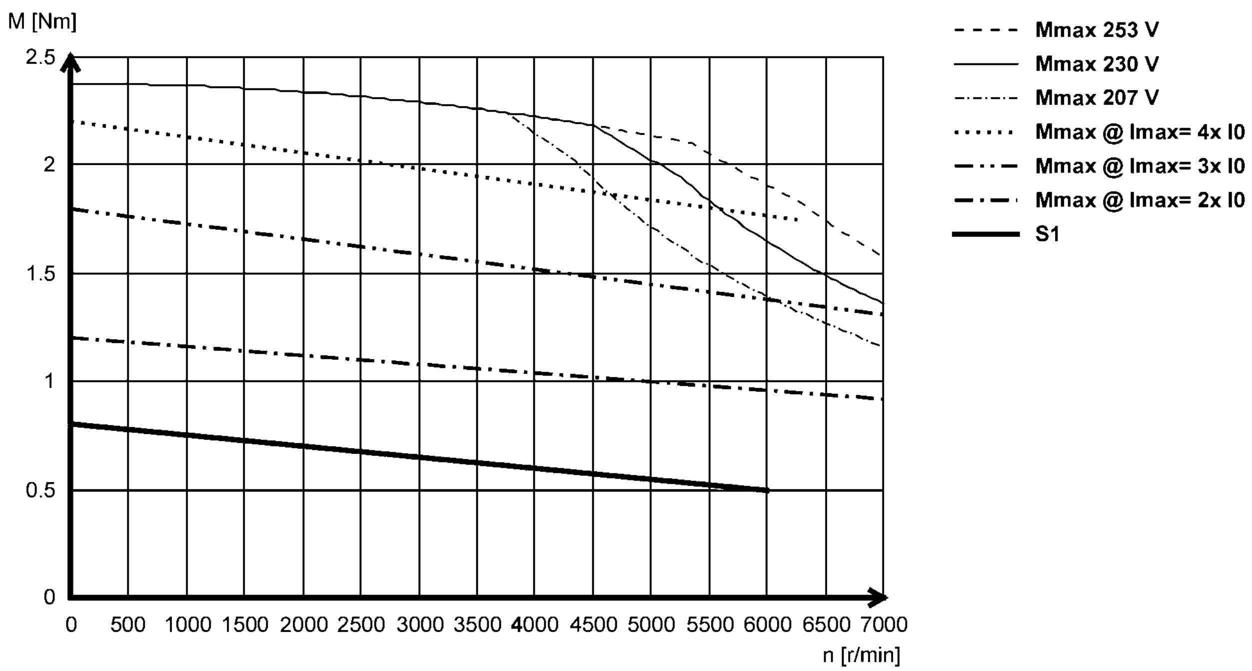
Torque characteristics

- The data applies to a mains connection voltage of 3 x 230 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

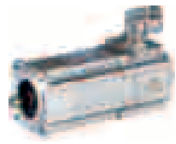
MCS06C41L (non-ventilated)



MCS06C60L (non-ventilated)



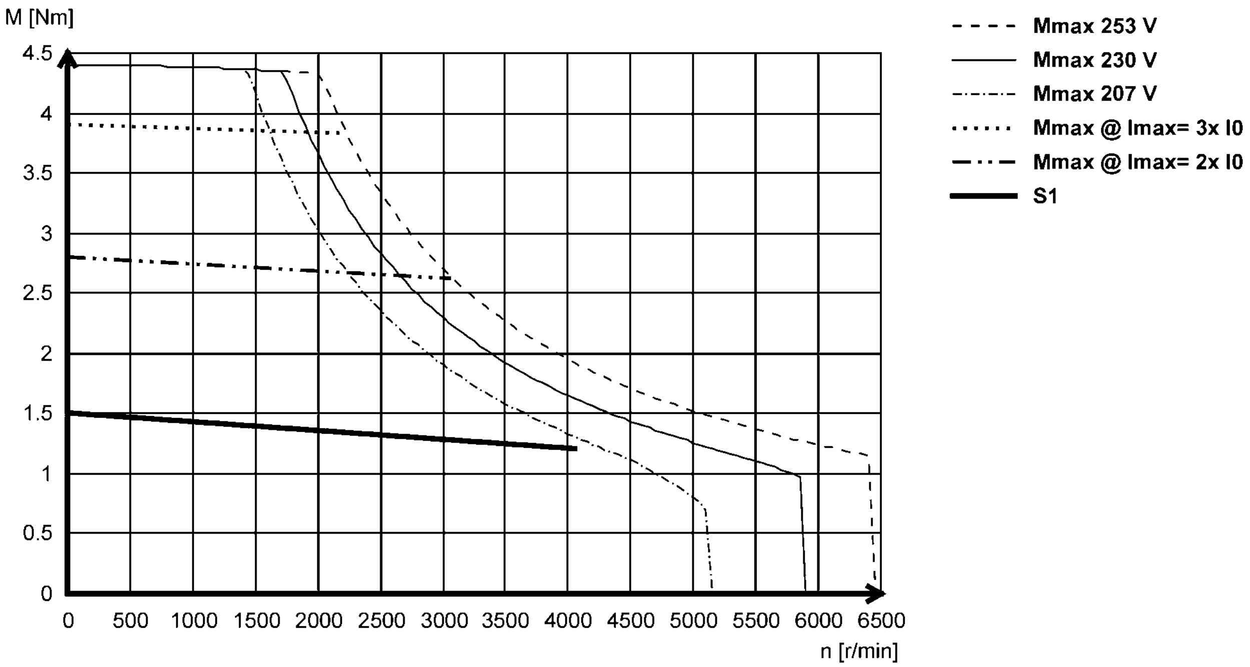
5.1



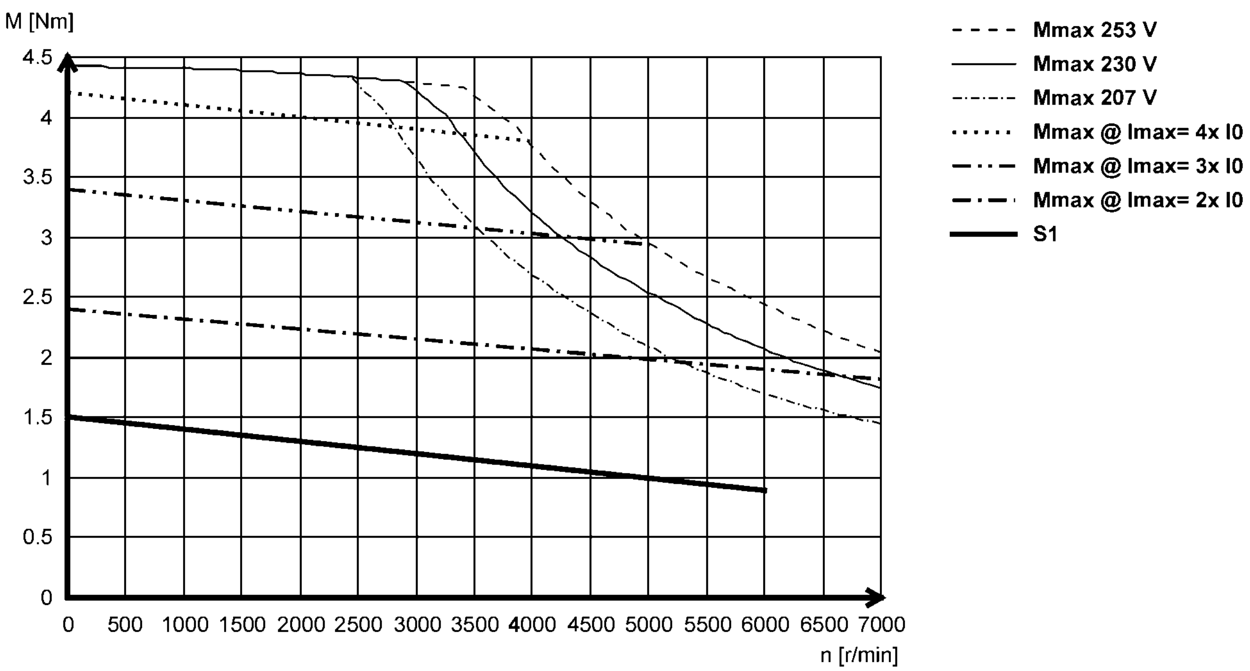
Torque characteristics

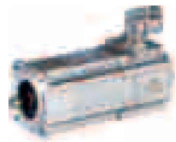
- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS06F41L (non-ventilated)



MCS06F60L (non-ventilated)

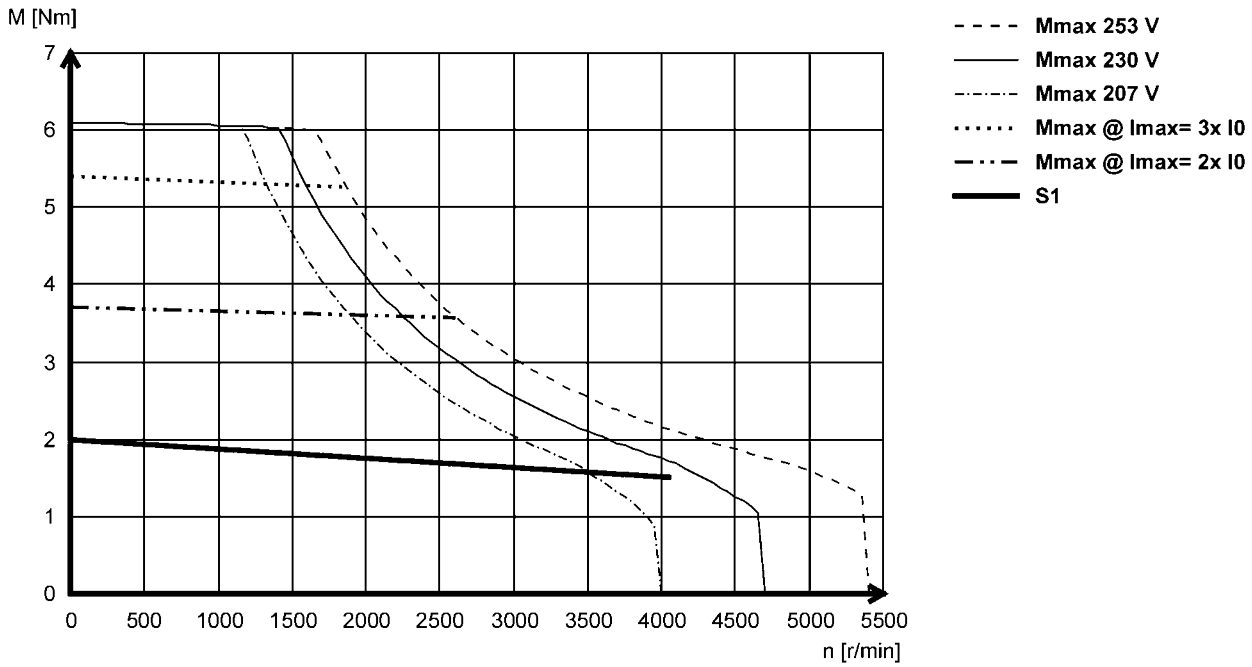




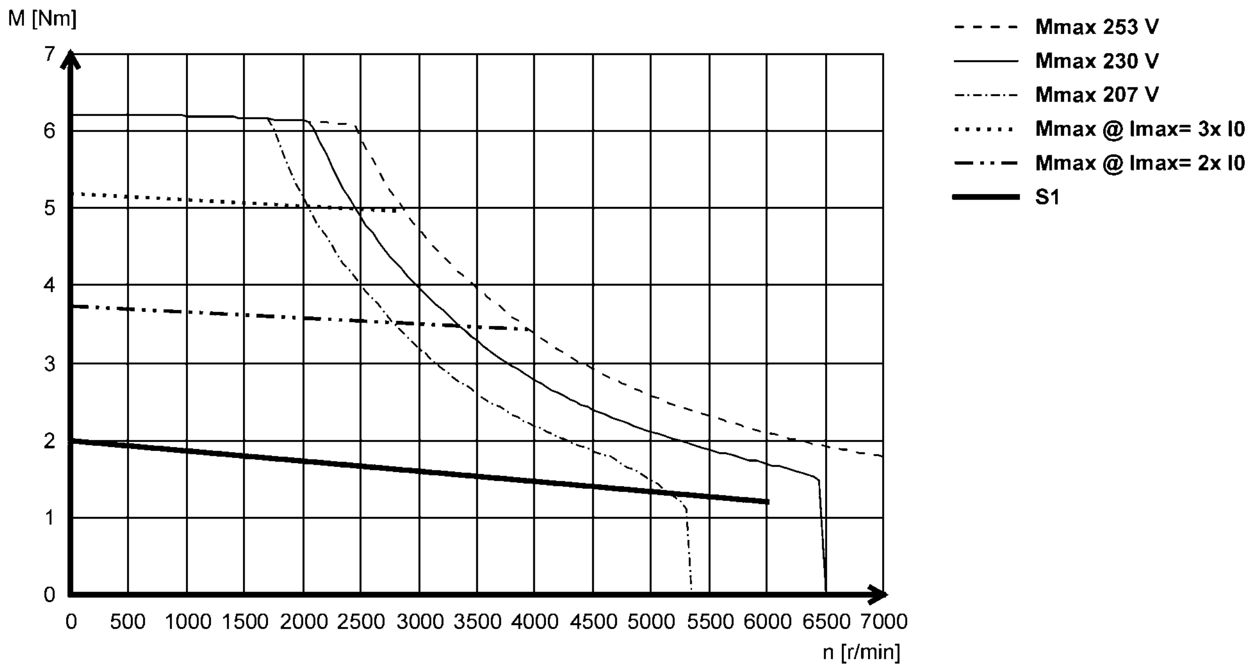
Torque characteristics

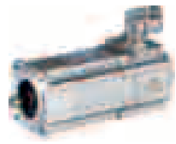
- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS06I41L (non-ventilated)



MCS06I60L (non-ventilated)

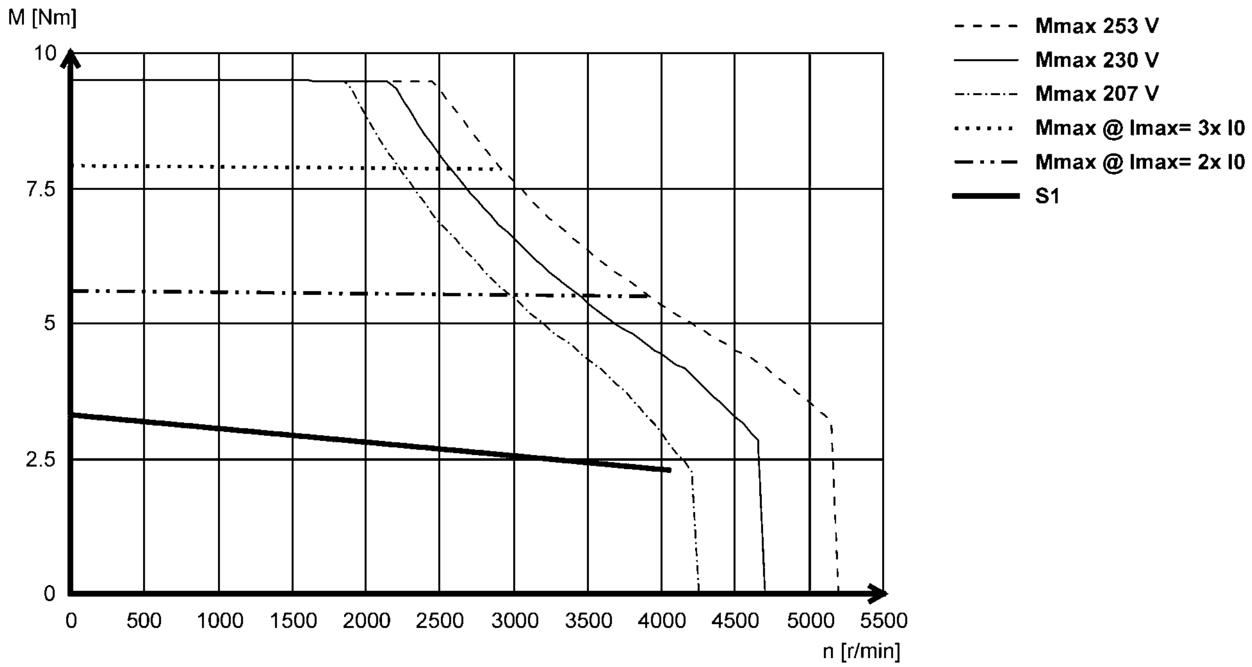




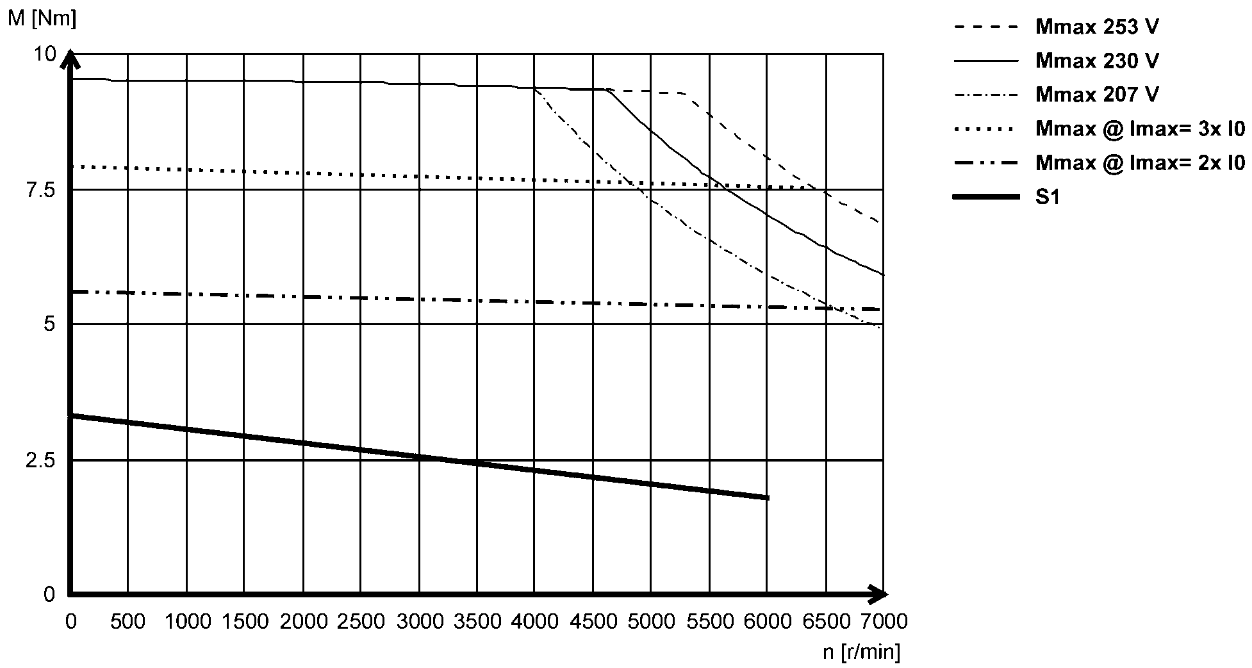
Torque characteristics

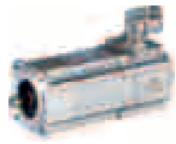
- The data applies to a mains connection voltage of 3 x 230 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09D41L (non-ventilated)



MCS09D60L (non-ventilated)

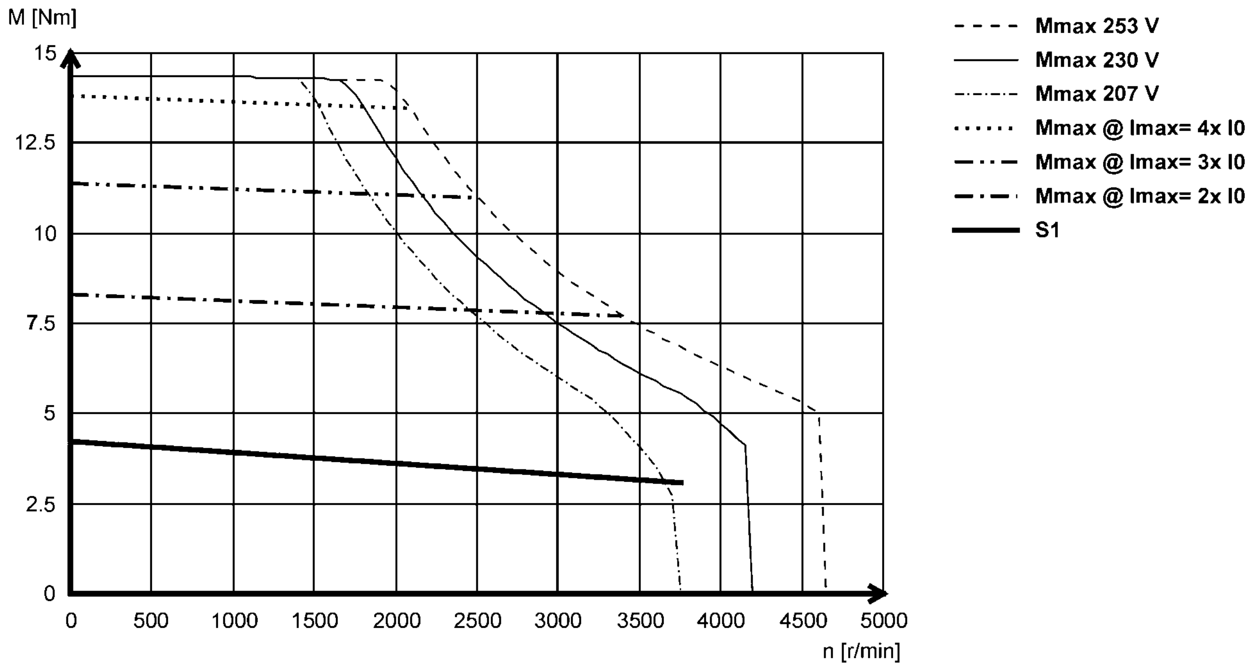




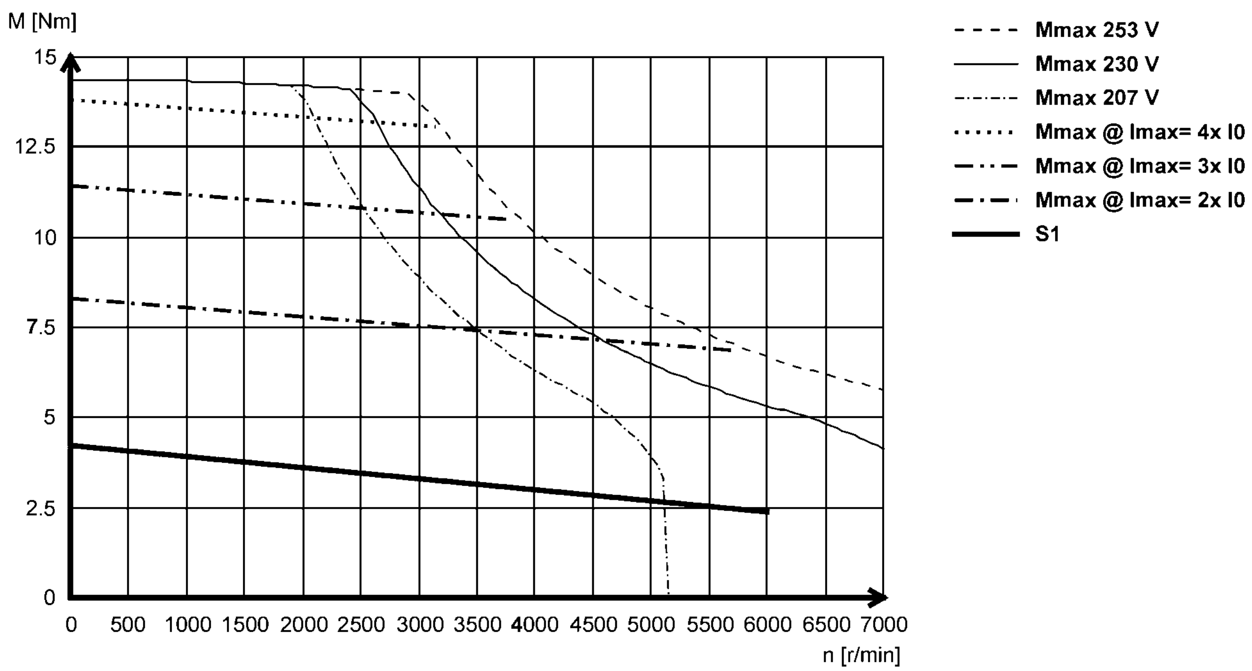
Torque characteristics

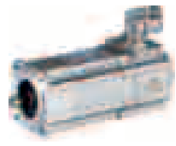
- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09F38L (non-ventilated)



MCS09F60L (non-ventilated)

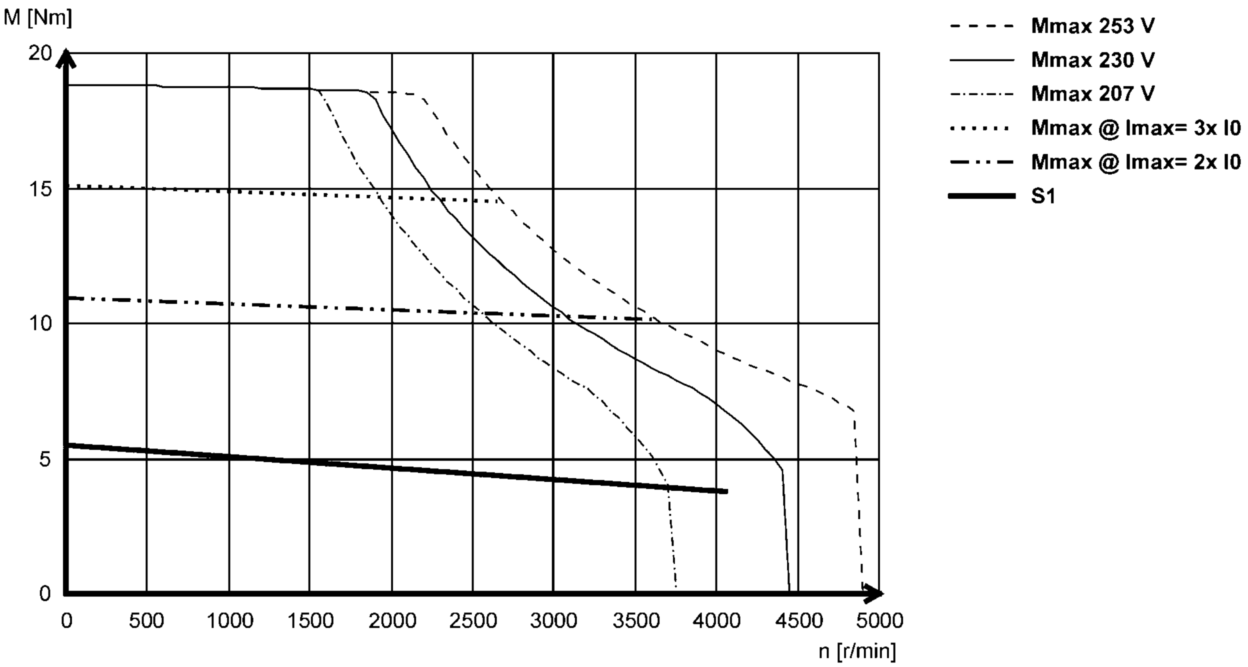




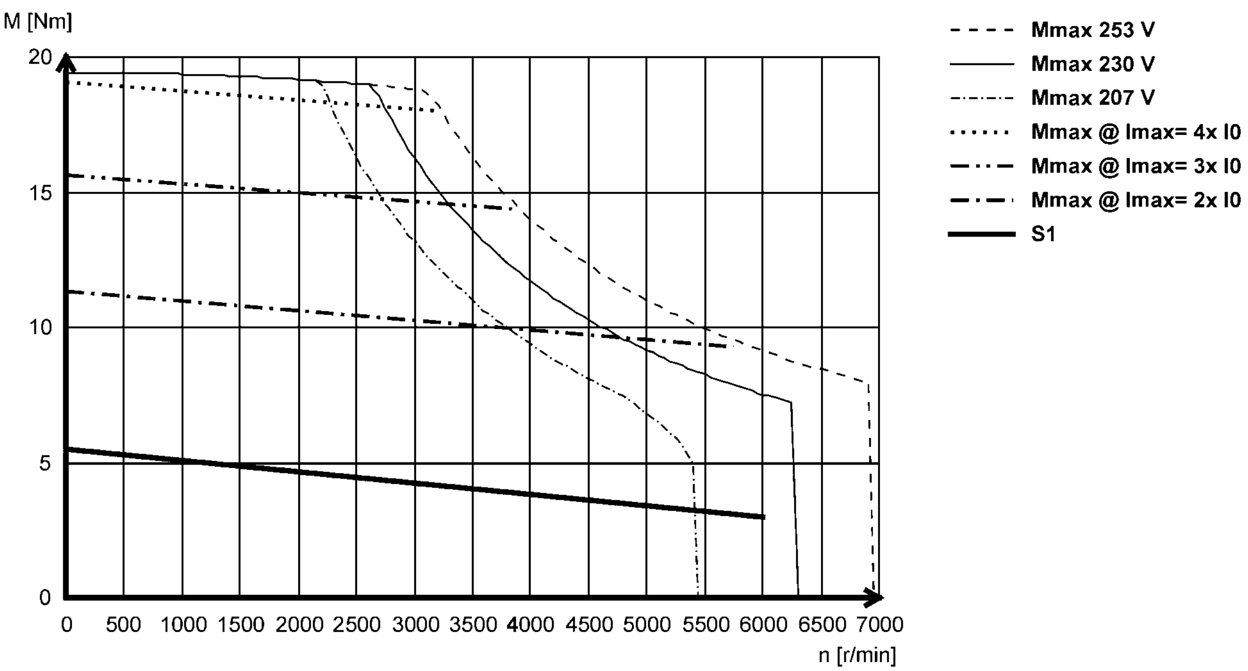
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS09H41L (non-ventilated)



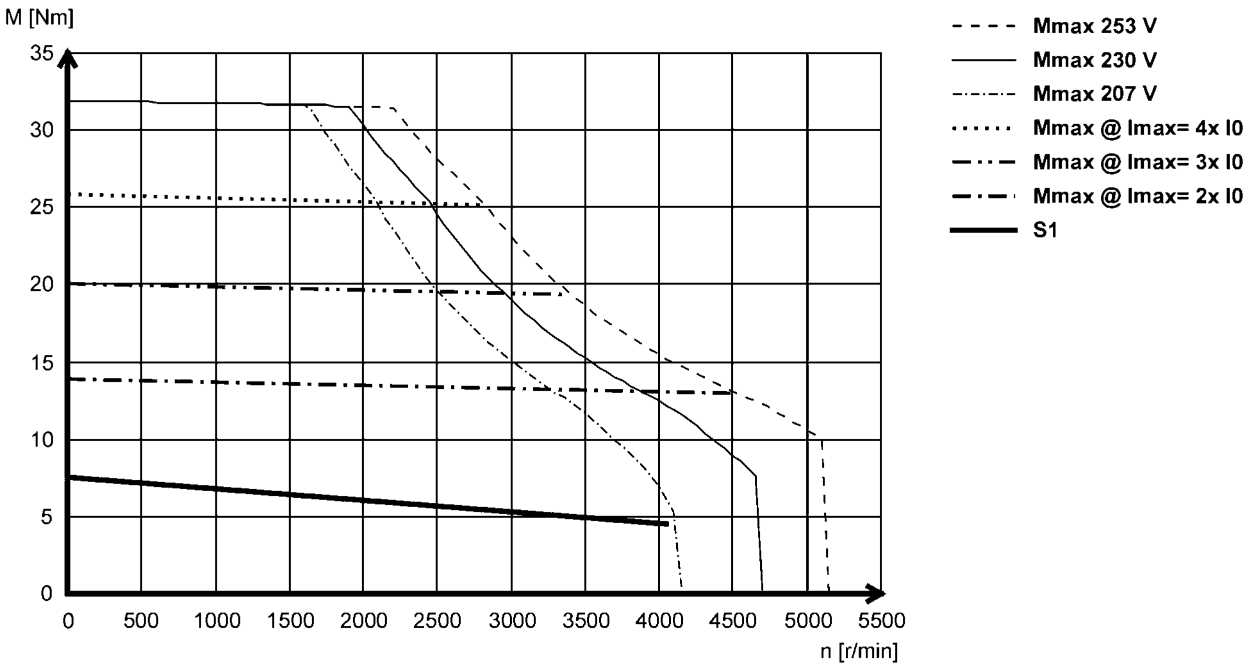
MCS09H60L (non-ventilated)



Torque characteristics

- The data applies to a mains connection voltage of 3 x 230 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

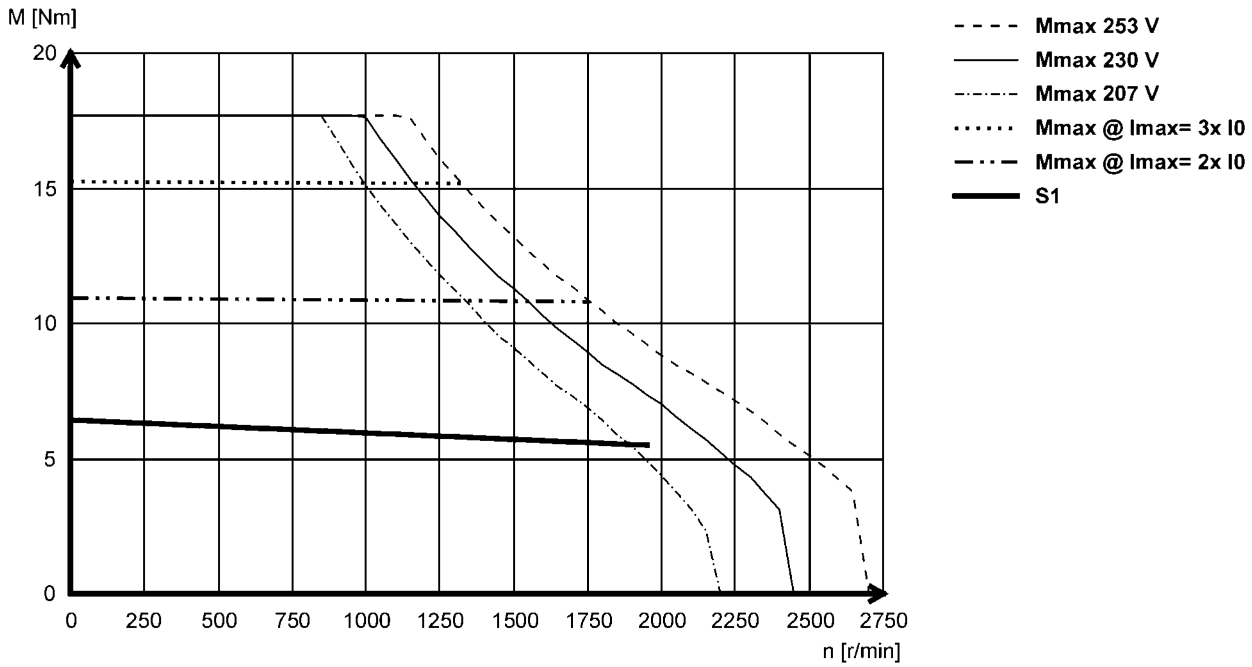
MCS09L41L (non-ventilated)



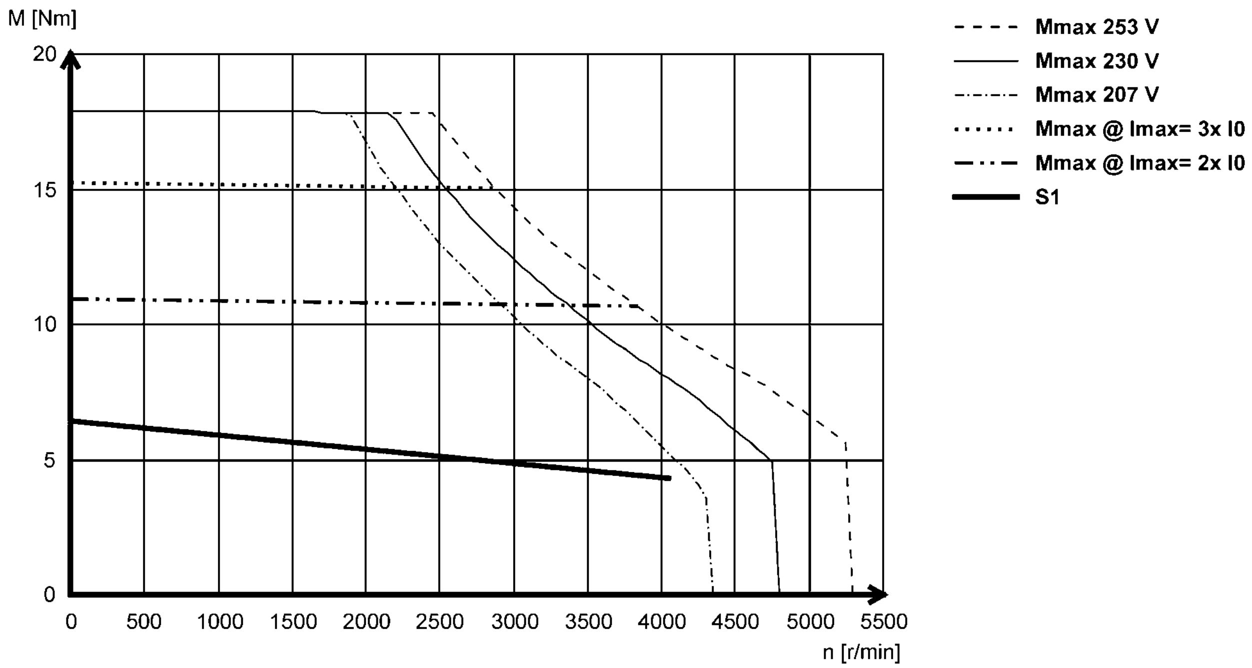
Torque characteristics

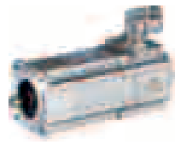
- The data applies to a mains connection voltage of 3 x 230 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12D20L (non-ventilated)



MCS12D41L (non-ventilated)

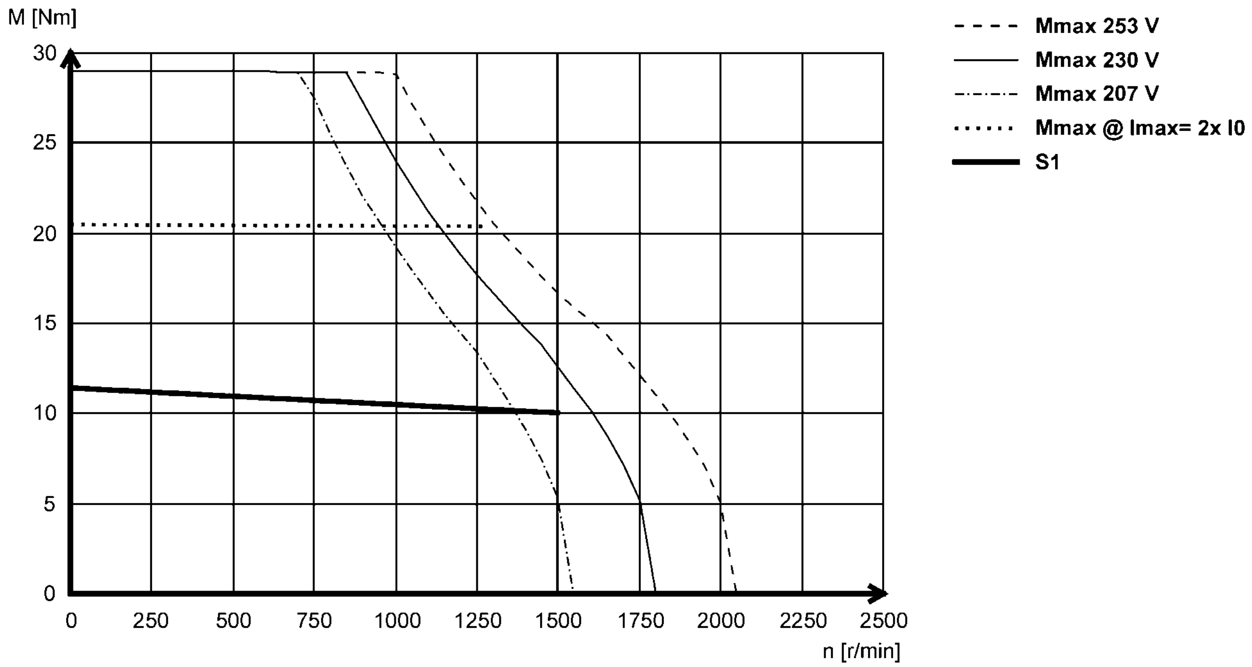




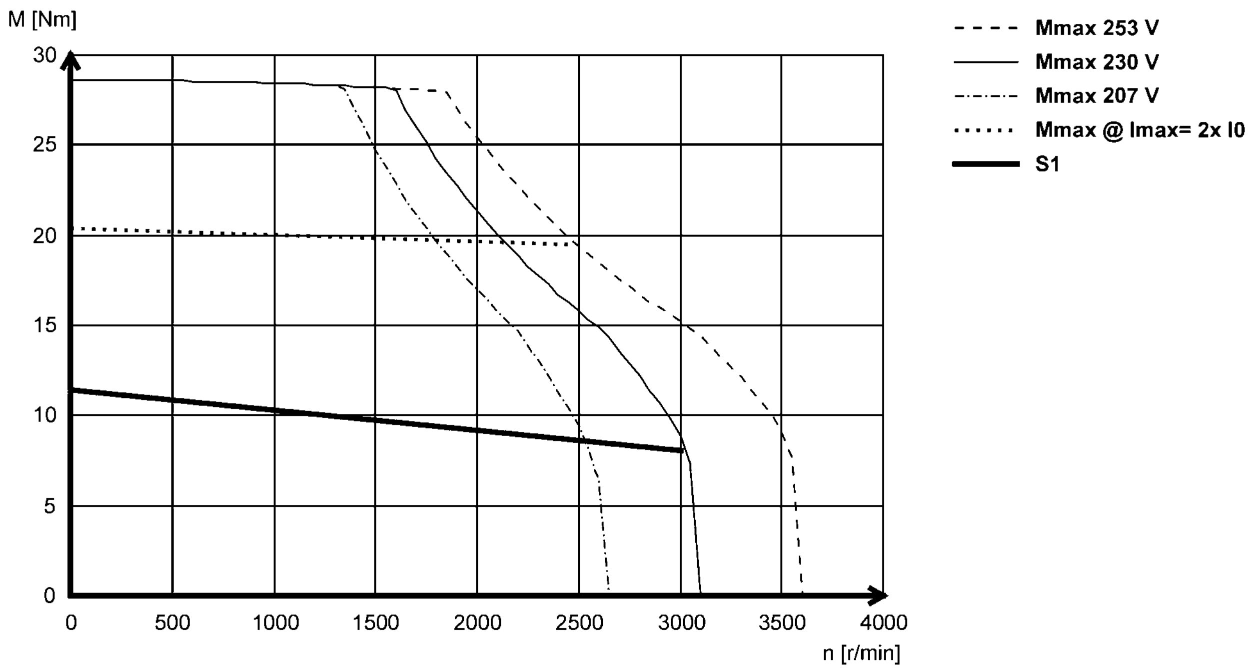
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12H15L (non-ventilated)



MCS12H30L- (non-ventilated)



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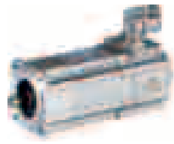
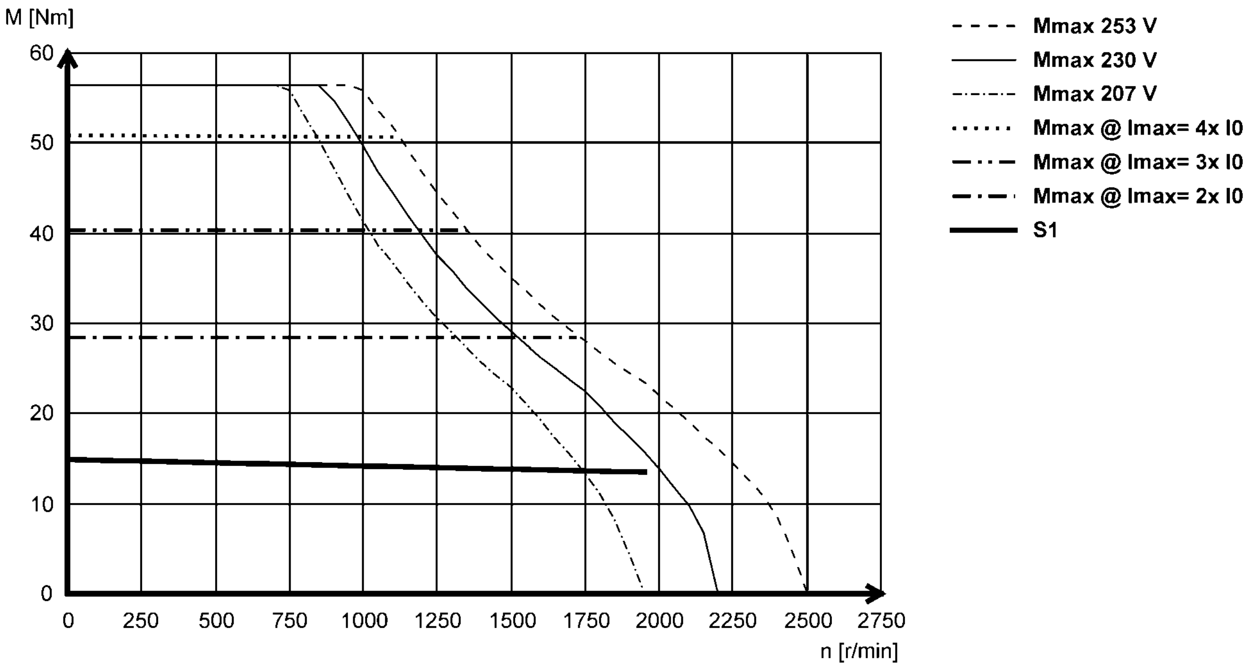


Torque characteristics

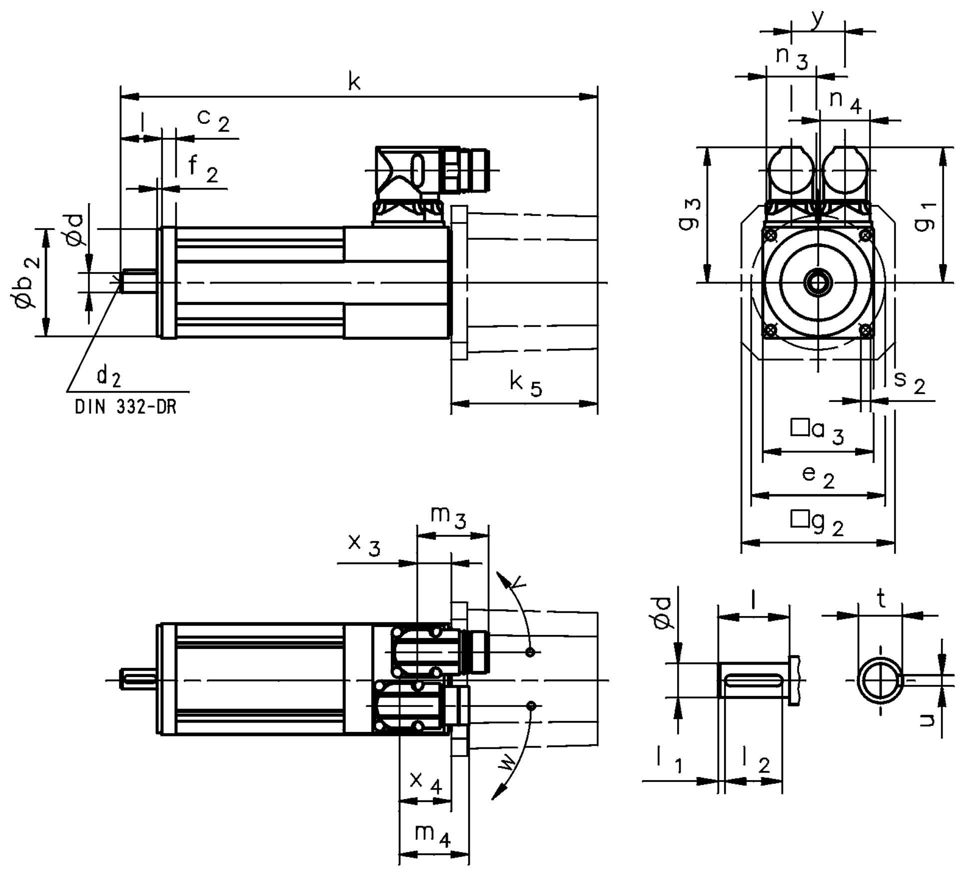
- ► The data applies to a mains connection voltage of 3 x 230 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCS12L20L (non-ventilated)



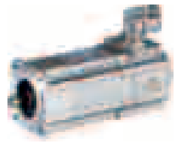
5.1

Dimensions, self-ventilated



			MCS06C	MCS06F	MCS06I
R□0 / C40 B0	k	[mm]	155	185	215
R□0 / C40 P□	k	[mm]	174	204	233
SR□ / SV□ / E□□ B0	k	[mm]	237	266	297
SR□ / SV□ / E□□ P□	k	[mm]	255	285	315
SR□ / SV□ / E□□	k_5	[mm]	82.0		
	g_2	[mm]	86.0		
SKM BO	k	[mm]	190	220	250
SKM P□	k	[mm]	209	239	268
SKM	k_5	[mm]	35.0		
	g_2	[mm]	62.0		

- Speed / angle sensor: R□□ / C□□ / S□□ / E□□
- Brake: B0 / P□



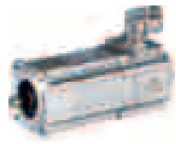
Dimensions, self-ventilated

	g_1	g_3	x_3	x_4	m_3	m_4	n_3	n_4	y	v	w
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]
MCS06	77	77	19	29	40	40	28	28	30	190	230

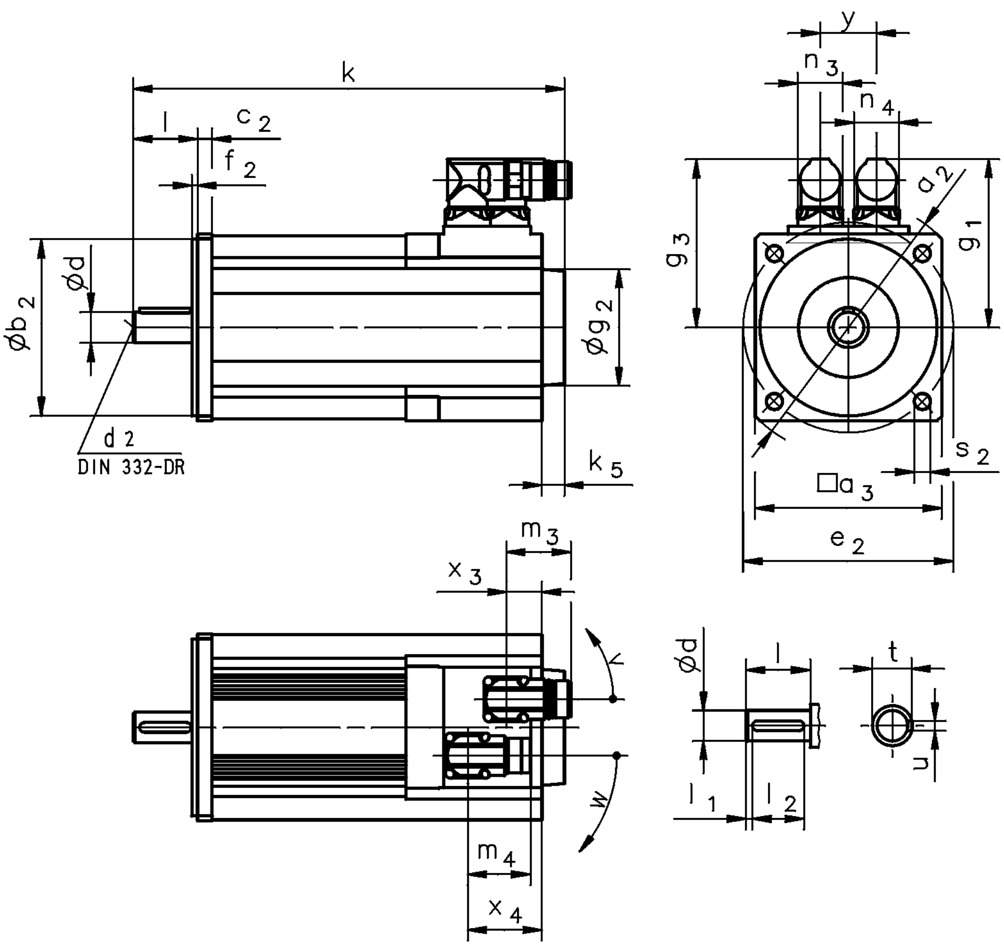
	d	d_2	l	l_1	l_2	u	t
	k6		-0.7 ... 0.3				
	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
MCS06	11	M4	23	2.0	18	4.0	12.5

	a_3	b_2	c_2	e_2	f_2	s_2
		j6				
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCS06	62	60	8	75	2.5	5.5

5.1



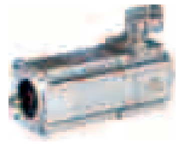
Dimensions, self-ventilated



			MCS09D	MCS09F	MCS09H	MCS09L	MCS12D	MCS12H	MCS12L
R□0 / C40 B0	k	[mm]	213	233	253	293	228	268	308
R□0 / C40 P□	k	[mm]	233	253	273	313	248	288	328
R□0 / C40	k_5	[mm]	13				14		
	g_2	[mm]	67				72		
S□□ / E□□ B0	k	[mm]	264	284	304	344	277	317	357
S□□ / E□□ P□	k	[mm]	284	304	324	364	297	337	377
S□□ / E□□	k_5	[mm]	64				63		
	g_2	[mm]	81				89		

			MCS14D	MCS14H	MCS14L	MCS14P	MCS19F	MCS19J	MCS19P
R□0 / C40 B0	k	[mm]	251	291	331	371	280	320	380
R□0 / C40 P□	k	[mm]	279	319	359	399	314	364	424
R□0 / C40	k_5	[mm]	24				15		
	g_2	[mm]	78						
S□□ / E□□ B0	k	[mm]	301	341	381	421	329	369	429
S□□ / E□□ P□	k	[mm]	329	369	409	449	363	413	473
S□□ / E□□	k_5	[mm]	74				64		
	g_2	[mm]	101						

► Speed / angle sensor: R□□ / C□□ / S□□ / E□□
► Brake: B0 / P□



Dimensions, self-ventilated

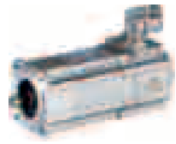
	g_1	g_3	x_3	x_4	m_3	m_4	n_3	n_4	y	v	w
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]
MCS09	90	90	20	44	40	40	28	28	35	195	260
MCS12	105	105	22	46							

	g_1	g_3	x_3	x_4	m_3	m_4	n_3	n_4	y	v	w
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]
MCS14D15-	117	117	24	48	40	40	28	28	35	195	260
MCS14D36-											
MCS14H15-											
MCS14H32-											
MCS14L15-											
MCS14L32-	146	126	29	36		75		45		180	205
MCS14P14-	117	117	24	48		40		28		195	260
MCS14P32-	146	126	29	36		75		45		180	205
MCS19F14-	142	142	24 51[1)]	48 75[1)]		40		28		195	260
MCS19F30-	171	151	29 56[1)]	36 63[1)]		75		45		180	205
MCS19J14-	142	142	24 51[1)]	48 75[1)]		40		28		195	260
MCS19J30-	171	151	29 56[1)]	36 63[1)]		75		45		180	205
MCS19P14-	142	142	24 51[1)]	48 75[1)]		40		28		195	260
MCS19P30-	171	151	29 56[1)]	36 63[1)]		75		45		180	205

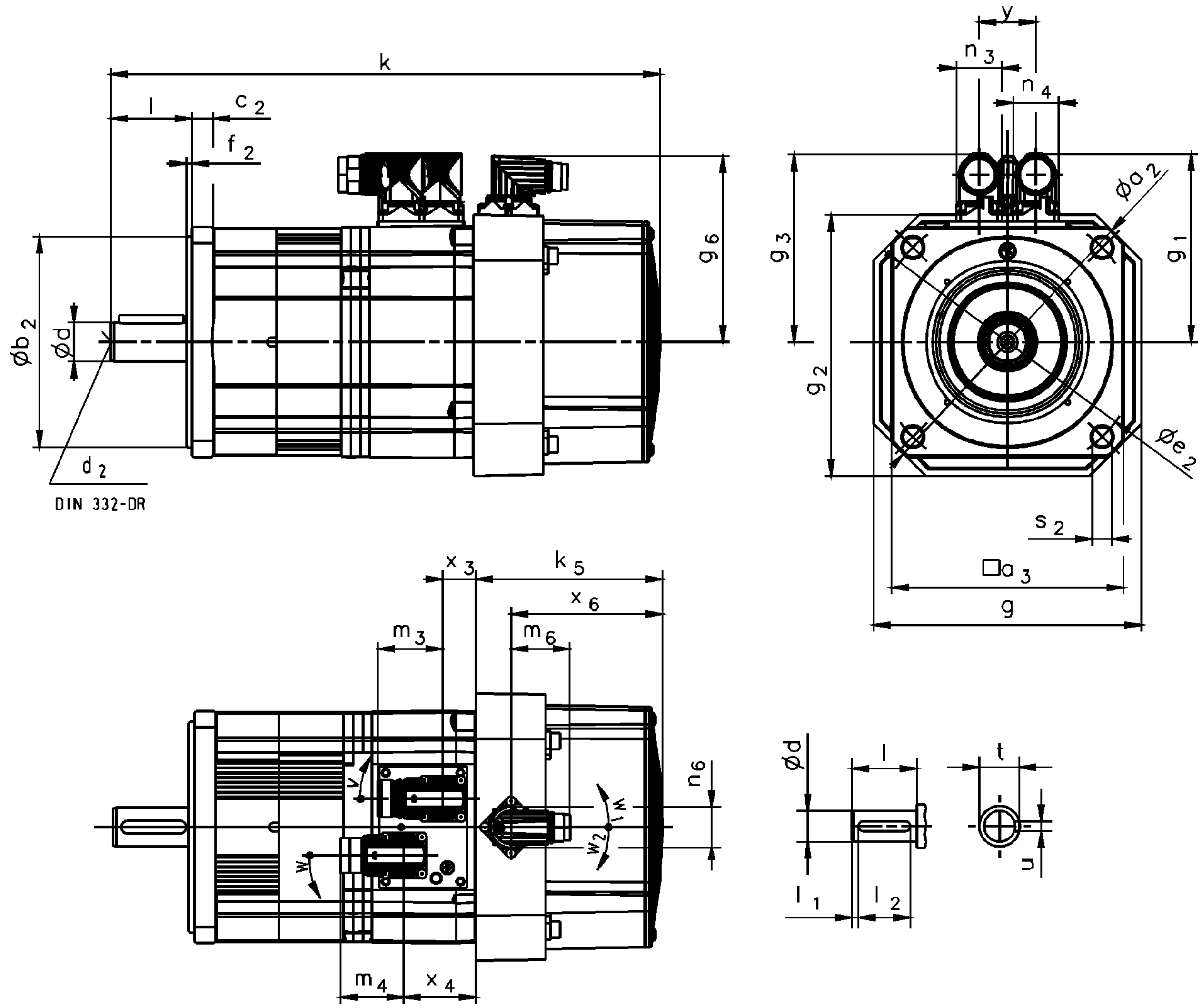
	d	d_2	l	l_1	l_2	u	t
	k6		-0.7 ... 0.3				
	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
MCS09	14	M5	30	2.5	25	5.0	16.0
MCS12	19	M6	40	4.0	32	6.0	21.5
MCS14	24	M8	50	5.0	40	8.0	27.0
MCS19	28	M10	60		50		31.0

	a_2	a_3	b_2	c_2	e_2	f_2	s_2
			j6				
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCS09	120	89	80	8	100	3.0	7.0
MCS12	160	116	110	9	130	3.5	10.0
MCS14	188	143	130	13	165		12.0
MCS19	250	192	180	11	215	4.0	14.0

[1)] On version with brake (P□)

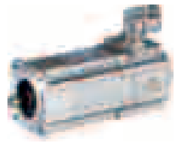


Dimensions, forced ventilated



			MCS12D	MCS12H	MCS12L	MCS14D	MCS14H	MCS14L	MCS14P	MCS19F	MCS19J	MCS19P
R□0 / C40 B0	k	[mm]	301	341	381	339	379	419	459	387	427	487
R□0 / C40 P□	k	[mm]	321	361	401	368	408	448	488	421	471	531
R□0 / C40	k_5	[mm]	92			115				126		
S□□ / E□□ B0	k	[mm]	344	384	424	392	432	472	512	425	465	525
S□□ / E□□ P□	k	[mm]	364	404	444	421	461	501	541	459	509	569
S□□ / E□□	k_5	[mm]	135			169				165		
	g	[mm]	140			167				212		
	g_2	[mm]	140			163				210		

► Speed / angle sensor: R□□ / C□□ / S□□ / E□□
► Brake: B0 / P□



Dimensions, forced ventilated

<table>
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<tr><td>MCS12D17</td><td rowspan="6">105</td><td rowspan="6">105</td><td rowspan="6">107</td><td rowspan="6">16</td><td rowspan="6">40</td><td rowspan="6">67</td><td rowspan="20">40</td><td rowspan="9">40</td><td rowspan="20">37</td><td rowspan="20">28</td><td rowspan="9">28</td><td rowspan="20">28</td><td rowspan="20">35</td><td rowspan="20">160</td><td rowspan="20">160</td><td rowspan="20">120</td><td rowspan="20">130</td></tr>
<tr><td>MCS12D35</td></tr>
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<tr><td>MCS14D30</td></tr>
<tr><td>MCS14H12</td></tr>
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<tr><td>MCS14P26</td><td>146</td><td>126</td><td>24</td><td>31</td><td>75</td><td>45</td></tr>
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46 1)</td><td>43
70 1)</td><td rowspan="6">96</td><td>40</td><td>28</td></tr>
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51 1)</td><td rowspan="5">31
58 1)</td><td rowspan="5">75</td><td rowspan="5">45</td></tr>
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<tr><th></th><th>k6</th><th></th><th>-0.7 ... 0.3</th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th>[mm]</th><th>[mm]</th><th></th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th></tr>
<tr><td>MCS12</td><td>19</td><td>M6</td><td>40</td><td>4.0</td><td>32</td><td>6.0</td><td>21.5</td></tr>
<tr><td>MCS14</td><td>24</td><td>M8</td><td>50</td><td rowspan="2">5.0</td><td>40</td><td rowspan="2">8.0</td><td>27.0</td></tr>
<tr><td>MCS19</td><td>28</td><td>M10</td><td>60</td><td>50</td><td>31.0</td></tr>
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<table>
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<tr><th></th><th></th><th></th><th>j6</th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th></tr>
<tr><td>MCS12</td><td>160</td><td>116</td><td>110</td><td>9</td><td>130</td><td rowspan="2">3.5</td><td>10.0</td></tr>
<tr><td>MCS14</td><td>188</td><td>143</td><td>130</td><td>13</td><td>165</td><td>12.0</td></tr>
<tr><td>MCS19</td><td>250</td><td>192</td><td>180</td><td>11</td><td>215</td><td>4.0</td><td>14.0</td></tr>
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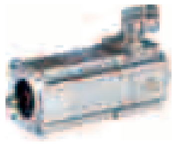
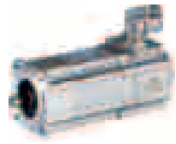
1) On version with brake (P□)





Permanent magnet holding brake

The synchronous servo motor can be fitted with integral permanent magnet holding brakes.
In the case of permanent magnet brakes, the rated torque applies solely as holding torque at standstill. This is due to the nature of their design. During braking from full motor speed, e.g. in the event of emergency stops, the braking torque is significantly reduced.
As such, they may not be used as safety elements (particularly with lifting axes) without additional measures being implemented.
The brakes are activated when the supply voltage is disconnected (closed-circuit principle). When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.

For traversing axes, adherence to the permissible load/brake motor (J_L / J_{MB}) moment of inertia ensures that the permissible maximum switching rate of the brake will not be exceeded and at least 2,000 emergency stop functions can be performed from a speed of 3,000 rpm.
For lifting axes, the load torque resulting from the weight acts additionally. In this case the specifications for J_L / J_{MB} do not apply.

Caution:
The brakes used are not safety brakes in the sense that a reduction in torque may arise as a result of disruptive factors that cannot be influenced, e.g. oil ingress.

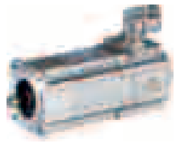
The ohmic voltage drop along the cable must be taken into consideration in long motor supply cables and must be compensated for by a higher voltage at the line input.

The following applies for Lenze system cables:

$$U[V]=U_B[V]+0.08\frac{[V]}{[A]\cdot[m]}\cdot l_{Lg}[m]\cdot I_B[A]$$

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.
The shortest switching times of the brakes are achieved by DC switching of the voltage. A spark suppressor is required to suppress interference and to increase the service life of the relay contacts here.

Permanent magnet holding brake



Permanent magnet holding brake

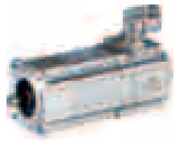
Rated data with standard braking torque

	$U_{N, DC}$ [3,5]	M_N	M_N	M_{av}	I_N [2]	J	t_1 [1]	t_2 [1]	Q_E [4]	m	J_{MB}	J_L/J_{MB}
		20 °C	120 °C	120 °C								
	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MCS06C											0.26	22.1
MCS06F		2.20	2.00	0.60	0.34	0.12	15.0	30.0	30.0	0.30	0.34	16.6
MCS06I											0.42	13.3
MCS09D											2.17	36.4
MCS09F		8.00	6.00	4.50			20.0	40.0		0.80	2.57	30.5
MCS09H											2.97	26.3
MCS09L					0.65	1.07			400		3.87	19.9
MCS12D	24										5.07	15.0
MCS12H		12.0	10.0	7.00			13.0	43.0		0.90	8.40	8.70
MCS12L											11.7	5.90
MCS14D											11.3	10.5
MCS14H		22.0	18.0	8.00	0.88	3.20	15.0	150	640	1.90	17.4	6.50
MCS14L											26.6	3.90
MCS14P											37.9	2.40
MCS19F		37.0	32.0	15.0	0.93	12.4	96.0	113	2350	3.10	77.4	5.20

Rated data with increased braking torque

	$U_{N, DC}$ [3,5]	M_N	M_N	M_{av}	I_N [2]	J	t_1 [1]	t_2 [1]	Q_E [4]	m	J_{MB}	J_L/J_{MB}
		20 °C	120 °C	120 °C								
	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MCS09D											2.17	36.4
MCS09F		12.0	10.0	7.00	0.65	1.07	20.0	40.0	400	0.80	2.57	30.5
MCS09H											2.97	26.3
MCS09L											3.87	19.9
MCS12D											7.10	24.3
MCS12H		24.0	19.0	12.0	0.71	3.13	16.0	90.0	890	1.20	10.4	16.3
MCS12L	24										13.7	12.1
MCS14D											20.5	22.2
MCS14H		37.0	32.0	15.0	0.93	12.4	96.0	113	2350	3.10	26.6	16.9
MCS14L											35.8	12.3
MCS14P											47.1	9.10
MCS19J		100	80.0	43.0	1.29	30.0	30.0	90.0	2100	4.30	135	2.20
MCS19P											190	1.20

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24V DC brake: smoothed DC voltage, ripple ≤1 %.
4) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
5) Voltage tolerance: -10% to +5%



Resolver

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

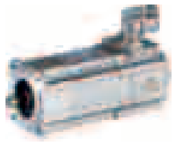
Speed/angle sensor					
	1)			RS0	RV0
Product key					
				RS0	RV03
Resolution					
Angle			[']	0.80	
Accuracy					
			[']	-10 ... 10	
Absolute positioning					
				1 revolution	
Max. speed					
	n_{max}		[r/min]	8000	
Max. input voltage					
DC	$U_{in,max}$		[V]	10.0	
Max. input frequency					
	$f_{in,max}$		[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	
Max. angle error					
			[']	-10 ... 10	
Inverter assignment					
				E84AVTC E94A ECS EVS93	

1) 6 - Product key > speed/angle sensor

Speed-dependent safety functions

Suitable for safety function				
			No	Yes
Max. permissible angular acceleration				
MCS06	α	[rad/s²]		56000
MCS09 ... MCS19 2)	α	[rad/s²]		19000
Functional safety				
IEC 61508				SIL3
EN 13849-1				Up to Performance Level e

2) 10 - Single encoder concepts with resolvers



Incremental encoder and SinCos absolute value encoder

Encoder type			TTL incremental	SinCos absolute value		
Speed/angle sensor	1)		C40	EQI	SRS	SVS
Product key			IK4096-5V-T	AM32-5V-E	AS1024-8V-H	AS1024-8V-K2
Encoder type			Single-turn	Multi-turn	Single-turn	
Pulses			4096	32	1024	
Output signals			TTL	1 Vss		
Interfaces				EnDat	Hiperface	
Absolute revolutions			0	4096	1	
Resolution						
Angle 2)		[']	1.30	0.40		
Accuracy		[']	-1 ... 1	-5 ... 5	-0.8 ... 0.8	
Min. input voltage						
DC	$U_{in,min}$	[V]	4.50	4.75	7.00	
Max. input voltage						
DC	$U_{in,max}$	[V]	5.50	5.25	12.0	
Max. speed	n_{max}	[r/min]	7324	12000	6000	
Max. current consumption	I_{max}	[A]	0.075	0.17	0.080	
Limit frequency	f_{max}	[kHz]	500	6.00	200	
Inverter assignment			E94P	E94A	E84AVTC E94A ECS EVS93	

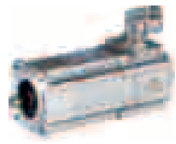
1) 6 - Product key > speed/angle sensor

2) Inverter-dependent.

Speed-dependent safety functions

Suitable for safety function			No	No	No	Yes
Max. permissible angular acceleration						
MCS06	α	[rad/s²]				970000
MCS09 ... MCS19	α	[rad/s²]				240000
Functional safety						
IEC 61508						SIL2
EN 13849-1						Up to Performance Level d

5.1



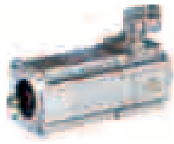
Incremental encoder and SinCos absolute value encoder

			SKM	SRM	SVM	ECN	EQN
Encoder type			SinCos absolute value				
Speed/angle sensor			SKM	SRM	SVM	ECN	EQN
Product key			AM128-8V-H	AM1024-8V-H	AM1024-8V-K2	AS2048-5V-E	AM2048-5V-E
Encoder type			Multi-turn			Single-turn	Multi-turn
Pulses			128	1024		2048	
Output signals			1 Vss				
Interfaces			Hiperface			EnDat	
Absolute revolutions			4096			1	4096
Resolution							
Angle		[']	0.40				
Accuracy		[']	-1.3 ... 1.3	-0.8 ... 0.8		-0.6 ... 0.6	
Min. input voltage							
DC	$U_{in,min}$	[V]	7.00			4.75	
Max. input voltage							
DC	$U_{in,max}$	[V]	12.0			5.25	
Max. speed	n_{max}	[r/min]	9000	6000		12000	
Max. current consumption	I_{max}	[A]	0.060	0.080		0.15	0.25
Limit frequency	f_{max}	[kHz]	200				
Inverter assignment			E84AVTC E94A ECS EVS93			E94A	

[1] Inverter-dependent.

Speed-dependent safety functions

			SKM	SRM	SVM	ECN	EQN
Suitable for safety function			No	No	Yes	No	No
Max. permissible angular acceleration							
MCS06	α	[rad/s²]			970000		
MCS09 ... MCS19	α	[rad/s²]			240000		
Functional safety							
IEC 61508					SIL2		
EN 13849-1					Up to Performance Level d		



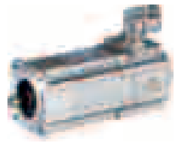
Blowers

Rated data for 50 Hz

		Enclosure	**Number of phases**					
				U_{min}	U_{max}	$U_{N, AC}$	P_N	I_N
				[V]	[V]	[V]	[kW]	[A]
MCS12	F10	IP54	1	210	240	230	0.019	0.12
	F50			104	122	115	0.018	0.22
MCS14	F10			210	240	230	0.040	0.25
	F50			104	122	115		0.53
MCS19	F10			210	240	230	0.060	0.26
	F50			104	122	115	0.047	0.45

Rated data for 60 Hz

		Enclosure	**Number of phases**					
				U_{min}	U_{max}	$U_{N, AC}$	P_N	I_N
				[V]	[V]	[V]	[kW]	[A]
MCS12	F10	IP54	1	210	240	230	0.019	0.12
	F50			104	122	115	0.018	0.22
MCS14	F10			210	240	230	0.040	0.25
	F50			104	122	115		0.53
MCS19	F10			210	240	230	0.060	0.26
	F50			104	122	115	0.047	0.45



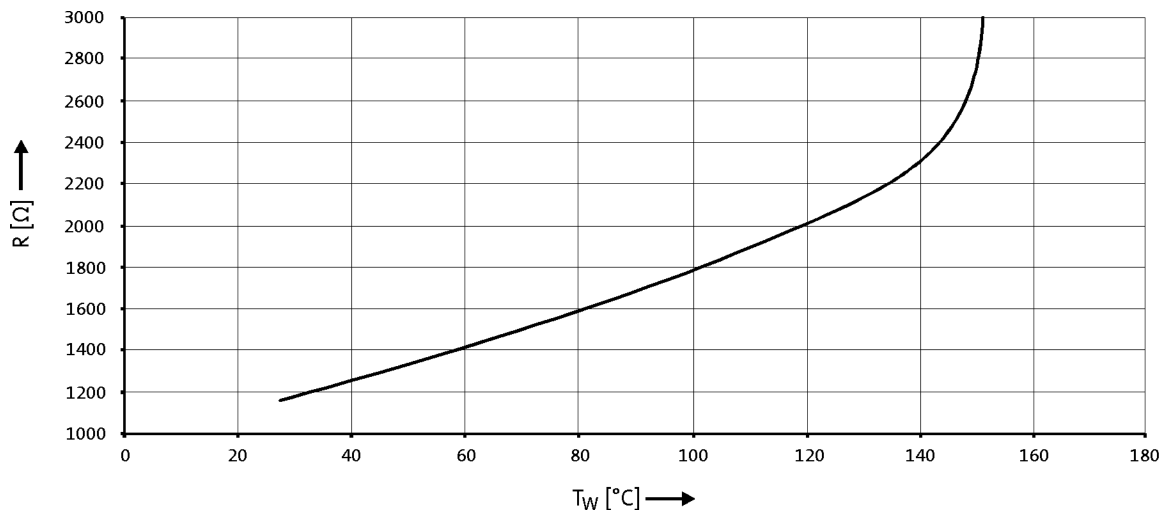
Temperature monitoring

The thermal sensors used in the MCS motors continuously monitor the motor temperature. The temperature signal is transmitted over the system cable of the feedback system to the servo controller. Because of the different physical conditions, there are two temperature monitoring mechanisms on the MCS motors (there is no complete motor protection in either case)

MCS06
on this motor, the winding temperature of one winding phase is monitored with a KTY 83-110 type thermal sensor.

MCS09 to 19
These motors are monitored by three thermal sensors (1x KTY 83-110 + 2x PTC 150 °C) connected in series. This means that the temperature of the motor is determined with great accuracy in the permitted operating range and at the same time the overtemperature response configured in the controller is executed in the event of overtemperature in one of the winding phases.

Variation of resistance



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

Terminal box

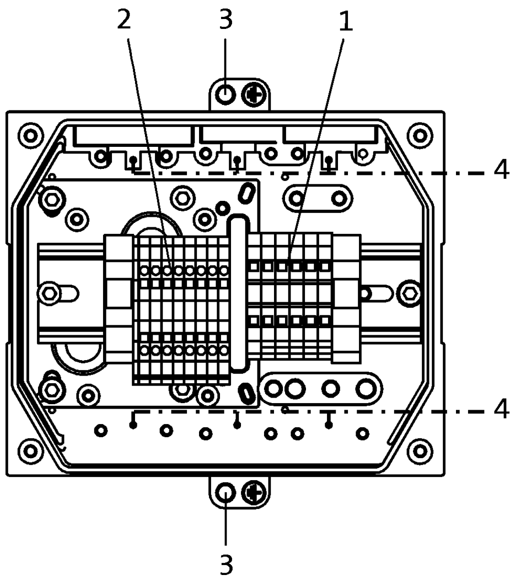
If a servo motor is to be connected to an existing cable or plug connectors are not to be used for other reasons, the connection can also be made via a terminal box.

The terminals are designed as tension spring terminals to ensure here the long-term vibration resistance of the cable contacts with adequate contact pressure required.

The terminal boxes have generously dimensioned space for the customer's own wiring and large surface shield connection areas to ensure a secure EMC-compliant connection. The cable outlet may be to the left or to the right, depending on requirements.

It is not possible to attach a terminal box to the MCS06 or to models with the blower.

Connections



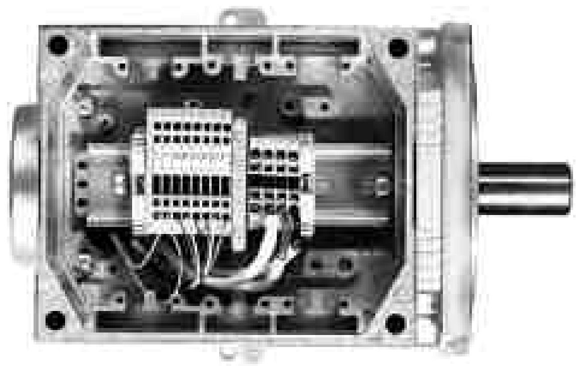
1: Power connection (terminals loadable up to 65 A) + brake connection.

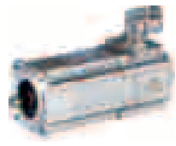
2: Angle/speed sensor connection + thermal sensor connection.

3: PE connection.

4: Large area shield contact.

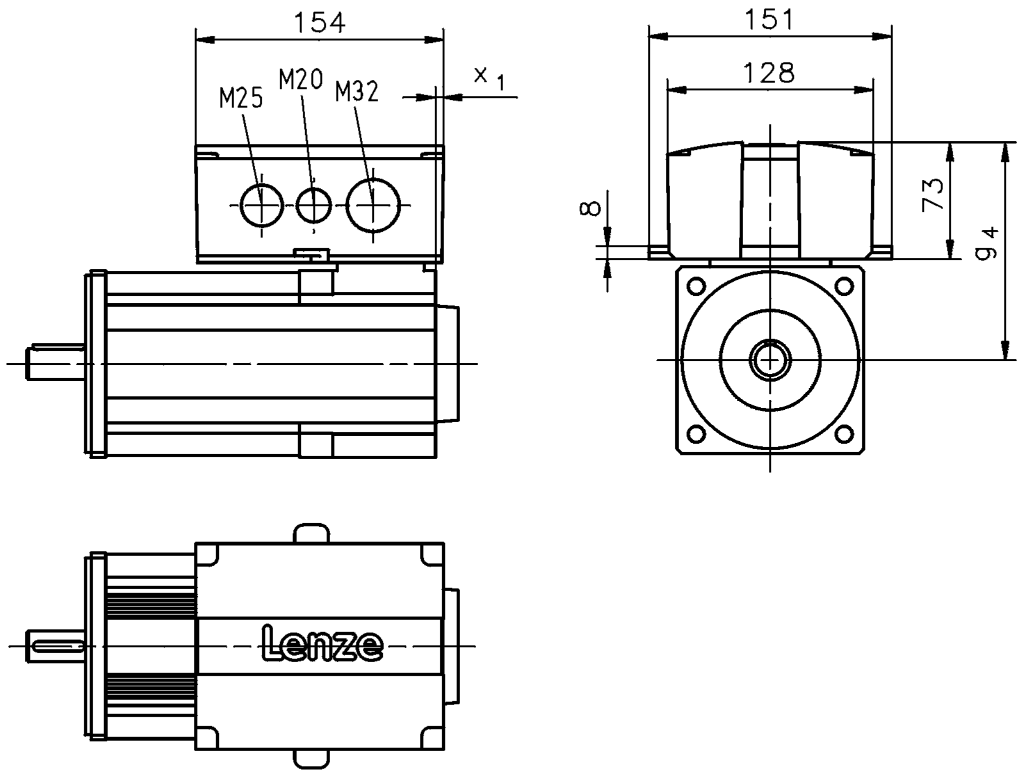
5: Openings for 2x M32, 2x M25, 2x M20 fittings. The openings are plugged and can be opened up as required by the customer.



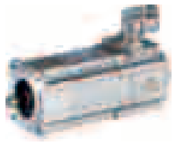


Terminal box

Dimensions



	g_4	x_1
	[mm]	[mm]
MCS09	121	8
MCS12	136	5
MCS14	147	3
MCS19	172	



ICN connector

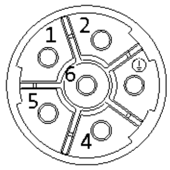
An ICN connector is used as standard for the electrical connection to the servo motors.

A connector is used for the connection of motor and brake.
The connections to the feedback system/temperature monitoring and the blower each employ a separate connector.

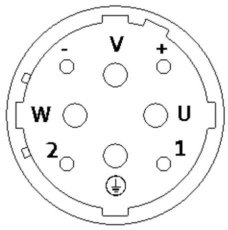
The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional union nuts. Existing mating connectors can therefore still be used without difficulty.

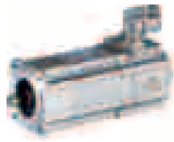
Connection for power and brake

► MCS06 to 12

Pin assignment			
Contact	Designation	Meaning	
1	BD1	Holding brake +	
2	BD2	Holding brake -	
PE	PE	PE conductor	
4	U	Phase U power	
5	V	Phase V power	
6	W	Phase W power	

► MCS14 to 19

Pin assignment			
Contact	Designation	Meaning	
1		Not assigned	
2			
+	BD1	Holding brake +	
-	BD2	Holding brake -	
PE	PE	PE conductor	
U	U	Phase U power	
V	V	Phase V power	
W	W	Phase W power	

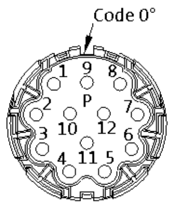


ICN connector

Feedback connection

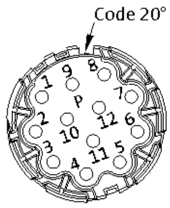
► Resolver

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		

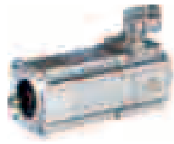


► Hiperface incremental encoder and SinCos absolute value encoder

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		



5.1

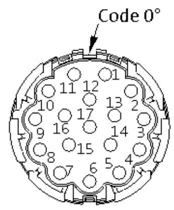


ICN connector

Feedback connection

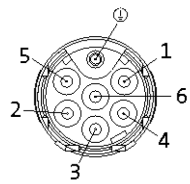
► SinCos absolute value encoder with EnDat interface

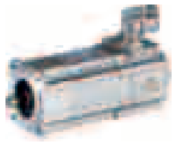
Pin assignment			
Contact	Designation	Meaning	
1	U_P sensor	Supply: UP sensor	
2		Not assigned	
3			
4	0 V sensor	Supply: 0 V sensor	
5	+KTY	KTY temperature sensor	
6	-KTY		
7	$+U_B$	Supply +	
8	Cycle	EnDat interface cycle	
9	Cycle$^-$	EnDat interface inverse cycle	
10	GND	Mass	
11	Shield	Encoder housing screen	
12	B	Track B	
13	B$^-$	Track B inverse/-SIN	
14	Data	EnDat interface data	
15	A	Track A	
16	A$^-$	Track A inverse	
17	Data$^-$	EnDat interface inverse data	

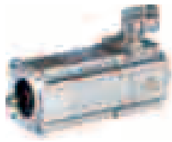


Blower connection

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

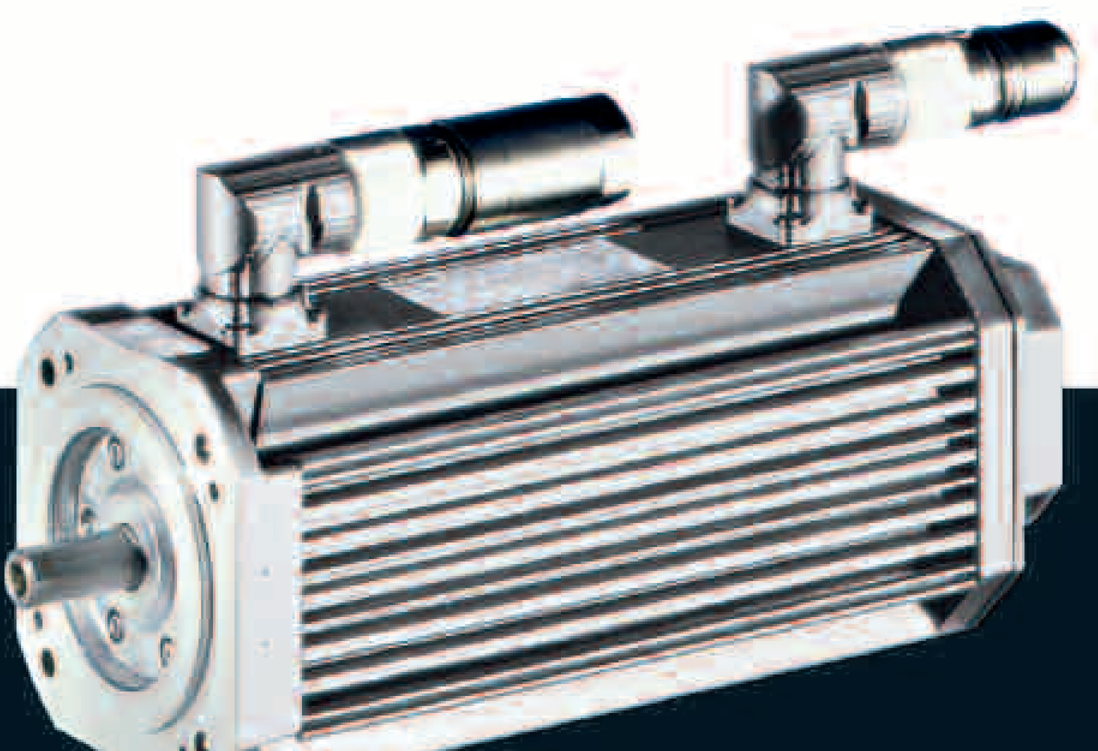






MD□KS synchronous servo motors

2.8 to 52 Nm



MD□KS synchronous servo motors

Contents

List of abbreviations

$\eta_{100\,\%}$	[%]	Efficiency
cos ϕ		Power factor
du/dt	[kV/µs]	Insulation resistance
$F_{ax,-}$	[N]	Min. axial force
$F_{ax,+}$	[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}	[N]	Max. radial force
H_{max}	[m]	Site altitude
I_0	[A]	Standstill current
I_{max}	[A]	Max. short-time DC-bus current
I_{max}	[A]	Max. current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. DC-bus current
I_N	[A]	Rated current
J	[kgcm²]	Moment of inertia
J_{MB}	[kgcm²]	Moment of inertia
$KE_{LL\,150\,°C}$	[V /1000 rp]	Voltage constant
$Kt_{0\,150\,°C}$	[Nm/A]	Torque constant
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_0	[Nm]	Stall torque
$M_{0,\,max}$	[Nm]	Max. standstill torque
M_{av}	[Nm]	Average dynamic torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_{eto}	[r/min]	Transition speed
n_k	[r/min]	Speed
n_{max}	[r/min]	Max. speed

n_N	[r/min]	Rated speed
P_N	[kW]	Rated power
Q_E	[J]	Maximum switching energy
R	[Ω]	Insulation resistance
R	[Ω]	Min. insulation resistance
R_1	[Ω]	Stator impedance
R_2	[Ω]	Charging resistor
R_2	[Ω]	Rotor impedance
$R_{UV\,150\,°C}$	[Ω]	Stator impedance
$R_{UV\,20\,°C}$	[Ω]	Stator impedance
$S_{hü}$	[1/h]	Transition operating frequency
T	[°C]	Operating temperature
T	[°C]	Rated temperature
T	[°C]	Max. ambient temperature of bearing
T	[°C]	Max. surface temperature
T	[°C]	Max. ambient temperature for transport
T	[°C]	Min. ambient storage temperature
T	[°C]	Min. ambient temperature for transport
T	[°C]	Ambient temperature
t_1	[ms]	Engagement time
t_2	[ms]	Disengagement time
$T_{opr,max}$	[°C]	Max. ambient operating temperature
$T_{opr,min}$	[°C]	Min. ambient operating temperature
$U_{in,max}$	[V]	Max. input voltage
$U_{in,min}$	[V]	Min. input voltage
U_{max}	[V]	Max. mains voltage
U_{max}	[V]	Min. input voltage
U_{min}	[V]	Min. mains voltage
$U_{N,\,AC}$	[V]	Rated voltage
$U_{N,\,DC}$	[V]	Rated voltage
Z_{ro}	[Ω]	Rotor impedance
Z_{rs}	[Ω]	Impedance
Z_{so}	[Ω]	Stator impedance

List of abbreviations

CE	Communauté Européenne
CSA	Canadian Standards Association
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
UkrSEPRO	Certificate for Ukraine
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

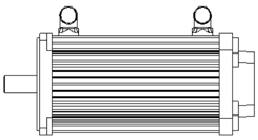
Product key

Motor type

MD □ KS

- **S** – Natural ventilation, no fan
- **F** – Forced ventilation with blower

Synchronous servo motor



Accessories

□□

No brake:
- **RS** – **Resolver,** RS0; **Safety resolver,** RV03
- **AG** – **SinCos absolute encoder single-turn,** Hiperface®, AS1024-8V-H (SRS50); **SinCos absolute encoder multi-turn,** Hiperface®, AM1024-8V-H (SRM50); **Safety SinCos absolute encoder single-turn,** Safety, AS1024-8V-K2; **Safety SinCos absolute encoder multi-turn,** Hiperface®, AM1024-8V-K2

PM brake DC 24 V, DC 205 V [1]:
- **BS** – **Resolver,** RS0; **Safety resolver,** RV03
- **BA** – **SinCos absolute encoder single-turn,** Hiperface®, AS1024-8V-H (SRS50); **SinCos absolute encoder multi-turn,** Hiperface®, AM1024-8V-H (SRM50); **Safety SinCos absolute encoder single-turn,** Safety, AS1024-8V-K2; **Safety SinCos absolute encoder multi-turn,** Hiperface®, AM1024-8V-K2

Motor size

□□□ - □□

(Example: 071-13)

[1] Not possible for UL design.

Ordering details checklist	
Product key	MDSKS... / MDFKS...
Built-on accessories: brake	Without/24 V DC/205 V DC
Motor design	B14 / B5 design
Shaft design	with/without keyway
Enclosure	IP54 / IP65
Motor connection	Circular connector / terminal box...
Colour	RAL 9005 (jet black) / RAL...

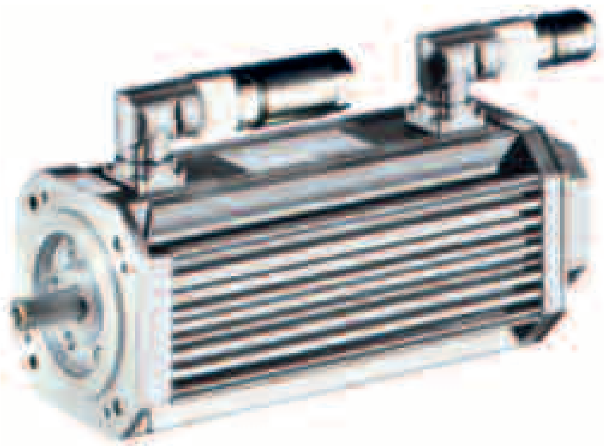
8 - Servo motor designs

Product information

An application-oriented structure, low moments of inertia, compact dimensions and a high degree of intrinsic operational reliability characterise these robust and dynamic motors.

Whether naturally ventilated or with blower – in a power range from 1.1 kW to 5.9 kW these servo motors provide rated torque values from 2.8 Nm to 17 Nm with peak torques of up to 52 Nm.
High overload capacity and rapid angular acceleration ensure the best possible dynamic performance, while also guaranteeing excellent smooth running characteristics.
Continuous internal temperature measurement guarantees optimum control behaviour at all times, regardless of the temperature. A reinforced insulation system with thermal reserve (enamel-insulated wire in line with temperature class H, utilisation in line with F) ensures a long service life of the winding. Together with the IP54 protection, the prestressed roller bearings with high temperature-resistant grease guarantee long, maintenance-free operation. Thanks to the compact structure and modular motor concept, the MD□KS motors can be adapted for use with virtually any drive task.

Advantages
- High dynamic performance thanks to low moments of inertia
- Compact size with high power density
- Cooling with or without axial external fan
- Robust regenerative resolver system as standard
- Alternatively, sin/cos encoder for the highest precision
- Easy to install and service friendly thanks to use of SpeedTec connectors
- Optional terminal box
- Protection: IP54, IP65 optional for naturally ventilated motors
- GOST-certified, CE, RoHS-compliant, optionally available in UR
- High maximum speeds
- Wide speed setting range



MDSKA071 synchronous servo motor

Functions and features

	MDSKS□□056	MDSKS□□071	MDFKS□□071
Design			
	B14-FT85 B5-FF100	B14-FT130 B5-FF130	
Shaft end (with and without keyway)			
	14 x 30	19 x 40	
A end shield			
	Not oil-tight		
Brake			
Permanent magnetic brake	DC 24 V AC 230 V [1] DC 205 V [1]		
Speed and angle encoder			
	Resolver SinCos single-turn/multi-turn		
Cooling			
Without blower	Naturally ventilated		
Axial blower, 1 phase			230 V; 50 Hz
Thermal sensor			
Thermal detector	KTY		
Motor connection: plug connector			
	Power + brake Encoder + thermal sensor		Power + brake Encoder + thermal sensor Blower
Motor connection: terminal box			
	Power + brake Encoder + thermal sensor		Power + brake Encoder + thermal sensor + blower
Motor connection: Terminal box + plug connector			
Terminal box	Power + brake Encoder + thermal sensor		
Plug connector			Blower
Shaft bearings			
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, sealing disc or cover plate		
Position of the locating bearing	Drive end Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		
Colour			
	RAL9005M		

[1] Not possible for UR version.

5.2

Dimensioning

Speed-dependent safety functions

Single encoder concepts with resolvers

Servo motors can perform speed-dependent safety functions for safe speed and / or safe relative position monitoring in a drive system with the Servo Drives 9400. The SM301 safety module, which can be integrated in the Servo Drives 9400, is used to implement these functions. When planning systems/installations of this kind, the following must always be observed:

When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard IEC 61800-5-2 [Adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional] stipulates special requirements for the connection between feedback system and motor shaft. This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip".
As such, acceleration limit values must not be exceeded for the individual drive solutions. You can find the limit values in the corresponding feedback data of the individual motor ranges.

Speed-dependent safety functions in connection with the SM301 safety module

For the following speed-dependent safety functions, the motor-feedback system combinations listed in the following table are available:

- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely Limited Speed (SLS)
- Safe Maximum Speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI).

Encoder type	Encoder type	Product key	Feedback	Safe speed monitoring
			Design	
SinCos absolute value	Single-turn	AS1024-8V-K2		PL d/SIL 2
	Multi-turn	AM1024-8V-K2		
Resolver		RV03		PL e/SIL 3
			2-encoder concept	up to PL e / SIL 3

Dimensioning

Cooling effect of mounting flange

Mounting on a thermally conducting / insulating plate or machine chassis has an influence on heating up the motor, particularly when using naturally ventilated motors.

The motor rating data specified in the catalogue applies when mounting on a steel plate with free convection with the following dimensions:
- MDSKS□□036 / 056 / 071: 270 x 270 mm

Vibrational severity

		MDSKS□□056	MDSKS□□071	MDFKS□□071
Vibrational severity				
IEC/EN 60034-14		A		
Maximum r.m.s. value of the vibration velocity 1)	[mm/s]	1.60		

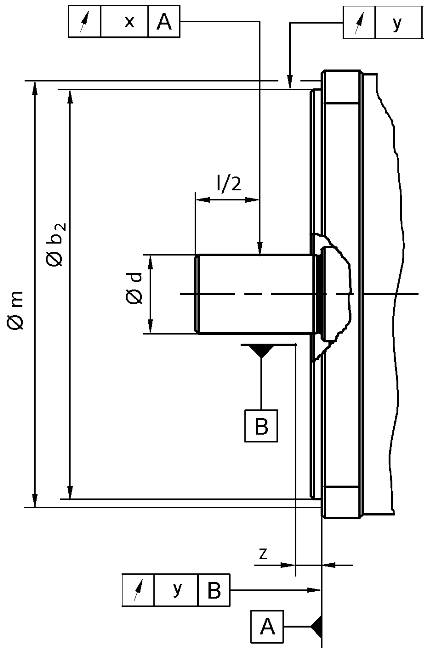
1) Free suspension

► at n = 600 to 3,600 rpm

5.2

Dimensioning

Concentricity and axial run-out of the mounting flanges and smooth running of the shaft ends



5.2

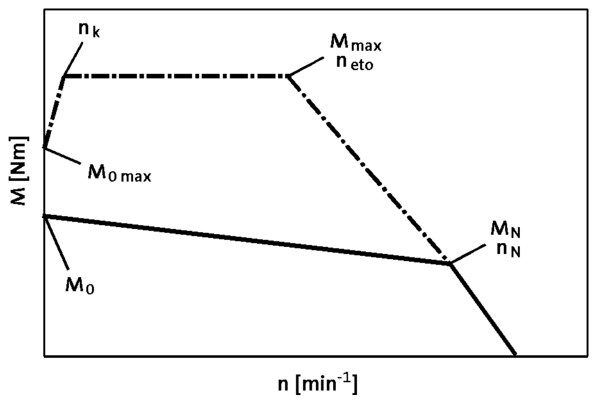
				MDSKS□□056		MDSKS□□071		MDFKS□□071	
Flange size									
				FF100	FT85	FF130	FT130	FF130	FT130
Dimensions									
	b_2	j6	[mm]	80	70	110			
	d	k6	[mm]						
Distance									
Measuring diameter	m		[mm]	113	98.0	149			
Dial gauge holder for flange check	z	+/- 1	[mm]	10.0					
Concentricity									
IEC 60072				Normal class					
Value	y		[mm]	0.080		0.10			
Linear movement									
IEC 60072				Normal class					
Value	y		[mm]	0.080		0.10			
Smooth running									
IEC 60072				Normal class					
Value	x		[mm]	0.035		0.040			

► Limit values for checking the smooth running of the shaft ends as well as the concentricity and axial run-out of the mounting flange to IEC 60072

Dimensioning

Notes on the selection tables

Graphical display of the operating points



<table>
<tr><th></th><th>n_k</th></tr>
<tr><th></th><th>[r/min]</th></tr>
<tr><td>MCS</td><td>75.0</td></tr>
<tr><td>MDSKS</td><td rowspan="2">100</td></tr>
<tr><td>MDFKS</td></tr>
</table>

Further selection tables with different switching frequencies are available with the following codes:

- DS_ZT_MCS_0001
- DS_ZT_MCA_0001
- DS_ZT_MDSKS_0001
- DS_ZT_MDFKS_0001

Simply enter this code (e.g. DS_ZT_MCS_0001) as a search string at **www.lenze.de/dsc** and you will be given the information immediately in the form of a PDF format.

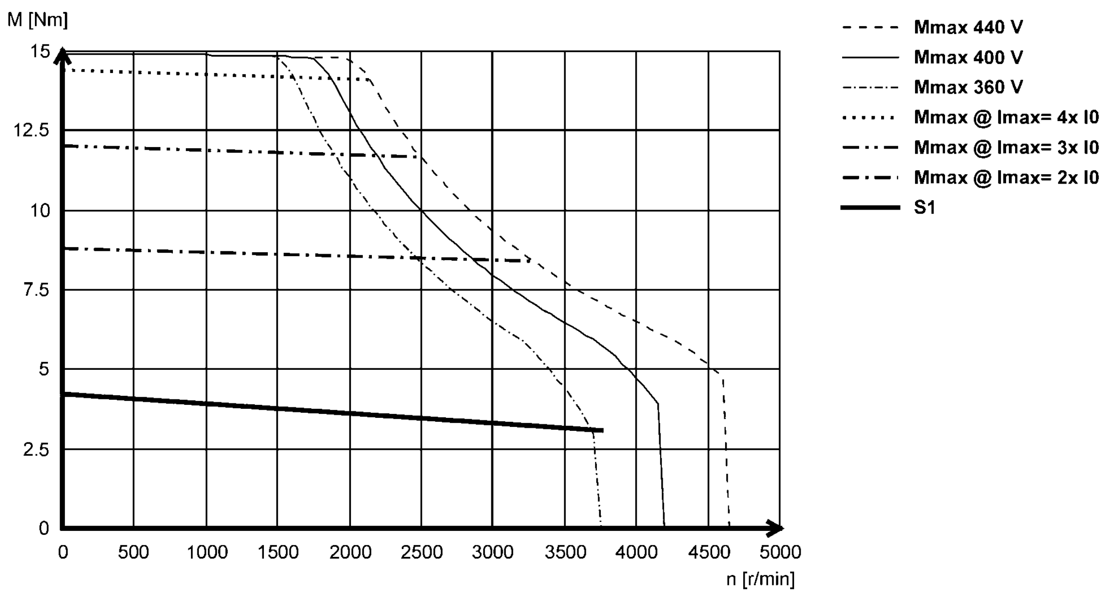
Please note:

- In case of an active load (e.g. vertical drive axes, hoists, test benches, unwinders), $M_{0\ max}$ has to be considered
- In case of a passive load (e.g. horizontal drive axes), M_{max} can be usually used
- In case of a speed < n_k and inverter-specifically, the achievable torque $M_{0\ max}$ is smaller than M_{max}
- In case of a speed n = 0, the standstill torque M_0 and the standstill current I_0 have to be reduced by 30% after 2 seconds. In case of applications which require a longer holding of M_0, we recommend the drive to be held via the holding brake and reduce the current, e.g. by controller inhibit.
- In case of servo inverters, the switching frequency dependent overload capacity is considered in the default setting. For more information, see the servo inverter catalogue.

Dimensioning

Notes on the torque characteristics

Graph of the torque characteristics



With synchronous servo motors, the limit torque characteristics that result from the selection of servo inverters with maximum currents are also shown alongside the characteristics for continuous operation (S1). These correspond to a multiple of the motor standstill current (2x I0 to 4x I0).

Characteristics in the Internet

You can find the torque characteristic for inverter-motor combinations on the Internet at **www.lenze.de/dsc**. This lists all useful combinations with the servo inverters 9400, 9300, ECS and Inverter Drives 8400 TopLine. These characteristics are each determined using the factory default settings of the inverters:

- 9400 with variables switching frequency.
  This means that up to 6-fold overcurrent can be applied in borderline cases.
- 9300 and ECS with fixed switching frequency.
- 8400 TopLine with variables switching frequency.

The continuous operation characteristics (S1) show the inverter-independent motor rating values

Further information on the terms switching frequency and factory default settings can be found in the operating manual of the respective servo inverter.

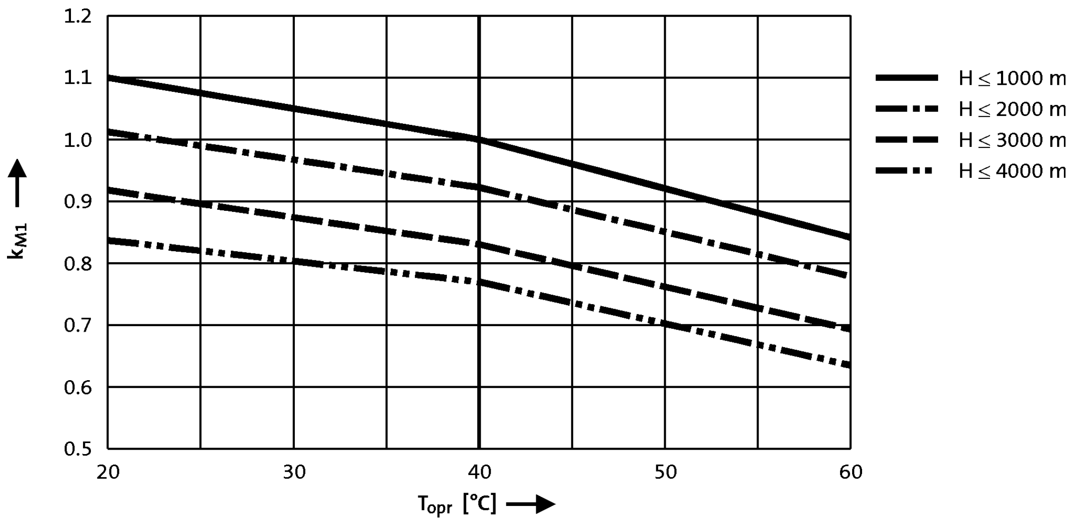
Dimensioning

Influence of ambient temperature and site altitude

The information relating to the servo motors in the tables and graphs is valid for a maximum ambient temperature (T_{opr}) of 40 °C and a site altitude (H) up to 1000 m above sea level. The torque correction factor (k_{M1}) shall be applied to the S1 torque characteristic (M_0...M_N) in the event of differing installation conditions.

► The maximum permissible ambient temperature (T_{opr}) for servo motors with blowers is 40 °C

Torque correction factor k_{m1}

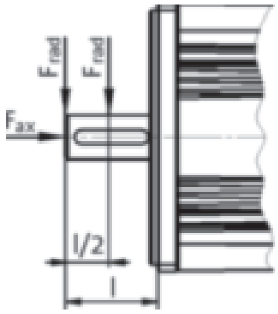


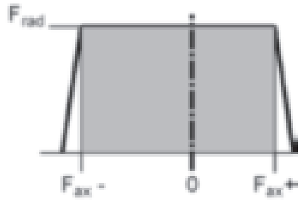
Standards and operating conditions

			MDSKS	MDFKS
Cooling type				
			Naturally ventilated	Blower
Enclosure				
EN 60529			IP54 IP65	IP54
Temperature class				
IEC/EN 60034-1; utilisation			F	
IEC/EN 60034-1; insulation system (enamel-insulated wire)			H	
Conformity				
CE			Low-Voltage Directive	
			2006/95/EC	
EAC			TP TC 004/2011 (TR C	
Approval				
			UkrSEPRO	
CSA			CSA 22.2 No. 100	
cURus			UL 1004-1 UL 1004-6 Power Conversion Equipment (File-No. E210321)	
Max. voltage load				
IEC/TS 60034-25			Pulse voltage limiting curve A	
Smooth running				
IEC 60072			Normal class	
Linear movement				
IEC 60072			Normal class	
Concentricity				
IEC 60072			Normal class	
Mechanical ambient conditions (vibration)				
IEC/EN 60721-3-3			3M6	
Min. ambient operating temperature				
Without brake	$T_{opr,min}$	[°C]	-20	-15
With brake	$T_{opr,min}$	[°C]	-10	
Max. ambient temperature for operation				
	$T_{opr,max}$	[°C]	40	
Max. surface temperature				
	T	[°C]	140	110
Mechanical tolerance				
Flange centring diameter			$b_2 \leq 230$ mm = j6 $b_2 > 230$ mm = h6	
Shaft diameter			d ≤ 50 mm = k6 d > 50 mm = m6	
Site altitude				
Amsl	H_{max}	[m]	4000	

Permissible radial and axial forces

Application of forces





5.2

Application of force at l/2

<table>
<tr><th colspan="16">Bearing service life L_{10}</th></tr>
<tr><th></th><th colspan="3">5000 h</th><th colspan="3">10000 h</th><th colspan="3">20000 h</th><th colspan="3">30000 h</th><th colspan="3">50000 h</th></tr>
<tr><th></th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th></tr>
<tr><th></th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th></tr>
<tr><td>MDSKS□□056</td><td>590</td><td>-90</td><td>280</td><td>470</td><td>-40</td><td>230</td><td>370</td><td>0</td><td>190</td><td rowspan="3">310</td><td>10</td><td>180</td><td>220</td><td>10</td><td>180</td></tr>
<tr><td>MDSKS□□071</td><td rowspan="2">910</td><td rowspan="2">-50</td><td rowspan="2">520</td><td rowspan="2">700</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">430</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">50</td><td rowspan="2">-50</td><td rowspan="2">520</td></tr>
<tr><td>MDFKS□□071</td></tr>
</table>

Application of force at l

<table>
<tr><th colspan="16">Bearing service life L_{10}</th></tr>
<tr><th></th><th colspan="3">5000 h</th><th colspan="3">10000 h</th><th colspan="3">20000 h</th><th colspan="3">30000 h</th><th colspan="3">50000 h</th></tr>
<tr><th></th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th><th>F_{rad}</th><th>$F_{ax,-}$</th><th>$F_{ax,+}$</th></tr>
<tr><th></th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th><th>[N]</th></tr>
<tr><td>MDSKS□□056</td><td>550</td><td>-90</td><td>280</td><td>430</td><td>-40</td><td>230</td><td>340</td><td>0</td><td>190</td><td>290</td><td>10</td><td>180</td><td>200</td><td>10</td><td>180</td></tr>
<tr><td>MDSKS□□071</td><td rowspan="2">820</td><td rowspan="2">-50</td><td rowspan="2">520</td><td rowspan="2">630</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">390</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">280</td><td rowspan="2">20</td><td rowspan="2">450</td><td rowspan="2">40</td><td rowspan="2">-50</td><td rowspan="2">520</td></tr>
<tr><td>MDFKS□□071</td></tr>
</table>

- The values for the bearing service life L_{10} refer to an average speed of 4000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.

Rated data, non-ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MDSKS□□056-23	3800	3.20	2.80	11.6	1.10	2.60	2.30	10.0	330	190
MDSKS□□056-33	4000	4.70	4.20	17.2	1.80	4.00	3.60	16.0	325	200
MDSKS□□071-03	3400	6.70	5.70	23.6	2.00	4.90	4.20	19.0	330	170
MDSKS□□071-13	3700	10.0	8.30	35.2	3.20	8.40	7.00	32.0	325	185
MDSKS□□071-33	3600	14.7	12.3	52.0	4.60	11.9	10.0	45.0	325	180

	$\eta_{100\,\%}$	J [1)]	$KE_{LL\ 150\,°C}$	$R_{UV\ 20\,°C}$	$R_{UV\ 150\,°C}$	L_N	$Kt_{0\ 150\,°C}$	n_{max} [2)]	m [1)]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MDSKS□□056-23	85.0	1.20	78.1	10.1	13.6	17.1	1.23	5500	5.30
MDSKS□□056-33	87.0	1.80	74.6	5.10	6.90	10.8	1.18	5500	6.30
MDSKS□□071-03	85.0	6.00	93.0	3.40	4.60	10.6	1.37	5000	8.90
MDSKS□□071-13	82.0	8.00	84.5	1.50	2.10	5.30	1.19	5000	10.9
MDSKS□□071-33	82.0	10.0	88.2	1.10	1.60	5.80	1.24	5000	13.0

[1)] Without brake.
[2)] Mechanically permissible maximum speed.

Rated data, forced ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	I_{max}	$U_{N, AC}$	f_N
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[A]	[V]	[Hz]
MDFKS□□071-03	3300	8.80	7.50	23.6	2.60	6.60	5.60	19.0	330	165
MDFKS□□071-13	3600	13.3	11.0	35.2	4.10	11.1	9.20	32.0	325	180
MDFKS□□071-33	3500	19.3	16.2	52.0	5.90	15.6	13.1	45.0	325	175

	$\eta_{100\,\%}$	J [1)]	$KE_{LL\ 150\,°C}$	$R_{UV\ 20\,°C}$	$R_{UV\ 150\,°C}$	L_N	$Kt_{0\ 150\,°C}$	n_{max} [2)]	m [1)]
	[%]	[kgcm²]	[V /1000 rp]	[Ω]	[Ω]	[mH]	[Nm/A]	[r/min]	[kg]
MDFKS□□071-03	81.0	6.00	93.0	3.40	4.60	10.6	1.33	5000	10.2
MDFKS□□071-13	79.0	8.00	84.5	1.50	2.10	5.30	1.20	5000	12.2
MDFKS□□071-33	80.0	10.0	88.2	1.10	1.60	5.80	1.24	5000	12.2

[3)] Without brake.
[4)] Mechanically permissible maximum speed.

Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5
MDSKS	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5
056-23	2.8	3800	2.3	1.10	M_0	2.3	3.2					
					M_N	2.3	2.8					
					$M_{0,max}$	7.5	11.6					
					M_{max}	7.5	11.6					
					n_{eto}	-	-					
056-33	4.2	4000	3.6	1.80	M_0		3.6	4.7				
					M_N		3.6	4.2				
					$M_{0,max}$		12.0	17.2				
					M_{max}		12.0	17.2				
					n_{eto}		-	-				
071-03	5.7	3400	4.2	2.00	M_0		4.2	6.7	6.7			
					M_N		4.2	5.7	5.7			
					$M_{0,max}$		15.2	21.4	23.6			
					M_{max}		15.2	21.4	23.6			
					n_{eto}		-	-	-			
071-13	8.3	3700	7.0	3.20	M_0			6.0	10.0	10.0	10.0	
					M_N			5.9	8.3	8.3	8.3	
					$M_{0,max}$			22.0	27.1	32.7	35.2	
					M_{max}			22.0	27.1	32.7	35.2	
					n_{eto}			-	-	-	-	
071-33	12.3	3600	10.0	4.60	M_0				10.9	14.3	14.7	14.7
					M_N				10.8	12.3	12.3	12.3
					$M_{0,max}$				31.2	38.9	48.3	52.0
					M_{max}				31.2	38.9	48.3	52.0
					n_{eto}				-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0044	E0074	E0094	E0134	E0174
					I_N	5.0	8.8	11.7	16.3	20.6
					$I_{0,max}$	16.0	21.0	28.0	39.0	49.5
MDFKS	M_N	n_N	I_N	P_N	I_{max}	16.0	21.0	28.0	39.0	49.5
071-03	7.5	3300	5.6	2.60	M_0	6.7	8.8			
					M_N	6.7	7.5			
					$M_{0,max}$	21.6	23.6			
					M_{max}	21.6	23.6			
					n_{eto}	-	-			
071-13	11.0	3600	9.2	4.10	M_0		10.5	13.3	13.3	
					M_N		10.5	11.0	11.0	
					$M_{0,max}$		27.8	33.1	35.2	
					M_{max}		27.8	33.1	35.2	
					n_{eto}		-	-	-	
071-33	16.2	3500	13.1	5.90	M_0			14.4	19.3	19.3
					M_N			14.3	16.2	16.2
					$M_{0,max}$			40.0	48.8	52.0
					M_{max}			40.0	48.8	52.0
					n_{eto}			-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□5514	□7514	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534
					I_N	1.8	2.4	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0
					$I_{0,max}$	2.7	3.6	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2
MDSKS	M_N	n_N	I_N	P_N	I_{max}	3.6	4.8	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0
056-23	2.8	3800	2.3	1.10	M_0	2.4	3.1	3.2	3.2	3.2	3.2					
					M_N	2.2	2.8	2.8	2.8	2.8	2.8					
					$M_{0,max}$	4.6	6.2	8.0	9.8	11.6	11.6					
					M_{max}	4.6	6.2	8.0	9.8	11.6	11.6					
					n_{eto}	-	-	-	-	-	-					
056-33	4.2	4000	3.6	1.80	M_0			4.1	4.6	4.7	4.7	4.7	4.7			
					M_N			3.7	4.2	4.2	4.2	4.2	4.2			
					$M_{0,max}$			8.2	10.0	14.0	17.2	16.8	17.2			
					M_{max}			8.2	10.0	14.0	17.2	16.8	17.2			
					n_{eto}			-	-	-	-	-	-			
071-03	5.7	3400	4.2	2.00	M_0			4.3	5.3	6.7	6.7	6.7	6.7			
					M_N			4.3	5.3	5.7	5.7	5.7	5.7			
					$M_{0,max}$			10.5	12.8	17.8	22.0	23.0	23.6			
					M_{max}			10.5	12.8	17.8	22.0	23.0	23.6			
					n_{eto}			-	-	-	-	-	-			
071-13	8.3	3700	7.0	3.20	M_0					7.0	8.7	10.0	10.0	10.0	10.0	
					M_N					7.0	8.7	8.3	8.3	8.3	8.3	
					$M_{0,max}$					17.4	21.6	25.0	29.3	29.3	29.3	
					M_{max}					17.4	21.6	25.0	34.3	35.2	35.2	
					n_{eto}					-	-	-	-	-	-	
071-33	12.3	3600	10.0	4.60	M_0							14.0	14.7	14.7	14.7	14.7
					M_N							11.7	12.3	12.3	12.3	12.3
					$M_{0,max}$							28.5	39.1	42.7	42.7	42.7
					M_{max}							28.5	39.1	52.0	52.0	52.0
					n_{eto}							-	-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534
					I_N	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0
					$I_{0,max}$	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2
MDFKS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0
071-03	7.5	3300	5.6	2.60	M_0	4.3	5.2	8.8	8.8	8.8	8.8			
					M_N	4.3	5.2	7.5	7.5	7.5	7.5			
					$M_{0,max}$	8.6	10.4	18.3	22.7	23.0	23.6			
					M_{max}	8.6	10.4	18.3	22.7	23.0	23.6			
					n_{eto}	-	-	-	-	-	-			
071-13	11.0	3600	9.2	4.10	M_0			7.1	8.8	13.3	13.3	13.3	13.3	
					M_N			7.1	8.8	11.0	11.0	11.0	11.0	
					$M_{0,max}$			14.2	17.5	25.7	29.9	29.9	29.3	
					M_{max}			14.2	17.5	25.7	35.2	35.2	35.2	
					n_{eto}			-	-	-	-	-	-	
071-33	16.2	3500	13.1	5.90	M_0					11.8	16.1	19.3	19.3	19.3
					M_N					11.8	16.1	16.2	16.2	16.2
					$M_{0,max}$					29.7	40.7	43.6	43.6	43.6
					M_{max}					29.7	40.7	52.0	52.0	52.0
					n_{eto}					-	-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	008C□B	016C□B	032C□B	048C□B
					I_N	4.0	8.0	12.7	17.0
					$I_{0,max}$	4.6	9.1	18.1	27.2
MDSKS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	8.0	16.0	32.0	48.0
056-23	2.8	3800	2.3	1.10	M_0	3.2	3.2		
					M_N	2.8	2.8		
					$M_{0,max}$	5.9	10.7		
					M_{max}	9.6	11.6		
					n_{eto}	2816	2452		
056-33	4.2	4000	3.6	1.80	M_0	4.7	4.7		
					M_N	4.2	4.2		
					$M_{0,max}$	5.4	11.1		
					M_{max}	9.9	17.2		
					n_{eto}	3620	2705		
071-03	5.7	3400	4.2	2.00	M_0	5.5	6.7		
					M_N	5.4	5.7		
					$M_{0,max}$	6.2	14.1		
					M_{max}	12.7	21.4		
					n_{eto}	3177	2750		
071-13	8.3	3700	7.0	3.20	M_0		9.5	10.0	
					M_N		8.3	8.3	
					$M_{0,max}$		10.8	24.3	
					M_{max}		22.0	35.2	
					n_{eto}		3517	3000	
071-33	12.3	3600	10.0	4.60	M_0		9.9	14.7	14.7
					M_N		9.8	12.3	12.3
					$M_{0,max}$		11.2	27.6	38.1
					M_{max}		24.8	42.7	52.0
					n_{eto}		3368	2840	2350

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.2

Selection tables, Servo Drives ECS

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	008C□B	016C□B	032C□B	048C□B
					I_N	4.0	8.0	12.7	17.0
					$I_{0,max}$	4.6	9.1	18.1	27.2
MDFKS	M_N	n_N	I_N	P_N	I_{max}	8.0	16.0	32.0	48.0
071-03	7.5	3300	5.6	2.60	M_0	5.3	8.8		
					M_N	5.4	7.5		
					$M_{0,max}$	6.2	14.6		
					M_{max}	13.2	21.6		
					n_{eto}	3177	2750		
071-13	11.0	3600	9.2	4.10	M_0		9.6	13.3	
					M_N		9.6	11.0	
					$M_{0,max}$		10.9	25.0	
					M_{max}		22.8	35.2	
					n_{eto}		3517	3000	
071-33	16.2	3500	13.1	5.90	M_0			15.7	19.3
					M_N			15.7	16.2
					$M_{0,max}$			22.4	39.2
					M_{max}			43.6	52.0
					n_{eto}			2840	2350

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.2

Selection tables, Servo Inverter 9300

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□
					I_N	2.5	3.9	7.0	13.0	23.5	32.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0
MDSKS	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0
056-23	2.8	3800	2.3	1.10	M_0	3.1	3.2	3.2			
					M_N	2.8	2.8	2.8			
					$M_{0,max}$	4.9	7.4	11.6			
					M_{max}	4.9	7.4	11.6			
					n_{eto}	3601	3248	2452			
056-33	4.2	4000	3.6	1.80	M_0		4.6	4.7	4.7		
					M_N		4.2	4.2	4.2		
					$M_{0,max}$		7.6	12.5	17.2		
					M_{max}		7.6	12.5	17.2		
					n_{eto}		3834	3360	2455		
071-03	5.7	3400	4.2	2.00	M_0		5.3	6.7	6.7		
					M_N		5.3	5.7	5.7		
					$M_{0,max}$		9.7	15.8	23.6		
					M_{max}		9.7	15.8	23.6		
					n_{eto}		3291	3047	2500		
071-13	8.3	3700	7.0	3.20	M_0			8.3	10.0	10.0	
					M_N			8.3	8.3	8.3	
					$M_{0,max}$			15.5	25.7	29.3	
					M_{max}			15.5	25.7	35.2	
					n_{eto}			3690	3418	3000	
071-33	12.3	3600	10.0	4.60	M_0				14.7	14.7	14.7
					M_N				12.3	12.3	12.3
					$M_{0,max}$				29.3	34.1	42.7
					M_{max}				29.3	45.4	52.0
					n_{eto}				3252	2716	2350

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.2

Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

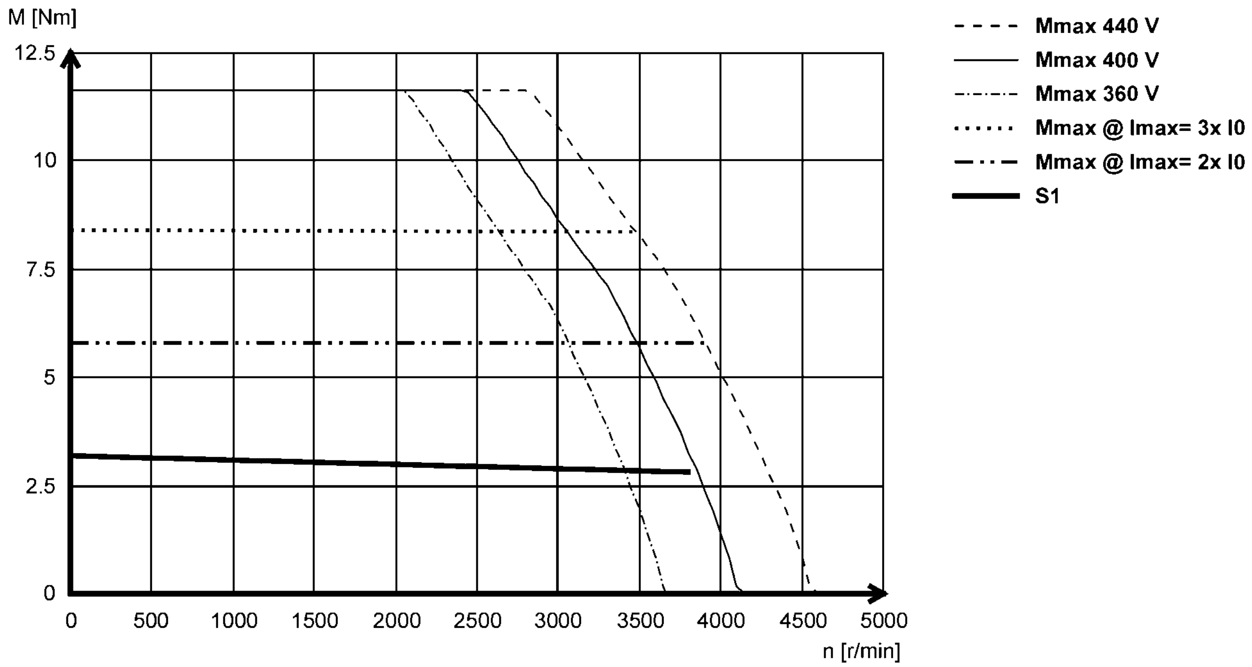
					EVS	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□
					I_N	3.9	7.0	13.0	23.5	32.0
					$I_{0,max}$	5.9	10.5	19.5	23.5	32.0
MDFKS	M_N	n_N	I_N	P_N	I_{max}	5.9	10.5	19.5	35.3	48.0
071-03	7.5	3300	5.6	2.60	M_0	5.2	8.8	8.8		
					M_N	5.2	7.5	7.5		
					$M_{0,max}$	7.9	16.3	23.6		
					M_{max}	7.9	16.3	23.6		
					n_{eto}	3291	3047	2500		
071-13	11.0	3600	9.2	4.10	M_0		8.4	13.3	13.3	
					M_N		8.4	11.0	11.0	
					$M_{0,max}$		12.6	26.4	29.9	
					M_{max}		12.6	26.4	35.2	
					n_{eto}		3690	3418	3000	
071-33	16.2	3500	13.1	5.90	M_0			16.1	19.3	19.3
					M_N			16.1	16.2	16.2
					$M_{0,max}$			30.5	35.2	43.6
					M_{max}			30.5	46.2	52.0
					n_{eto}			3252	2716	2350

► I... [A], M... [Nm], n... [r/min], P... [kW]

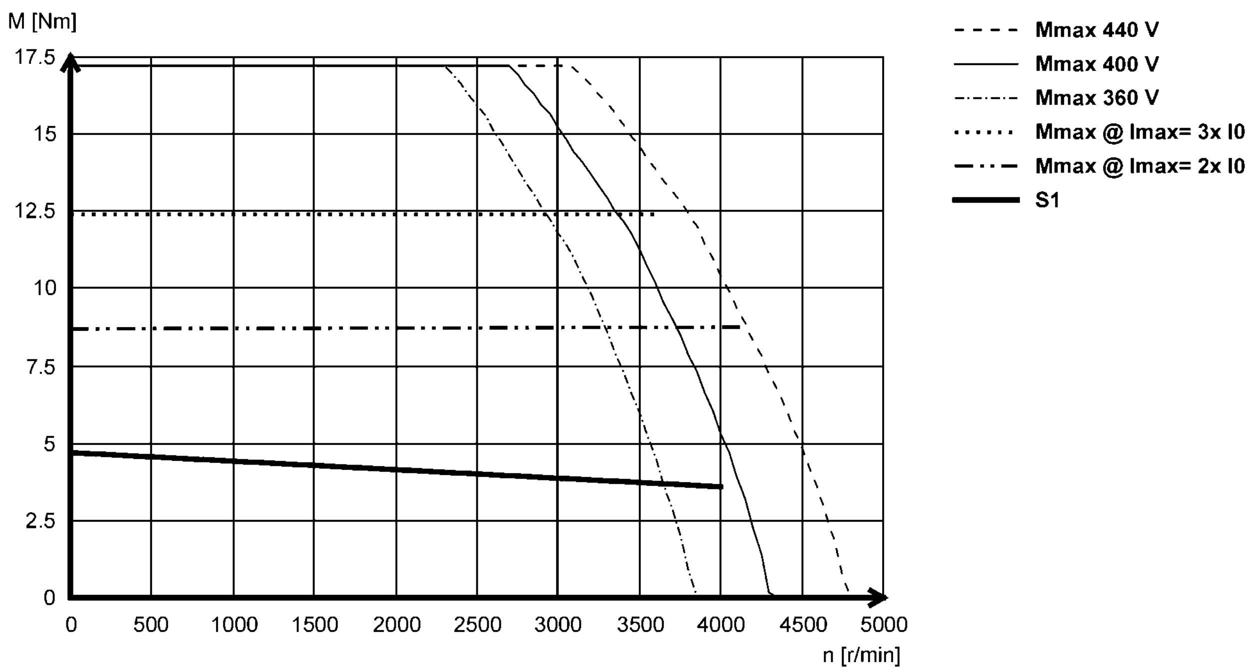
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MDSKS□□056-23 (non-ventilated)



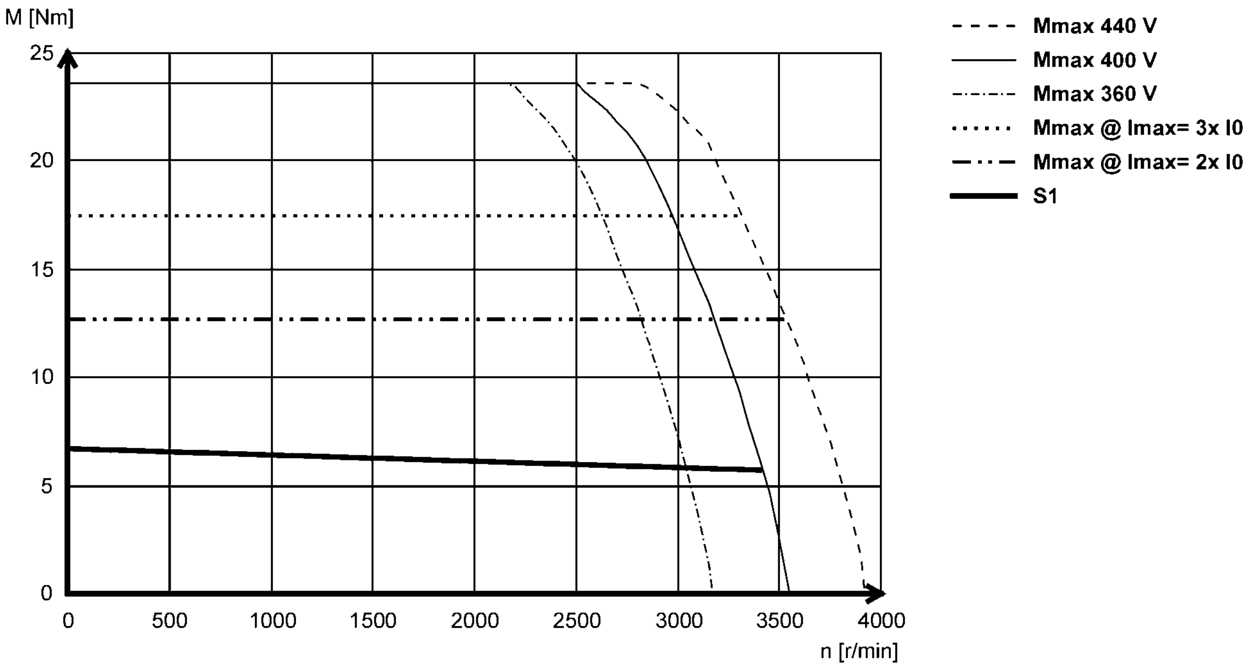
MDSKS□□056-33 (non-ventilated)



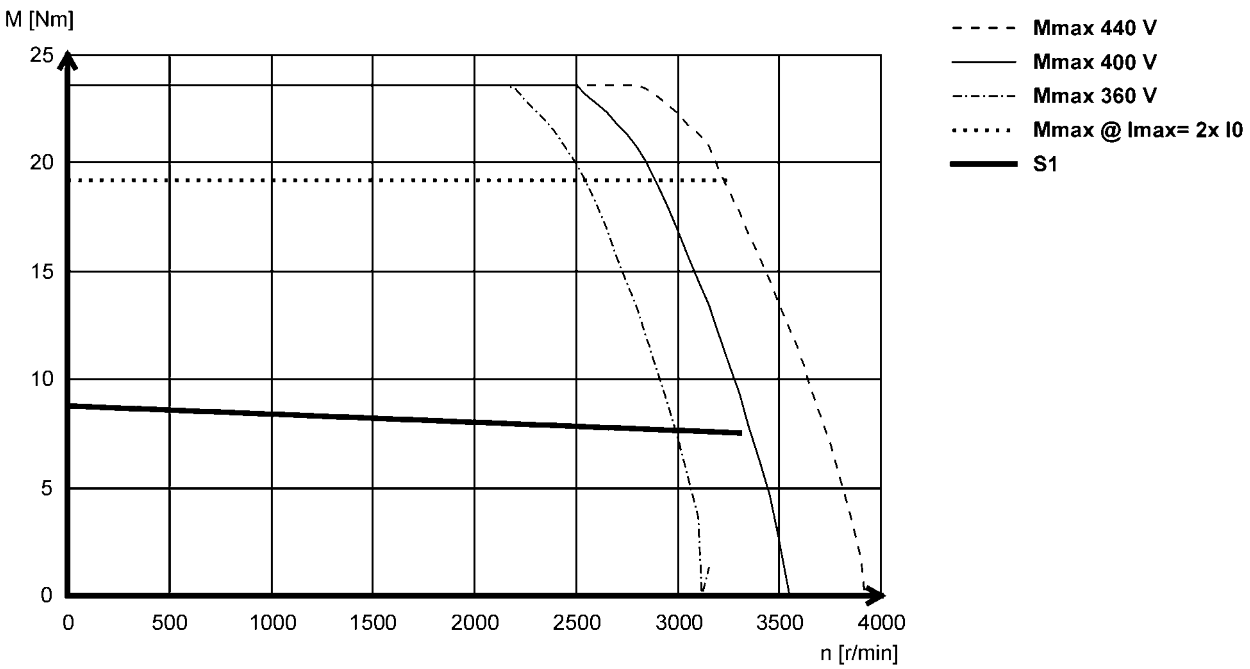
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MDSKS□□071-03 (non-ventilated)



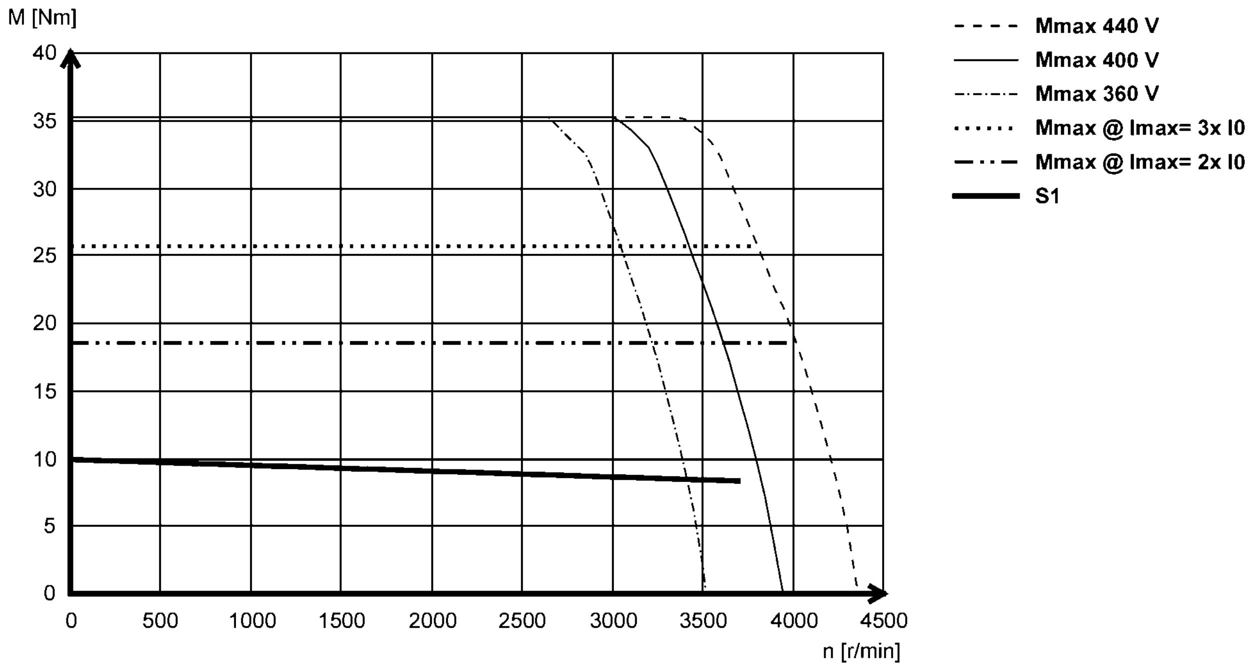
MDFKS□□071-03 (forced ventilated)



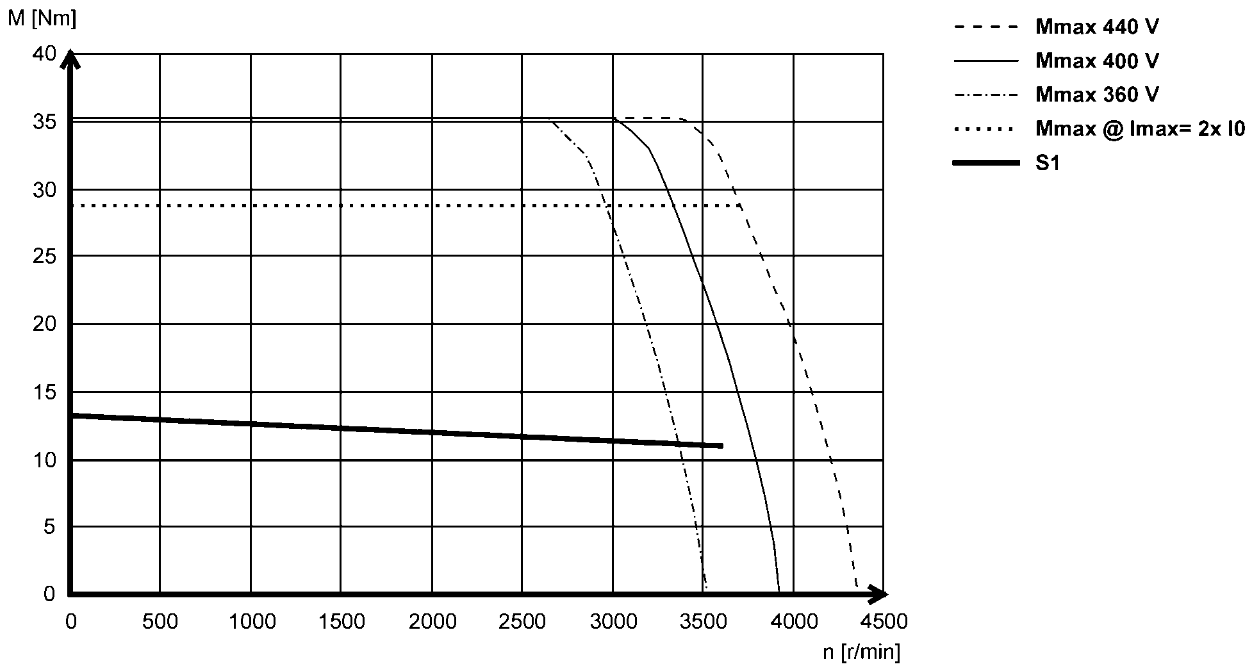
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MDSKS□□071-13 (non-ventilated)



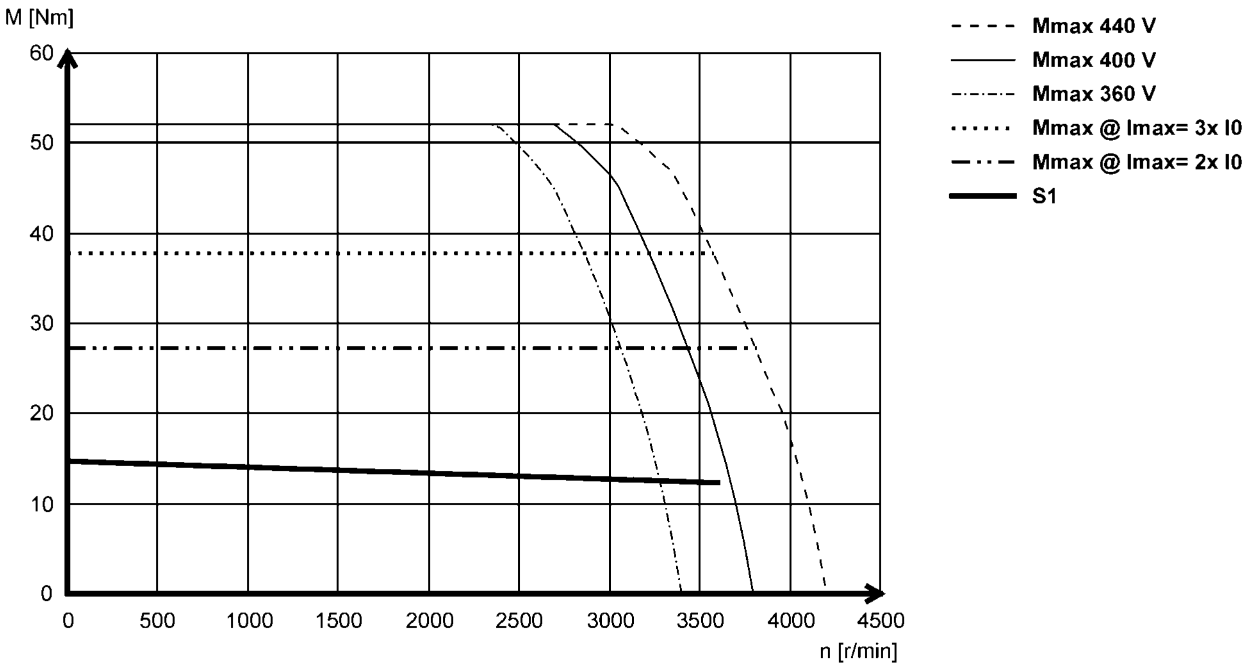
MDFKS□□071-13 (forced ventilated)



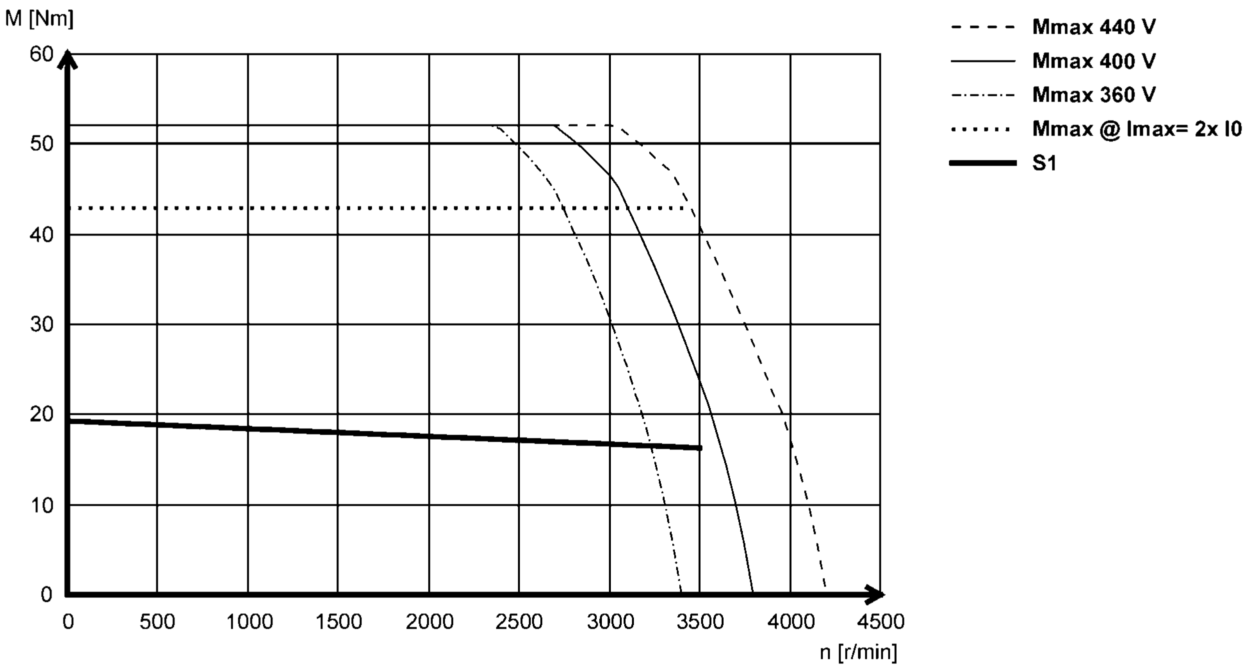
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

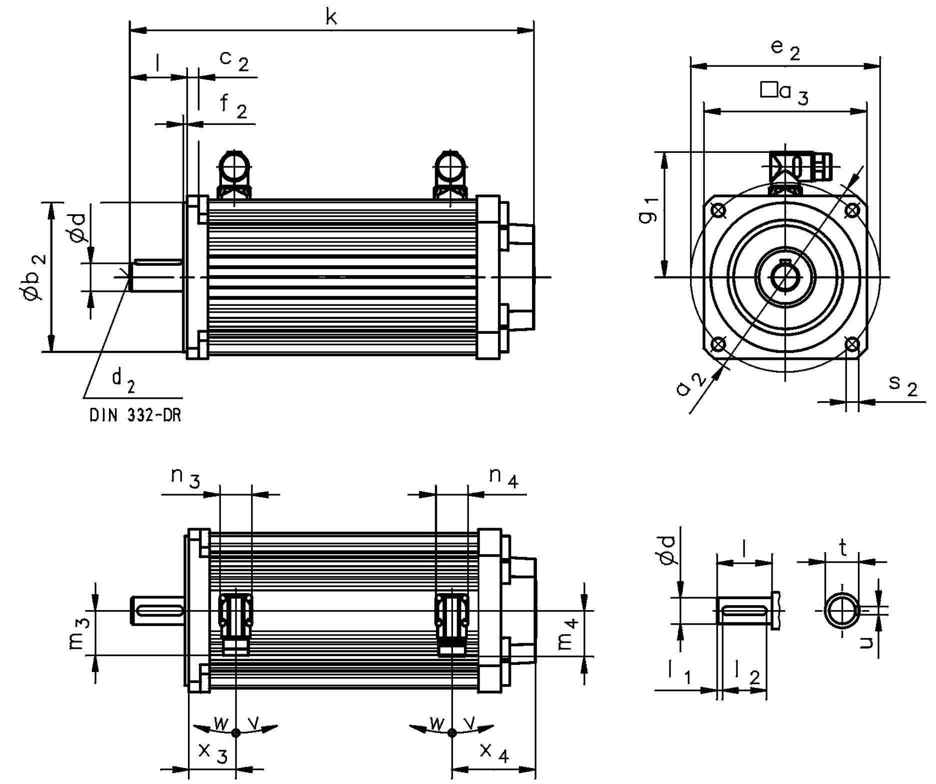
MDSKS□□071-33 (non-ventilated)



MDFKS□□071-33 (forced ventilated)



Dimensions, self-ventilated



5.2

			MDSKS□□056-23	MDSKS□□056-33
RS	k	[mm]	241	276
	x_3	[mm]	36	
	x_4	[mm]	60	
BS	k	[mm]	267	302
	x_3	[mm]	59	
	x_4	[mm]	60	
AG / IG	k	[mm]	295	330
	x_3	[mm]	36	
	x_4	[mm]	114	
BA / BI	k	[mm]	321	356
	x_3	[mm]	59	
	x_4	[mm]	114	

			MDSKS□□071-03	MDSKS□□071-13	MDSKS□□071-33
RS	k	[mm]	259	294	329
	x_3	[mm]		39	
	x_4	[mm]		58	
BS	k	[mm]	294	329	364
	x_3	[mm]		72	
	x_4	[mm]		58	
AG / IG	k	[mm]	314	349	384
	x_3	[mm]		39	
	x_4	[mm]		113	
BA / BI	k	[mm]	349	384	419
	x_3	[mm]		72	
	x_4	[mm]		113	

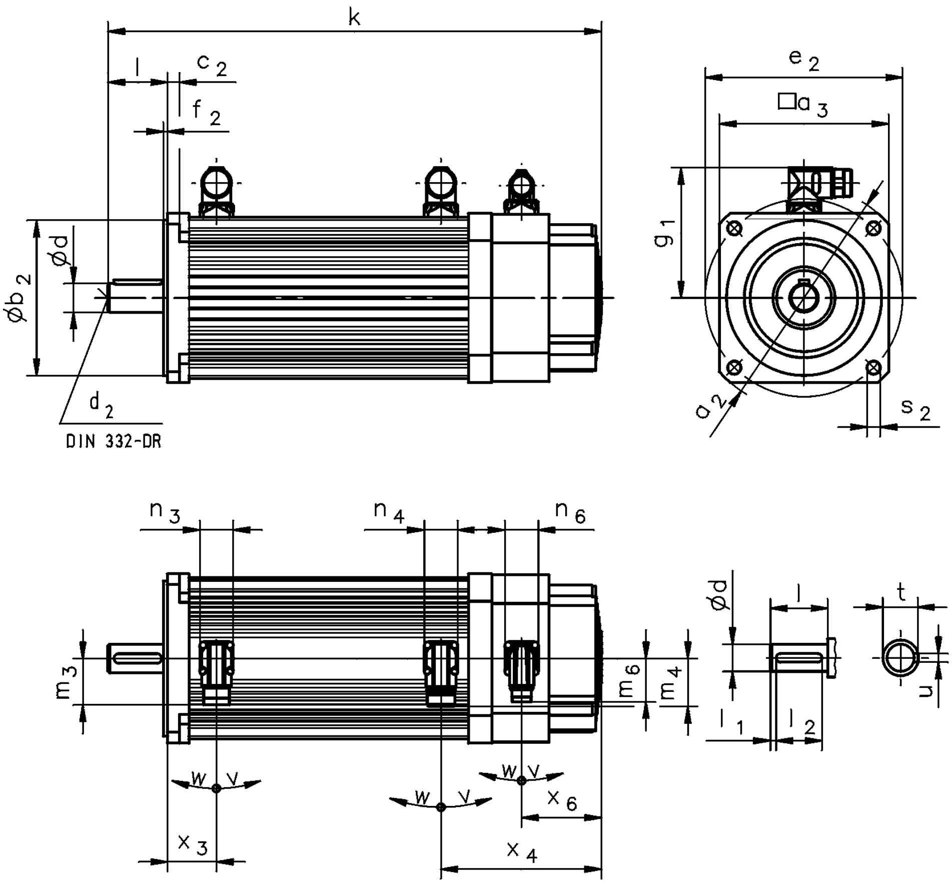
Dimensions, self-ventilated

	g_1	n_3	n_4	m_3	m_4	v	w
	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]
MDSKS□□056-23	90	28	28	40	40	195	80
MDSKS□□056-33							
MDSKS□□071-03	102						
MDSKS□□071-13							
MDSKS□□071-33							

	d	d_2	l	l_1	l_2	u	t
	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MDSKS□□056	14	M5	30	2.5	25	5.0	16.0
MDSKS□□071	19	M6	40	2.0	36	6.0	21.5

		a_2	a_3	b_2	c_2	e_2	f_2	s_2
				j6				
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MDSKS□□056	FF100	120	102	80	8	100	3.0	7
	FT85			70		85	2.5	M6
MDSKS□□071	FF130	160	130	110	9	130	3.5	9.0
	FT130							M8

Dimensions, forced ventilated



			MDFKS□□071-03	MDFKS□□071-13	MDFKS□□071-33
RS	k	[mm]	327	362	397
	x_3	[mm]	39		
	x_4	[mm]	126		
BS	k	[mm]	362	397	432
	x_3	[mm]	72		
	x_4	[mm]	126		
AG / IG	k	[mm]	382	417	452
	x_3	[mm]	39		
	x_4	[mm]	181		
BA / BI	k	[mm]	417	452	487
	x_3	[mm]	72		
	x_4	[mm]	181		
	x_6	[mm]	73		

Dimensions, forced ventilated

	g_1	n_3	n_4	n_6	m_3	m_4	m_6	v	w
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]
MDFKS□□071-03	102	28	28	28	40	40	40	195	80
MDFKS□□071-13									
MDFKS□□071-33									

	d	d_2	l	l_1	l_2	u	t
	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MDFKS□□071	19	M6	40	2.0	36	6.0	21.5

		a_2	a_3	b_2	c_2	e_2	f_2	s_2
				j6				
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MDFKS□□071	FF130	160	130	110	9	130	3.5	9.0
	FT130							M8

5.2

Permanent magnet holding brake

The synchronous servo motor can be fitted with integral permanent magnet holding brakes.
In the case of permanent magnet brakes, the rated torque applies solely as holding torque at standstill. This is due to the nature of their design. During braking from full motor speed, e.g. in the event of emergency stops, the braking torque is significantly reduced.
As such, they may not be used as safety elements (particularly with lifting axes) without additional measures being implemented.
The brakes are activated when the supply voltage is disconnected (closed-circuit principle). When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.

For traversing axes, adherence to the permissible load/brake motor (J_L / J_{MB}) moment of inertia ensures that the permissible maximum switching rate of the brake will not be exceeded and at least 2,000 emergency stop functions can be performed from a speed of 3,000 rpm.
For lifting axes, the load torque resulting from the weight acts additionally. In this case the specifications for J_L / J_{MB} do not apply.

Caution:
The brakes used are not safety brakes in the sense that a reduction in torque may arise as a result of disruptive factors that cannot be influenced, e.g. oil ingress.

The ohmic voltage drop along the cable must be taken into consideration in long motor supply cables and must be compensated for by a higher voltage at the line input.

The following applies for Lenze system cables:

$$U[V] = U_B[V] + 0.08 \frac{[V]}{[A]\cdot[m]} \cdot l_{Lg}[m] \cdot I_B[A]$$

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.
The shortest switching times of the brakes are achieved by DC switching of the voltage. A spark suppressor is required to suppress interference and to increase the service life of the relay contacts here.

Permanent magnet holding brake

Permanent magnet holding brake

Rated data with standard braking torque

- The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

<table>
<tr><th></th><th>$U_{N, DC}$ [3, 4, 6]</th><th>M_N</th><th>M_N</th><th>M_{av}</th><th>I_N [2]</th><th>J</th><th>t_1 [1]</th><th>t_2 [1]</th><th>Q_E [5]</th><th>m</th><th>J_{MB}</th><th>J_L/J_{MB}</th></tr>
<tr><th></th><th></th><th>20 °C</th><th>120 °C</th><th>120 °C</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th>[V]</th><th>[Nm]</th><th>[Nm]</th><th>[Nm]</th><th>[A]</th><th>[kgcm²]</th><th>[ms]</th><th>[ms]</th><th>[J]</th><th>[kg]</th><th>[kgcm²]</th><th></th></tr>
<tr><td>MDSKS□□056-23</td><td rowspan="2">24</td><td rowspan="4">3.30</td><td rowspan="4">2.50</td><td rowspan="4">1.20</td><td rowspan="2">0.50</td><td rowspan="4">0.38</td><td rowspan="4">10.0</td><td rowspan="4">20.0</td><td rowspan="4">350</td><td rowspan="4">0.90</td><td>1.58</td><td>43.9</td></tr>
<tr><td>MDSKS□□056-33</td><td>2.18</td><td>31.5</td></tr>
<tr><td>MDSKS□□056-23</td><td rowspan="2">205</td><td rowspan="2">0.060</td><td>1.58</td><td>43.9</td></tr>
<tr><td>MDSKS□□056-33</td><td>2.18</td><td>31.5</td></tr>
<tr><td>MDSKS□□071-03</td><td rowspan="3">24</td><td rowspan="12">12.0</td><td rowspan="12">11.0</td><td rowspan="12">5.50</td><td rowspan="3">0.67</td><td rowspan="12">1.06</td><td rowspan="12">20.0</td><td rowspan="12">29.0</td><td rowspan="12">400</td><td rowspan="12">0.80</td><td>7.06</td><td>10.5</td></tr>
<tr><td>MDSKS□□071-13</td><td>9.06</td><td>8.20</td></tr>
<tr><td>MDSKS□□071-33</td><td>11.1</td><td>6.70</td></tr>
<tr><td>MDSKS□□071-03</td><td rowspan="3">205</td><td rowspan="3">0.080</td><td>7.06</td><td>10.5</td></tr>
<tr><td>MDSKS□□071-13</td><td>9.06</td><td>8.20</td></tr>
<tr><td>MDSKS□□071-33</td><td>11.1</td><td>6.70</td></tr>
<tr><td>MDFKS□□071-03</td><td rowspan="3">24</td><td rowspan="3">0.67</td><td>7.06</td><td>10.5</td></tr>
<tr><td>MDFKS□□071-13</td><td>9.06</td><td>8.20</td></tr>
<tr><td>MDFKS□□071-33</td><td>11.1</td><td>6.70</td></tr>
<tr><td>MDFKS□□071-03</td><td rowspan="3">205</td><td rowspan="3">0.080</td><td>7.06</td><td>10.5</td></tr>
<tr><td>MDFKS□□071-13</td><td>9.06</td><td>8.20</td></tr>
<tr><td>MDFKS□□071-33</td><td>11.1</td><td>6.70</td></tr>
</table>

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.
With 205 V DC brake: connection to 230 V AC through rectifier.
4) UR not possible in the case of a brake with a 205 V supply voltage.
5) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
6) Voltage tolerance: -10% to +5%

Permanent magnet holding brake

Rated data with increased braking torque

► These ratings apply only for geared servo motors with integrated servo motor (without mounting flange).

	$U_{N, DC}$ 3), 4), 6)	M_N	M_N	M_{av}	I_N 2)	J	t_1 1)	t_2 1)	Q_E 5)	m	J_{MB}	J_L/J_{MB}
		20 °C	120 °C	120 °C								
	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MDSKS□□056-23	24	6.00	5.00	2.50	0.67	1.06	20.0	29.0	400	5.30	2.26	34.9
MDSKS□□056-33										6.30	2.86	27.3
MDSKS□□056-23	205				0.80					5.30	2.26	34.9
MDSKS□□056-33										6.30	2.86	27.3
MDSKS□□071-03	24	15.0	12.0	6.00	0.75	3.60	13.0	30.0	700	8.90	9.60	10.6
MDSKS□□071-13										10.9	11.6	8.80
MDSKS□□071-33										13.0	13.6	7.50
MDSKS□□071-03	205				0.090					8.90	9.60	10.6
MDSKS□□071-13										10.9	11.6	8.80
MDSKS□□071-33										13.0	13.6	7.50
MDFKS□□071-03	24				0.75					10.2	9.60	10.6
MDFKS□□071-13										12.2	11.6	8.80
MDFKS□□071-33											13.6	7.50
MDFKS□□071-03	205				0.090					10.2	9.60	10.6
MDFKS□□071-13										12.2	11.6	8.80
MDFKS□□071-33											13.6	7.50

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.
With 205 V DC brake: connection to 230 V AC through rectifier.
4) UR not possible in the case of a brake with a 205 V supply voltage.
5) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
6) Voltage tolerance: -10% to +5%

Resolver

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

Built-on accessories					
	[1]			RS BS	
Product key					
				RS0	RV03
Resolution					
Angle			[']	0.80	
Accuracy					
			[']	-10 ... 10	
Absolute positioning					
				1 revolution	
Max. speed					
	n_{max}		[r/min]	8000	
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	
Max. angle error					
			[']	-10 ... 10	
Inverter assignment					
				E84AVTC E94A ECS EVS93	

[1] 6 - Product key > built-on accessories

Speed-dependent safety functions

Suitable for safety function				
			No	Yes
Max. permissible angular acceleration				
MDxKS056 ... MDxKS071 [2]	α	[rad/s²]		17000
Functional safety				
IEC 61508				SIL3
EN 13849-1				Up to Performance Level e

[2] 9 - Single encoder concepts with resolvers

Incremental encoder and SinCos absolute value encoder

Encoder type						
			SinCos absolute value			
Built-on accessories						
	-1)		AG BA			
			AS1024-8V-H	AS1024-8V-K2	AM1024-8V-H	AM1024-8V-K2
Encoder type						
			Single-turn		Multi-turn	
Pulses						
			1024			
Output signals						
			1 Vss			
Interfaces						
			Hiperface			
Absolute revolutions						
			1		4096	
Resolution						
Angle 1)		[']	0.40			
Accuracy						
		[']	-0.8 ... 0.8			
Min. input voltage						
DC	$U_{in,min}$	[V]	7.00			
Max. input voltage						
DC	$U_{in,max}$	[V]	12.0			
Max. speed						
	n_{max}	[r/min]	6000			
Max. current consumption						
	I_{max}	[A]	0.080			
Limit frequency						
	f_{max}	[kHz]	200			
Inverter assignment						
			E84AVTC E94A ECS EVS93			

1) Inverter-dependent.

Speed-dependent safety functions

Suitable for safety function						
			No	Yes	No	Yes
Max. permissible angular acceleration						
MDxKS056 ... MDxKS071	α	[rad/s²]		240000		240000
Functional safety						
IEC 61508				SIL2		SIL2
EN 13849-1				Up to Performance Level d		Up to Performance Level d

Blowers

Rated data for 50 Hz

		Enclosure	Number of phases					
				U_{min}	U_{max}	$U_{N, AC}$	P_N	I_N
				[V]	[V]	[V]	[kW]	[A]
MDFKS□□071	F10	IP54	1	210	240	230	0.019	0.12

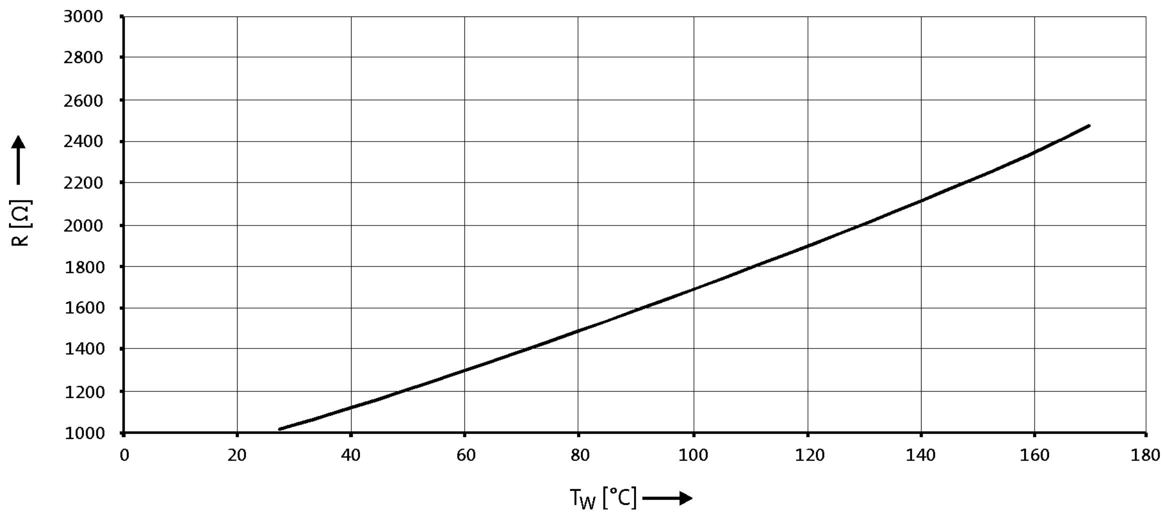
Rated data for 60 Hz

		Enclosure	Number of phases					
				U_{min}	U_{max}	$U_{N, AC}$	P_N	I_N
				[V]	[V]	[V]	[kW]	[A]
MDFKS□□071	F10	IP54	1	210	240	230	0.019	0.12

Temperature monitoring

The thermal sensors (1x KTY 83-110) used continuously monitor the motor temperature. The temperature signal is transmitted over the system cable of the feedback system to the servo controller.
This means that the temperature of the motor is determined with great accuracy in the permitted operating range and at the same time the overtemperature response configured in the controller is executed in the event of overtemperature in one of the winding phases.

Variation of resistance



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

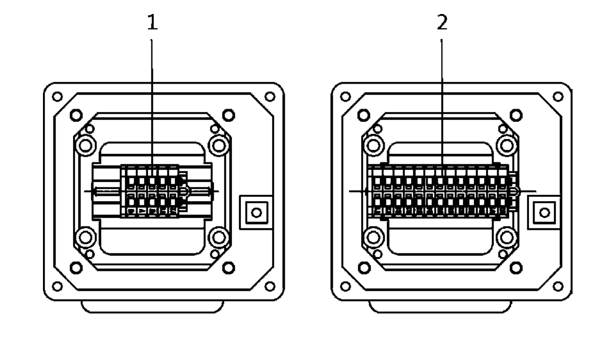
Terminal box

If a servo motor is to be connected to an existing cable or plug connectors are not to be used for other reasons, the connection can also be made via a terminal box.

The motor can either be fitted with a terminal box for the power connection and motor holding brake or a second terminal box provided to connect the motor feedback and blower (if applicable).

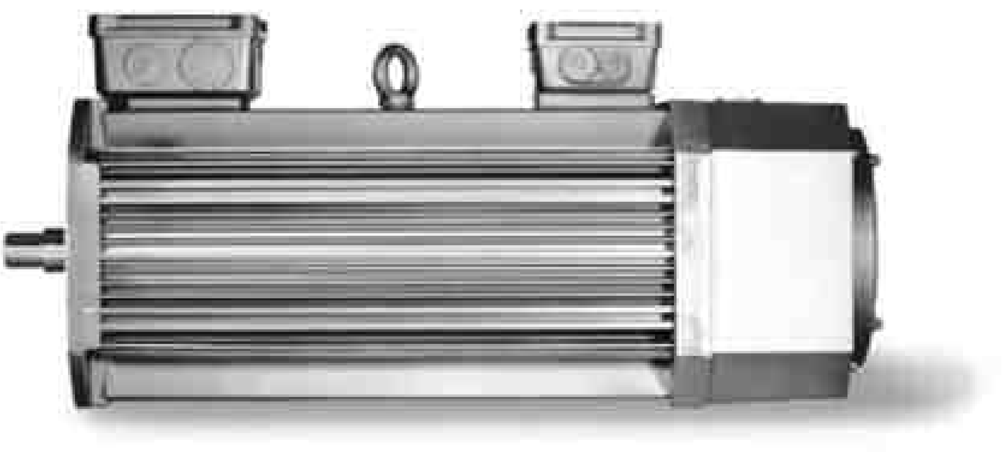
Connections

Connections



1: Power connection + brake connection + PE connection.

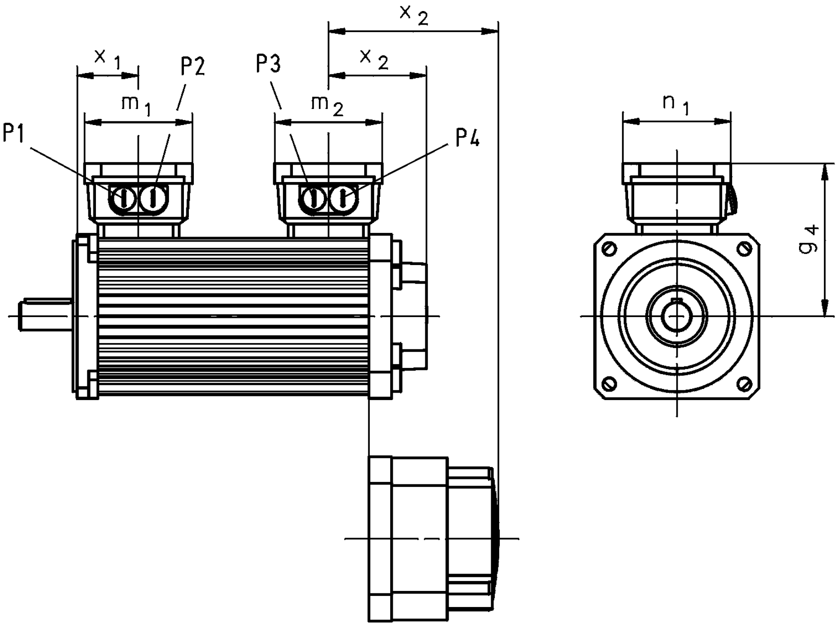
2: Angle/speed sensor connection + thermal sensor connection



MD□KS synchronous servo motors with blower and terminal box

Terminal box

Dimensions



			MDSKS□□056-23	MDSKS□□056-33	MDSKS□□071-03	MDSKS□□071-13	MDSKS□□071-33
RS	x_2	[mm]	63	78	62	77	
BS	x_2	[mm]	78		77		
AG / IG	x_2	[mm]	117	132	116	131	
BA / IG	x_2	[mm]	132		131		

			MDFKS□□071-03	MDFKS□□071-13	MDFKS□□071-33
RS	x_2	[mm]	130	145	
BS	x_2	[mm]	145		
AG / IG	x_2	[mm]	184	199	
BA / IG	x_2	[mm]	199		

	g_4	m_1	m_2	n_1	x_1	P_1	P_2	P_3	P_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MDSKS□□056	113				54				
MDSKS□□071	125	93	93	93	57	M20x1.5	M20x1.5	M20x1.5	M20x1.5
MDFKS□□071									

ICN connector

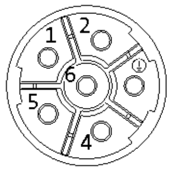
An ICN connector is used as standard for the electrical connection to the servo motors.

A connector is used for the connection of motor and brake.
The connections to the feedback system/temperature monitoring and the blower each employ a separate connector.

The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional union nuts. Existing mating connectors can therefore still be used without difficulty.

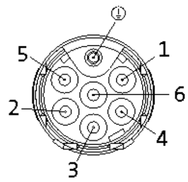
Connection for power and brake

Pin assignment			
Contact	Designation	Meaning	
1	BD1	Holding brake +	
2	BD2	Holding brake -	
PE	PE	PE conductor	
4	U	Phase U power	
5	V	Phase V power	
6	W	Phase W power	



Blower connection

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



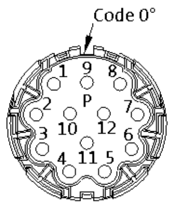
5.2

ICN connector

Feedback connection

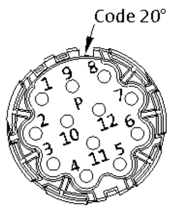
► Resolver

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

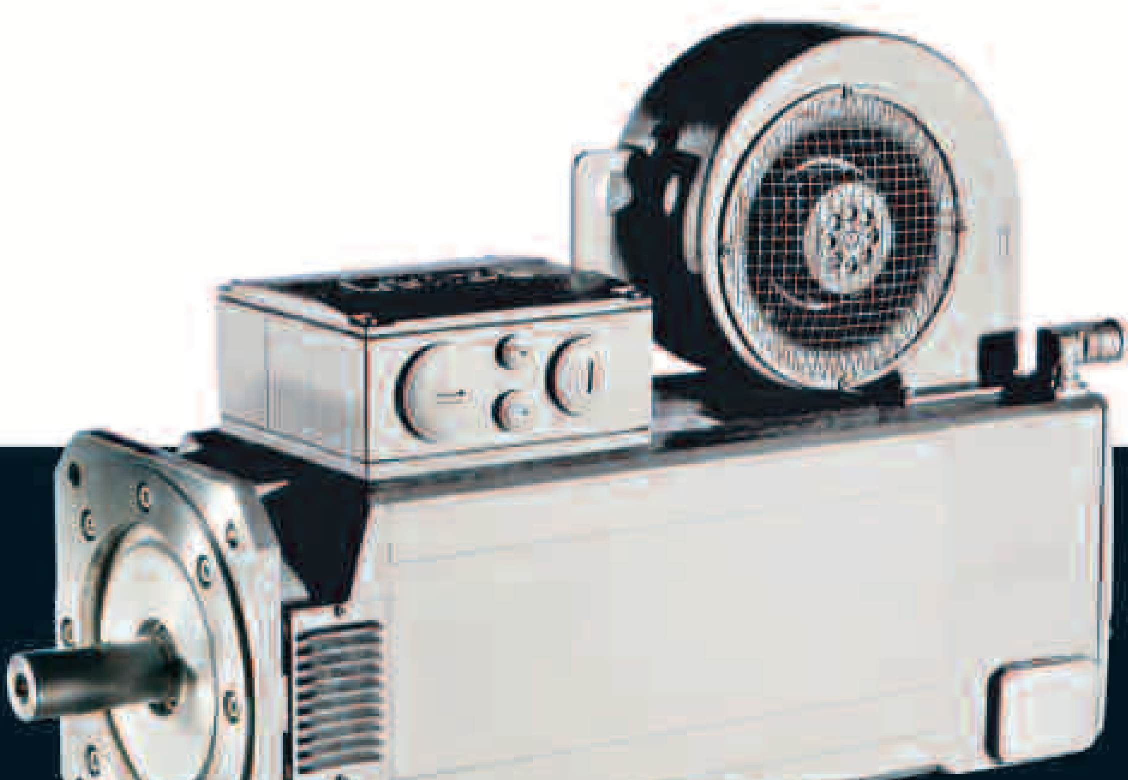
Pin assignment			
Contact	Designation	Meaning	
1	B	Track B/+SIN	
2	$\bar{A}$	Track A inverse/-COS	
3	A	Track A/+COS	
4	+U_B	Supply +	
5	GND	Mass	
6	$\bar{Z}$	Zero track inverse/-RS485	
7	Z	Zero track/+RS485	
8		Not assigned	
9	$\bar{B}$	Track B inverse/-SIN	
10		Not assigned	
11	+KTY	KTY temperature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



5.2

MQA asynchronous servo motors

66 to 1,100 Nm



MQA asynchronous servo motors

Contents

List of abbreviations

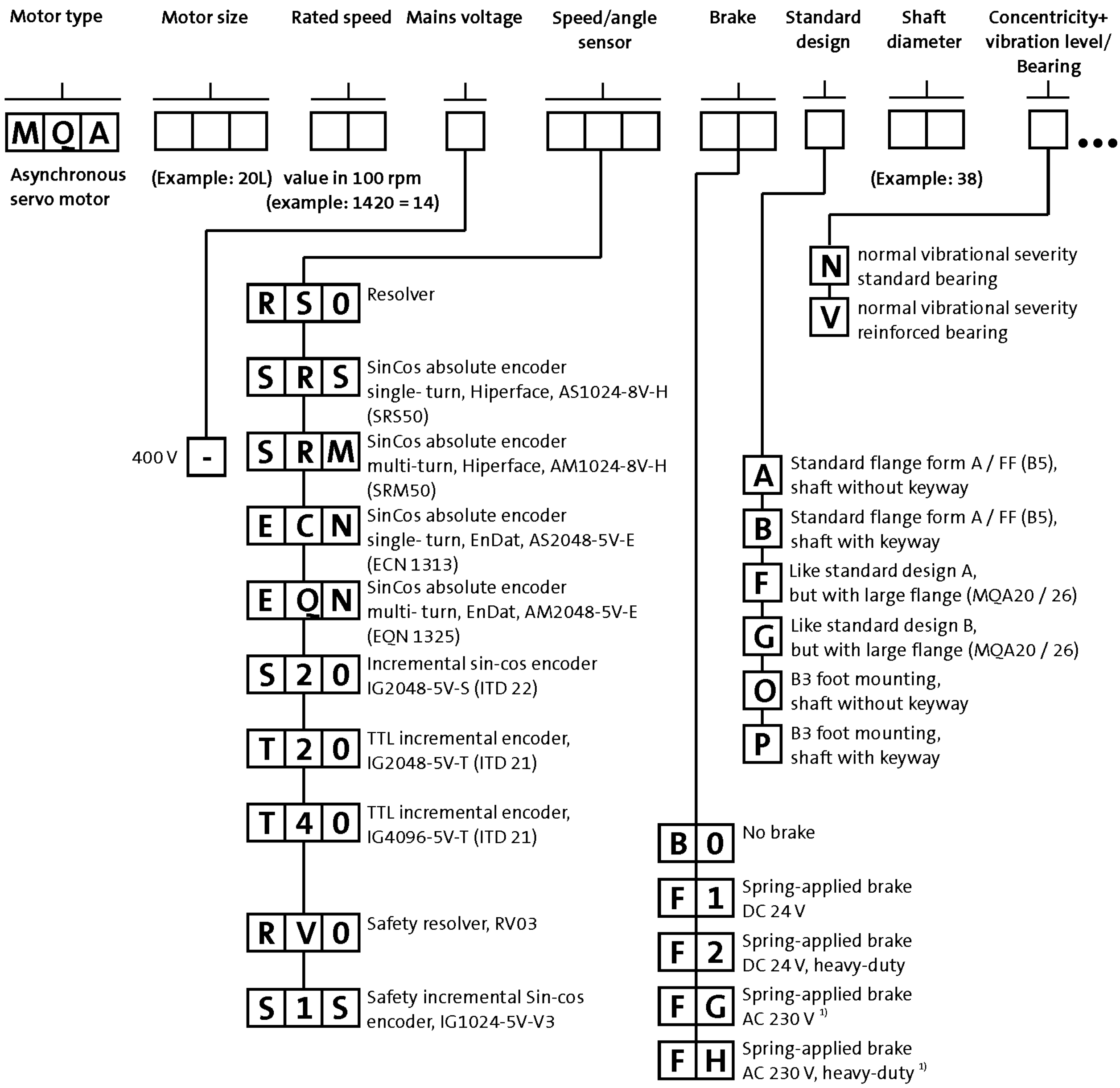
$\eta_{100\,\%}$	[%]	Efficiency
$\cos\phi$		Power factor
du/dt	[kV/µs]	Insulation resistance
$F_{ax,-}$	[N]	Min. axial force
$F_{ax,+}$	[N]	Max. axial force
$f_{in,max}$	[Hz]	Max. input frequency
f_{max}	[kHz]	Limit frequency
f_{max}	[kHz]	Max. switching frequency
f_N	[Hz]	Rated frequency
F_{rad}	[N]	Max. radial force
H_{max}	[m]	Site altitude
I_0	[A]	Standstill current
I_{max}	[A]	Max. short-time DC-bus current
I_{max}	[A]	Max. current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. DC-bus current
I_N	[A]	Rated current
J	[kgcm²]	Moment of inertia
J_{MB}	[kgcm²]	Moment of inertia
$KE_{LL\,150\,°C}$	[V /1000 rp]	Voltage constant
$Kt_{0\,150\,°C}$	[Nm/A]	Torque constant
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_0	[Nm]	Stall torque
$M_{0,\,max}$	[Nm]	Max. standstill torque
M_{av}	[Nm]	Average dynamic torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_{eto}	[r/min]	Transition speed
n_k	[r/min]	Speed
n_{max}	[r/min]	Max. speed

n_N	[r/min]	Rated speed
P_N	[kW]	Rated power
Q_E	[J]	Maximum switching energy
R	[Ω]	Insulation resistance
R	[Ω]	Min. insulation resistance
R_1	[Ω]	Stator impedance
R_2	[Ω]	Charging resistor
R_2	[Ω]	Rotor impedance
$R_{UV\,150\,°C}$	[Ω]	Stator impedance
$R_{UV\,20\,°C}$	[Ω]	Stator impedance
$S_{hü}$	[1/h]	Transition operating frequency
T	[°C]	Operating temperature
T	[°C]	Rated temperature
T	[°C]	Max. ambient temperature of bearing
T	[°C]	Max. surface temperature
T	[°C]	Max. ambient temperature for transport
T	[°C]	Min. ambient storage temperature
T	[°C]	Min. ambient temperature for transport
T	[°C]	Ambient temperature
t_1	[ms]	Engagement time
t_2	[ms]	Disengagement time
$T_{opr,max}$	[°C]	Max. ambient operating temperature
$T_{opr,min}$	[°C]	Min. ambient operating temperature
$U_{in,max}$	[V]	Max. input voltage
$U_{in,min}$	[V]	Min. input voltage
U_{max}	[V]	Max. mains voltage
U_{max}	[V]	Min. input voltage
U_{min}	[V]	Min. mains voltage
$U_{N,\,AC}$	[V]	Rated voltage
$U_{N,\,DC}$	[V]	Rated voltage
Z_{ro}	[Ω]	Rotor impedance
Z_{rs}	[Ω]	Impedance
Z_{so}	[Ω]	Stator impedance

List of abbreviations

CE	Communauté Européenne
CSA	Canadian Standards Association
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
UkrSEPRO	Certificate for Ukraine
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

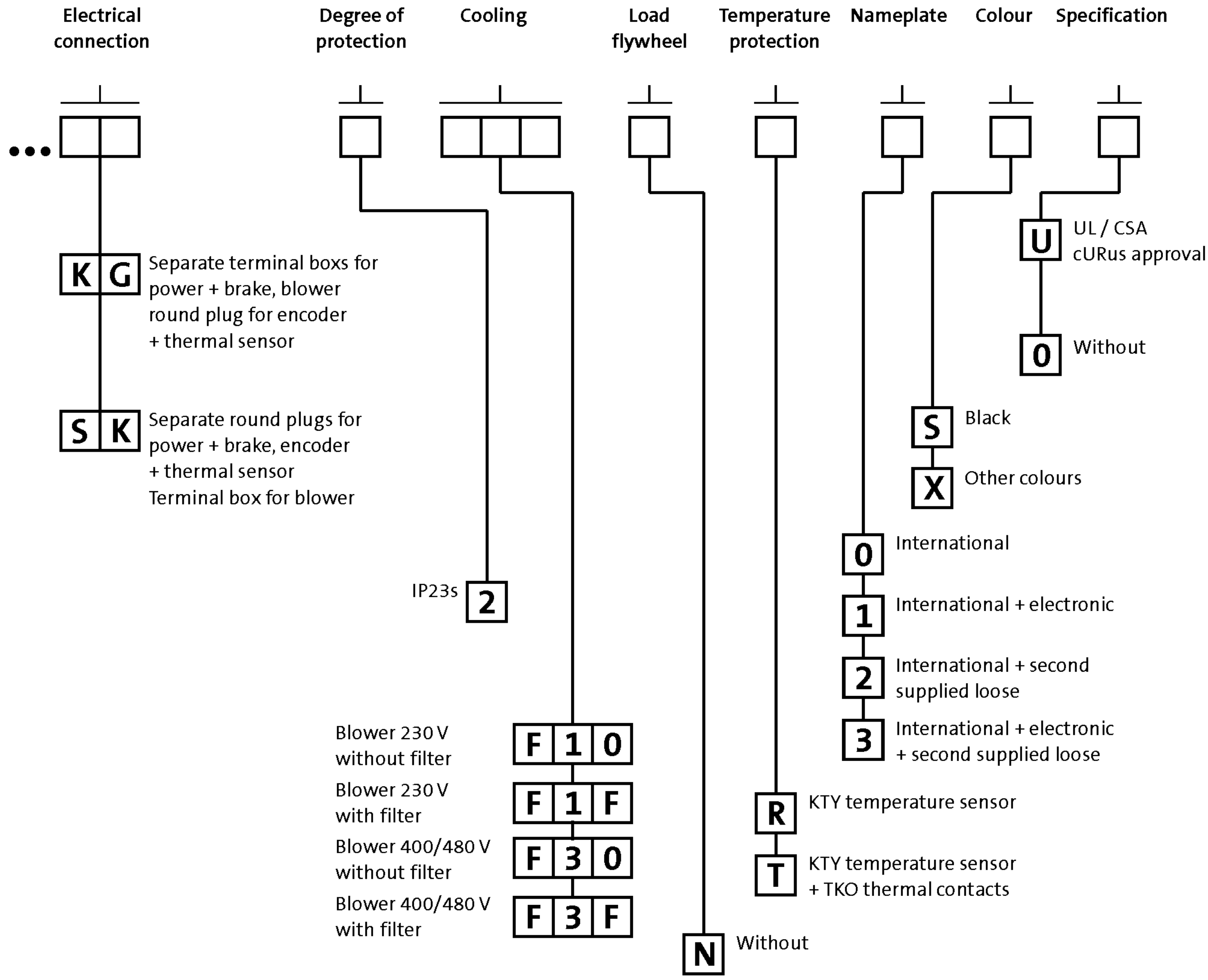
Product key



[1] Not possible for UL design.

5.3

Product key

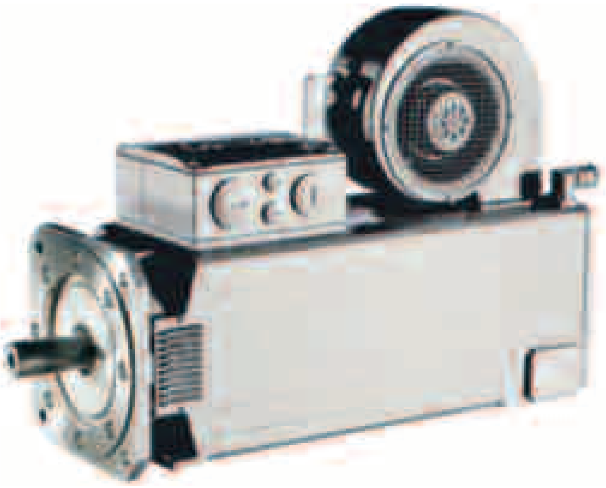

Electrical connection
Degree of protection
Cooling
Load flywheel
Temperature protection
Nameplate
Colour
Specification
K G
Separate terminal boxs for power + brake, blower round plug for encoder + thermal sensor
S K
Separate round plugs for power + brake, encoder + thermal sensor Terminal box for blower
IP23s
2
Blower 230 V without filter
F 1 0
Blower 230 V with filter
F 1 F
Blower 400/480 V without filter
F 3 0
Blower 400/480 V with filter
F 3 F
N
Without
R
KTY temperature sensor
T
KTY temperature sensor + TKO thermal contacts
0
International
1
International + electronic
2
International + second supplied loose
3
International + electronic + second supplied loose
S
Black
X
Other colours
U
UL / CSA cURus approval
0
Without

Product information

Designed for the harsh conditions of continuous operation in tight spaces at high torques, the enclosed-ventilated motors in the MDFQA series offer a long service life and optimum operational performance in all drive situations.

The motors, which have a power range of between 10 kW and 95 kW, are compact units with IP23 enclosure. They have been designed specifically for operation with Lenze's frequency and servo inverters. A wide range of feedback systems, brakes and blowers ensures that the perfect system configuration is available for virtually all operating conditions.

Advantages
- High power density
- Excellent operating characteristics
- IP23 protection
- Easy to install and service friendly
  - MQA 20 with SpeedTec connectors
  - MQA 22 and 26 with three-part terminal box
- Temperature class F
- KTY temperature monitoring
- Radial external fan
- B3 or B35 design
- Wide speed control range
- Field weakening operation usable



MQA22 asynchronous servo motor

Functions and features

<table>
<tr><th></th><th>MQA20</th><th>MQA22</th><th>MQA26</th></tr>
<tr><td>Design</td><td></td><td></td><td></td></tr>
<tr><td></td><td>B3
B35-FF215
B35-FF265</td><td>B3
B35-FF265</td><td>B3
B35-FF265
B35-FF350</td></tr>
<tr><td>Shaft end (with and without keyway)</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="2">38 x 80</td><td>55 x 110</td></tr>
<tr><td>A end shield</td><td colspan="3"></td></tr>
<tr><td></td><td colspan="3">Oil-tight
Not oil-tight</td></tr>
<tr><td>Brake</td><td colspan="3"></td></tr>
<tr><td>Spring-applied brake</td><td colspan="3">DC 24 V
AC 230 V [1, 2]</td></tr>
<tr><td>Speed and angle encoder</td><td colspan="3"></td></tr>
<tr><td></td><td colspan="3">Resolver
SinCos single-turn/multi-turn
Incremental encoder</td></tr>
<tr><td>Cooling</td><td colspan="3"></td></tr>
<tr><td>Radial blower, 1 phase</td><td colspan="3">230 V; 50 Hz
230 V; 60 Hz</td></tr>
<tr><td>Radial blower, 3 phase</td><td colspan="3">400 V; 50 Hz
400 V; 60 Hz
460 V; 50 Hz
460 V; 60 Hz
480 V; 60 Hz</td></tr>
<tr><td>Thermal sensor</td><td colspan="3"></td></tr>
<tr><td>Thermal detector</td><td colspan="3">KTY</td></tr>
<tr><td>Thermal contact</td><td colspan="3">TKO [3]</td></tr>
<tr><td>Motor connection: Terminal box + plug connector</td><td colspan="3"></td></tr>
<tr><td>Terminal box</td><td colspan="3">Power + brake
Blower</td></tr>
<tr><td>Plug connector</td><td>Power + brake
Encoder + thermal sensor</td><td colspan="2">Encoder + thermal sensor</td></tr>
<tr><td>Shaft bearings</td><td colspan="3"></td></tr>
<tr><td>Bearing type</td><td colspan="3">Deep-groove ball bearing with high-temperature resistant grease, sealing disc or cover plate</td></tr>
<tr><td>Position of the locating bearing</td><td colspan="3">Non-drive end</td></tr>
<tr><td>Installation of the locating bearing</td><td colspan="3">insulation</td></tr>
<tr><td>Colour</td><td colspan="3"></td></tr>
<tr><td></td><td colspan="3">Primed (grey)
RAL9005M</td></tr>
</table>

[1] Not possible for UR version.
[2] Not possible for MQA motor type with circular connector for motor connection.
[3] Not possible for MQA motor type with circular connector for motor connection and brake.

Dimensioning

Speed-dependent safety functions

Single encoder concepts with resolvers

Servo motors can perform speed-dependent safety functions for safe speed and / or safe relative position monitoring in a drive system with the Servo Drives 9400. The SM301 safety module, which can be integrated in the Servo Drives 9400, is used to implement these functions. When planning systems/installations of this kind, the following must always be observed:

When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard IEC 61800-5-2 [Adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional] stipulates special requirements for the connection between feedback system and motor shaft. This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip".
As such, acceleration limit values must not be exceeded for the individual drive solutions. You can find the limit values in the corresponding feedback data of the individual motor ranges.

Speed-dependent safety functions in connection with the SM301 safety module

For the following speed-dependent safety functions, the motor-feedback system combinations listed in the following table are available:

- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely Limited Speed (SLS)
- Safe Maximum Speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI).

Encoder type	Encoder type	Product key	Feedback	Safe speed monitoring
			Design	
SinCos incremental	Single-turn	IG1024-5V-V3		PL e/SIL 3
Resolver		RV03		
			2-encoder concept	up to PL e / SIL 3

Dimensioning

Cooling effect of mounting flange

Mounting on a thermally conducting / insulating plate or machine chassis only has a minor impact in terms of heating up the motor when using servo motors from the MQA range. As such, this effect is negligible and can be disregarded.

Vibrational severity

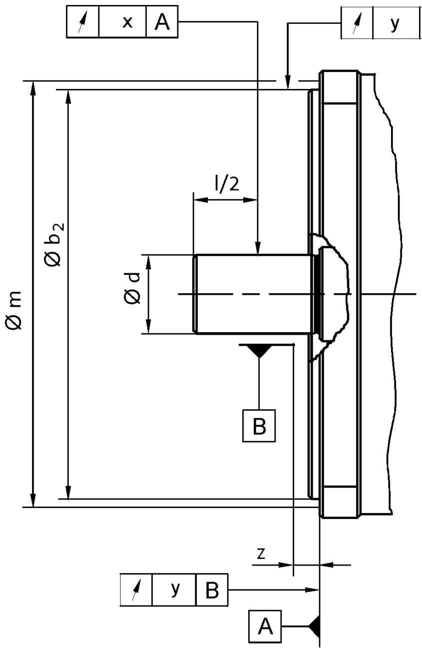
		MQA20	MQA22	MQA26
Vibrational severity				
IEC/EN 60034-14			A	
Maximum r.m.s. value of the vibration velocity [1]	[mm/s]		1.60	

[1] Free suspension

- ► at n = 600 to 3,600 rpm

Dimensioning

Concentricity and axial run-out of the mounting flanges and smooth running of the shaft ends



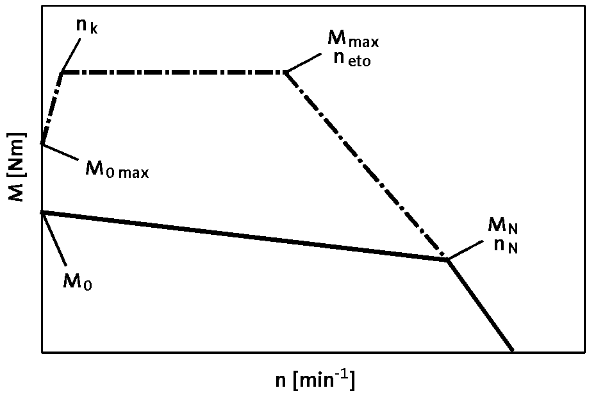
				MQA20		MQA22	MQA26	
Flange size								
				FF215	FF265			FF350
Dimensions								
	b_2	j6	[mm]	180	230			
	b_2	h6	[mm]					300
	d	k6	[mm]	38				
	d	m6	[mm]				55	
Distance								
Measuring diameter	m		[mm]	239	289			384
Dial gauge holder for flange check	z	+/- 1	[mm]	10.0				
Concentricity								
IEC 60072				Normal class				
Value	y		[mm]	0.10				
Linear movement								
IEC 60072				Normal class				
Value	y		[mm]	0.10				
Smooth running								
IEC 60072				Normal class				
Value	x		[mm]	0.050			0.060	

► Limit values for checking the smooth running of the shaft ends as well as the concentricity and axial run-out of the mounting flange to IEC 60072

Dimensioning

Notes on the selection tables

Graphical display of the operating points



	n_k
	[r/min]
MCA	150
MQA	

Please note:
- With an active load (e.g. vertical drive axes, hoists, test benches, unwinders), $M_{0\ max}$ must be taken into account
- With a passive load (e.g. horizontal drive axes), M_{max} can generally be used
- At speeds < n_k, the inverter-specific torque $M_{0\ max}$ that can be achieved is lower than M_{max}
- On the servo inverters, the switching frequency-dependent overload capacity has been taken into account in the factory settings. For further information, please refer to the Servo-Inverters catalogue.

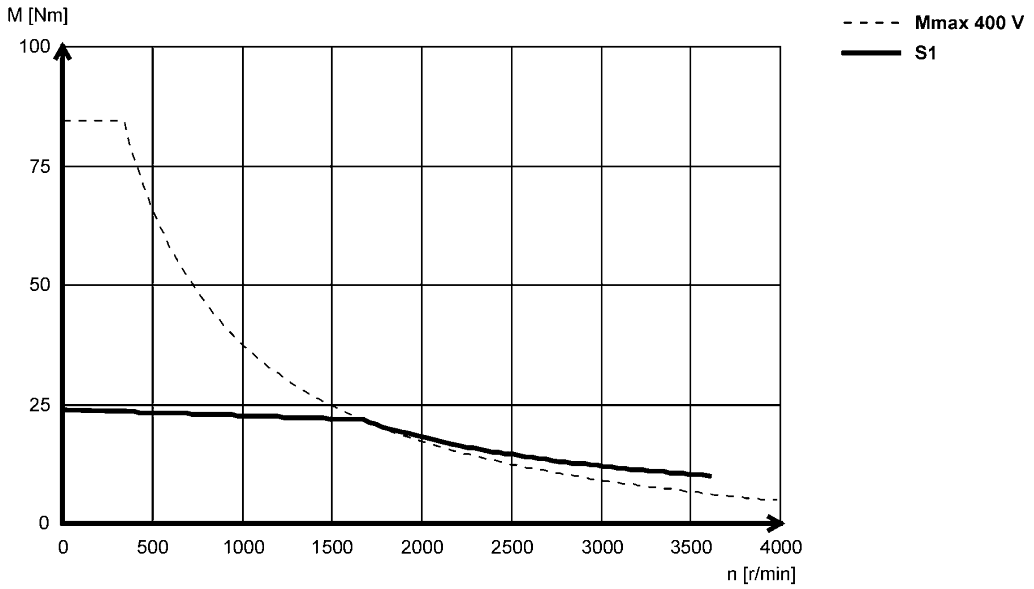
Further selection tables with different switching frequencies are available with the following codes:
- DS_ZT_MCS_0001
- DS_ZT_MCA_0001
- DS_ZT_MDSKS_0001
- DS_ZT_MDFKS_0001

Simply enter this code (e.g. DS_ZT_MCS_0001) as a search string at **www.lenze.de/dsc** and you will be given the information immediately in the form of a PDF format.

Dimensioning

Notes on the torque characteristics

Graph of the torque characteristics



With asynchronous servo motors, two characteristics are shown in each case. The characteristics for continuous operation (S1) show the speed-dependent constant torque of the motor when operating with a servo inverter that itself is operated at a constant switching frequency. The limit torque characteristics correspond to those that come about during operation of the motor with the largest possible 9400 Servo Drive in each case (see selection tables). The servo inverter is set to a variable switching frequency here.

Characteristics in the Internet

You can find the torque characteristic for inverter-motor combinations on the Internet at **www.lenze.de/dsc**. This lists all useful combinations with the servo inverters 9400, 9300, ECS and Inverter Drives 8400 TopLine. These characteristics are each determined using the factory default settings of the inverters:

- 9400 with variables switching frequency.
  This means that up to 6-fold overcurrent can be applied in borderline cases.
- 9300 and ECS with fixed switching frequency.
- 8400 TopLine with variables switching frequency.

The continuous operation characteristics (S1) show the inverter-independent motor rating values

Further information on the terms switching frequency and factory default settings can be found in the operating manual of the respective servo inverter.

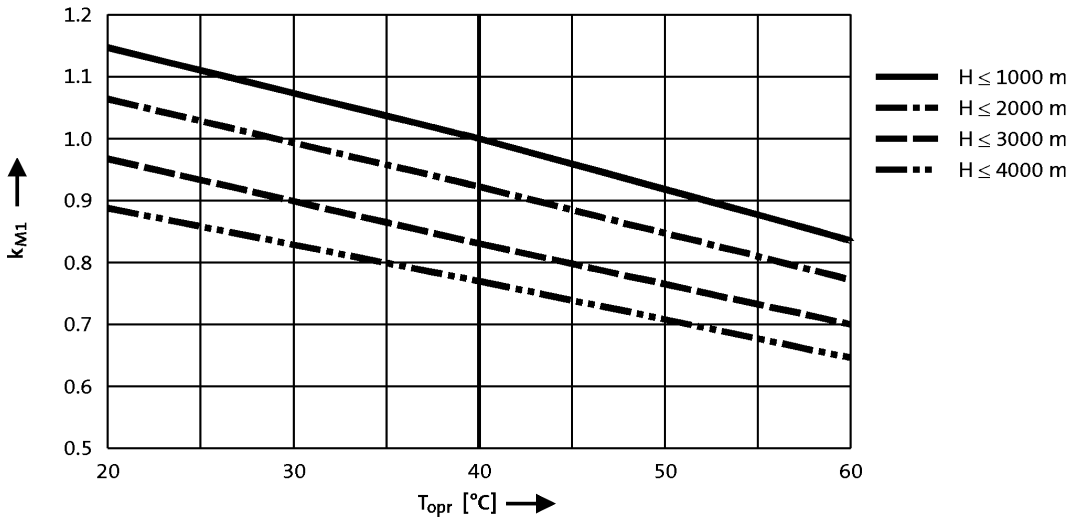
Dimensioning

Influence of ambient temperature and site altitude

The information relating to the servo motors in the tables and graphs is valid for a maximum ambient temperature (T_{opr}) of 40 °C and a site altitude (H) up to 1000 m above sea level. The torque correction factor (k_{M1}) shall be applied to the S1 torque characteristic (M_0...M_N) in the event of differing installation conditions.

► The maximum permissible ambient temperature (T_{opr}) for servo motors with blowers is 40 °C

Torque correction factor k_{m1}



Standards and operating conditions

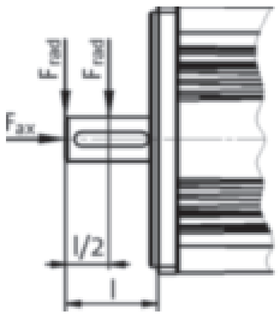
			MQA
Cooling type			
			Blower
Enclosure			
EN 60529			IP23s
Temperature class			
IEC/EN 60034-1; utilisation			F
IEC/EN 60034-1; insulation system (enamel-insulated wire)			H
Conformity			
CE			Low-Voltage Directive
			2006/95/EC
EAC			TP TC 004/2011 (TR C
Approval			
			UkrSEPRO
CSA			CSA 22.2 No. 100
cURus [1]			UL 1004-1 UL 1004-6 Power Conversion Equipment (File-No. E210321)
Max. voltage load			
IEC/TS 60034-25			Pulse voltage limiting curve A
Smooth running			
IEC 60072			Normal class
Linear movement			
IEC 60072			Normal class
Concentricity			
IEC 60072			Normal class
Mechanical ambient conditions (vibration)			
IEC/EN 60721-3-3			3M6
Min. ambient operating temperature			
Without brake	$T_{opr,min}$	[°C]	-15
With brake	$T_{opr,min}$	[°C]	-10
Max. ambient temperature for operation			
	$T_{opr,max}$	[°C]	40
Max. surface temperature			
	T	[°C]	110
Mechanical tolerance			
Flange centring diameter			$b_2 \leq 230$ mm = j6 $b_2 > 230$ mm = h6
Shaft diameter			d ≤ 50 mm = k6 d > 50 mm = m6
Site altitude			
Amsl	H_{max}	[m]	4000

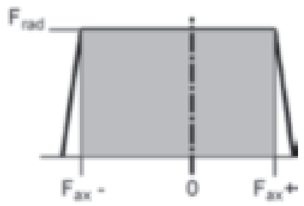
[1] MQA20L29 with circular connector for motor connection only UR

5.3

Permissible radial and axial forces

Application of forces





Application of force at l/2

Bearing service life L_{10}	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MQA20	3400	-1330	690	2500	-1020	380	1950	-780	140	1700	-690	40			
MQA22	3600	-2370	1700	2800	-1740	1090	2200	-1280	640	1900	-1080	440	1600	-880	240
MQA26	6950	-2500	1580	5400	-1800	880	4300	-1300	380	3700	-1090	160			

5.3

Application of force at l

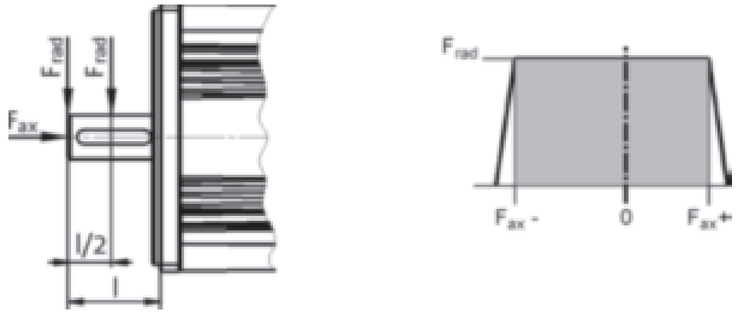
Bearing service life L_{10}	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MQA20	3150	-1170	530	2300	-920	280	1800	-710	70	1400	-650	0			
MQA22	3500	-2240	1600	2600	-1640	1100	2050	-1200	560	1800	-1020	380	1450	-850	200
MQA26	6400	-2080	1150	5000	-1600	680	4000	-1160	230	3400	-1090	50			

► The values for the bearing service life L_{10} refer to an average speed of 3000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease life-time.

Permissible radial and axial forces

► Reinforced bearings

Application of forces



Application of force at l/2

	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MQA20	7100	-970	330	5100	-800	160	3900	-640	0						
MQA22	8500	-1850	1200	7000	-1400	760	5600	-1030	390	4350	-930	290	3200	-800	160
MQA26	10500	-2180	1250	8370	-1530	600	6670	-1130	200	5840	-960	30			

5.3

Application of force at l

	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MQA20	6350	-720	80	4100	-680	40	2800	-640	0						
MQA22	7000	-1750	1100	5500	-1300	660	4700	-920	280	3900	-820	180	3000	-700	60
MQA26	9600	-2200	1280	7700	-1280	360	6000	-960	30						

► The values for the bearing service life L_{10} refer to an average speed of 3000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.

Rated data, forced ventilated

► The data applies to a mains connection voltage of 3 x 400 V.

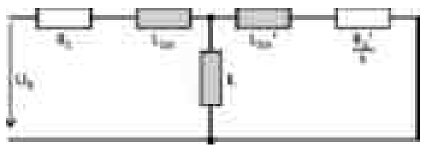
	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	$U_{N, AC}$	f_N	J [1]	$\eta_{100\,\%}$
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[V]	[Hz]	$[kgcm^2]$	[%]
MQA20L14...2F□□	1420	76.0	71.3	250	10.6	27.0	26.5	360	50	171	80.0
MQA20L29...2F□□	2930	76.0	66.2	250	20.3	54.0	46.9	360	100	171	90.0
MQA22P08...2F□□	760	156	145	500	11.5	29.5	27.6	360	28	487	77.0
MQA22P14...2F□□	1425	156	135	500	20.1	51.0	45.6	360	50	487	86.0
MQA22P17...2F□□	1670	156	130	500	22.7	59.0	50.3	360	58	487	88.0
MQA22P29...2F□□	2935	156	125	500	38.4	102	86.0	360	100	487	90.0
MQA26T05...2F□□	550	325	296	1100	17.0	48.5	44.5	360	20	1335	81.0
MQA26T10...2F□□	1030	325	288	1100	31.1	85.5	76.2	360	36	1335	87.0
MQA26T12...2F□□	1200	325	282	1100	35.4	109	88.8	360	42	1335	82.0
MQA26T22...2F□□	2235	325	257	1100	60.2	171	138	340	76	1335	92.0

<table>
<tr><th></th><th>R_1</th><th>$R_{UV\ 20\ °C}$</th><th>$R_{UV\ 150\ °C}$</th><th>R_2</th><th>$L_{1\sigma}$</th><th>L</th><th>$L_{2\sigma}$</th><th>n_{max} [2]</th><th>m [1]</th></tr>
<tr><th></th><th>[Ω]</th><th>[Ω]</th><th>[Ω]</th><th>[Ω]</th><th>[mH]</th><th>[mH]</th><th>[mH]</th><th>[r/min]</th><th>[kg]</th></tr>
<tr><td>MQA20L14...2F□□</td><td>0.37</td><td>0.73</td><td>1.10</td><td>0.36</td><td>1.98</td><td>57.0</td><td>2.10</td><td rowspan="10">6500</td><td rowspan="2">63.0</td></tr>
<tr><td>MQA20L29...2F□□</td><td>0.090</td><td>0.18</td><td>0.28</td><td>0.090</td><td>0.49</td><td>13.7</td><td>0.52</td></tr>
<tr><td>MQA22P08...2F□□</td><td rowspan="2">0.54</td><td>1.07</td><td>1.62</td><td rowspan="2">0.48</td><td>3.53</td><td>92.8</td><td>4.76</td><td rowspan="4">102</td></tr>
<tr><td>MQA22P14...2F□□</td><td>0.36</td><td>0.54</td><td>3.57</td><td>93.3</td><td>4.81</td></tr>
<tr><td>MQA22P17...2F□□</td><td rowspan="2">0.13</td><td>0.27</td><td>0.40</td><td rowspan="2">0.12</td><td>0.90</td><td>23.9</td><td>1.21</td></tr>
<tr><td>MQA22P29...2F□□</td><td>0.080</td><td>0.12</td><td>0.89</td><td>23.2</td><td>1.20</td></tr>
<tr><td>MQA26T05...2F□□</td><td rowspan="2">0.29</td><td>0.59</td><td>0.89</td><td rowspan="2">0.25</td><td>2.87</td><td>70.0</td><td>5.05</td><td rowspan="4">193</td></tr>
<tr><td>MQA26T10...2F□□</td><td>0.20</td><td>0.30</td><td>2.91</td><td>69.2</td><td>5.09</td></tr>
<tr><td>MQA26T12...2F□□</td><td rowspan="2">0.080</td><td>0.15</td><td>0.23</td><td rowspan="2">0.060</td><td rowspan="2">0.78</td><td>18.1</td><td rowspan="2">1.30</td></tr>
<tr><td>MQA26T22...2F□□</td><td>0.050</td><td>0.075</td><td>18.4</td></tr>
</table>

[1] Without brake.

[2] Mechanically permissible maximum speed.

The data in the R_1, $L_{1\sigma}$, L, R_2' and $L_{2\sigma}$' columns is based on a single-phase equivalent circuit diagram at 20°C.



Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E94A□□	E0174	E0244	E0324	E0474	E0594	E0864	E1044	E1454	E1724
					I_N	16.5	23.5	32.0	41.0	41.0	73.0	78.0	102.0	120.0
					$I_{0,max}$	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0
MQA	M_N	n_N	I_N	P_N	I_{max}	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0
20L14-...2F□□	71.3	1420	26.5	10.60	M_0	32.5	66.0							
					M_N	32.5	66.0							
					$M_{0,max}$	154.2	190.0							
					M_{max}	154.2	190.0							
					n_{eto}	-	-							
20L29-...2F□□	66.2	2930	46.9	20.30	M_0			28.0	51.6	51.6				
					M_N			28.0	51.6	51.6				
					$M_{0,max}$			116.0	148.2	192.8				
					M_{max}			116.0	148.2	192.8				
					n_{eto}			-	-	-				
22P08-...2F□□	145.0	760	27.6	11.50	M_0		116.0	156.0						
					M_N		116.0	145.0						
					$M_{0,max}$		313.0	402.0						
					M_{max}		313.0	402.0						
					n_{eto}		-	-						
22P14-...2F□□	135.0	1425	45.6	20.10	M_0					118.0				
					M_N					118.0				
					$M_{0,max}$					372.0				
					M_{max}					372.0				
					n_{eto}					-				
22P17-...2F□□	130.0	1670	50.3	22.70	M_0					99.0	156.0			
					M_N					99.0	130.0			
					$M_{0,max}$					325.0	463.0			
					M_{max}					325.0	463.0			
					n_{eto}					-	-			
22P29-...2F□□	125.0	2935	86.0	38.40	M_0							109.0	156.0	156.0
					M_N							109.0	125.0	125.0
					$M_{0,max}$							335.0	416.0	486.0
					M_{max}							335.0	416.0	486.0
					n_{eto}							-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!
► When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP23s motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E94A□□	E0474	E0594	E0864	E1044	E1454	E1724	E2024	E2454	E2924	E3664
					I_N	41.0	41.0	73.0	78.0	102.0	120.0	131.0	160.0	191.0	240.0
					$I_{0,max}$	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0	659.0
MQA	M_N	n_N	I_N	P_N	I_{max}	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0	659.0
26T05-...2F□□	296.0	550	44.5	17.00	M_0	268.0	268.0	325.0							
					M_N	268.0	268.0	296.0							
					$M_{0,max}$	665.0	826.0	1100.0							
					M_{max}	665.0	826.0	1100.0							
					n_{eto}	-	-	-							
26T10-...2F□□	288.0	1030	76.2	31.10	M_0			270.0	298.0	325.0					
					M_N			270.0	288.0	288.0					
					$M_{0,max}$			713.0	855.0	1044.0					
					M_{max}			713.0	855.0	1044.0					
					n_{eto}			-	-	-					
26T12-...2F□□	282.0	1200	88.8	35.40	M_0				219.0	291.0	325.0	325.0			
					M_N				219.0	282.0	282.0	282.0			
					$M_{0,max}$				609.0	739.0	840.0	950.0			
					M_{max}				609.0	739.0	840.0	950.0			
					n_{eto}				-	-	-	-			
26T22-...2F□□	257.0	2235	138.1	60.10	M_0							242.0	290.0	325.0	325.0
					M_N							242.0	257.0	257.0	257.0
					$M_{0,max}$							711.0	843.0	1001.0	1100.0
					M_{max}							711.0	843.0	1001.0	1100.0
					n_{eto}							-	-	-	-

5.3

- ► I... [A], M... [Nm], n... [r/min], P... [kW]
- ► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!
- ► When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP23s motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1134	□1534	□1834	□2234	□3034	□3734	□4534
					I_N	23.5	32.0	39.0	47.0	61.0	76.0	89.0
					$I_{0,max}$	32.9	43.2	60.0	70.5	91.5	114.0	133.5
MQA	M_N	n_N	I_N	P_N	I_{max}	47.0	64.0	78.0	94.0	122.0	152.0	178.0
20L14-…2F□□	71.3	1420	26.5	10.60	M_0	-	76.0	76.0	76.0	76.0		
					M_N	-	71.3	71.3	71.3	71.3		
					$M_{0,max}$	146.0	202.0	249.2	250.0	250.0		
					M_{max}	146.0	202.2	249.2	250.0	250.0		
					n_{eto}	-	-	-	-	-		
20L29-…2F□□	66.2	2930	46.9	20.30	M_0			-	76.0	76.0	76.0	76.0
					M_N			-	66.2	66.2	66.2	66.2
					$M_{0,max}$			121.8	140.9	183.7	224.5	250.0
					M_{max}			121.8	140.9	183.9	225.5	250.0
					n_{eto}			-	-	-	-	-
22P08-…2F□□	145.0	760	27.6	11.50	M_0	-	156.0	156.0	156.0	156.0		
					M_N	-	144.5	144.5	144.5	144.5		
					$M_{0,max}$	222.8	310.5	377.0	372.9	374.6		
					M_{max}	223.0	310.5	377.0	372.9	374.6		
					n_{eto}	-	-	-	-	-		
22P14-…2F□□	135.0	1425	45.6	20.10	M_0		-	-	156.0	156.0	156.0	156.0
					M_N		-	-	134.7	134.7	134.7	134.7
					$M_{0,max}$		185.1	230.6	267.1	343.7	418.3	500.0
					M_{max}		185.1	230.6	267.1	344.4	420.0	500.0
					n_{eto}		-	-	-	-	-	-
22P17-…2F□□	130.0	1670	50.3	22.70	M_0			-	-	156.0	156.0	156.0
					M_N			-	-	129.8	129.8	129.8
					$M_{0,max}$			198.6	230.2	300.0	365.3	447.0
					M_{max}			198.6	230.4	300.0	367.5	449.9
					n_{eto}			-	-	-	-	-
22P29-…2F□□	125.0	2935	86.0	38.40	M_0					-	-	156.0
					M_N					-	-	124.9
					$M_{0,max}$					176.1	218.9	263.2
					M_{max}					176.4	219.6	264.1
					n_{eto}					-	-	-
26T05-…2F□□	296.0	550	44.5	17.00	M_0		-	-	325.0	325.0	325.0	325.0
					M_N		-	-	295.2	295.2	295.2	295.2
					$M_{0,max}$		390.4	489.6	567.1	744.4	902.3	1080.2
					M_{max}		390.4	490.2	568.0	744.8	904.7	1080.2
					n_{eto}		-	-	-	-	-	-
26T10-…2F□□	288.0	1030	76.2	31.10	M_0					-	-	325.0
					M_N					-	-	288.3
					$M_{0,max}$					429.7	532.5	638.2
					M_{max}					431.4	534.1	641.5
					n_{eto}					-	-	-

- ► I… [A], M… [Nm], n… [r/min], P… [kW]
- ► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP23s motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1134	□1534	□1834	□2234	□3034	□3734	□4534
					I_N	23.5	32.0	39.0	47.0	61.0	76.0	89.0
					$I_{0,max}$	32.9	43.2	60.0	70.5	91.5	114.0	133.5
MQA	M_N	n_N	I_N	P_N	I_{max}	47.0	64.0	78.0	94.0	122.0	152.0	178.0
26T12-…2F□□	282.0	1200	88.8	35.40	M_0						-	325.0
					M_N						-	281.7
					$M_{0,max}$						458.2	550.4
					M_{max}						460.6	552.9
					n_{eto}						-	-

- ► I... [A], M... [Nm], n... [r/min], P... [kW]
- ► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Servo Inverter 9300

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9326-E□	9327-E□	9328-E□	9329-E□	9330-E□	9331-E□	9332-E□
					I_N	23.5	32.0	47.0	59.0	89.0	110.0	145.0
					$I_{0,max}$	23.5	32.0	47.0	52.0	80.0	110.0	126.0
MQA	M_N	n_N	I_N	P_N	I_{max}	35.3	48.0	70.5	88.5	133.5	165.0	217.5
20L14-...2F□□	71.3	1420	26.5	10.60	M_0	61.0	76.0	76.0				
					M_N	61.0	71.3	71.3				
					$M_{0,max}$	61.0	112.0	187.0				
					M_{max}	109.3	156.7	232.1				
					n_{eto}	-	-	-				
20L29-...2F□□	66.2	2930	46.9	20.30	M_0		28.0	66.3	76.0	76.0		
					M_N		28.0	66.2	66.2	66.2		
					$M_{0,max}$		28.0	66.3	95.0	169.0		
					M_{max}		68.5	112.5	146.4	226.7		
					n_{eto}		-	-	-	-		
22P08-...2F□□	145.0	760	27.6	11.50	M_0		156.0	156.0	156.0			
					M_N		145.0	145.0	145.0			
					$M_{0,max}$		177.0	280.0	293.0			
					M_{max}		247.0	338.8	345.8			
					n_{eto}		-	-	-			
22P14-...2F□□	135.0	1425	45.6	20.10	M_0			146.0	156.0	156.0		
					M_N			135.0	135.0	135.0		
					$M_{0,max}$			146.0	186.0	188.0		
					M_{max}			230.1	292.9	341.8		
					n_{eto}			-	-	-		
22P17-...2F□□	130.0	1670	50.3	22.70	M_0			124.0	156.0	156.0	156.0	
					M_N			124.0	130.0	130.0	130.0	
					$M_{0,max}$			124.0	140.0	240.0	335.0	
					M_{max}			180.5	227.7	342.1	378.3	
					n_{eto}			-	-	-	-	
22P29-...2F□□	125.0	2935	86.0	38.40	M_0					135.5	156.0	156.0
					M_N					125.0	125.0	125.0
					$M_{0,max}$					137.0	195.0	250.0
					M_{max}					215.6	273.1	355.1
					n_{eto}					-	-	-
26T05-...2F□□	296.0	550	44.5	17.00	M_0			303.0	325.0	325.0		
					M_N			296.0	296.0	296.0		
					$M_{0,max}$			303.0	333.0	615.0		
					M_{max}			482.0	612.0	751.0		
					n_{eto}			-	-	-		
26T10-...2F□□	288.0	1030	76.2	31.10	M_0					319.0	325.0	
					M_N					288.0	288.0	
					$M_{0,max}$					300.0	440.0	
					M_{max}					552.0	671.0	
					n_{eto}					-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Servo Inverter 9300

Forced ventilated IP23s motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

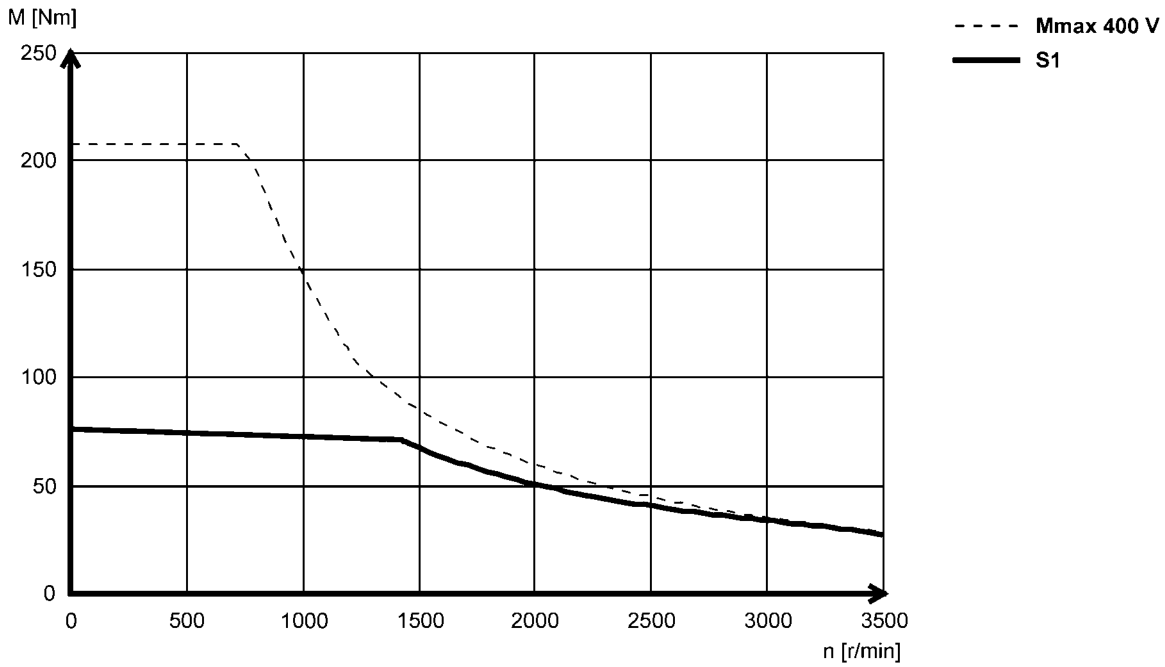
					EVS	9326-E□	9327-E□	9328-E□	9329-E□	9330-E□	9331-E□	9332-E□
					I_N	23.5	32.0	47.0	59.0	89.0	110.0	145.0
					$I_{0,max}$	23.5	32.0	47.0	52.0	80.0	110.0	126.0
MQA	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	35.3	48.0	70.5	88.5	133.5	165.0	217.5
26T12-...2F□□	282.0	1200	88.8	35.40	M_0					284.0	325.0	325.0
					M_N					282.0	282.0	282.0
					$M_{0,max}$					258.0	327.0	397.0
					M_{max}					424.0	512.0	663.0
					n_{eto}					-	-	-
26T22-...2F□□	257.0	2235	138.1	60.10	M_0						177.0	222.0
					M_N						177.0	257.0
					$M_{0,max}$						203.0	220.0
					M_{max}						315.0	432.0
					n_{eto}						-	-

- ► I... [A], M... [Nm], n... [r/min], P... [kW]
- ► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

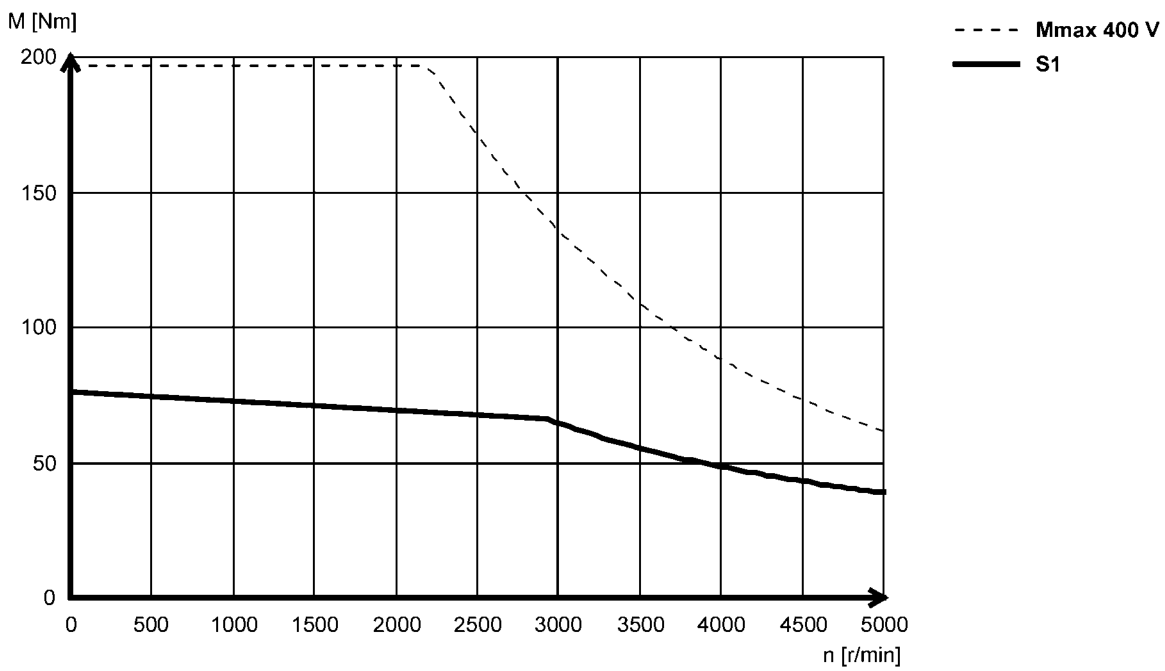
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MQA20L14...2F□□ (forced ventilated)



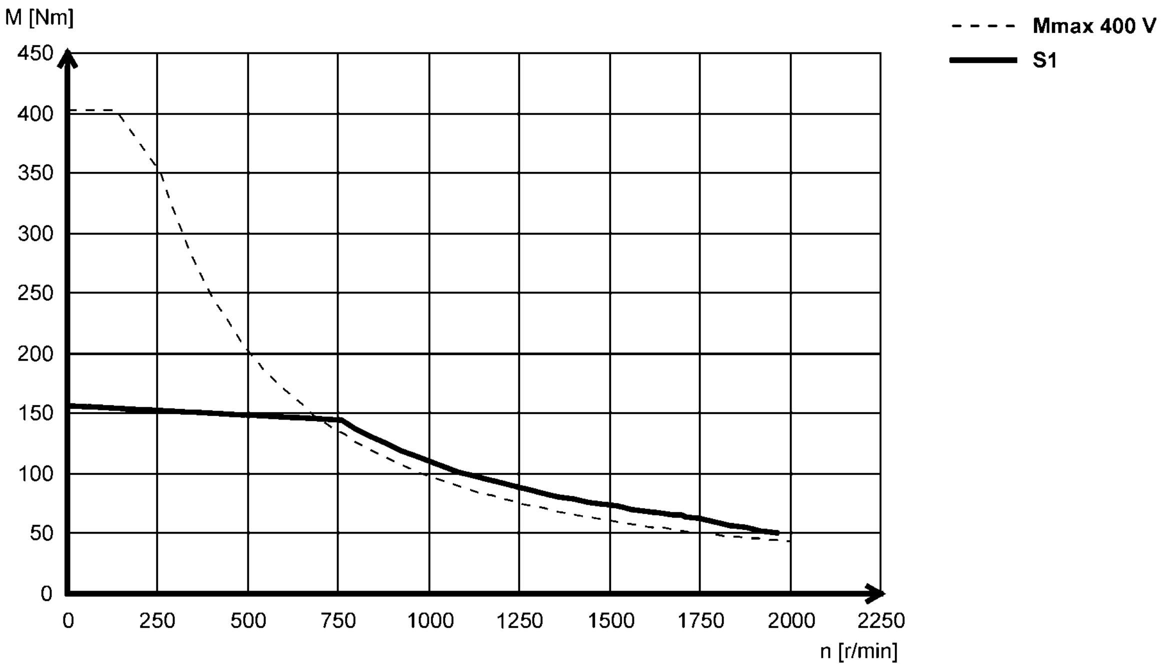
MQA20L29...2F□□ (forced ventilated)



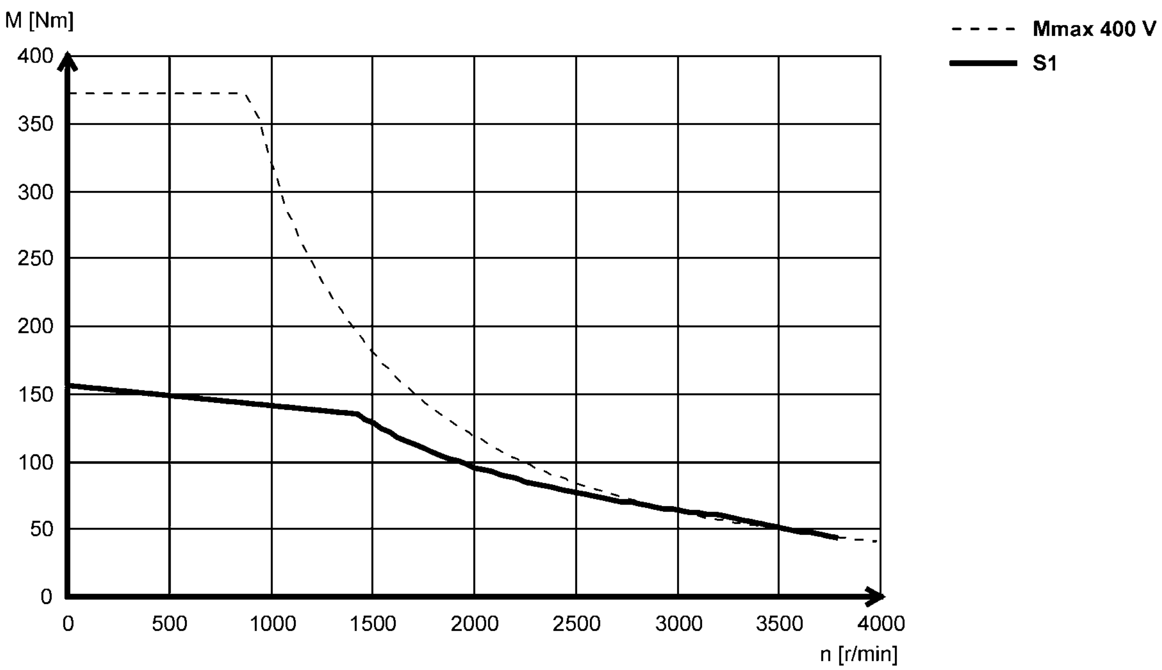
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MQA22P08...2F□□ (forced ventilated)



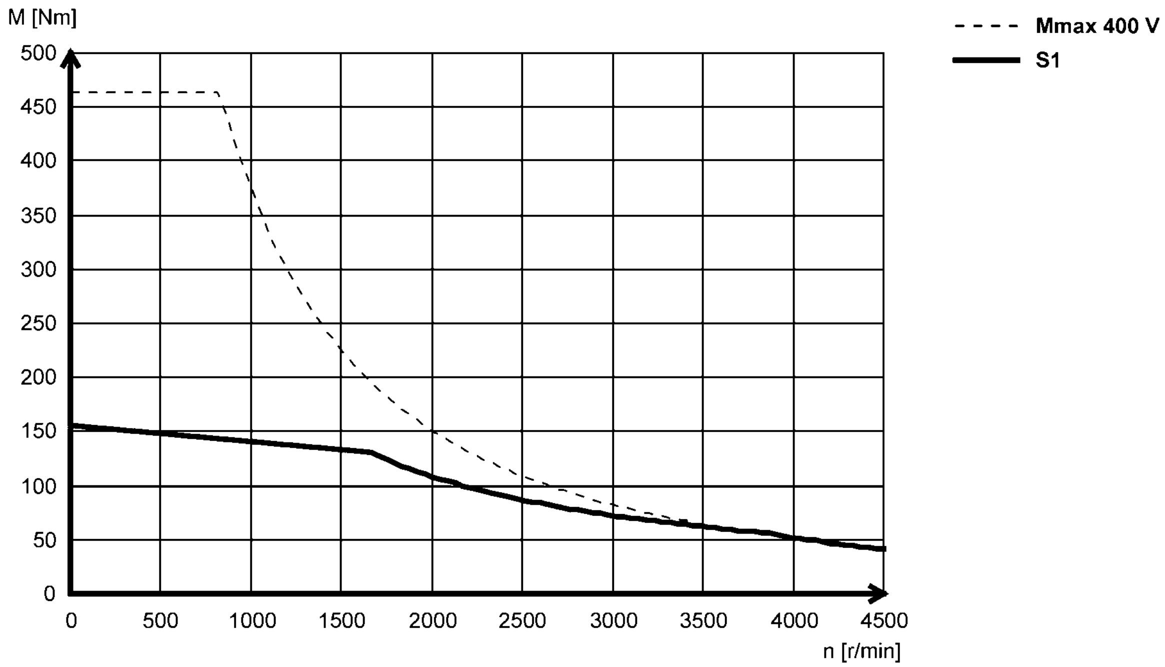
MQA22P14...2F□□ (forced ventilated)



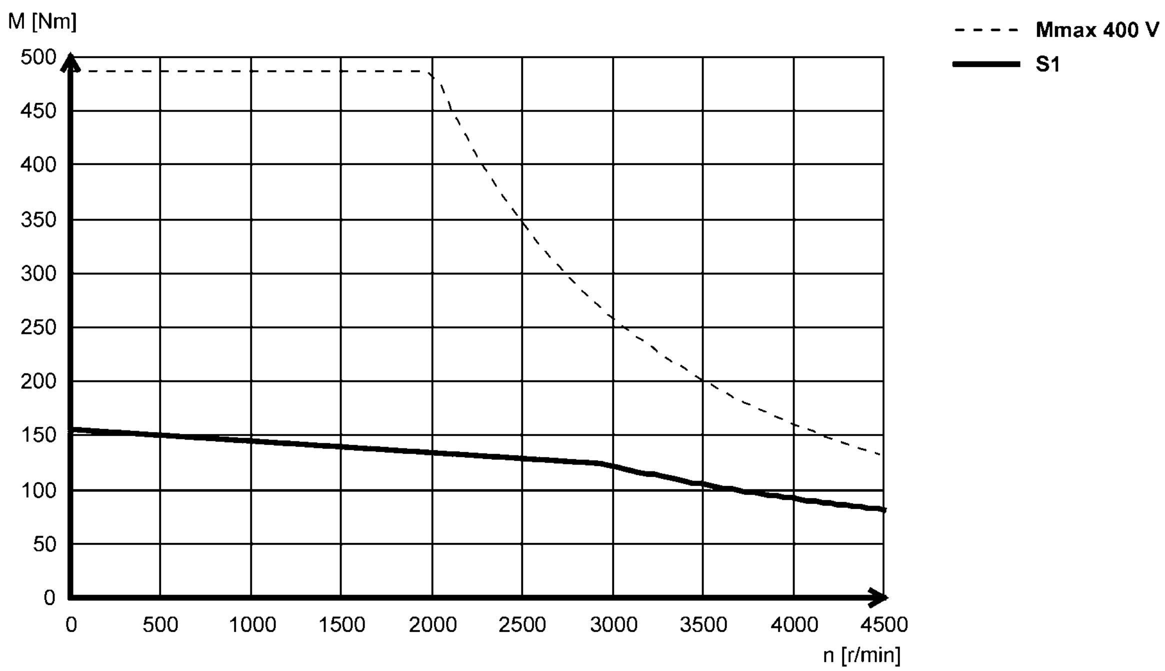
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MQA22P17...2F□□ (forced ventilated)



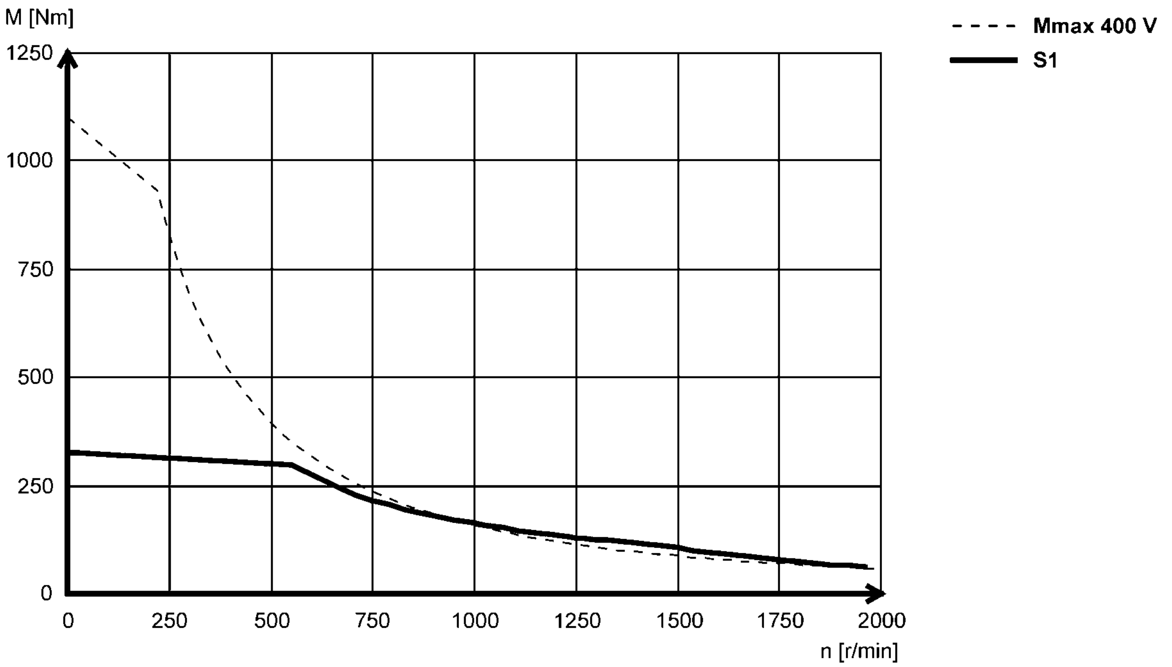
MQA22P29...2F□□ (forced ventilated)



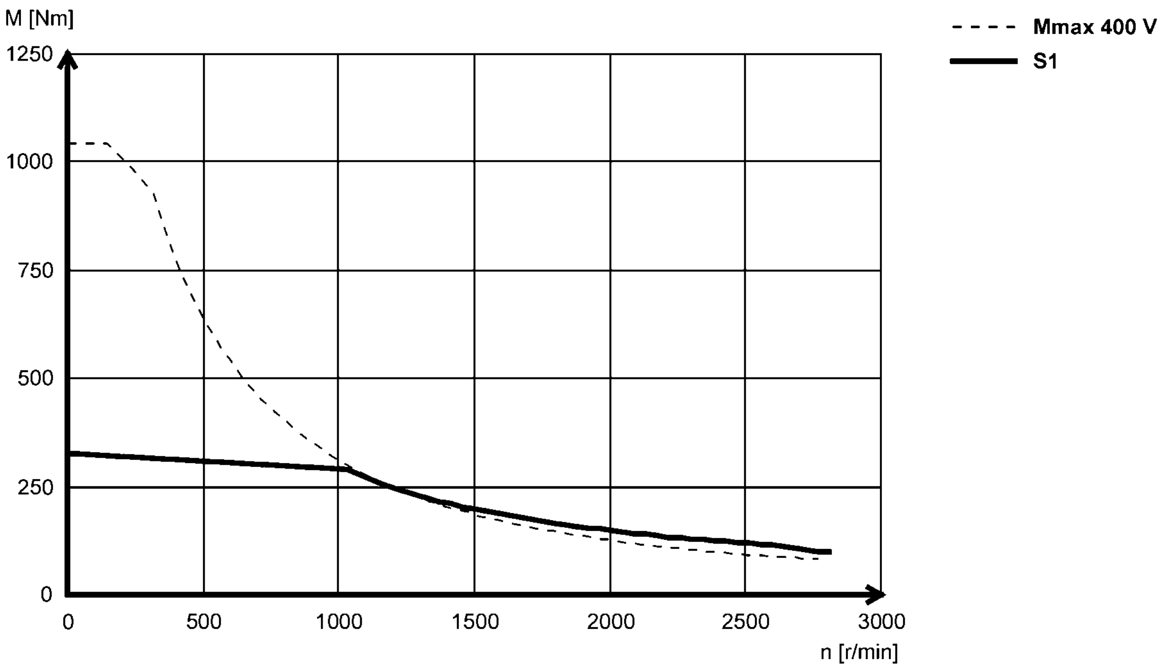
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MQA26T05...2F□□ (forced ventilated)



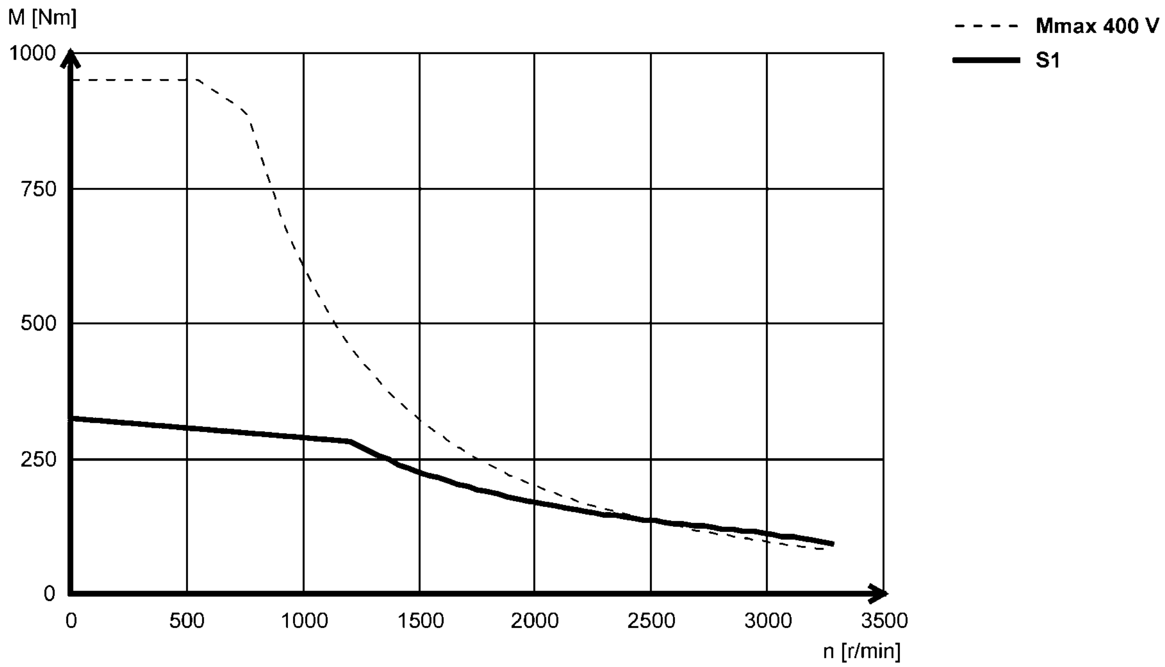
MQA26T10...2F□□ (forced ventilated)



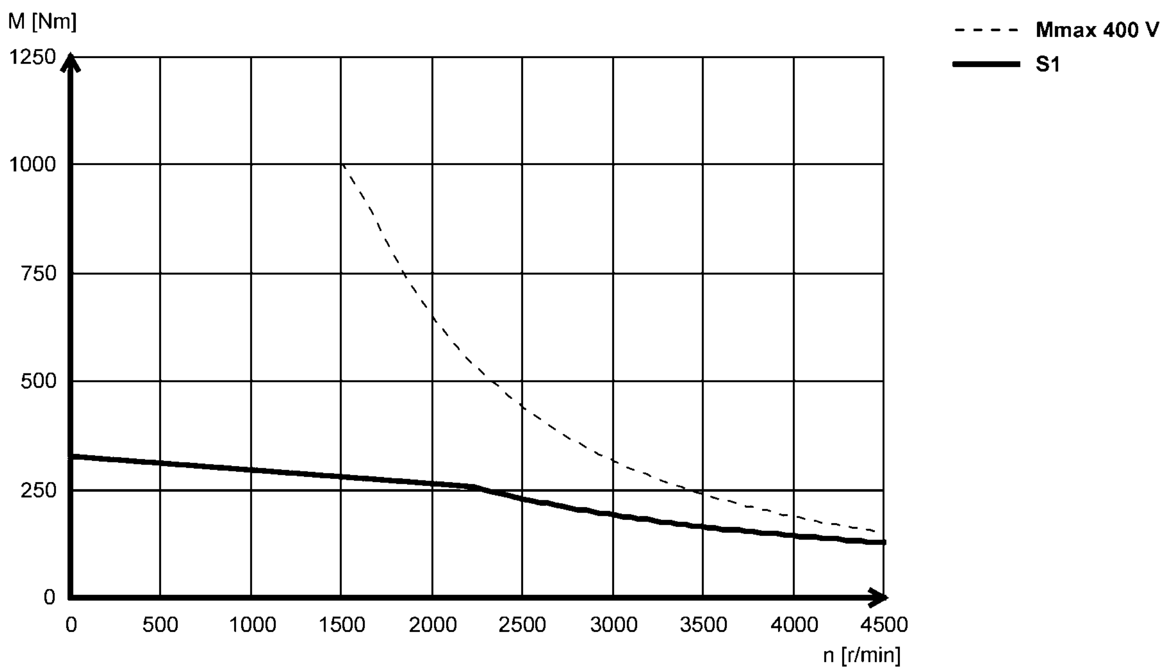
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MQA26T12...2F□□ (forced ventilated)

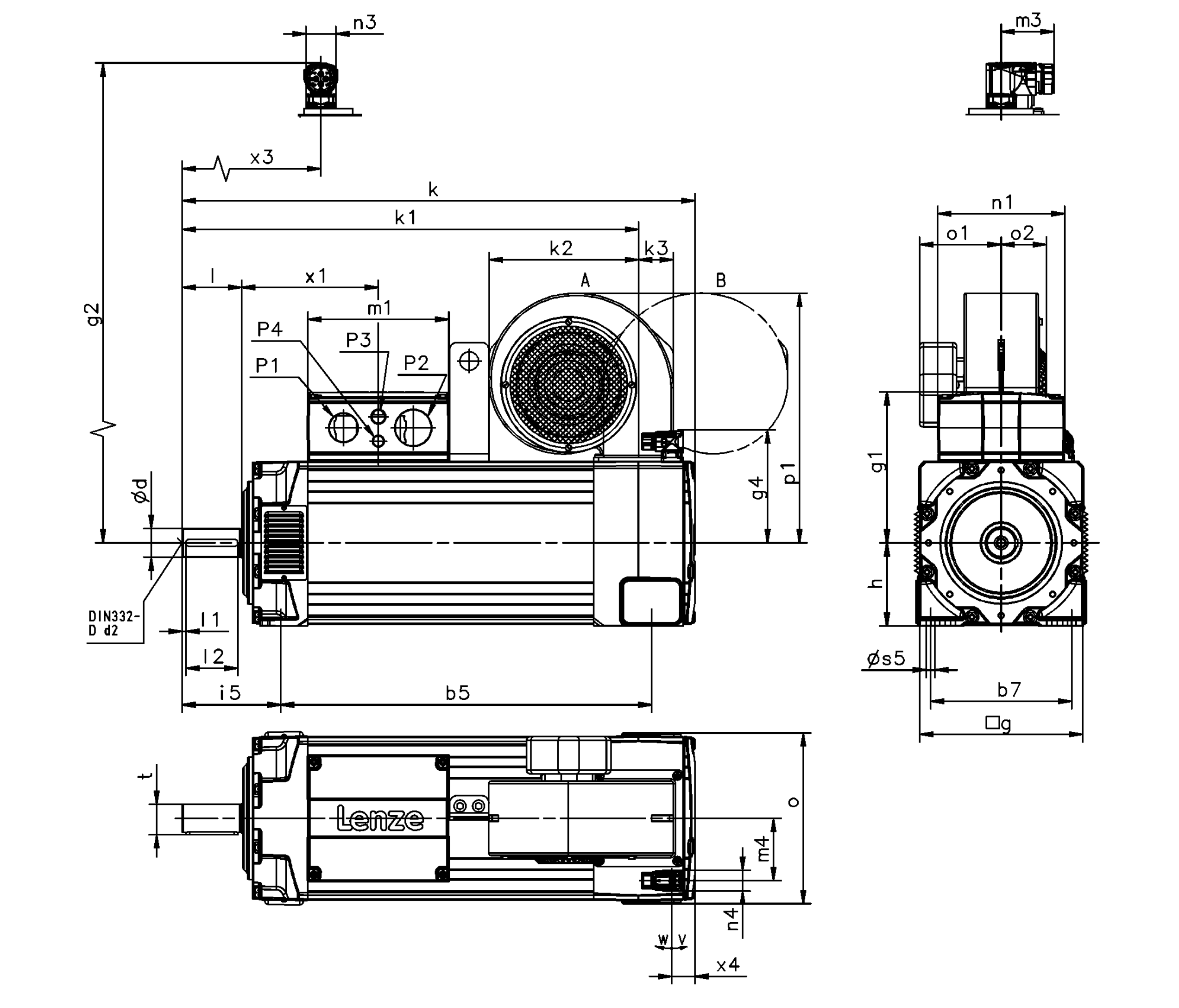


MQA26T22...2F□□ (forced ventilated)



Dimensions, forced ventilated

Design B3



			MQA20	MQA22	MQA26
R□0 / E□□ / T□□ / S□□ / B0	k	[mm]	577	691	841
	x_4	[mm]	33.0	31.0	24.0
	m_4	[mm]	74.0	84.0	100
R□0 F1	k	[mm]	661	773	979
	x_4	[mm]	41.0	40.0	
	m_4	[mm]	70.0	76.0	96.0
E□□ / T□□ / S□□ / F1	k	[mm]	704	816	1017
	x_4	[mm]	46.0	45.0	40.0
	m_4	[mm]	70.0	76.0	96.0
R□0 / E□□ / T□□ / S□□ / F2	k	[mm]	729	848	1017
	x_4	[mm]	46.0	45.0	40.0
	m_4	[mm]	70.0	76.0	96.0

- ► Speed/angle sensor: RS0 / S□□ / E□□ / T□□
- ► Brake: B0 / F1 / F2

Dimensions, forced ventilated

Design B3

	g	g_1	g_2	g_4	m_1	m_3	n_1	n_3	n_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	200	171	168	141	154	72	128	40	
MQA22	220	203		153	190		171		28
MQA26	260	256		173	234		212		

	o	P_1	P_2	P_3	P_4	v	w	x_1	x_3
	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]	[mm]	[mm]
MQA20	206	M32x1.5	M25x1.5					155	192
MQA22	230	M50x1.5	M40x1.5	M20x1.5	M16x1.5	195	80	184	
MQA26	266	M63x1.5	M50x1.5					218	

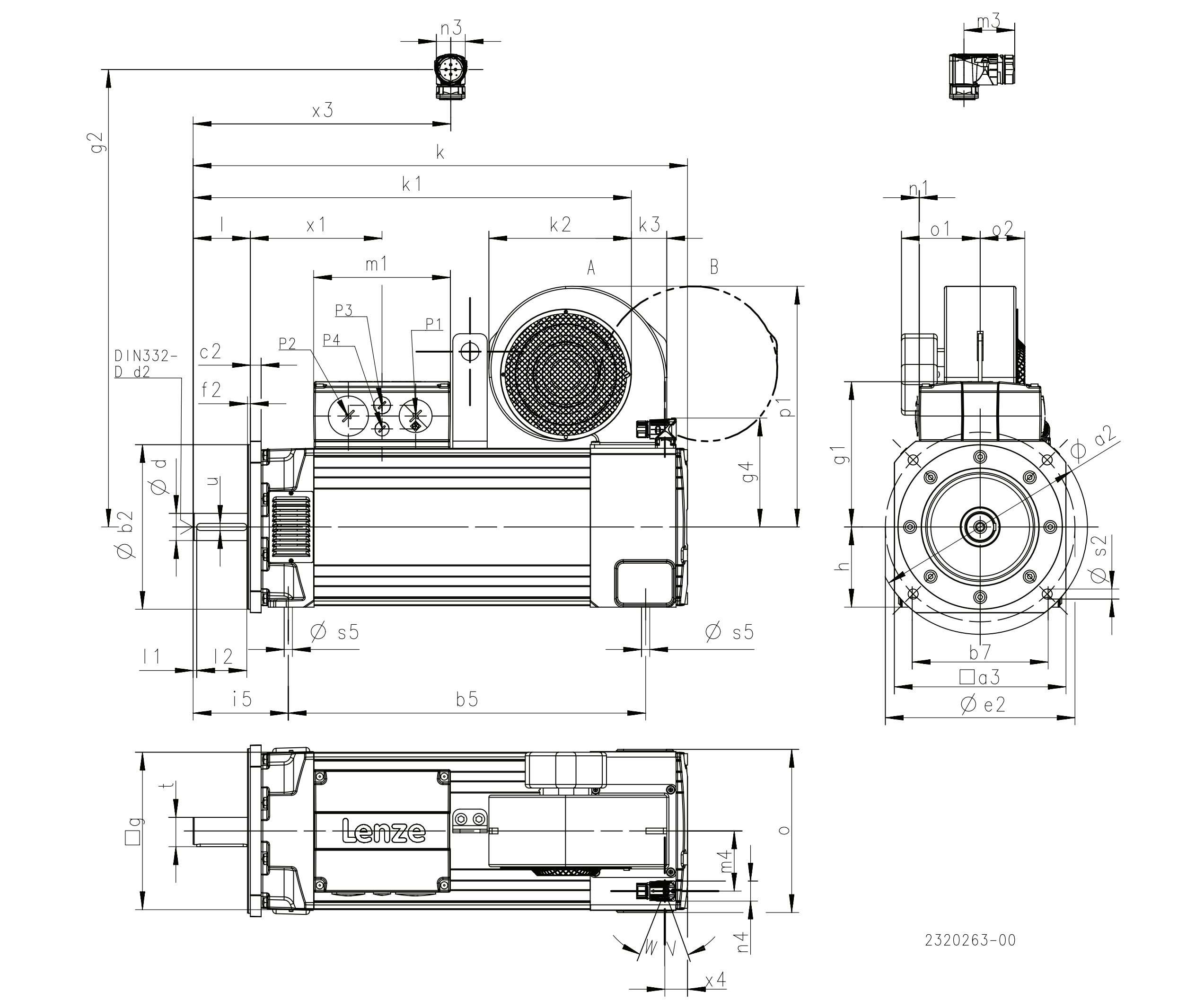
	d	d	d_2	l	l_1	l_2	u	t
	k6	m6		-0.7 ... 0.3				
	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
MQA20	38		M12	80	5.0	70	10.0	41.0
MQA22								
MQA26		55	M20	110		100	16.0	59.0

	h	b_5	b_7	s_5	i_5
	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	100	386	160	11.5	134
MQA22	112	500	190		133
MQA26	132	605	215	14.0	165

	F10 / F30						F1F / F3F					
	k_1	k_2	k_3	o_1	o_2	p_1	k_1	k_2	k_3	o_1	o_2	p_1
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	498	152	32.0	118	47.0	276	498	152	32.0	118	124	276
MQA22	615	201	47.0	110	63.0	336	615	201	47.0	104	144	336
MQA26	764	221	60.0	125	86.0	391	764	221	60.0	120	140	391

Dimensions, forced ventilated

Design B35



			MQA20	MQA22	MQA26
R□0 / E□□ / T□□ / S□□ / B0	k	[mm]	577	691	841
	x_4	[mm]	33.0	31.0	24.0
	m_4	[mm]	74.0	84.0	100
R□0 F1	k	[mm]	661	773	979
	x_4	[mm]	41.0	40.0	
	m_4	[mm]	70.0	76.0	96.0
E□□ / T□□ / S□□ / F1	k	[mm]	704	816	1017
	x_4	[mm]	46.0	45.0	40.0
	m_4	[mm]	70.0	76.0	96.0
R□0 / E□□ / T□□ / S□□ / F2	k	[mm]	729	848	1017
	x_4	[mm]	46.0	45.0	40.0
	m_4	[mm]	70.0	76.0	96.0

- ► Speed/angle sensor: RS0 / S□□ / E□□ / T□□
- ► Brake: B0 / F1 / F2

Dimensions, forced ventilated

Design B35

	g	g_1	g_2	g_4	m_1	m_3	n_1	n_3	n_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	200	171	168	141	154	72	128	40	
MQA22	220	203		153	190		171		28
MQA26	260	256		173	234		212		

	o	P_1	P_2	P_3	P_4	v	w	x_1	x_3
	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]	[mm]	[mm]
MQA20	206	M32x1.5	M25x1.5					155	192
MQA22	230	M50x1.5	M40x1.5	M20x1.5	M16x1.5	195	80	184	
MQA26	266	M63x1.5	M50x1.5					218	

	d	d	d_2	l	l_1	l_2	u	t
	k6	m6		-0.7 ... 0.3				
	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
MQA20	38		M12	80		70	10.0	41.0
MQA22					5.0			
MQA26		55	M20	110		100	16.0	59.0

	h	b_5	b_7	s_5	i_5
	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	100	386	160		134
MQA22	112	500	190	11.5	133
MQA26	132	605	215	14.0	165

	a_2	a_3	b_2	b_2	c_2	e_2	f_2	s_2
			j6	h6				
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	250	196	180			215		
MQA22	300	240	230		15	265	4.0	14
MQA26	400	320		300		350	5.0	18

	F10 / F30						F1F / F3F					
	k_1	k_2	k_3	o_1	o_2	p_1	k_1	k_2	k_3	o_1	o_2	p_1
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MQA20	498	152	32.0	118	47.0	276	498	152	32.0	118	124	276
MQA22	615	201	47.0	110	63.0	336	615	201	47.0	104	144	336
MQA26	764	221	60.0	125	86.0	391	764	221	60.0	120	140	391

Spring-applied holding brake

The servo motors can be equipped with spring-operated holding brakes.

The brakes are activated when the supply voltage is disconnected (closed-circuit principle). When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.

Caution:
The brakes used are not safety brakes in the sense that a reduction in torque may arise as a result of disruptive factors that cannot be influenced, e.g. oil ingress.

The ohmic voltage drop along the cable must be taken into consideration in long motor supply cables and must be compensated for by a higher voltage at the line input.

The following applies for Lenze system cables:

$$U[V] = U_B[V] + 0.08 \frac{[V]}{[A]\cdot[m]} \cdot l_{Lg}[m] \cdot I_B[A]$$

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.
The shortest switching times of the brakes are achieved by DC switching of the voltage. A spark suppressor is required to suppress interference and to increase the service life of the relay contacts here.

Spring-applied holding brake

Spring-applied holding brake

Rated data with standard braking torque

- The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

	$U_{N, DC}$ [3, 6]	$U_{N, AC}$ [4, 6]	M_N	M_N	M_{av}	I_N [2]	J	t_1 [1]	t_2 [1]	Q_E [5]	m	J_{MB}	J_L/J_{MB}
			20 °C	120 °C	120 °C								
	[V]	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MQA20	24		90.0	80.0	50.0	3.13	6.88	70.0	220	18000	13.0	177	19.6
		230				0.37							
MQA22	24		150	130	80.0	3.75	18.1	50.0	260	23000	20.5	505	8.20
		230				0.44		130					
MQA26	24		300	260	200	3.13	70.4	175	320	51000	30.7	1405	12.7
		230				0.37			360				

Rated data with increased braking torque

- The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

	$U_{N, DC}$ [3, 6]	$U_{N, AC}$ [4, 6]	M_N	M_N	M_{av}	I_N [2]	J	t_1 [1]	t_2 [1]	Q_E [5]	m	J_{MB}	J_L/J_{MB}
			20 °C	120 °C	120 °C								
	[V]	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MQA20	24		150	130	100	2.58	14.1	70.0	240	31000	15.4	185	33.0
		230				0.30							
MQA22	24		300	260	160	3.75	36.3	175	320	39000	26.0	523	14.1
		230				0.44		130	310				
MQA26	24		500	430	260	3.75	70.4	175	390	51000	30.8	1405	12.7
		230				0.44							

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24V DC brake: smoothed DC voltage, ripple ≤1 %.
4) UR not possible in the case of a brake with 230 V supply voltage.
5) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
6) Voltage tolerance: permanent magnet brakes -10% to +5%
spring-applied brakes ±10%

Resolver

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

Speed/angle sensor					
	1)			RS0	RV0
Product key					
				RS0	RV03
Resolution					
Angle			[']	0.80	
Accuracy					
			[']	-10 ... 10	
Absolute positioning					
				1 revolution	
Max. speed					
	n_{max}		[r/min]	8000	
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	
Max. angle error					
			[']	-10 ... 10	
Inverter assignment					
				E84AVTC E94A ECS EVS93	

1) 6 - Product key > speed/angle sensor

Speed-dependent safety functions

Suitable for safety function				
			No	Yes
Max. permissible angular acceleration				
MQA20 ... MQA26 2)	α	[rad/s²]		22000
Functional safety				
IEC 61508				SIL3
EN 13849-1				Up to Performance Level e

2) 1 - Single encoder concepts with resolvers

5.3

Incremental encoder and SinCos absolute value encoder

Encoder type						
			TTL incremental		SinCos incremental	
Speed/angle sensor						
	1)		T20	T40	S20	S1S
Product key						
			IG2048-5V-T	IG4096-5V-T	IG2048-5V-S	IG1024-5V-V3
Encoder type						
					Single-turn	
Pulses						
			2048	4096	2048	1024
Output signals						
			TTL		1 Vss	
Interfaces						
			A, B, N track and inverted			
Absolute revolutions						
			0			
Resolution						
Angle 2)		[']	2.60	1.30	0.40	
Accuracy						
		[']	-2 ... 2		-0.8 ... 0.8	
Min. input voltage						
DC	$U_{in,min}$	[V]	4.75		4.50	4.75
Max. input voltage						
DC	$U_{in,max}$	[V]	5.25		5.50	5.25
Max. speed						
	n_{max}	[r/min]	8789		5273	8000
Max. current consumption						
	I_{max}	[A]	0.15		0.10	0.070
Limit frequency						
	f_{max}	[kHz]	300		180	200
Inverter assignment						
			E84AVTC E94A ECS EVS93			E94A

1) 6 - Product key > speed/angle sensor

2) Inverter-dependent.

Speed-dependent safety functions

Suitable for safety function						
			No	No	No	Yes
Max. permissible angular acceleration						
MQA20 ... MQA26	α	[rad/s²]				73000
Functional safety						
IEC 61508						SIL3
EN 13849-1						Up to Performance Level e

Incremental encoder and SinCos absolute value encoder

Encoder type			SinCos absolute value			
Speed/angle sensor	1)		SRS	SRM	ECN	EQN
Product key			AS1024-8V-H	AM1024-8V-H	AS2048-5V-E	AM2048-5V-E
Encoder type			Single-turn	Multi-turn	Single-turn	Multi-turn
Pulses			1024		2048	
Output signals			1 Vss			
Interfaces			Hiperface		EnDat	
Absolute revolutions			1	4096	1	4096
Resolution						
Angle		[']	0.40			
Accuracy		[']	-0.8 ... 0.8		-0.6 ... 0.6	
Min. input voltage						
DC	$U_{in,min}$	[V]	7.00		4.75	
Max. input voltage						
DC	$U_{in,max}$	[V]	12.0		5.25	
Max. speed	n_{max}	[r/min]	6000		12000	
Max. current consumption	I_{max}	[A]	0.080		0.15	0.25
Limit frequency	f_{max}	[kHz]	200			
Inverter assignment			E84AVTC E94A ECS EVS93		E94A	

1) 6 - Product key > speed/angle sensor

Blowers

Rated data for 50 Hz

<table>
<tr><th></th><th></th><th>Enclosure</th><th>Number of phases</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td></td><td></td><td></td><td></td><td>U_{min}</td><td>U_{max}</td><td>$U_{N, AC}$</td><td>P_N</td><td>I_N</td></tr>
<tr><td></td><td></td><td></td><td></td><td>[V]</td><td>[V]</td><td>[V]</td><td>[kW]</td><td>[A]</td></tr>
<tr><td rowspan="2">MQA20</td><td>F10
F1F</td><td rowspan="5">IP23s</td><td>1</td><td>210</td><td>250</td><td>230</td><td>0.090</td><td>0.39</td></tr>
<tr><td>F30
F3F</td><td>3</td><td>360</td><td>440</td><td>400</td><td>0.067</td><td>0.13</td></tr>
<tr><td rowspan="2">MQA22</td><td>F10
F1F</td><td>1</td><td>210</td><td>250</td><td>230</td><td>0.26</td><td>1.10</td></tr>
<tr><td rowspan="2">F30
F3F</td><td rowspan="2">3</td><td rowspan="2">360</td><td rowspan="2">440</td><td rowspan="2">400</td><td>0.23</td><td>0.37</td></tr>
<tr><td>MQA26</td><td>0.43</td><td>0.68</td></tr>
</table>

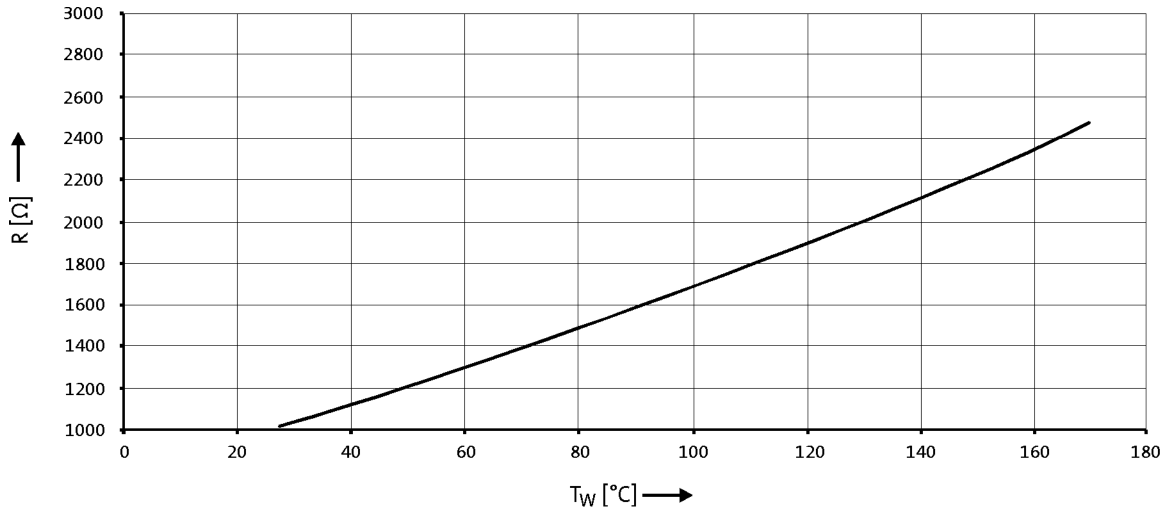
Rated data for 60 Hz

<table>
<tr><th></th><th></th><th>Enclosure</th><th>Number of phases</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td></td><td></td><td></td><td></td><td>U_{min}</td><td>U_{max}</td><td>$U_{N, AC}$</td><td>P_N</td><td>I_N</td></tr>
<tr><td></td><td></td><td></td><td></td><td>[V]</td><td>[V]</td><td>[V]</td><td>[kW]</td><td>[A]</td></tr>
<tr><td rowspan="2">MQA20</td><td>F10
F1F</td><td rowspan="5">IP23s</td><td>1</td><td>210</td><td>250</td><td>230</td><td>0.12</td><td>0.49</td></tr>
<tr><td>F30
F3F</td><td>3</td><td>440</td><td>520</td><td>480</td><td>0.10</td><td>0.16</td></tr>
<tr><td rowspan="2">MQA22</td><td>F10
F1F</td><td>1</td><td>210</td><td>250</td><td>230</td><td>0.30</td><td>1.28</td></tr>
<tr><td rowspan="2">F30
F3F</td><td rowspan="2">3</td><td rowspan="2">440</td><td rowspan="2">520</td><td rowspan="2">480</td><td>0.37</td><td>0.48</td></tr>
<tr><td>MQA26</td><td>0.60</td><td>0.79</td></tr>
</table>

Temperature monitoring

The thermal sensors (1x KTY 83-110) used continuously monitor the motor temperature. The temperature signal is transmitted over the system cable of the feedback system to the servo controller.
This means that the temperature of the motor is determined with great accuracy in the permitted operating range and at the same time the overtemperature response configured in the controller is executed in the event of overtemperature in one of the winding phases.

Variation of resistance



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

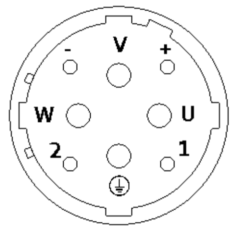
ICN connector

A connector is used for motor and brake connection.
The connection to the feedback system employs a separate connector.

The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional union nuts. Existing mating connectors can therefore still be used without difficulty.

Connection for power and brake

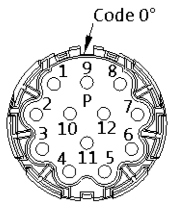
► MQA20

Pin assignment			
Contact	Designation	Meaning	
1		Not assigned	
2			
+	BD1	Holding brake +	
-	BD2	Holding brake -	
PE	PE	PE conductor	
U	U	Phase U power	
V	V	Phase V power	
W	W	Phase W power	

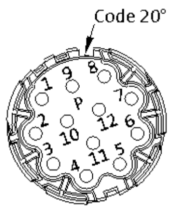
ICN connector

Feedback 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		

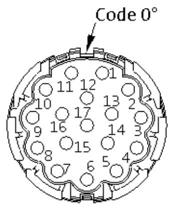
► Hiperface incremental encoder and SinCos absolute value encoder

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

ICN connector

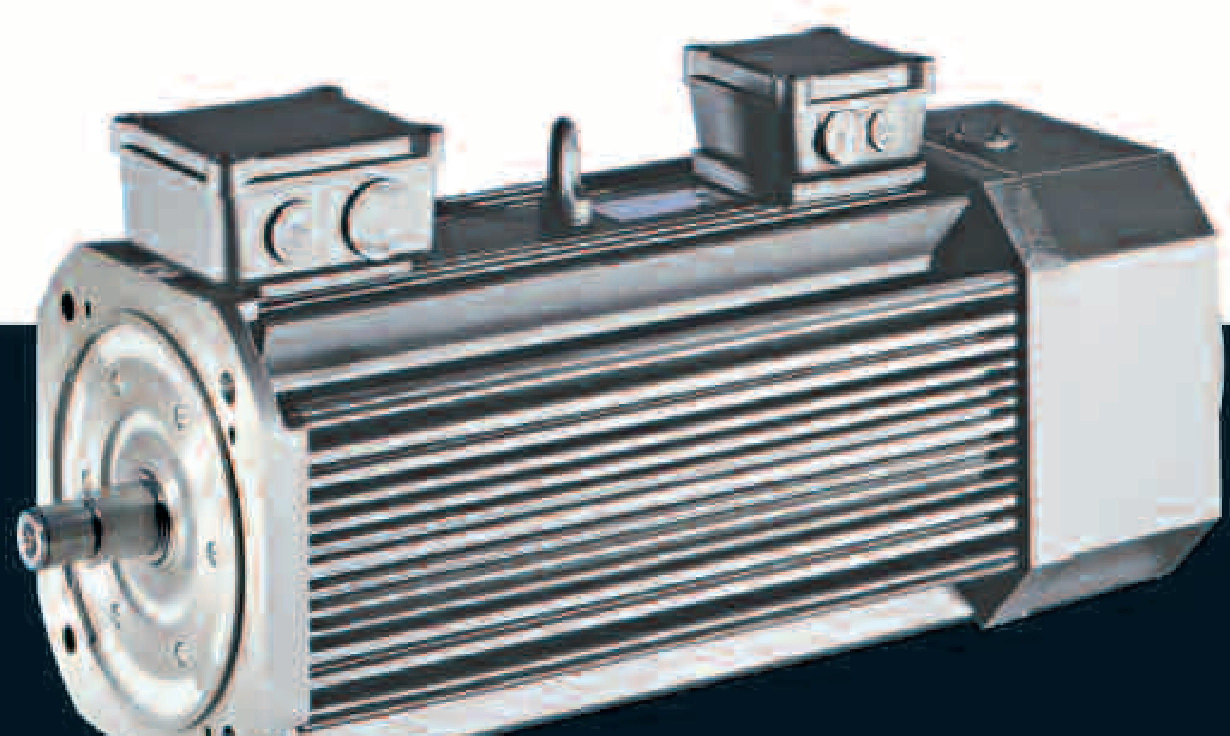
Feedback connection

► SinCos absolute value encoder with EnDat interface

Pin assignment			
Contact	Designation	Meaning	
1	U_P sensor	Supply: UP sensor	
2		Not assigned	
3			
4	0 V sensor	Supply: 0 V sensor	
5	+KTY	KTY temperature sensor	
6	-KTY		
7	$+U_B$	Supply +	
8	Cycle	EnDat interface cycle	
9	Cycle^{-}	EnDat interface inverse cycle	
10	GND	Mass	
11	Shield	Encoder housing screen	
12	B	Track B	
13	B^{-}	Track B inverse/-SIN	
14	Data	EnDat interface data	
15	A	Track A	
16	A^{-}	Track A inverse	
17	Data^{-}	EnDat interface inverse data	

MCA asynchronous servo motors

2 to 1,100 Nm



MCA asynchronous servo motors

Contents

List of abbreviations

$\eta_{100\,\%}$	[%]	Efficiency
cos ϕ		Power factor
du/dt	[kV/µs]	Insulation resistance
$F_{ax,-}$	[N]	Min. axial force
$F_{ax,+}$	[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}	[N]	Max. radial force
H_{max}	[m]	Site altitude
I_0	[A]	Standstill current
I_{max}	[A]	Max. short-time DC-bus current
I_{max}	[A]	Max. current
I_{max}	[A]	Max. current consumption
I_{max}	[A]	Max. current
I_{max}	[A]	Max. DC-bus current
I_N	[A]	Rated current
J	[kgcm²]	Moment of inertia
J_{MB}	[kgcm²]	Moment of inertia
$KE_{LL\,150\,°C}$	[V /1000 rp]	Voltage constant
$Kt_{0\,150\,°C}$	[Nm/A]	Torque constant
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_0	[Nm]	Stall torque
$M_{0,\,max}$	[Nm]	Max. standstill torque
M_{av}	[Nm]	Average dynamic torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]	Rated torque
n_{eto}	[r/min]	Transition speed
n_k	[r/min]	Speed
n_{max}	[r/min]	Max. speed

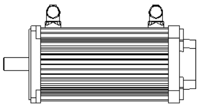
n_N	[r/min]	Rated speed
P_N	[kW]	Rated power
Q_E	[J]	Maximum switching energy
R	[Ω]	Insulation resistance
R	[Ω]	Min. insulation resistance
R_1	[Ω]	Stator impedance
R_2	[Ω]	Charging resistor
R_2	[Ω]	Rotor impedance
$R_{UV\,150\,°C}$	[Ω]	Stator impedance
$R_{UV\,20\,°C}$	[Ω]	Stator impedance
$S_{hü}$	[1/h]	Transition operating frequency
T	[°C]	Operating temperature
T	[°C]	Rated temperature
T	[°C]	Max. ambient temperature of bearing
T	[°C]	Max. surface temperature
T	[°C]	Max. ambient temperature for transport
T	[°C]	Min. ambient storage temperature
T	[°C]	Min. ambient temperature for transport
T	[°C]	Ambient temperature
t_1	[ms]	Engagement time
t_2	[ms]	Disengagement time
$T_{opr,max}$	[°C]	Max. ambient operating temperature
$T_{opr,min}$	[°C]	Min. ambient operating temperature
$U_{in,max}$	[V]	Max. input voltage
$U_{in,min}$	[V]	Min. input voltage
U_{max}	[V]	Max. mains voltage
U_{max}	[V]	Min. input voltage
U_{min}	[V]	Min. mains voltage
$U_{N,\,AC}$	[V]	Rated voltage
$U_{N,\,DC}$	[V]	Rated voltage
Z_{ro}	[Ω]	Rotor impedance
Z_{rs}	[Ω]	Impedance
Z_{so}	[Ω]	Stator impedance

List of abbreviations

CE	Communauté Européenne
CSA	Canadian Standards Association
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
UkrSEPRO	Certificate for Ukraine
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

Product key

Motor type	Motor size	Rated speed	Mains voltage	Speed/angle sensor	Brake	Standard design	Shaft diameter	Concentricity+ vibration level/ Bearing
MCA	□□□	□□	□	□□□	□□	□	□□	□ ...
Asynchronous servo motor	(Example: 14L)	value in 100 rpm (example: 2000 = 20)					(Example: 24)	



Mains voltage

- 400 V: -

Speed/angle sensor

- RS0: Resolver
- SRS: SinCos absolute encoder single- turn, Hiperface, AS1024-8V-H (SRS50)
- SRM: SinCos absolute encoder multi-turn, Hiperface, AM1024-8V-H (SRM50)
- ECN: SinCos absolute encoder single- turn, EnDat, AS2048-5V-E (ECN 1313)
- EQN: SinCos absolute encoder multi- turn, EnDat, AM2048-5V-E (EQN 1325)
- EQI: SinCos absolute encoder multi- turn, EnDat, AM32-5V-E (EQI 1331) [2]
- S20: Incremental sin-cos encoder IG2048-5V-S (ITD 22)
- T20: TTL incremental encoder, IG2048-5V-T (ITD 21)
- T40: TTL incremental encoder, IG4096-5V-T (ITD 21)
- RV0: Safety resolver, RV03
- S1S: Safety incremental Sin-cos encoder, IG1024-5V-V3

Concentricity+ vibration level/ Bearing

- N: normal vibrational severity standard bearing
- R: reduced vibrational severity standard bearing
- V: normal vibrational severity reinforced bearing

Standard design

- A: Standard flange form A / FF (B5), shaft without keyway
- B: Standard flange form A / FF (B5), shaft with keyway
- C: Standard flange form C / FT (B14), shaft without keyway
- N: Standard flange form C / FT (B14), shaft with keyway
- F: Like standard design A, but with large flange (MCA20/21/26)
- G: Like standard design B, but with large flange (MCA20/21/26)
- O: B3 foot mounting, shaft without keyway
- P: B3 foot mounting, shaft with keyway

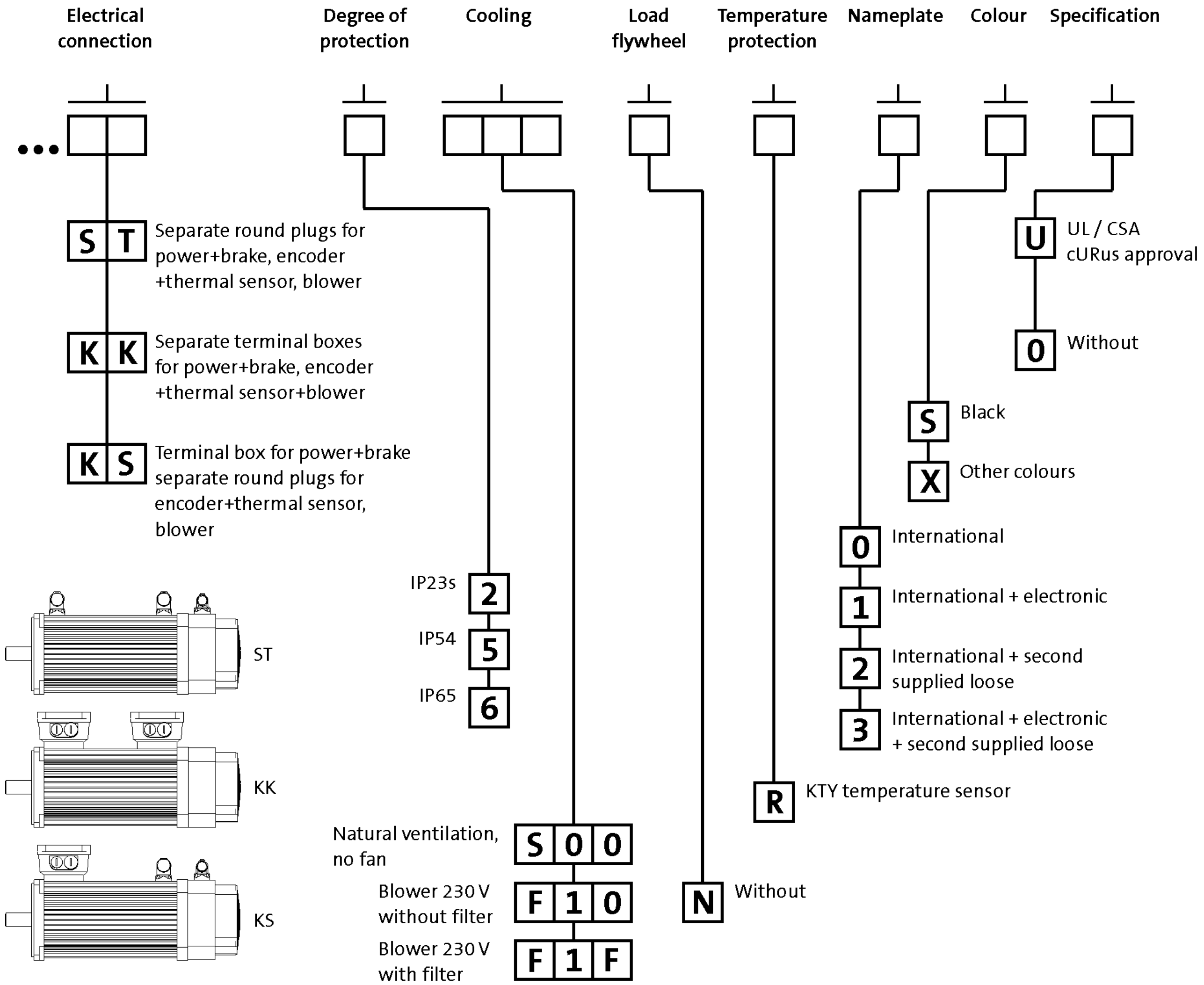
Brake

- B0: No brake
- P1: PM brake DC 24V
- P2: PM brake DC 24V, heavy-duty
- P5: PM brake DC 205 V [1]
- P6: PM brake DC 205 V, heavy-duty [1]
- F1: Spring-applied brake DC 24 V
- F2: Spring-applied brake DC 24 V, heavy-duty
- FG: Spring-applied brake AC 230 V [1]
- FH: Spring-applied brake AC 230 V, heavy-duty [1]

[1] Not possible for UL design.
[2] Not possible for motor frame sizes 20, 22 and 26.

5.4

Product key

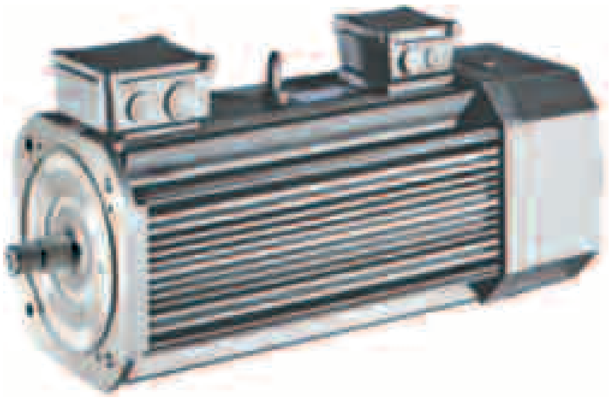

Electrical connection
Degree of protection
Cooling
Load flywheel
Temperature protection
Nameplate
Colour
Specification
S T
Separate round plugs for power+brake, encoder +thermal sensor, blower
K K
Separate terminal boxes for power+brake, encoder +thermal sensor+blower
K S
Terminal box for power+brake separate round plugs for encoder+thermal sensor, blower
ST
KK
KS
IP23s 2
IP54 5
IP65 6
Natural ventilation, no fan S 0 0
Blower 230 V without filter F 1 0
Blower 230 V with filter F 1 F
N Without
R KTY temperature sensor
0 International
1 International + electronic
2 International + second supplied loose
3 International + electronic + second supplied loose
S Black
X Other colours
U UL / CSA cURus approval
0 Without

Product information

An application-oriented structure, low moments of inertia, compact dimensions and a high degree of intrinsic operational reliability characterise these robust and dynamic motors.

The compact design and the low moment of inertia allow these motors to be used in dynamic applications. If your application calls for a broad speed setting range and a robust construction, then the choice is easy: MCA asynchronous servo motors from Lenze.
Whether as a self-ventilated version or with a blower – with a power range from 0.8 to 53.8 kW, the MCA asynchronous servo motors offer rated torque values of up to 280 Nm and peak torque values of up to 1100 Nm. In comparison to standard three-phase AC motors, these servo motors have the edge in terms of lower moments of inertia, lower weight and higher maximum speeds.

Advantages
- High dynamic performance thanks to low moments of inertia
- Compact size with high power density
- Robust regenerative resolver system – alternatively SinCos and incremental encoder for the highest precision
- Easy to install and service friendly thanks to use of SpeedTec connectors
- Terminal box optional up to MCA21 MCA22 and 26 with three-part terminal box
- Protection: IP23, IP54, IP65 optional for naturally ventilated servo motors
- cURus-approved, GOST-certified, CE, RoHS-compliant
- High maximum speeds
- Wide speed setting range
- Field weakening operation usable
- Electronic nameplate



MCA21 asynchronous servo motor

5.4

Functions and features

	MCA10	MCA13	MCA14	MCA17	MCA19
Design					
	B14-FT85 B5-FF100	B14-FT130 B5-FF130	B14-FT130 B5-FF165		B14-FT130 B5-FF215
Shaft end (with and without keyway)					
	14 x 30	19 x 40	24 x 50		28 x 60
A end shield					
	Oil-tight Not oil-tight				
Brake					
Spring-applied brake					
Permanent magnetic brake	DC 24 V AC 230 V 1) DC 205 V 1)				
Speed and angle encoder					
	Resolver SinCos single-turn/multi-turn Incremental encoder				
Cooling					
Without blower	Naturally ventilated				
Axial blower, 1 phase	230 V; 50 Hz				
Thermal sensor					
Thermal detector	KTY				
Motor connection: plug connector					
	Power + brake Encoder + thermal sensor Blower				
Motor connection: terminal box					
	Power + brake Encoder + thermal sensor	Power + brake Encoder + thermal sensor + blower			
Motor connection: Terminal box + plug connector					
Terminal box	Power + brake Encoder + thermal sensor				
Plug connector		Blower			
Shaft bearings					
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, sealing disc or cover plate				
Position of the locating bearing	Drive end Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A				
Installation of the locating bearing					
Colour					
	RAL9005M				

1) Not possible for UR version.

Functions and features

	MCA20	MCA21	MCA22	MCA26
Design				
	B3 B35-FF215 B35-FF265	B14-FT130 B5-FF215 B5-FF265	B3 B35-FF265	B3 B35-FF265 B35-FF350
Shaft end (with and without keyway)				
	38 x 80			55 x 110
A end shield				
	Oil-tight Not oil-tight			
Brake				
Spring-applied brake	DC 24 V AC 230 V [1]		DC 24 V AC 230 V [1]	
Permanent magnetic brake		DC 24 V AC 230 V [1] DC 205 V [1]		
Speed and angle encoder				
	Resolver SinCos single-turn/multi-turn Incremental encoder			
Cooling				
Without blower		Naturally ventilated		
Axial blower, 1 phase	230 V; 50 Hz 230 V; 60 Hz	230 V; 50 Hz	230 V; 50 Hz 230 V; 60 Hz	
Thermal sensor				
Thermal detector	KTY			
Motor connection: plug connector				
	Power + brake Encoder + thermal sensor Blower			
Motor connection: terminal box				
		Power + brake Encoder + thermal sensor + blower		
Motor connection: Terminal box + plug connector				
Terminal box	Power + brake	Power + brake Encoder + thermal sensor	Power + brake	
Plug connector	Encoder + thermal sensor Blower	Blower	Encoder + thermal sensor Blower	
Shaft bearings				
Bearing type	Deep-groove ball bearing with high-temperature resistant grease, sealing disc or cover plate			
Position of the locating bearing	Non-drive end	Drive end Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A	Non-drive end	
Installation of the locating bearing	insulation		insulation	
Colour				
	RAL9005M			

[1] Not possible for UR version.

5.4

Dimensioning

Speed-dependent safety functions

Single encoder concepts with resolvers

Servo motors can perform speed-dependent safety functions for safe speed and / or safe relative position monitoring in a drive system with the Servo Drives 9400. The SM301 safety module, which can be integrated in the Servo Drives 9400, is used to implement these functions. When planning systems/installations of this kind, the following must always be observed:

When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard IEC 61800-5-2 [Adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional] stipulates special requirements for the connection between feedback system and motor shaft. This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip".
As such, acceleration limit values must not be exceeded for the individual drive solutions. You can find the limit values in the corresponding feedback data of the individual motor ranges.

Speed-dependent safety functions in connection with the SM301 safety module

For the following speed-dependent safety functions, the motor-feedback system combinations listed in the following table are available:
- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely Limited Speed (SLS)
- Safe Maximum Speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI).

Encoder type	Encoder type	Product key	Feedback	Safe speed monitoring
			Design	
SinCos incremental	Single-turn	IG1024-5V-V3		PL e/SIL 3
Resolver		RV03		
			2-encoder concept	up to PL e / SIL 3

Dimensioning

Cooling effect of mounting flange

Mounting on a thermally conducting / insulating plate or machine chassis has an influence on heating up the motor, particularly when using naturally ventilated motors.

The motor rating data specified in the catalogue applies when mounting on a steel plate with free convection with the following dimensions:
- MCA10 / 13: 270 x 270 mm
- MCA14 / 17: 330 x 330 mm
- MCA19 to 26: 450 x 450 mm

Vibrational severity

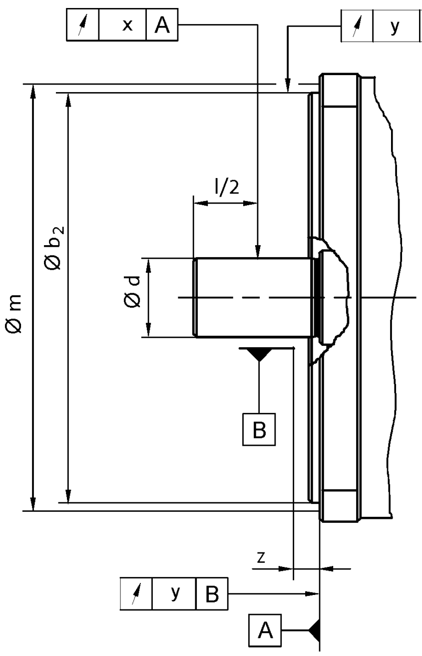
		MCA10	MCA13	MCA14	MCA17	MCA19	MCA20	MCA21	MCA22	MCA26
Vibrational severity										
IEC/EN 60034-14		A		B			A	B	A	
Maximum r.m.s. value of the vibration velocity [1]	[mm/s]	1.60		0.70			1.60	0.70	1.60	

[1] Free suspension

► at n = 600 to 3,600 rpm

Dimensioning

Concentricity and axial run-out of the mounting flanges and smooth running of the shaft ends



				MCA10		MCA13		MCA14		MCA17		MCA19	
Flange size													
				FF100	FT85	FF130	FT130	FF165	FT130	FF165	FT130	FF215	FT130
Dimensions													
	b_2	j6	[mm]	80	70	110		130	110	130	110	180	110
	b_2	h6	[mm]										
	d	k6	[mm]	14		19		24				28	
	d	m6	[mm]										
Distance													
Measuring diameter	m		[mm]	113	98.0	149		188	149	188	149	239	149
Dial gauge holder for flange check	z	+/- 1	[mm]	10.0									
Concentricity													
IEC 60072				Normal class				Precision class					
Value	y		[mm]	0.080		0.10		0.050					
Linear movement													
IEC 60072				Normal class				Precision class					
Value	y		[mm]	0.080		0.10		0.050					
Smooth running													
IEC 60072				Normal class				Precision class					
Value	x		[mm]	0.035		0.040		0.021					

► Limit values for checking the smooth running of the shaft ends as well as the concentricity and axial run-out of the mounting flange to IEC 60072

Dimensioning

Concentricity and axial run-out of the mounting flanges and smooth running of the shaft ends

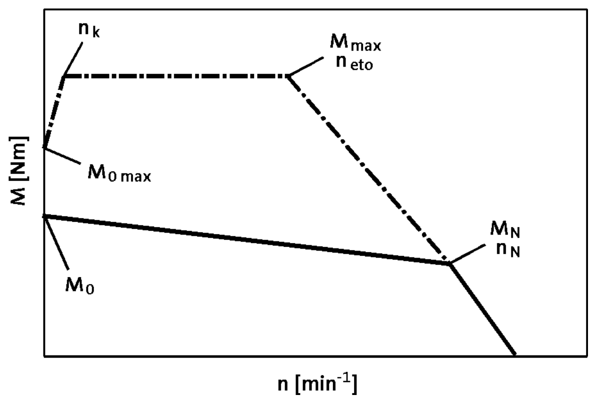
				MCA20		MCA21			MCA22	MCA26	
Flange size											
				FF215	FF265	FF215	FF265	FT130	FF265		FF350
Dimensions											
	b_2	j6	[mm]	180	230	180	230	110	230		
	b_2	h6	[mm]								300
	d	k6	[mm]	38							
	d	m6	[mm]							55	
Distance											
Measuring diameter	m		[mm]	239	289	239	289	149	289		384
Dial gauge holder for flange check	z	+/- 1	[mm]	10.0							
Concentricity											
IEC 60072				Normal class		Precision class			Normal class		
Value	y		[mm]	0.10		0.050			0.10		
Linear movement											
IEC 60072				Normal class		Precision class			Normal class		
Value	y		[mm]	0.10		0.050			0.10		
Smooth running											
IEC 60072				Normal class		Precision class			Normal class		
Value	x		[mm]	0.050		0.060			0.050	0.060	

► Limit values for checking the smooth running of the shaft ends as well as the concentricity and axial run-out of the mounting flange to IEC 60072

Dimensioning

Notes on the selection tables

Graphical display of the operating points



Please note:
- With an active load (e.g. vertical drive axes, hoists, test benches, unwinders), $M_{0\ max}$ must be taken into account
- With a passive load (e.g. horizontal drive axes), M_{max} can generally be used
- At speeds < n_k, the inverter-specific torque $M_{0\ max}$ that can be achieved is lower than M_{max}
- On the servo inverters, the switching frequency-dependent overload capacity has been taken into account in the factory settings. For further information, please refer to the Servo-Inverters catalogue.

	n_k
	[r/min]
MCA	150
MQA	

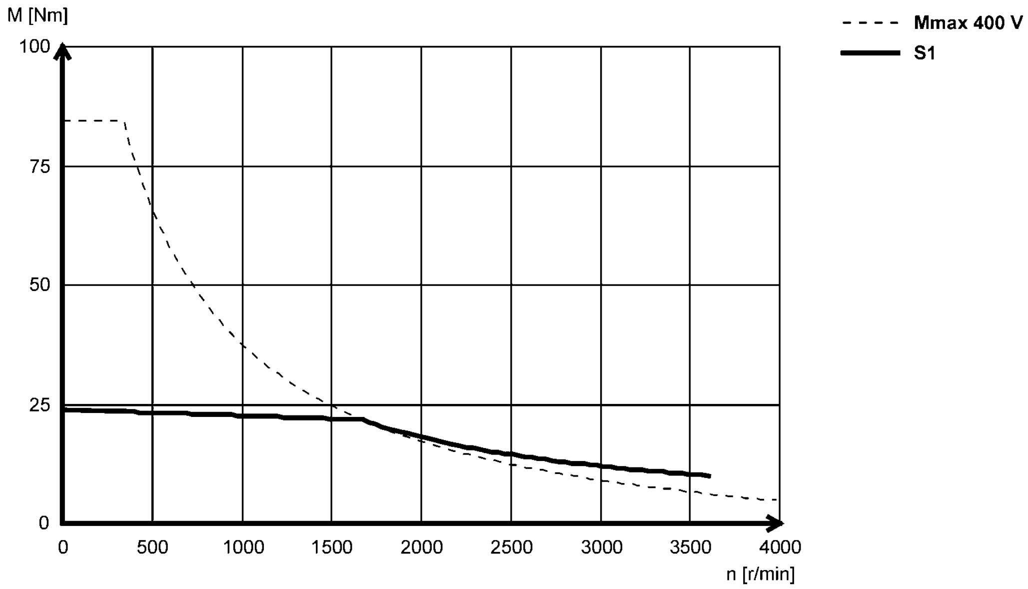
Further selection tables with different switching frequencies are available with the following codes:
- DS_ZT_MCS_0001
- DS_ZT_MCA_0001
- DS_ZT_MDSKS_0001
- DS_ZT_MDFKS_0001

Simply enter this code (e.g. DS_ZT_MCS_0001) as a search string at **www.lenze.de/dsc** and you will be given the information immediately in the form of a PDF format.

Dimensioning

Notes on the torque characteristics

Graph of the torque characteristics



5.4

With asynchronous servo motors, two characteristics are shown in each case. The characteristics for continuous operation (S1) show the speed-dependent constant torque of the motor when operating with a servo inverter that itself is operated at a constant switching frequency. The limit torque characteristics correspond to those that come about during operation of the motor with the largest possible 9400 Servo Drive in each case (see selection tables). The servo inverter is set to a variable switching frequency here.

Characteristics in the Internet

You can find the torque characteristic for inverter-motor combinations on the Internet at **www.lenze.de/dsc**. This lists all useful combinations with the servo inverters 9400, 9300, ECS and Inverter Drives 8400 TopLine. These characteristics are each determined using the factory default settings of the inverters:

- 9400 with variables switching frequency.
  This means that up to 6-fold overcurrent can be applied in borderline cases.
- 9300 and ECS with fixed switching frequency.
- 8400 TopLine with variables switching frequency.

The continuous operation characteristics (S1) show the inverter-independent motor rating values

Further information on the terms switching frequency and factory default settings can be found in the operating manual of the respective servo inverter.

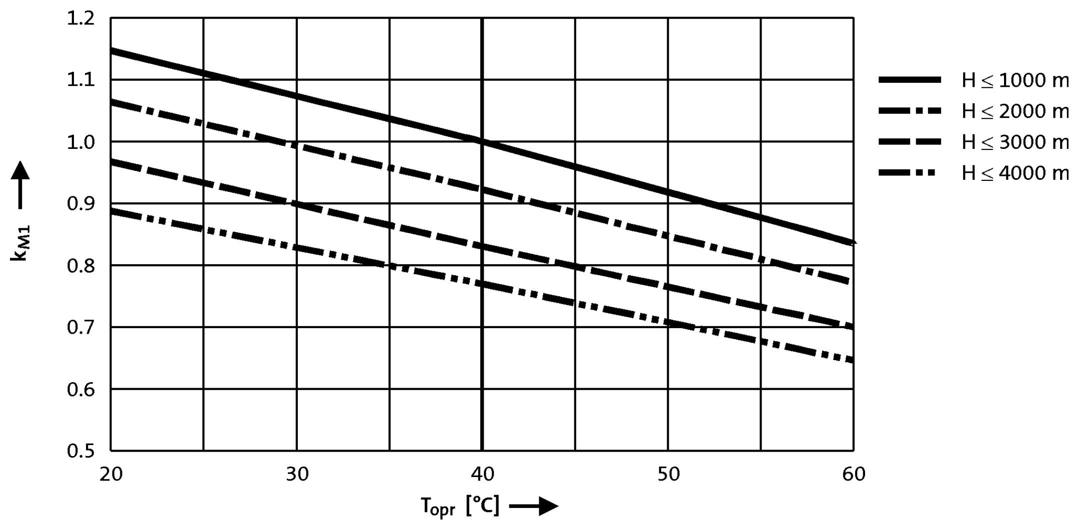
Dimensioning

Influence of ambient temperature and site altitude

The information relating to the servo motors in the tables and graphs is valid for a maximum ambient temperature (T_{opr}) of 40 °C and a site altitude (H) up to 1000 m above sea level. The torque correction factor (k_{M1}) shall be applied to the S1 torque characteristic (M_0...M_N) in the event of differing installation conditions.

► The maximum permissible ambient temperature (T_{opr}) for servo motors with blowers is 40 °C

Torque correction factor k_{m1}



5.4

Standards and operating conditions

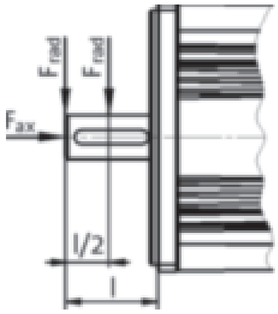
			MCA	
Cooling type				
			Naturally ventilated	Blower
Enclosure				
EN 60529			IP54 IP65	IP54 IP23s [2]
Temperature class				
IEC/EN 60034-1; utilisation			F	
IEC/EN 60034-1; insulation system (enamel-insulated wire)			H	
Conformity				
CE			Low-Voltage Directive	
			2006/95/EC	
EAC			TP TC 004/2011 (TR C	
Approval				
			UkrSEPRO	
CSA			CSA 22.2 No. 100	
cURus [3]			UL 1004-1 UL 1004-6 Power Conversion Equipment (File-No. E210321)	
Max. voltage load				
IEC/TS 60034-25			Pulse voltage limiting curve A	
Smooth running				
IEC 60072			Precision class [1] Normal class	
Linear movement				
IEC 60072			Precision class [1] Normal class	
Concentricity				
IEC 60072			Precision class [1] Normal class	
Mechanical ambient conditions (vibration)				
IEC/EN 60721-3-3			3M6 3M6	
Min. ambient operating temperature				
Without brake	$T_{opr,min}$	[°C]	-20	-15
With brake	$T_{opr,min}$	[°C]	-10	
Max. ambient temperature for operation				
	$T_{opr,max}$	[°C]	40	
Max. surface temperature				
	T	[°C]	140	110
Mechanical tolerance				
Flange centring diameter			$b_2 \leq 230$ mm = j6 $b_2 > 230$ mm = h6	
Shaft diameter			d ≤ 50 mm = k6 d > 50 mm = m6	
Site altitude				
Amsl	H_{max}	[m]	4000	

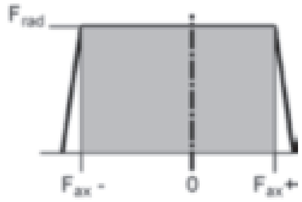
1) MCA14, 17, 19 and 21.
2) MCA20, 22 and 26.
3) MCA20X29, MCA21X35 with circular connector for motor connection only
UR

5.4

Permissible radial and axial forces

Application of forces





Application of force at l/2

	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MCA10	630	-130	320	500	-60	250	400	-30	210	330	-10	190	230	0	200
MCA13	850	-110	570	700	-10	450	470	0	450		0	450			
MCA14	1000	-140	500	780	-60	420	550	-30	380	400	-10	360	250	0	350
MCA17	1380	-180	790	1040	-70	680	660	-40	650	440	-20	630	280		610
MCA19	1880	-50	1530	1080	-30	1510	500	-100	1490	160	0	1470			
MCA20	3400	-1330	690	2500	-1020	380	1950	-780	140	1700	-690	40			
MCA21	3200	-260	1740	2360	-70	1550	1470	-20	1504	1030	0	1480			
MCA22	3600	-2370	1700	2800	-1740	1090	2200	-1280	640	1900	-1080	440	1600	-880	240
MCA26	6950	-2500	1580	5400	-1800	880	4300	-1300	380	3700	-1090	160			

Application of force at l

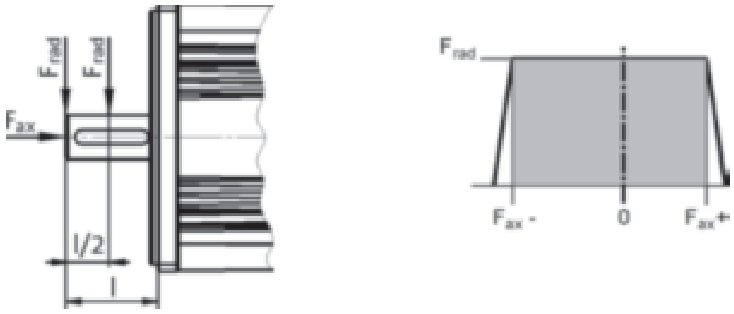
	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MCA10	590	-130	320	470	-60	250	370	-30	210	310	-10	190	220	0	200
MCA13	780	-110	570	640	-10	450	430	0	450	300	0	450			
MCA14	930	-140	500	710	-60	420	490	-30	380	370	-10	360	230	0	350
MCA17	1270	-180	790	960	-70	680	610	-40	650	400	-20	630	260		610
MCA19	1740	-50	1530	1000	-30	1510	420	-100	1490	140	0	1470			
MCA20	3150	-1170	530	2300	-920	280	1800	-710	70	1400	-650	0			
MCA21	2940	-260	1740	2160	-70	1550	1350	-20	1504	950	0	1480			
MCA22	3500	-2240	1600	2600	-1640	1100	2050	-1200	560	1800	-1020	380	1450	-850	200
MCA26	6400	-2080	1150	5000	-1600	680	4000	-1160	230	3400	-1090	50			

► The values for the bearing service life L_{10} relate to an average speed of 4000 r/min. For MCA20/22/26 the speed is 3000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.

Permissible radial and axial forces

► Reinforced bearings

Application of forces



Application of force at l/2

	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MCA20	7100	-970	330	5100	-800	160	3900	-640	0						
MCA22	8500	-1850	1200	7000	-1400	760	5600	-1030	390	4350	-930	290	3200	-800	160
MCA26	10500	-2180	1250	8370	-1530	600	6670	-1130	200	5840	-960	30			

Application of force at l

	Bearing service life L_{10}														
	5000 h			10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
MCA20	6350	-720	80	4100	-680	40	2800	-640	0						
MCA22	7000	-1750	1100	5500	-1300	660	4700	-920	280	3900	-820	180	3000	-700	60
MCA26	9600	-2200	1280	7700	-1280	360	6000	-960	30						

► The values for the bearing service life L_{10} refer to an average speed of 3000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.

Rated data, non-ventilated

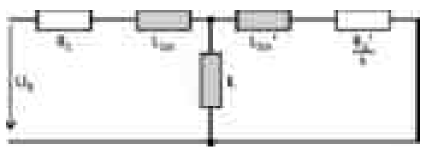
► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	$U_{N, AC}$	f_N	J [1]	$\eta_{100\,\%}$
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[V]	[Hz]	[kgcm²]	[%]
MCA10I40	3950	2.30	2.00	10.0	0.80	2.60	2.40	390	140	2.40	0.70
MCA13I41	4050	4.60	4.00	32.0	1.70	4.60	4.40	390	140	8.30	75.0
MCA14L20	2000	8.00	6.70	60.0	1.40	3.90	3.30	390	70	19.2	84.0
MCA14L41	4100	8.00	5.40	60.0	2.30	7.70	5.80	390	140	19.2	78.0
MCA17N23	2300	12.8	10.8	100	2.60	6.00	5.50	390	80	36.0	86.0
MCA17N41	4110	12.8	9.50	100	4.10	12.0	10.2	350	140	36.0	83.0
MCA19S23	2340	22.5	16.3	180	4.00	9.90	8.20	390	80	72.0	90.0
MCA19S42	4150	22.5	12.0	180	5.20	19.7	14.0	330	140	72.0	83.0
MCA21X25	2490	39.0	24.6	300	6.40	15.9	13.5	390	85	180	85.0
MCA21X42	4160	39.0	17.0	300	7.40	31.8	19.8	320	140	180	84.0

<table>
<tr><th></th><th>R_1</th><th>$R_{UV\ 20\ °C}$</th><th>$R_{UV\ 150\ °C}$</th><th>R_2</th><th>$L_{1\sigma}$</th><th>L</th><th>$L_{2\sigma}$</th><th>n_{max} [2]</th><th>m [1]</th></tr>
<tr><th></th><th>[Ω]</th><th>[Ω]</th><th>[Ω]</th><th>[Ω]</th><th>[mH]</th><th>[mH]</th><th>[mH]</th><th>[r/min]</th><th>[kg]</th></tr>
<tr><td>MCA10I40</td><td>4.70</td><td>9.40</td><td>12.7</td><td>5.20</td><td>9.80</td><td>169</td><td>10.0</td><td rowspan="10">8000</td><td>6.40</td></tr>
<tr><td>MCA13I41</td><td>1.70</td><td>3.40</td><td>4.60</td><td>1.41</td><td>5.40</td><td>92.6</td><td>4.90</td><td>10.4</td></tr>
<tr><td>MCA14L20</td><td>3.00</td><td>6.00</td><td>8.10</td><td>3.13</td><td>10.0</td><td>269</td><td>10.0</td><td rowspan="2">15.1</td></tr>
<tr><td>MCA14L41</td><td>0.75</td><td>1.50</td><td>2.00</td><td>0.78</td><td>2.50</td><td>65.8</td><td>2.50</td></tr>
<tr><td>MCA17N23</td><td>1.52</td><td>3.04</td><td>4.10</td><td>1.37</td><td>6.20</td><td>176</td><td>6.80</td><td rowspan="2">22.9</td></tr>
<tr><td>MCA17N41</td><td>0.38</td><td>0.76</td><td>1.00</td><td>0.34</td><td>1.50</td><td>43.4</td><td>1.70</td></tr>
<tr><td>MCA19S23</td><td>0.69</td><td>1.38</td><td>1.90</td><td>0.62</td><td>3.20</td><td>111</td><td>3.90</td><td rowspan="2">44.7</td></tr>
<tr><td>MCA19S42</td><td>0.18</td><td>0.35</td><td>0.50</td><td>0.15</td><td>0.80</td><td>28.0</td><td>1.00</td></tr>
<tr><td>MCA21X25</td><td>0.36</td><td>0.72</td><td>1.00</td><td>0.36</td><td>2.30</td><td>78.1</td><td>2.80</td><td rowspan="2">60.0</td></tr>
<tr><td>MCA21X42</td><td>0.090</td><td>0.18</td><td>0.20</td><td>0.090</td><td>0.60</td><td>19.5</td><td>0.70</td></tr>
</table>

[1] Without brake.
[2] Mechanically permissible maximum speed.

The data in the R_1, $L_{1\sigma}$, L, R_2' and $L_{2\sigma}$' columns is based on a single-phase equivalent circuit diagram at 20°C.



Rated data, IP54 forced ventilated

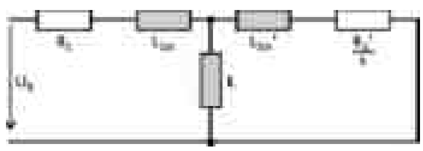
► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	$U_{N, AC}$	f_N	J [1]	$\eta_{100\,\%}$
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[V]	[Hz]	[kgcm²]	[%]
MCA13I34	3410	7.00	6.30	32.0	2.20	6.30	6.00	390	120	8.30	72.0
MCA14L16	1635	13.5	12.0	60.0	2.10	5.30	4.80	390	60	19.2	80.0
MCA14L35	3455	13.5	10.8	60.0	3.90	10.5	9.10	390	120	19.2	79.0
MCA17N17	1680	23.9	21.5	100	3.80	9.10	8.50	390	60	36.0	83.0
MCA17N35	3480	23.9	19.0	100	6.90	18.1	15.8	390	120	36.0	81.0
MCA19S17	1700	40.0	36.3	180	6.40	15.4	13.9	390	60	72.0	82.0
MCA19S35	3510	40.0	36.0	180	13.2	30.8	28.7	390	120	72.0	85.0
MCA21X17	1710	75.0	61.4	300	11.0	25.8	22.5	390	60	180	85.0
MCA21X35	3520	75.0	55.0	300	20.3	49.5	42.5	390	120	180	88.0
MCA22P08...5F□□	760	120	110	500	8.75	23.4	22.1	345	28	487	80.0
MCA22P14...5F□□	1425	120	107	500	16.0	40.5	37.7	350	50	487	87.0
MCA22P17...5F□□	1670	120	106	500	18.5	46.7	42.7	360	58	487	88.0
MCA22P29...5F□□	2935	120	100	500	30.7	80.9	72.1	360	100	487	87.0
MCA26T05...5F□□	550	220	216	1100	12.4	35.4	34.9	350	19	1335	83.0
MCA26T10...5F□□	1030	220	210	1100	22.7	62.9	61.5	350	36	1335	88.0
MCA26T12...5F□□	1200	220	207	1100	26.0	78.4	75.1	350	41	1335	87.0
MCA26T22...5F□□	2235	220	195	1100	45.6	125	113	340	76	1335	92.0

	R_1	$R_{UV\,20\,°C}$	$R_{UV\,150\,°C}$	R_2	$L_{1\sigma}$	L	$L_{2\sigma}$	n_{max} [2]	m [1]
	[Ω]	[Ω]	[Ω]	[Ω]	[mH]	[mH]	[mH]	[r/min]	[kg]
MCA13I34	1.70	3.40	4.60	1.41	4.90	76.7	4.40	8000	12.0
MCA14L16	3.00	6.00	8.10	3.13	9.50	224	9.30		16.9
MCA14L35	0.75	1.50	2.00	0.78	2.40	56.7	2.30		
MCA17N17	1.52	3.04	4.10	1.37	5.60	144	6.00		25.5
MCA17N35	0.38	0.76	1.00	0.34	1.40	36.9	1.50		
MCA19S17	0.69	1.38	1.90	0.62	2.60	80.9	3.10		48.2
MCA19S35	0.18	0.35	0.50	0.15	0.70	20.3	0.80		
MCA21X17	0.36	0.72	1.00	0.36	2.10	68.9	2.60		63.5
MCA21X35	0.090	0.18	0.20	0.090	0.50	16.8	0.60		
MCA22P08...5F□□	0.54	1.07	1.62	0.48	3.56	94.9	4.80	6500	105
MCA22P14...5F□□		0.36	0.54		3.60	94.2	4.85		
MCA22P17...5F□□	0.13	0.27	0.40	0.12	0.90	23.4	1.21		
MCA22P29...5F□□		0.080	0.12			22.9			
MCA26T05...5F□□	0.29	0.59	0.89	0.25	2.86	66.8	5.04		194
MCA26T10...5F□□		0.20	0.30		2.93	69.2	5.12		
MCA26T12...5F□□	0.080	0.15	0.23	0.062	0.74	18.1	1.29		
MCA26T22...5F□□		0.050	0.075		0.78	19.8			

[1] Without brake.
[2] Mechanically permissible maximum speed.

The data in the R_1, $L_{1\sigma}$, L, R_2' and $L_{2\sigma}$' columns is based on a single-phase equivalent circuit diagram at 20°C.



5.4

Rated data, IP23s forced ventilated

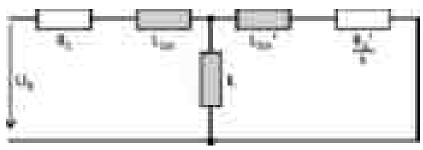
► The data applies to a mains connection voltage of 3 x 400 V.

	n_N	M_0	M_N	M_{max}	P_N	I_0	I_N	$U_{N, AC}$	f_N	J 1)	$\eta_{100\,\%}$
	[r/min]	[Nm]	[Nm]	[Nm]	[kW]	[A]	[A]	[V]	[Hz]	[kgcm²]	[%]
MCA20X14...2F□□	1420	68.0	61.0	250	9.07	26.0	23.0	350	50	171	82.0
MCA20X29...2F□□	2930	68.0	53.5	250	16.4	52.0	42.4	350	100	171	87.0
MCA22P08...2F□□	760	135	120	500	9.55	26.0	23.5	355	28	487	80.0
MCA22P14...2F□□	1425	135	115	500	17.2	45.1	40.0	360	50	487	86.0
MCA22P17...2F□□	1670	135	112	500	19.6	52.1	44.5	360	58	487	88.0
MCA22P29...2F□□	2935	135	110	500	33.8	90.2	77.8	360	100	487	89.0
MCA26T05...2F□□	550	290	280	1100	16.1	44.0	42.4	350	20	1335	81.0
MCA26T10...2F□□	1030	290	260	1100	28.0	78.0	69.6	350	36	1335	87.0
MCA26T12...2F□□	1200	290	255	1100	32.0	101	83.3	350	41	1335	87.0
MCA26T22...2F□□	2235	290	230	1100	53.8	160	127	340	76	1335	92.0

	R_1	$R_{UV\ 20\ °C}$	$R_{UV\ 150\ °C}$	R_2	$L_{1\sigma}$	L	$L_{2\sigma}$	n_{max} 2)	m 1)
	[Ω]	[Ω]	[Ω]	[Ω]	[mH]	[mH]	[mH]	[r/min]	[kg]
MCA20X14...2F□□	0.37	0.73	1.10	0.36	2.01	60.2	2.14	6500	64.0
MCA20X29...2F□□	0.090	0.18	0.28	0.090	0.50	14.3	0.54		
MCA22P08...2F□□	0.54	1.07	1.62	0.48	3.50	91.9	4.74		105
MCA22P14...2F□□		0.36	0.54		3.55	90.9	4.79		
MCA22P17...2F□□	0.13	0.27	0.40	0.12	0.90	23.5	1.22		
MCA22P29...2F□□		0.080	0.12			22.9	1.21		
MCA26T05...2F□□	0.29	0.59	0.89	0.25	3.11	72.1	5.08		194
MCA26T10...2F□□		0.20	0.30		3.17	71.4	5.14		
MCA26T12...2F□□	0.080	0.15	0.23	0.062	0.78	18.6	1.30		
MCA26T22...2F□□		0.050	0.077			20.2			

1) Without brake.
2) Mechanically permissible maximum speed.

The data in the R_1, $L_{1\sigma}$, L, R_2' and $L_{2\sigma}$' columns is based on a single-phase equivalent circuit diagram at 20°C.



Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0024	E0034	E0044	E0074	E0094	E0134	E0174	E0244	E0324
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
MCA	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
10I40	2.0	3950	2.4	0.80	M_0	1.1	2.3							
					M_N	1.0	2.0							
					$M_{0,max}$	6.9	10.0							
					M_{max}	6.9	10.0							
					n_{eto}	-	-							
13I41	4.0	4050	4.4	1.70	M_0			4.6	4.6					
					M_N			4.0	4.0					
					$M_{0,max}$			18.9	20.8					
					M_{max}			18.9	20.8					
					n_{eto}			-	-					
14L20	6.7	2000	3.3	1.40	M_0		5.1	8.0						
					M_N		4.4	6.7						
					$M_{0,max}$		25.0	42.8						
					M_{max}		25.0	42.8						
					n_{eto}		-	-						
14L41	5.4	4100	5.8	2.30	M_0			3.5	8.0	8.0				
					M_N			3.5	5.4	5.4				
					$M_{0,max}$			21.5	27.0	31.3				
					M_{max}			21.5	27.0	31.3				
					n_{eto}			-	-	-				
17N23	10.8	2300	5.5	2.60	M_0			9.5	12.8					
					M_N			9.0	10.8					
					$M_{0,max}$			38.0	50.0					
					M_{max}			38.0	50.0					
					n_{eto}			-	-					
17N41	9.5	4110	10.2	4.10	M_0				7.1	11.5	12.8	12.8		
					M_N				6.7	9.5	9.5	9.5		
					$M_{0,max}$				24.0	33.3	45.8	49.9		
					M_{max}				24.0	33.3	45.8	49.9		
					n_{eto}				-	-	-	-		
19S23	16.3	2340	8.2	4.00	M_0				18.4	22.5	22.5			
					M_N				15.6	16.3	16.3			
					$M_{0,max}$				55.0	73.7	86.0			
					M_{max}				55.0	73.7	86.0			
					n_{eto}				-	-	-			
19S42	12.0	4150	14.0	5.20	M_0						15.0	22.5	22.5	
					M_N						12.0	12.0	12.0	
					$M_{0,max}$						48.8	62.0	70.0	
					M_{max}						48.8	62.0	70.0	
					n_{eto}						-	-	-	
21X25	24.6	2490	13.5	6.40	M_0					21.4	39.0	39.0	39.0	
					M_N					19.6	24.6	24.6	24.6	
					$M_{0,max}$					71.7	96.0	126.0	136.0	
					M_{max}					71.7	96.0	126.0	136.0	
					n_{eto}					-	-	-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives 9400 HighLine

Non-ventilated motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	**E0024**	**E0034**	**E0044**	**E0074**	**E0094**	**E0134**	**E0174**	**E0244**	**E0324**
					I_N	1.9	3.1	5.0	8.8	11.7	16.3	20.6	29.4	38.4
					$I_{0,max}$	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
MCA	M_N	n_N	I_N	P_N	I_{max}	6.0	10.0	16.0	21.0	28.0	39.0	49.5	58.8	76.8
21X42	17.0	4160	19.8	7.40	M_0								31.3	39.0
					M_N								17.0	17.0
					$M_{0,max}$								71.7	91.0
					M_{max}								71.7	91.0
					n_{eto}								-	-

- ► I... [A], M... [Nm], n... [r/min], P... [kW]

5.4

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					E94A□□	E0044	E0074	E0094	E0134	E0174	E0244	E0324	E0474	E0594	E0864
					I_N	5.0	8.8	11.7	16.3	20.6	29.4	38.4	47.0	59.0	86.0
					$I_{0,max}$	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0	172.0
MCA	M_N	n_N	I_N	P_N	I_{max}	16.0	21.0	28.0	39.0	49.5	58.8	76.8	94.0	118.0	172.0
13I34	6.3	3410	6.0	2.20	M_0	4.6	7.0	7.0							
					M_N	4.4	6.3	6.3							
					$M_{0,max}$	20.8	26.0	29.2							
					M_{max}	20.8	26.0	29.2							
					n_{eto}	-	-	-							
14L16	12.0	1635	4.8	2.10	M_0	12.0	13.5								
					M_N	12.0	12.0								
					$M_{0,max}$	45.4	52.6								
					M_{max}	45.4	52.6								
					n_{eto}	-	-								
14L35	10.8	3455	9.1	3.90	M_0		10.1	13.5	13.5						
					M_N		9.7	10.8	10.8						
					$M_{0,max}$		32.4	46.0	60.0						
					M_{max}		32.4	46.0	60.0						
					n_{eto}		-	-	-						
17N17	21.5	1680	8.5	3.80	M_0		21.6	23.9	23.9						
					M_N		21.5	21.5	21.5						
					$M_{0,max}$		59.4	81.4	84.5						
					M_{max}		59.4	81.4	84.5						
					n_{eto}		-	-	-						
17N35	19.0	3480	15.8	6.90	M_0				19.4	23.9	23.9				
					M_N				19.0	19.0	19.0				
					$M_{0,max}$				59.2	75.0	90.0				
					M_{max}				59.2	75.0	90.0				
					n_{eto}				-	-	-				
19S17	36.3	1700	13.9	6.40	M_0				40.0	40.0	40.0				
					M_N				36.3	36.3	36.3				
					$M_{0,max}$				105.0	133.0	148.0				
					M_{max}				105.0	133.0	148.0				
					n_{eto}				-	-	-				
19S35	36.0	3510	28.7	13.20	M_0						36.9	40.0	40.0	40.0	
					M_N						36.0	36.0	36.0	36.0	
					$M_{0,max}$						82.0	112.0	132.0	160.0	
					M_{max}						82.0	112.0	132.0	160.0	
					n_{eto}						-	-	-	-	
21X17	61.4	1710	22.5	11.00	M_0					54.4	75.0	75.0	75.0		
					M_N					50.4	61.4	61.4	61.4		
					$M_{0,max}$					134.0	158.0	215.0	246.0		
					M_{max}					134.0	158.0	215.0	246.0		
					n_{eto}					-	-	-	-		
21X35	55.0	3520	42.5	20.30	M_0								63.9	75.0	75.0
					M_N								55.0	55.0	55.0
					$M_{0,max}$								134.0	167.0	232.0
					M_{max}								134.0	167.0	232.0
					n_{eto}								-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E94A□□	E0174	E0244	E0324	E0474	E0594	E0864	E1044	E1454	E1724	E2024	E2454
					I_N	16.5	23.5	32.0	41.0	41.0	73.0	78.0	102.0	120.0	131.0	160.0
					$I_{0,max}$	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0
MCA	M_N	n_N	I_N	P_N	I_{max}	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0
22P08-...5F□□	110.0	760	22.1	8.80	M_0	64.0	110.0	120.0								
					M_N	64.0	110.0	110.0								
					$M_{0,max}$	261.0	313.0	402.0								
					M_{max}	261.0	313.0	402.0								
					n_{eto}	-	-	-								
22P14-...5F□□	107.0	1425	37.7	16.00	M_0			82.0	120.0	120.0						
					M_N			82.0	107.0	107.0						
					$M_{0,max}$			242.0	300.0	372.0						
					M_{max}			242.0	300.0	372.0						
					n_{eto}			-	-	-						
22P17-...5F□□	105.0	1670	42.7	18.50	M_0					99.0	120.0					
					M_N					99.0	106.0					
					$M_{0,max}$					325.0	463.0					
					M_{max}					325.0	463.0					
					n_{eto}					-	-					
22P29-...5F□□	100.0	2935	72.1	30.70	M_0							110.0	120.0	120.0		
					M_N							100.0	100.0	100.0		
					$M_{0,max}$							335.0	416.0	465.0		
					M_{max}							335.0	416.0	465.0		
					n_{eto}							-	-	-		
26T05-...5F□□	216.0	550	34.9	12.40	M_0			191.0	220.0	220.0	220.0					
					M_N			191.0	216.0	216.0	216.0					
					$M_{0,max}$			531.0	665.0	826.0	1010.0					
					M_{max}			531.0	665.0	826.0	1010.0					
					n_{eto}			-	-	-	-					
26T10-...5F□□	210.0	1030	61.5	22.70	M_0					77.0	220.0	220.0	220.0			
					M_N					77.0	210.0	210.0	210.0			
					$M_{0,max}$					472.0	713.0	855.0	1044.0			
					M_{max}					472.0	713.0	855.0	1044.0			
					n_{eto}					-	-	-	-			
26T12-...5F□□	207.0	1200	75.1	26.00	M_0						204.0	219.0	220.0	220.0		
					M_N						204.0	207.0	207.0	207.0		
					$M_{0,max}$						502.0	609.0	739.0	819.0		
					M_{max}						502.0	609.0	739.0	819.0		
					n_{eto}						-	-	-	-		
26T22-...5F□□	195.0	2235	112.9	45.60	M_0								154.0	211.0	220.0	220.0
					M_N								154.0	195.0	195.0	195.0
					$M_{0,max}$								523.0	611.0	711.0	843.0
					M_{max}								523.0	611.0	711.0	843.0
					n_{eto}								-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!
► When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E94A□□	E0174	E0244	E0324	E0474	E0594	E0864	E1044	E1454	E1724	E2024	E2454	E2924
					I_N	16.5	23.5	32.0	41.0	41.0	73.0	78.0	102.0	120.0	131.0	160.0	191.0
					$I_{0,max}$	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0
MCA	M_N	n_N	I_N	P_N	I_{max}	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0
20X14-...2F□□	61.0	1420	23.0	9.10	M_0	32.5	66.0										
					M_N	32.5	61.0										
					$M_{0,max}$	154.2	190.0										
					M_{max}	154.2	190.0										
					n_{eto}	-	-										
20X29-...2F□□	53.5	2930	42.4	16.40	M_0			28.0	51.6	51.6							
					M_N			28.0	51.6	51.6							
					$M_{0,max}$			116.0	148.2	192.8							
					M_{max}			116.0	148.2	192.8							
					n_{eto}			-	-	-							
22P08-...2F□□	120.0	760	23.5	9.60	M_0		120.0	135.0									
					M_N		120.0	120.0									
					$M_{0,max}$		313.0	402.0									
					M_{max}		313.0	402.0									
					n_{eto}		-	-									
22P14-...2F□□	115.0	1425	40.0	17.20	M_0				118.0	118.0							
					M_N				115.0	115.0							
					$M_{0,max}$				300.0	372.0							
					M_{max}				300.0	372.0							
					n_{eto}				-	-							
22P17-...2F□□	112.0	1670	44.5	19.60	M_0					99.0	135.0						
					M_N					99.0	112.0						
					$M_{0,max}$					325.0	463.0						
					M_{max}					325.0	463.0						
					n_{eto}					-	-						
22P29-...2F□□	110.0	2935	77.8	33.80	M_0							110.0	135.0	135.0			
					M_N							110.0	110.0	110.0			
					$M_{0,max}$							335.0	416.0	486.0			
					M_{max}							335.0	416.0	486.0			
					n_{eto}							-	-	-			
26T05-...2F□□	280.0	550	42.4	16.10	M_0				268.0	268.0	290.0						
					M_N				268.0	268.0	280.0						
					$M_{0,max}$				665.0	826.0	1100.0						
					M_{max}				665.0	826.0	1100.0						
					n_{eto}				-	-	-						
26T10-...2F□□	260.0	1030	69.6	28.00	M_0						270.0	290.0	290.0				
					M_N						260.0	260.0	260.0				
					$M_{0,max}$						713.0	855.0	1044.0				
					M_{max}						713.0	855.0	1044.0				
					n_{eto}						-	-	-				

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!
► When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

5.4

Selection tables, Servo Drives 9400 HighLine

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E94A□□	E0174	E0244	E0324	E0474	E0594	E0864	E1044	E1454	E1724	E2024	E2454	E2924
					I_N	16.5	23.5	32.0	41.0	41.0	73.0	78.0	102.0	120.0	131.0	160.0	191.0
					$I_{0,max}$	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0
MCA	M_N	n_N	I_N	P_N	I_{max}	49.5	58.8	76.8	94.0	118.0	172.0	208.0	261.0	310.0	364.0	441.0	526.0
26T12-...2F□□	255.0	1200	83.3	32.00	M_0						204.0	219.0	290.0	290.0	290.0		
					M_N						204.0	219.0	255.0	255.0	255.0		
					$M_{0,max}$						502.0	609.0	739.0	840.0	896.0		
					M_{max}						502.0	609.0	739.0	840.0	896.0		
					n_{eto}						-	-	-	-	-		
26T22-...2F□□	230.0	2235	126.7	53.80	M_0									211.0	242.0	290.0	290.0
					M_N									211.0	230.0	230.0	230.0
					$M_{0,max}$									611.0	711.0	843.0	1001.0
					M_{max}									611.0	711.0	843.0	1001.0
					n_{eto}									-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!
► When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

5.4

Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□5514	□7514	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534	□1834
					I_N	1.8	2.4	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0	39.0
					$I_{0,max}$	2.7	3.6	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2	60.0
MCA	M_N	n_N	I_N	P_N	I_{max}	3.6	4.8	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0	78.0
10I40	2.0	3950	2.4	0.80	M_0	-	2.3	2.3	2.3	2.3							
					M_N	-	1.9	1.9	1.9	1.9							
					$M_{0,max}$	4.2	5.8	8.0	9.8	10.0							
					M_{max}	4.2	5.8	8.0	9.8	10.0							
					n_{eto}	-	-	-	-	-							
13I41	4.0	4050	4.4	1.70	M_0			-	-	4.6	4.6	4.6					
					M_N			-	-	4.0	4.0	4.0					
					$M_{0,max}$			7.6	9.6	14.3	18.9	22.9					
					M_{max}			7.6	9.6	14.3	18.9	22.9					
					n_{eto}			-	-	-	-	-					
14L20	6.7	2000	3.3	1.40	M_0		-	-	8.0	8.0	8.0						
					M_N		-	-	6.7	6.7	6.7						
					$M_{0,max}$		11.6	16.2	20.1	29.4	34.7						
					M_{max}		11.6	16.2	20.1	29.4	34.7						
					n_{eto}		-	-	-	-	-						
14L41	5.4	4100	5.8	2.30	M_0					-	8.0	8.0	8.0				
					M_N					-	5.4	5.4	5.4				
					$M_{0,max}$					14.1	19.0	25.1	31.0				
					M_{max}					14.1	19.0	25.1	31.0				
					n_{eto}					-	-	-	-				
17N23	10.8	2300	5.5	2.60	M_0				-	12.8	12.8	12.8	12.8				
					M_N				-	10.8	10.8	10.8	10.8				
					$M_{0,max}$				17.1	25.3	33.3	43.8	51.1				
					M_{max}				17.1	25.3	33.3	43.8	51.1				
					n_{eto}				-	-	-	-	-				
17N41	9.5	4110	10.2	4.10	M_0						-	-	12.8	12.8	12.8		
					M_N						-	-	9.5	9.5	9.5		
					$M_{0,max}$						16.5	22.3	31.1	39.9	49.5		
					M_{max}						16.5	22.3	31.1	39.9	49.5		
					n_{eto}						-	-	-	-	-		
19S23	16.3	2340	8.2	4.00	M_0						-	22.5	22.5	22.5			
					M_N						-	16.3	16.3	16.3			
					$M_{0,max}$						32.8	43.6	60.9	77.5			
					M_{max}						32.8	43.7	61.0	77.5			
					n_{eto}						-	-	-	-			
19S42	12.0	4150	14.0	5.20	M_0								-	22.5	22.5	22.5	
					M_N								-	12.0	12.0	12.0	
					$M_{0,max}$								28.5	37.0	53.7	64.7	
					M_{max}								28.5	37.0	53.8	64.7	
					n_{eto}								-	-	-	-	
21X25	24.6	2490	13.5	6.40	M_0							-	-	39.0	39.0	39.0	
					M_N							-	-	24.5	24.5	24.5	
					$M_{0,max}$							33.6	46.7	59.3	85.9	97.3	
					M_{max}							33.6	46.7	59.3	85.9	97.6	
					n_{eto}							-	-	-	-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

Non-ventilated motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□5514	□7514	□1124	□1524	□2224	□3024	□4024	□5524	□7524	□1134	□1534	□1834
					I_N	1.8	2.4	3.2	3.9	5.9	7.3	9.5	13.0	16.5	23.5	32.0	39.0
					$I_{0,max}$	2.7	3.6	4.8	5.9	8.4	11.0	14.3	19.5	26.4	32.9	43.2	60.0
MCA	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	3.6	4.8	6.4	7.8	11.8	14.6	19.0	26.0	33.0	47.0	64.0	78.0
21X42	17.0	4160	19.8	7.40	M_0									-	39.0	39.0	39.0
					M_N									-	17.0	17.0	17.0
					$M_{0,max}$									35.3	52.2	72.1	88.5
					M_{max}									35.3	52.2	72.1	88.5
					n_{eto}									-	-	-	-

- ► I... [A], M... [Nm], n... [r/min], P... [kW]

5.4

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□1524	□2224	□3024	□4024	□5524	□7524
					I_N	3.9	5.9	7.3	9.5	13.0	16.5
					$I_{0,max}$	5.9	8.4	11.0	14.3	19.5	26.4
MCA	M_N	n_N	I_N	P_N	I_{max}	7.8	11.8	14.6	19.0	26.0	33.0
13I34	6.3	3410	6.0	2.20	M_0		-	7.0	7.0	7.0	
					M_N		-	6.2	6.2	6.2	
					$M_{0,max}$		16.0	21.4	28.2	32.0	
					M_{max}		16.0	21.4	28.2	32.0	
					n_{eto}		-	-	-	-	
14L16	12.0	1635	4.8	2.10	M_0	-	13.5	13.5	13.5		
					M_N	-	12.3	12.3	12.3		
					$M_{0,max}$	23.4	34.7	45.5	50.8		
					M_{max}	23.4	34.7	45.5	50.8		
					n_{eto}	-	-	-	-		
14L35	10.8	3455	9.1	3.90	M_0			-	13.5	13.5	13.5
					M_N			-	10.8	10.8	10.8
					$M_{0,max}$			21.1	28.4	39.8	51.1
					M_{max}			21.1	28.4	39.8	51.1
					n_{eto}			-	-	-	-
17N17	21.5	1680	8.5	3.80	M_0			-	23.9	23.9	23.9
					M_N			-	21.6	21.6	21.6
					$M_{0,max}$			42.1	55.9	77.5	93.3
					M_{max}			42.2	56.0	77.5	93.3
					n_{eto}			-	-	-	-
17N35	19.0	3480	15.8	6.90	M_0					-	23.9
					M_N					-	18.9
					$M_{0,max}$					38.0	49.5
					M_{max}					38.0	49.5
					n_{eto}					-	-
19S17	36.3	1700	13.9	6.40	M_0					-	40.0
					M_N					-	36.0
					$M_{0,max}$					71.6	94.7
					M_{max}					71.6	94.7
					n_{eto}					-	-
19S35	36.0	3510	28.7	13.20	M_0						
					M_N						
					$M_{0,max}$						
					M_{max}						
					n_{eto}						
21X17	61.4	1710	22.5	11.00	M_0						-
					M_N						-
					$M_{0,max}$						99.0
					M_{max}						99.0
					n_{eto}						-
21X35	55.0	3520	42.5	20.30	M_0						
					M_N						
					$M_{0,max}$						
					M_{max}						
					n_{eto}						

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

□1134	□1534	□1834	□2234	□3034	□3734	□4534	E84AVTC					
23.5	32.0	39.0	47.0	61.0	76.0	89.0	I_N					
32.9	43.2	60.0	70.5	91.5	114.0	133.5	$I_{0,max}$					
47.0	64.0	78.0	94.0	122.0	152.0	178.0	I_{max}	P_N	I_N	n_N	M_N	MCA
							M_0					
							M_N					
							$M_{0,max}$	2.20	6.0	3410	6.3	13I34
							M_{max}					
							n_{eto}					
							M_0					
							M_N					
							$M_{0,max}$	2.10	4.8	1635	12.0	14L16
							M_{max}					
							n_{eto}					
13.5							M_0					
10.8							M_N					
56.5							$M_{0,max}$	3.90	9.1	3455	10.8	14L35
56.6							M_{max}					
-							n_{eto}					
							M_0					
							M_N					
							$M_{0,max}$	3.80	8.5	1680	21.5	17N17
							M_{max}					
							n_{eto}					
23.9	23.9						M_0					
18.9	18.9						M_N					
72.5	97.8						$M_{0,max}$	6.90	15.8	3480	19.0	17N35
72.5	97.8						M_{max}					
-	-						n_{eto}					
40.0	40.0						M_0					
36.0	36.0						M_N					
138.9	165.2						$M_{0,max}$	6.40	13.9	1700	36.3	19S17
139.0	165.3						M_{max}					
-	-						n_{eto}					
-	40.0	40.0	40.0	40.0			M_0					
-	35.9	35.9	35.9	35.9			M_N					
55.1	78.8	97.8	112.8	146.2			$M_{0,max}$	13.20	28.7	3510	36.0	19S35
55.1	78.8	97.8	112.9	146.2			M_{max}					
-	-	-	-	-			n_{eto}					
75.0	75.0	75.0	75.0				M_0					
61.4	61.4	61.4	61.4				M_N					
143.7	198.5	242.2	277.2				$M_{0,max}$	11.00	22.5	1710	61.4	21X17
144.0	198.7	242.3	277.2				M_{max}					
-	-	-	-				n_{eto}					
	-	-	75.0	75.0	75.0	75.0	M_0					
	-	-	55.1	55.1	55.1	55.1	M_N					
	97.5	120.6	138.5	177.5	216.7	267.8	$M_{0,max}$	20.30	42.5	3520	55.0	21X35
	97.5	120.6	138.6	178.0	217.5	269.8	M_{max}					
	-	-	-	-	-	-	n_{eto}					

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP54 motors

- The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□7524	□1134	□1534	□1834	□2234	□3034	□3734	□4534
					I_N	16.5	23.5	32.0	39.0	47.0	61.0	76.0	89.0
					$I_{0,max}$	26.4	32.9	43.2	60.0	70.5	91.5	114.0	133.5
MCA	M_N	n_N	I_N	P_N	I_{max}	33.0	47.0	64.0	78.0	94.0	122.0	152.0	178.0
22P08-...5F□□	110.0	760	22.1	8.80	M_0	-	120.0	120.0	120.0	120.0			
					M_N	-	110.6	110.6	110.6	110.6			
					$M_{0,max}$	157.8	233.4	323.3	396.6	394.3			
					M_{max}	157.8	233.5	323.3	396.6	394.3			
					n_{eto}	-	-	-	-	-			
22P14-...5F□□	107.0	1425	37.7	16.00	M_0			-	120.0	120.0	120.0	120.0	120.0
					M_N			-	107.2	107.2	107.2	107.2	107.2
					$M_{0,max}$			186.5	232.5	268.8	345.7	422.7	458.8
					M_{max}			186.7	232.7	269.0	346.3	423.7	460.9
					n_{eto}			-	-	-	-	-	-
22P17-...5F□□	105.0	1670	42.7	18.50	M_0			-	-	120.0	120.0	120.0	120.0
					M_N			-	-	105.8	105.8	105.8	105.8
					$M_{0,max}$			162.7	204.2	236.9	307.8	374.9	461.2
					M_{max}			162.7	204.2	237.1	308.3	377.0	462.4
					n_{eto}			-	-	-	-	-	-
22P29-...5F□□	100.0	2935	72.1	30.70	M_0						-	120.0	120.0
					M_N						-	99.9	99.9
					$M_{0,max}$						180.5	224.5	270.5
					M_{max}						180.8	226.0	271.4
					n_{eto}						-	-	-

- I... [A], M... [Nm], n... [r/min], P... [kW]
- If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Inverter Drives 8400 TopLine

Forced ventilated IP23s motors

- The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					E84AVTC	□7524	□1134	□1534	□1834	□2234	□3034	□3734	□4534
					I_N	16.5	23.5	32.0	39.0	47.0	61.0	76.0	89.0
					$I_{0,max}$	26.4	32.9	43.2	60.0	70.5	91.5	114.0	133.5
MCA	M_N	n_N	I_N	P_N	I_{max}	33.0	47.0	64.0	78.0	94.0	122.0	152.0	178.0
20X14-...2F□□	61.0	1420	23.0	9.10	M_0	-	67.0	68.0	68.0	68.0			
					M_N	-	61.2	61.2	61.2	61.2			
					$M_{0,max}$	94.8	139.9	192.6	235.5	250.0			
					M_{max}	94.9	139.9	192.8	235.7	250.0			
					n_{eto}	-	-	-	-	-			
20X29-...2F□□	53.5	2930	42.4	16.40	M_0			-	-	57.0	68.0	68.0	68.0
					M_N			-	-	53.4	53.4	53.4	53.4
					$M_{0,max}$			96.8	121.2	140.3	182.5	222.1	250.0
					M_{max}			96.8	121.2	140.4	182.6	223.0	250.0
					n_{eto}			-	-	-	-	-	-
22P08-...2F□□	120.0	760	23.5	9.60	M_0	-	135.0	135.0	135.0	135.0			
					M_N	-	120.6	120.6	120.6	120.6			
					$M_{0,max}$	157.8	234.2	325.4	401.4	400.9			
					M_{max}	157.8	234.8	325.8	401.4	400.9			
					n_{eto}	-	-	-	-	-			
22P14-...2F□□	115.0	1425	40.0	17.20	M_0			-	-	135.0	135.0	135.0	135.0
					M_N			-	-	115.3	115.3	115.3	115.3
					$M_{0,max}$			188.4	235.1	270.8	350.2	425.8	493.6
					M_{max}			188.7	235.1	271.0	350.3	428.1	496.1
					n_{eto}			-	-	-	-	-	-
22P17-...2F□□	112.0	1670	44.5	19.60	M_0			-	-	135.0	135.0	135.0	135.0
					M_N			-	-	112.1	112.1	112.1	112.1
					$M_{0,max}$			163.1	204.6	237.9	309.7	376.9	463.1
					M_{max}			163.1	204.6	238.2	310.6	379.0	465.2
					n_{eto}			-	-	-	-	-	-
22P29-...2F□□	110.0	2935	77.8	33.80	M_0						-	-	135.0
					M_N						-	-	110.0
					$M_{0,max}$						180.0	224.4	268.2
					M_{max}						180.7	225.0	269.4
					n_{eto}						-	-	-

- I... [A], M... [Nm], n... [r/min], P... [kW]
- If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Servo Drives ECS

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	4.6	9.1	18.1	27.2	36.3
MCA	M_N	n_N	I_N	P_N	I_{max}	8.0	16.0	32.0	48.0	64.0
10I40	2.0	3950	2.4	0.80	M_0	2.3				
					M_N	2.0				
					$M_{0,max}$	5.6				
					M_{max}	8.1				
					n_{eto}	-				
13I41	4.0	4050	4.4	1.70	M_0	3.0	4.6			
					M_N	3.0	4.0			
					$M_{0,max}$	4.3	11.0			
					M_{max}	9.4	18.2			
					n_{eto}	-	-			
14L20	6.7	2000	3.3	1.40	M_0	8.0	8.0			
					M_N	6.7	6.7			
					$M_{0,max}$	10.7	25.3			
					M_{max}	21.6	42.8			
					n_{eto}	-	-			
14L41	5.4	4100	5.8	2.30	M_0		8.0	8.0		
					M_N		5.4	5.4		
					$M_{0,max}$		11.0	24.0		
					M_{max}		20.7	29.1		
					n_{eto}		-	-		
17N23	10.8	2300	5.5	2.60	M_0		12.8	12.8		
					M_N		10.8	10.8		
					$M_{0,max}$		20.5	43.5		
					M_{max}		40.2	63.7		
					n_{eto}		-	-		
17N41	9.5	4110	10.2	4.10	M_0		6.1	12.8	12.8	
					M_N		6.1	9.5	9.5	
					$M_{0,max}$		7.8	21.5	33.5	
					M_{max}		17.4	29.6	57.7	
					n_{eto}		-	-	-	
19S23	16.3	2340	8.2	4.00	M_0		15.1	22.5		
					M_N		15.1	16.3		
					$M_{0,max}$		18.7	43.5		
					M_{max}		38.5	67.9		
					n_{eto}		-	-		
19S42	12.0	4150	14.0	5.20	M_0			9.8	16.7	
					M_N			9.8	12.0	
					$M_{0,max}$			18.4	31.9	
					M_{max}			29.9	58.2	
					n_{eto}			-	-	
21X25	24.6	2490	13.5	6.40	M_0			21.0	39.0	
					M_N			21.0	24.6	
					$M_{0,max}$			41.0	64.5	
					M_{max}			64.4	120.5	
					n_{eto}			-	-	

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives ECS

Non-ventilated motors

- The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	4.6	9.1	18.1	27.2	36.3
MCA	M_N	n_N	I_N	P_N	I_{max}	8.0	16.0	32.0	48.0	64.0
21X42	17.0	4160	19.8	7.40	M_0				13.0	17.0
					M_N				13.0	17.0
					$M_{0,max}$				30.0	45.0
					M_{max}				59.4	83.0
					n_{eto}				-	-

- I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Drives ECS

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 4 kHz.

					ECS□□	008C□B	016C□B	032C□B	048C□B	064C□B
					I_N	4.0	8.0	12.7	17.0	20.0
					$I_{0,max}$	4.6	9.1	18.1	27.2	36.3
MCA	**M_N**	**n_N**	**I_N**	**P_N**	I_{max}	8.0	16.0	32.0	48.0	64.0
13I34	6.3	3410	6.0	2.20	M_0		7.0			
					M_N		6.3			
					$M_{0,max}$		10.7			
					M_{max}		20.8			
					n_{eto}		-			
14L16	12.0	1635	4.8	2.10	M_0	8.9	13.5			
					M_N	8.9	12.0			
					$M_{0,max}$	11.5	25.4			
					M_{max}	21.6	46.7			
					n_{eto}	-	-			
14L35	10.8	3455	9.1	3.90	M_0		8.3	13.5	13.5	
					M_N		8.3	10.8	10.8	
					$M_{0,max}$		11.0	27.0	41.0	
					M_{max}		22.2	42.0	60.0	
					n_{eto}		-	-	-	
17N17	21.5	1680	8.5	3.80	M_0		19.5	23.9		
					M_N		19.5	21.5		
					$M_{0,max}$		23.0	53.0		
					M_{max}		44.8	80.0		
					n_{eto}		-	-		
17N35	19.0	3480	15.8	6.90	M_0			12.7	23.0	
					M_N			12.7	19.0	
					$M_{0,max}$			23.0	37.5	
					M_{max}			37.7	64.4	
					n_{eto}			-	-	
19S17	36.3	1700	13.9	6.40	M_0			28.3	40.0	40.0
					M_N			28.3	36.3	36.3
					$M_{0,max}$			46.5	72.0	98.0
					M_{max}			75.4	130.8	158.9
					n_{eto}			-	-	-
21X17	61.4	1710	22.5	11.00	M_0					52.5
					M_N					52.5
					$M_{0,max}$					107.0
					M_{max}					190.0
					n_{eto}					-

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.4

Selection tables, Servo Inverter 9300

Non-ventilated motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9322-E□	9323-E□	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□
					I_N	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCA	M_N	n_N	I_N	P_N	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
10I40	2.0	3950	2.4	0.80	M_0	2.2	2.3						
					M_N	2.0	2.0						
					$M_{0,max}$	4.4	7.3						
					M_{max}	4.4	7.3						
					n_{eto}	-	-						
13I41	4.0	4050	4.4	1.70	M_0			4.6	4.6				
					M_N			4.0	4.0				
					$M_{0,max}$			12.6	19.5				
					M_{max}			12.6	19.5				
					n_{eto}			-	-				
14L20	6.7	2000	3.3	1.40	M_0		8.0	8.0					
					M_N		6.7	6.7					
					$M_{0,max}$		15.1	29.3					
					M_{max}		15.1	29.3					
					n_{eto}		-	-					
14L41	5.4	4100	5.8	2.30	M_0			7.0	8.0				
					M_N			5.4	5.4				
					$M_{0,max}$			13.2	26.0				
					M_{max}			13.2	26.0				
					n_{eto}			-	-				
17N23	10.8	2300	5.5	2.60	M_0			12.8	12.8				
					M_N			10.8	10.8				
					$M_{0,max}$			24.4	46.2				
					M_{max}			24.4	46.2				
					n_{eto}			-	-				
17N41	9.5	4110	10.2	4.10	M_0				12.8	12.8	12.8		
					M_N				9.5	9.5	9.5		
					$M_{0,max}$				23.4	37.0	54.0		
					M_{max}				23.4	43.7	59.4		
					n_{eto}				-	-	-		
19S23	16.3	2340	8.2	4.00	M_0				22.5	22.5			
					M_N				16.3	16.3			
					$M_{0,max}$				47.2	78.0			
					M_{max}				47.2	88.2			
					n_{eto}				-	-			
19S42	12.0	4150	14.0	5.20	M_0				10.0	22.5	22.5		
					M_N				10.0	12.0	12.0		
					$M_{0,max}$				20.7	33.5	51.0		
					M_{max}				20.7	43.3	60.7		
					n_{eto}				-	-	-		
21X25	24.6	2490	13.5	6.40	M_0				23.7	39.0	39.0		
					M_N				23.7	24.6	24.6		
					$M_{0,max}$				46.2	66.0	84.0		
					M_{max}				46.2	78.0	92.4		
					n_{eto}				-	-	-		

► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Inverter 9300

Non-ventilated motors

- ► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	**9322-E□**	**9323-E□**	**9324-E□**	**9325-E□**	**9326-E□**	**9327-E□**	**9328-E□**	**9329-E□**
					I_N	2.5	3.9	7.0	13.0	23.5	32.0	47.0	59.0
					$I_{0,max}$	3.8	5.9	10.5	19.5	23.5	32.0	47.0	52.0
MCA	M_N	n_N	I_N	P_N	I_{max}	3.8	5.9	10.5	19.5	35.3	48.0	70.5	88.5
21X42	17.0	4160	19.8	7.40	M_0					24.0	39.0	39.0	39.0
					M_N					17.0	17.0	17.0	17.0
					$M_{0,max}$					24.0	47.0	84.0	94.0
					M_{max}					43.9	63.3	96.8	123.0
					n_{eto}					-	-	-	-

- ► I... [A], M... [Nm], n... [r/min], P... [kW]

Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9324-E□	9325-E□	9326-E□	9327-E□	9328-E□	9329-E□	9330-E□	9331-E□
					I_N	7.0	13.0	23.5	32.0	47.0	59.0	89.0	110.0
					$I_{0,max}$	10.5	19.5	23.5	32.0	47.0	52.0	80.0	110.0
MCA	M_N	n_N	I_N	P_N	I_{max}	10.5	19.5	35.3	48.0	70.5	88.5	133.5	165.0
13I34	6.3	3410	6.0	2.20	M_0	7.0	7.0						
					M_N	6.3	6.3						
					$M_{0,max}$	13.0	25.0						
					M_{max}	13.0	25.0						
					n_{eto}	-	-						
14L16	12.0	1635	4.8	2.10	M_0	13.5							
					M_N	12.0							
					$M_{0,max}$	29.6							
					M_{max}	29.6							
					n_{eto}	-							
14L35	10.8	3455	9.1	3.90	M_0		13.5	13.5					
					M_N		10.8	10.8					
					$M_{0,max}$		29.3	47.0					
					M_{max}		29.3	53.8					
					n_{eto}		-	-					
17N17	21.5	1680	8.5	3.80	M_0		23.9						
					M_N		21.5						
					$M_{0,max}$		57.2						
					M_{max}		57.2						
					n_{eto}		-						
17N35	19.0	3480	15.8	6.90	M_0			23.9	23.9	23.9			
					M_N			19.0	19.0	19.0			
					$M_{0,max}$			27.5	57.0	89.0			
					M_{max}			50.7	69.2	100.2			
					n_{eto}			-	-	-			
19S17	36.3	1700	13.9	6.40	M_0		34.0	40.0	40.0				
					M_N		34.0	36.3	36.3				
					$M_{0,max}$		50.1	76.0	112.0				
					M_{max}		50.1	95.9	130.8				
					n_{eto}		-	-	-				
19S35	36.0	3510	28.7	13.20	M_0			21.0	39.0	40.0	40.0	40.0	
					M_N			21.0	36.0	36.0	36.0	36.0	
					$M_{0,max}$			21.0	39.0	73.0	80.0	161.5	
					M_{max}			45.7	67.6	104.3	132.9	180.0	
					n_{eto}			-	-	-	-	-	
21X17	61.4	1710	22.5	11.00	M_0			65.5	75.0	75.0	75.0		
					M_N			61.4	61.4	61.4	61.4		
					$M_{0,max}$			65.5	102.0	178.0	200.0		
					M_{max}			104.1	143.3	210.7	257.3		
					n_{eto}			-	-	-	-		
21X35	55.0	3520	42.5	20.30	M_0					68.0	75.0	75.0	75.0
					M_N					55.0	55.0	55.0	55.0
					$M_{0,max}$					68.0	88.0	156.0	219.0
					M_{max}					107.7	135.9	205.0	250.1
					n_{eto}					-	-	-	-

► I... [A], M... [Nm], n... [r/min], P... [kW]

5.4

Selection tables, Servo Inverter 9300

Forced ventilated IP54 motors

- The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

- I... [A], M... [Nm], n... [r/min], P... [kW]
- If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Servo Inverter 9300

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9326-E□	9327-E□	9328-E□	9329-E□	9330-E□	9331-E□	9332-E□
					I_N	23.5	32.0	47.0	59.0	89.0	110.0	145.0
					$I_{0,max}$	23.5	32.0	47.0	52.0	80.0	110.0	126.0
MCA	M_N	n_N	I_N	P_N	I_{max}	35.3	48.0	70.5	88.5	133.5	165.0	217.5
20X14-...2F□□	61.0	1420	23.0	9.10	M_0	61.0	68.0	68.0				
					M_N	61.0	61.0	61.0				
					$M_{0,max}$	61.0	93.0	153.0				
					M_{max}	109.3	156.7	232.1				
					n_{eto}	-	-	-				
20X29-...2F□□	53.5	2930	42.4	16.40	M_0		28.0	66.3	68.0	68.0		
					M_N		28.0	53.5	53.5	53.5		
					$M_{0,max}$		28.0	66.3	72.0	129.0		
					M_{max}		68.5	112.5	146.4	226.7		
					n_{eto}		-	-	-	-		
22P08-...2F□□	120.0	760	23.5	9.60	M_0	115.0	135.0	135.0	135.0			
					M_N	115.0	120.0	120.0	120.0			
					$M_{0,max}$	115.0	166.0	242.0	267.0			
					M_{max}	185.0	247.0	338.8	345.8			
					n_{eto}	-	-	-	-			
22P14-...2F□□	115.0	1425	40.0	17.20	M_0			135.0	135.0	135.0		
					M_N			115.0	115.0	115.0		
					$M_{0,max}$			146.0	160.0	264.0		
					M_{max}			230.1	292.9	341.8		
					n_{eto}			-	-	-		
22P17-...2F□□	112.0	1670	44.5	19.60	M_0			124.0	134.0	135.0	135.0	
					M_N			112.0	112.0	112.0	112.0	
					$M_{0,max}$			124.0	140.0	240.0	335.0	
					M_{max}			180.5	227.7	342.1	378.3	
					n_{eto}			-	-	-	-	
22P29-...2F□□	110.0	2935	77.8	33.80	M_0					118.0	135.0	135.0
					M_N					110.0	110.0	110.0
					$M_{0,max}$					122.0	171.0	200.0
					M_{max}					215.6	273.1	355.1
					n_{eto}					-	-	-
26T05-...2F□□	280.0	550	42.4	16.10	M_0		191.0	290.0	290.0	290.0		
					M_N		191.0	280.0	280.0	280.0		
					$M_{0,max}$		191.0	303.0	333.0	615.0		
					M_{max}		313.0	482.0	612.0	751.0		
					n_{eto}		-	-	-	-		
26T10-...2F□□	260.0	1030	69.6	28.00	M_0				159.0	290.0	290.0	
					M_N				197.0	260.0	260.0	
					$M_{0,max}$				159.0	300.0	440.0	
					M_{max}				343.0	552.0	671.0	
					n_{eto}				-	-	-	

5.4

► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

Selection tables, Servo Inverter 9300

Forced ventilated IP23s motors

► The data applies to a mains connection voltage of 3 x 400 V and an inverter switching frequency of 8 kHz.

					EVS	9326-E□	9327-E□	9328-E□	9329-E□	9330-E□	9331-E□	9332-E□
					I_N	23.5	32.0	47.0	59.0	89.0	110.0	145.0
					$I_{0,max}$	23.5	32.0	47.0	52.0	80.0	110.0	126.0
MCA	M_N	n_N	I_N	P_N	I_{max}	35.3	48.0	70.5	88.5	133.5	165.0	217.5
26T12-...2F□□	255.0	1200	83.3	32.00	M_0					232.0	290.0	290.0
					M_N					255.0	255.0	255.0
					$M_{0,max}$					258.0	327.0	397.0
					M_{max}					424.0	512.0	663.0
					n_{eto}					-	-	-
26T22-...2F□□	230.0	2235	126.7	53.80	M_0						177.0	222.0
					M_N						177.0	230.0
					$M_{0,max}$						203.0	220.0
					M_{max}						315.0	432.0
					n_{eto}						-	-

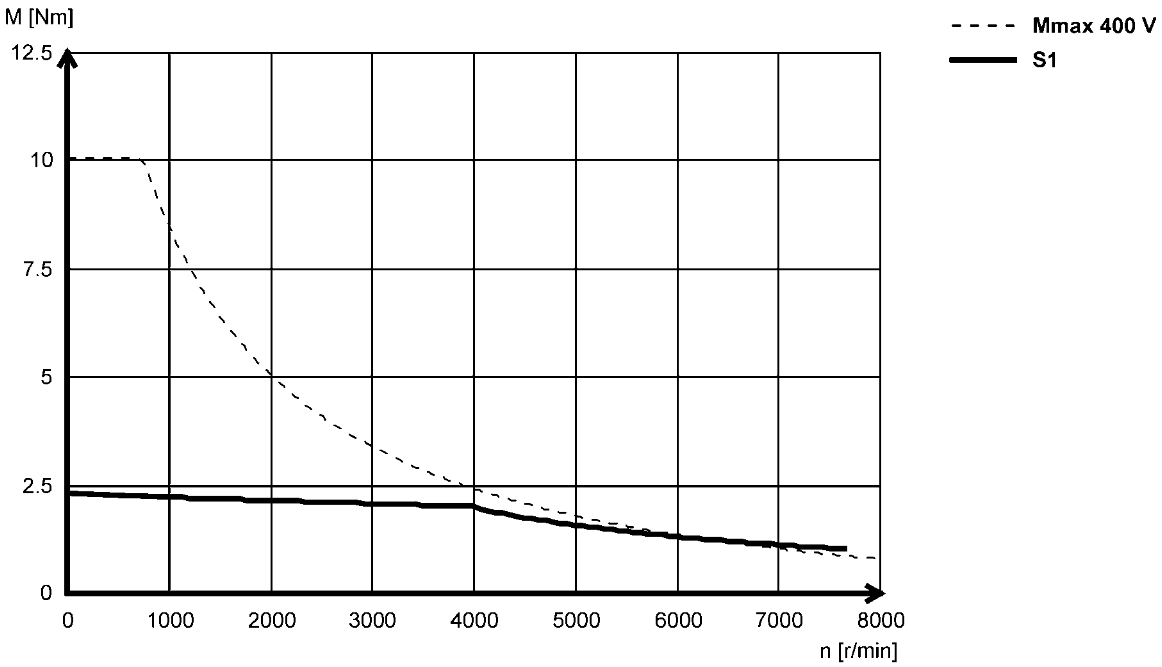
► I... [A], M... [Nm], n... [r/min], P... [kW]
► If the motors are operated at a lower switching frequency, please contact your Lenze sales office!

5.4

Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

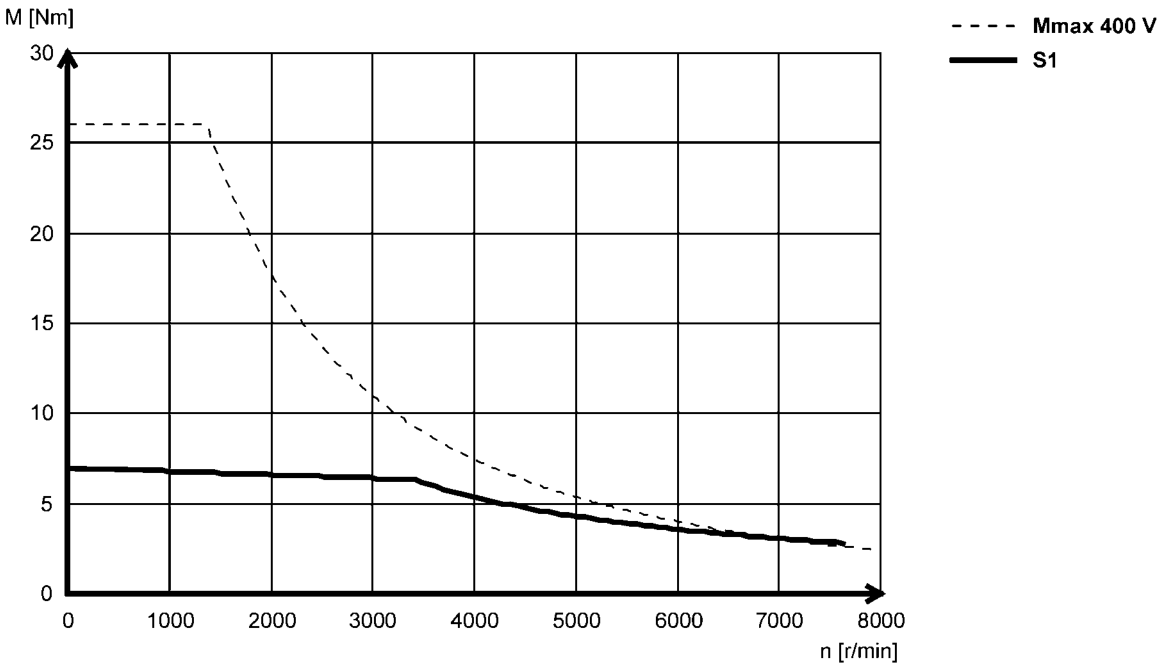
MCA10I40 (non-ventilated)



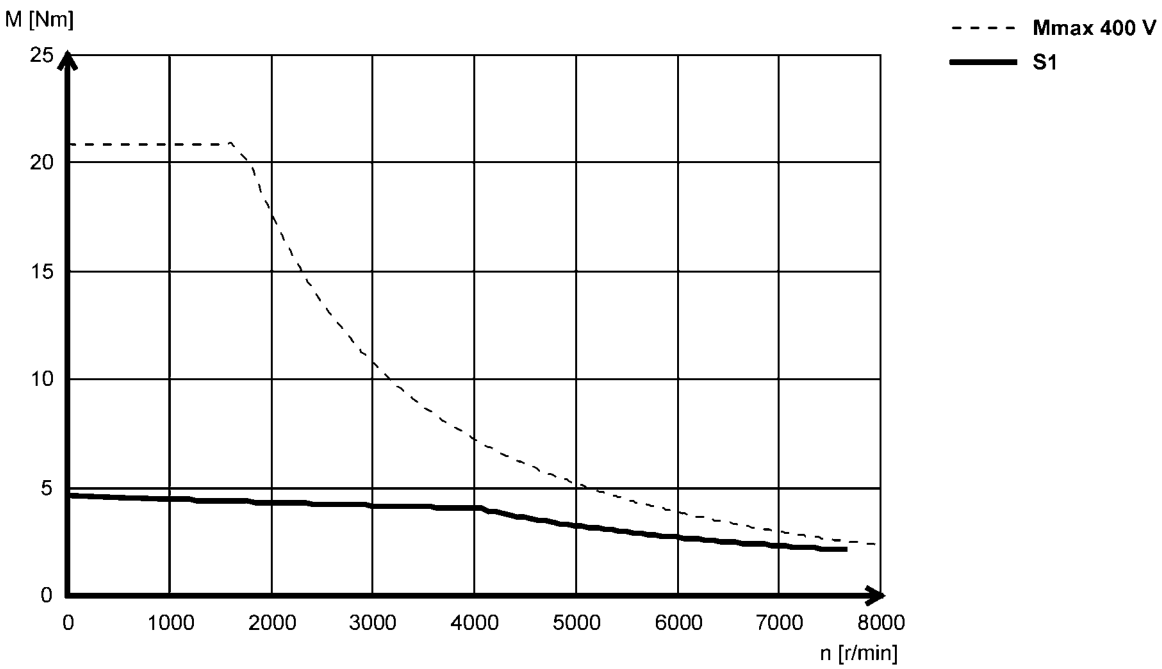
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA13I34 (forced ventilated)



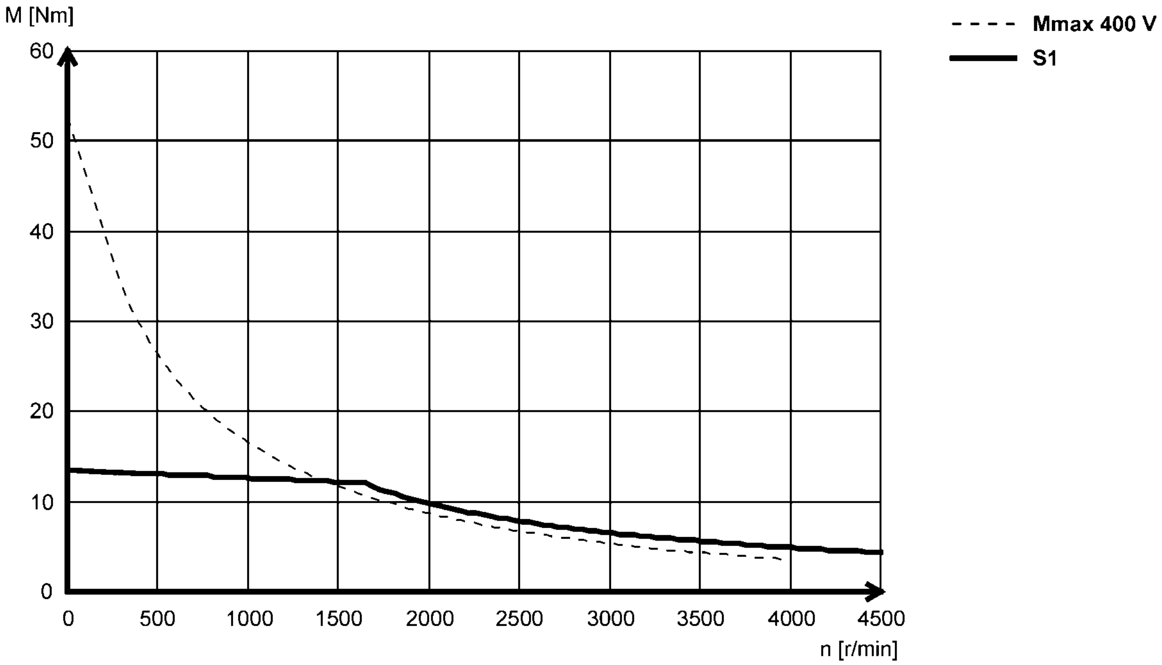
MCA13I41 (non-ventilated)



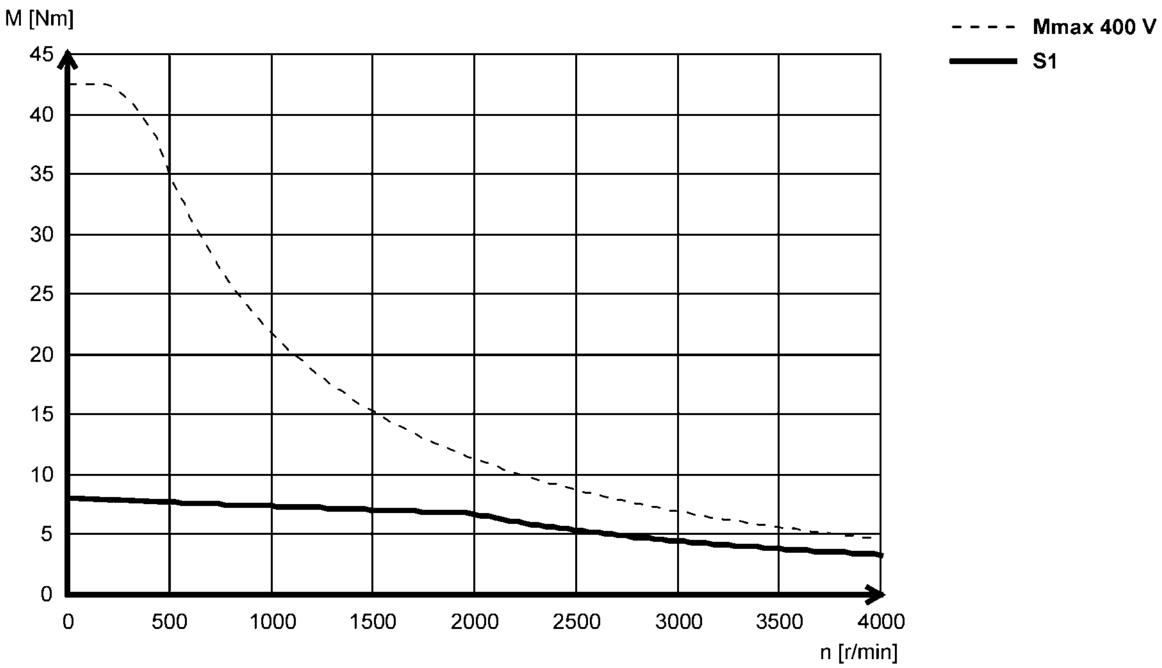
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA14L16 (forced ventilated)



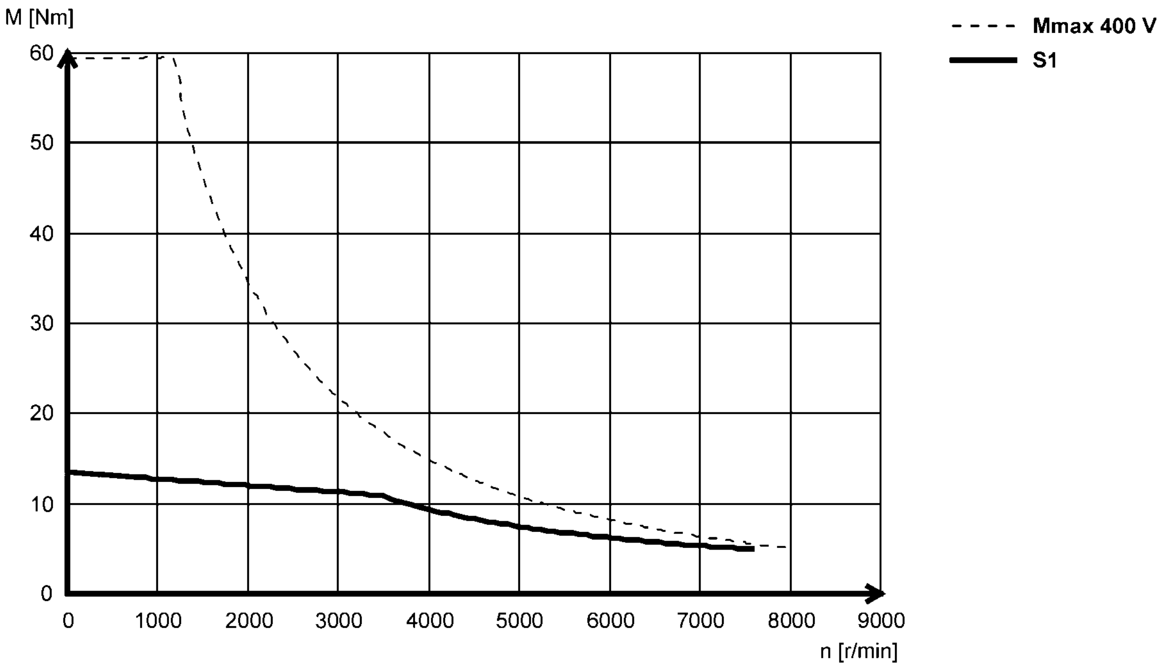
MCA14L20 (non-ventilated)



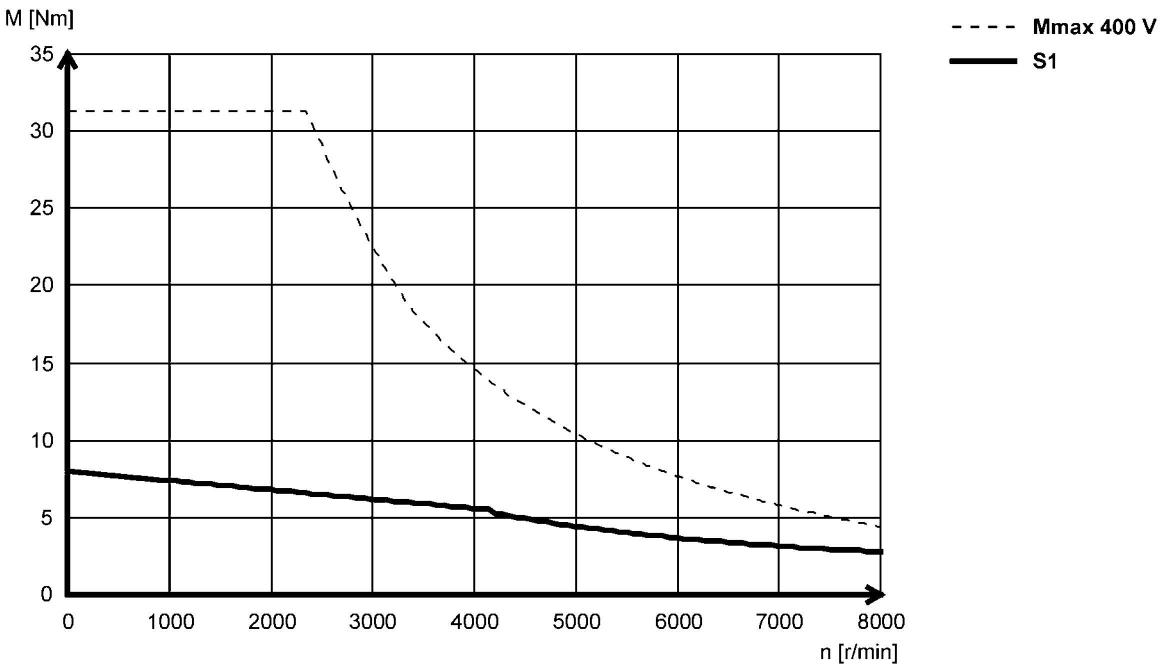
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCA14L35 (forced ventilated)



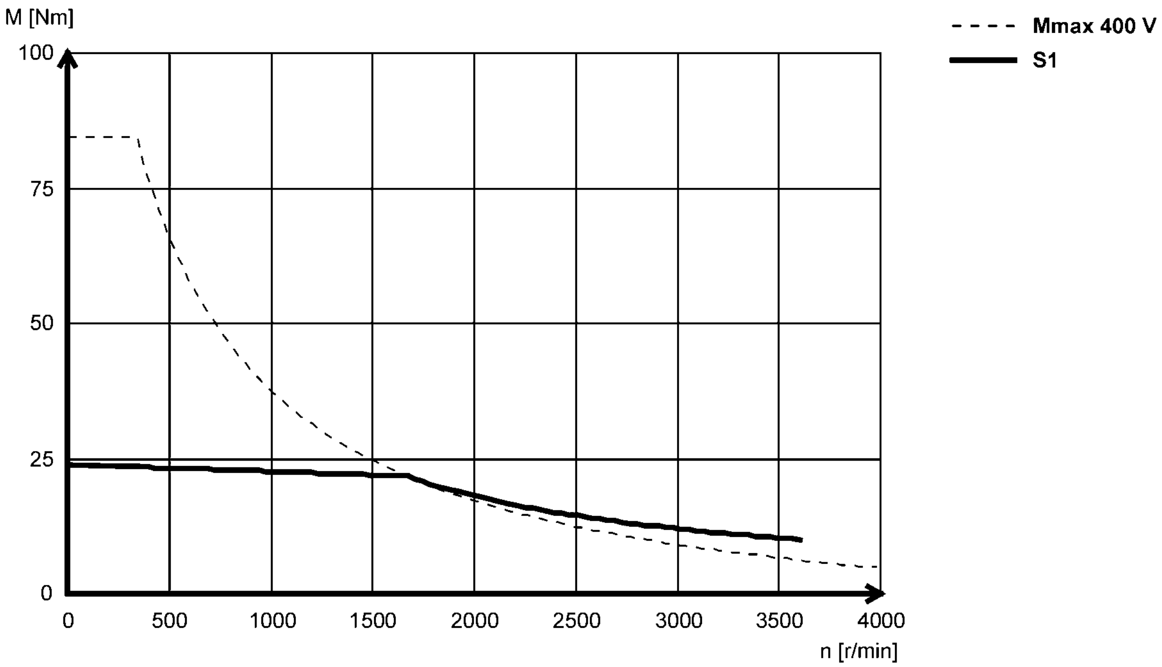
MCA14L41 (non-ventilated)



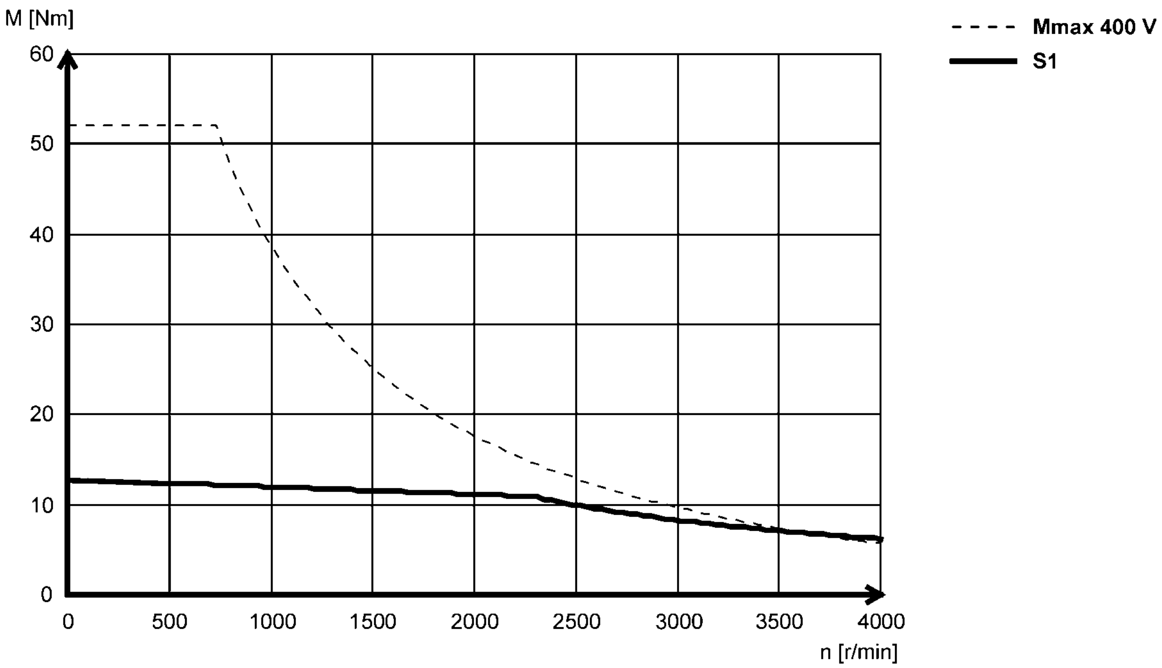
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCA17N17 (forced ventilated)



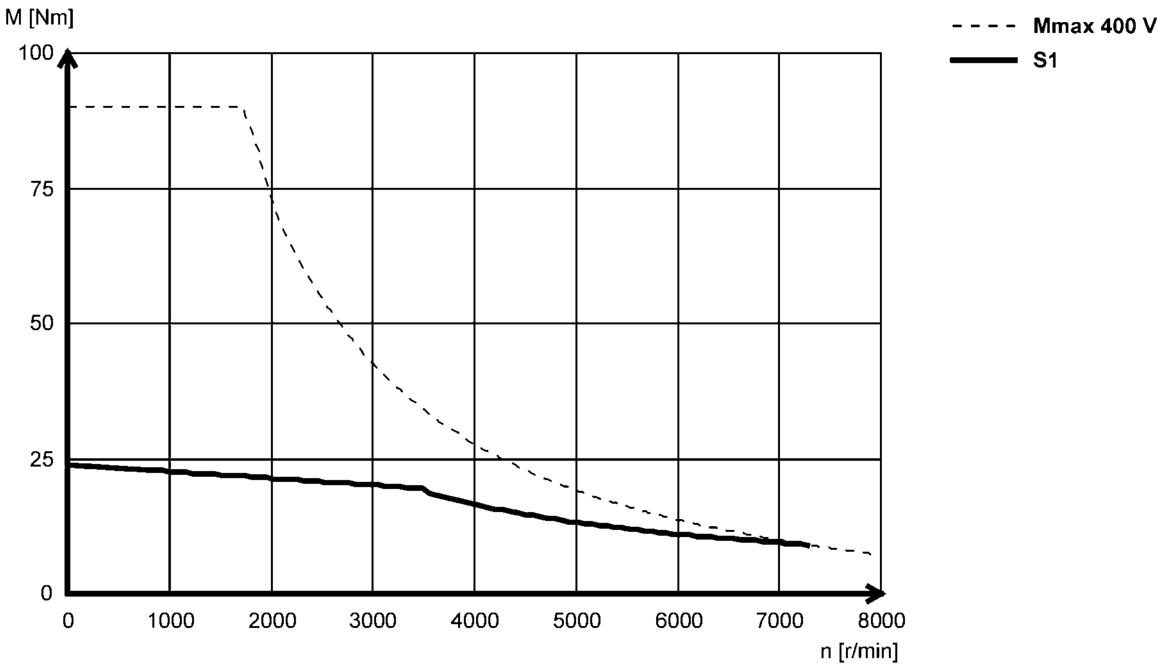
MCA17N23 (non-ventilated)



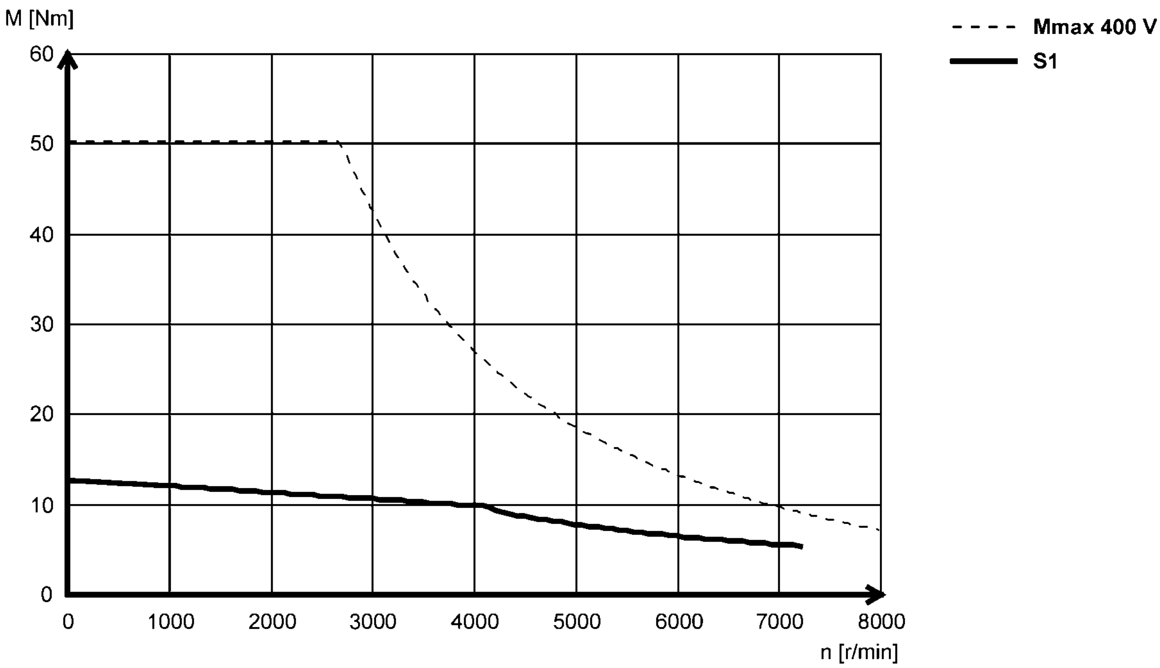
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA17N35 (forced ventilated)



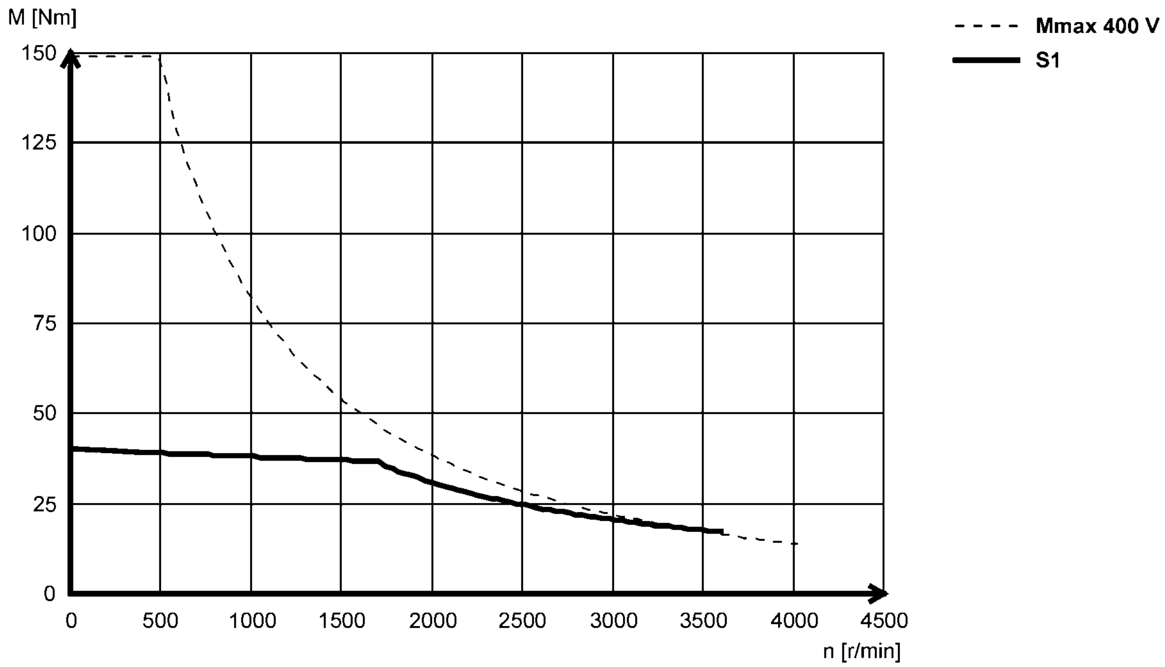
MCA17N41 (non-ventilated)



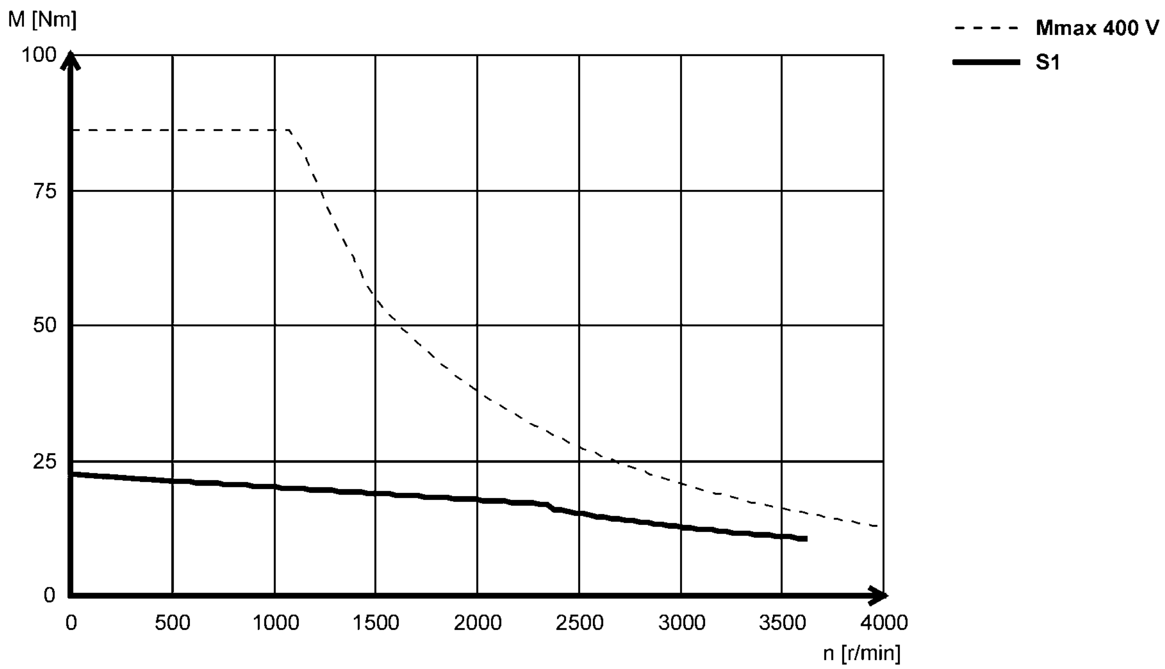
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA19S17 (forced ventilated)



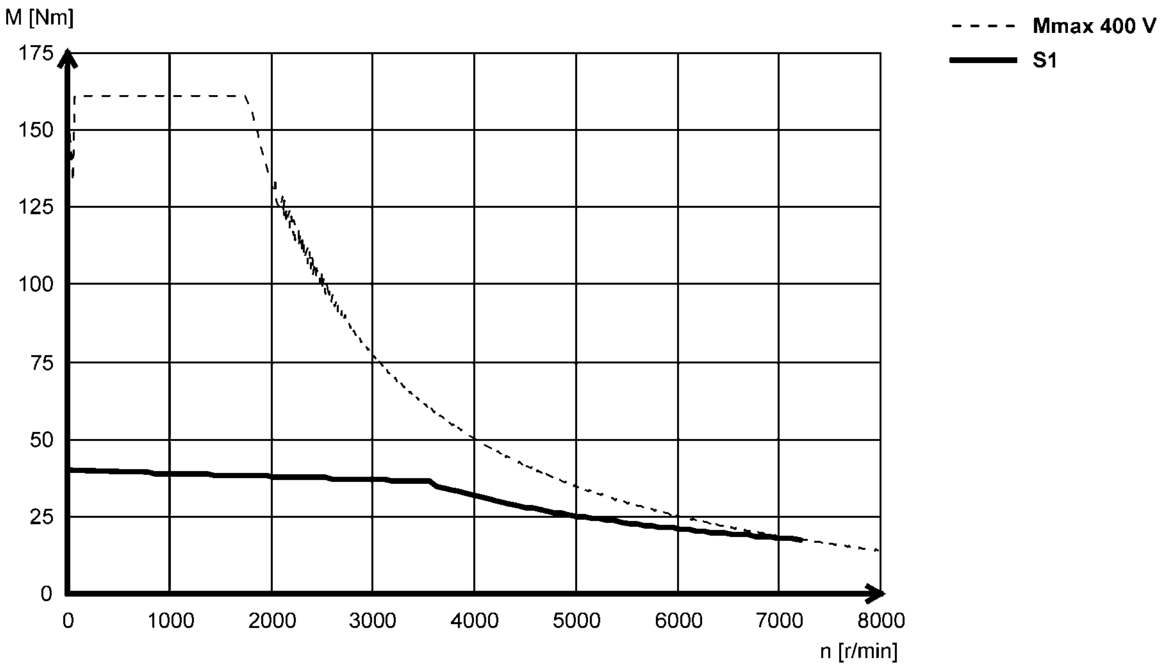
MCA19S23 (non-ventilated)



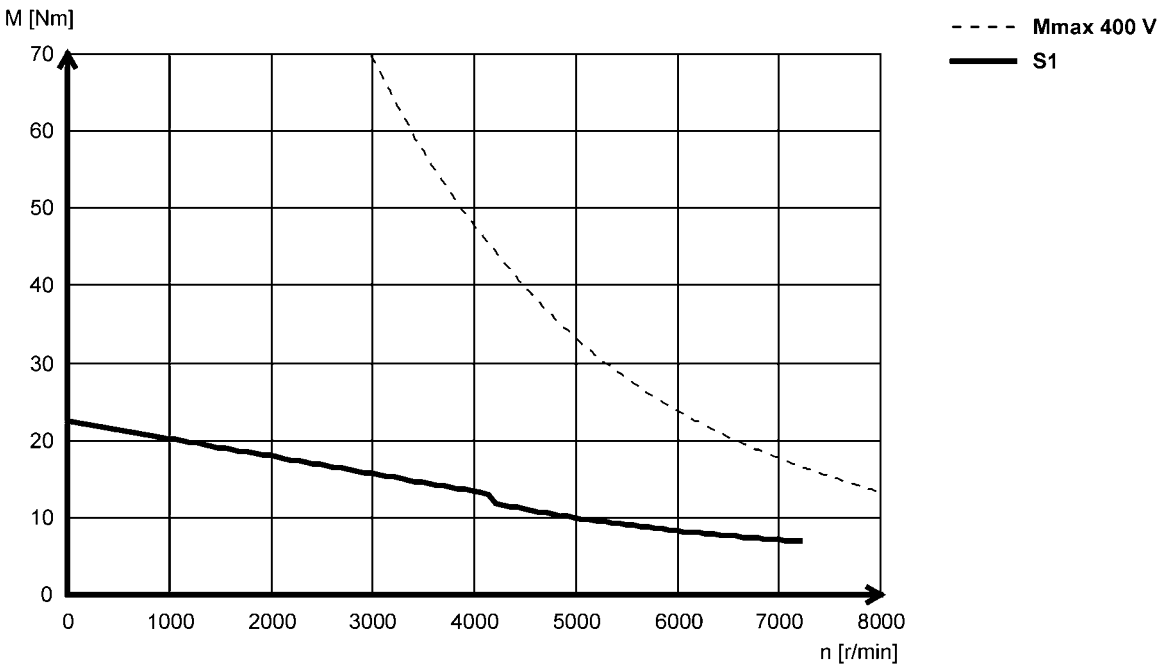
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA19S35 (forced ventilated)



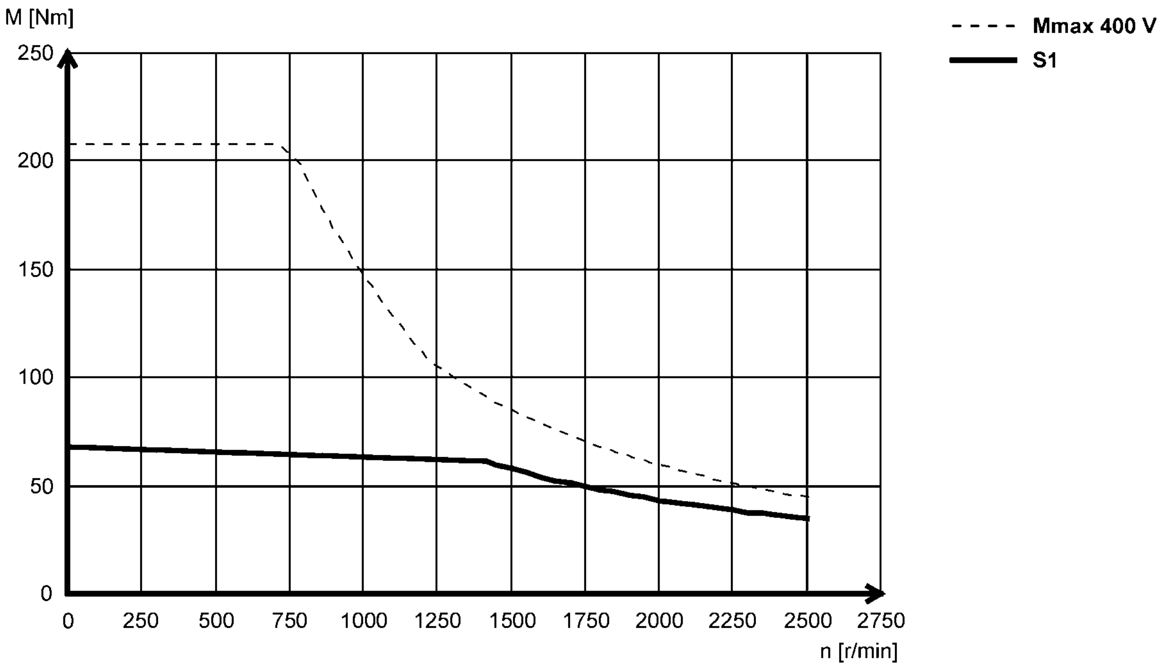
MCA19S42 (non-ventilated)



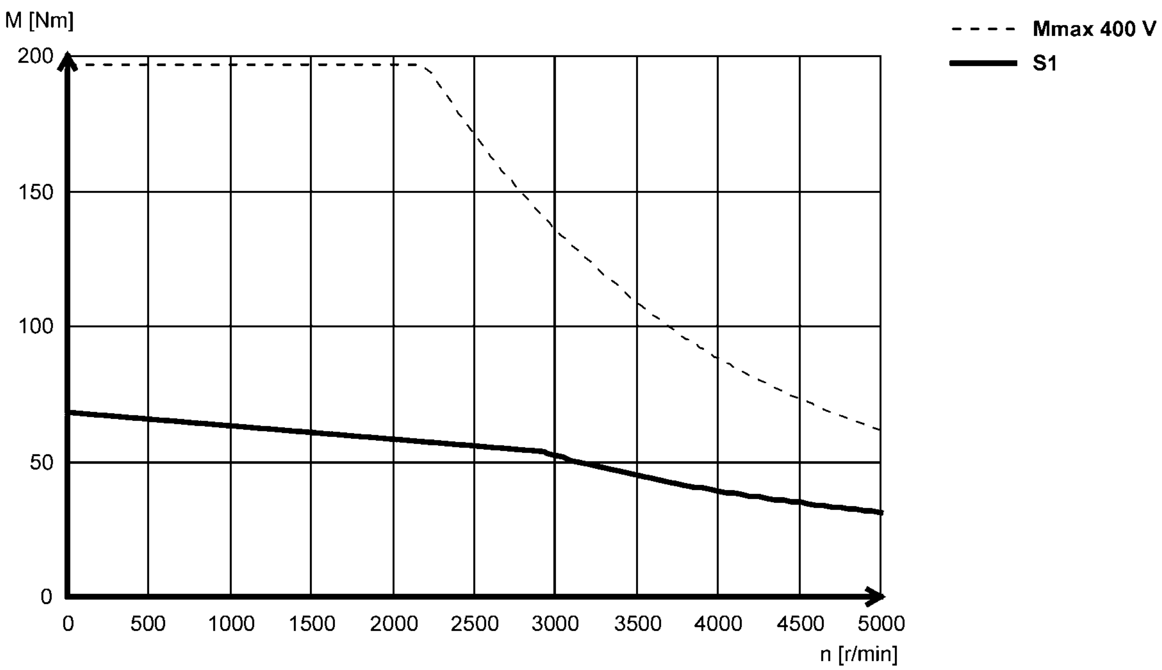
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA20X14...2F□□ (forced ventilated)



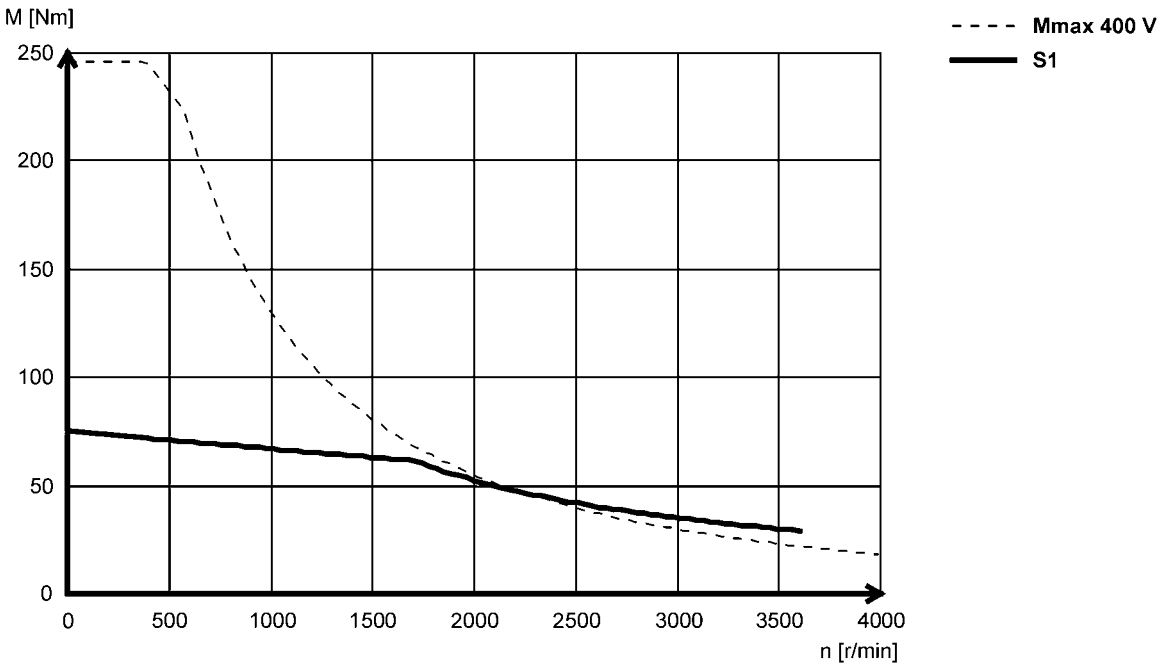
MCA20X29...2F□□ (forced ventilated)



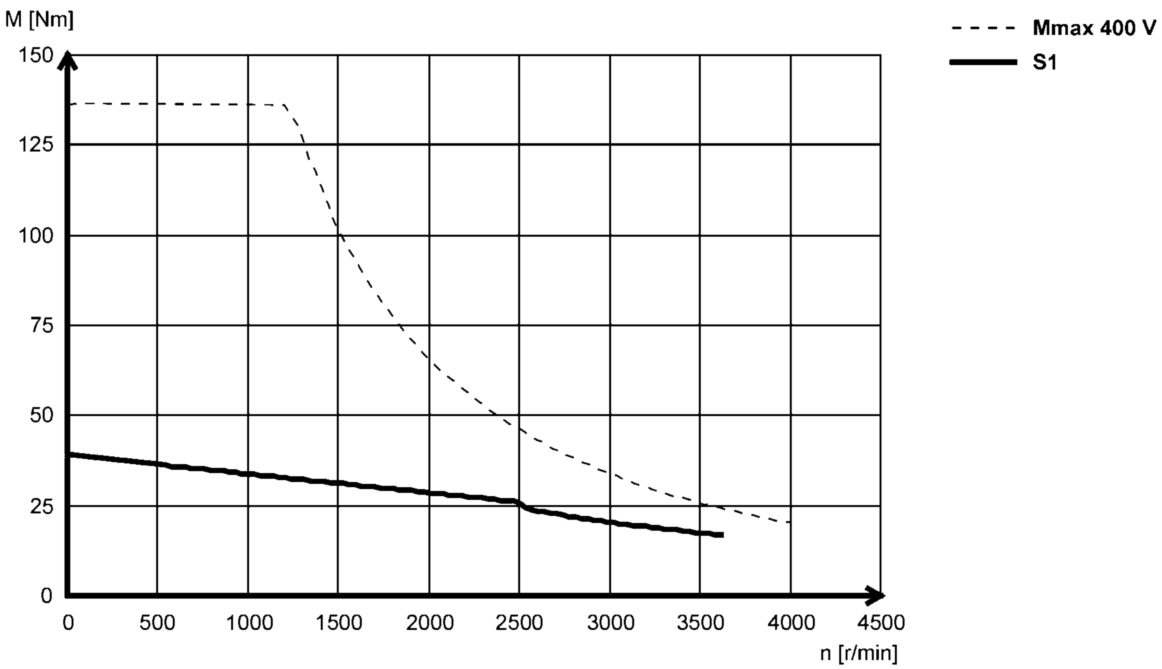
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA21X17 (forced ventilated)



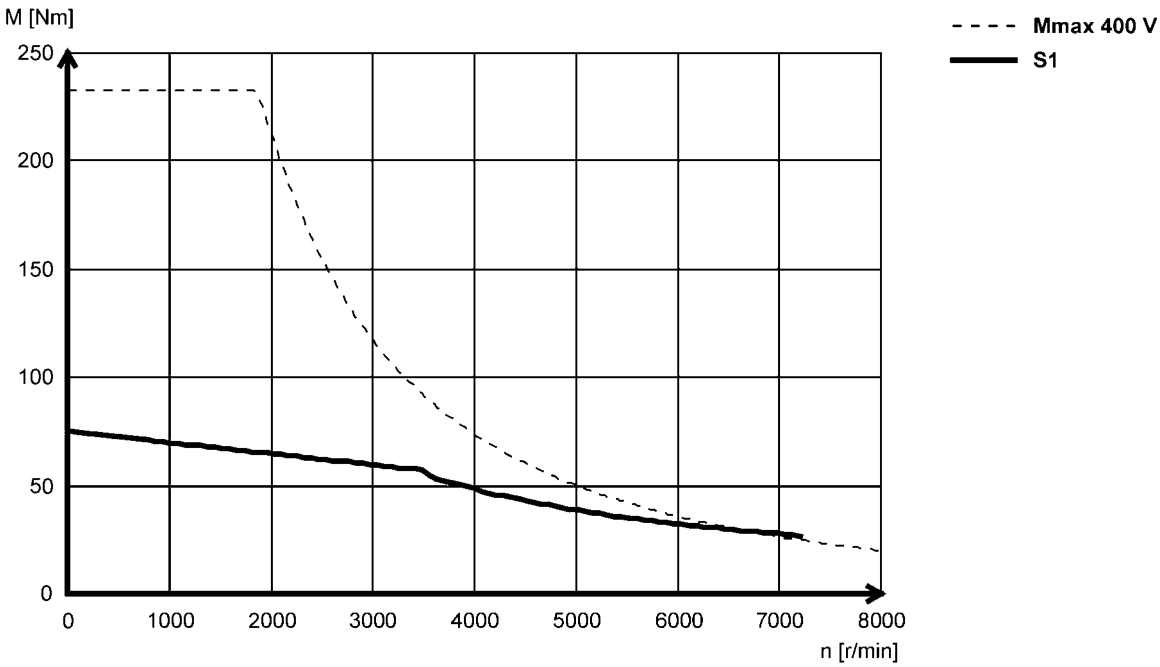
MCA21X25 (non-ventilated)



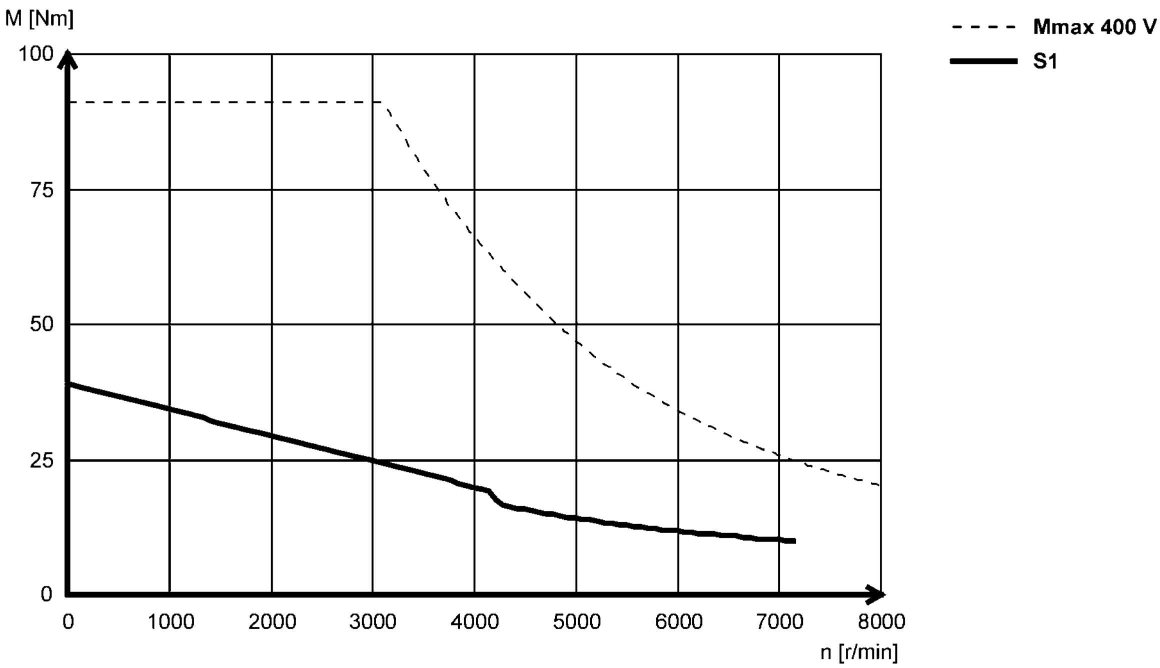
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA21X35 (forced ventilated)



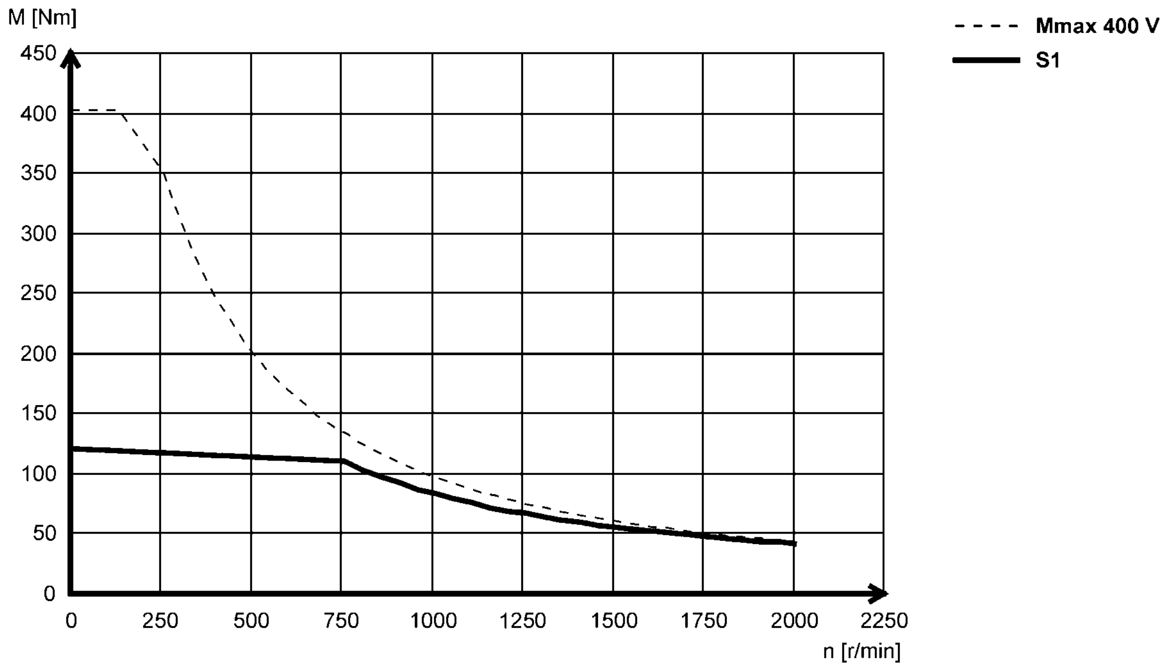
MCA21X42 (non-ventilated)



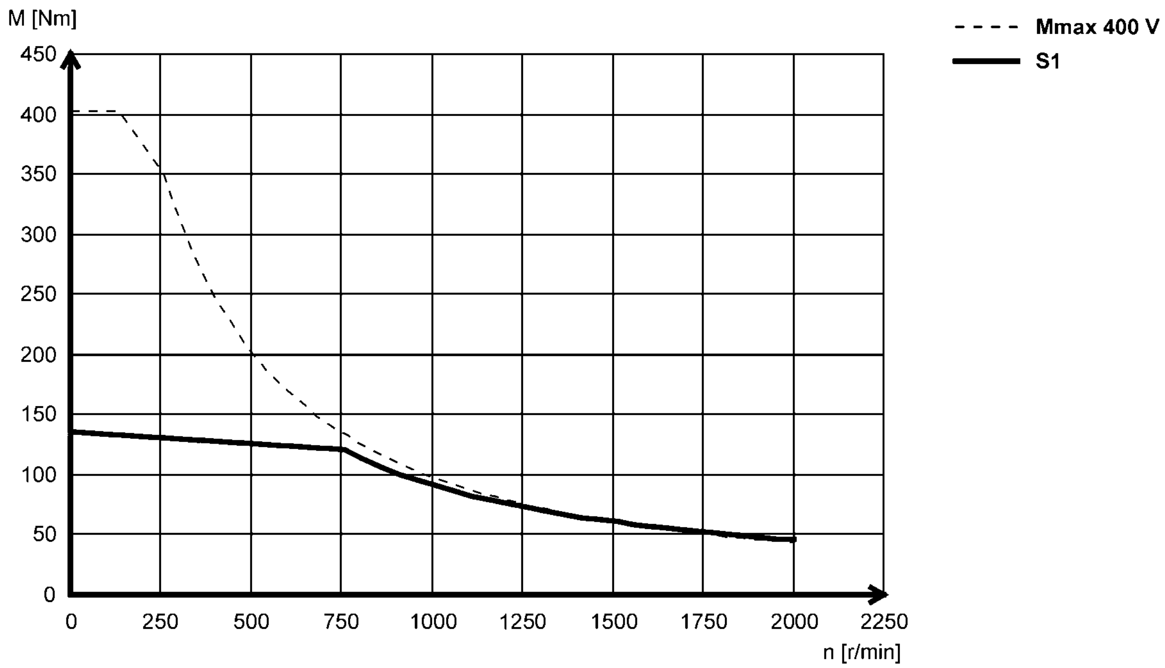
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA22P08...5F□□ (forced ventilated)



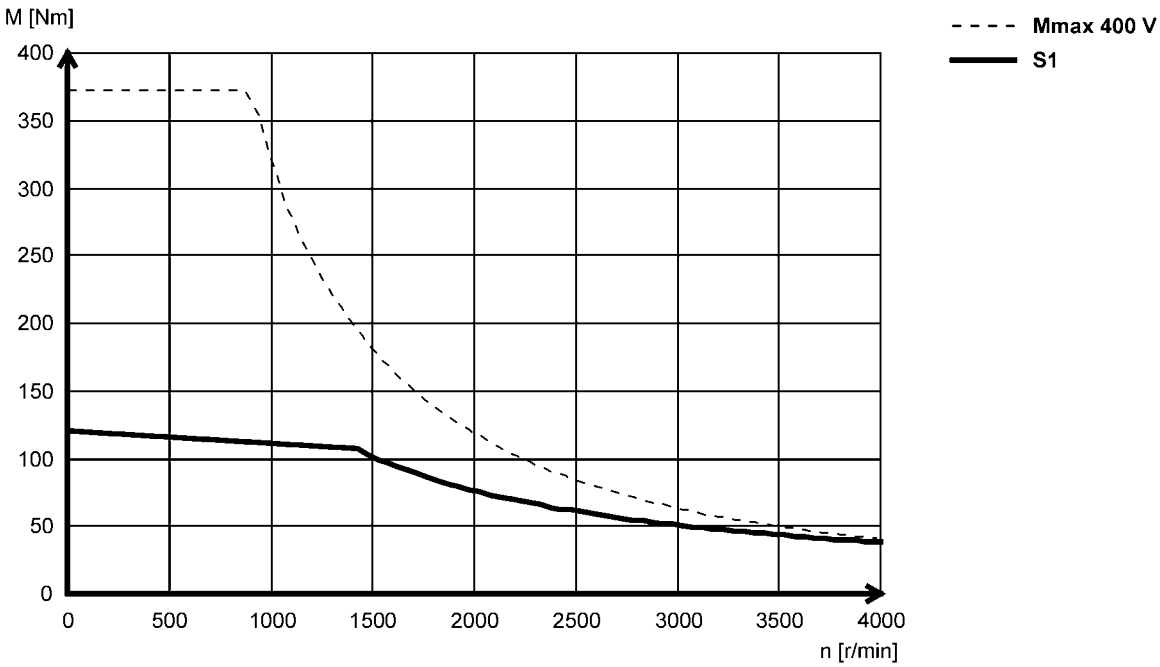
MCA22P08...2F□□ (forced ventilated)



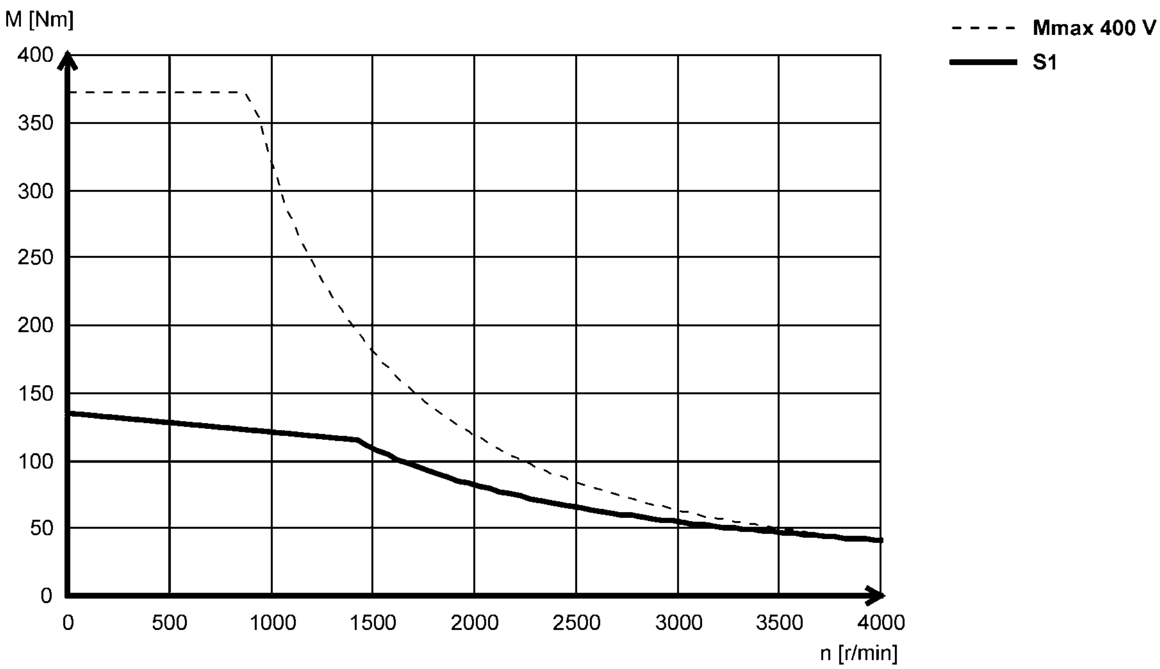
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA22P14...5F□□ (forced ventilated)



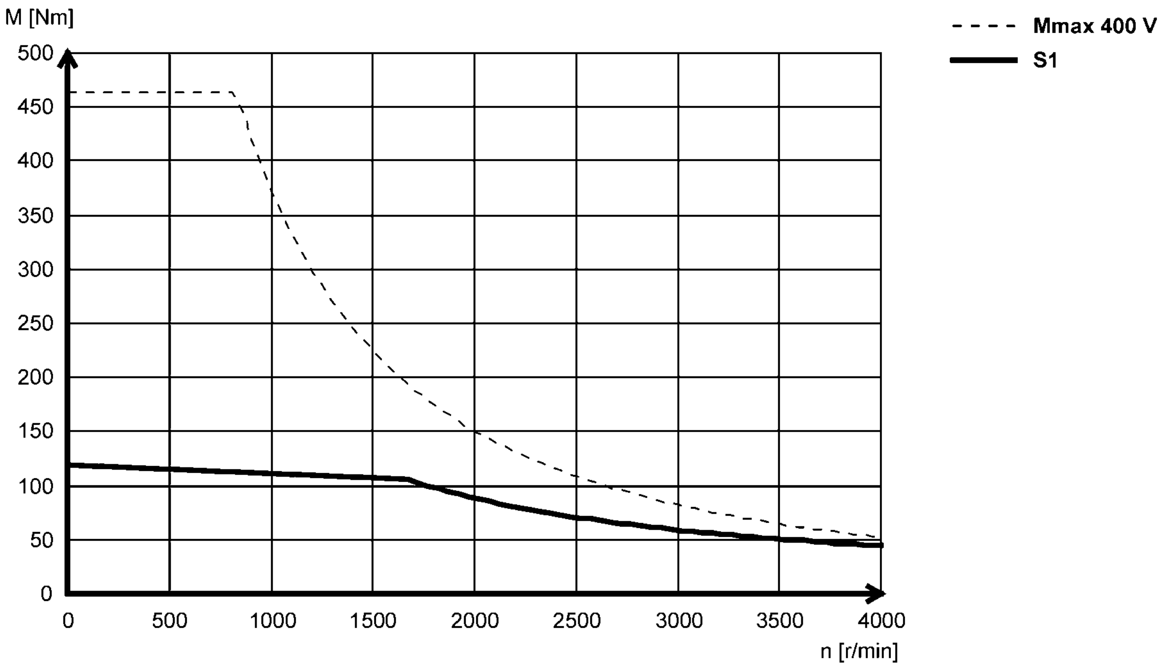
MCA22P14...2F□□ (forced ventilated)



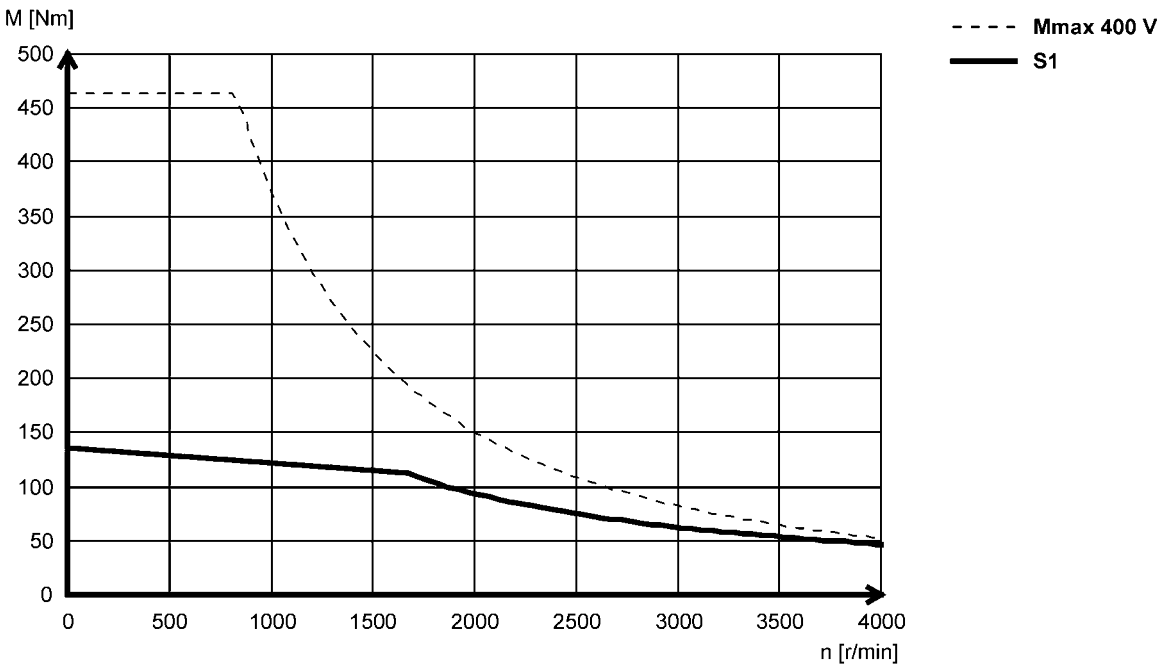
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCA22P17...5F□□ (forced ventilated)



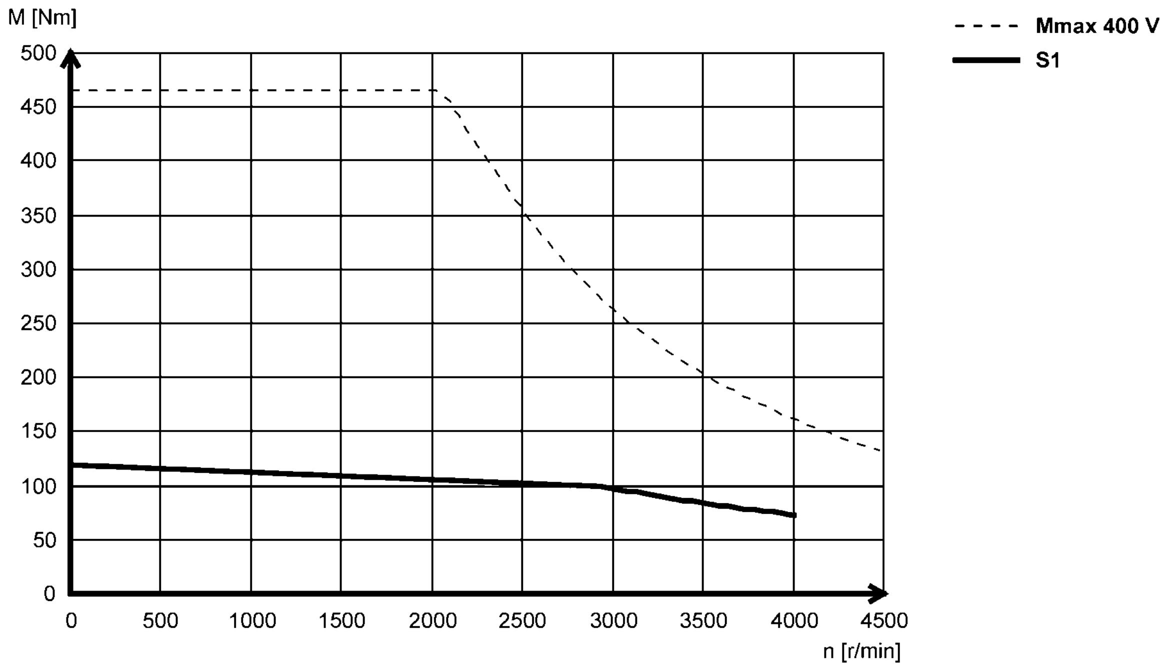
MCA22P17...2F□□ (forced ventilated)



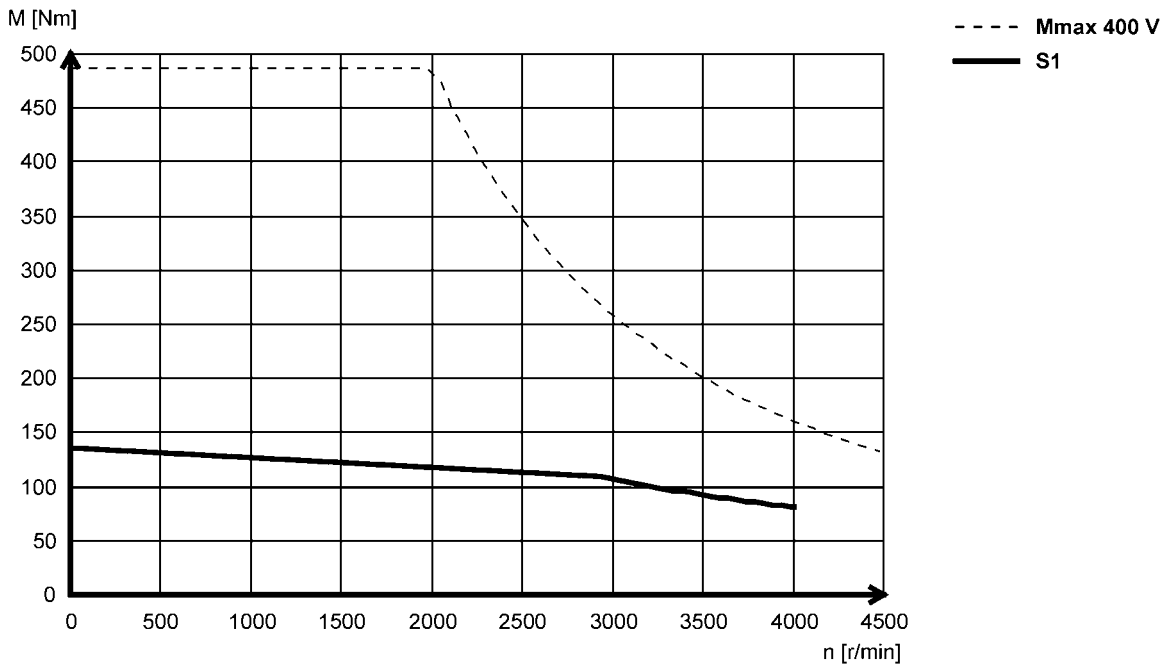
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA22P29...5F□□ (forced ventilated)



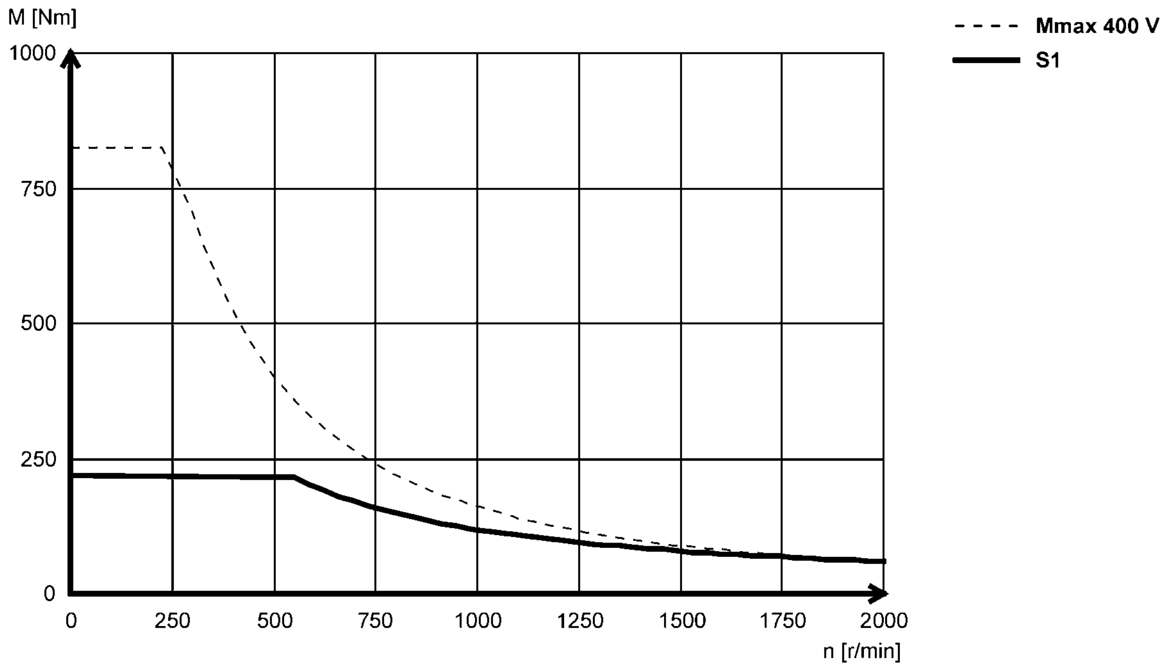
MCA22P29...2F□□ (forced ventilated)



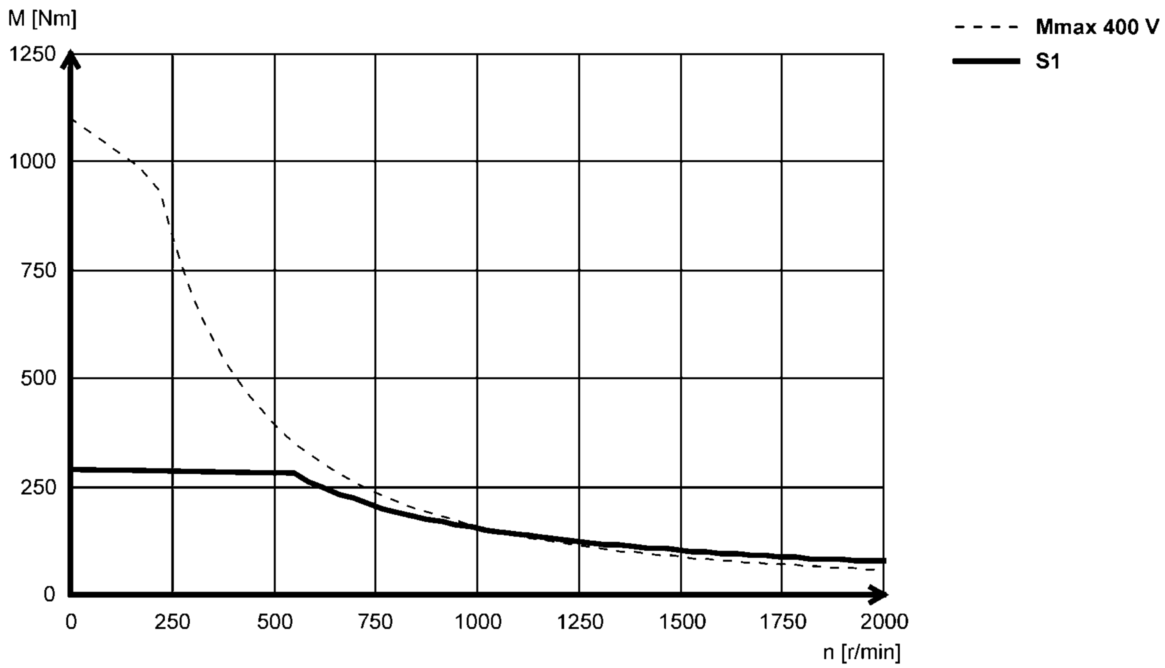
Torque characteristics

► The data applies to a mains connection voltage of 3 x 400 V.
► You can find further torque characteristics at **www.lenze.de/dsc**.

MCA26T05...5F□□ (forced ventilated)



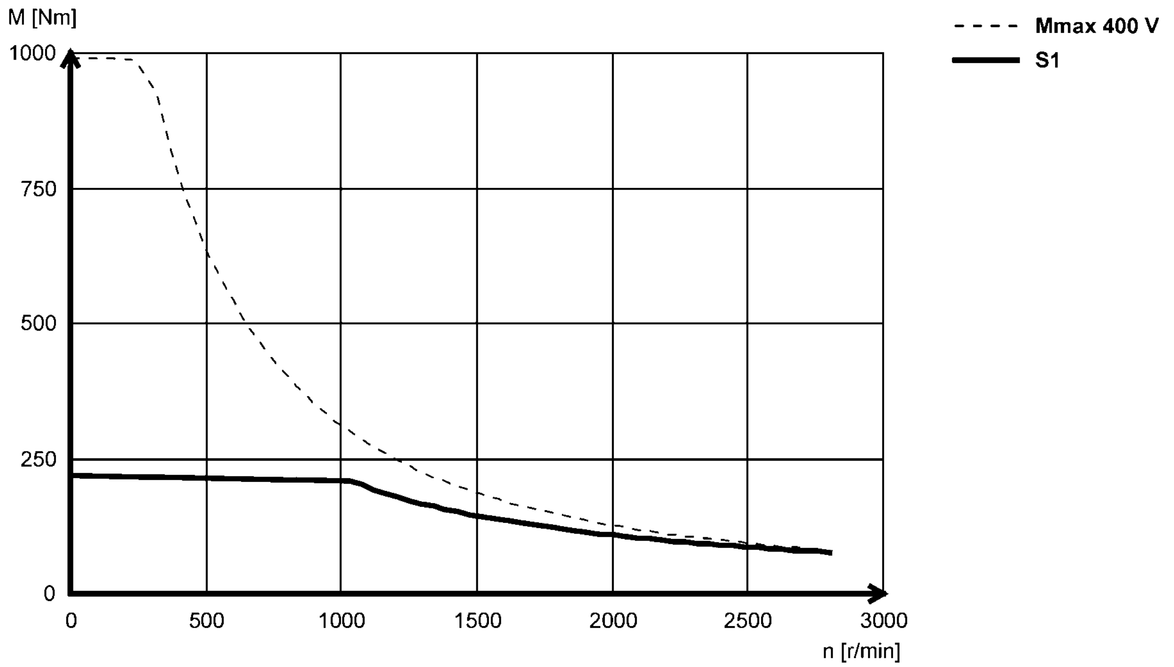
MCA26T05...2F□□ (forced ventilated)



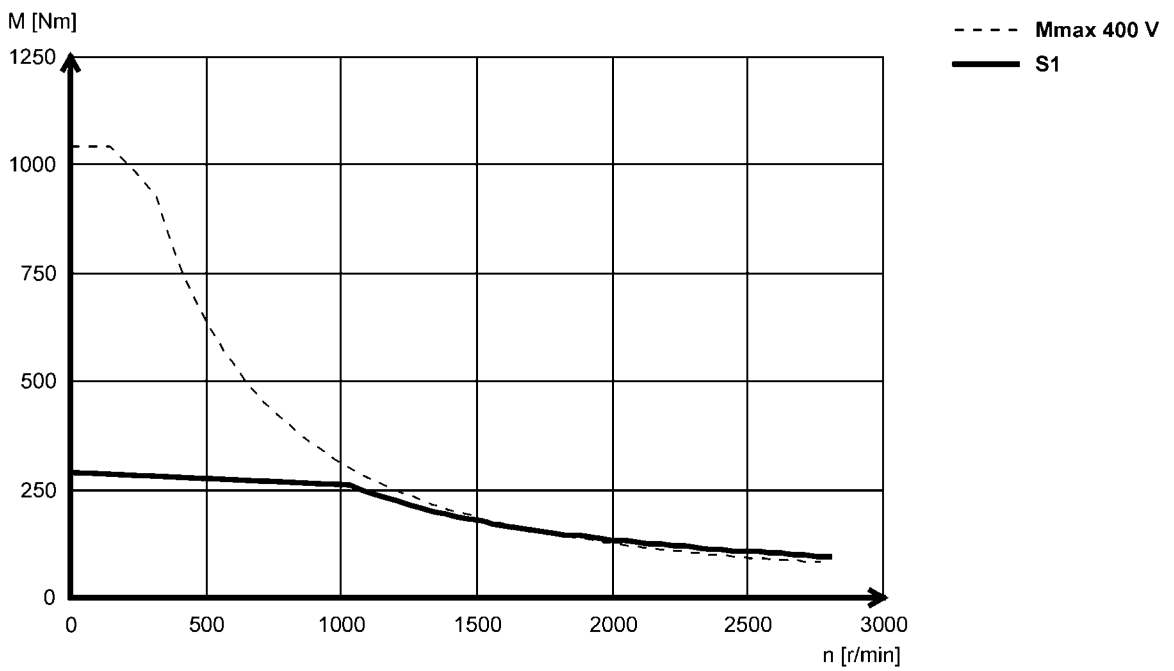
Torque characteristics

- The data applies to a mains connection voltage of 3 x 400 V.
- You can find further torque characteristics at **www.lenze.de/dsc**.

MCA26T10...5F□□ (forced ventilated)



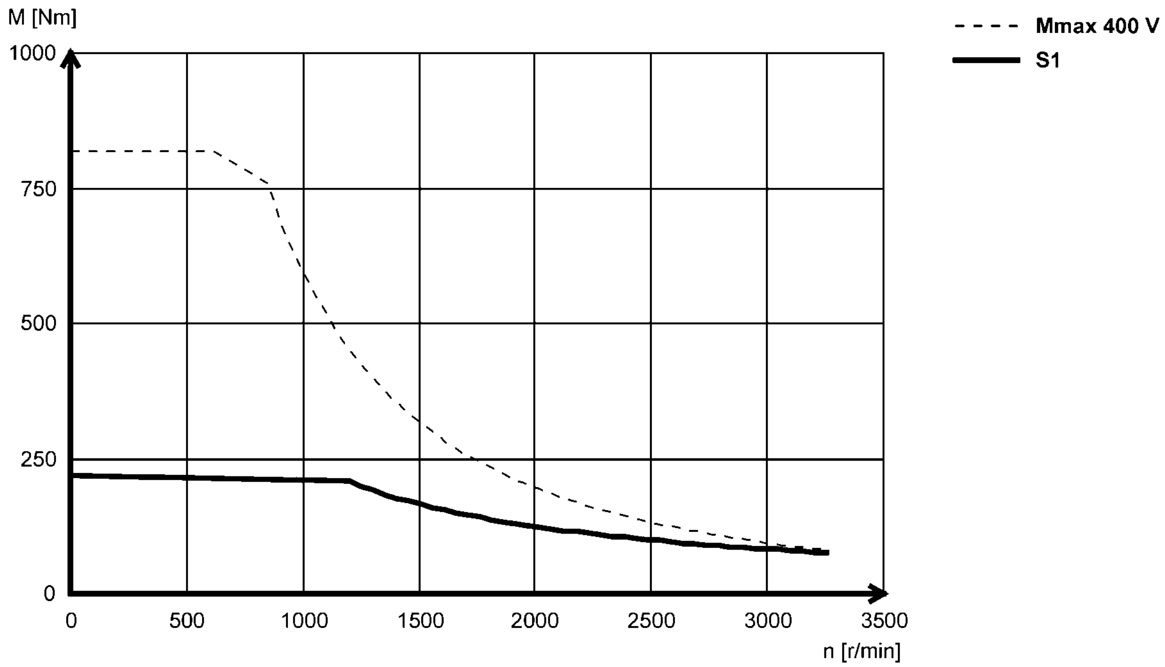
MCA26T10...2F□□ (forced ventilated)



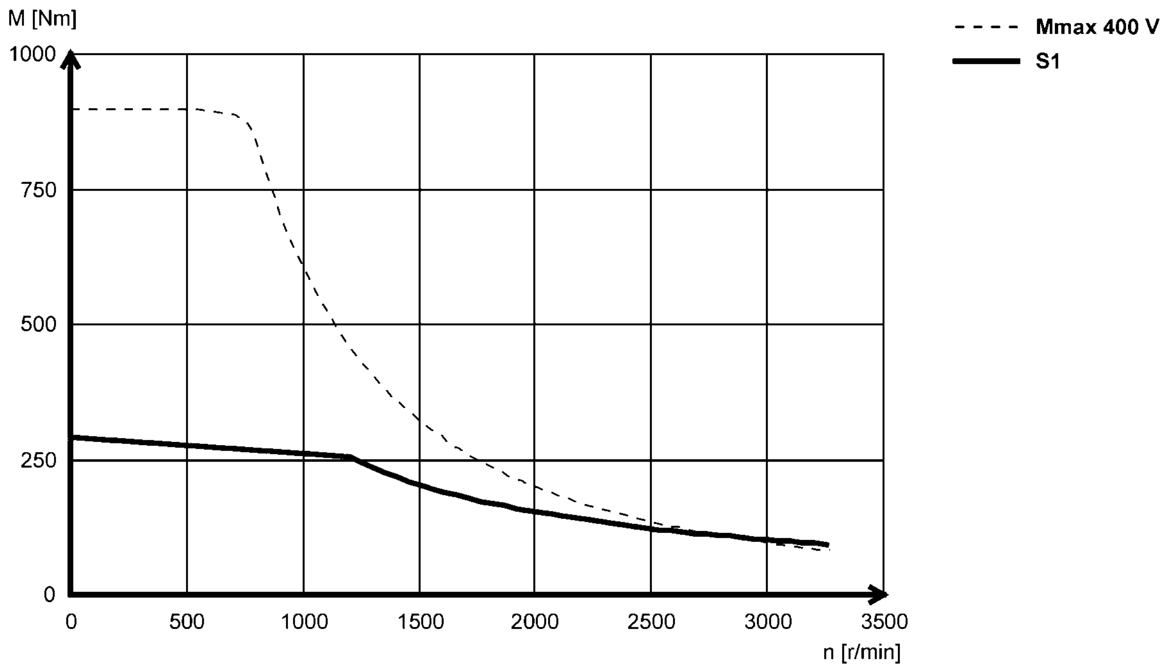
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

MCA26T12...5F□□ (forced ventilated)



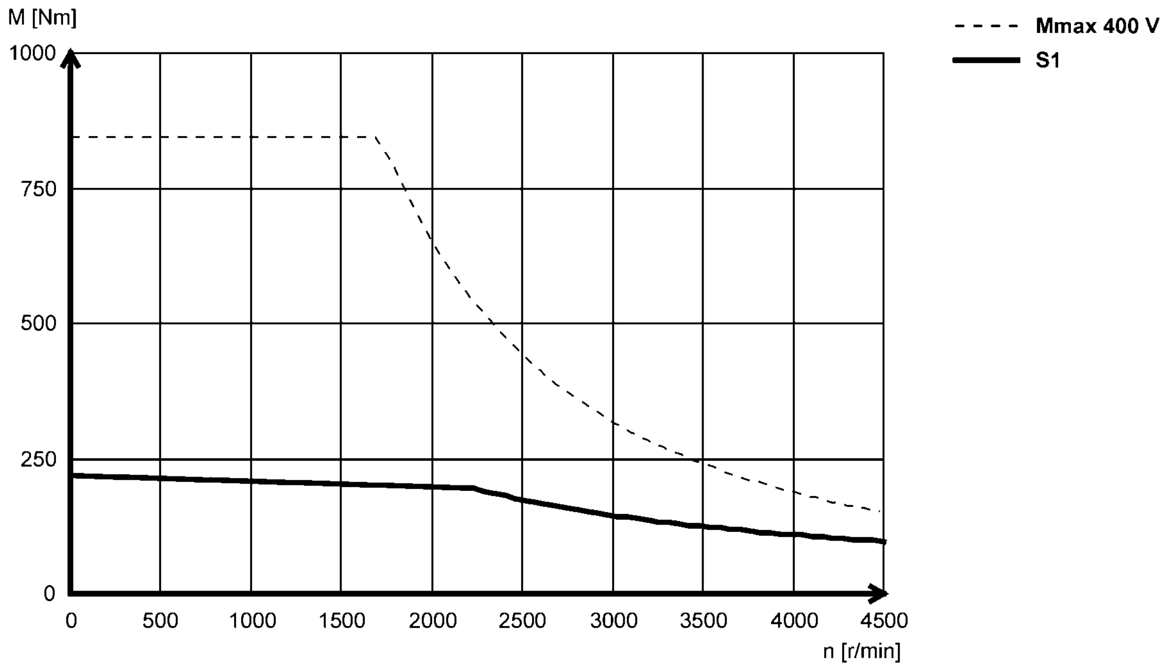
MCA26T12...2F□□ (forced ventilated)



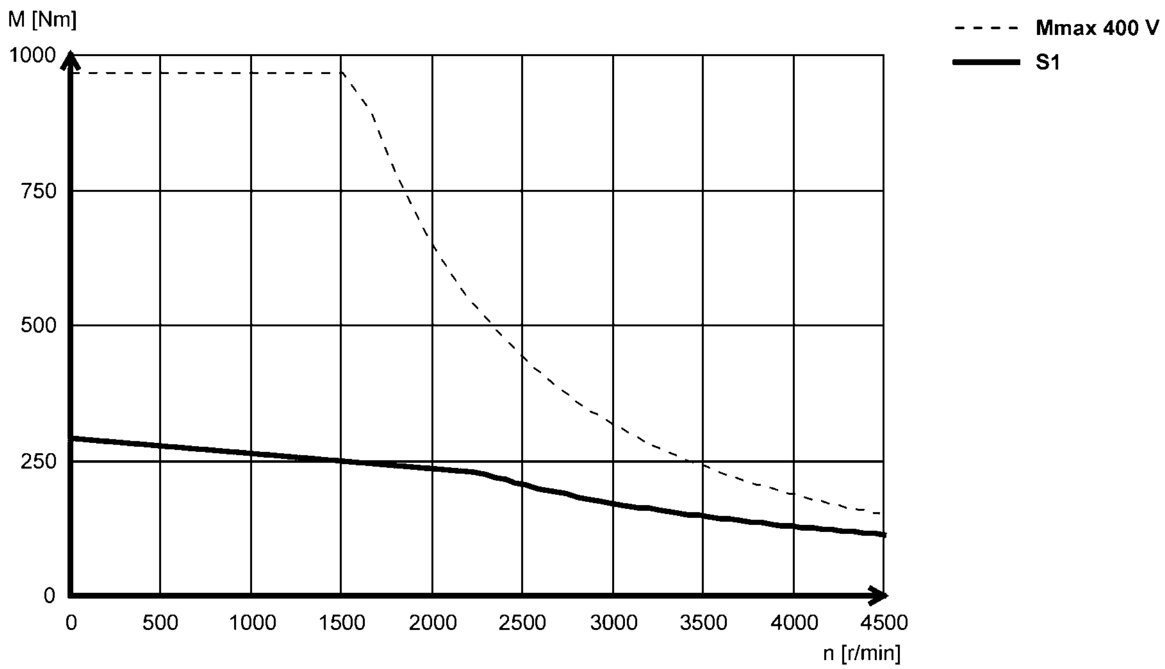
Torque characteristics

- ► The data applies to a mains connection voltage of 3 x 400 V.
- ► You can find further torque characteristics at **www.lenze.de/dsc**.

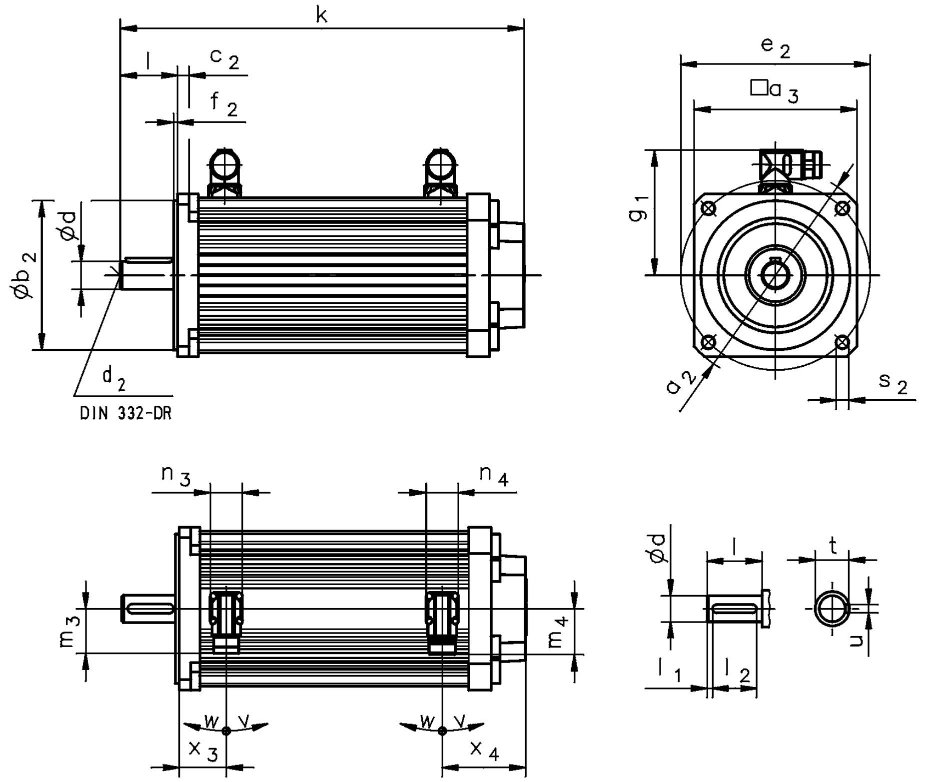
MCA26T22...5F□□ (forced ventilated)



MCA26T22...2F□□ (forced ventilated)



Dimensions, self-ventilated



			MCA10I40	MCA13I41	MCA14L20	MCA17N23	MCA19S23	MCA21X25
					MCA14L41	MCA17N41	MCA19S42	MCA21X42
R□0 B0	k	[mm]	292	311	352	390	461	550
	x_3	[mm]	37	45	41	43	56	62
	x_4	[mm]	61	65	73			78
R□0 P□	k	[mm]	317	346	385	425	499	592
	x_3	[mm]	59	72	68	75	91	102
	x_4	[mm]	61	65	73			78
S□□ / E□□ / T20 / B0	k	[mm]	346	365	407	444	511	599
	x_3	[mm]	37	45	41	43	56	62
	x_4	[mm]	115	119	128	127	123	127
S□□ / E□□ / T20 / P□	k	[mm]	371	400	440	479	549	641
	x_3	[mm]	59	72	68	75	91	102
	x_4	[mm]	115	119	128	127	123	127

- ► Speed/angle sensor: RS0 / S□□ / E□□ / T20
- ► Brake: B0 / P□

Dimensions, self-ventilated

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<tr><td>MCA14L41</td></tr>
<tr><td>MCA17N23</td><td rowspan="2">118</td></tr>
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<tr><td>MCA13</td><td>19</td><td>M6</td><td>40</td><td>2.0</td><td>36</td><td>6.0</td><td>21.5</td></tr>
<tr><td>MCA14</td><td rowspan="2">24</td><td rowspan="2">M8</td><td rowspan="2">50</td><td rowspan="4">5.0</td><td rowspan="2">40</td><td rowspan="3">8.0</td><td rowspan="2">27.0</td></tr>
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<tr><td>110</td><td>130</td><td>3.5</td><td>M8</td></tr>
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<tr><td>300</td><td>250</td><td>230</td><td>12</td><td>265</td></tr>
<tr><td>250</td><td>214</td><td>110</td><td>11</td><td>130</td><td>3.5</td><td>M8</td></tr>
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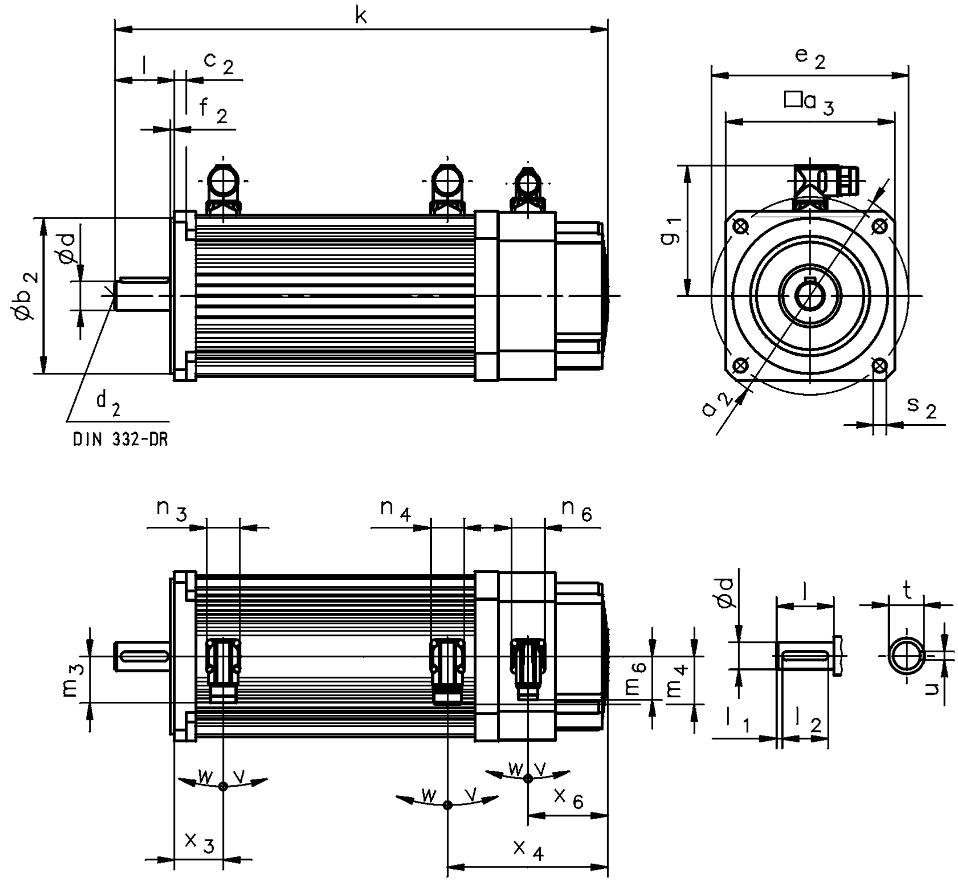
5.4

Dimensions, forced ventilated

Motors MCA13 to 19/21



5.4

			MCA13I34	MCA14L16	MCA17N17	MCA19S17	MCA21X17
				MCA14L35	MCA17N35	MCA19S35	MCA21X35
R□0 B0	k	[mm]	379	414	476	558	646
	x_3	[mm]	45	41	43	56	62
	x_4	[mm]	133	135	159	170	174
R□0 P□	k	[mm]	414	447	511	596	688
	x_3	[mm]	72	68	75	91	102
	x_4	[mm]	133	135	159	170	174
S□□ / E□□ / T20 / B0	k	[mm]	433	469	530	608	695
	x_3	[mm]	45	41	43	56	62
	x_4	[mm]	187	190	213	220	223
S□□ / E□□ / T20 / P□	k	[mm]	468	502	565	646	737
	x_3	[mm]	72	68	75	91	102
	x_4	[mm]	187	190	213	220	223
	x_6	[mm]	73	67	94	103	96

- ► Speed/angle sensor: RS0 / S□□ / E□□ / T20
- ► Brake: B0 / P□

Dimensions, forced ventilated

Motors MCA13 to 19/21

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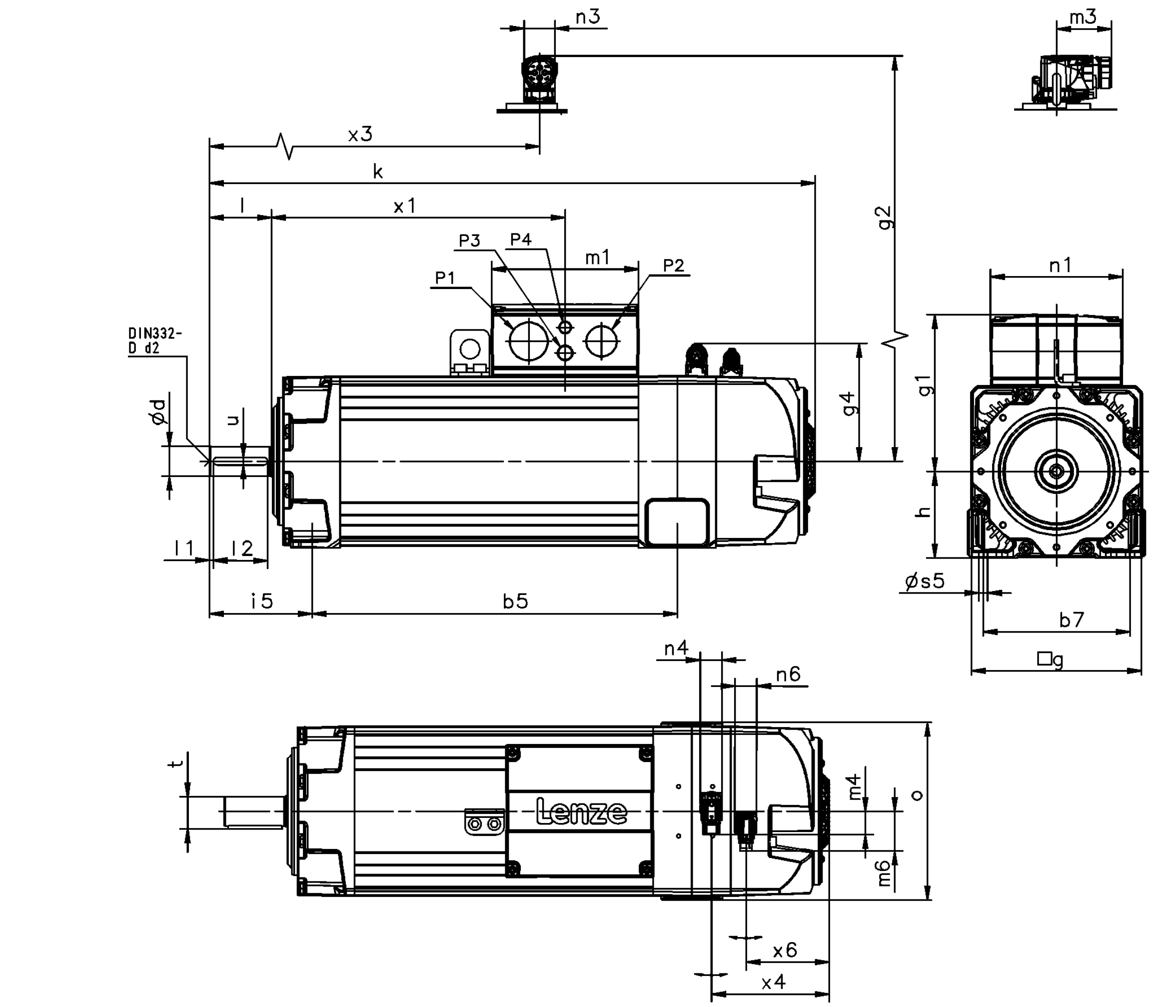
5.4

Dimensions, forced ventilated

MCA20/22/26 motors in B3 design



			MCA20	MCA22	MCA26
R□0 / E□□ / T□□ / S□□ / B0...F10	k	[mm]	666	783	970
R□0 / E□□ / T□□ / S□□ / B0...F1F	k	[mm]	754	865	1022
R□0 / E□□ / T□□ / S□□ / B0	x_4	[mm]	146	153	194
	m_4	[mm]	25.0	31.0	25.0
R□0 F1...F10	k	[mm]	753	878	1125
R□0 F1...F1F	k	[mm]	842	959	1177
R□0 F1	x_4	[mm]	151	157	201
	m_4	[mm]	31.0		
E□□ / T□□ / S□□ / F1...F10	k	[mm]	797	916	1163
E□□ / T□□ / S□□ / F1...F1F	k	[mm]	885	998	1215
E□□ / T□□ / S□□ / F1	x_4	[mm]	146	162	200
	m_4	[mm]	31.0		
R□0 / E□□ / T□□ / S□□ / F2...F10	k	[mm]	822	948	1163
R□0 / E□□ / T□□ / S□□ / F2...F1F	k	[mm]	910	1030	1215
R□0 / E□□ / T□□ / S□□ / F2	x_4	[mm]	146	162	200
	m_4	[mm]	31.0		

Dimensions, forced ventilated

MCA20/22/26 motors in B3 design

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<tr><td>MCA26</td><td>260</td><td>256</td><td>173</td><td>234</td><td>212</td></tr>
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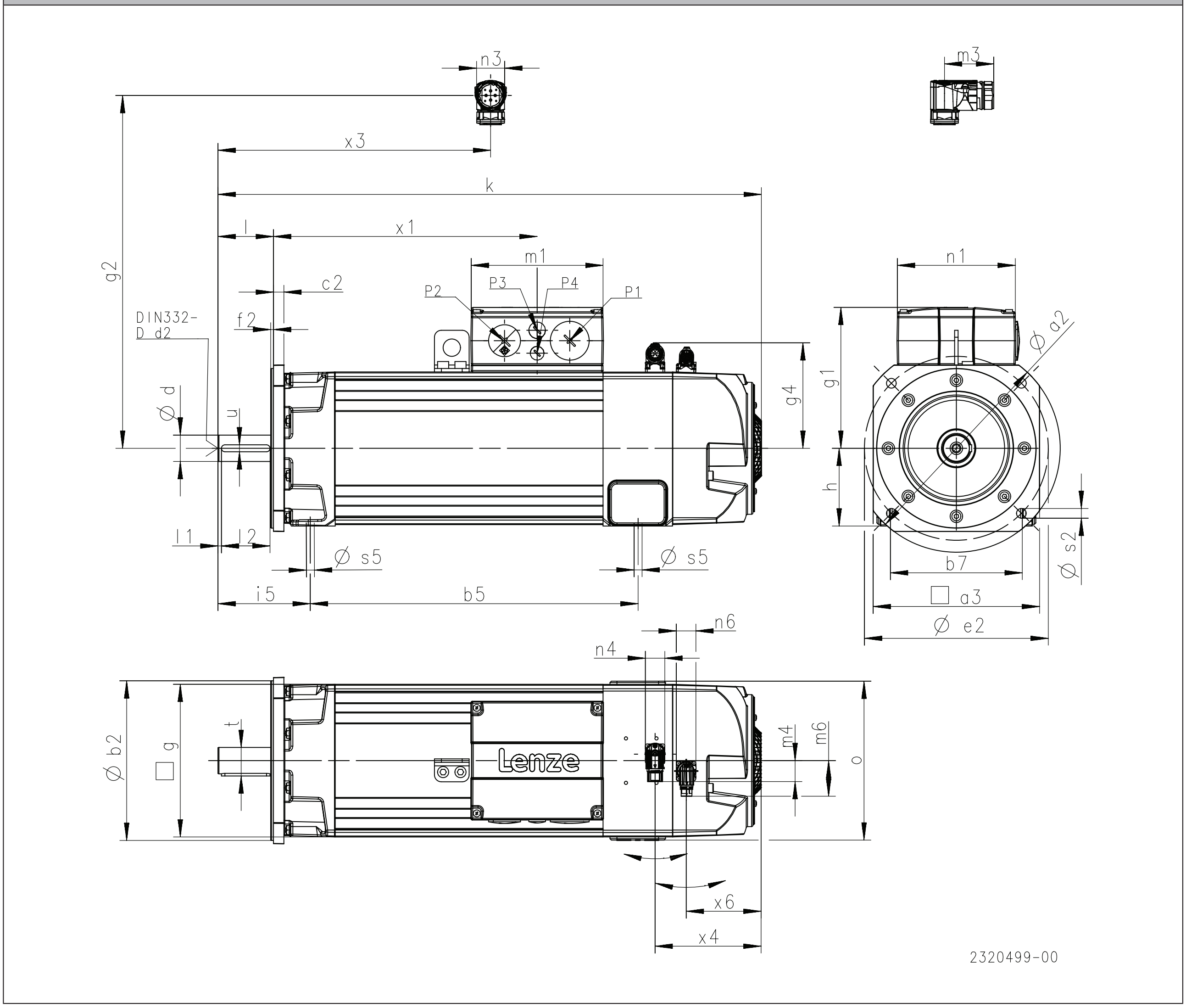
- Speed/angle sensor: RS0 / S□□ / E□□ / T□□
- Brake: B0 / F1 / F2
- Blower: F10 / F1F

Dimensions, forced ventilated

MCA20/22/26 motors in B35 design



			MCA20	MCA22	MCA26
R□0 / E□□ / T□□ / S□□ / B0...F10	k	[mm]	666	783	970
R□0 / E□□ / T□□ / S□□ / B0...F1F	k	[mm]	754	865	1022
R□0 / E□□ / T□□ / S□□ / B0	x_4	[mm]	146	153	194
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R□0 F1...F1F	k	[mm]	842	959	1177
R□0 F1	x_4	[mm]	151	157	201
	m_4	[mm]		31.0	
E□□ / T□□ / S□□ / F1...F10	k	[mm]	797	916	1163
E□□ / T□□ / S□□ / F1...F1F	k	[mm]	885	998	1215
E□□ / T□□ / S□□ / F1	x_4	[mm]	146	162	200
	m_4	[mm]		31.0	
R□0 / E□□ / T□□ / S□□ / F2...F10	k	[mm]	822	948	1163
R□0 / E□□ / T□□ / S□□ / F2...F1F	k	[mm]	910	1030	1215
R□0 / E□□ / T□□ / S□□ / F2	x_4	[mm]	146	162	200
	m_4	[mm]		31.0	

Dimensions, forced ventilated

MCA20/22/26 motors in B35 design

	g	g_1	g_2	g_4	m_1	m_3	m_6	n_1	n_3	n_4	n_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCA20	200	171	168	141	154	72		128	40		
MCA22	220	203		153	190		51	171		28	28
MCA26	260	256		173	234			212			

	o	P_1	P_2	P_3	P_4	x_1	x_3	x_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCA20	206	M32x1.5	M25x1.5			299	422	101
MCA22	230	M50x1.5	M40x1.5	M20x1.5	M16x1.5	380		108
MCA26	269	M63x1.5	M50x1.5			465		152

	d	d	d_2	l	l_1	l_2	u	t
	k6	m6		-0.7 ... 0.3				
	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
MCA20	38		M12	80	5.0	70	10.0	41.0
MCA22								
MCA26		55	M20	110		100	16.0	59.0

	h	b_5	b_7	s_5	i_5
	[mm]	[mm]	[mm]	[mm]	[mm]
MCA20	100	366	160	11.5	134
MCA22	112	472	190		133
MCA26	132	581	215	14.0	165

	a_2	a_3	b_2	b_2	c_2	e_2	f_2	s_2
			j6	h6				
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCA20	250	196	180			215	4.0	14
MCA22	300	240	230		15	265		
MCA26	400	320		300		350	5.0	18

- Speed/angle sensor: RS0 / S□□ / E□□ / T□□
- Brake: B0 / F1 / F2
- Blower: F10 / F1F

Permanent magnet holding brake

The asynchronous servo motors MCA10 to 19 and 21 can be fitted with integral permanent magnet holding brakes.
In the case of permanent magnet brakes, the rated torque applies solely as holding torque at standstill. This is due to the nature of their design. During braking from full motor speed, e.g. in the event of emergency stops, the braking torque is significantly reduced.
As such, they may not be used as safety elements (particularly with lifting axes) without additional measures being implemented.
The brakes are activated when the supply voltage is disconnected (closed-circuit principle). When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.

For traversing axes, adherence to the permissible load/brake motor (J_L / J_{MB}) moment of inertia ensures that the permissible maximum switching rate of the brake will not be exceeded and at least 2,000 emergency stop functions can be performed from a speed of 3,000 rpm.
For lifting axes, the load torque resulting from the weight acts additionally. In this case the specifications for J_L / J_{MB} do not apply.

Caution:
The brakes used are not safety brakes in the sense that a reduction in torque may arise as a result of disruptive factors that cannot be influenced, e.g. oil ingress.

The ohmic voltage drop along the cable must be taken into consideration in long motor supply cables and must be compensated for by a higher voltage at the line input.

The following applies for Lenze system cables:

$$U[V] = U_B[V] + 0.08 \frac{[V]}{[A]\cdot[m]} \cdot l_{Lg}[m] \cdot I_B[A]$$

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.
The shortest switching times of the brakes are achieved by DC switching of the voltage. A spark suppressor is required to suppress interference and to increase the service life of the relay contacts here.

Permanent magnet holding brake

Permanent magnet holding brake

Rated data with standard braking torque

► The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

<table>
<tr><th></th><th>$U_{N, DC}$ [3, 4, 7]</th><th>$U_{N, AC}$ [5, 7]</th><th>M_N</th><th>M_N</th><th>M_{av}</th><th>I_N [2]</th><th>J</th><th>t_1 [1]</th><th>t_2 [1]</th><th>Q_E [6]</th><th>m</th><th>J_{MB}</th><th>J_L/J_{MB}</th></tr>
<tr><th></th><th></th><th></th><th>20 °C</th><th>120 °C</th><th>120 °C</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th>[V]</th><th>[V]</th><th>[Nm]</th><th>[Nm]</th><th>[Nm]</th><th>[A]</th><th>[kgcm²]</th><th>[ms]</th><th>[ms]</th><th>[J]</th><th>[kg]</th><th>[kgcm²]</th><th></th></tr>
<tr><td rowspan="2">MCA10</td><td>24</td><td rowspan="12"></td><td rowspan="2">3.30</td><td rowspan="2">2.50</td><td rowspan="2">1.20</td><td>0.50</td><td rowspan="2">0.38</td><td rowspan="2">10.0</td><td rowspan="2">20.0</td><td rowspan="2">350</td><td rowspan="2">0.90</td><td rowspan="2">2.78</td><td rowspan="2">24.5</td></tr>
<tr><td>205</td><td>0.060</td></tr>
<tr><td rowspan="2">MCA13</td><td>24</td><td rowspan="2">12.0</td><td rowspan="2">11.0</td><td rowspan="2">5.50</td><td>0.67</td><td rowspan="2">1.06</td><td rowspan="2">20.0</td><td rowspan="2">29.0</td><td rowspan="2">400</td><td rowspan="2">0.80</td><td rowspan="2">9.36</td><td rowspan="2">7.70</td></tr>
<tr><td>205</td><td>0.080</td></tr>
<tr><td rowspan="2">MCA14</td><td>24</td><td rowspan="2">15.0</td><td rowspan="2">12.0</td><td rowspan="2">6.00</td><td>0.75</td><td rowspan="4">3.60</td><td rowspan="2">13.0</td><td rowspan="2">30.0</td><td rowspan="2">700</td><td rowspan="4">1.50</td><td rowspan="2">22.8</td><td rowspan="2">5.20</td></tr>
<tr><td>205</td><td>0.090</td></tr>
<tr><td rowspan="2">MCA17</td><td>24</td><td rowspan="2">24.0</td><td rowspan="2">22.0</td><td rowspan="2">11.0</td><td>0.75</td><td rowspan="4">25.0</td><td rowspan="2">50.0</td><td rowspan="2">1200</td><td rowspan="2">39.6</td><td rowspan="2">5.10</td></tr>
<tr><td>205</td><td>0.090</td></tr>
<tr><td rowspan="2">MCA19</td><td>24</td><td rowspan="2">46.0</td><td rowspan="2">40.0</td><td rowspan="2">18.0</td><td>1.00</td><td rowspan="2">9.50</td><td rowspan="2">73.0</td><td rowspan="2">1900</td><td rowspan="2">2.70</td><td rowspan="2">81.5</td><td rowspan="2">3.70</td></tr>
<tr><td>205</td><td>0.12</td></tr>
<tr><td rowspan="2">MCA21</td><td>24</td><td rowspan="2">88.0</td><td rowspan="2">80.0</td><td rowspan="2">35.0</td><td>1.46</td><td rowspan="2">31.8</td><td rowspan="2">53.0</td><td rowspan="2">97.0</td><td rowspan="2">2800</td><td rowspan="2">5.00</td><td rowspan="2">212</td><td rowspan="2">1.70</td></tr>
<tr><td>205</td><td>0.18</td></tr>
</table>

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.
With 205 V DC brake: connection to 230 V AC through rectifier.
4) UR not possible in the case of a brake with a 205 V supply voltage.
5) UR not possible in the case of a brake with 230 V supply voltage.
6) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
7) Voltage tolerance: permanent magnet brakes -10% to +5%
spring-applied brakes ±10%

Permanent magnet holding brake

Rated data with increased braking torque

► These ratings apply only for geared servo motors with integrated servo motor (without mounting flange).

<table>
<tr><th></th><th>$U_{N, DC}$ 3, 4, 7)</th><th>M_N</th><th>M_N</th><th>M_{av}</th><th>I_N 2)</th><th>J</th><th>t_1 1)</th><th>t_2 1)</th><th>Q_E 6)</th><th>m</th><th>J_{MB}</th><th>J_L/J_{MB}</th></tr>
<tr><th></th><th></th><th>20 °C</th><th>120 °C</th><th>120 °C</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th>[V]</th><th>[Nm]</th><th>[Nm]</th><th>[Nm]</th><th>[A]</th><th>[kgcm²]</th><th>[ms]</th><th>[ms]</th><th>[J]</th><th>[kg]</th><th>[kgcm²]</th><th></th></tr>
<tr><td rowspan="2">MCA10</td><td>24</td><td rowspan="2">6.00</td><td rowspan="2">5.00</td><td rowspan="2">2.50</td><td>0.67</td><td rowspan="2">1.06</td><td rowspan="2">20.0</td><td rowspan="2">29.0</td><td rowspan="2">400</td><td rowspan="2">0.80</td><td rowspan="2">3.46</td><td rowspan="2">22.4</td></tr>
<tr><td>205</td><td>0.80</td></tr>
<tr><td rowspan="2">MCA13</td><td>24</td><td rowspan="2">15.0</td><td rowspan="2">12.0</td><td rowspan="2">6.00</td><td>0.75</td><td rowspan="2">3.60</td><td rowspan="2">13.0</td><td rowspan="2">30.0</td><td rowspan="2">700</td><td rowspan="2">1.50</td><td rowspan="2">11.9</td><td rowspan="2">8.40</td></tr>
<tr><td>205</td><td>0.090</td></tr>
<tr><td rowspan="2">MCA14</td><td>24</td><td rowspan="4">23.0</td><td rowspan="4">20.0</td><td rowspan="6">20.0</td><td>0.92</td><td rowspan="4">9.50</td><td rowspan="4">18.0</td><td rowspan="4">55.0</td><td rowspan="4">1350</td><td rowspan="4">2.40</td><td rowspan="2">22.8</td><td rowspan="2">6.60</td></tr>
<tr><td>205</td><td>0.12</td></tr>
<tr><td rowspan="2">MCA17</td><td>24</td><td>0.92</td><td rowspan="2">45.5</td><td rowspan="2">5.00</td></tr>
<tr><td>205</td><td>0.12</td></tr>
<tr><td rowspan="2">MCA19</td><td>24</td><td rowspan="2">48.0</td><td rowspan="2">40.0</td><td>1.46</td><td rowspan="4">31.8</td><td rowspan="2">30.0</td><td rowspan="2">100</td><td rowspan="4">2800</td><td rowspan="2">4.80</td><td rowspan="2">104</td><td rowspan="2">4.50</td></tr>
<tr><td>205</td><td>0.18</td></tr>
<tr><td rowspan="2">MCA21</td><td>24</td><td rowspan="2">88.0</td><td rowspan="2">80.0</td><td rowspan="2">35.0</td><td>1.46</td><td rowspan="2">53.0</td><td rowspan="2">97.0</td><td rowspan="2">5.00</td><td rowspan="2">212</td><td rowspan="2">1.70</td></tr>
<tr><td>205</td><td>0.18</td></tr>
</table>

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.
With 205 V DC brake: connection to 230 V AC through rectifier.
4) UR not possible in the case of a brake with a 205 V supply voltage.
5) UR not possible in the case of a brake with 230 V supply voltage.
6) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
7) Voltage tolerance: permanent magnet brakes -10% to +5%
spring-applied brakes ±10%

5.4

Spring-applied holding brake

Spring-operated holding brakes are available for the asynchronous servo motors MCA20, 22 and 26.
The brakes are activated when the supply voltage is disconnected (closed-circuit principle). When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.

Caution:
The brakes used are not safety brakes in the sense that a reduction in torque may arise as a result of disruptive factors that cannot be influenced, e.g. oil ingress.

The ohmic voltage drop along the cable must be taken into consideration in long motor supply cables and must be compensated for by a higher voltage at the line input.

The following applies for Lenze system cables:

$$U[V] = U_B[V] + 0.08 \frac{[V]}{[A] \cdot [m]} \cdot l_{Lg}[m] \cdot I_B[A]$$

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.
The shortest switching times of the brakes are achieved by DC switching of the voltage. A spark suppressor is required to suppress interference and to increase the service life of the relay contacts here.

Spring-applied holding brake

Spring-applied holding brake

Rated data with standard braking torque

► The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

	$U_{N, DC}$ 3, 4, 7)	$U_{N, AC}$ 5, 7)	M_N	M_N	M_{av}	I_N 2)	J	t_1 1)	t_2 1)	Q_E 6)	m	J_{MB}	J_L/J_{MB}
			20 °C	120 °C	120 °C								
	[V]	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MCA20	24		90.0	80.0	50.0	3.13	6.88	70.0	220	18000	13.0	177	19.6
		230				0.37							
MCA22	24		150	130	80.0	3.75	18.1	50.0	260	23000	20.5	505	8.20
		230				0.44		130					
MCA26	24		300	260	160	3.75	36.3	175	320	39000	26.0	1405	12.7
		230			200	0.37	70.4		360	51000	30.7		

Rated data with increased braking torque

► The figures stated apply to servo motors. They only apply to geared servo motors when the servo motor is connected via a mounting flange.

	$U_{N, DC}$ 3, 4, 7)	$U_{N, AC}$ 5, 7)	M_N	M_N	M_{av}	I_N 2)	J	t_1 1)	t_2 1)	Q_E 6)	m	J_{MB}	J_L/J_{MB}
			20 °C	120 °C	120 °C								
	[V]	[V]	[Nm]	[Nm]	[Nm]	[A]	[kgcm²]	[ms]	[ms]	[J]	[kg]	[kgcm²]	
MCA20	24		150	130	100	2.58	14.1	70.0	240	31000	15.4	189	33.0
		230				0.30							
MCA22	24		300	260	160	3.75	36.3	175	320	39000	26.0	523	14.1
		230				0.44		130	310				
MCA26	24		500	430	260	3.75	70.4	175	390	51000	30.8	1405	12.7
		230				0.44							

1) Engagement and disengagement times are valid for rated voltage (± 0 %) and protective circuit for brakes with varistor for DC switching. The times may increase without a protective circuit.
2) The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.
3) With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.
With 205 V DC brake: connection to 230 V AC through rectifier.
4) UR not possible in the case of a brake with a 205 V supply voltage.
5) UR not possible in the case of a brake with 230 V supply voltage.
6) Maximum switching energy per emergency stop at n = 3000 r/min for at least 2000 emergency stops.
7) Voltage tolerance: permanent magnet brakes -10% to +5%
spring-applied brakes ±10%

Resolver

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

Speed/angle sensor					
	[1]			RS0	RV0
Product key					
				RS0	RV03
Resolution					
Angle			[']	0.80	
Accuracy					
			[']	-10 ... 10	
Absolute positioning					
				1 revolution	
Max. speed					
	n_{max}		[r/min]	8000	
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	
Max. angle error					
			[']	-10 ... 10	
Inverter assignment					
				E84AVTC E94A ECS EVS93	

[1] 6 - Product key > speed/angle sensor

Speed-dependent safety functions

Suitable for safety function				
			No	Yes
Max. permissible angular acceleration				
MCA10 ... MCA19 [2]	α	[rad/s²]		22000
MCA20 ... MCA26 [2]	α	[rad/s²]		22000
Functional safety				
IEC 61508				SIL3
EN 13849-1				Up to Performance Level e

[2] 1 - Single encoder concepts with resolvers

Incremental encoder and SinCos absolute value encoder

Encoder type						
			TTL incremental		SinCos incremental	
Speed/angle sensor						
	[1]		T20	T40	S20	S1S
Product key						
			IG2048-5V-T	IG4096-5V-T	IG2048-5V-S	IG1024-5V-V3
Encoder type						
					Single-turn	
Pulses						
			2048	4096	2048	1024
Output signals						
			TTL		1 Vss	
Interfaces						
			A, B, N track and inverted			
Absolute revolutions						
			0			
Resolution						
Angle [2]		[']	2.60	1.30	0.40	
Accuracy						
		[']	-2 ... 2		-0.8 ... 0.8	
Min. input voltage						
DC	$U_{in,min}$	[V]	4.75		4.50	4.75
Max. input voltage						
DC	$U_{in,max}$	[V]	5.25		5.50	5.25
Max. speed						
	n_{max}	[r/min]	8789		5273	8000
Max. current consumption						
	I_{max}	[A]	0.15		0.10	0.070
Limit frequency						
	f_{max}	[kHz]	300		180	200
Inverter assignment						
			E84AVTC E94A ECS EVS93			E94A

[1] 6 - Product key > speed/angle sensor

[2] Inverter-dependent.

Speed-dependent safety functions

Suitable for safety function						
			No	No	No	Yes
Max. permissible angular acceleration						
MQA20 ... MQA26	α	[rad/s²]				73000
Functional safety						
IEC 61508						SIL3
EN 13849-1						Up to Performance Level e

Incremental encoder and SinCos absolute value encoder

Encoder type			SinCos absolute value				
Speed/angle sensor	1)		EQI	SRS	SRM	ECN	EQN
Product key			AM32-5V-E	AS1024-8V-H	AM1024-8V-H	AS2048-5V-E	AM2048-5V-E
Encoder type			Multi-turn	Single-turn	Multi-turn	Single-turn	Multi-turn
Pulses			32	1024		2048	
Output signals			1 Vss				
Interfaces			EnDat	Hiperface		EnDat	
Absolute revolutions			4096	1	4096	1	4096
Resolution							
Angle		[']	0.40				
Accuracy		[']	-5 ... 5	-0.8 ... 0.8		-0.6 ... 0.6	
Min. input voltage							
DC	$U_{in,min}$	[V]	4.75	7.00		4.75	
Max. input voltage							
DC	$U_{in,max}$	[V]	5.25	12.0		5.25	
Max. speed	n_{max}	[r/min]	12000	6000		12000	
Max. current consumption	I_{max}	[A]	0.17	0.080		0.15	0.25
Limit frequency	f_{max}	[kHz]	6.00	200			
Inverter assignment			E94A	E84AVTC E94A ECS EVS93		E94A	

1) 6 - Product key > speed/angle sensor

5.4

Blowers

Rated data for 50 Hz

<table>
<tr><th></th><th></th><th>Enclosure</th><th>Number of phases</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th></th><th></th><th></th><th>U_{min}</th><th>U_{max}</th><th>$U_{N, AC}$</th><th>P_N</th><th>I_N</th></tr>
<tr><th></th><th></th><th></th><th></th><th>[V]</th><th>[V]</th><th>[V]</th><th>[kW]</th><th>[A]</th></tr>
<tr><td>MCA13</td><td rowspan="4">F10</td><td rowspan="4">IP54</td><td rowspan="9">1</td><td rowspan="9">210</td><td rowspan="4">240</td><td rowspan="9">230</td><td rowspan="2">0.019</td><td rowspan="2">0.12</td></tr>
<tr><td>MCA14</td></tr>
<tr><td>MCA17</td><td rowspan="2">0.040</td><td rowspan="2">0.25</td></tr>
<tr><td>MCA19</td></tr>
<tr><td>MCA20</td><td>F10
F1F</td><td>IP23s</td><td>250</td><td>0.17</td><td>0.73</td></tr>
<tr><td>MCA21</td><td>F10</td><td>IP54</td><td>240</td><td>0.060</td><td>0.26</td></tr>
<tr><td>MCA22</td><td rowspan="2">F10
F1F</td><td rowspan="2">IP23s
IP54</td><td rowspan="2">250</td><td>0.24</td><td>1.05</td></tr>
<tr><td>MCA26</td><td>0.40</td><td>1.75</td></tr>
</table>

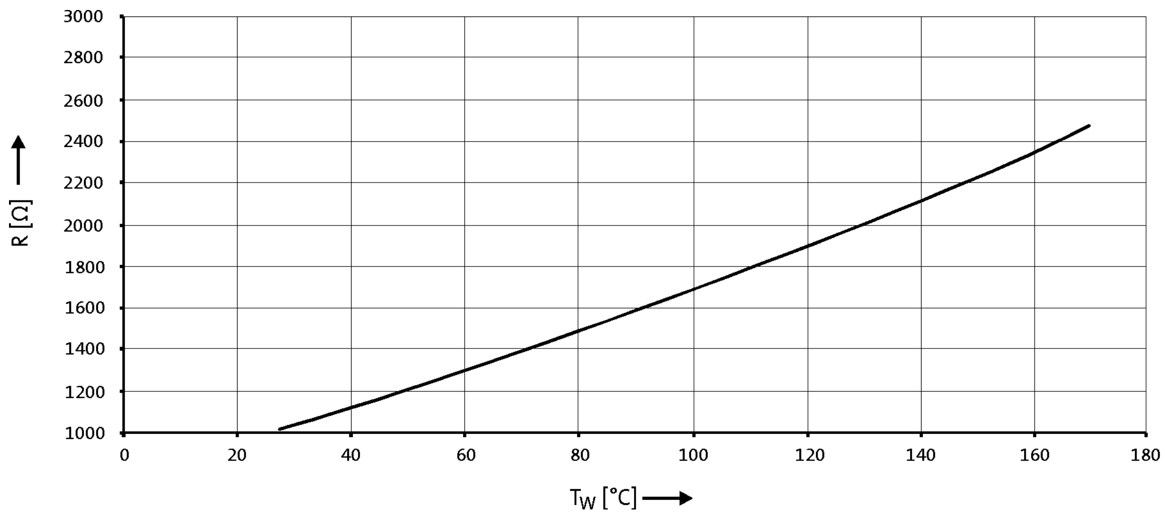
Rated data for 60 Hz

<table>
<tr><th></th><th></th><th>Enclosure</th><th>Number of phases</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><th></th><th></th><th></th><th></th><th>U_{min}</th><th>U_{max}</th><th>$U_{N, AC}$</th><th>P_N</th><th>I_N</th></tr>
<tr><th></th><th></th><th></th><th></th><th>[V]</th><th>[V]</th><th>[V]</th><th>[kW]</th><th>[A]</th></tr>
<tr><td>MCA13</td><td rowspan="4">F10</td><td rowspan="4">IP54</td><td rowspan="9">1</td><td rowspan="9">210</td><td rowspan="4">240</td><td rowspan="9">230</td><td rowspan="2">0.019</td><td rowspan="2">0.12</td></tr>
<tr><td>MCA14</td></tr>
<tr><td>MCA17</td><td rowspan="2">0.040</td><td rowspan="2">0.25</td></tr>
<tr><td>MCA19</td></tr>
<tr><td>MCA20</td><td>F10
F1F</td><td>IP23s</td><td>250</td><td>0.20</td><td>0.90</td></tr>
<tr><td>MCA21</td><td>F10</td><td>IP54</td><td>240</td><td>0.060</td><td>0.26</td></tr>
<tr><td>MCA22</td><td rowspan="2">F10
F1F</td><td rowspan="2">IP23s
IP54</td><td rowspan="2">250</td><td>0.28</td><td>1.23</td></tr>
<tr><td>MCA26</td><td>0.41</td><td>1.82</td></tr>
</table>

Temperature monitoring

The thermal sensors (1x KTY 83-110) used continuously monitor the motor temperature. The temperature signal is transmitted over the system cable of the feedback system to the servo controller.
This means that the temperature of the motor is determined with great accuracy in the permitted operating range and at the same time the overtemperature response configured in the controller is executed in the event of overtemperature in one of the winding phases.

Variation of resistance



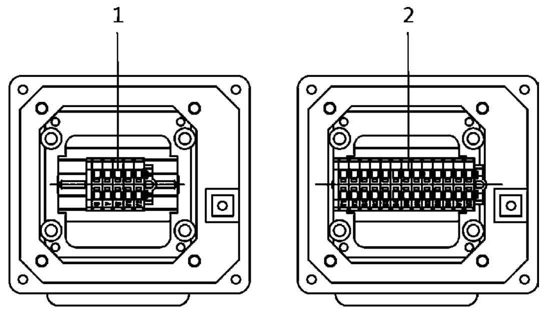
► If the detector is supplied with a measured current of 1 mA, the above relationship between the temperature and the resistance applies.

Terminal box

Motors MCA10 to 19/21

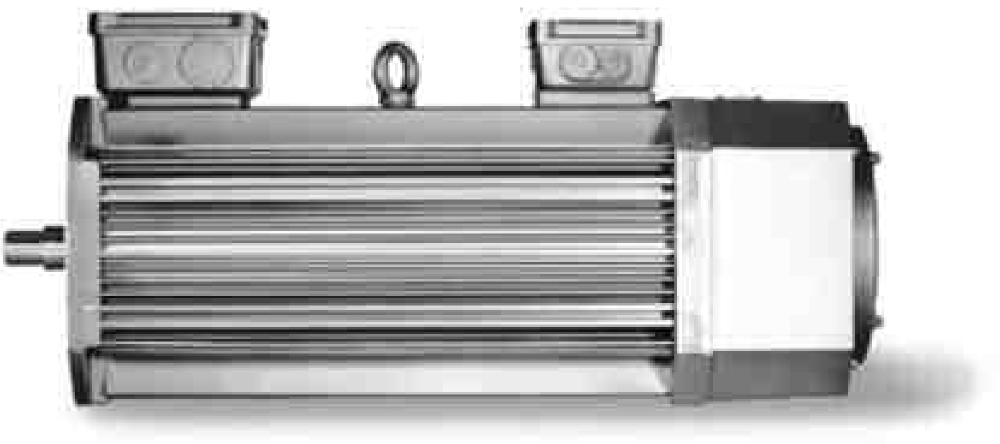
If a servo motor is to be connected to an existing cable or plug connectors are not to be used for other reasons, the connection can also be made via a terminal box.

The motor can either be fitted with a terminal box for the power connection and motor holding brake or a second terminal box provided to connect the motor feedback and blower (if applicable).

Connections


1: Power connection + brake connection + PE connection.

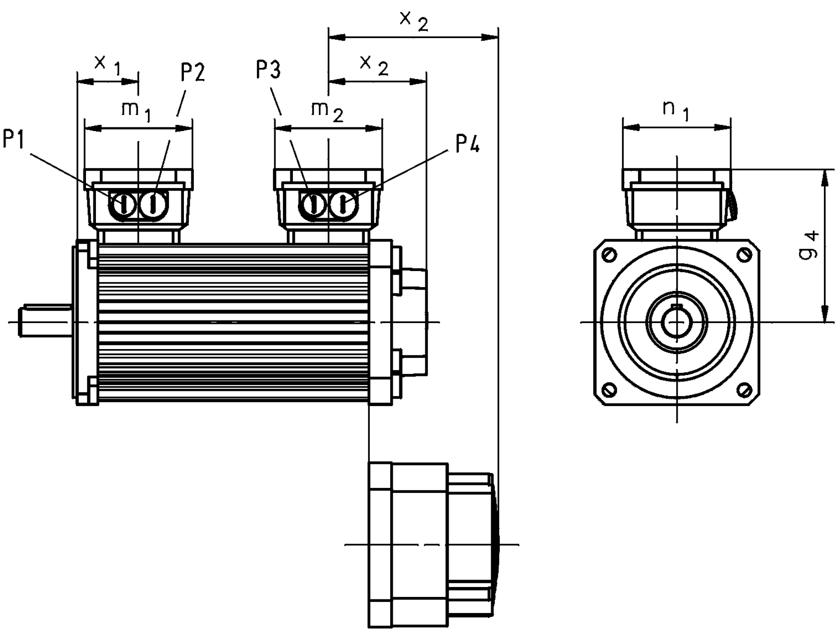
2: Angle/speed sensor connection + thermal sensor connection



MCA asynchronous servo motors with blower and terminal box

Terminal box

Motors MCA10 to 19/21



			MCA10I40	MCA13I41	MCA14L20	MCA17N23	MCA19S23	MCA21X25
					MCA14L41	MCA17N41	MCA19S42	MCA21X42
R□0 B0	x_2	[mm]	78	77	85		93	97
R□0 P□	x_2	[mm]	78	77	85		93	97
S□□ / E□□ / T20 / B0	x_2	[mm]	132	131	140	139	143	147
S□□ / E□□ / T20 / P□	x_2	[mm]	132	131	140	139	143	147

			MCA13I34	MCA14L16	MCA17N17	MCA19S17	MCA21X17
				MCA14L35	MCA17N35	MCA19S35	MCA21X35
R□0 B0	x_2	[mm]	145	147	171	190	193
R□0 P□	x_2	[mm]	145	147	171	190	193
S□□ / E□□ / T20 / B0	x_2	[mm]	199	202	225	240	243
S□□ / E□□ / T20 / P□	x_2	[mm]	199	202	225	240	243

- Speed/angle sensor: RS0 / S□□ / E□□ / T20
- Brake: B0 / P□

	g_4	m_1	m_2	n_1	x_1	P_1	P_2	P_3	P_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
MCA10	113	93	93	93	54	M20x1.5	M20x1.5	M20x1.5	M20x1.5
MCA13	125				57				
MCA14	133				53				
MCA17	141				55				
MCA19	158	115	115	115	64	M25x1.5	M32x1.5		
MCA21	169				70				

ICN connector

Servo motors MCA10 to 21 provide ICN connectors as standard for electrical connection. Servo motors MCA22 and MCA26 provide a terminal box for electrical connection.

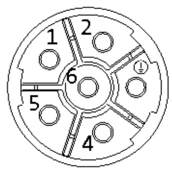
A connector is used for the connection of motor and brake.
The connections to the feedback system/temperature monitoring and the blower each employ a separate connector.

The connectors can be rotated through 270° and are fitted with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional union nuts. Existing mating connectors can therefore still be used without difficulty.

Connection for power and brake

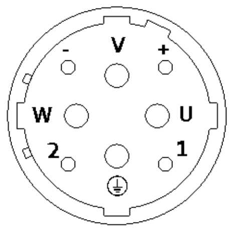
► MCA10 to 17

Pin assignment		
Contact	Designation	Meaning
1	BD1	Holding brake +
2	BD2	Holding brake -
PE	PE	PE conductor
4	U	Phase U power
5	V	Phase V power
6	W	Phase W power



► MCA19 to 21

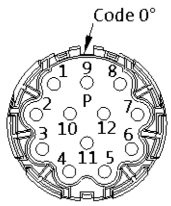
Pin assignment		
Contact	Designation	Meaning
1		Not assigned
2		
+	BD1	Holding brake +
-	BD2	Holding brake -
PE	PE	PE conductor
U	U	Phase U power
V	V	Phase V power
W	W	Phase W power



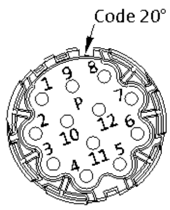
ICN connector

Feedback 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

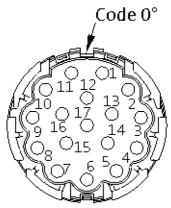
Pin assignment			
Contact	Designation	Meaning	
1	B	Track B/+SIN	
2	$\overline{A}$	Track A inverse/-COS	
3	A	Track A/+COS	
4	$+U_B$	Supply +	
5	GND	Mass	
6	$\overline{Z}$	Zero track inverse/-RS485	
7	Z	Zero track/+RS485	
8		Not assigned	
9	$\overline{B}$	Track B inverse/-SIN	
10		Not assigned	
11	+KTY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

ICN connector

Feedback connection

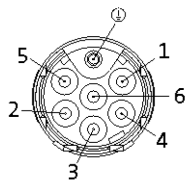
► SinCos absolute value encoder with EnDat interface

Pin assignment		
Contact	Designation	Meaning
1	U_P sensor	Supply: UP sensor
2		Not assigned
3		
4	0 V sensor	Supply: 0 V sensor
5	+KTY	KTY temperature sensor
6	-KTY	
7	$+U_B$	Supply +
8	Cycle	EnDat interface cycle
9	Cycle^{-}	EnDat interface inverse cycle
10	GND	Mass
11	Shield	Encoder housing screen
12	B	Track B
13	B^{-}	Track B inverse/-SIN
14	Data	EnDat interface data
15	A	Track A
16	A^{-}	Track A inverse
17	Data^{-}	EnDat interface inverse data



Blower connection

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



L-force catalogue

Automation systems
Drive solutions

Controls
Inverter
Motors
Gearboxes
Engineering Tools

Motors: Inverter opt. three-phase AC motors MF, IE2 MH three-phase AC motors, IE1 MD three-phase AC motors

Lenze
As easy as that.

Contents of the L-force catalogue

Selected portfolio

Additional portfolio

Lenze makes many things easy for you.

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

1

Developing ideas

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

2

Drafting concepts

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

3

Implementing solutions

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

4

Manufacturing machines

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

5

Ensuring productivity

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

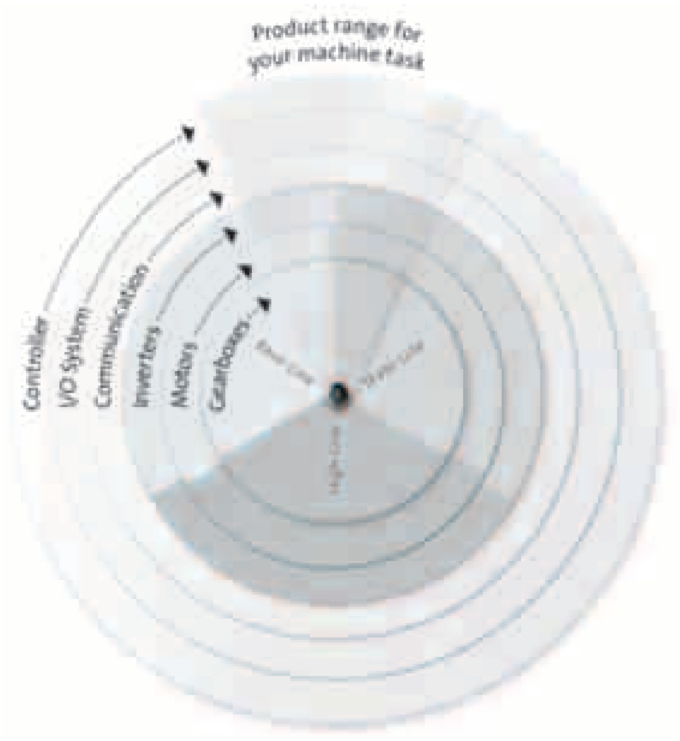
A matter of principle: the right products for every application.

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

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

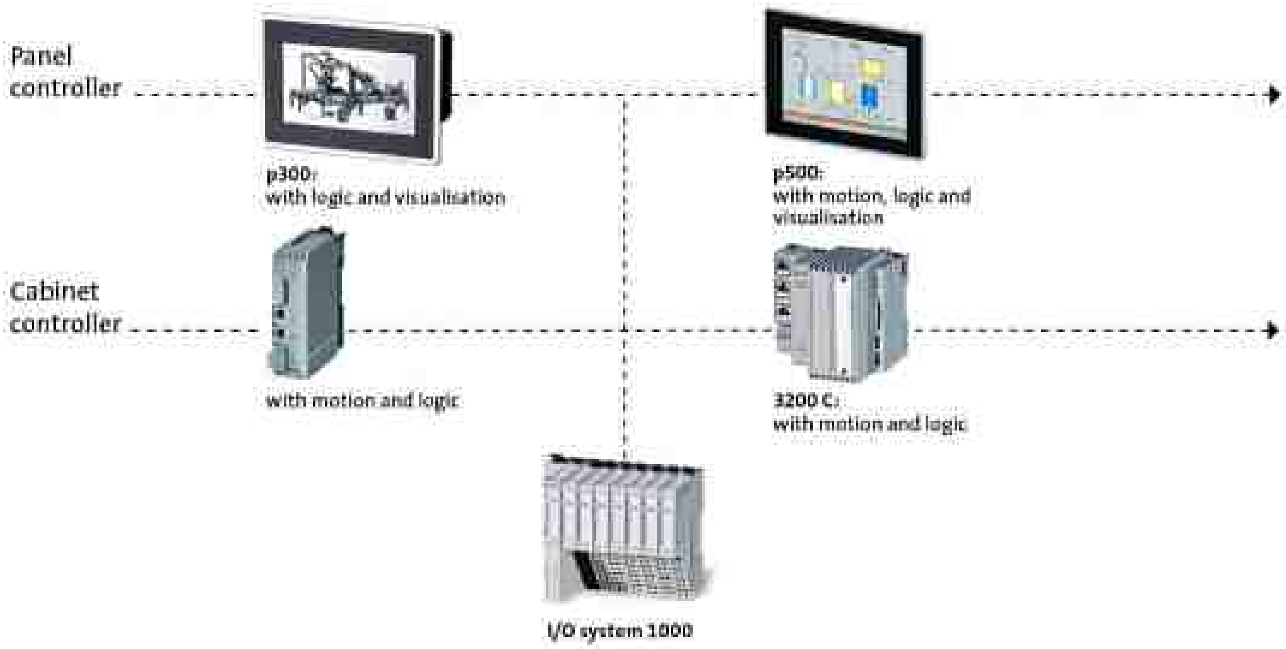
Powerful products with a major impact:
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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

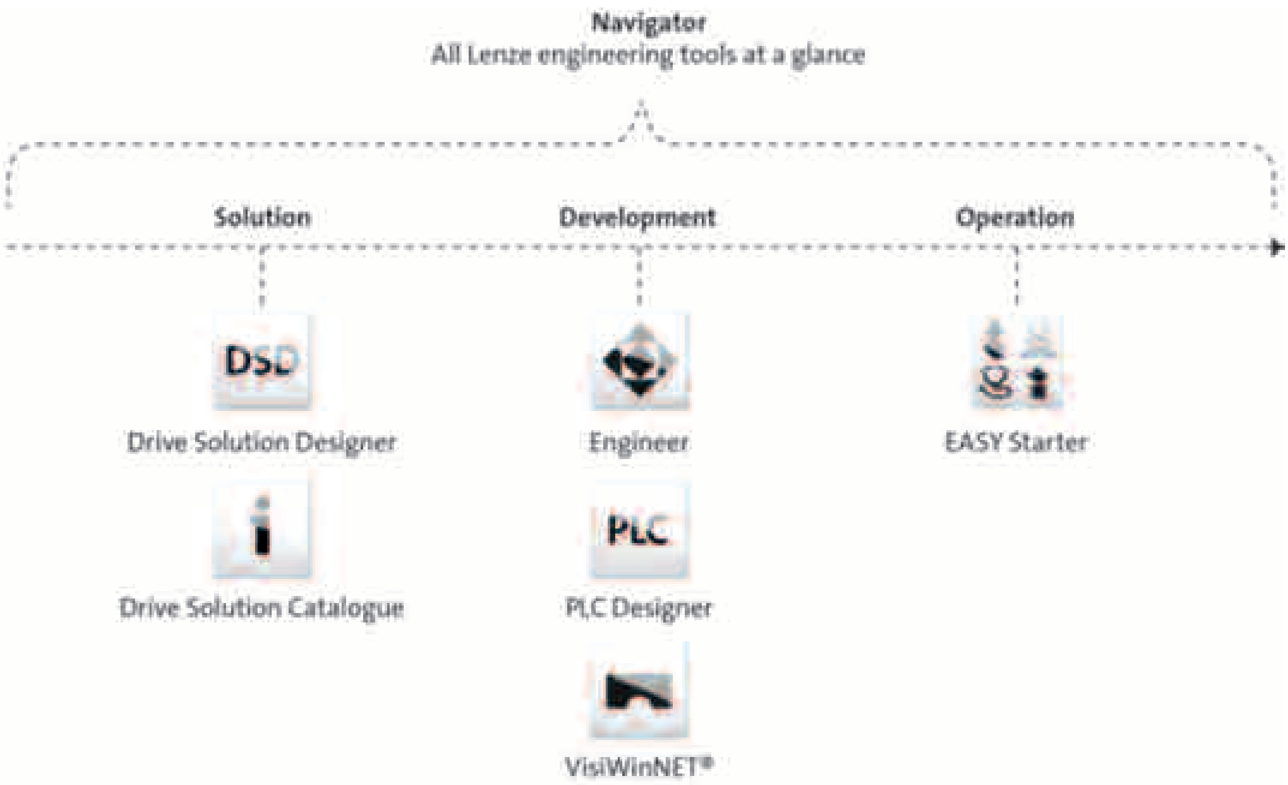


L-force product portfolio

Controls

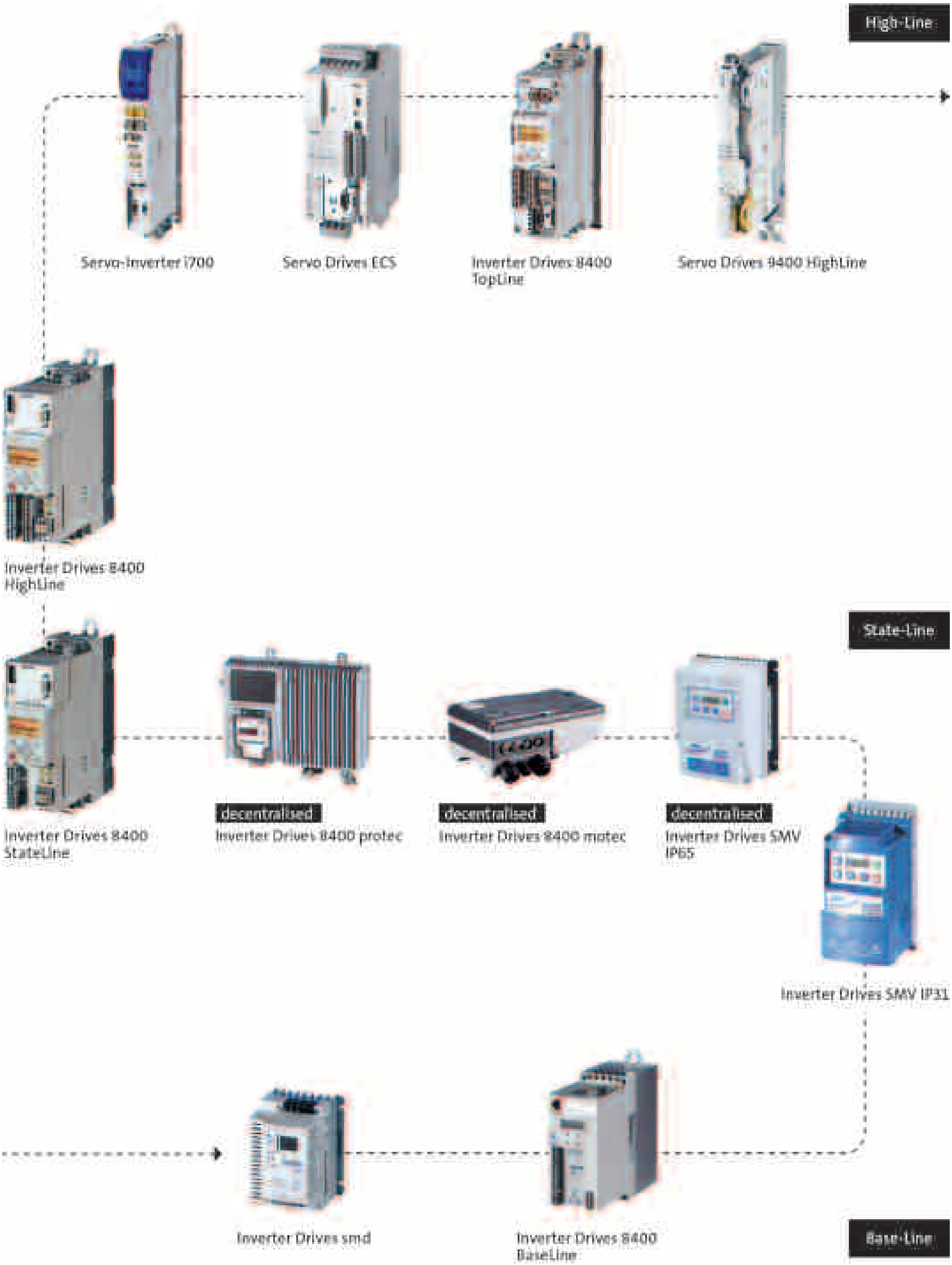


Engineering Tools



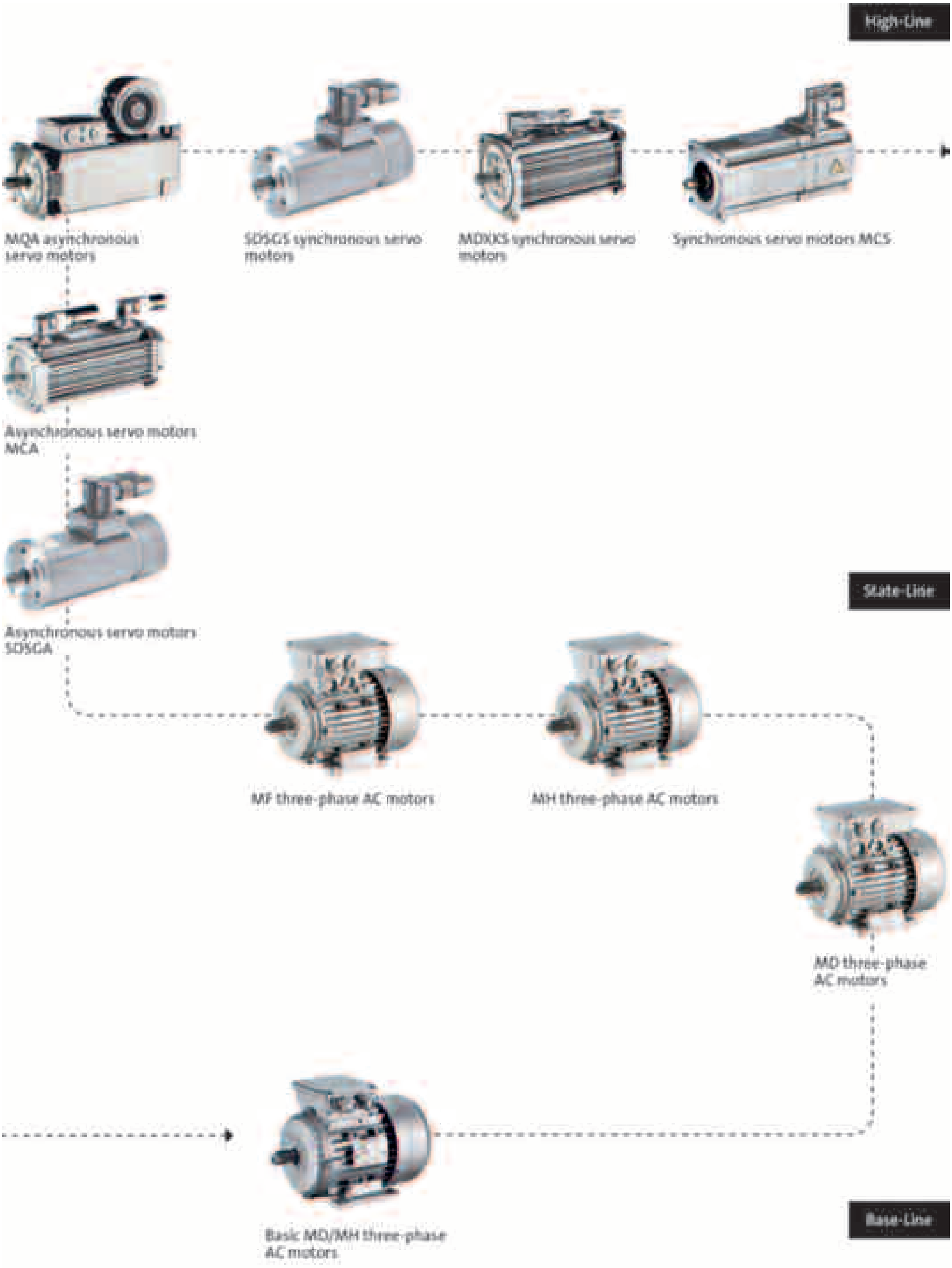
L-force product portfolio

Inverter



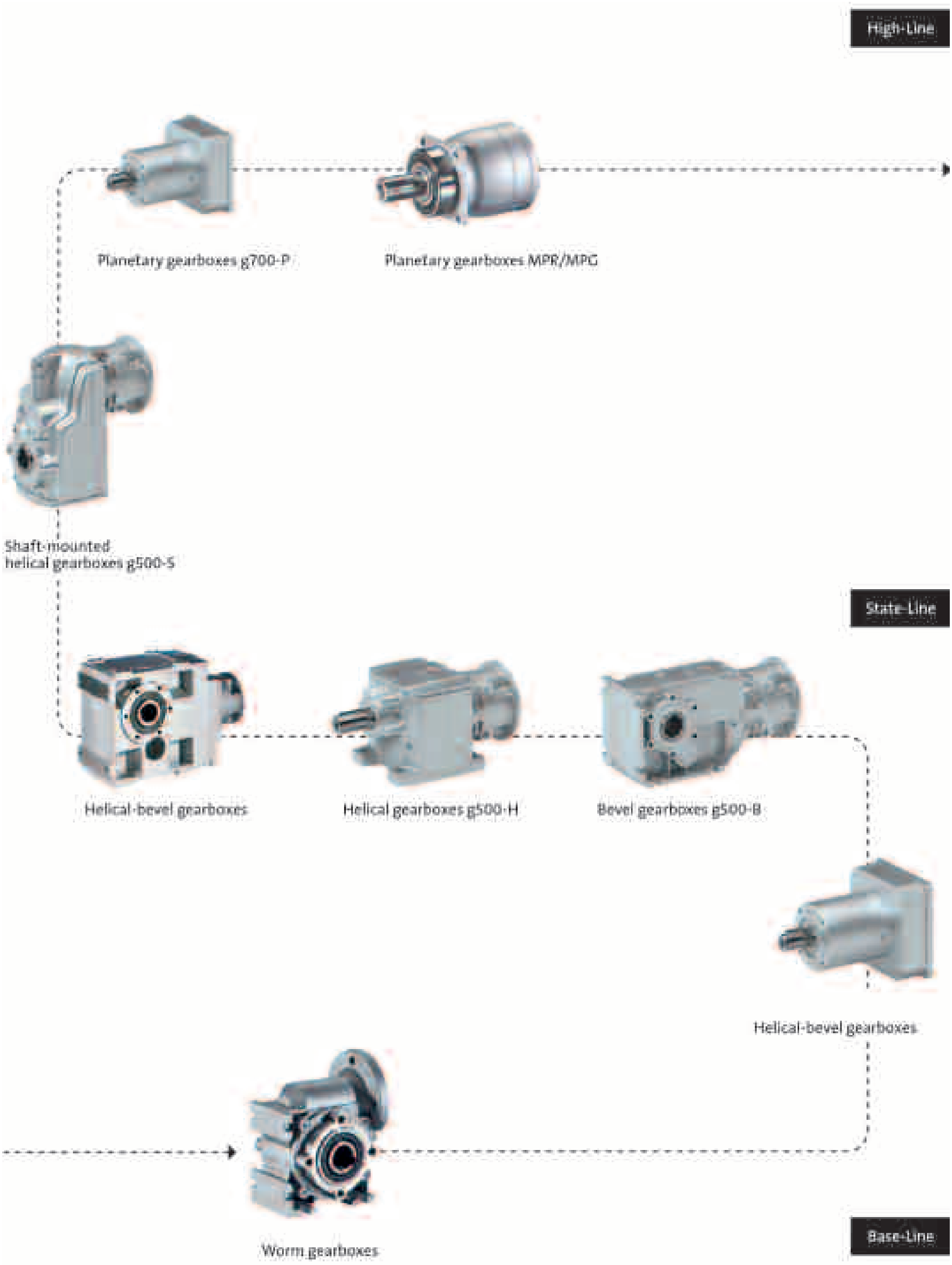
L-force product portfolio

Motors



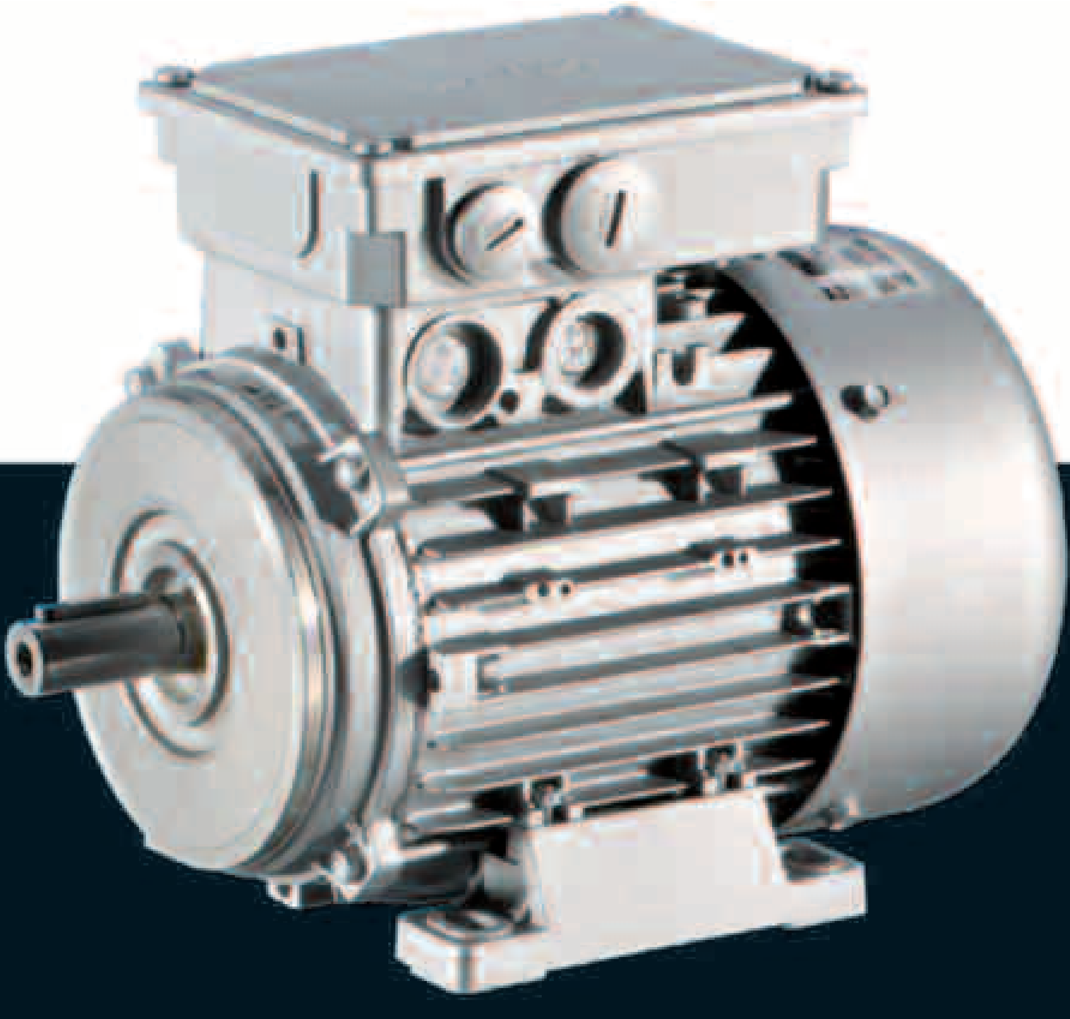
L-force product portfolio

Gearboxes



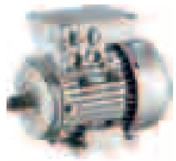
Inverter opt. three-phase AC motors MF

0.55 to 22 kW



Inverter opt. three-phase AC motors MF

Contents

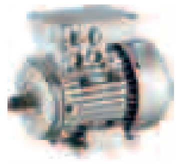


List of abbreviations

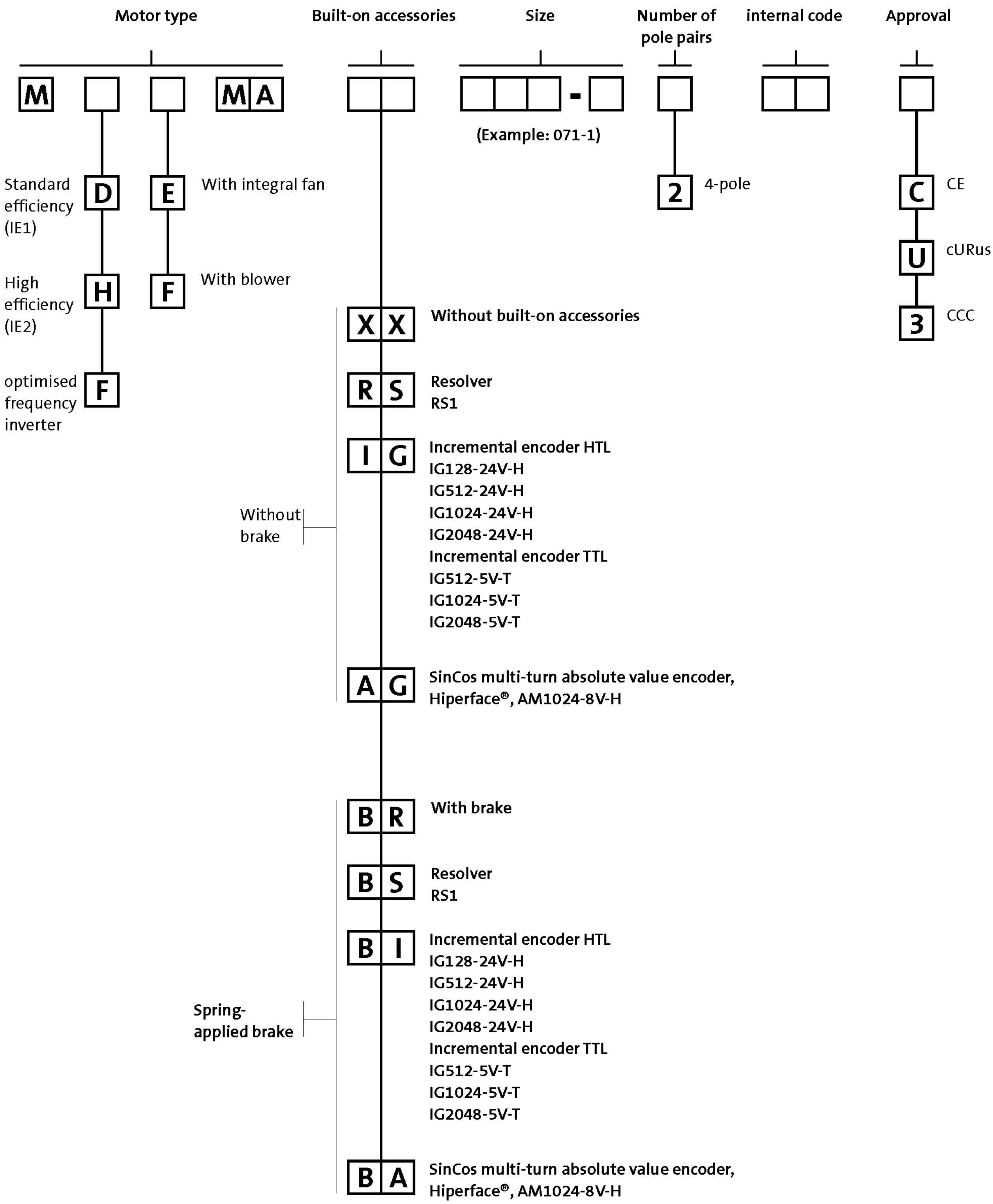
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
$\cos\phi$		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]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

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

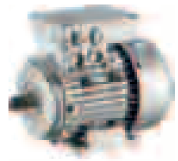
CE	Communauté Européenne
CSA	Canadian Standards Association
DIN	Deutsches Institut für Normung e.V.
EMC	Electromagnetic compatibility
EN	European standard
IEC	International Electrotechnical Commission
IM	International Mounting Code
IP	International Protection Code
NEMA	National Electrical Manufacturers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



Product key



Motor type
Built-on accessories
Size
Number of pole pairs
internal code
Approval
M
MA
(Example: 071-1)
Standard efficiency (IE1)
D
E
With integral fan
High efficiency (IE2)
H
F
With blower
optimised frequency inverter
F
2
4-pole
C
CE
U
cURus
3
CCC
Without brake
XX
Without built-on accessories
RS
Resolver
RS1
IG
Incremental encoder HTL
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
Incremental encoder TTL
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
AG
SinCos multi-turn absolute value encoder,
Hiperface®, AM1024-8V-H
Spring-applied brake
BR
With brake
BS
Resolver
RS1
BI
Incremental encoder HTL
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
Incremental encoder TTL
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
BA
SinCos multi-turn absolute value encoder,
Hiperface®, AM1024-8V-H



Product information

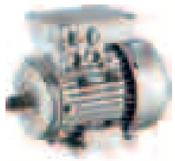
For a long time now, three-phase AC motors from Lenze have been established in virtually all industrial sectors. Based on our many years of experience in the field of drive and automation technology, we have developed motors, which will ensure that your demands in terms of productivity, quality and availability are perfectly met.
Three-phase AC motors from the L-force series are primarily characterised by their comprehensive modularity. The wide variety of options allows you to precisely adjust the drive characteristics in line with your application. We call this Rightsizing.

L-force MF three-phase AC motors are available in a power range from 0.55 to 22 kW and have been fully optimised for inverter operation.

The benefits for you:
- Up to sizes smaller than standard three-phase AC motors
- The motors exceed the minimum efficiency levels of efficiency class IE2
- Large speed setting range: 1:24 (without field weakening)
- Dynamic thanks to a low moment of inertia

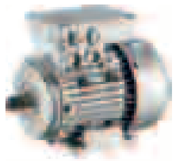
Basic versions
- The motors feature B3, B5 and B14 designs and dimensions standardised in line with IEC 60072-1 and/or DIN EN 50347 which makes then suitable for universal use.
- The thermal sensors integrated as standard allow for permanent temperature monitoring and are coordinated to the motor winding's temperature class F (155 °C).
- The motors of the basic version are adapted to ambient conditions by IP55 degree of protection .
- In tough operating conditions, the surface and corrosion protection system is provided to reliably protect the motor from aggresive media.

Options
- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach 10 x 10^6 switching cycles.
- A resolver and various incremental and absolute value encoders can be fitted for speed and position detection.
- For fast commissioning, the motors are also available with connectors for the power connection, brake, blower and feedback.
- Instead of an integral fan, the motor can optionally be equipped with a blower. No torque reduction is then necessary, even at speeds below 20 Hz.
- For drive tasks in decentralised applications, the motor can be ordered with the motec inverter connected to the terminal box.
- The motors are available with cURus, GOST-R, CCC and UkrSepro approval.



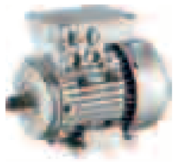
Functions and features

Size					
Motor		063	071	080	090
Design					
		B3 B5 B14			
Shaft journal					
d x l	[mm]	11 x 23	14 x 30	19 x 40	24 x 50
Spring-applied brake					
Design		Standard or LongLife design Reduced or standard braking torque With rectifier With manual release lever Low noise		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback					
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)			
Temperature sensor					
Thermal contact		TKO			
Thermal detector		KTY83-110 KTY84-130			
PTC thermistor		PTC			
Motor connection					
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector			
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector			
Blower connection		Terminal box ICN connector			
Feedback connection		Terminal box ICN connector			
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection			
Shaft bearings					
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A			
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates			
Colour					
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours			



Functions and features

Size				
Motor		100	112	132
Design				
		B3 B5 B14		B3 B5
Shaft journal				
d x l	[mm]	28 x 60		38 x 80
Spring-applied brake				
Design		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback				
Design			Resolver Incremental encoder Absolute value encoder (multi-turn)	
Temperature sensor				
Thermal contact			TKO	
Thermal detector			KTY83-110 KTY84-130	
PTC thermistor			PTC	
Motor connection				
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector	Terminal box	Terminal box HAN modular connector
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector	Terminal box	Terminal box HAN modular connector
Blower connection			Terminal box ICN connector	
Feedback connection			Terminal box ICN connector	
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feed-back connection	Terminal box KTY at connector in the feedback connection	
Shaft bearings				
Position of the locating bearing			Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A	
Bearing type			Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates	
Colour				
			Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours	



Functions and features

Surface and corrosion protection

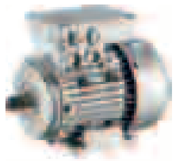
For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

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

Surface and corrosion protection system	Applications	Measures
OKS-G (primed)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey)
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating corresponding to corrosivity category C1 (subject to EN 12944-2)
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)
OKS-L (high) OKS-XL (extra 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 • Screws zinc-coated • Cable glands with gaskets • Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request) Optional measures: • Motor recesses sealed off (on request)

Structure of surface coating

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

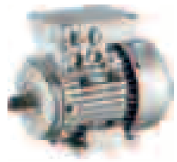


Motor – inverter assignment

Rated frequency 120 Hz

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

Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.55	MF□□□□□063-32	E84DVB□5514S□□□2□	E84AV□□□5514□□0
0.75	MF□□□□□063-42	E84DVB□7514S□□□2□	E84AV□□□7514□□0
1.10	MF□□□□□071-32	E84DVB□1124S□□□2□	E84AV□□□1124□□0
1.50	MF□□□□□071-42	E84DVB□1524S□□□2□	E84AV□□□1524□□0
2.20	MF□□□□□080-32	E84DVB□2224S□□□2□	E84AV□□□2224□□0
3.00	MF□□□□□080-42	E84DVB□3024S□□□2□	E84AV□□□3024□□0
4.00	MF□□□□□090-32	E84DVB□4024S□□□2□	E84AV□□□4024□□0
5.50	MF□□□□□100-12	E84DVB□5524S□□□2□	E84AV□□□5524□□0
7.50	MF□□□□□100-32	E84DVB□7524S□□□2□	E84AV□□□7524□□0
11.0	MF□□□□□112-22		E84AV□□□1134□□0
15.0	MF□□□□□132-12		E84AV□□□1534□□0
18.5	MF□□□□□132-22		E84AV□□□1834□□0
22.0	MF□□□□□132-32		E84AV□□□2234□□0

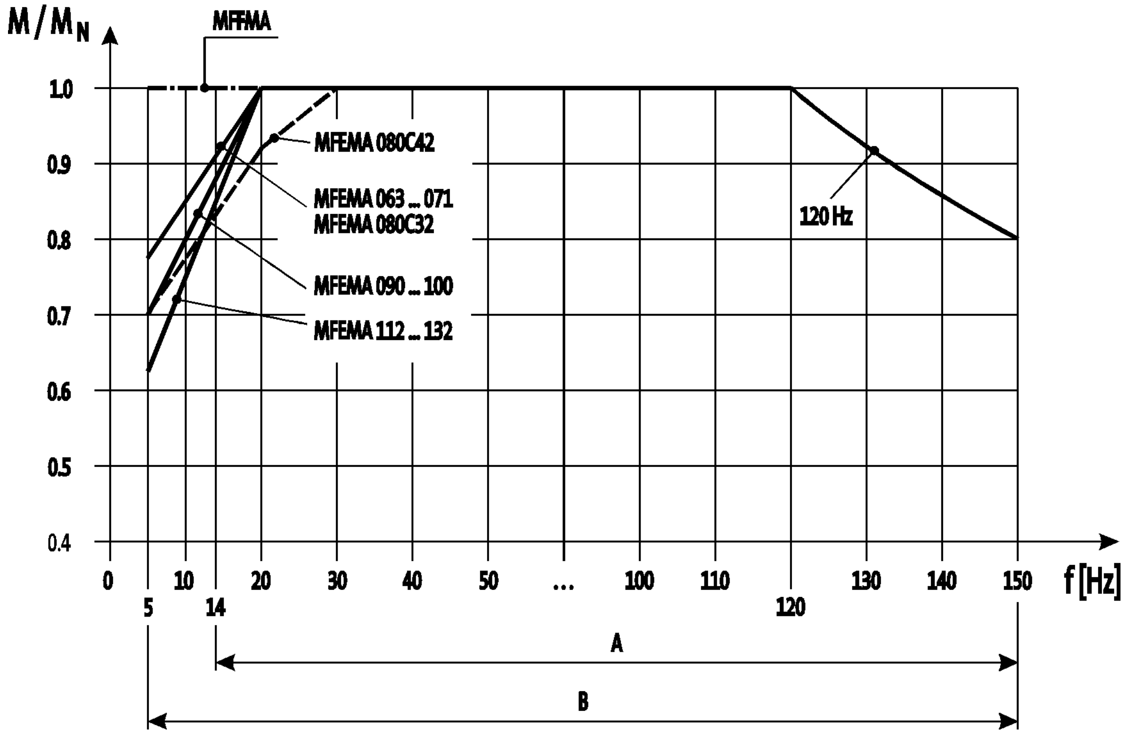


Dimensioning

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



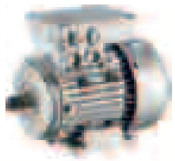
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

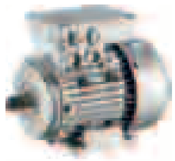
► The motor specifications stated in this catalogue for inverter operation apply to operation with a Lenze inverter. If you are uncertain, get in touch with the manufacturer of the inverter to ask whether the device is capable of driving the motor with the stated specifications (e.g. setting range, base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

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

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

Please contact your Lenze sales office.

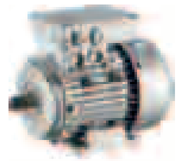




Standards and operating conditions

Degree of protection			
EN 60529			IP55 1) IP65 1) IP66 1)
Conformity			
CE			Low-Voltage Directive
			2006/95/EC
EAC			TP TC 004/2011 (TR CU 004/2011)
Approval			
			UkrSEPRO
CCC			GB Standard 12350-2009
CSA			CSA 22.2 No. 100
cURus			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

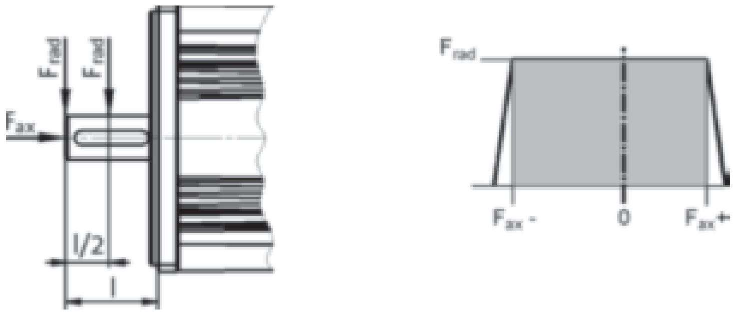
1) Designs with different degrees of protection:
IP55 with brake (IP54 with manual release lever).
IP54 with resolver RS1.
IP54 with HTL incremental encoder IG128-24V-H.



Permissible radial and axial forces

► Forces at medium speed 2000 r/min.

Application of forces

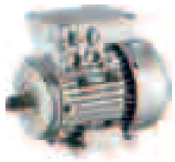


Application of force at l/2

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	600	-600	300	470	-480	180	410	-430	120	350	-370	70
071	740	-800	470	590	-630	300	510	-550	220	430	-470	140
080	960	-1090	580	770	-860	350	670	-760	250	570	-650	140
090	1050	-1160	630	840	-920	390	730	-800	280	620	-690	160
100	1490	-1490	910	1190	-1160	580	1050	-1010	430	890	-860	270
112	2250	-2330	1340	1790	-1830	840	1570	-1600	610	1330	-1360	370
132	3300	-2150	1190	2640	-1670	710	2320	-1440	480	1970	-1210	250
160	3750	-2700	1520	3000	-2130	950	2640	-1830	670	2250	-1440	360
180	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
200	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
225	5200	-3100	3900	3900	-2100	2900	3300	-1300	2100	2650	-1000	1800

► The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
► Data for axial forces relate to the maximum radial force with the corresponding bearing service life.

5.7



Permissible radial and axial forces

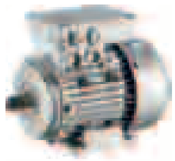
► Forces at medium speed 2000 r/min.

Application of force at l

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	400	-600	300	370	-480	180	320	-430	120	300	-370	70
071	680	-800	470	540	-630	300	470	-550	220	400	-470	140
080	880	-1090	580	700	-860	350	610	-760	250	520	-650	140
090	940	-1160	630	750	-920	390	660	-800	280	560	-690	160
100	1350	-1490	910	1080	-1160	580	940	-1010	430	800	-860	270
112	2040	-2330	1340	1620	-1830	840	1420	-1600	610	1210	-1360	370
132	3020	-2150	1190	2420	-1670	710	2120	-1440	480	1800	-1210	250
160	3410	-2700	1520	2730	-2130	950	2400	-1830	670	2050	-1440	360
180	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
200	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
225	4800	-3100	3900	3600	-2100	2900	3000	-1300	2100	2400	-1000	1800

► The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.

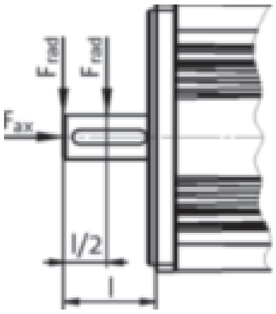
► Data for axial forces relate to the maximum radial force with the corresponding bearing service life.

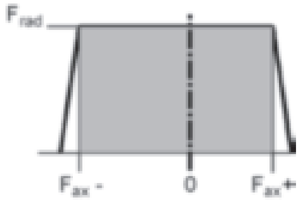


Permissible radial and axial forces

► Forces at medium speed 3500 r/min.

Application of forces





Application of force at l/2

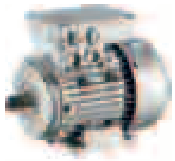
	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	500	-430	270	400	-330	180	350	-290	140	290	-240	90
071	610	-580	250	490	-490	130	430	-430	80	360	-360	30
080	800	-790	280	640	-640	130	560	-570	60	480	-500	0
090	880	-830	310	700	-670	150	610	-600	70	520	-520	0
100	1250	-1060	480	1000	-840	250	870	-740	150	740	-630	50
112	1870	-1680	700	1500	-1500	360	1310	-1190	200	1110	-1030	40
132	2750	-1400	440	2200	-1100	130	1700	-980	20			

Application of force at l

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	460	-410	260	370	-320	170	320	-280	130	270	-240	80
071	570	-560	230	450	-450	120	400	-400	70	330	-350	20
080	730	-750	250	580	-610	100	510	-550	40			
090	790	-790	270	630	-640	120	550	-570	50			
100	1120	-1000	420	900	-800	210	790	-700	120	670	-600	20
112	1690	-1600	610	1350	-1280	300	1190	-1140	150	1000	-1000	0
132	2520	-1300	330	2020	-1020	60	1300	-960	0			

► The values for the bearing service life L_{10} refer to an average speed of 3500 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease life-time.

► Data for axial forces relate to the maximum radial force with the corresponding bearing service life.



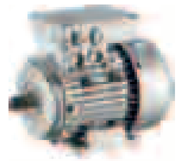
Rated data for 120 Hz

4-pole motors

	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$
			± 10 %		± 10 %	
	[kW]	[r/min]	[V]	[A]	[V]	[A]
MF□□□□□063-32	0.55	3440	200	3.20	345	1.80
MF□□□□□063-42	0.75	3400	210	4.00	370	2.30
MF□□□□□071-32	1.10	3490	200	5.50	345	3.20
MF□□□□□071-42	1.50	3450	205	6.80	360	3.90
MF□□□□□080-32	2.20	3500	200	9.10	345	5.30
MF□□□□□080-42	3.00	3480	210	11.4	370	6.60
MF□□□□□090-32	4.00	3480			370	8.50
MF□□□□□100-12	5.50	3525			340	12.9
MF□□□□□100-32	7.50	3515			375	15.9
MF□□□□□112-22	11.0	3530			370	23.5
MF□□□□□132-12	15.0	3560			370	31.2
MF□□□□□132-22	18.5	3560			360	39.0
MF□□□□□132-32	22.0	3550			380	44.5

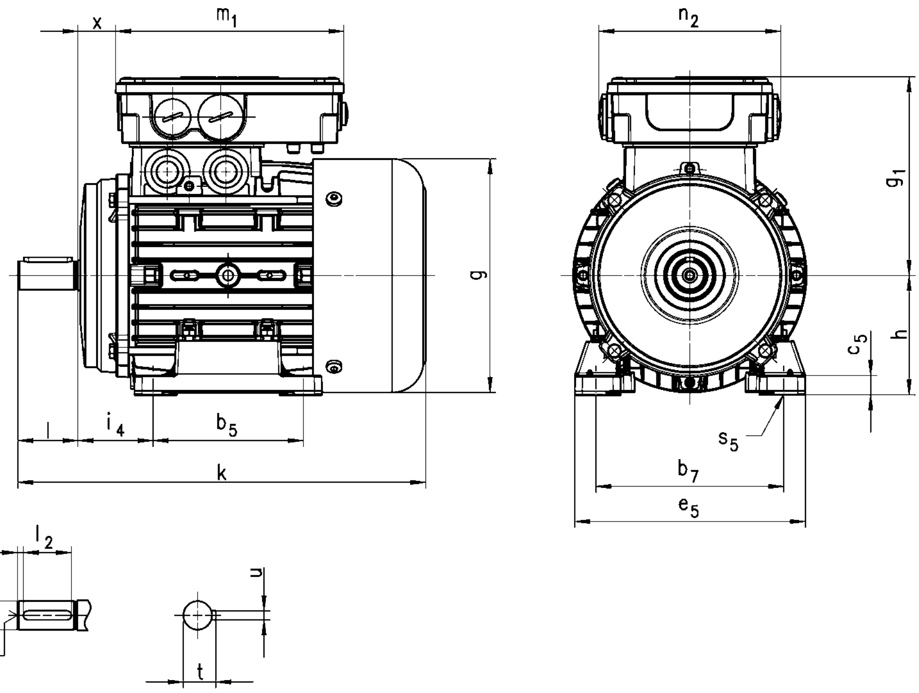
	M_N	M_{max}	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J 1)	m 1)
	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MF□□□□□063-32	1.53	6.00	0.68	75.0	75.0	3.70	4.40
MF□□□□□063-42	2.11	8.00	0.69	79.6	79.6	3.70	4.40
MF□□□□□071-32	3.01	12.0	0.77	81.4	81.4	12.8	6.40
MF□□□□□071-42	4.15	16.0	0.80	82.8	82.8	12.8	6.40
MF□□□□□080-32	6.00	24.0	0.86	84.3	84.3	28.0	11.0
MF□□□□□080-42	8.20	32.0	0.86	85.5	85.5	28.0	11.0
MF□□□□□090-32	10.9	44.0	0.85	87.0	86.6	32.0	18.0
MF□□□□□100-12	14.9	60.0	0.81	87.9	87.7	61.0	26.5
MF□□□□□100-32	20.3	80.0	0.81	88.9	88.7	61.0	26.5
MF□□□□□112-22	29.7	120	0.78	89.8	89.8	107	38.0
MF□□□□□132-12	40.3	160	0.84	88.9	90.6	336	66.0
MF□□□□□132-22	49.6	200	0.84	89.9	91.2	336	66.0
MF□□□□□132-32	59.2	240	0.83	90.5	91.6	336	66.0

1) Without accessories

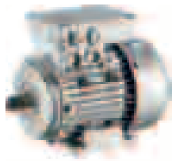


Dimensions, self-ventilated (4-pole)

Design B3



Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	327	176	137	29			399	176	137	29		
100	382	194	147	36			458	194	147	36		
112	392	218	158	38			479	218	158	38		
132	497	258	187	51	194	125	576	258	187	51	194	125



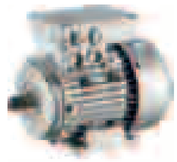
Dimensions, self-ventilated (4-pole)

Design B3

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			338	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	418	178	137	29			436	176	147	28		
100	463	196	147	36			479	194	158	35		
112	472	220	158	38			509	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		

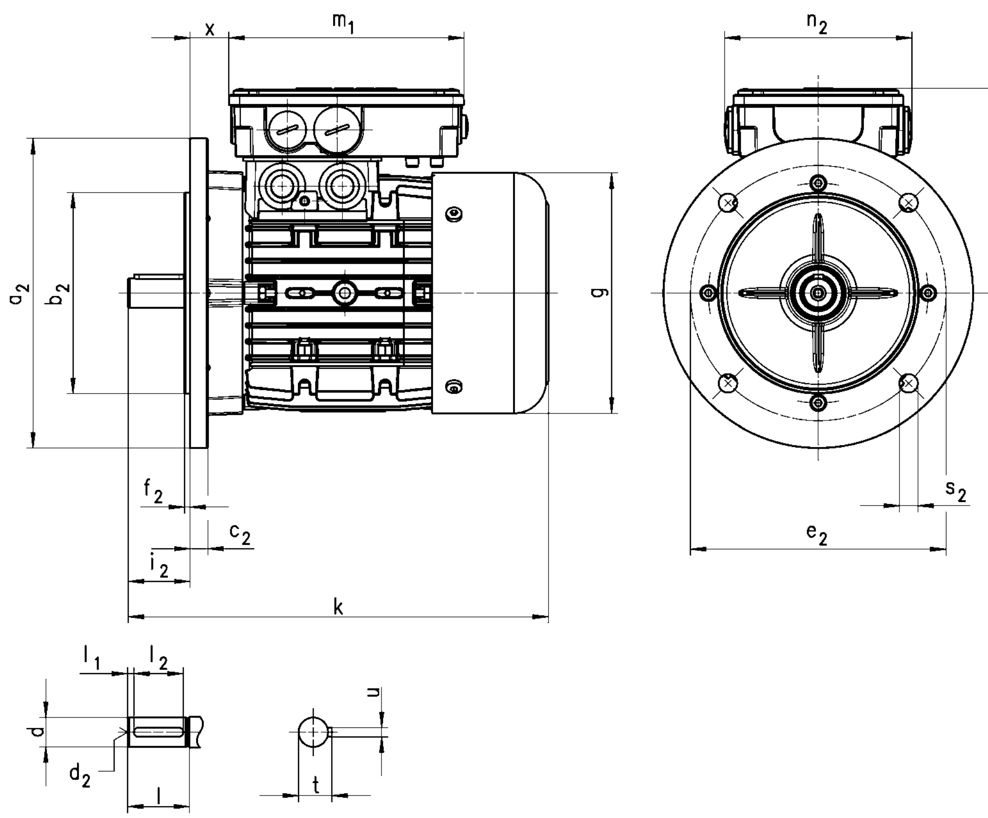
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10	7.0
071	112	45	90	134	71	11	
080	125	50	100	154	80	13	10.0
090	140	56	125	174	90		
100	160	63	140	194	100	15	12.0
112	190	70		223	112	14	
132	216	89	178	260	132	18	

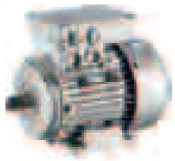


Dimensions, self-ventilated (4-pole)

Design B5



Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	327	176	137	29			399	176	137	29		
100	382	194	147	36			458	194	147	36		
112	392	218	158	38			479	218	158	38		
132	497	258	187	51	194	125	576	258	187	51	194	125



Dimensions, self-ventilated (4-pole)

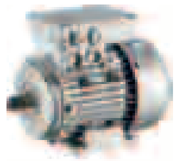
Design B5

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			338	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	418	178	137	29			436	176	147	28		
100	463	196	147	36			479	194	158	35		
112	472	220	158	38			509	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0

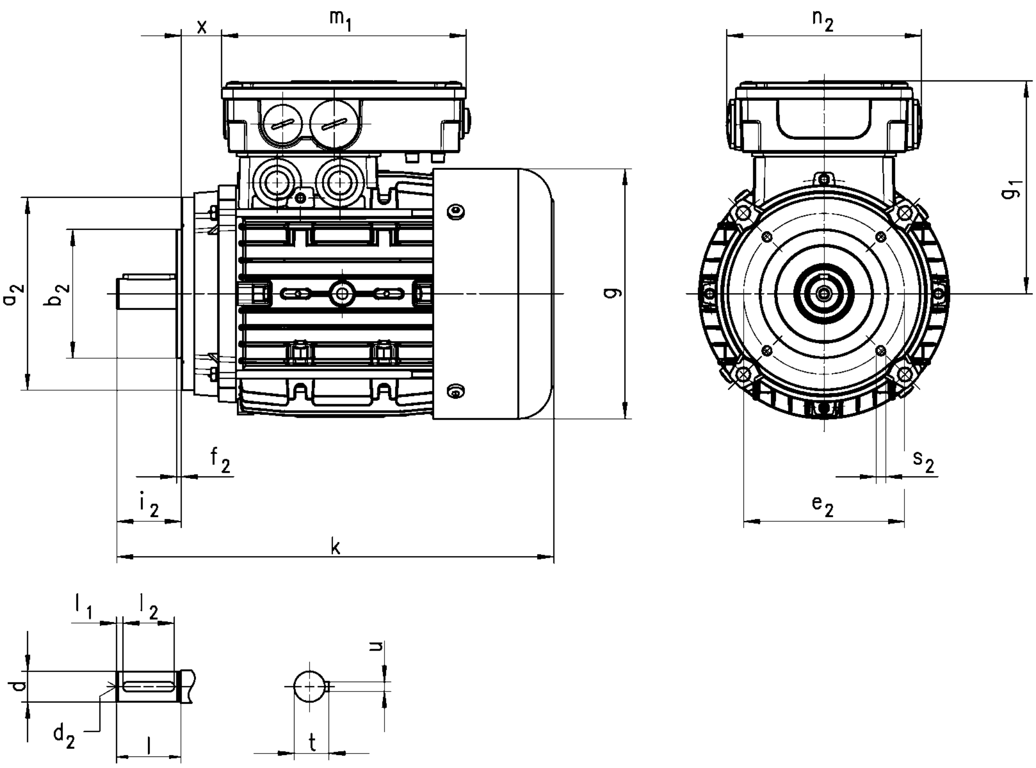
	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23.0
071	FF130	160	110		130	3.5		30.0
080	FF165	200	130	11	165		12.0	40.0
090								50.0
100	FF215	250	180	15	215	4.0	14.5	60.0
112								
132	FF265	300	230	20	265			80.0

5.7

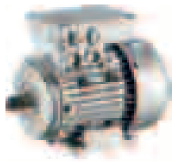


Dimensions, self-ventilated (4-pole)

Design B14



Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	327	176	137	29			399	176	137	29		
100	382	194	147	36			458	194	147	36		
112	392	218	158	38			479	218	158	38		



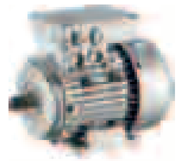
Dimensions, self-ventilated (4-pole)

Design B14

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			338	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	418	178	137	29			436	176	147	28		
100	463	196	147	36			479	194	158	35		
112	472	220	158	38			509	218	168	37		

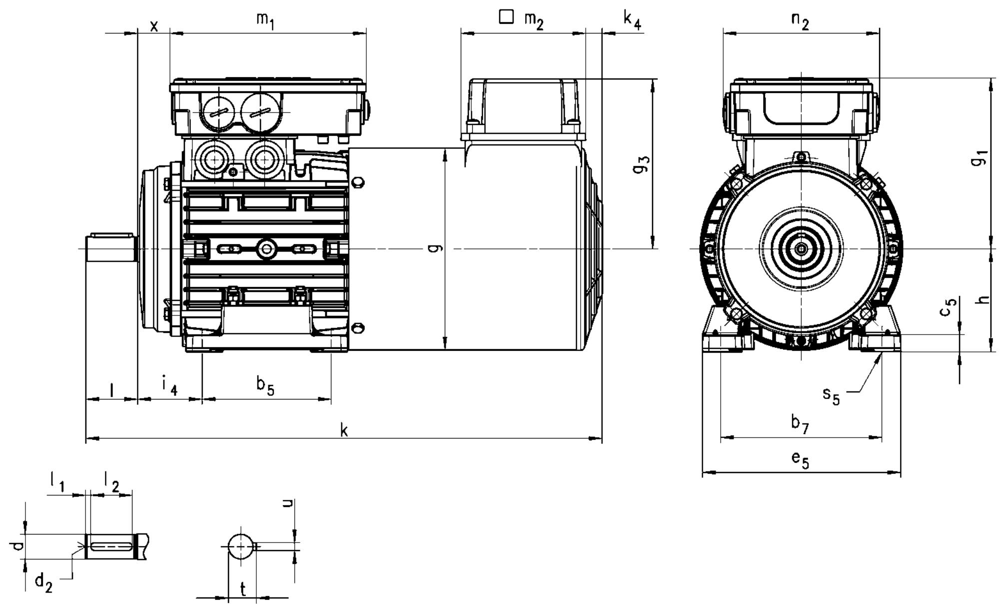
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FT75	90	60	75	2.5	M5x10	23.0
071	FT85	105	70	85		M6x10	30.0
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
	FT130	160	110	130	3.5		
100						M8x14	60.0
112						M8x16	

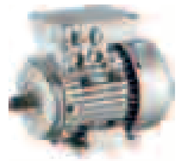


Dimensions, forced ventilated (4-pole)

Design B3



Motor type	MFFMAXX									MFFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	460	176	137	29			141	22	95	513	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		
132	612	257	187	51	194	125	182	32		698	257	187	51	194	125	182	32	



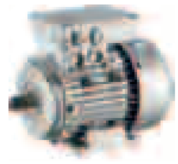
Dimensions, forced ventilated (4-pole)

Design B3

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13	194	125	122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24			132	13	96
090	460	176	137	29			141	22	95	513	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	

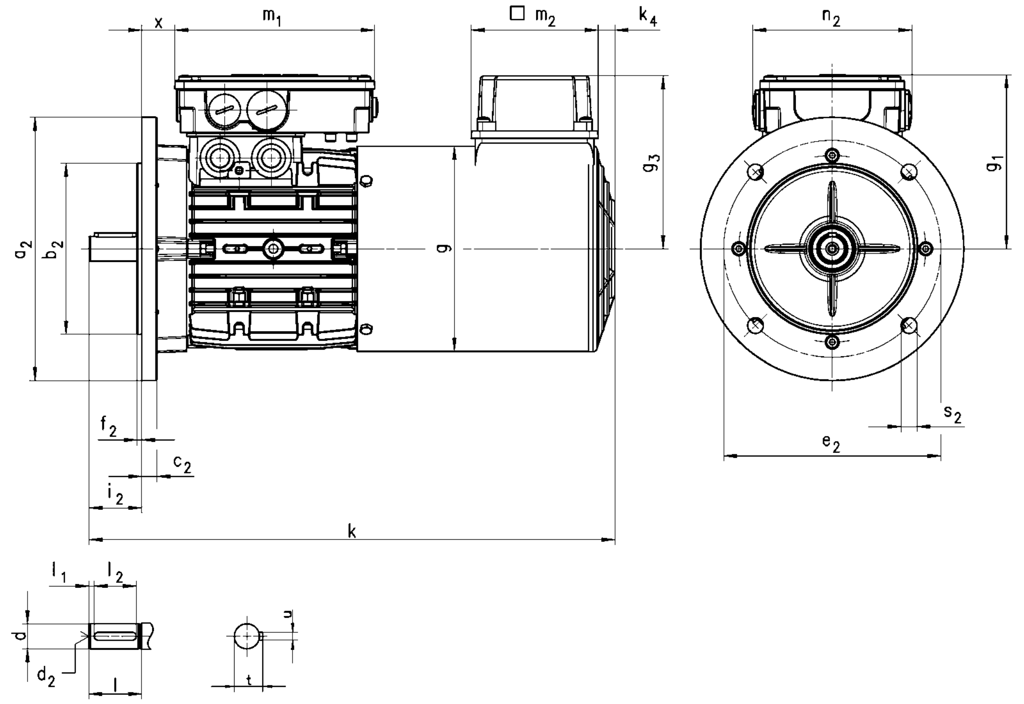
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10	7.0
071	112	45	90	134	71	11	
080	125	50	100	154	80	13	10.0
090	140	56	125	174	90		
100	160	63	140	194	100	15	12.0
112	190	70		223	112	14	
132	216	89	178	260	132	18	

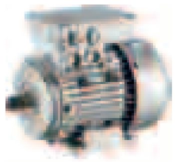


Dimensions, forced ventilated (4-pole)

Design B5



Motor type	MFFMAXX									MFFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	460	176	137	29			141	22	95	513	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		
132	612	257	187	51	194	125	182	32		698	257	187	51	194	125	182	32	



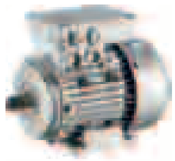
Dimensions, forced ventilated (4-pole)

Design B5

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13	194	125	122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24			132	13	96
090	460	176	137	29			141	22	95	513	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	

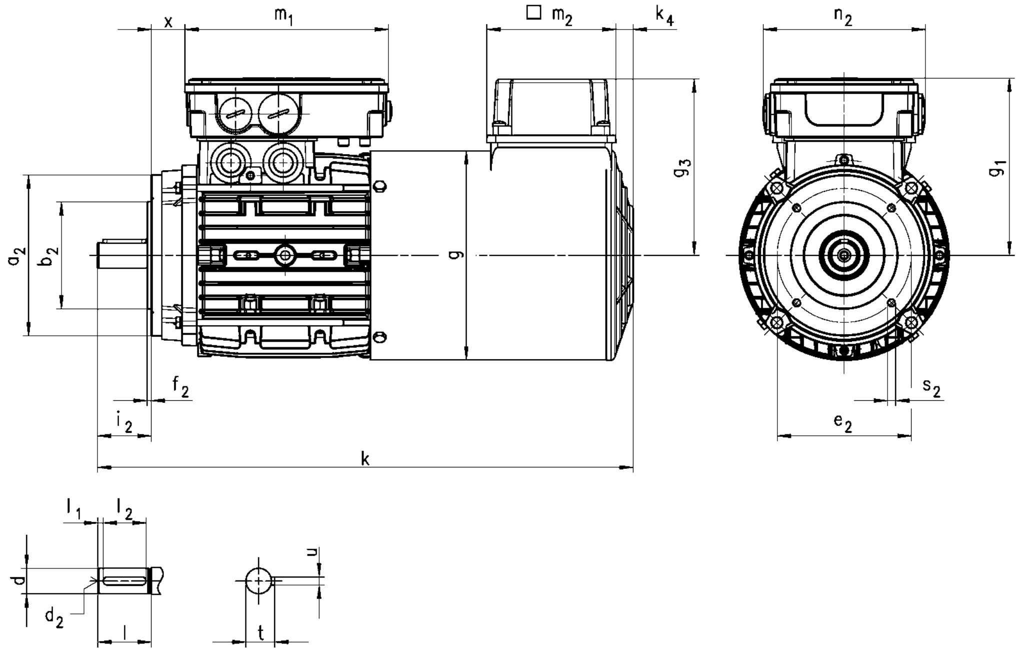
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23.0
071	FF130	160	110		130	3.5		30.0
080	FF165	200	130	11	165		12.0	40.0
090								50.0
100	FF215	250	180	15	215	4.0	14.5	60.0
112								
132	FF265	300	230	20	265			80.0

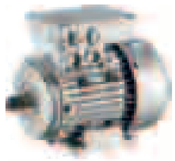


Dimensions, forced ventilated (4-pole)

Design B14



Motor type	MFFMAXX									MFFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	460	176	137	29			141	22	95	513	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		



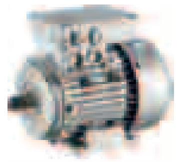
Dimensions, forced ventilated (4-pole)

Design B14

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13			122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24	194	125	132	13	96
090	460	176	137	29			141	22	95	513	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		

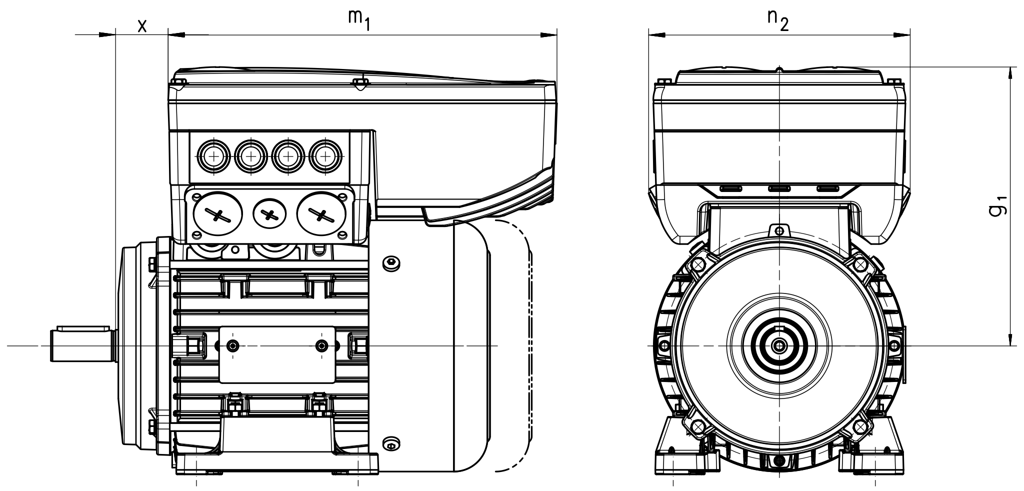
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FT75	90	60	75	2.5	M5x10	23.0
071	FT85	105	70	85		M6x10	30.0
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
100	FT130	160	110	130	3.5	M8x14	60.0
112						M8x16	

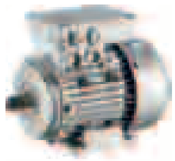


Dimensions, 8400 motec inverter

Rated frequency 120 Hz



Product key					
Motor	Inverter				
		$g_{1,\,120Hz}$	$m_{1,\,120Hz}$	$n_{2,\,120Hz}$	x_{120Hz}
		[mm]	[mm]	[mm]	[mm]
MF□□□□□063-32	E84DVB□5514S□□□2□	154	241	161	23.5
MF□□□□□063-42	E84DVB□7514S□□□2□				
MF□□□□□071-32	E84DVB□1124S□□□2□	163			29.5
MF□□□□□071-42	E84DVB□1524S□□□2□				21.0
MF□□□□□080-32	E84DVB□2224S□□□2□	201	260	176	31.5
MF□□□□□080-42	E84DVB□3024S□□□2□				
MF□□□□□090-32	E84DVB□4024S□□□2□	261	325	195	23.3
MF□□□□□100-12	E84DVB□5524S□□□2□	272			29.9
MF□□□□□100-32	E84DVB□7524S□□□2□				



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

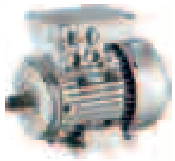
Degree of protection
- Without manual release IP55
- With manual release IP54

Friction lining
- Non-asbestos, low wearing

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

Motor – brake assignment

Design	Standard		LongLife	
Motor frame size	**Size**	**Rated torque**	**Size**	**Rated torque**
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
063-32 063-42	06 06	2.50 4.00	06	4.00
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
080-42	08 08 10 10	3.50 8.00 7.00 16.0	08 10 10	8.00 7.00 16.0



Spring-applied brake

Motor – brake assignment

<table>
<tr><th>Design</th><th colspan="2">Standard</th><th colspan="2">LongLife</th></tr>
<tr><th>Motor frame size</th><th>Size</th><th>Rated torque</th><th>Size</th><th>Rated torque</th></tr>
<tr><td></td><td>Brake</td><td></td><td>Brake</td><td></td></tr>
<tr><td></td><td></td><td>M_k</td><td></td><td>M_k</td></tr>
<tr><td></td><td></td><td>[Nm]</td><td></td><td>[Nm]</td></tr>
<tr><td>090-32</td><td>08
08
10
10
10</td><td>3.50
8.00
7.00
16.0
23.0</td><td>08
10
10</td><td>8.00
7.00
16.0</td></tr>
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12
12</td><td>7.00
16.0
14.0
32.0</td><td rowspan="2">10
12
12</td><td rowspan="2">16.0
14.0
32.0</td></tr>
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16.0
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46.0</td></tr>
<tr><td>112-22</td><td>12
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32.0
35.0
60.0</td><td rowspan="3"></td><td rowspan="3"></td></tr>
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60.0
80.0</td></tr>
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132-32</td><td>14
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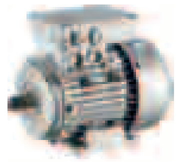
16</td><td>35.0
60.0
60.0
80.0
100</td></tr>
</table>



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

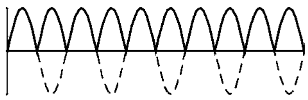
If the brake is not directly supplied with DC voltage, a rectifier is required. This is included in the scope of supply and is located in the terminal box of the motor. The rectifier converts the AC voltage of the connection into DC voltage. The following rectifiers are available:

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

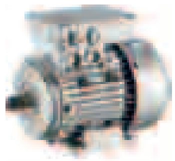
Bridge rectifier, 6-pole

- 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

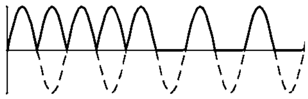


Spring-applied brake

Connection via mains voltage with brake rectifier

Bridge/half-wave rectifier, 6-pole

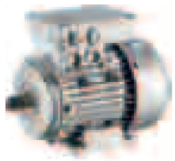
- Supply voltage / brake coil voltage ratio
  up to the overexcitation time = 1.11
  From the overexcitation time = 2.22
- Supply voltages
  AC 230 V
  AC 400 V



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:

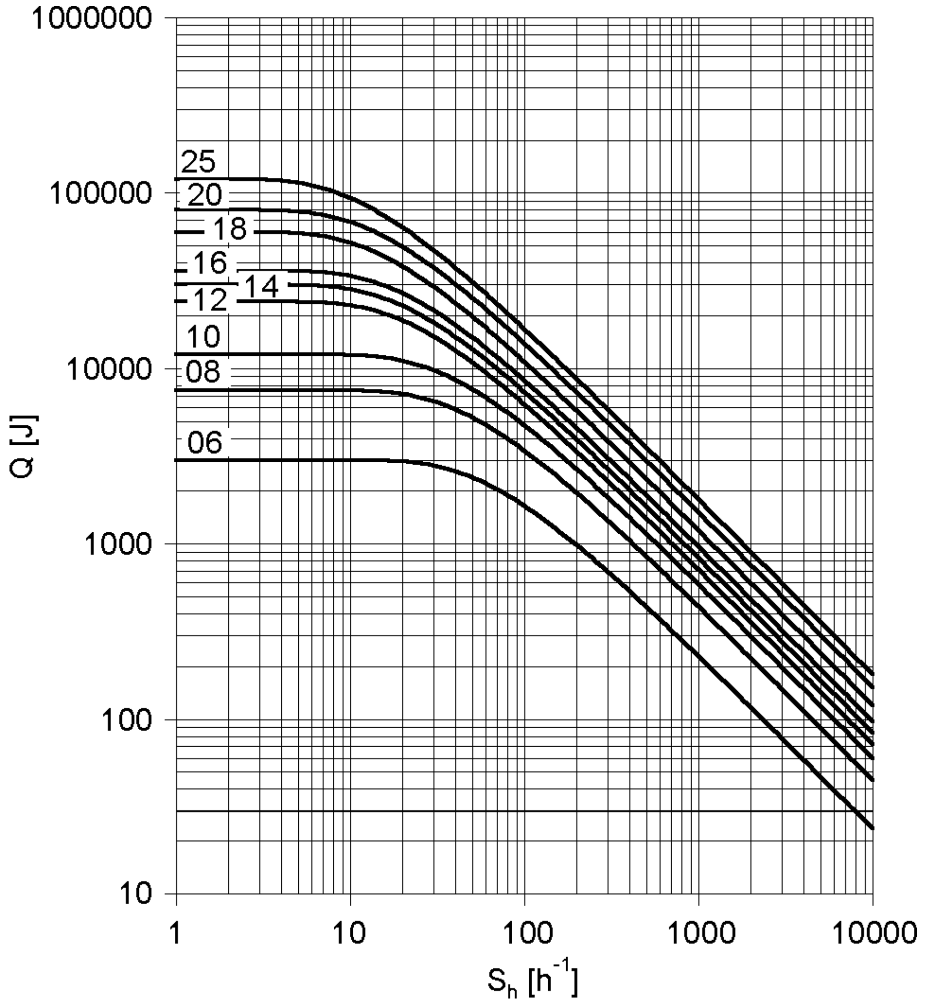
- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_{ü}$ with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.
  These features make this activation version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

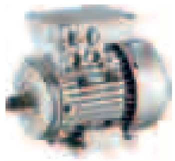


Spring-applied brake

Permissible friction energy



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



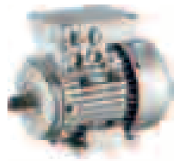
Spring-applied brake

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

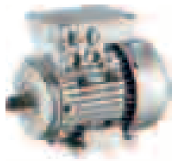
► Activation via half-wave or bridge rectifier

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

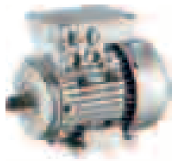
Rated data with standard braking torque

► 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

5.7

[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

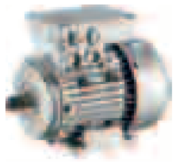
Size			06	08	10	12	14	16	18	20	25
Friction energy	Q_{BW}	[MJ]	85.0	158	264	530	571	966	1542	2322	3522
Delay time Engaging	t_{11}	[ms]	15.0		28.0		17.0	27.0	33.0	65.0	110
Rise time Braking torque	t_{12}	[ms]	13.0	16.0	19.0	25.0		30.0	45.0	100	120
Engagement time	t_1	[ms]	28.0	31.0	47.0	53.0	42.0	57.0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

5.7



Spring-applied brake

Rated data with increased braking torque

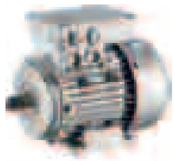
► Please enquire for braking torques and maximum switching work values not listed here.

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

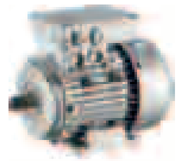
Rated data with increased braking torque

- 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

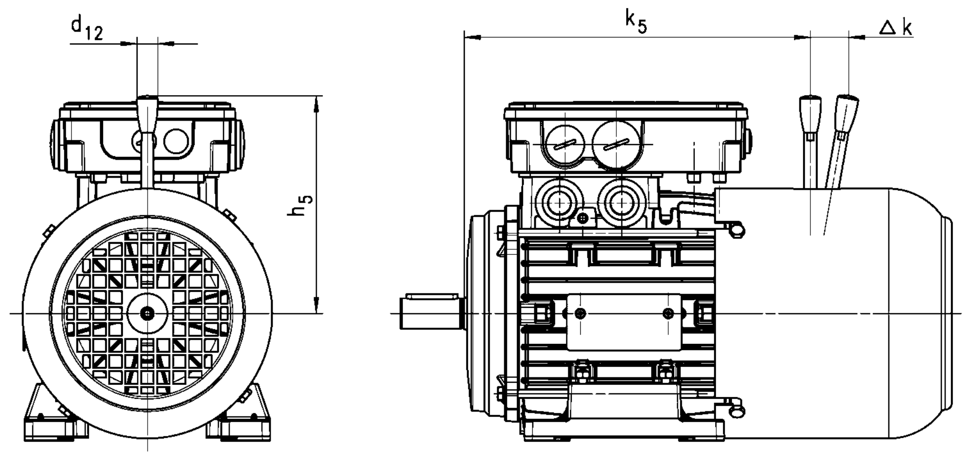
Design			Over-excitation									
Size			10	12	14	16		18	20		25	
Friction energy	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time	$t_{ü}$	[ms]	300		1300							
Min. rest time	t	[ms]	900		3900							
Delay time Engaging	t_{11}	[ms]	29.0	54.0	31.0	70.0	46.0	86.0	103	55.0	171	135
Rise time 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

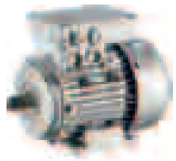
Manual release lever



	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
063	06	178	29	107	13.0
071	06 08	205 206	29 27	107 116	13.0 13.0
080	08 10	224 239	27 28	116 132	13.0 13.0
090	08 10	264 277	27 28	116 132	13.0 13.0
100	10 12	305 307	28 37	132 161	13.0 13.0
112	12 14	320 323	37 41	161 195	13.0 24.0
132	14 16	400 406	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)

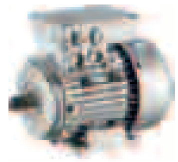


Resolver

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

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

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



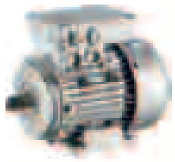
Incremental encoder and SinCos absolute value encoder

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

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

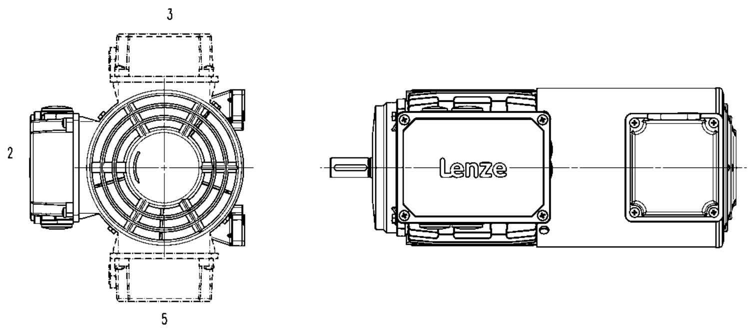
Inverters
- Inverter Drives 8400 StateLine (E84AVSC)
- Inverter Drives 8400 HighLine (E84AVHC)
- Inverter Drives 8400 TopLine (E84AVTC)

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



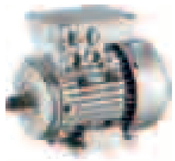
Blower

► The blower terminal box is available in positions 2, 3 or 5.



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

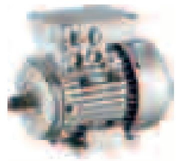
Rated data for 50 Hz

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

Rated data for 60 Hz

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

5.7



Temperature monitoring

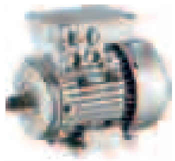
► The thermal sensors are integrated in the windings. The use of an additional motor protection switch is recommended.

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

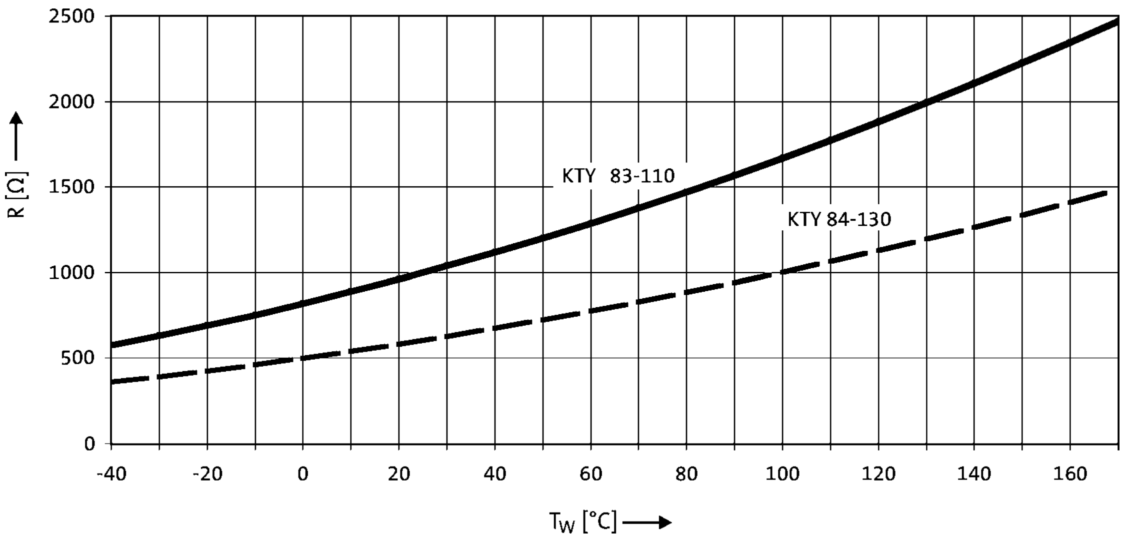


Temperature monitoring

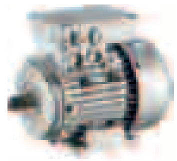
KTY temperature sensor

	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



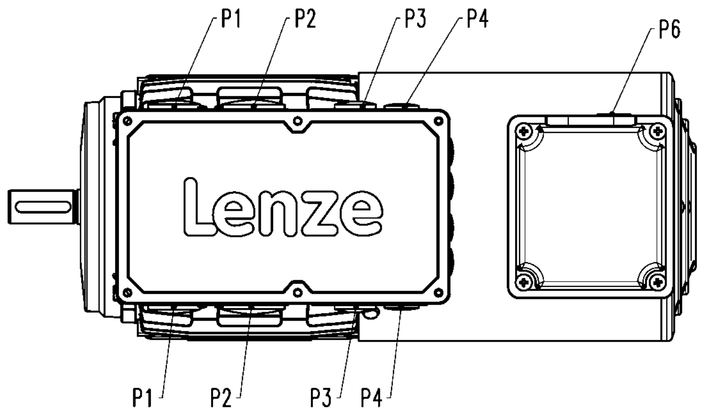
► If the thermal sensor is supplied with a measurement current of 1 mA, the above relationship between the temperature and the resistance applies.



Terminal box

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

Connections

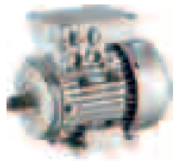


Motor type		
Built-on accessories	M□□MAXX M□□MABR M□□MARS M□□MAIG M□□MAAG	M□□MABS M□□MABI M□□MABA

<table>
<tr><th></th><th>P_1</th><th>P_2</th><th>P_3</th><th>P_4</th><th>P_6</th><th>P_1</th><th>P_2</th><th>P_3</th><th>P_4</th><th>P_6</th></tr>
<tr><th></th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th></tr>
<tr><td>063</td><td rowspan="2">M16x1.5</td><td rowspan="2">M20x1.5</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="7">M16x1.5</td><td rowspan="7">M25x1.5</td><td rowspan="7">M32x1.5</td><td rowspan="7">M20x1.5</td><td rowspan="7">M16x1.5</td><td rowspan="7">M16x1.5</td></tr>
<tr><td>071</td></tr>
<tr><td>080</td><td rowspan="4">M20x1.5</td><td rowspan="4">M25x1.5</td></tr>
<tr><td>090</td></tr>
<tr><td>100</td></tr>
<tr><td>112</td></tr>
<tr><td>132</td><td>M25x1.5</td><td>M32x1.5</td><td>M20x1.5</td><td>M16x1.5</td></tr>
</table>

1) The cable glands P1 to P4 are only arranged at the bottom.

5.7

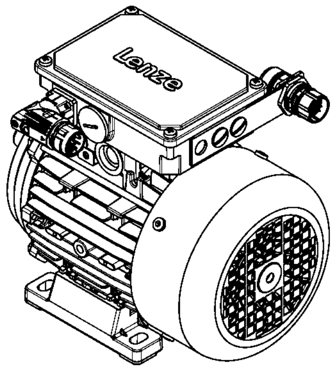


Plug connectors

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

ICN connector

A connector is used for 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.

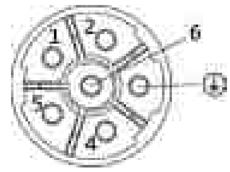


Connection for power, brake and temperature monitoring

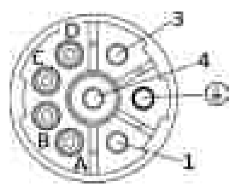
The connectors can be rotated by 270° and are equipped with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional box nuts, existing mating connectors can still be used without difficulty. The motor connection is determined in the terminal box.

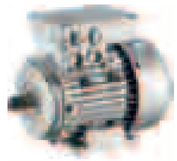
- ICN 6-pole

  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

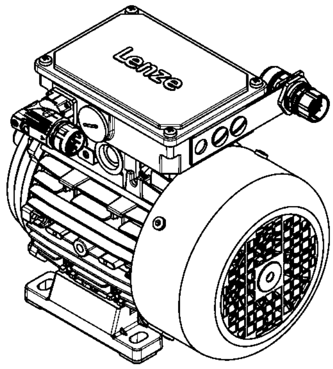
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	W	Phase W power	
4	V	Phase V power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake -/AC	



ICN connector

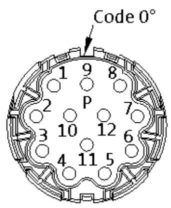
Feedback connection

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



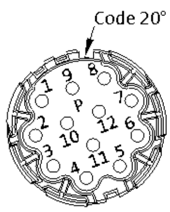
► Resolver

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



► Hiperface incremental encoder and SinCos absolute value encoder

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



ICN connector

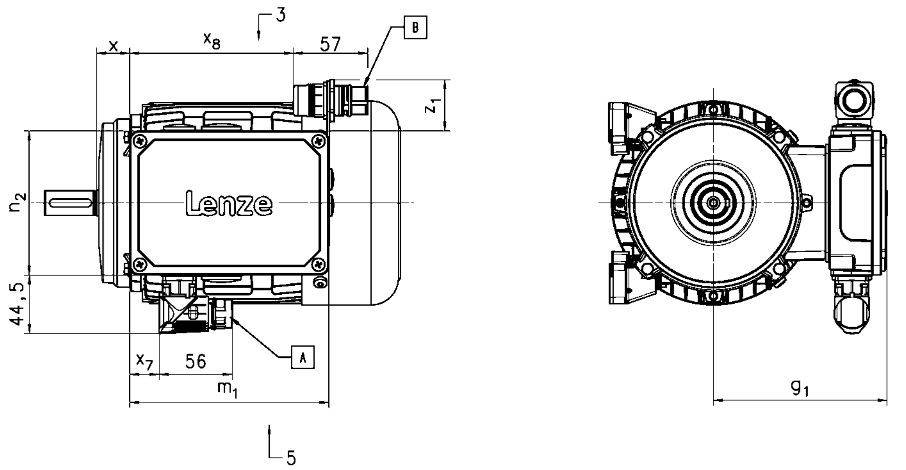
Dimensions of the connectors on the terminal box

The following connector positions are possible:

- power connection (A) in position 5 and feedback connection (B) in position 3
- power connection (A) in position 3 and feedback connection (B) in position 5

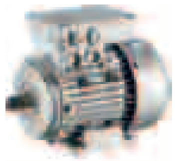
With the following motors, the feedback connection (B) is only available in position 3 or 5:

- motor frame size 132 to 180



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

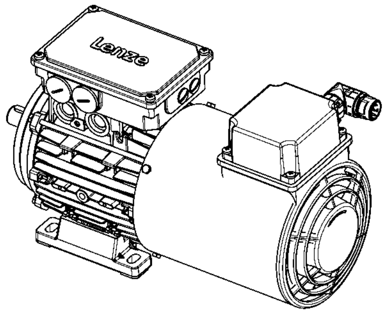
	g_1	x	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	109	17	136	103	16	109	43
071	118	24					
080	132	25	152	121	23	125	41
090	137	29					
100	147	36					
112	158	38					
132	187	51	194	125	27	166	71
160	220	69	253	152		200	65
180	239	75					
200		77					
225	348	68	354	204		328	51



ICN connector

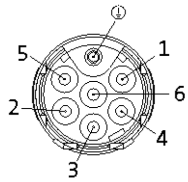
Blower connection

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



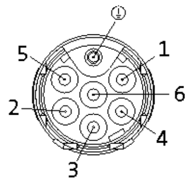
► Blower 1-ph

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



► Blower 3-ph

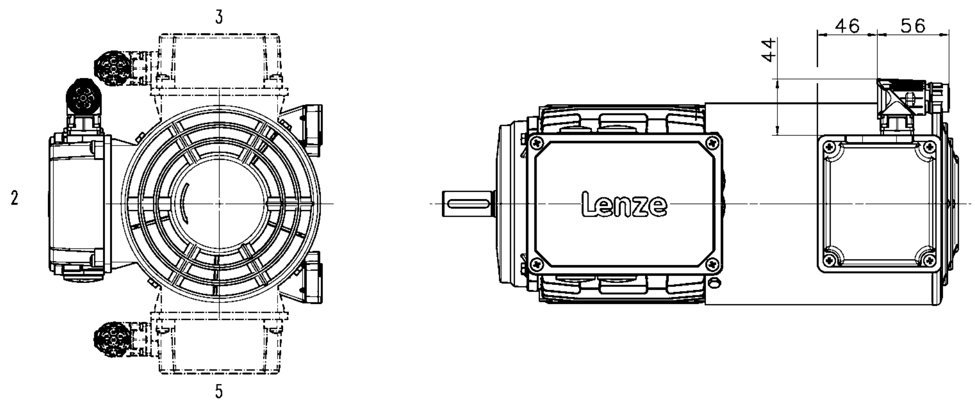
Pin assignment		
Contact	Designation	Meaning
PE	PE	PE conductor
1	U	Phase U power
2		Not assigned
3	V	Phase V power
4		Not assigned
5		
6	W	Phase W power

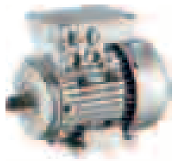


ICN connector

Blower connection

- The blower terminal box is available in positions 2, 3 or 5.
- In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.



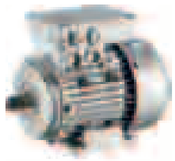


M12 connector

IG128-24V-H incremental encoder connection

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

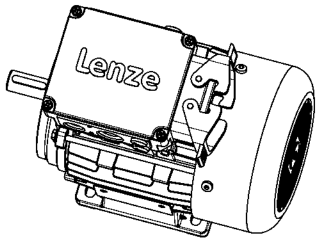
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

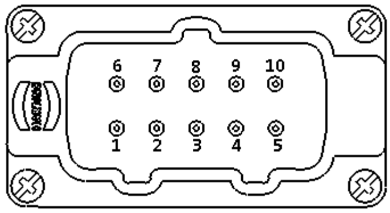


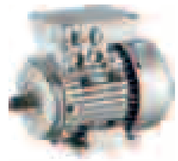
HAN connector

10E

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



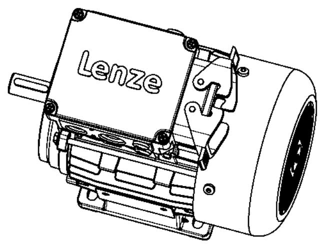
Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	



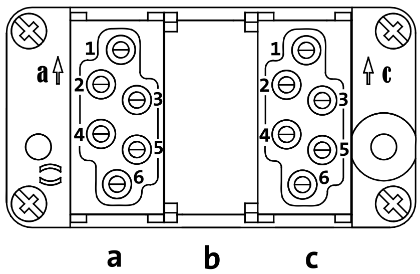
HAN connector

HAN modular

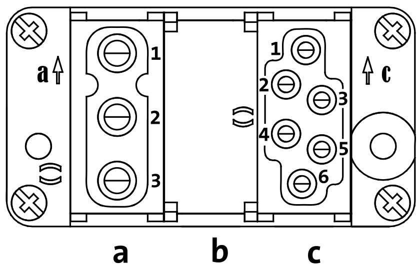
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.

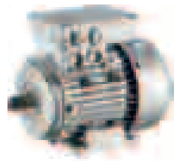


► HAN modular 16 A

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	

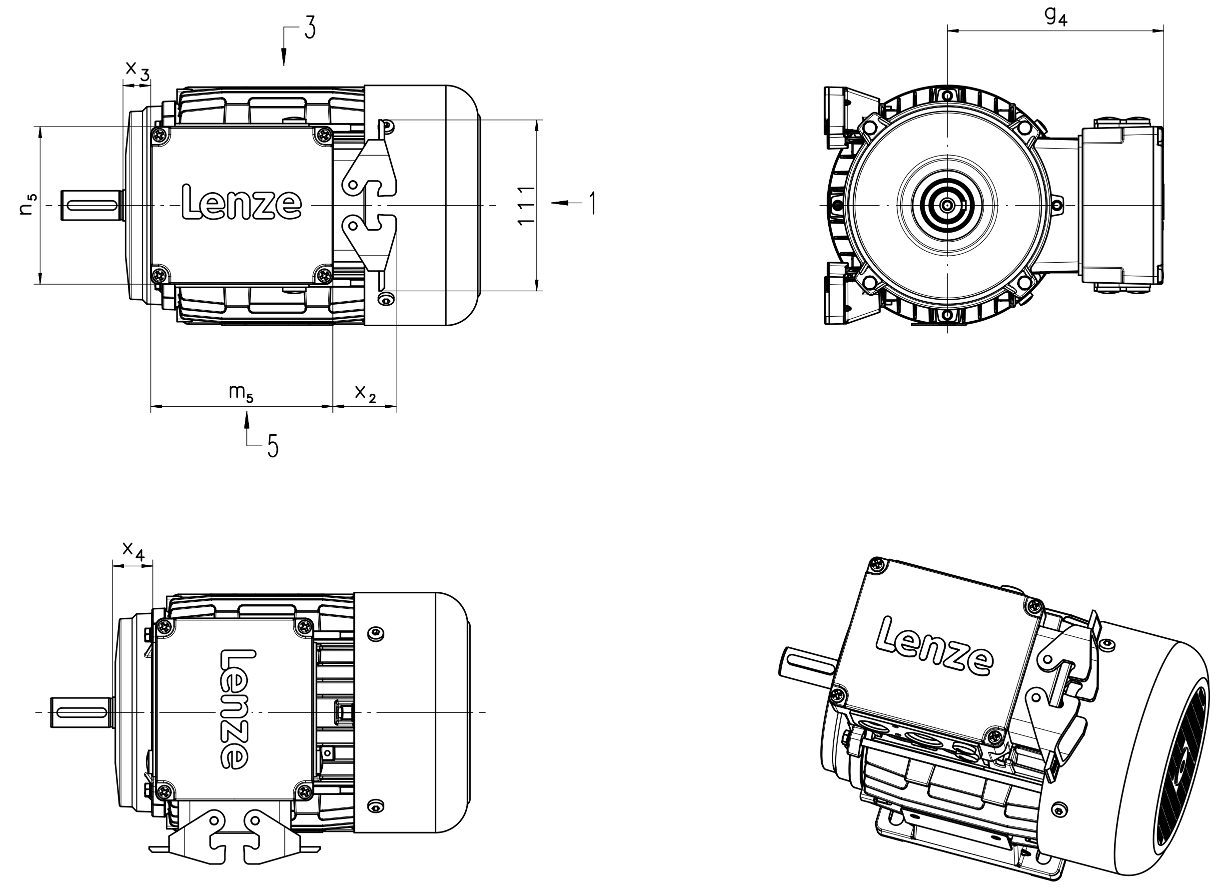
► HAN modular 40 A

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	



HAN connector

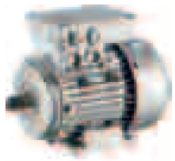
► The connection position for the connector is shown in position 1. Positions 3 and 5 are also possible.

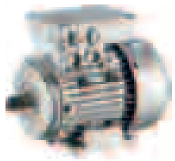


Motor type	
	M□□MAXX M□□MABR

	g_4	m_5	n_5	x_2	x_3	x_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	120	118	102	41	11	12
071	129				16	17
080	138				18	26
090	143				22	30
100	154				29	37
112	164				28	36
132 [1)]	233	120	180	47	48	18
160	248				72	42

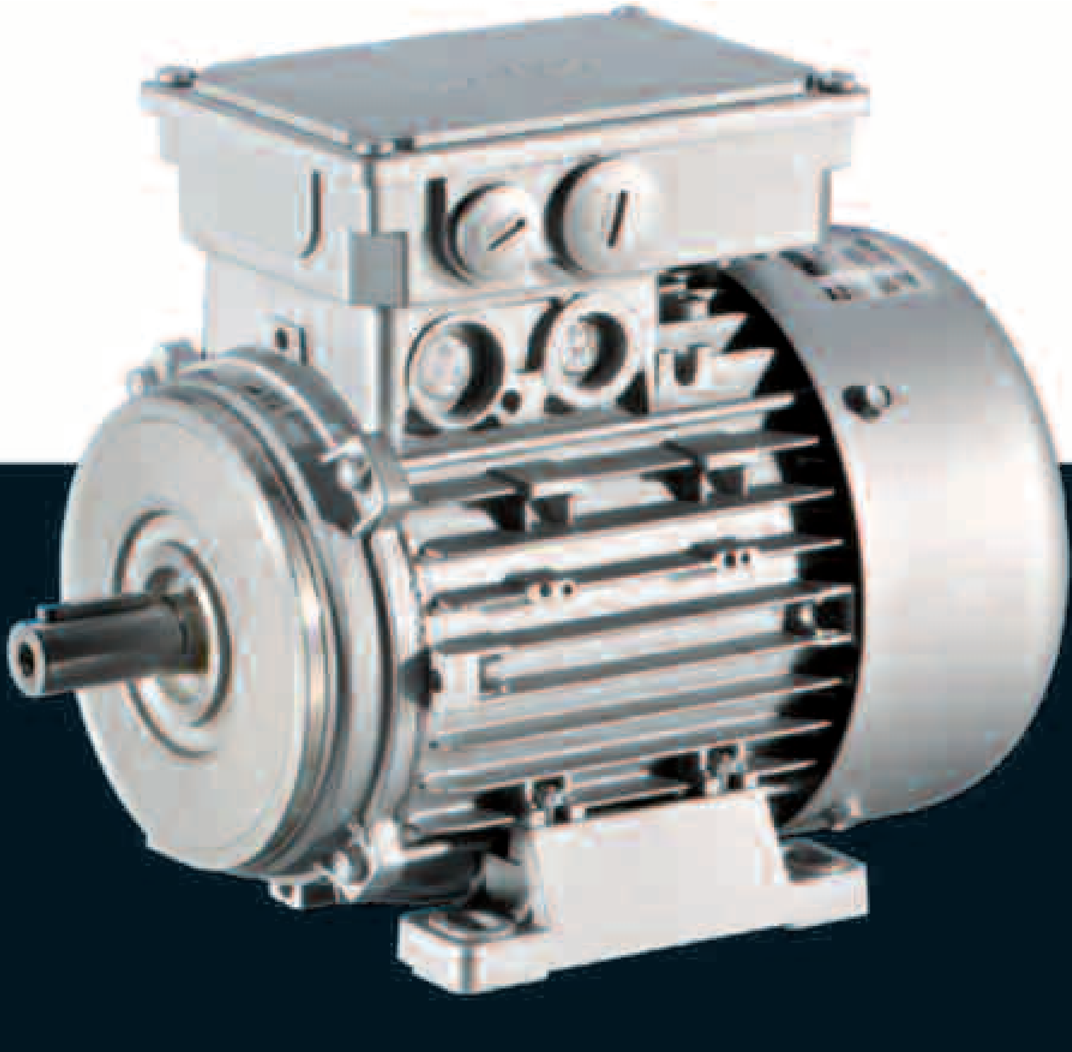
1) In the case of the B5 design motors, it is not possible to connect the connector at position 3 or 5.





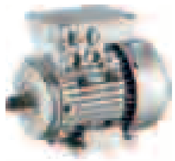
IE2 MH three-phase AC motors

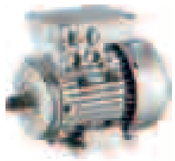
0.75 to 45 kW



IE2 MH three-phase AC motors

Contents



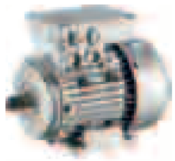


List of abbreviations

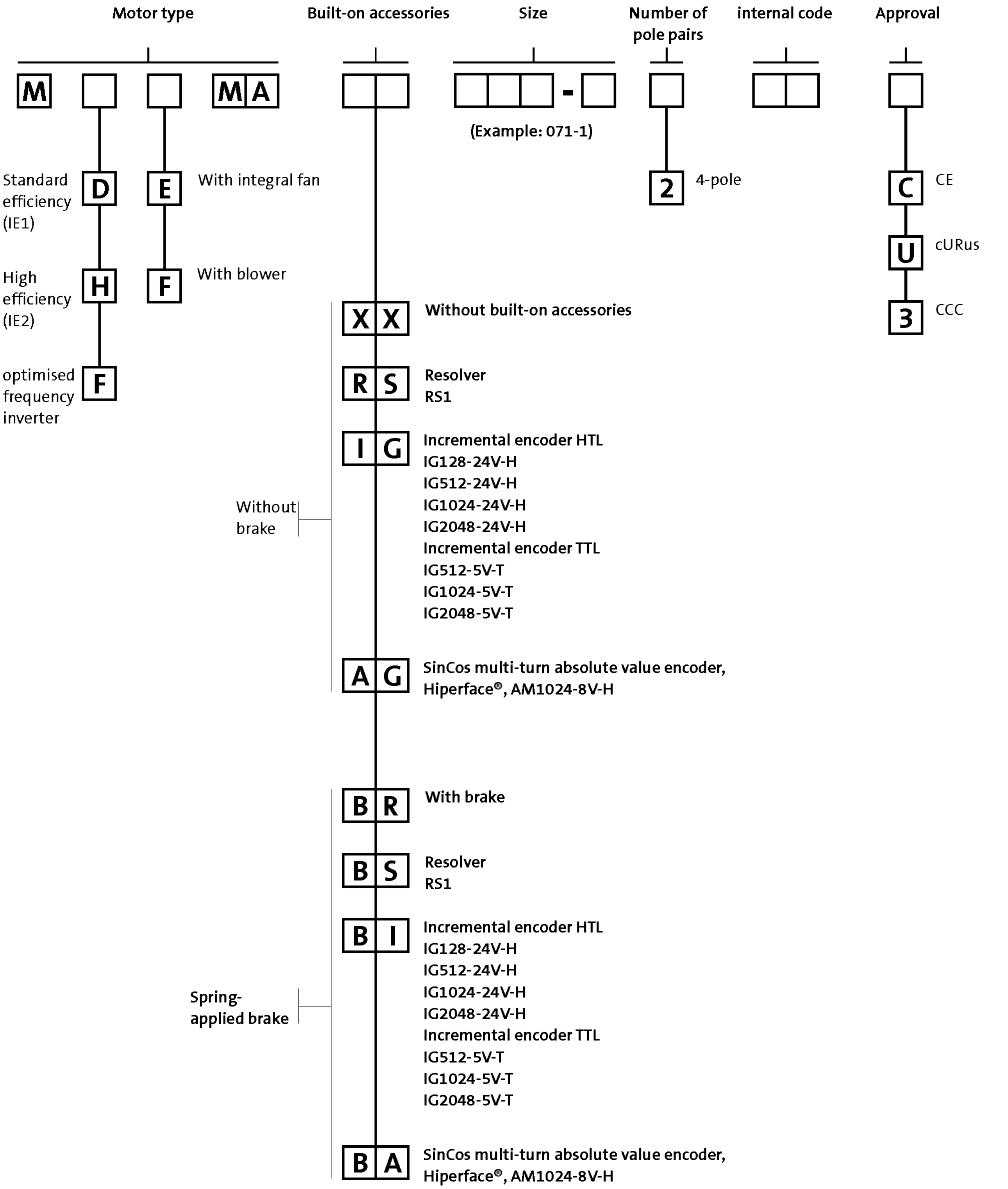
$\eta_{100\,\%}$	[%]	Efficiency
$\eta_{75\,\%}$	[%]	Efficiency
$\eta_{50\,\%}$	[%]	Efficiency
$\cos\phi$		Power factor
I_N	[A]	Rated current
I_{max}	[A]	Max. current consumption
J	[kgcm²]	Moment of inertia
m	[kg]	Mass
M_a	[Nm]	Starting torque
M_b	[Nm]	Stalling torque
M_{max}	[Nm]	Max. torque
M_N	[Nm]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

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

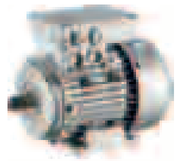
CE	Communauté Européenne
CSA	Canadian Standards Association
DIN	Deutsches Institut für Normung e.V.
EMC	Electromagnetic compatibility
EN	European standard
IEC	International Electrotechnical Commission
IM	International Mounting Code
IP	International Protection Code
NEMA	National Electrical Manufacturers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



Product key



Motor type
Built-on accessories
Size
Number of pole pairs
internal code
Approval
M
MA
(Example: 071-1)
Standard efficiency (IE1)
D
E
With integral fan
2
4-pole
C
CE
U
cURus
High efficiency (IE2)
H
F
With blower
3
CCC
optimised frequency inverter
F
Without brake
XX
Without built-on accessories
RS
Resolver RS1
IG
Incremental encoder HTL
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
Incremental encoder TTL
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
AG
SinCos multi-turn absolute value encoder, Hiperface®, AM1024-8V-H
Spring-applied brake
BR
With brake
BS
Resolver RS1
BI
Incremental encoder HTL
IG128-24V-H
IG512-24V-H
IG1024-24V-H
IG2048-24V-H
Incremental encoder TTL
IG512-5V-T
IG1024-5V-T
IG2048-5V-T
BA
SinCos multi-turn absolute value encoder, Hiperface®, AM1024-8V-H



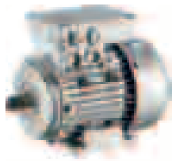
Product information

For a long time now, three-phase AC motors from Lenze have been established in virtually all industrial sectors. Based on our many years of experience in the field of drive and automation technology, we have developed motors, which will ensure that your demands in terms of productivity, quality and availability are perfectly met.
Three-phase AC motors from the L-force series are primarily characterised by their comprehensive modularity. The wide variety of options allows you to precisely adjust the drive characteristics in line with your application. We call this Rightsizing.

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

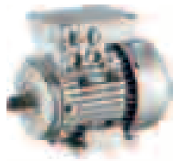
Basic versions
- The motors feature B3, B5 and B14 designs and dimensions standardised in line with IEC 60072-1 and/or DIN EN 50347 which makes then suitable for universal use.
- The thermal sensors integrated as standard allow for permanent temperature monitoring and are coordinated to the motor winding's temperature class F (155 °C).
- The motors of the basic version are adapted to ambient conditions by IP55 degree of protection .
- In tough operating conditions, the surface and corrosion protection system is provided to reliably protect the motor from aggresive media.

Options
- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach 10×10^6 switching cycles.
- A resolver and various incremental and absolute value encoders can be fitted for speed and position detection.
- For fast commissioning, the motors are also available with connectors for the power connection, brake, blower and feedback.
- Instead of an integral fan, the motor can optionally be equipped with a blower. No torque reduction is then necessary, even at speeds below 20 Hz.
- For drive tasks in decentralised applications, the motor can be ordered with the motec inverter connected to the terminal box.
- The motors are available with cURus, GOST-R, CCC and UkrSepro approval.



Functions and features

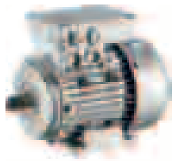
Size				
Motor		080	090	100
Design				
		B3 B5 B14		
Shaft journal				
d x l	[mm]	19 x 40	24 x 50	28 x 60
Spring-applied brake				
Design		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise		
Feedback				
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)		
Temperature sensor				
Thermal contact		TKO		
Thermal detector		KTY83-110 KTY84-130		
PTC thermistor		PTC		
Motor connection				
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector		
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector		
Blower connection		Terminal box ICN connector		
Feedback connection		Terminal box ICN connector		
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection		
Shaft bearings				
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour				
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		



Functions and features

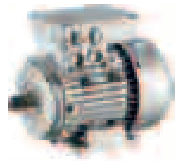
Size				
Motor		112	132	160
Design				
		B3 B5 B14	B3 B5	
Shaft journal				
d x l	[mm]	28 x 60	38 x 80	42 x 110
Spring-applied brake				
Design		Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise		
Feedback				
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)		
Temperature sensor				
Thermal contact		TKO		
Thermal detector		KTY83-110 KTY84-130		
PTC thermistor		PTC		
Motor connection				
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector	Terminal box ICN connector HAN modular connector	Terminal box HAN modular connector
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector	Terminal box ICN connector HAN modular connector	Terminal box HAN modular connector
Blower connection		Terminal box ICN connector		
Feedback connection		Terminal box ICN connector		
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection		
Shaft bearings				
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour				
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		

5.8



Functions and features

Size				
Motor		180	200	225
Design				
			B3 B5	
Shaft journal				
d x l	[mm]	48 x 110	55 x 110	60 x 140
Spring-applied brake				
Design			Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback				
Design			Resolver Incremental encoder Absolute value encoder (multi-turn)	
Temperature sensor				
Thermal contact			TKO	
Thermal detector			KTY83-110 KTY84-130	
PTC thermistor			PTC	
Motor connection				
Power connection			Terminal box	
Brake connection			Terminal box	
Blower connection			Terminal box ICN connector	
Feedback connection			Terminal box ICN connector	
Temperature sensor connection			Terminal box	
Shaft bearings				
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		Drive end
Bearing type			Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates	
Colour				
			Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours	



Functions and features

Surface and corrosion protection

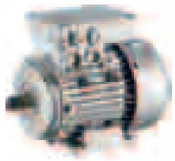
For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

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

Surface and corrosion protection system	Applications	Measures
OKS-G (primed)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey)
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating corresponding to corrosivity category C1 (subject to EN 12944-2)
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)
OKS-L (high) OKS-XL (extra 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 • Screws zinc-coated • Cable glands with gaskets • Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request) Optional measures: • Motor recesses sealed off (on request)

Structure of surface coating

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

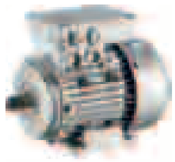


Motor – inverter assignment

Rated frequency 50/60 Hz

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

Rated power	Product key		
	Motor	Inverter	
P_N			
[kW]			
0.75	MH□□□□□080-32	E84DVB□7514S□□□2□	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

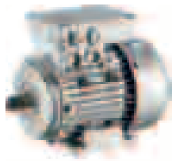


Motor – inverter assignment

Rated frequency 87 Hz

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

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

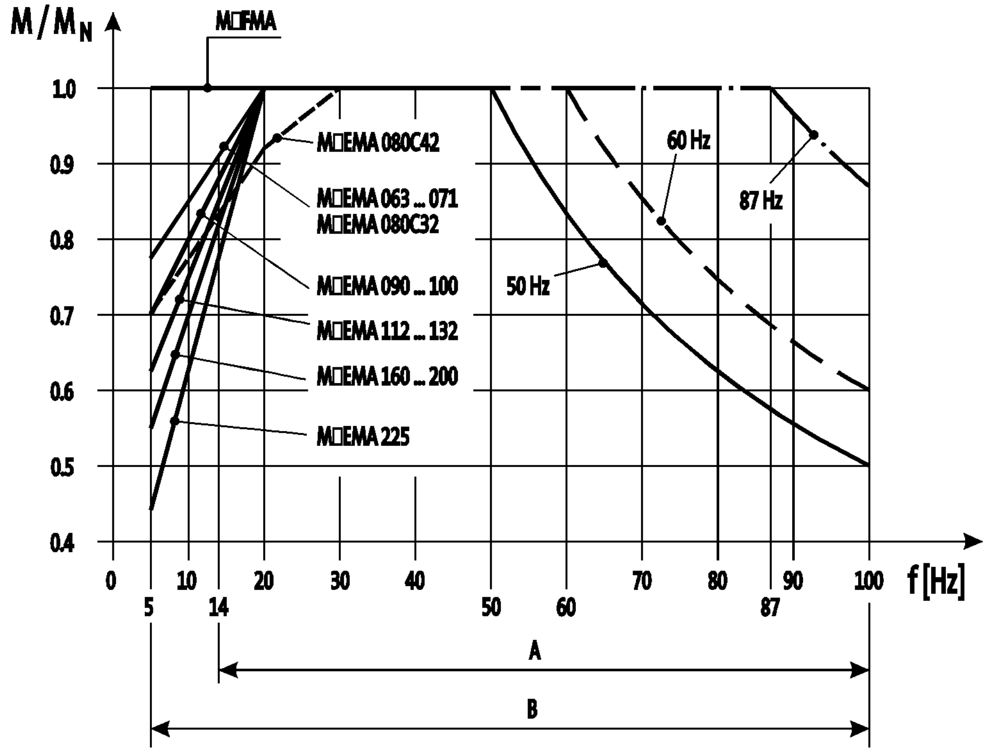


Dimensioning

Torque derating at low motor frequencies

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



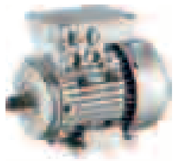
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

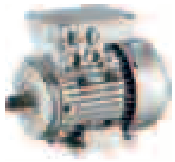
► The motor specifications stated in this catalogue for inverter operation apply to operation with a Lenze inverter. If you are uncertain, get in touch with the manufacturer of the inverter to ask whether the device is capable of driving the motor with the stated specifications (e.g. setting range, base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

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

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

Please contact your Lenze sales office.



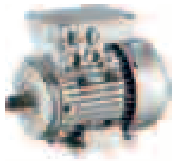


Standards and operating conditions

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

[1] Designs with different degrees of protection:
IP55 with brake (IP54 with manual release lever).
IP54 with resolver RS1.
IP54 with HTL incremental encoder IG128-24V-H.
[2] Motor frame size 225, in preparation.

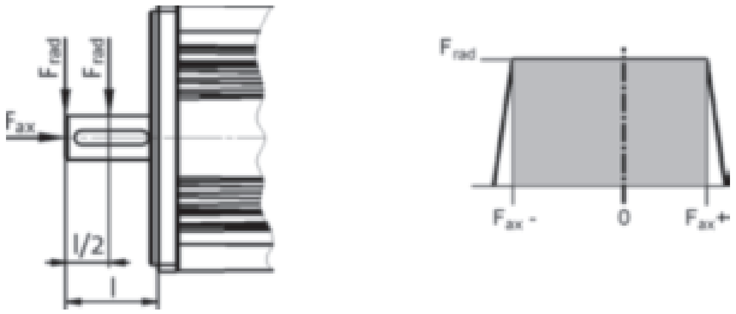
► In the European Union, the ErP Directive stipulates minimum efficiency levels for three-phase AC motors. Geared three-phase AC motors that do not conform with this Directive do not meet CE requirements and must not be marketed in the European Economic Area. For further information about the ErP Directive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



Permissible radial and axial forces

- Forces at medium speed 2000 r/min.

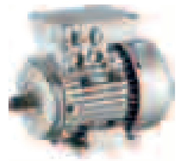
Application of forces



Application of force at l/2

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	600	-600	300	470	-480	180	410	-430	120	350	-370	70
071	740	-800	470	590	-630	300	510	-550	220	430	-470	140
080	960	-1090	580	770	-860	350	670	-760	250	570	-650	140
090	1050	-1160	630	840	-920	390	730	-800	280	620	-690	160
100	1490	-1490	910	1190	-1160	580	1050	-1010	430	890	-860	270
112	2250	-2330	1340	1790	-1830	840	1570	-1600	610	1330	-1360	370
132	3300	-2150	1190	2640	-1670	710	2320	-1440	480	1970	-1210	250
160	3750	-2700	1520	3000	-2130	950	2640	-1830	670	2250	-1440	360
180	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
200	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
225	5200	-3100	3900	3900	-2100	2900	3300	-1300	2100	2650	-1000	1800

- The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
- Data for axial forces relate to the maximum radial force with the corresponding bearing service life.



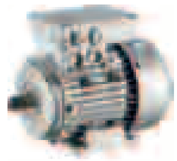
Permissible radial and axial forces

► Forces at medium speed 2000 r/min.

Application of force at l

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	400	-600	300	370	-480	180	320	-430	120	300	-370	70
071	680	-800	470	540	-630	300	470	-550	220	400	-470	140
080	880	-1090	580	700	-860	350	610	-760	250	520	-650	140
090	940	-1160	630	750	-920	390	660	-800	280	560	-690	160
100	1350	-1490	910	1080	-1160	580	940	-1010	430	800	-860	270
112	2040	-2330	1340	1620	-1830	840	1420	-1600	610	1210	-1360	370
132	3020	-2150	1190	2420	-1670	710	2120	-1440	480	1800	-1210	250
160	3410	-2700	1520	2730	-2130	950	2400	-1830	670	2050	-1440	360
180	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
200	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
225	4800	-3100	3900	3600	-2100	2900	3000	-1300	2100	2400	-1000	1800

► The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
► Data for axial forces relate to the maximum radial force with the corresponding bearing service life.



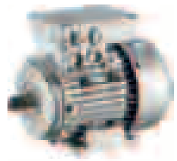
Rated data for 50 Hz

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□□□□□200-32	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□□□□□200-32	196	469	528	0.87	91.9	92.5	92.3	1850	315
MH□□□□□225-12	238	620	620	0.87	94.0	94.6	94.3	4610	395
MH□□□□□225-22	290	698	669	0.88	93.7	94.5	94.3	5300	415

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



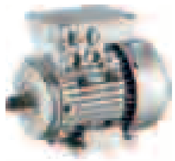
Rated data for 60 Hz

4-pole motors

	P_N	n_N	$U_{N,\Delta}$ [2)]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MH□□□□□080-32	0.75	1720	265	2.80	460	1.60	5.80
MH□□□□□090-12	1.10	1740	265	4.00	460	2.30	6.50
MH□□□□□090-32	1.50	1745	265	5.10	460	3.00	7.20
MH□□□□□100-12	2.20	1750	265	7.70	460	4.40	6.90
MH□□□□□100-32	3.00	1755	265	10.6	460	6.10	7.70
MH□□□□□112-22	4.00	1760	265	12.8	460	7.40	7.00
MH□□□□□132-12	5.50	1775	265 460 [3)]	18.0 10.4	460	10.4	7.10
MH□□□□□132-22	7.50	1765	265 460 [3)]	24.2 14.0	460	14.0	9.70
MH□□□□□160-22	11.0	1775	265 460 [3)]	32.5 18.7	460	18.7	9.40
MH□□□□□160-32	15.0	1775	265 460 [3)]	44.1 24.5	460	24.5	9.80
MH□□□□□180-12	18.5	1775	265 460 [3)]	51.1 29.4	460	29.4	9.70
MH□□□□□180-32	22.0	1775	265 460 [3)]	59.7 34.4	460	34.4	9.00
MH□□□□□200-32	30.0	1770	265 460 [3)]	80.7 46.5	460	46.5	8.10
MH□□□□□225-12	37.0	1787	265 460 [3)]	92.5 53.4	460	53.4	8.70
MH□□□□□225-22	45.0	1784	265 460 [3)]	111 64.2	460	64.2	8.80

	M_N	M_a	M_b	cos ϕ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1)]	m [1)]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	4.16	9.37	9.89	0.82	77.9	81.5	82.5	28.0	11.0
MH□□□□□090-12	6.04	17.0	20.0	0.71	79.3	83.0	84.0	32.0	16.0
MH□□□□□090-32	8.21	27.0	28.0	0.75	79.3	83.0	84.0	36.0	18.0
MH□□□□□100-12	12.0	40.0	47.0	0.78	82.6	86.5	87.5	61.0	24.0
MH□□□□□100-32	16.3	55.0	64.0	0.71	84.2	86.6	87.5	66.0	26.5
MH□□□□□112-22	21.7	69.0	84.0	0.79	84.2	86.6	87.5	135	38.0
MH□□□□□132-12	29.6	74.0	92.0	0.77	86.1	88.6	89.5	290	59.0
MH□□□□□132-22	40.6	92.0	147	0.79	86.1	88.6	89.5	336	66.0
MH□□□□□160-22	59.2	148	231	0.81	89.3	90.9	91.0	570	109
MH□□□□□160-32	80.7	210	274	0.81	89.3	90.9	91.0	760	124
MH□□□□□180-12	99.5	338	348	0.86	90.6	92.3	92.4	1390	175
MH□□□□□180-32	118	379	355	0.87	90.6	92.3	92.4	1440	180
MH□□□□□200-32	162	440	505	0.87	92.0	92.9	93.0	1850	315
MH□□□□□225-12	198	590	590	0.87	92.0	92.9	93.0	4610	395
MH□□□□□225-22	241	660	635	0.88	92.6	93.5	93.6	5300	415

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

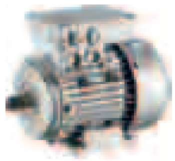


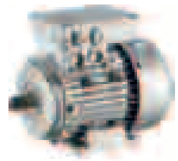
Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N, \Delta}$	$I_{N, \Delta}$	cos ϕ	$\eta_{50\,\%}$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
					± 10 %							
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	1.35	2520	5.12	20.0	400	3.10	0.84	77.3	81.6	83.5	28.0	11.0
MH□□□□□090-12	2.00	2540	7.52	30.0	400	4.60	0.78	80.4	84.9	86.5	32.0	16.0
MH□□□□□090-32	2.70	2545	10.1	40.0	400	5.80	0.76	82.3	85.5	86.0	36.0	18.0
MH□□□□□100-12	3.90	2555	14.6	60.0	400	8.60	0.83	85.7	89.6	90.0	61.0	24.0
MH□□□□□100-32	5.40	2555	20.2	80.0	400	12.1	0.76	84.7	87.9	88.5	66.0	26.5
MH□□□□□112-22	7.10	2565	26.4	106	400	14.5	0.83	87.4	90.2	90.9	135	38.0
MH□□□□□132-12	9.70	2580	35.9	144	400	20.6	0.82	88.2	91.4	91.8	290	59.0
MH□□□□□132-22	13.2	2570	49.1	196	400	27.0	0.82	88.2	90.1	90.7	336	66.0
MH□□□□□160-22	19.4	2580	71.8	287	400	37.7	0.81	90.6	91.0	91.6	570	109
MH□□□□□160-32	26.4	2580	97.7	391	400	50.3	0.81	91.4	91.0	91.6	760	124
MH□□□□□180-12	32.5	2585	120	480	400	58.8	0.86	92.0	92.2	92.8	1390	175
MH□□□□□180-32	38.7	2580	143	573	400	68.9	0.87	92.1	92.9	93.4	1440	180
MH□□□□□200-32	52.7	2575	196	782	400	92.6	0.87	92.6	92.7	93.2	1850	315
MH□□□□□225-12	64.0	2593	236	920	400	113	0.87	93.0	94.4	94.8	4610	395
MH□□□□□225-22	78.0	2590	288	1150	400	137	0.85	93.5	94.3	94.7	5300	415

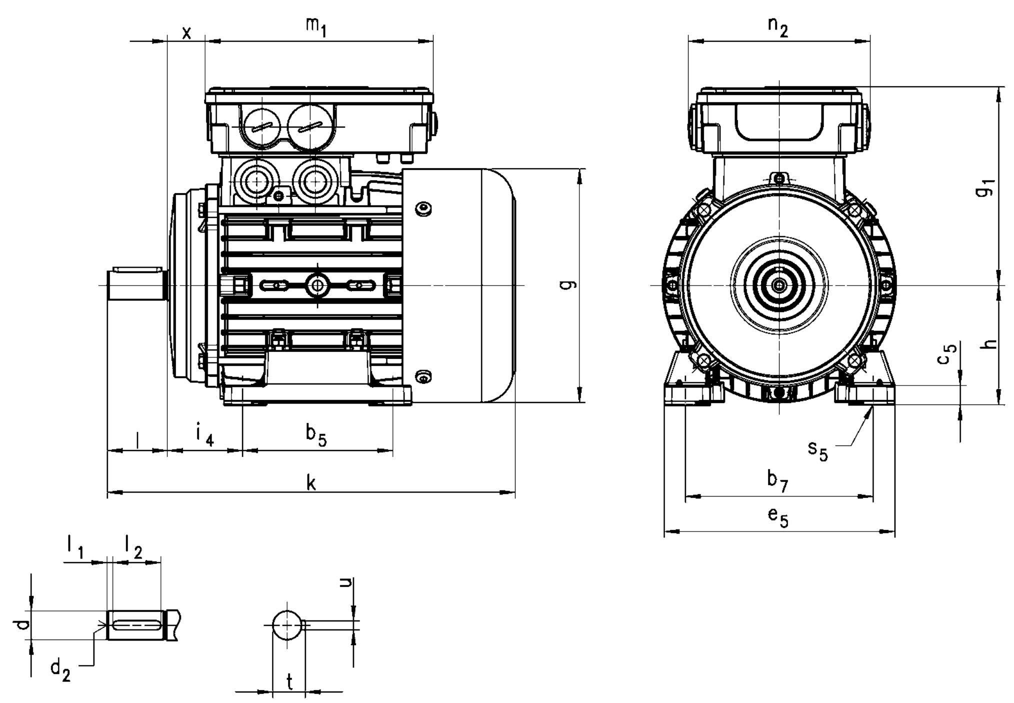
[1] Without accessories





Dimensions, self-ventilated (4-pole)

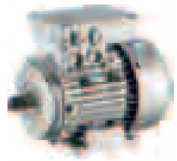
Design B3



Motor type	MHEMAXX						MHEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	272	156	132	25	152	121	345	154	132	25	152	121
090	331	176	137	29			399	176	137	29		
100	382 [1]	194	147	36			463 [1]	194	147	36		
	397 [2]						489 [2]					
112	436	218	158	38			526	218	158	38		
132	497	258	187	51	194	125	576	258	187	51	194	125
160	598 [3]	310	220	69	253	152	703 [3]	313	220	69	253	152
	642 [4]						747 [4]					
180	671	348	239	75			784	351	239	75		
200	728	351		77			841			77		
225	961	447	348	68	354	204	1074	447	348	68	354	204

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

5.8



Dimensions, self-ventilated (4-pole)

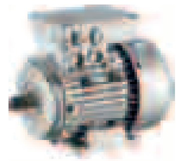
Design B3

Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	156	132	25			383	156	142	24		
090	418	178	137	29			436	176	147	28		
100	463[1]	196	147	36	152	121	479[1]	194	158	35	194	125
	478[2]						494[2]					
112	516	220	158	38			556	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		
160	681[3]	313	220	69			789[3]	313	220	69		
	725[4]				253	152	833[4]				253	152
180	750	351	239	75			863	351	239	75		
200	807			77			920			77		
225	1040	447	348	68	354	204	1153	447	348	68	354	204

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50		40	27.0	
100	28			M10	60		50	31.0	8.0
112									
132		38		M12	80	5.0	70	41.0	10.0
160		42		M16				45.0	12.0
180		48			110		100	51.5	14.0
200			55	M20				59.0	16.0
225			60		140		130	64.0	18.0

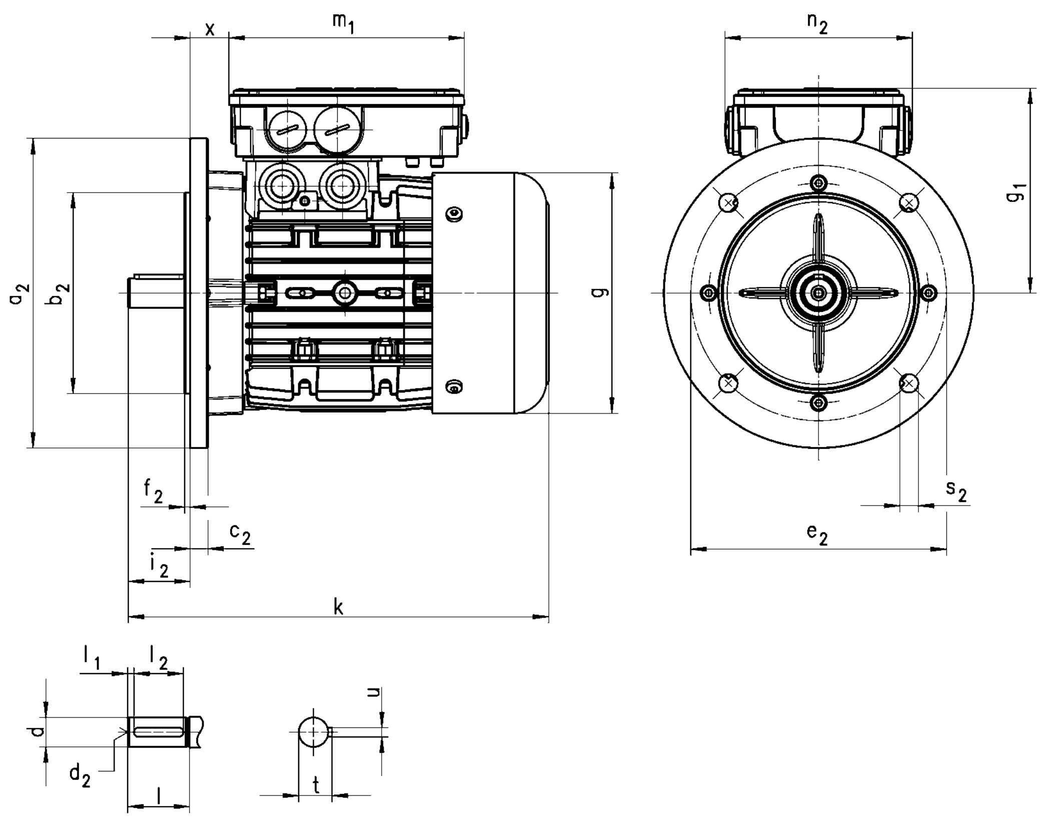
	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	125	50	100	154	80	13	10.0
090	140	56	125	174	90		
100	160	63	140	194	100	15	
112	190	70		223	112	14	12.0
132	216	89	178	260	132	18	
160	254	108	210[3]	305	160	22	
			254[4]				14.5
180	279	121	241[5]	350	180	23	
			279[6]				
200	318	133	305	400	200	32	
225	356	149	286[7]	440	225	34	18.5
			311[8]				

1) 100-12
2) 100-32
3) 160-22
4) 160-32
5) 180-12
6) 180-32
7) 225-12
8) 225-22



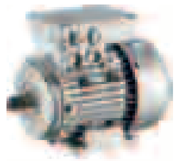
Dimensions, self-ventilated (4-pole)

Design B5



<table>
<tr><th>Motor type</th><th colspan="6">MHEMAXX</th><th colspan="6">MHEMABR</th></tr>
<tr><td></td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td></tr>
<tr><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>080</td><td>272</td><td>156</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td><td>345</td><td>154</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td></tr>
<tr><td>090</td><td>331</td><td>176</td><td>137</td><td>29</td><td>399</td><td>176</td><td>137</td><td>29</td></tr>
<tr><td rowspan="2">100</td><td>382 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td><td>463 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td></tr>
<tr><td>397 2)</td><td>489 2)</td></tr>
<tr><td>112</td><td>436</td><td>218</td><td>158</td><td>38</td><td>526</td><td>218</td><td>158</td><td>38</td></tr>
<tr><td>132</td><td>497</td><td>258</td><td>187</td><td>51</td><td>194</td><td>125</td><td>576</td><td>258</td><td>187</td><td>51</td><td>194</td><td>125</td></tr>
<tr><td rowspan="2">160</td><td>598 3)</td><td rowspan="2">310</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td><td>703 3)</td><td rowspan="2">313</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td></tr>
<tr><td>642 4)</td><td>747 4)</td></tr>
<tr><td>180</td><td>671</td><td>348</td><td rowspan="2">239</td><td>75</td><td>784</td><td rowspan="2">351</td><td rowspan="2">239</td><td>75</td></tr>
<tr><td>200</td><td>728</td><td>351</td><td>77</td><td>841</td><td>77</td></tr>
<tr><td>225</td><td>961</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td><td>1074</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td></tr>
</table>

1) 100-12
2) 100-32
3) 160-22
4) 160-32



Dimensions, self-ventilated (4-pole)

Design B5

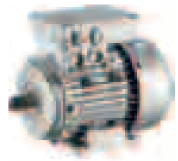
Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	156	132	25	152	121	383	156	142	24	194	125
090	418	178	137	29			436	176	147	28		
100	463 [1]	196	147	36			479 [1]	194	158	35		
	478 [2]						494 [2]					
112	516	220	158	38			556	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		
160	681 [3]	313	220	69	253	152	789 [3]	313	220	69	253	152
	725 [4]						833 [4]					
180	750	351	239	75			863	351	239	75		
200	807			77			920			77		
225	1040	447	348	68	354	204	1153	447	348	68	354	204

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0
225			60		140		130	64.0	18.0

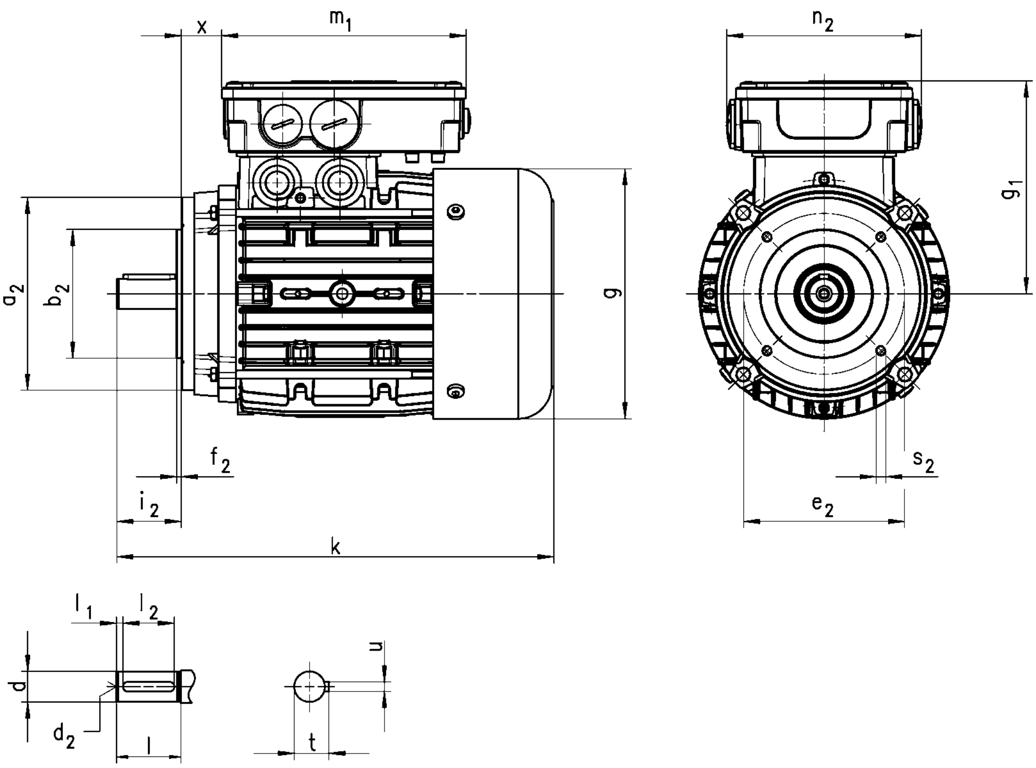
	Flange size								
		a_2	b_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6	h6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080		200	130		11	165	3.5		40.0
090									50.0
100		250	180		15	215	4.0		60.0
112									
132		300	230		20	265			80.0
160		350	250		13	300	5.0		110
180									
200		400		300	17	350			
225		450		350	18	400			140

5.8



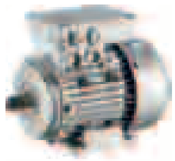
Dimensions, self-ventilated (4-pole)

Design B14



Motor type	MHEMAXX						MHEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	272	156	132	25			345	154	132	25		
090	331	176	137	29			399	176	137	29		
100	382 1)	194	147	36	152	121	463 1)	194	147	36	152	121
	397 2)						489 2)					
112	436	218	158	38			526	218	158	38		

1) 100-12
2) 100-32



Dimensions, self-ventilated (4-pole)

Design B14

Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	156	132	25			383	156	142	24		
090	418	178	137	29			436	176	147	28		
100	463 [1]	196	147	36	152	121	479 [1]	194	158	35	194	125
	478 [2]						494 [2]					
112	516	220	158	38			556	218	168	37		

[1] 100-12
[2] 100-32

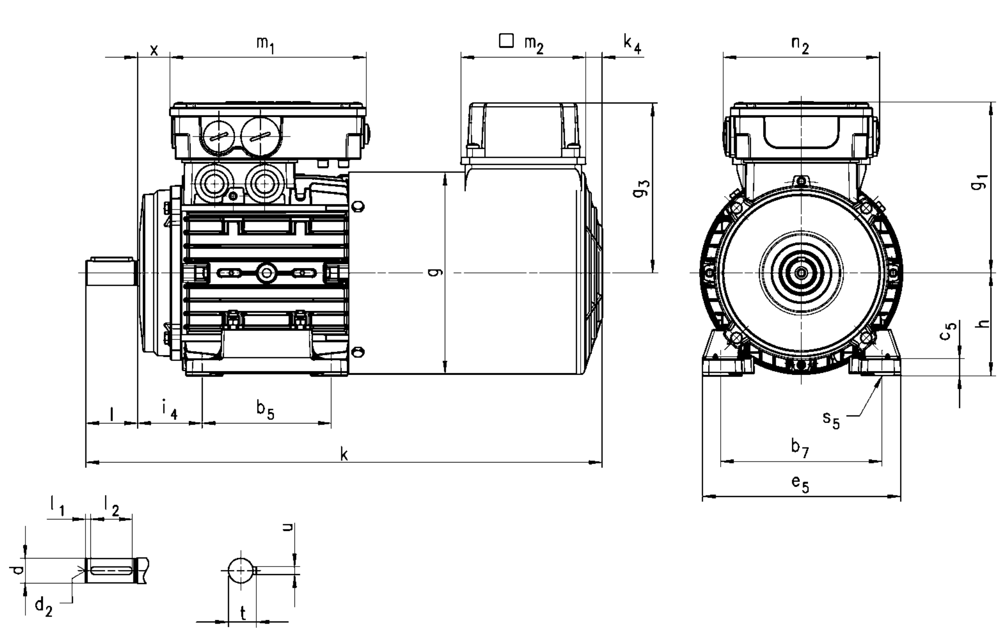
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19		M6	40	4.0	32	21.5	6.0
090	24		M8	50		40	27.0	
100	28		M10	60	5.0	50	31.0	8.0
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
	FT130	160	110	130	3.5		
100						M8x14	60.0
112						M8x16	

5.8

Dimensions, forced ventilated (4-pole)

Design B3



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<tr><th>Motor type</th><th colspan="9">MHFMAXX</th><th colspan="9">MHFMABR</th></tr>
<tr><td></td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td><td>g_3</td><td>k_4</td><td>m_2</td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td><td>g_3</td><td>k_4</td><td>m_2</td></tr>
<tr><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>080</td><td>400</td><td>156</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td><td>132</td><td>13</td><td>96</td><td>455</td><td>156</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td><td>132</td><td>13</td><td>96</td></tr>
<tr><td>090</td><td>460</td><td>176</td><td>137</td><td>29</td><td>141</td><td rowspan="4">22</td><td rowspan="5">95</td><td>513</td><td>176</td><td>137</td><td>29</td><td>141</td><td rowspan="4">22</td><td rowspan="5">95</td></tr>
<tr><td rowspan="2">100</td><td>491 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td><td rowspan="2">150</td><td>552 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td><td rowspan="2">150</td></tr>
<tr><td>506 2)</td><td>567 2)</td></tr>
<tr><td>112</td><td>538</td><td>218</td><td>158</td><td>38</td><td>162</td><td>619</td><td>218</td><td>158</td><td>38</td><td>162</td></tr>
<tr><td>132</td><td>612</td><td>257</td><td>187</td><td>51</td><td>194</td><td>125</td><td>182</td><td>32</td><td>698</td><td>257</td><td>187</td><td>51</td><td>194</td><td>125</td><td>182</td><td>32</td></tr>
<tr><td rowspan="2">160</td><td>747 3)</td><td rowspan="2">309</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td><td rowspan="5">209</td><td rowspan="5">31</td><td rowspan="3">96</td><td>777 3)</td><td rowspan="2">309</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td><td rowspan="5">209</td><td rowspan="5">31</td><td rowspan="3">96</td></tr>
<tr><td>791 4)</td><td>821 4)</td></tr>
<tr><td>180</td><td>820</td><td>348</td><td rowspan="2">239</td><td>75</td><td>886</td><td>348</td><td rowspan="2">239</td><td>75</td></tr>
<tr><td>200</td><td>883</td><td>351</td><td>77</td><td>106</td><td>943</td><td>351</td><td>77</td><td>106</td></tr>
<tr><td>225</td><td>1175</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td><td>96</td><td>1175</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td><td>96</td></tr>
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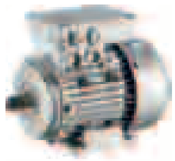
1) 100-12
2) 100-32
3) 160-22
4) 160-32



Dimensions, forced ventilated (4-pole)

Design B3

Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25	152	121	132	13	96	455	156	142	24	194	125	132	13	96
090	460	176	137	29			141	22	95	513	176	147	28			141	22	95
100	491 [1)] 506 [2)]	194	147	36			150			552 [1)] 567 [2)]	194	158	35			150		
112	619	218	158	38			162			619	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	
160	822 [3)] 866 [4)]	309	220	69	253	152	209	31	96	835 [3)] 877 [4)]	309	220	69	253	152	209	31	96
180	886	348	239	75						946	348	239	75					
200	943	351		77					106	1003	351		77					106
225	1175	447	348	68	354	204			96	1175	447	348	68	354	204			96

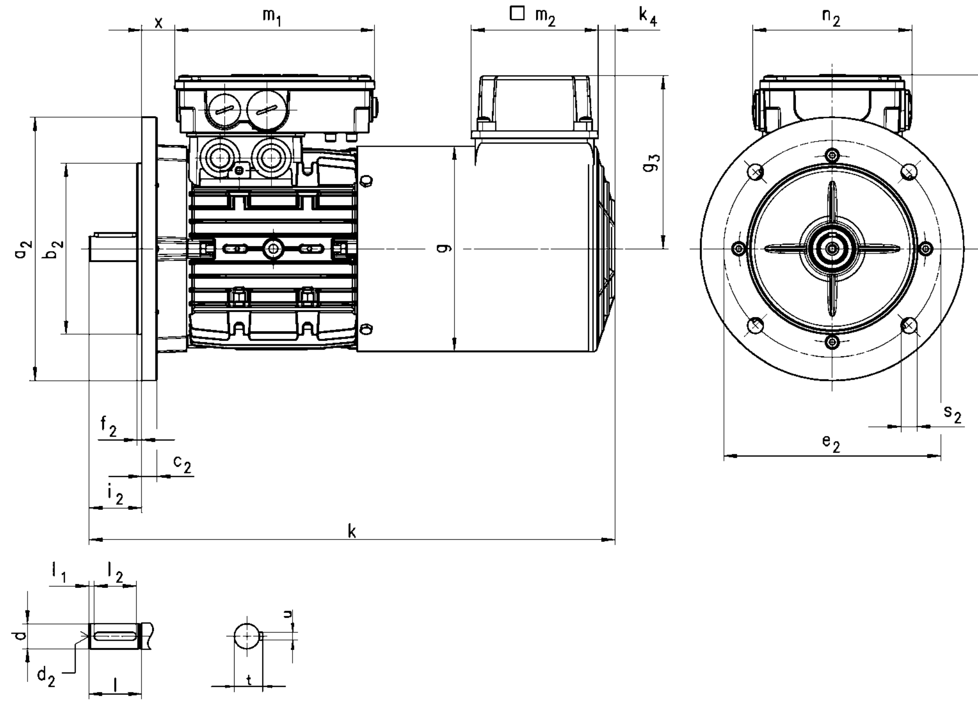
	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0
225			60		140		130	64.0	18.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	125	50	100	154	80	13	10.0
090	140	56	125	174	90		
100	160	63	140	194	100	15	12.0
112	190	70		223	112	14	
132	216	89	178	260	132	18	
160	254	108	210 [3)] 254 [4)]	305	160	22	14.5
180	279	121	241 [5)] 279 [6)]	350	180	23	
200	318	133	305	400	200	32	18.5
225	356	149	286 [7)] 311 [8)]	440	225	34	

1) 100-12
2) 100-32
3) 160-22
4) 160-32
5) 180-12
6) 180-32
7) 225-12
8) 225-22

Dimensions, forced ventilated (4-pole)

Design B5



<table>
<tr><th>Motor type</th><th colspan="9">MHFMAXX</th><th colspan="9">MHFMABR</th></tr>
<tr><td></td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td><td>g_3</td><td>k_4</td><td>m_2</td><td>k</td><td>g</td><td>g_1</td><td>x</td><td>m_1</td><td>n_2</td><td>g_3</td><td>k_4</td><td>m_2</td></tr>
<tr><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>080</td><td>400</td><td>156</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td><td>132</td><td>13</td><td>96</td><td>455</td><td>156</td><td>132</td><td>25</td><td rowspan="5">152</td><td rowspan="5">121</td><td>132</td><td>13</td><td>96</td></tr>
<tr><td>090</td><td>460</td><td>176</td><td>137</td><td>29</td><td>141</td><td rowspan="4">22</td><td rowspan="5">95</td><td>513</td><td>176</td><td>137</td><td>29</td><td>141</td><td rowspan="4">22</td><td rowspan="5">95</td></tr>
<tr><td rowspan="2">100</td><td>491 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td><td rowspan="2">150</td><td>552 1)</td><td rowspan="2">194</td><td rowspan="2">147</td><td rowspan="2">36</td><td rowspan="2">150</td></tr>
<tr><td>506 2)</td><td>567 2)</td></tr>
<tr><td>112</td><td>538</td><td>218</td><td>158</td><td>38</td><td>162</td><td>619</td><td>218</td><td>158</td><td>38</td><td>162</td></tr>
<tr><td>132</td><td>612</td><td>257</td><td>187</td><td>51</td><td>194</td><td>125</td><td>182</td><td>32</td><td>698</td><td>257</td><td>187</td><td>51</td><td>194</td><td>125</td><td>182</td><td>32</td></tr>
<tr><td rowspan="2">160</td><td>747 3)</td><td rowspan="2">309</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td><td rowspan="5">209</td><td rowspan="5">31</td><td rowspan="3">96</td><td>777 3)</td><td rowspan="2">309</td><td rowspan="2">220</td><td rowspan="2">69</td><td rowspan="4">253</td><td rowspan="4">152</td><td rowspan="5">209</td><td rowspan="5">31</td><td rowspan="3">96</td></tr>
<tr><td>791 4)</td><td>821 4)</td></tr>
<tr><td>180</td><td>820</td><td>348</td><td rowspan="2">239</td><td>75</td><td>886</td><td>348</td><td rowspan="2">239</td><td>75</td></tr>
<tr><td>200</td><td>883</td><td>351</td><td>77</td><td>106</td><td>943</td><td>351</td><td>77</td><td>106</td></tr>
<tr><td>225</td><td>1175</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td><td>96</td><td>1175</td><td>447</td><td>348</td><td>68</td><td>354</td><td>204</td><td>96</td></tr>
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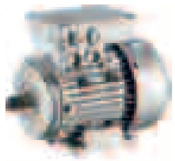
1) 100-12
2) 100-32
3) 160-22
4) 160-32



Dimensions, forced ventilated (4-pole)

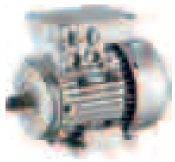
Design B5

Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25	152	121	132	13	96	455	156	142	24	194	125	132	13	96
090	460	176	137	29			141	22	95	513	176	147	28			141	22	95
100	491 [1]	194	147	36			150			552 [1]	194	158	35			150		
	506 [2]									567 [2]								
112	619	218	158	38			162			619	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	
160	822 [3]	309	220	69	253	152	209	31	96	835 [3]	309	220	69	253	152	209	31	96
	866 [4]									877 [4]								
180	886	348	239	75						946	348	239	75					
200	943	351		77					106	1003	351		77					106
225	1175	447	348	68	354	204			96	1175	447	348	68	354	204			96

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

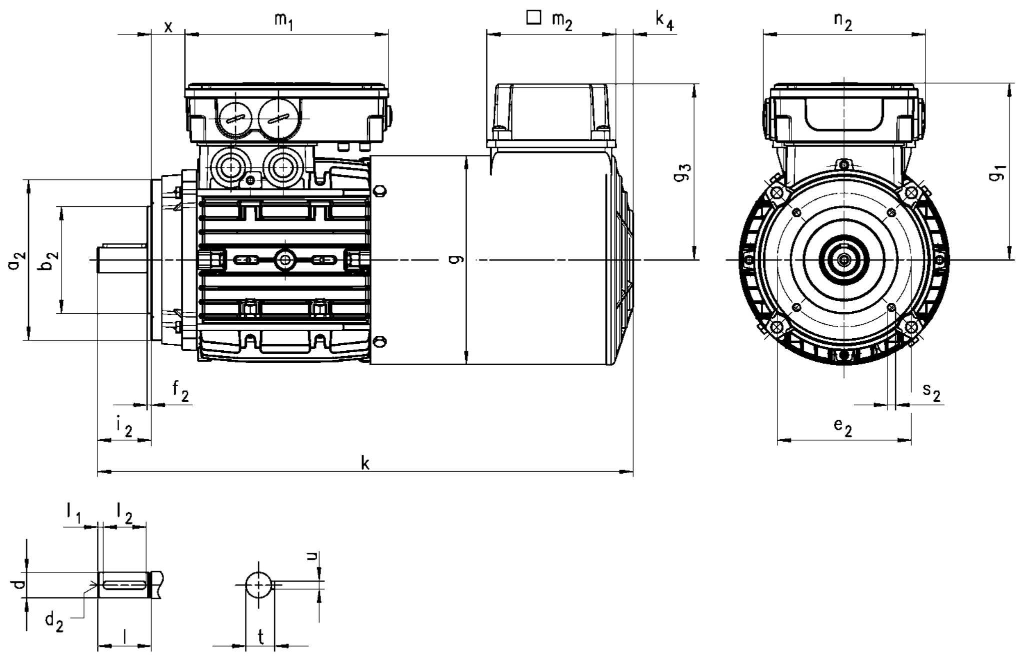
	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0
225			60		140		130	64.0	18.0

	Flange size								
		a_2	b_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6	h6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080		200	130		11	165	3.5		40.0
090									50.0
100		250	180		15	215	4.0		60.0
112									
132		300	230		20	265			80.0
160		350	250		13	300	5.0		110
180									
200		400		300	17	350			
225		450		350	18	400			140



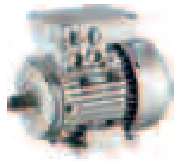
Dimensions, forced ventilated (4-pole)

Design B14



Motor type	MHFMAXX									MHFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	460	176	137	29			141	22	95	513	176	137	29			141	22	95
100	491 [1]	194	147	36			150			552 [1]	194	147	36			150		
	506 [2]									567 [2]								
112	538	218	158	38			162			619	218	158	38			162		

[1] 100-12
[2] 100-32



Dimensions, forced ventilated (4-pole)

Design B14

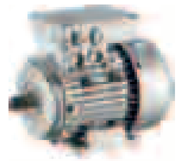
Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25			132	13	96	455	156	142	24			132	13	96
090	460	176	137	29			141			513	176	147	28			141		
100	491 1)	194	147	36	152	121	150	22	95	552 1)	194	158	35	194	125	150	22	95
	506 2)									567 2)								
112	619	218	158	38			162			619	218	168	37			162		

1) 100-12
2) 100-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19		M6	40	4.0	32	21.5	6.0
090	24		M8	50		40	27.0	
100	28		M10	60	5.0	50	31.0	8.0
112								

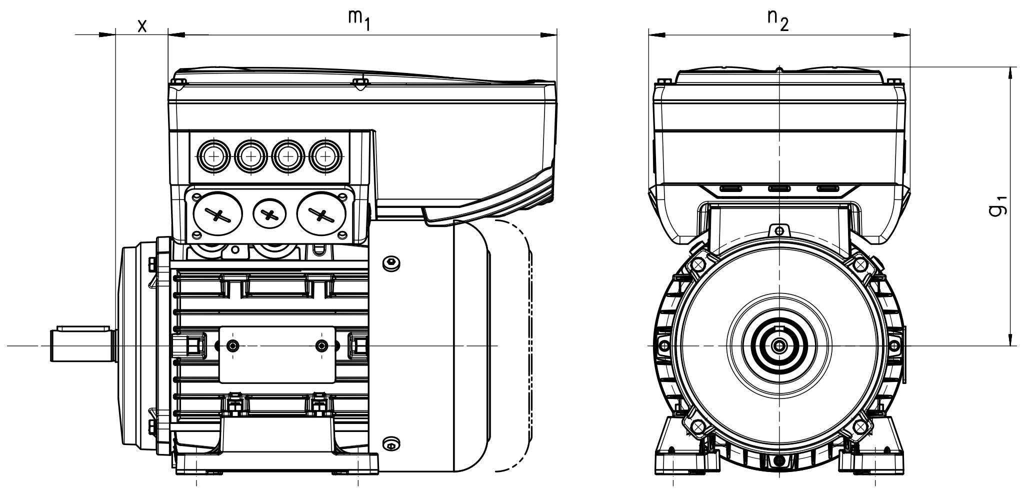
	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
100	FT130	160	110	130	3.5	M8x14	60.0
112						M8x16	

5.8

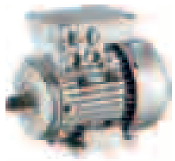


Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz

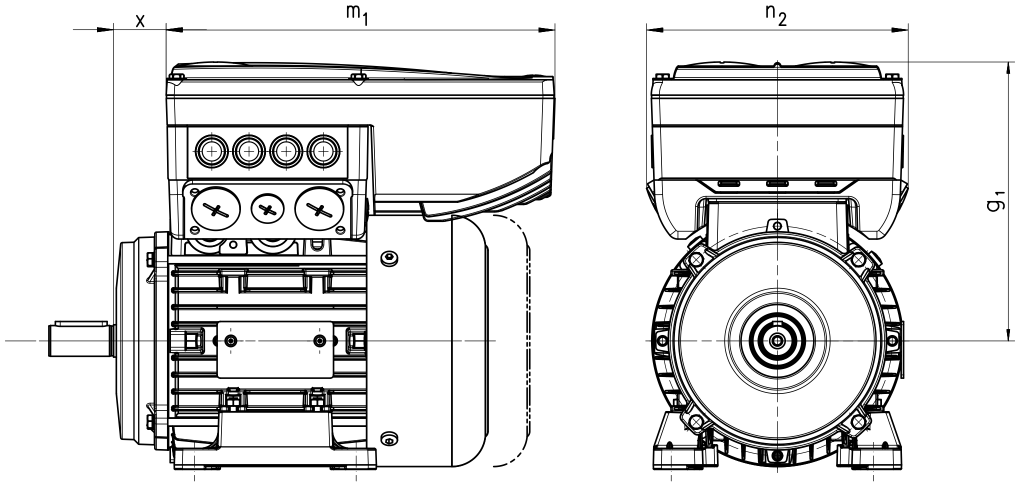


Product key					
Motor	Inverter				
		$g_{1,\ 50Hz}$	$m_{1,\ 50Hz}$	$n_{2,\ 50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MH□□□□□080-32	E84DVB□7514S□□□2□	172	241	161	32.5
MH□□□□□090-12	E84DVB□1124S□□□2□	177			36.2
MH□□□□□090-32	E84DVB□1524S□□□2□				
MH□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	42.4
MH□□□□□100-32	E84DVB□3024S□□□2□				
MH□□□□□112-22	E84DVB□4024S□□□2□	282	325	195	32.0
MH□□□□□132-12	E84DVB□5524S□□□2□	301			47.5
MH□□□□□132-22	E84DVB□7524S□□□2□				

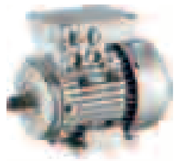


Dimensions, 8400 motec inverter

Rated frequency 87 Hz



Product key					
Motor	Inverter				
		$g_{1,\ 87Hz}$	$m_{1,\ 87Hz}$	$n_{2,\ 87Hz}$	x_{87Hz}
		[mm]	[mm]	[mm]	[mm]
MH□□□□□080-32	E84DVB□1524S□□□2□	172	241	161	32.5
MH□□□□□090-12	E84DVB□2224S□□□2□	206	260	176	35.2
MH□□□□□090-32	E84DVB□3024S□□□2□				
MH□□□□□100-12	E84DVB□4024S□□□2□	272	325	195	29.9
MH□□□□□100-32	E84DVB□5524S□□□2□				
MH□□□□□112-22	E84DVB□7524S□□□2□	282			32.0



Spring-applied brake

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

Features

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

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

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 4-pole motors and brakes

<table>
<tr><th>Design</th><th colspan="2">Standard
Standard</th><th colspan="2">LongLife
LongLife</th></tr>
<tr><th>Motor frame size</th><th>Size</th><th>Rated torque</th><th>Size</th><th>Rated torque</th></tr>
<tr><td></td><td>Brake</td><td></td><td>Brake</td><td></td></tr>
<tr><td></td><td></td><td>M_k</td><td></td><td>M_k</td></tr>
<tr><td></td><td></td><td>[Nm]</td><td></td><td>[Nm]</td></tr>
<tr><td>080-32</td><td>08
08
10</td><td>3.50
8.00
7.00</td><td>08
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7.00</td></tr>
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7.00
16.0
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10
10</td><td>8.00
7.00
16.0</td></tr>
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14.0
32.0</td></tr>
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16.0
14.0
32.0
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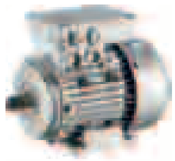
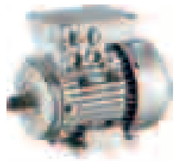
5.8



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	14.0		
	12	32.0		
	14	35.0		
	14	60.0		
132-12	14	35.0		
	14	60.0		
	16	60.0		
	16	80.0		
132-22	14	35.0		
	14	60.0		
	16	60.0		
	16	80.0		
	16	100		
160-22	16	60.0		
	16	80.0		
	18	80.0		
	18	150		
160-32	18	80.0		
	18	150		
	18	200		
180-12	18	80.0		
	18	150		
	20	145		
	20	260		
180-32	18	80.0		
	18	150		
	20	145		
	20	260		
	20	315		
200-32	18	80.0		
	18	150		
	20	145		
	20	260		
	20	315		
	20	400		
225-12	25	265		
	25	400		
	25	490		
225-22	25	265		
	25	400		
	25	490		
	25	600		



Spring-applied 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

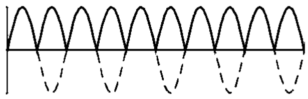
If the brake is not directly supplied with DC voltage, a rectifier is required. This is included in the scope of supply and is located in the terminal box of the motor. The rectifier converts the AC voltage of the connection into DC voltage. The following rectifiers are available:

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

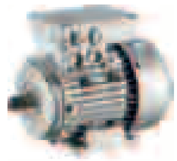
Bridge rectifier, 6-pole

- 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

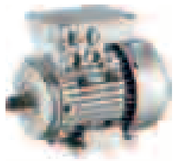
Connection via mains voltage with brake rectifier

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

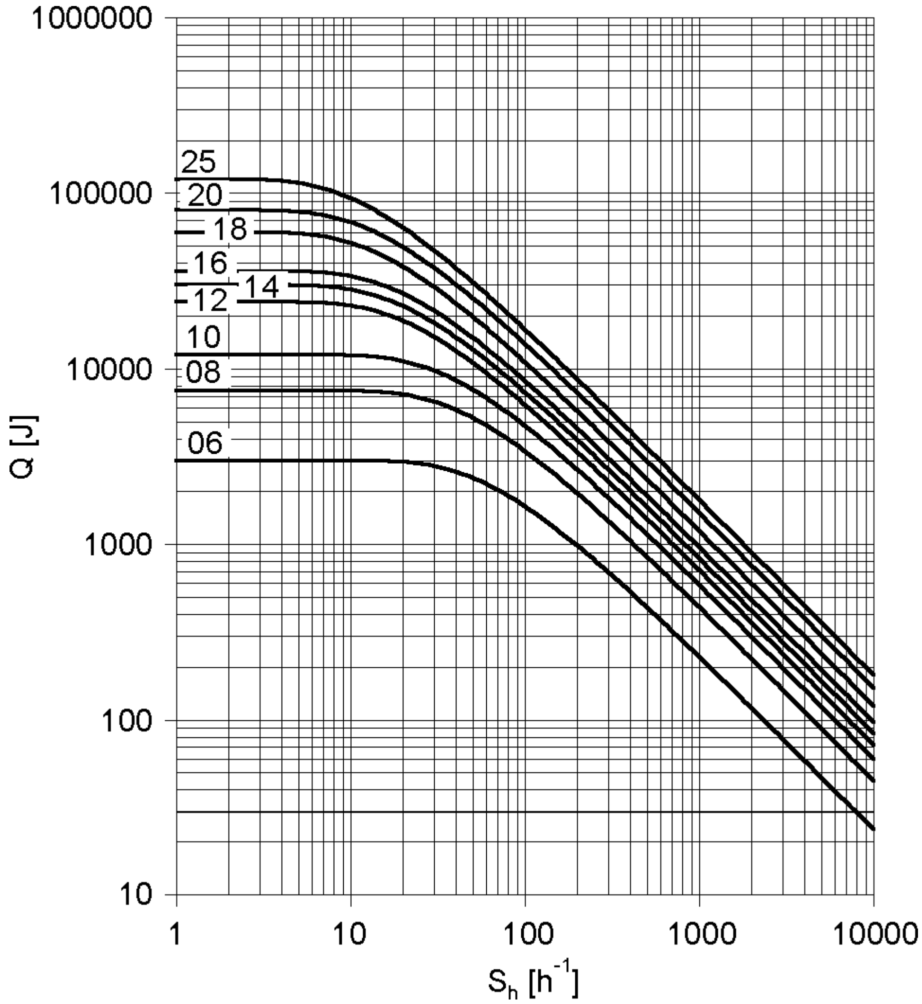
During the switching operation the bridge/half-wave rectifier functions as a bridge rectifier for the overexcitation time $t_{\ddot{u}}$ and then as a half-wave rectifier. This combination optimises the performance of the brake – depending on the assignment of brake coil voltage and supply voltage:

- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_{\ddot{u}}$ 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".

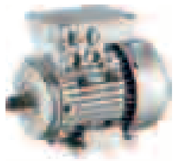


Spring-applied brake

Permissible friction energy



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



Spring-applied brake

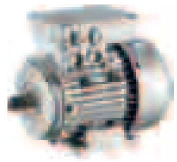
Rated data with reduced braking torque

► 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											
	$S_{\text{hü}}$	[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 %.

5.8



Spring-applied brake

Rated data with reduced braking torque

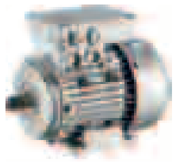
► Activation via half-wave or bridge rectifier

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.



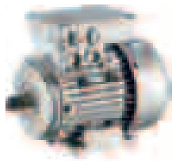
Spring-applied brake

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

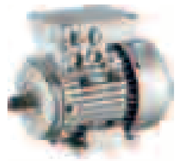
Size			06	08	10	12	14	16	18	20	25
Friction energy											
	Q_{BW}	[MJ]	85.0	158	264	530	571	966	1542	2322	3522
Delay time											
Engaging	t_{11}	[ms]	15.0		28.0		17.0	27.0	33.0	65.0	110
Rise time											
Braking torque	t_{12}	[ms]	13.0	16.0	19.0	25.0		30.0	45.0	100	120
Engagement time											
	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.

5.8



Spring-applied brake

Rated data with increased braking torque

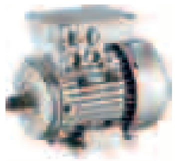
► Please enquire for braking torques and maximum switching work values not listed here.

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

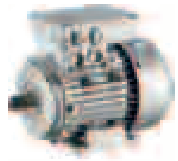
► Activation via bridge/half-wave rectifier

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

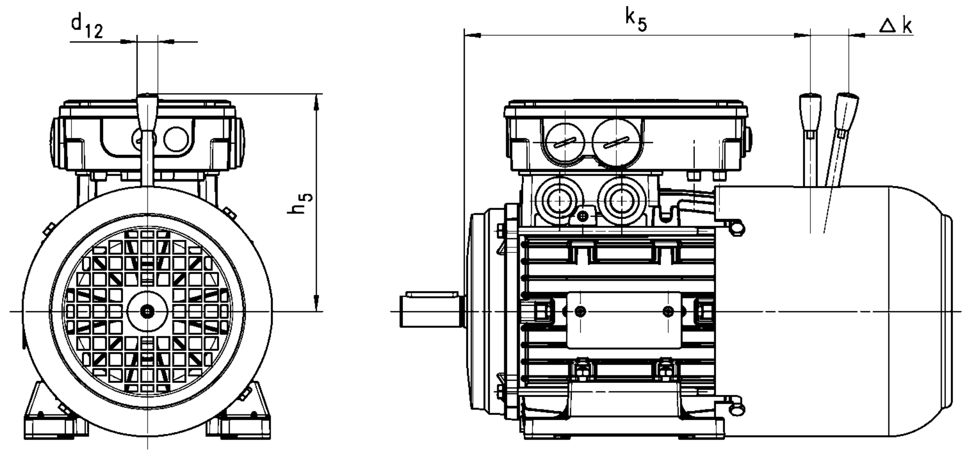
► The brake response and application times are guide values. The engagement time is 10 times longer with AC-side switching. With the maximum air gap the disengagement time t_2 – depending on the brake and control – is up to 4 times longer than the disengagement time with the rated air gap.

5.8



Spring-applied brake

Manual release lever

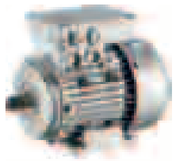


	Brake				
		k_5	Δk	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
080	08 10	224 239	27 28	116 132	13.0 13.0
090	08 10	264 277	27 28	116 132	13.0 13.0
100 [1]	10 12	305 307	28 37	132 161	13.0 13.0
100 [2]	10 12	320 322	28 37	132 161	13.0 13.0
112	12 14	320 323	37 41	161 195	13.0 24.0
132	14 16	400 406	41 55	195 240	24.0 24.0
160	16 18	505 509	55 59	240 279	24.0 24.0
180	18 20	540 546	59 74	279 319	24.0 24.0
200	18 20	597 603	59 74	279 319	24.0 24.0
225	25	757	103	445	24.0

[1] 100-12
[2] 100-32

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

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

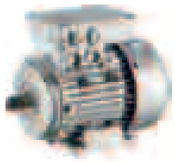


Resolver

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

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

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



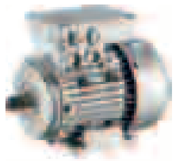
Incremental encoder and SinCos absolute value encoder

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

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

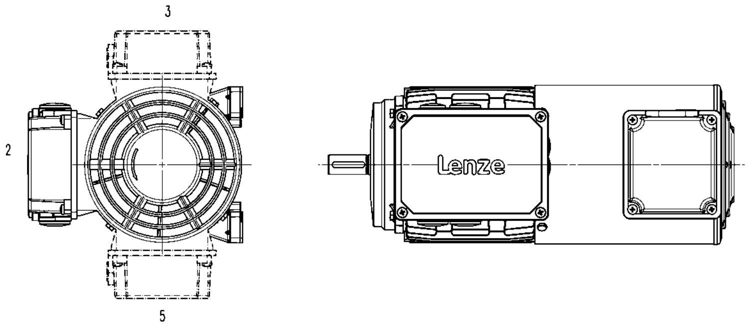
Inverters
- Inverter Drives 8400 StateLine (E84AVSC)
- Inverter Drives 8400 HighLine (E84AVHC)
- Inverter Drives 8400 TopLine (E84AVTC)

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



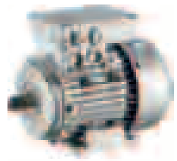
Blower

► The blower terminal box is available in positions 2, 3 or 5.



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	



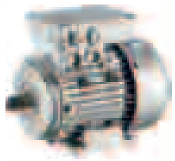
Blower

Rated data for 50 Hz

<table>
<tr><th>Size</th><th>Number of phases</th><th>Connection method</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>Motor</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>U_{min}</td><td>U_{max}</td><td>P_{max}</td><td>I_{max}</td><td>m</td></tr>
<tr><td></td><td></td><td></td><td>[V]</td><td>[V]</td><td>[kW]</td><td>[A]</td><td>[kg]</td></tr>
<tr><td rowspan="3">200</td><td>1</td><td></td><td>230</td><td>277</td><td rowspan="3">0.25</td><td>0.97</td><td rowspan="3">8.00</td></tr>
<tr><td rowspan="4">3</td><td>Δ</td><td>200</td><td>303</td><td>0.87</td></tr>
<tr><td>Y</td><td>346</td><td>525</td><td>0.50</td></tr>
<tr><td rowspan="2">225</td><td>Δ</td><td>200</td><td>400</td><td>0.28</td><td>1.10</td><td rowspan="2">15.0</td></tr>
<tr><td>Y</td><td>346</td><td>525</td><td>0.17</td><td>0.35</td></tr>
</table>

Rated data for 60 Hz

<table>
<tr><th>Size</th><th>Number of phases</th><th>Connection method</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>Motor</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>U_{min}</td><td>U_{max}</td><td>P_{max}</td><td>I_{max}</td><td>m</td></tr>
<tr><td></td><td></td><td></td><td>[V]</td><td>[V]</td><td>[kW]</td><td>[A]</td><td>[kg]</td></tr>
<tr><td rowspan="3">063</td><td>1</td><td></td><td>230</td><td>277</td><td>0.032</td><td>0.12</td><td rowspan="3">2.00</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>220</td><td>332</td><td rowspan="2">0.028</td><td>0.10</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.060</td></tr>
<tr><td rowspan="3">071</td><td>1</td><td></td><td>230</td><td>277</td><td>0.033</td><td>0.12</td><td rowspan="3">2.10</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>220</td><td>332</td><td rowspan="2">0.029</td><td>0.10</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.060</td></tr>
<tr><td rowspan="3">080</td><td>1</td><td></td><td>230</td><td>277</td><td>0.037</td><td>0.14</td><td rowspan="3">2.30</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>220</td><td>332</td><td rowspan="2">0.034</td><td>0.10</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.060</td></tr>
<tr><td rowspan="3">090</td><td>1</td><td></td><td rowspan="2">220</td><td>277</td><td>0.065</td><td>0.25</td><td rowspan="3">2.70</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>332</td><td rowspan="2">0.077</td><td>0.33</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.19</td></tr>
<tr><td rowspan="3">100</td><td>1</td><td></td><td rowspan="2">220</td><td>277</td><td>0.075</td><td>0.30</td><td rowspan="3">3.00</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>332</td><td rowspan="2">0.087</td><td>0.31</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.18</td></tr>
<tr><td rowspan="3">112</td><td>1</td><td></td><td rowspan="2">220</td><td>277</td><td>0.094</td><td>0.37</td><td rowspan="3">3.10</td></tr>
<tr><td rowspan="2">3</td><td>Δ</td><td>332</td><td rowspan="2">0.10</td><td>0.31</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.18</td></tr>
<tr><td rowspan="3">132</td><td>1</td><td></td><td>230</td><td>277</td><td rowspan="3">0.15</td><td>0.57</td><td rowspan="3">4.20</td></tr>
<tr><td rowspan="10">3</td><td>Δ</td><td>220</td><td>332</td><td>0.44</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.25</td></tr>
<tr><td rowspan="2">160</td><td>Δ</td><td>220</td><td>332</td><td rowspan="6">0.36</td><td>0.93</td><td rowspan="2">6.20</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.56</td></tr>
<tr><td rowspan="2">180</td><td>Δ</td><td>220</td><td>332</td><td>0.93</td><td rowspan="4">8.00</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.56</td></tr>
<tr><td rowspan="2">200</td><td>Δ</td><td>220</td><td>332</td><td>0.93</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.56</td></tr>
<tr><td rowspan="2">225</td><td>Δ</td><td>220</td><td>400</td><td>0.28</td><td>0.76</td><td rowspan="2">15.0</td></tr>
<tr><td>Y</td><td>380</td><td>575</td><td>0.26</td><td>0.43</td></tr>
</table>



Temperature monitoring

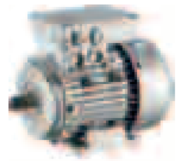
► The thermal sensors are integrated in the windings. The use of an additional motor protection switch is recommended.

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

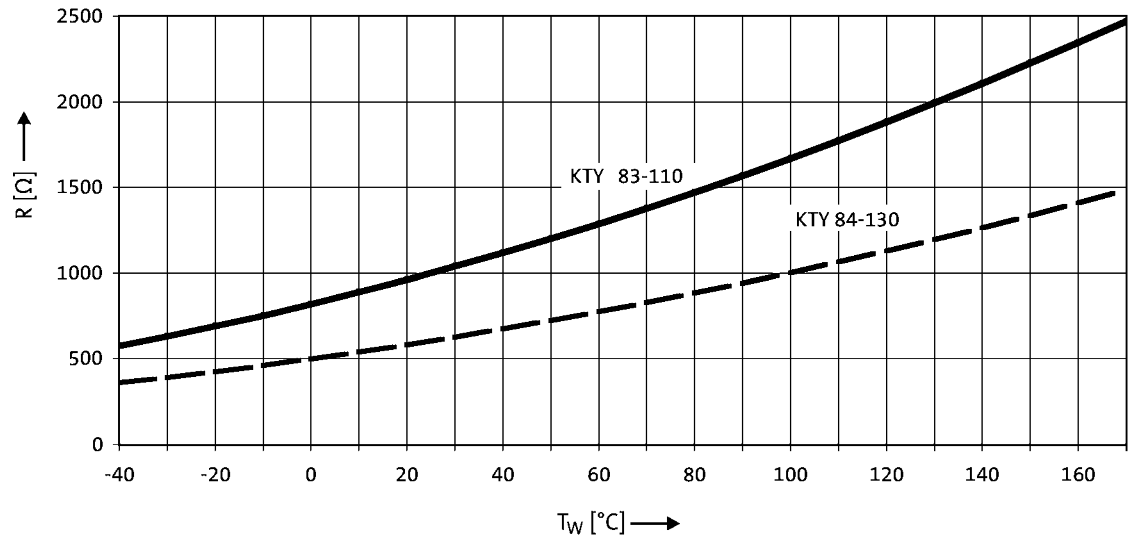


Temperature monitoring

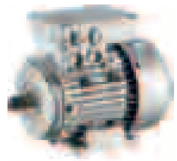
KTY temperature sensor

	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.

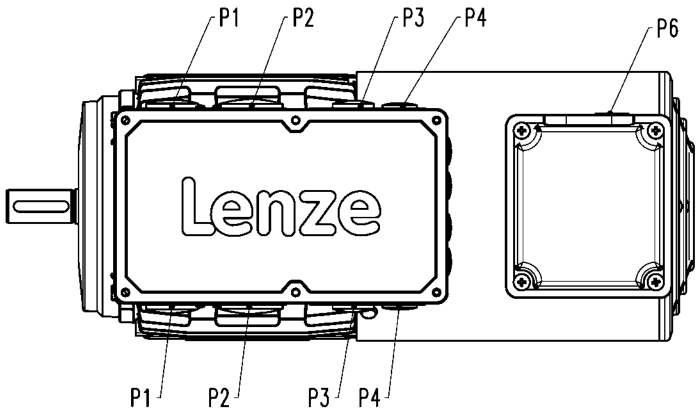


Terminal box

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

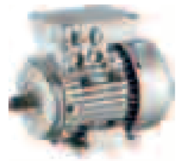
In the standard version, the motors are connected in the terminal box. As an option, the motors are also available with the connectors described on the following pages as long as the permissible ratings are not exceeded.

Connections



<table>
<tr><th>Motor type</th><th colspan="5"></th><th colspan="5"></th></tr>
<tr><td>Built-on accessories</td><td colspan="5">M□□MAXX
M□□MABR
M□□MARS
M□□MAIG
M□□MAAG</td><td colspan="5">M□□MABS
M□□MABI
M□□MABA</td></tr>
<tr><td></td><td>P_1</td><td>P_2</td><td>P_3</td><td>P_4</td><td>P_6</td><td>P_1</td><td>P_2</td><td>P_3</td><td>P_4</td><td>P_6</td></tr>
<tr><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>063</td><td rowspan="2">M16x1.5</td><td rowspan="2">M20x1.5</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="11">M16x1.5</td><td rowspan="7">M25x1.5</td><td rowspan="7">M32x1.5</td><td rowspan="10">M20x1.5</td><td rowspan="10">M16x1.5</td><td rowspan="11">M16x1.5</td></tr>
<tr><td>071</td></tr>
<tr><td>080</td><td rowspan="4">M20x1.5</td><td rowspan="4">M25x1.5</td></tr>
<tr><td>090</td></tr>
<tr><td>100</td></tr>
<tr><td>112</td></tr>
<tr><td>132</td><td>M25x1.5</td><td>M32x1.5</td><td rowspan="4">M20x1.5</td><td rowspan="4">M16x1.5</td></tr>
<tr><td>160</td><td rowspan="3">M50x1.5</td><td rowspan="3">M16x1.5</td><td rowspan="3">M50x1.5</td><td rowspan="3">M16x1.5</td></tr>
<tr><td>180</td></tr>
<tr><td>200</td></tr>
<tr><td>225 1)</td><td>M12x1.5</td><td>M63x1.5</td><td>M50x1.5</td><td>M12x1.5</td><td>M12x1.5</td><td>M63x1.5</td><td>M50x1.5</td><td>M12x1.5</td></tr>
</table>

1) The cable glands P1 to P4 are only arranged at the bottom.

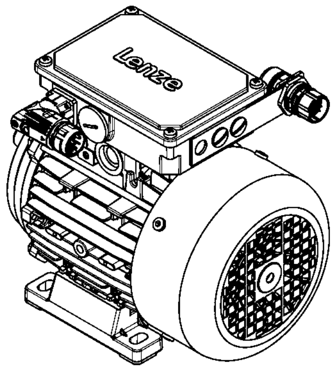


Plug connectors

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

ICN connector

A connector is used for 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.

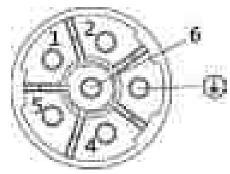


Connection for power, brake and temperature monitoring

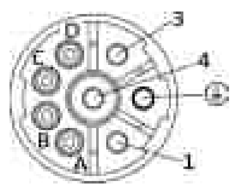
The connectors can be rotated by 270° and are equipped with a bayonet catch for SpeedTec connectors. As the connector fixing is also compatible with conventional box nuts, existing mating connectors can still be used without difficulty. The motor connection is determined in the terminal box.

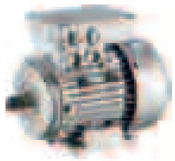
- ICN 6-pole

  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

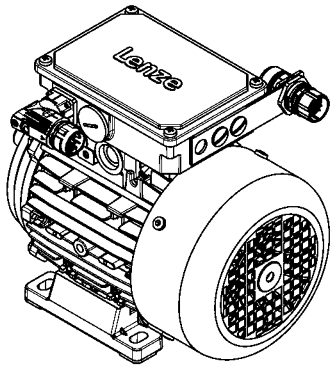
Pin assignment			
Contact	Designation	Meaning	
1	U	Phase U power	
PE	PE	PE conductor	
3	W	Phase W power	
4	V	Phase V power	
A	TB1 / TP1 / R1	Thermal sensor: TKO/PTC/ +KTY	
B	TB2 / TP2 / R2	Thermal sensor: TKO/PTC/-KTY	
C	BD1 / BA1	Brake +/AC	
D	BD2 / BA2	Brake -/AC	



ICN connector

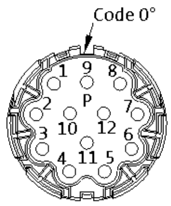
Feedback connection

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



► Resolver

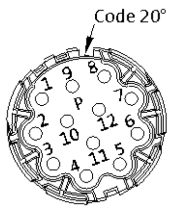
Pin assignment		
Contact	Designation	Meaning
1	+Ref	Transformer windings
2	-Ref	
3	+VCC ETS	Supply: Electronic nameplate
4	+COS	Cosine stator windings
5	-COS	
6	+SIN	Sine stator windings
7	-SIN	
8		Not assigned
9		
10		
11	+KTY	KTY temperature sensor
12	-KTY	



5.8

► Hiperface incremental encoder and SinCos absolute value encoder

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



ICN connector

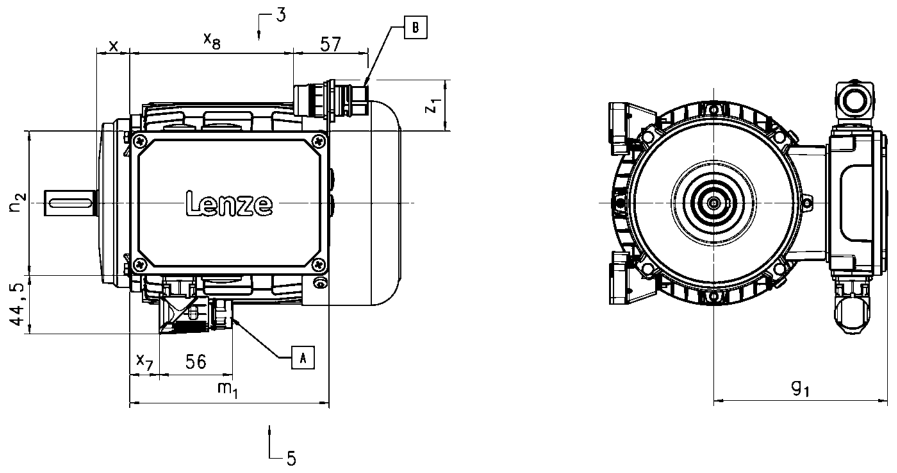
Dimensions of the connectors on the terminal box

The following connector positions are possible:

- power connection (A) in position 5 and feedback connection (B) in position 3
- power connection (A) in position 3 and feedback connection (B) in position 5

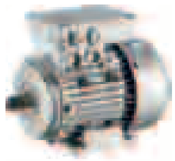
With the following motors, the feedback connection (B) is only available in position 3 or 5:

- motor frame size 132 to 180



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

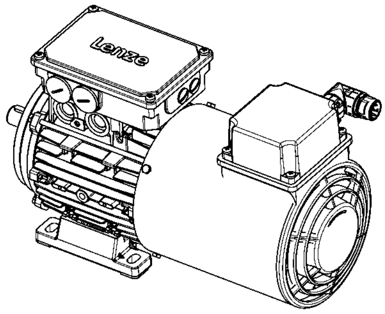
<table>
<tr><th></th><th>g_1</th><th>x</th><th>m_1</th><th>n_2</th><th>x_7</th><th>x_8</th><th>$z_{1, max}$</th></tr>
<tr><th></th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th><th>[mm]</th></tr>
<tr><td>063</td><td>109</td><td>17</td><td rowspan="2">136</td><td rowspan="2">103</td><td rowspan="2">16</td><td rowspan="2">109</td><td rowspan="2">43</td></tr>
<tr><td>071</td><td>118</td><td>24</td></tr>
<tr><td>080</td><td>132</td><td>25</td><td rowspan="4">152</td><td rowspan="4">121</td><td rowspan="4">23</td><td rowspan="4">125</td><td rowspan="4">41</td></tr>
<tr><td>090</td><td>137</td><td>29</td></tr>
<tr><td>100</td><td>147</td><td>36</td></tr>
<tr><td>112</td><td>158</td><td>38</td></tr>
<tr><td>132</td><td>187</td><td>51</td><td>194</td><td>125</td><td>27</td><td>166</td><td>71</td></tr>
<tr><td>160</td><td>220</td><td>69</td><td rowspan="3">253</td><td rowspan="3">152</td><td rowspan="4"></td><td rowspan="3">200</td><td rowspan="3">65</td></tr>
<tr><td>180</td><td rowspan="2">239</td><td>75</td></tr>
<tr><td>200</td><td>77</td></tr>
<tr><td>225</td><td>348</td><td>68</td><td>354</td><td>204</td><td>328</td><td>51</td></tr>
</table>



ICN connector

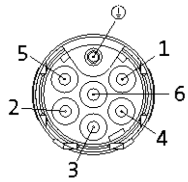
Blower connection

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



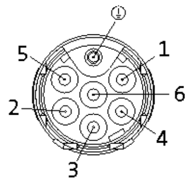
► Blower 1-ph

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



► Blower 3-ph

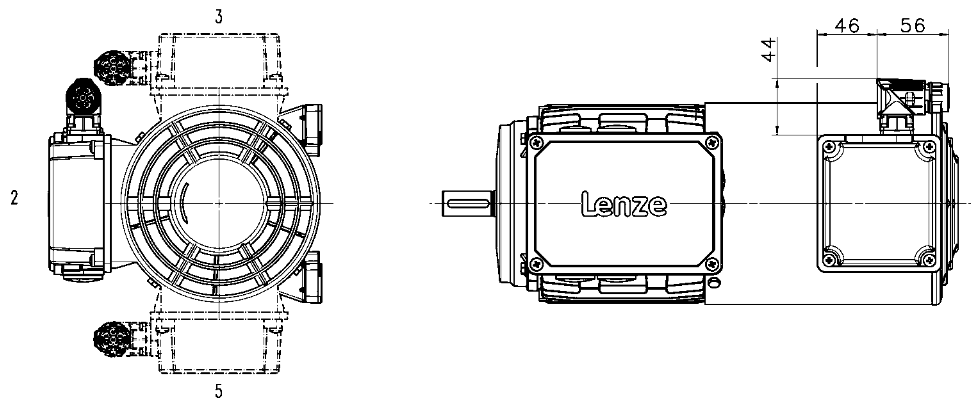
Pin assignment		
Contact	Designation	Meaning
PE	PE	PE conductor
1	U	Phase U power
2		Not assigned
3	V	Phase V power
4		Not assigned
5		
6	W	Phase W power

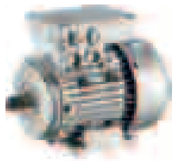


ICN connector

Blower connection

- The blower terminal box is available in positions 2, 3 or 5.
- In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.



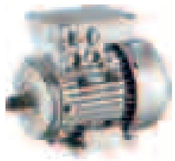


M12 connector

IG128-24V-H incremental encoder connection

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

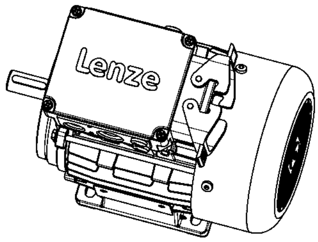
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

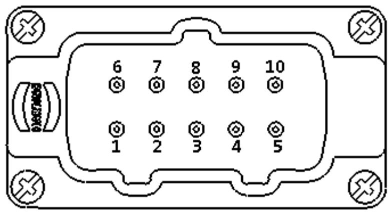


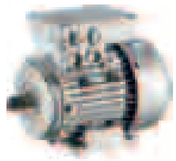
HAN connector

10E

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



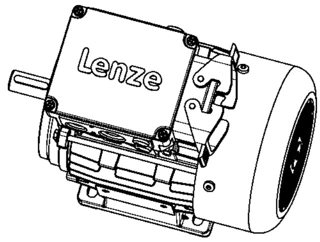
Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	



HAN connector

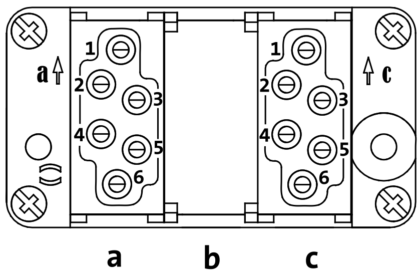
HAN modular

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.



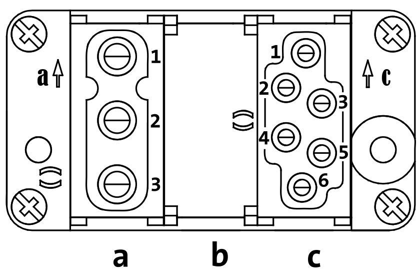
► HAN modular 16 A

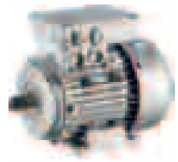
Pin assignment		
Module	Contact	Meaning
A	1	Terminal board: U1
	2	Terminal board: V1
	3	Terminal board: W1
B		Dummy module
C	1	Thermal sensor: +KTY/PTC/TKO
	2	Brake +/AC
	3	Brake -/AC
	4	Rectifier: Switching contact
	5	
	6	Thermal sensor: KTY/PTC/TKO



► HAN modular 40 A

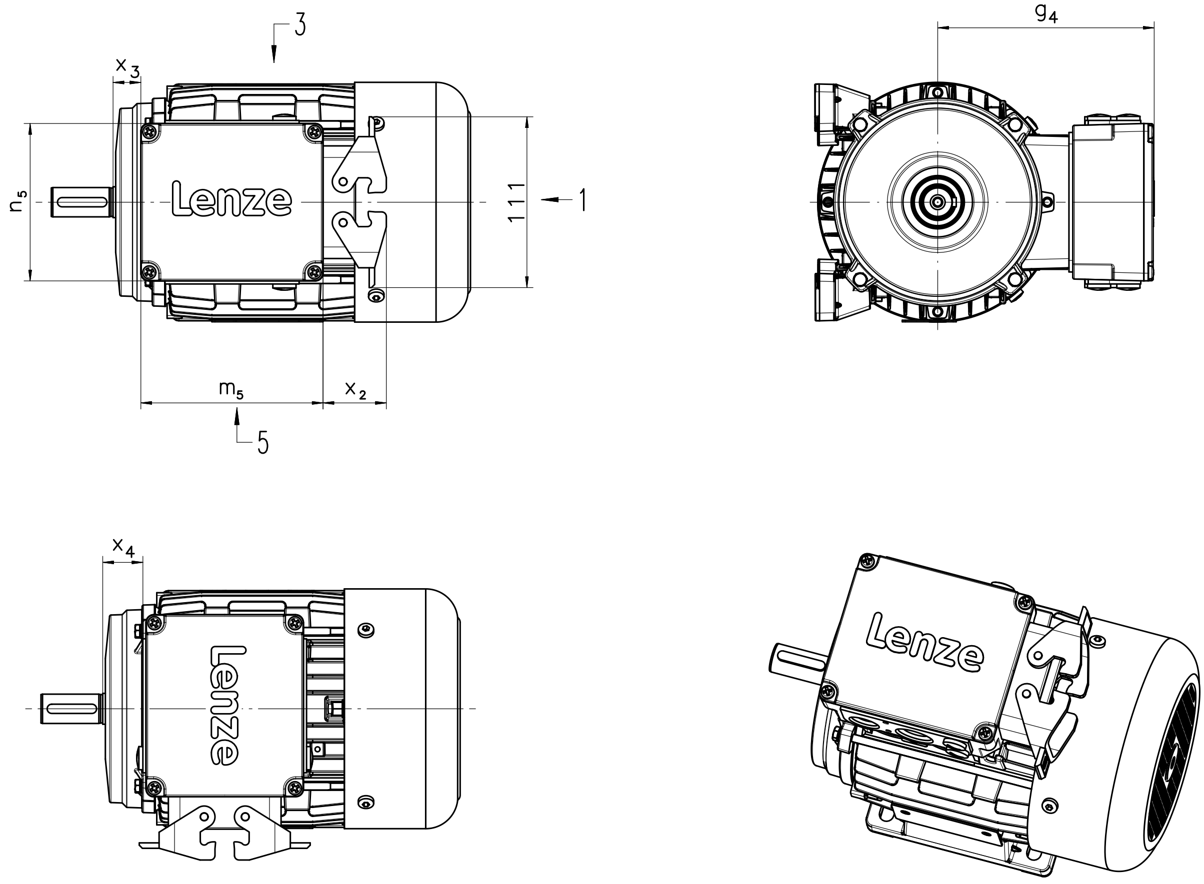
Pin assignment		
Module	Contact	Meaning
A	1	Terminal board: U1
	2	Terminal board: V1
	3	Terminal board: W1
B		Dummy module
C	1	Thermal sensor: +KTY/PTC/TKO
	2	Brake +/AC
	3	Brake -/AC
	4	Rectifier: Switching contact
	5	
	6	Thermal sensor: KTY/PTC/TKO





HAN connector

► The connection position for the connector is shown in position 1. Positions 3 and 5 are also possible.



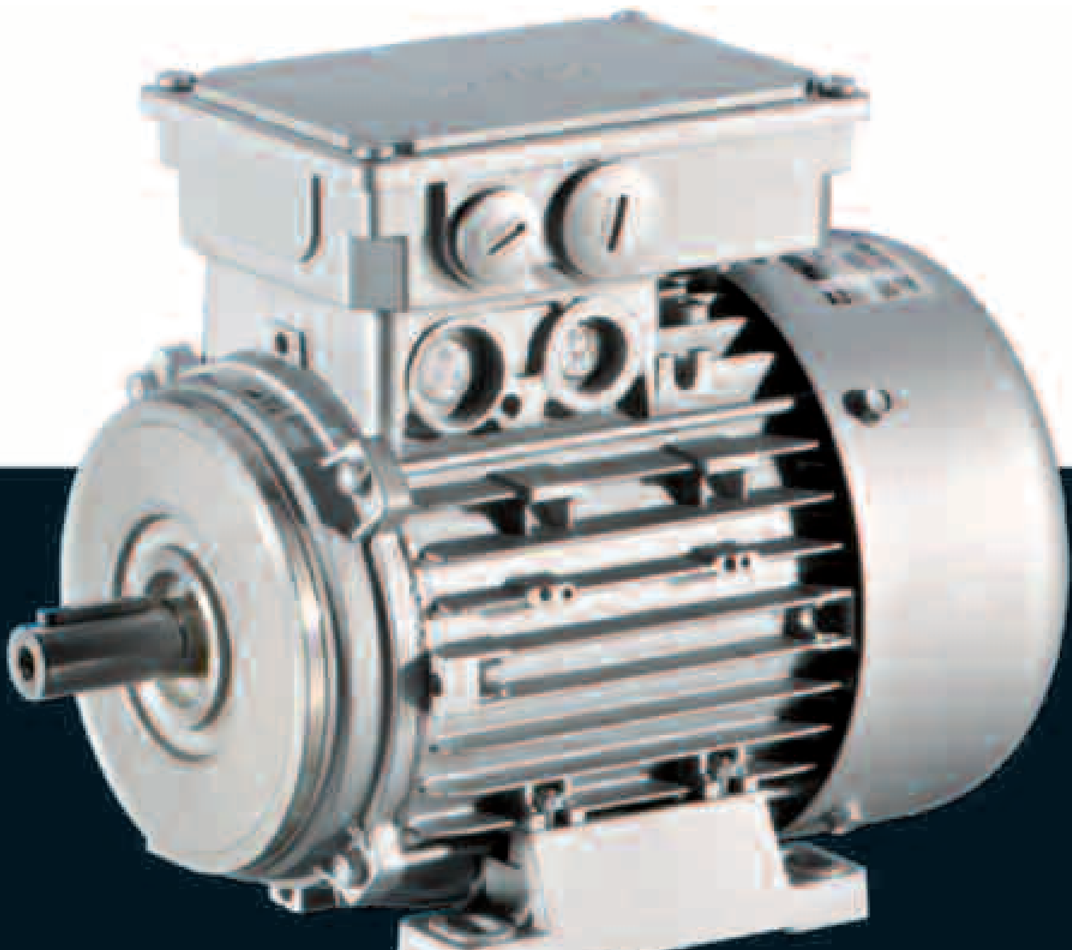
Motor type	
	M□□MAXX M□□MABR

	g4	m5	n5	x2	x3	x4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	120	118	102	41	11	12
071	129				16	17
080	138				18	26
090	143				22	30
100	154				29	37
112	164				28	36
132 [1]	233	120	180	47	48	18
160	248				72	42

[1] In the case of the B5 design motors, it is not possible to connect the connector at position 3 or 5.

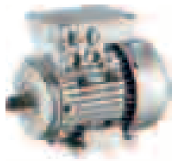
IE1 MD three-phase AC motors

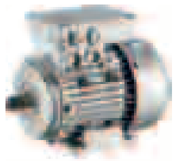
0.12 to 22 kW



IE1 MD three-phase AC motors

Contents



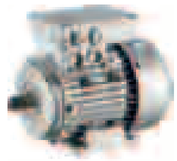


List of abbreviations

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

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

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



Product key

Motor type — M □ □ MA

- Standard efficiency (IE1): **D**
- High efficiency (IE2): **H**
- optimised frequency inverter: **F**

- **E** With integral fan
- **F** With blower

Built-on accessories — □□

Without brake:

- **XX** Without built-on accessories
- **RS** Resolver
  RS1
- **IG** Incremental encoder HTL
  IG128-24V-H
  IG512-24V-H
  IG1024-24V-H
  IG2048-24V-H
  Incremental encoder TTL
  IG512-5V-T
  IG1024-5V-T
  IG2048-5V-T
- **AG** SinCos multi-turn absolute value encoder,
  Hiperface®, AM1024-8V-H

Spring-applied brake:

- **BR** With brake
- **BS** Resolver
  RS1
- **BI** Incremental encoder HTL
  IG128-24V-H
  IG512-24V-H
  IG1024-24V-H
  IG2048-24V-H
  Incremental encoder TTL
  IG512-5V-T
  IG1024-5V-T
  IG2048-5V-T
- **BA** SinCos multi-turn absolute value encoder,
  Hiperface®, AM1024-8V-H

Size — □□□-□

(Example: 071-1)

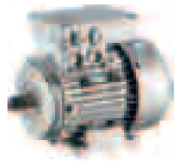
Number of pole pairs — □

- **2** 4-pole

internal code — □□

Approval — □

- **C** CE
- **U** cURus
- **3** CCC



Product information

For a long time now, three-phase AC motors from Lenze have been established in virtually all industrial sectors. Based on our many years of experience in the field of drive and automation technology, we have developed motors, which will ensure that your demands in terms of productivity, quality and availability are perfectly met.
Three-phase AC motors from the L-force series are primarily characterised by their comprehensive modularity. The wide variety of options allows you to precisely adjust the drive characteristics in line with your application. We call this Rightsizing.

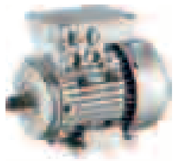
L-force MD three-phase AC motors are available in a power range from 0.12 to 22 kW and comply with efficiency class IE1 (standard efficiency) as per IEC 60034-30.

Basic versions

- The motors feature B3, B5 and B14 designs and dimensions standardised in line with IEC 60072-1 and/or DIN EN 50347 which makes then suitable for universal use.
- The thermal sensors integrated as standard allow for permanent temperature monitoring and are coordinated to the motor winding's temperature class F (155 °C).
- The motors of the basic version are adapted to ambient conditions by IP55 degree of protection .
- In tough operating conditions, the surface and corrosion protection system is provided to reliably protect the motor from aggresive media.

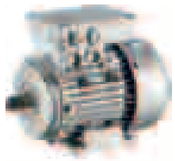
Options

- Various brake sizes – each available with several braking torques – can be combined with the three-phase AC motors.
- The LongLife version of the brake can easily reach 10 x 10^6 switching cycles.
- A resolver and various incremental and absolute value encoders can be fitted for speed and position detection.
- For fast commissioning, the motors are also available with connectors for the power connection, brake, blower and feedback.
- Instead of an integral fan, the motor can optionally be equipped with a blower. No torque reduction is then necessary, even at speeds below 20 Hz.
- For drive tasks in decentralised applications, the motor can be ordered with the motec inverter connected to the terminal box.
- The motors are available with cURus, GOST-R, CCC and UkrSepro approval.



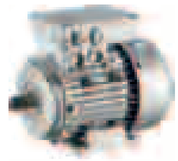
Functions and features

Size					
Motor		063	071	080	090
Design					
		B3 B5 B14			
Shaft journal					
d x l	[mm]	11 x 23	14 x 30	19 x 40	24 x 50
Spring-applied brake					
Design		Standard or LongLife design Reduced or standard braking torque With rectifier With manual release lever Low noise		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	
Feedback					
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)			
Temperature sensor					
Thermal contact		TKO			
Thermal detector		KTY83-110 KTY84-130			
PTC thermistor		PTC			
Motor connection					
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector			
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector			
Blower connection		Terminal box ICN connector			
Feedback connection		Terminal box ICN connector			
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection			
Shaft bearings					
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A			
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates			
Colour					
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours			



Functions and features

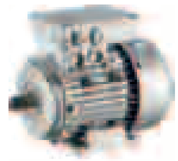
Size			
Motor		100	112
Design			
		B3 B5 B14	
Shaft journal			
d x l	[mm]	28 x 60	
Spring-applied brake			
Design		Standard or LongLife design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise	Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise
Feedback			
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)	
Temperature sensor			
Thermal contact		TKO	
Thermal detector		KTY83-110 KTY84-130	
PTC thermistor		PTC	
Motor connection			
Power connection		Terminal box ICN connector HAN10E connector HAN modular connector	
Brake connection		Terminal box ICN connector HAN modular connector HAN10E connector	
Blower connection		Terminal box ICN connector	
Feedback connection		Terminal box ICN connector	
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection	
Shaft bearings			
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A	
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates	
Colour			
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours	



Functions and features

Size				
Motor		132	160	180
Design				
		B3 B5		
Shaft journal				
d x l	[mm]	38 x 80	42 x 110	48 x 110
Spring-applied brake				
Design		Standard design Reduced, standard or increased braking torque With rectifier With manual release lever Low noise		
Feedback				
Design		Resolver Incremental encoder Absolute value encoder (multi-turn)		
Temperature sensor				
Thermal contact		TKO		
Thermal detector		KTY83-110 KTY84-130		
PTC thermistor		PTC		
Motor connection				
Power connection		Terminal box ICN connector HAN modular connector	Terminal box HAN modular connector	Terminal box
Brake connection		Terminal box ICN connector HAN modular connector	Terminal box HAN modular connector	Terminal box
Blower connection		Terminal box ICN connector		
Feedback connection		Terminal box ICN connector		
Temperature sensor connection		Terminal box TKO or PTC at connector in the power connection KTY at connector in the feedback connection		Terminal box
Shaft bearings				
Position of the locating bearing		Standard motors (B3, B5, B14): side B Motors for gearbox direct mounting: side A		
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour				
		Not coated Primed Paint in various corrosion-protection designs in accordance with RAL colours		

5.9



Functions and features

Surface and corrosion protection

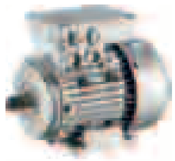
For optimum protection of three-phase AC motors against ambient conditions, the surface and corrosion protection system (OKS) offers tailor-made solutions.

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

Surface and corrosion protection system	Applications	Measures
OKS-G (primed)	• Dependent on subsequent top coat applied	• 2K PUR priming coat (grey)
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90%	• Surface coating corresponding to corrosivity category C1 (subject to EN 12944-2)
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)
OKS-L (high) OKS-XL (extra 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 • Screws zinc-coated • Cable glands with gaskets • Corrosion-resistant brake with cover ring, stainless friction plate, and chrome-plated armature plate (on request) Optional measures: • Motor recesses sealed off (on request)

Structure of surface coating

<table>
<tr><th>Surface and corrosion protection system</th><th>Corrosivity category</th><th>Surface coating</th><th>Colour</th></tr>
<tr><td></td><td>DIN EN ISO 12944-2</td><td>Structure</td><td></td></tr>
<tr><td>Without OKS
(uncoated)</td><td rowspan="2"></td><td></td><td rowspan="2"></td></tr>
<tr><td>OKS-G
(primed)</td><td>2K PUR priming coat</td></tr>
<tr><td>OKS-S
(small)</td><td>Comparable to C1</td><td>2K-PUR top coat</td><td rowspan="3">Standard: RAL 7012
Optional: RAL Classic</td></tr>
<tr><td>OKS-M
(medium)</td><td>Comparable to C2</td><td rowspan="2">2K PUR priming coat
2K-PUR top coat</td></tr>
<tr><td>OKS-L
(high)
OKS-XL
(extra Large)</td><td>Comparable to C3</td></tr>
</table>



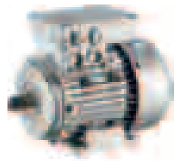
Motor – inverter assignment

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	MD□□□□□080-32	E84DVB□7514S□□□2□	E84AV□□□7514□□0
1.10	MD□□□□□080-42 MD□□□□□090-12	E84DVB□1124S□□□2□	E84AV□□□1124□□0
1.50	MD□□□□□090-32	E84DVB□1524S□□□2□	E84AV□□□1524□□0
2.20	MD□□□□□100-12	E84DVB□2224S□□□2□	E84AV□□□2224□□0
3.00	MD□□□□□100-32	E84DVB□3024S□□□2□	E84AV□□□3024□□0
4.00	MD□□□□□112-22	E84DVB□4024S□□□2□	E84AV□□□4024□□0
5.50	MD□□□□□132-12	E84DVB□5524S□□□2□	E84AV□□□5524□□0
7.50	MD□□□□□132-22	E84DVB□7524S□□□2□	E84AV□□□7524□□0
11.0	MD□□□□□160-22		E84AV□□□1134□□0
15.0	MD□□□□□160-32		E84AV□□□1534□□0
18.5	MD□□□□□180-12		E84AV□□□1834□□0
22.0	MD□□□□□180-32		E84AV□□□2234□□0

5.9

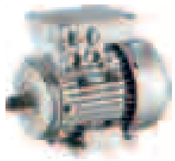


Motor – inverter assignment

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	MD□□□□□080-32	E84DVB□1524S□□□2□	E84AV□□□1524□□0
2.00	MD□□□□□080-42 MD□□□□□090-12	E84DVB□2224S□□□2□	E84AV□□□2224□□0
2.70	MD□□□□□090-32	E84DVB□3024S□□□2□	E84AV□□□3024□□0
3.90	MD□□□□□100-12	E84DVB□4024S□□□2□	E84AV□□□4024□□0
5.40	MD□□□□□100-32	E84DVB□5524S□□□2□	E84AV□□□5524□□0
7.10	MD□□□□□112-22	E84DVB□7524S□□□2□	E84AV□□□7524□□0
9.70	MD□□□□□132-12		E84AV□□□1134□□0
13.2	MD□□□□□132-22		E84AV□□□1534□□0
19.3	MD□□□□□160-22		E84AV□□□2234□□0
26.4	MD□□□□□160-32		E84AV□□□3034□□0
32.4	MD□□□□□180-12		E84AV□□□3734□□0

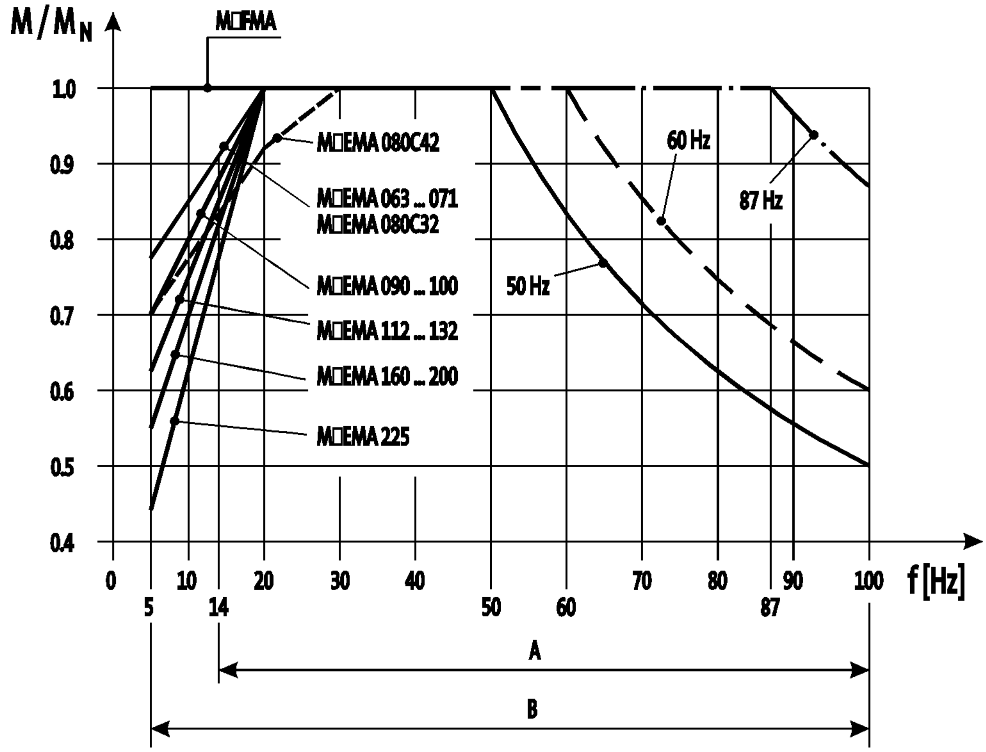


Dimensioning

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



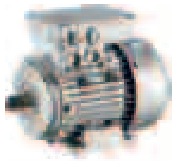
A = Operation with integral fan and brake
B = Operation with integral fan and brake control "Holding current reduction"

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

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

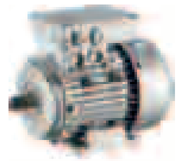
The Drive Solution Designer helps you to carry out a fast and high-quality drive dimensioning.
The software includes well-founded and proven knowledge on drive applications and electro-mechanical drive components.

Please contact your Lenze sales office.



IE1 MD three-phase AC motors

Technical data

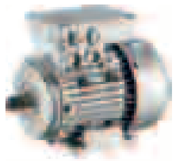


Standards and operating conditions

Degree of protection			
EN 60529			IP55 [1] IP65 [1] IP66 [1]
Energy efficiency class			
IEC 60034-30			IE1 [2]
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			
			UkrSEPRO
CCC			GB Standard 12350-2009
CSA			CSA 22.2 No. 100
cURus [3]			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] Only applies to 4-pole motors.
[3] Motor frame size 225, in preparation.

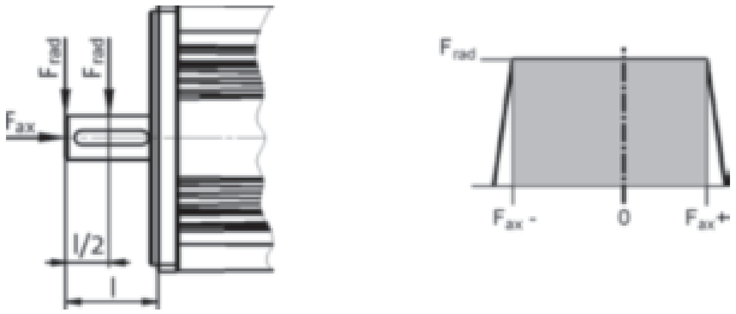
► In the European Union, the ErP Directive stipulates minimum efficiency levels for three-phase AC motors. Geared three-phase AC motors that do not conform with this Directive do not meet CE requirements and must not be marketed in the European Economic Area. For further information about the ErP Directive 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

- Forces at medium speed 2000 r/min.

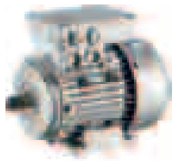
Application of forces



Application of force at l/2

	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	600	-600	300	470	-480	180	410	-430	120	350	-370	70
071	740	-800	470	590	-630	300	510	-550	220	430	-470	140
080	960	-1090	580	770	-860	350	670	-760	250	570	-650	140
090	1050	-1160	630	840	-920	390	730	-800	280	620	-690	160
100	1490	-1490	910	1190	-1160	580	1050	-1010	430	890	-860	270
112	2250	-2330	1340	1790	-1830	840	1570	-1600	610	1330	-1360	370
132	3300	-2150	1190	2640	-1670	710	2320	-1440	480	1970	-1210	250
160	3750	-2700	1520	3000	-2130	950	2640	-1830	670	2250	-1440	360
180	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
200	5620	-3270	1790	4500	-2580	1120	3960	-2210	790	3375	-1750	420
225	5200	-3100	3900	3900	-2100	2900	3300	-1300	2100	2650	-1000	1800

- The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
- Data for axial forces relate to the maximum radial force with the corresponding bearing service life.



Permissible radial and axial forces

- ► Forces at medium speed 2000 r/min.

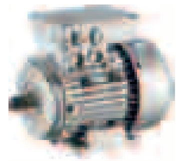
Application of force at l

Bearing service life L_{10}	10000 h			20000 h			30000 h			50000 h		
	F_{rad} [N]	$F_{ax,-}$ [N]	$F_{ax,+}$ [N]	F_{rad} [N]	$F_{ax,-}$ [N]	$F_{ax,+}$ [N]	F_{rad} [N]	$F_{ax,-}$ [N]	$F_{ax,+}$ [N]	F_{rad} [N]	$F_{ax,-}$ [N]	$F_{ax,+}$ [N]
063	400	-600	300	370	-480	180	320	-430	120	300	-370	70
071	680	-800	470	540	-630	300	470	-550	220	400	-470	140
080	880	-1090	580	700	-860	350	610	-760	250	520	-650	140
090	940	-1160	630	750	-920	390	660	-800	280	560	-690	160
100	1350	-1490	910	1080	-1160	580	940	-1010	430	800	-860	270
112	2040	-2330	1340	1620	-1830	840	1420	-1600	610	1210	-1360	370
132	3020	-2150	1190	2420	-1670	710	2120	-1440	480	1800	-1210	250
160	3410	-2700	1520	2730	-2130	950	2400	-1830	670	2050	-1440	360
180	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
200	4550	-3270	1790	3640	-2580	1120	3200	-2210	790	2730	-1750	420
225	4800	-3100	3900	3600	-2100	2900	3000	-1300	2100	2400	-1000	1800

- ► The values for the bearing service life L_{10} refer to an average speed of 2000 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
- ► Data for axial forces relate to the maximum radial force with the corresponding bearing service life.

IE1 MD three-phase AC motors

Technical data



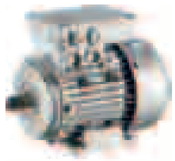
Rated data for 50 Hz

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]	
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□□□□□071-12	0.25	1370	230	1.30	400	0.75	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
MD□□□□□080-12	0.55	1390	230	2.50	400	1.40	3.80
MD□□□□□080-32	0.75	1410	230	3.30	400	1.90	4.60
MD□□□□□080-42	1.10	1390	230	4.80	400	2.80	4.40
MD□□□□□090-12	1.10	1390	230	4.80	400	2.80	4.10
MD□□□□□090-32	1.50	1410	230	6.60	400	3.80	4.80
MD□□□□□100-12	2.20	1440	230	9.20	400	5.30	6.00
MD□□□□□100-32	3.00	1430	230	12.5	400	7.20	4.60
MD□□□□□112-22	4.00	1450	230	16.1	400	9.30	6.20
MD□□□□□132-12	5.50	1450	230 400 [3]	20.2 11.7	400	11.7	4.00
MD□□□□□132-22	7.50	1455	230 400 [3]	28.6 16.5	400	16.5	5.90

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
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□□□□□071-12	1.74	3.10	3.10	0.75	65.0	66.0	8.30	5.80
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
MD□□□□□080-12	3.80	6.80	7.20	0.80	70.0	70.0	16.9	10.0
MD□□□□□080-32	5.10	11.0	12.1	0.80	73.0	74.0	26.0	11.0
MD□□□□□080-42	7.50	16.5	18.4	0.80	77.0	77.0	26.0	11.0
MD□□□□□090-12	7.56	15.5	16.0	0.81	75.0	75.0	23.2	12.0
MD□□□□□090-32	10.1	23.7	27.1	0.76	78.0	79.0	28.4	15.0
MD□□□□□100-12	14.6	38.0	44.0	0.73	83.0	84.0	61.0	24.0
MD□□□□□100-32	20.5	43.0	50.0	0.75	83.0	83.0	61.0	24.0
MD□□□□□112-22	26.3	70.0	95.0	0.73	85.0	86.0	107	31.0
MD□□□□□132-12	36.2	100	110	0.75	86.0	86.0	188	56.0
MD□□□□□132-22	49.2	100	150	0.76	87.0	88.0	336	66.0

[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 180-32, the required voltage must also be specified in your order.
[3] Star/delta start-up possible at 400 V.



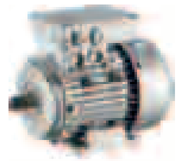
Rated data for 50 Hz

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]	
MD□□□□□160-22	11.0	1460	230 400 3)	36.5 21.0	400	21.0	7.00
MD□□□□□160-32	15.0	1460	230 400 3)	48.4 27.8	400	27.8	7.10
MD□□□□□180-12	18.5	1470	230 400 3)	57.8 32.8	400	32.8	6.80
MD□□□□□180-32	22.0	1465	230 400 3)	67.4 38.8	400	38.8	7.30

	M_N	M_a	M_b	$\cos\phi$	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J 1)	m 1)
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	71.9	150	204	0.85	89.2	89.0	610	110
MD□□□□□160-32	98.1	214	288	0.87	89.7	90.0	750	130
MD□□□□□180-12	120	260	313	0.90	90.7	90.5	1350	165
MD□□□□□180-32	144	330	360	0.90	91.2	91.0	1550	175

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 180-32, the required voltage must also be specified in your order.
3) Star/delta start-up possible at 400 V.



Rated data for 60 Hz

4-pole motors

	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□□□□□063-12	0.12	1735	265	0.69	460	0.40	4.00
MD□□□□□063-32	0.18	1695	265	0.80	460	0.46	3.60
MD□□□□□063-42	0.25	1680	265	1.30	460	0.75	3.80
MD□□□□□071-12	0.25	1680	265	1.10	460	0.65	3.30
MD□□□□□071-32	0.37	1720	265	1.50	460	0.84	3.90
MD□□□□□071-42	0.55	1720	265	2.10	460	1.20	4.10
MD□□□□□080-12	0.55	1700	265	2.10	460	1.20	4.30
MD□□□□□080-32	0.75	1720	265	2.90	460	1.70	5.60
MD□□□□□080-42	1.10	1705	265	4.20	460	2.40	5.40
MD□□□□□090-12	1.10	1700	265	4.20	460	2.40	4.50
MD□□□□□090-32	1.50	1720	265	5.80	460	3.40	5.70
MD□□□□□100-12	2.20	1745	265	8.10	460	4.70	6.90
MD□□□□□100-32	3.00	1740	265	10.8	460	6.30	5.30
MD□□□□□112-22	4.00	1755	265	14.1	460	8.20	6.90
MD□□□□□132-12	5.50	1755	265 460 [3]	17.5 10.1	460	10.1	4.50
MD□□□□□132-22	7.50	1760	265 460 [3]	25.7 14.8	460	14.8	6.50

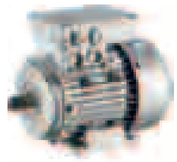
	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-12	0.66	2.25	2.64	0.55	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.00	2.21	2.56	0.68	65.0	66.0	3.30	4.10
MD□□□□□063-42	1.40	3.71	4.20	0.60	64.0	66.0	3.70	4.40
MD□□□□□071-12	1.40	2.80	2.80	0.73	67.0	68.0	8.30	5.80
MD□□□□□071-32	2.05	4.40	5.80	0.74	74.0	75.0	10.7	5.80
MD□□□□□071-42	3.05	7.00	9.00	0.73	76.0	77.0	12.8	6.40
MD□□□□□080-12	3.10	6.20	6.55	0.78	76.0	79.0	16.9	10.0
MD□□□□□080-32	4.16	10.3	12.2	0.78	78.0	78.0	26.0	11.0
MD□□□□□080-42	6.16	15.5	18.5	0.78	79.0	80.0	26.0	11.0
MD□□□□□090-12	6.18	14.0	14.5	0.75	78.0	79.0	23.2	12.0
MD□□□□□090-32	8.33	22.0	27.0	0.73	79.0	81.0	28.4	15.0
MD□□□□□100-12	12.0	33.0	43.0	0.71	83.0	85.0	61.0	24.0
MD□□□□□100-32	16.5	38.0	48.0	0.73	84.0	85.0	61.0	24.0
MD□□□□□112-22	21.8	57.0	89.0	0.72	85.0	87.0	107	31.0
MD□□□□□132-12	29.9	85.0	103	0.74	87.0	88.0	188	56.0
MD□□□□□132-22	40.7	83.0	137	0.75	88.0	89.0	336	66.0

[1] Without accessories

[2] Operation at 87 Hz is possible with 4-pole motors whose rated data at 60 Hz displays the voltage values Δ 265 V.
With motor frame sizes 132-12 to 180-32, the required voltage must also be specified in your order.

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

5.9



Rated data for 60 Hz

4-pole motors

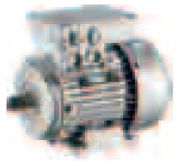
	P_N	n_N	$U_{N, \Delta}$ [2]	$I_{N, \Delta}$	$U_{N, Y}$	$I_{N, Y}$	I_a/I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□160-22	11.0	1770	265 460 [3]	31.7 18.3	460	18.3	7.60
MD□□□□□160-32	15.0	1760	265 460 [3]	40.7 23.5	460	23.5	7.60
MD□□□□□180-12	18.5	1780	265 460 [3]	48.5 28.0	460	28.0	7.20
MD□□□□□180-32	22.0	1760	265 460 [3]	57.2 33.0	460	33.0	7.60

	M_N	M_a	M_b	cos ϕ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	59.5	122	187	0.84	91.1	90.0	610	110
MD□□□□□160-32	81.2	171	265	0.87	92.6	92.0	750	130
MD□□□□□180-12	99.3	203	287	0.90	93.0	92.0	1350	165
MD□□□□□180-32	119	248	331	0.90	94.0	93.0	1550	175

[1] Without accessories

[2] Operation at 87 Hz is possible with 4-pole motors whose rated data at 60 Hz displays the voltage values Δ 265 V.
With motor frame sizes 132-12 to 180-32, the required voltage must also be specified in your order.

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

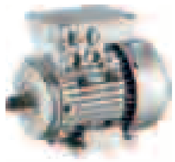


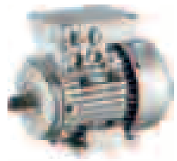
Rated data for 87 Hz

4-pole motors

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1)]	m [1)]
					± 10 %						
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[kgcm²]	[kg]
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□□□□□071-12	0.45	2480	1.74	7.00	400	1.30	0.74	66.0	68.0	8.30	5.80
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
MD□□□□□080-12	1.00	2500	3.80	15.0	400	2.50	0.78	72.0	72.0	16.9	10.0
MD□□□□□080-32	1.35	2520	5.10	20.0	400	3.30	0.80	75.0	77.0	26.0	11.0
MD□□□□□080-42	2.00	2500	7.50	30.0	400	4.80	0.80	81.0	82.0	26.0	11.0
MD□□□□□090-12	2.00	2500	7.56	30.0	400	4.80	0.78	77.0	77.0	23.2	12.0
MD□□□□□090-32	2.70	2520	10.1	40.0	400	6.70	0.73	83.0	85.0	28.4	15.0
MD□□□□□100-12	3.90	2550	14.6	60.0	400	9.20	0.71	87.0	88.0	61.0	24.0
MD□□□□□100-32	5.40	2540	20.5	80.0	400	12.5	0.73	87.0	88.0	61.0	24.0
MD□□□□□112-22	7.10	2560	26.3	105	400	16.1	0.71	87.0	88.0	107	31.0
MD□□□□□132-12	9.70	2560	36.2	145	400	20.1	0.74	90.0	90.0	188	56.0
MD□□□□□132-22	13.2	2565	49.2	200	400	28.6	0.75	90.0	90.0	336	66.0
MD□□□□□160-22	19.3	2565	71.9	280	400	36.5	0.85	91.7	90.0	610	110
MD□□□□□160-32	26.4	2565	98.1	390	400	48.4	0.86	91.9	92.0	750	130
MD□□□□□180-12	32.4	2575	120	480	400	57.8	0.89	92.8	92.0	1350	165
MD□□□□□180-32	38.7	2560	144	572	400	67.4	0.89	92.8	92.0	1550	175

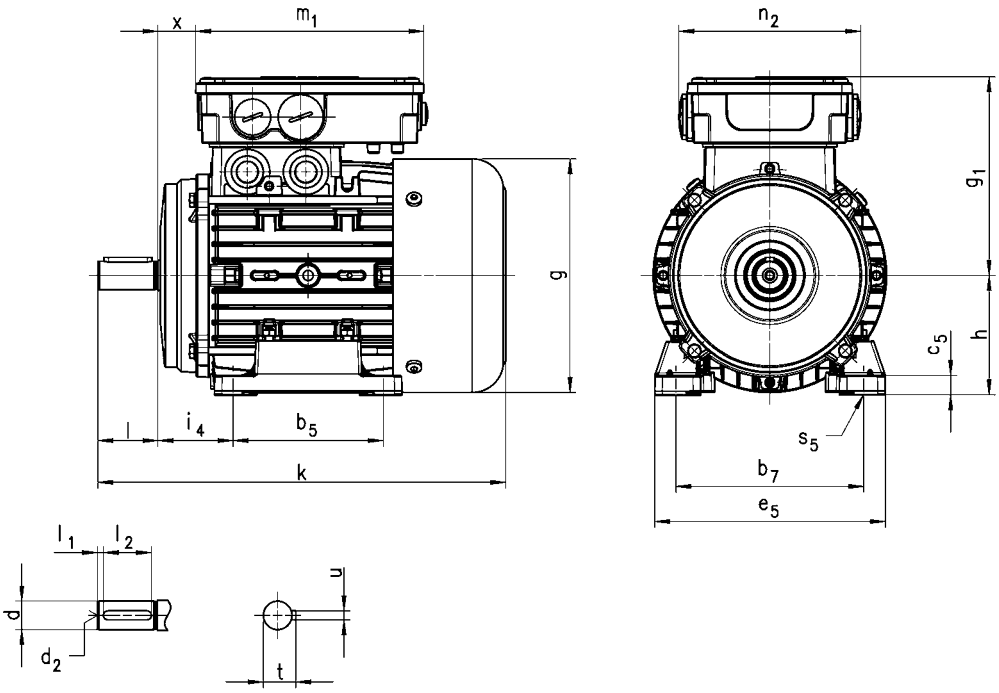
[1)] Without accessories





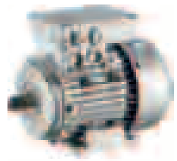
Dimensions, self-ventilated (4-pole)

Design B3



Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	311	176	137	29			373	176	137	29		
100	382	194	147	36			463	194	147	36		
112	392	218	158	38			479	218	158	38		
132	497	258	187	51	194	125	576	258	187	51	194	125
160	598 1)	310	220	69	253	152	703 1)	313	220	69	253	152
	642 2)						747 2)					
180	671	348	239	75			784	351	239	75		

1) 160-22
2) 160-32



Dimensions, self-ventilated (4-pole)

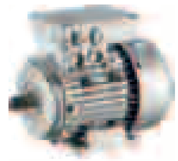
Design B3

Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			341	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	392	178	137	29			410	176	147	28		
100	463	196	147	36			483	194	158	35		
112	472	220	158	38			512	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		
160	681 [1]	313	220	69	253	152	789 [1]	313	220	69	253	152
	725 [2]						833 [2]					
180	750	351	239	75			863	351	239	75		

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

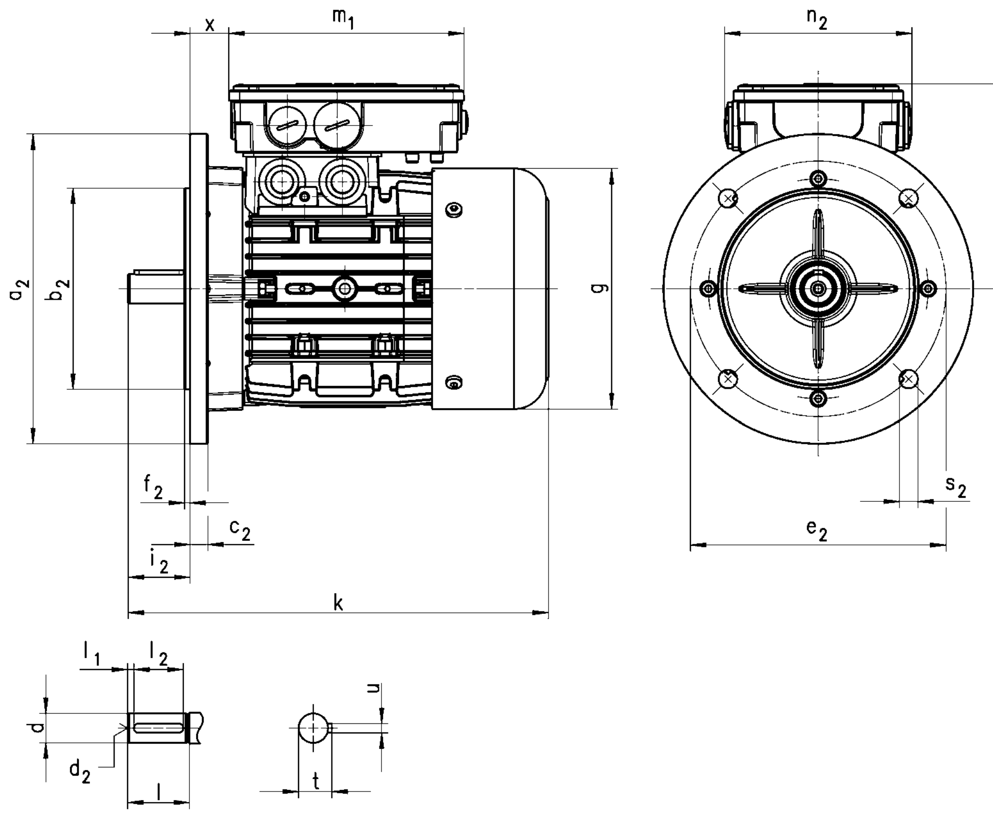
	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10	7.0
071	112	45	90	134	71	11	
080	125	50	100	154	80	13	10.0
090	140	56		174	90		
100	160	63	140	194	100	15	12.0
112	190	70		223	112	14	
132	216	89	178	260	132	18	
160	254	108	210 [1]	305	160	22	14.5
			254 [2]				
180	279	121	241 [3]	350	180	23	
			279 [4]				

[1] 160-22
[2] 160-32
[3] 180-12
[4] 180-32



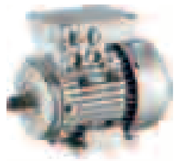
Dimensions, self-ventilated (4-pole)

Design B5



Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	311	176	137	29			373	176	137	29		
100	382	194	147	36			463	194	147	36		
112	392	218	158	38			479	218	158	38		
132	497	258	187	51	194	125	576	258	187	51	194	125
160	598 1)	310	220	69	253	152	703 1)	313	220	69	253	152
	642 2)						747 2)					
180	671	348	239	75			784	351	239	75		

1) 160-22
2) 160-32



Dimensions, self-ventilated (4-pole)

Design B5

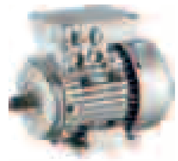
Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			341	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	392	178	137	29			410	176	147	28		
100	463	196	147	36			483	194	158	35		
112	472	220	158	38			512	218	168	37		
132	599	261	187	51	194	125	621	258	187	51		
160	681 1) 725 2)	313	220	69	253	152	789 1) 833 2)	313	220	69	253	152
180	750	351	239	75			863	351	239	75		

1) 160-22
2) 160-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

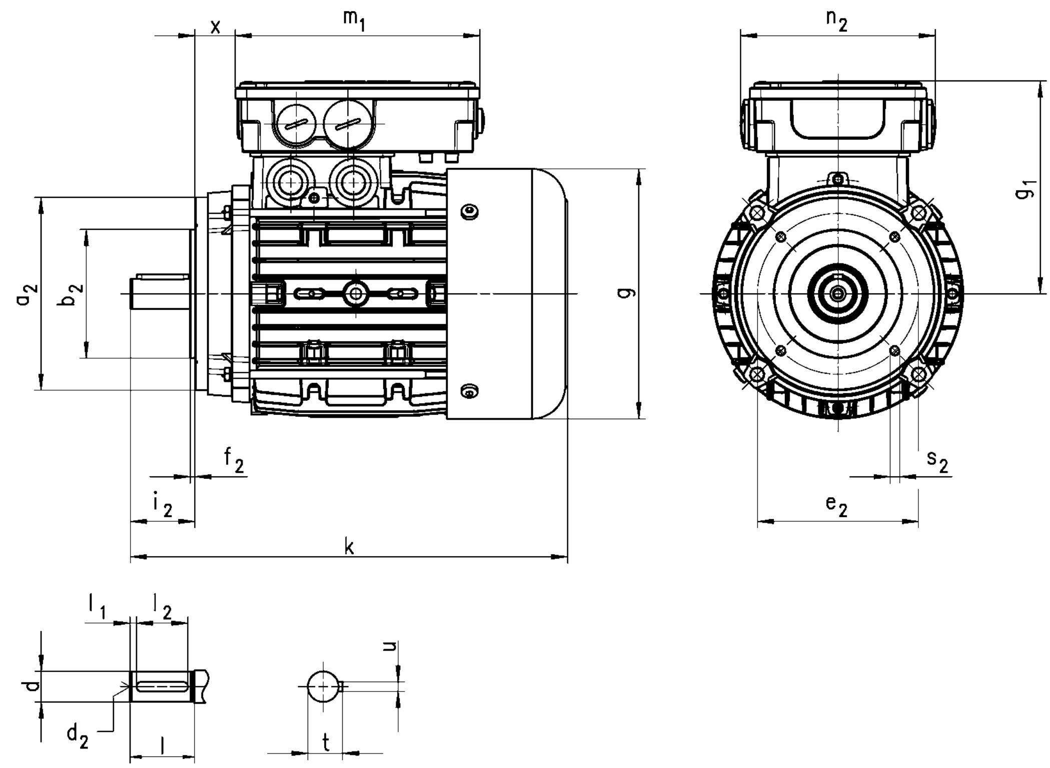
	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23.0
071	FF130	160	110		130	3.5		30.0
080	FF165	200	130	11	165		12.0	40.0
090								50.0
100	FF215	250	180	15	215	4.0	14.5	60.0
112								
132	FF265	300	230	20	265			80.0
160	FF300	350	250	13	300	5.0	18.5	110
180								

5.9



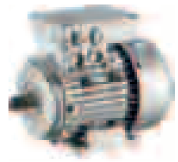
Dimensions, self-ventilated (4-pole)

Design B14



Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17	136	103	271	123	109	17	136	103
071	246	139	118	24			297	139	118	24		
080	272	156	132	25	152	121	345	154	132	25	152	121
090	311	176	137	29			373	176	137	29		
100	382	194	147	36			463	194	147	36		
112	392	218	158	38			479	218	158	38		

5.9



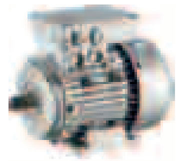
Dimensions, self-ventilated (4-pole)

Design B14

Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	271	123	109	17	136	103	318	123	109	17	136	103
071	297	139	118	24			341	139	133	13	194	125
080	369	156	132	25	152	121	383	156	142	24		
090	392	178	137	29			410	176	147	28		
100	463	196	147	36			483	194	158	35		
112	472	220	158	38			512	218	168	37		

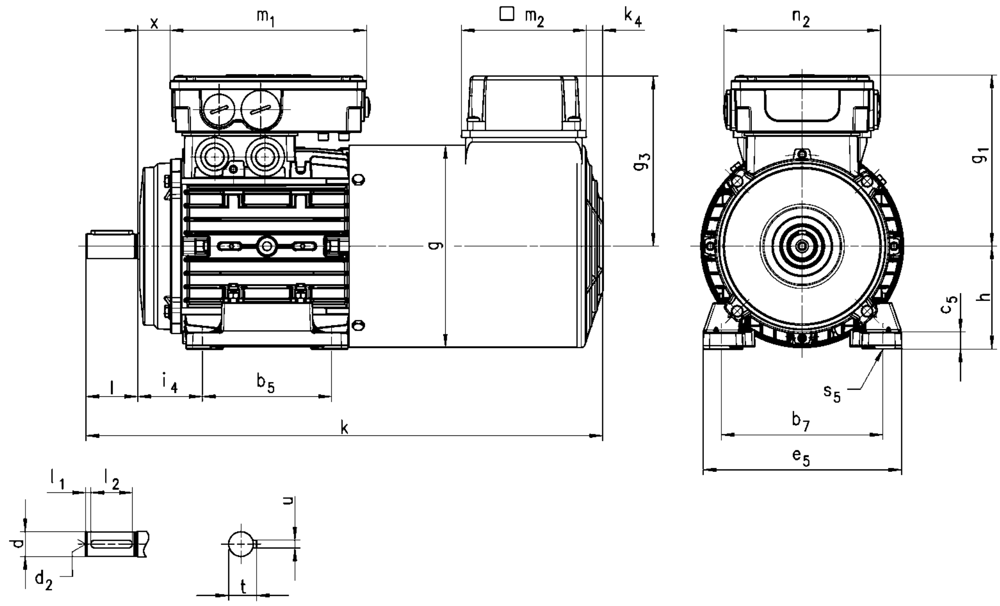
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FT75	90	60	75	2.5	M5x10	23.0
071	FT85	105	70	85		M6x10	30.0
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
	FT130	160	110	130	3.5		
100						M8x14	60.0
112						M8x16	



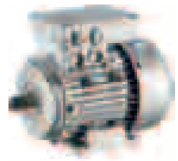
Dimensions, forced ventilated (4-pole)

Design B3



Motor type	MDFMAXX									MDFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	434	176	137	29			141	22	95	487	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		
132	612	257	187	51	194	125	182	32		698	257	187	51	194	125	182	32	
160	747 [1]	309	220	69	253	152	209	31	96	777 [1]	309	220	69	253	152	209	31	96
	791 [2]									821 [2]								
180	820	348	239	75						886	348	239	75					

[1] 160-22
[2] 160-32



Dimensions, forced ventilated (4-pole)

Design B3

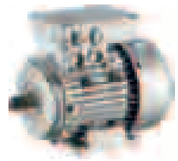
Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13	194	125	122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24			132	13	96
090	434	176	137	29			141	22	95	487	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	
160	822 [1] 866 [2]	309	220	69	253	152	209	31	96	835 [1] 877 [2]	309	220	69	253	152	209	31	96
180	886	348	239	75						946	348	239	75					

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10	7.0
071	112	45	90	134	71	11	
080	125	50	100	154	80	13	10.0
090	140	56		174	90		
100	160	63	140	194	100	15	12.0
112	190	70		223	112	14	
132	216	89	178	260	132	18	
160	254	108	210 [1] 254 [2]	305	160	22	14.5
180	279	121	241 [3] 279 [4]	350	180	23	

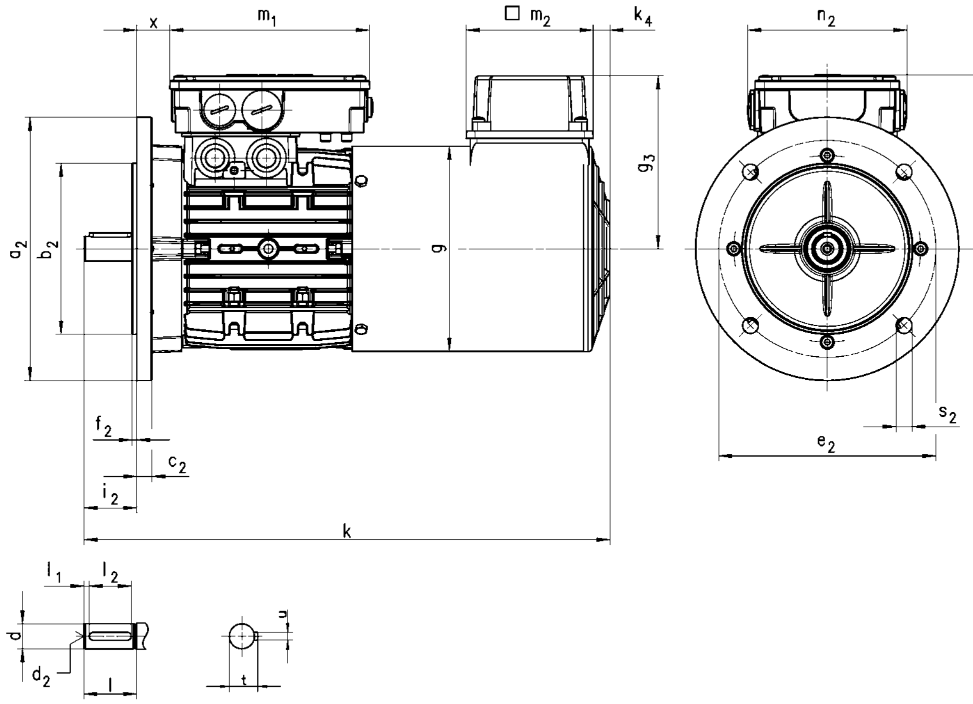
[1] 160-22
[2] 160-32
[3] 180-12
[4] 180-32

5.9



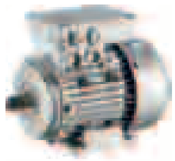
Dimensions, forced ventilated (4-pole)

Design B5



Motor type	MDFMAXX									MDFMABR								
	k [mm]	g [mm]	g_1 [mm]	x [mm]	m_1 [mm]	n_2 [mm]	g_3 [mm]	k_4 [mm]	m_2 [mm]	k [mm]	g [mm]	g_1 [mm]	x [mm]	m_1 [mm]	n_2 [mm]	g_3 [mm]	k_4 [mm]	m_2 [mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	434	176	137	29			141	22	95	487	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		
132	612	257	187	51	194	125	182	32		698	257	187	51	194	125	182	32	
160	747 [1]	309	220	69	253	152	209	31	96	777 [1]	309	220	69	253	152	209	31	96
	791 [2]									821 [2]								
180	820	348	239	75						886	348	239	75					

[1] 160-22
[2] 160-32



Dimensions, forced ventilated (4-pole)

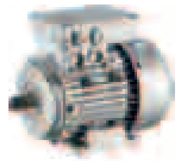
Design B5

Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13	194	125	122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24			132	13	96
090	434	176	137	29			141	22	95	487	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		
132	698	257	187	51	194	125	182	32		698	257	187	51			182	32	
160	822 [1] 866 [2]	309	220	69	253	152	209	31	96	835 [1] 877 [2]	309	220	69	253	152	209	31	96
180	886	348	239	75						946	348	239	75					

[1] 160-22
[2] 160-32

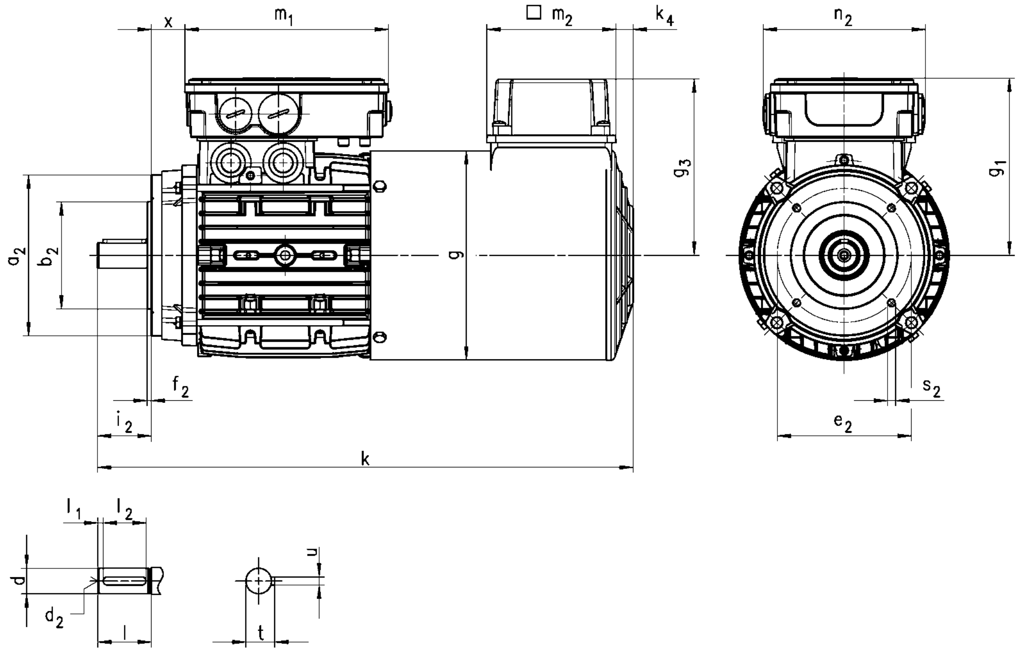
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23.0
071	FF130	160	110		130	3.5		30.0
080	FF165	200	130	11	165		12.0	40.0
090								50.0
100	FF215	250	180	15	215	4.0	14.5	60.0
112								
132	FF265	300	230	20	265			80.0
160	FF300	350	250	13	300	5.0	18.5	110
180								

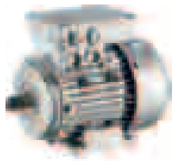


Dimensions, forced ventilated (4-pole)

Design B14



Motor type	MDFMAXX									MDFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	118	24			122		
080	400	156	132	25	152	121	132	13	96	455	156	132	25	152	121	132	13	96
090	434	176	137	29			141	22	95	487	176	137	29			141	22	95
100	491	194	147	36			150			552	194	147	36			150		
112	494	218	158	38			162			575	218	158	38			162		



Dimensions, forced ventilated (4-pole)

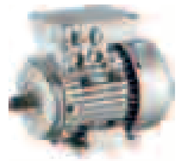
Design B14

Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17	136	103	115	12	95	385	123	109	17	136	103	115	12	95
071	373	138	118	24			122			410	138	133	13	194	125	122		
080	400	156	132	25	152	121	132	13	96	455	156	142	24			132	13	96
090	434	176	137	29			141	22	95	487	176	147	28			141	22	95
100	491	194	147	36			150			552	194	158	35			150		
112	575	218	158	38			162			575	218	168	37			162		

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

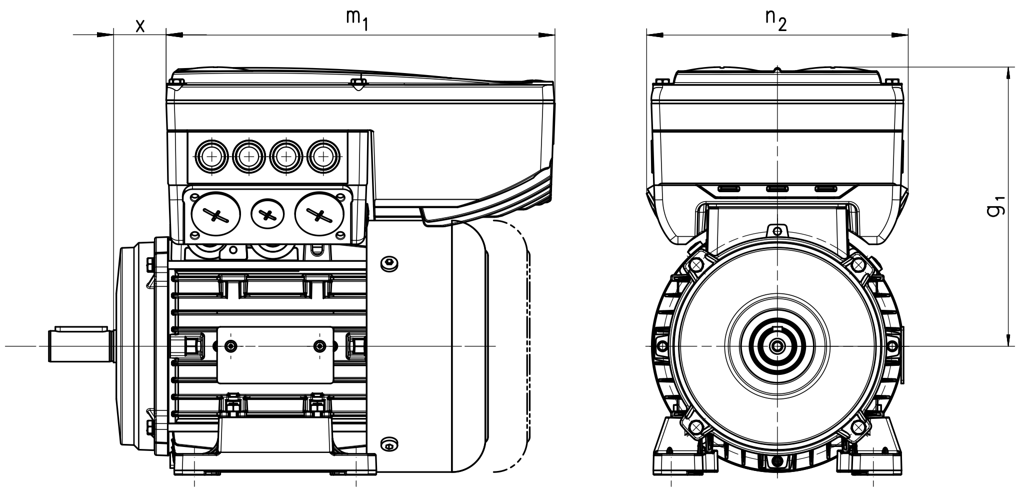
	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FT75	90	60	75	2.5	M5x10	23.0
071	FT85	105	70	85		M6x10	30.0
080	FT100	120	80	100	3.0	M6x12	40.0
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50.0
	FT130	160	110	130	3.5		
100						M8x14	60.0
112						M8x16	

5.9

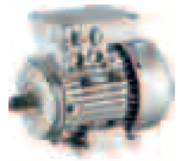


Dimensions, 8400 motec inverter

Rated frequency 50/60 Hz

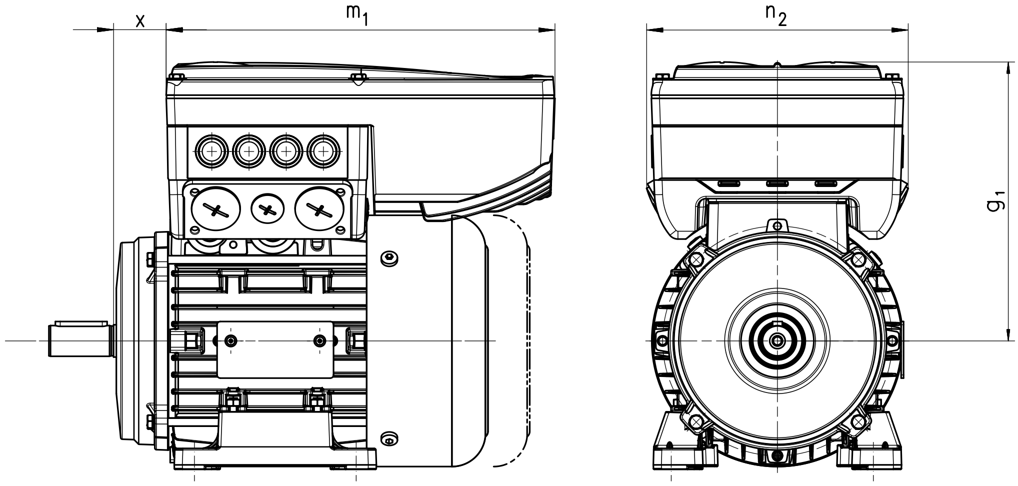


Product key					
Motor	Inverter				
		$g_{1,\,50Hz}$	$m_{1,\,50Hz}$	$n_{2,\,50Hz}$	x_{50Hz}
		[mm]	[mm]	[mm]	[mm]
MD□□□□□071-32	E84DVB□3714S□□□2□	163	241	161	29.5
MD□□□□□071-42	E84DVB□5514S□□□2□				
MD□□□□□080-12		172			32.5
MD□□□□□080-32	E84DVB□7514S□□□2□				
MD□□□□□080-42	E84DVB□1124S□□□2□				
MD□□□□□090-12		177			36.2
MD□□□□□090-32	E84DVB□1524S□□□2□				
MD□□□□□100-12	E84DVB□2224S□□□2□	217	260	176	42.4
MD□□□□□100-32	E84DVB□3024S□□□2□				
MD□□□□□112-22	E84DVB□4024S□□□2□	282	325	195	32.0
MD□□□□□132-12	E84DVB□5524S□□□2□	301			47.5
MD□□□□□132-22	E84DVB□7524S□□□2□				



Dimensions, 8400 motec inverter

Rated frequency 87 Hz



<table>
<tr><th colspan="2">Product key</th><th colspan="4"></th></tr>
<tr><td>Motor</td><td>Inverter</td><td colspan="4"></td></tr>
<tr><td></td><td></td><td>$g_{1,\ 87Hz}$</td><td>$m_{1,\ 87Hz}$</td><td>$n_{2,\ 87Hz}$</td><td>x_{87Hz}</td></tr>
<tr><td></td><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>MD□□□□□063-32</td><td>E84DVB□3714S□□□2□</td><td rowspan="2">154</td><td rowspan="7">241</td><td rowspan="7">161</td><td rowspan="2">23.5</td></tr>
<tr><td>MD□□□□□063-42</td><td rowspan="2">E84DVB□5514S□□□2□</td></tr>
<tr><td>MD□□□□□071-12</td><td rowspan="3">163</td><td rowspan="3">29.5</td></tr>
<tr><td>MD□□□□□071-32</td><td>E84DVB□7514S□□□2□</td></tr>
<tr><td>MD□□□□□071-42</td><td rowspan="2">E84DVB□1124S□□□2□</td></tr>
<tr><td>MD□□□□□080-12</td><td rowspan="2">172</td><td rowspan="2">32.5</td></tr>
<tr><td>MD□□□□□080-32</td><td>E84DVB□1524S□□□2□</td></tr>
<tr><td>MD□□□□□080-42</td><td rowspan="2">E84DVB□2224S□□□2□</td><td>201</td><td rowspan="3">260</td><td rowspan="3">176</td><td>31.5</td></tr>
<tr><td>MD□□□□□090-12</td><td rowspan="2">206</td><td rowspan="2">35.2</td></tr>
<tr><td>MD□□□□□090-32</td><td>E84DVB□3024S□□□2□</td></tr>
<tr><td>MD□□□□□100-12</td><td>E84DVB□4024S□□□2□</td><td rowspan="2">272</td><td rowspan="3">325</td><td rowspan="3">195</td><td rowspan="2">29.9</td></tr>
<tr><td>MD□□□□□100-32</td><td>E84DVB□5524S□□□2□</td></tr>
<tr><td>MD□□□□□112-22</td><td>E84DVB□7524S□□□2□</td><td>282</td><td>32.0</td></tr>
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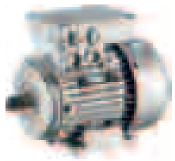
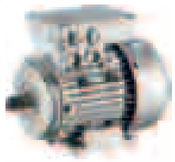
5.9





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

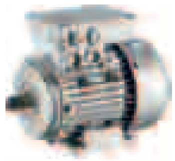
- Non-asbestos, low wearing

Options

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

Assignment of 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
080-12 080-32	08 08 10	3.50 8.00 7.00	08 10	8.00 7.00
080-42	08 08 10 10	3.50 8.00 7.00 16.0	08 10 10	8.00 7.00 16.0

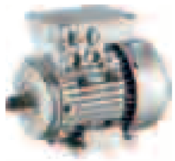


Spring-applied brake

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]
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		
112-22 112-32	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		
132-22 132-32	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		
180-42	18 18 20 20 20 20	80.0 150 145 260 315 400		

5.9



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.

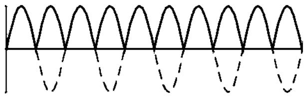
- Supply voltages
  DC 24 V
  DC 180 V
  DC 205 V

Connection via mains voltage with brake rectifier

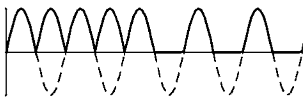
If the brake is not directly supplied with DC voltage, a rectifier is required. This is included in the scope of supply and is located in the terminal box of the motor. The rectifier converts the AC voltage of the connection into DC voltage. The following rectifiers are available:

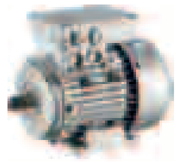
Half-wave rectifier, 6-pole
- Ratio of supply voltage to brake coil voltage = 2.22
- Approved by UL/CSA
- Supply voltages
  AC 230 V
  AC 400 V
  AC 460 V

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



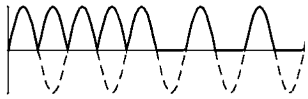


Spring-applied brake

Connection via mains voltage with brake rectifier

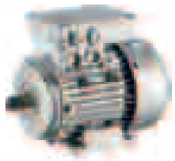
Bridge/half-wave rectifier, 6-pole

- 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

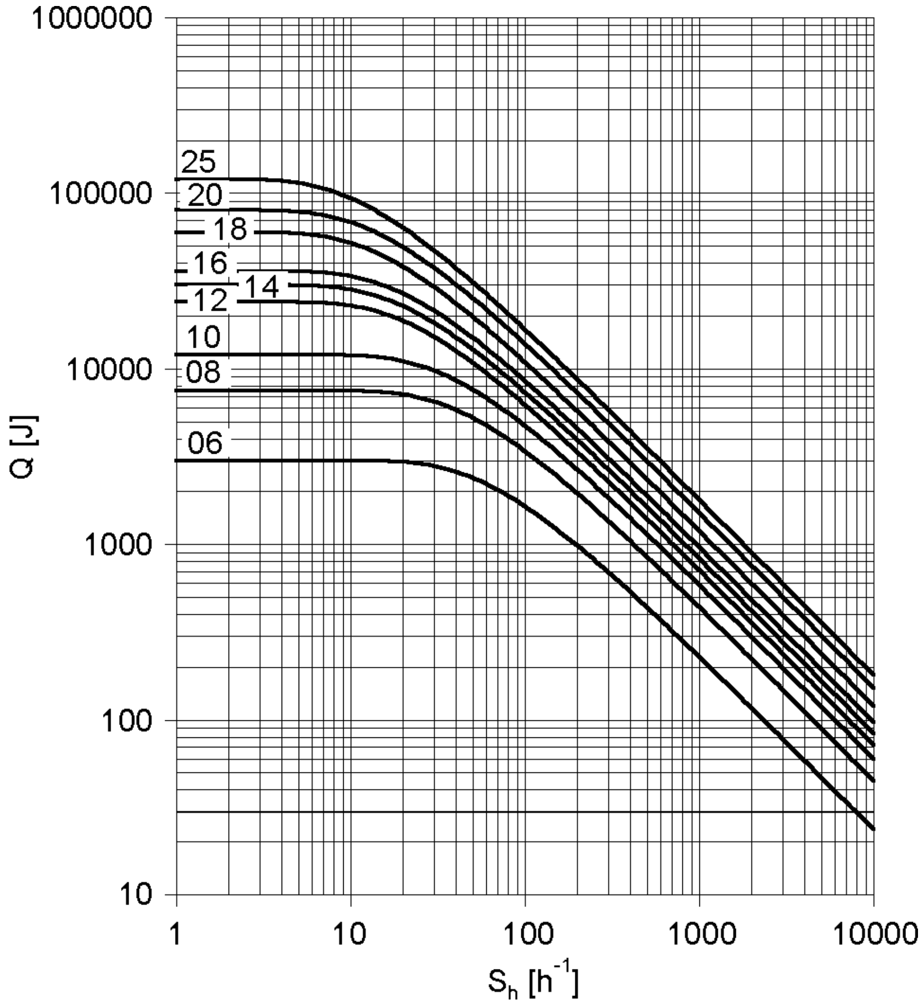


During the switching operation the bridge/half-wave rectifier functions as a bridge rectifier for the overexcitation time $t_ü$ and then as a half-wave rectifier. This combination optimises the performance of the brake – depending on the assignment of brake coil voltage and supply voltage:

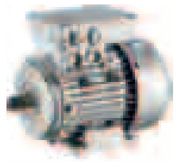
- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_ü$ with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.
  These features make this activation version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



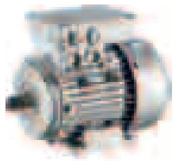
Spring-applied brake

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											
	$S_{h\ddot{u}}$	[1/h]	79.0	50.0	40.0	30.0	28.0	27.0	20.0	19.0	15.0
Moment of inertia											
	J	[kgcm^2]	0.015	0.061	0.20	0.45	0.63	1.50	2.90	7.30	20.0
Mass											
	m	[kg]	0.90	1.50	2.60	4.20	5.80	8.70	12.6	19.5	31.0

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



Spring-applied brake

Rated data with reduced braking torque

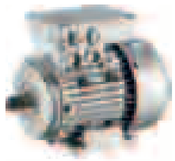
► Activation via half-wave or bridge rectifier

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.



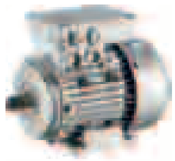
Spring-applied brake

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

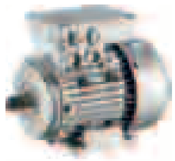
► Activation via half-wave or bridge rectifier

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

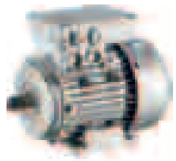
► Please enquire for braking torques and maximum switching work values not listed here.

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

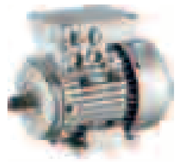
Rated data with increased braking torque

- ► 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

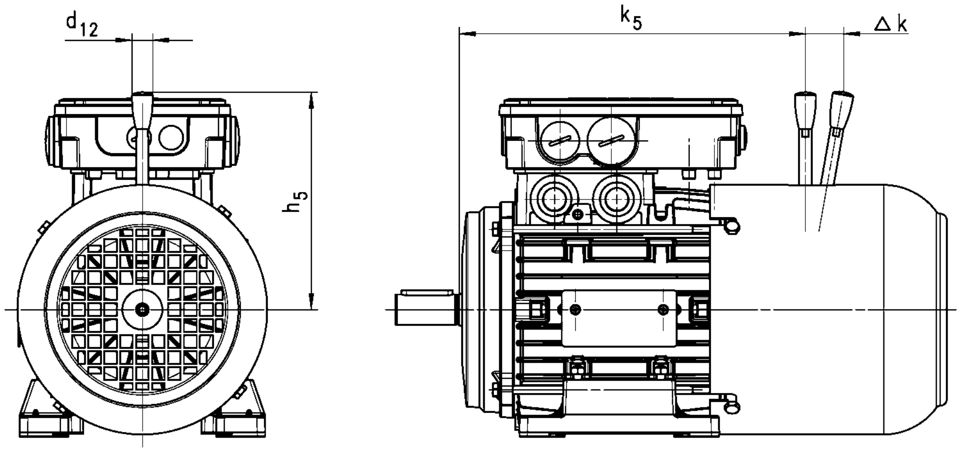
Design			Over-excitation									
Size			10	12	14	16		18	20		25	
Friction energy	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time	$t_ü$	[ms]	300		1300							
Min. rest time	t	[ms]	900		3900							
Delay time Engaging	t_{11}	[ms]	29.0	54.0	31.0	70.0	46.0	86.0	103	55.0	171	135
Rise time 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.



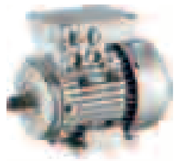
Spring-applied brake

Manual release lever



	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
063	06	178	29	107	13.0
071	06 08	205 206	29 27	107 116	13.0 13.0
080	08 10	224 239	27 28	116 132	13.0 13.0
090	08 10	238 251	27 28	116 132	13.0 13.0
100	10 12	305 307	28 37	132 161	13.0 13.0
112	12 14	320 323	37 41	161 195	13.0 24.0
132	14 16	400 406	41 55	195 240	24.0 24.0
160	16 18	505 509	55 59	240 279	24.0 24.0
180	18 20	540 546	59 74	279 319	24.0 24.0

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

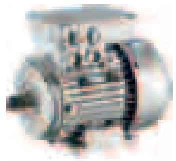


Resolver

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

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

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



Incremental encoder and SinCos absolute value encoder

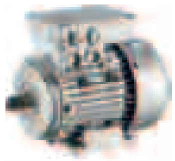
► The three-phase AC motors with incremental encoders or SinCos absolute value encoders cannot be used for speed-dependent safety functions in connection with the SM 301 safety module.

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

5.9

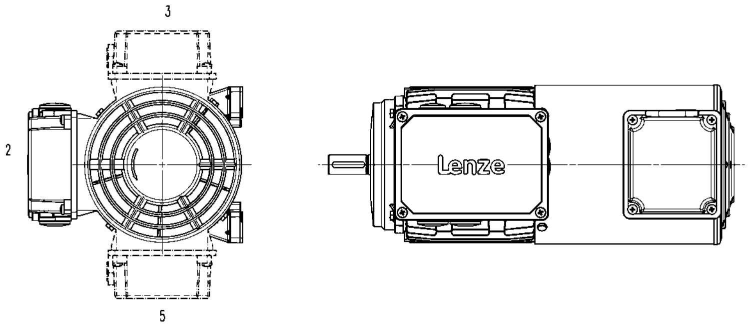
Inverters
- Inverter Drives 8400 StateLine (E84AVSC)
- Inverter Drives 8400 HighLine (E84AVHC)
- Inverter Drives 8400 TopLine (E84AVTC)

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



Blower

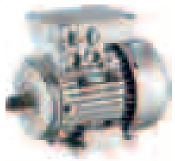
► The blower terminal box is available in positions 2, 3 or 5.



Rated data for 50 Hz

Size Motor	Number of phases	Connection method	U_{min} [V]	U_{max} [V]	P_{max} [kW]	I_{max} [A]	m [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	

5.9



Blower

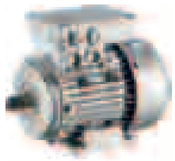
Rated data for 50 Hz

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

Rated data for 60 Hz

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

5.9



Temperature monitoring

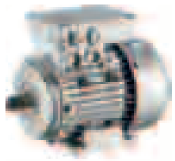
► The thermal sensors are integrated in the windings. The use of an additional motor protection switch is recommended.

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

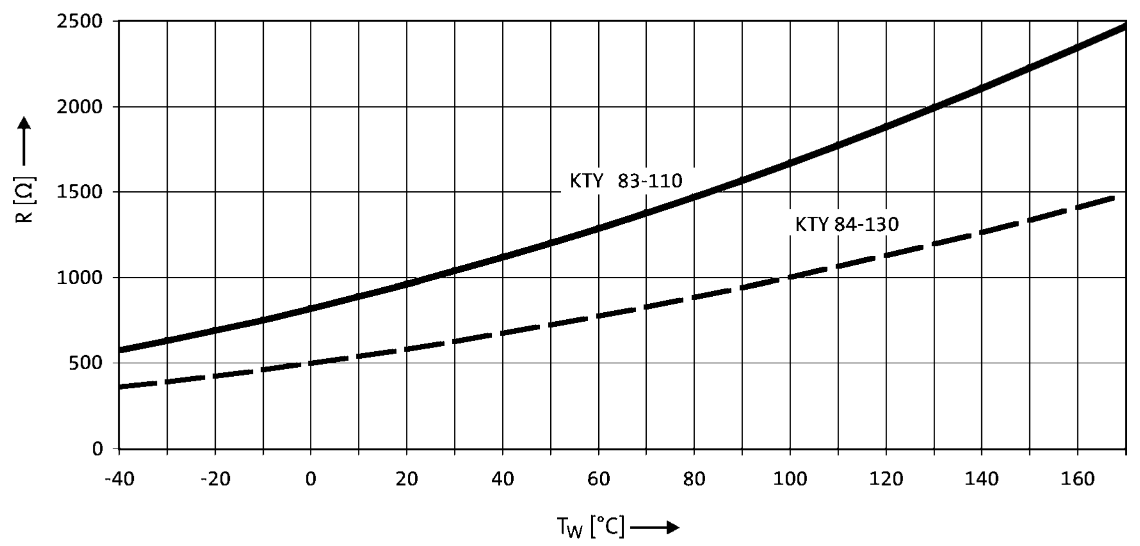


Temperature monitoring

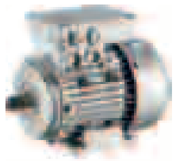
KTY temperature sensor

	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.

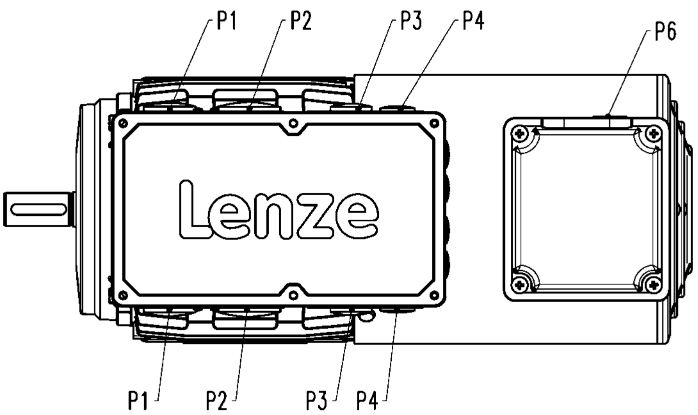


Terminal box

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

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

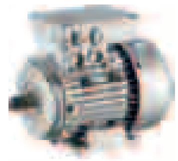
Connections



<table>
<tr><th>Motor type</th><th colspan="5"></th><th colspan="5"></th></tr>
<tr><td>Built-on accessories</td><td colspan="5">M□□MAXX
M□□MABR
M□□MARS
M□□MAIG
M□□MAAG</td><td colspan="5">M□□MABS
M□□MABI
M□□MABA</td></tr>
<tr><td></td><td>P_1</td><td>P_2</td><td>P_3</td><td>P_4</td><td>P_6</td><td>P_1</td><td>P_2</td><td>P_3</td><td>P_4</td><td>P_6</td></tr>
<tr><td></td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td><td>[mm]</td></tr>
<tr><td>063</td><td rowspan="2">M16x1.5</td><td rowspan="2">M20x1.5</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="11">M16x1.5</td><td rowspan="7">M25x1.5</td><td rowspan="7">M32x1.5</td><td rowspan="10">M20x1.5</td><td rowspan="10">M16x1.5</td><td rowspan="11">M16x1.5</td></tr>
<tr><td>071</td></tr>
<tr><td>080</td><td rowspan="4">M20x1.5</td><td rowspan="4">M25x1.5</td></tr>
<tr><td>090</td></tr>
<tr><td>100</td></tr>
<tr><td>112</td></tr>
<tr><td>132</td><td>M25x1.5</td><td>M32x1.5</td><td rowspan="4">M20x1.5</td><td rowspan="4">M16x1.5</td></tr>
<tr><td>160</td><td rowspan="3">M50x1.5</td><td rowspan="3">M16x1.5</td><td rowspan="3">M50x1.5</td><td rowspan="3">M16x1.5</td></tr>
<tr><td>180</td></tr>
<tr><td>200</td></tr>
<tr><td>225 1)</td><td>M12x1.5</td><td>M63x1.5</td><td>M50x1.5</td><td>M12x1.5</td><td>M12x1.5</td><td>M63x1.5</td><td>M50x1.5</td><td>M12x1.5</td></tr>
</table>

1) The cable glands P1 to P4 are only arranged at the bottom.

5.9

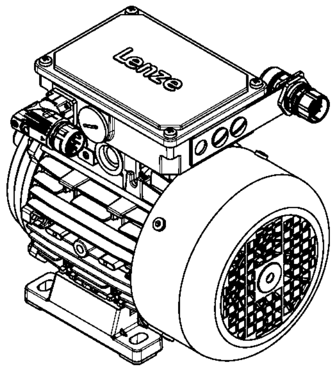


Plug connectors

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

ICN connector

A connector is used for 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.



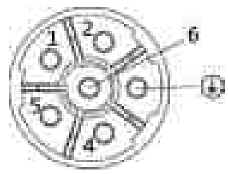
Connection for power, brake and temperature monitoring

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

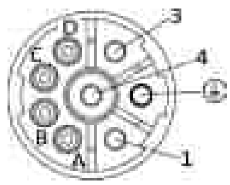
No connection of temperature monitoring possible!

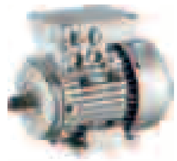
Pin assignment		
Contact	Designation	Meaning
1	BD1 / BA1	Brake +/AC
2	BD2 / BA2	Brake -/AC
PE	PE	PE conductor
4	U	Phase U power
5	V	Phase V power
6	W	Phase W power



► 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

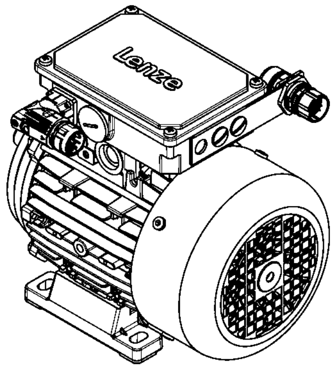




ICN connector

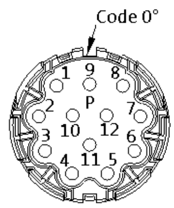
Feedback connection

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



► Resolver

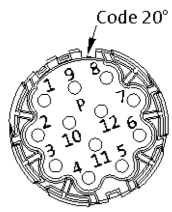
Pin assignment		
Contact	Designation	Meaning
1	+Ref	Transformer windings
2	-Ref	
3	+VCC ETS	Supply: Electronic nameplate
4	+COS	Cosine stator windings
5	-COS	
6	+SIN	Sine stator windings
7	-SIN	
8		Not assigned
9		
10		
11	+KTY	KTY temperature sensor
12	-KTY	

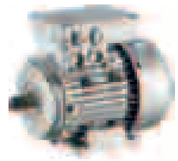


5.9

► Hiperface incremental encoder and SinCos absolute value encoder

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



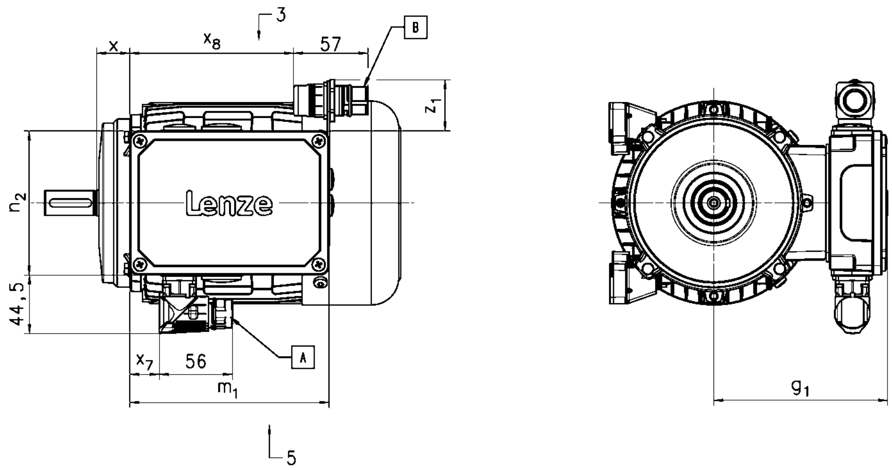


ICN connector

Dimensions of the connectors on the terminal box

The following connector positions are possible:
- power connection (A) in position 5 and feedback connection (B) in position 3
- power connection (A) in position 3 and feedback connection (B) in position 5

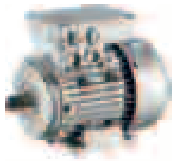
With the following motors, the feedback connection (B) is only available in position 3 or 5:
- motor frame size 132 to 180



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

	g_1	x	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	109	17	136	103	16	109	43
071	118	24					
080	132	25	152	121	23	125	41
090	137	29					
100	147	36					
112	158	38					
132	187	51	194	125	27	166	71
160	220	69	253	152		200	65
180	239	75					
200		77					
225	348	68	354	204		328	51

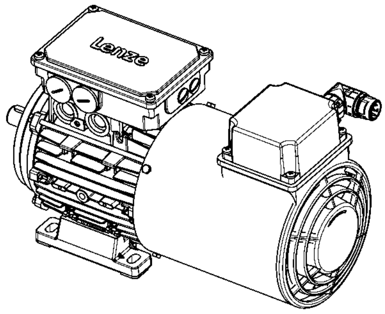
5.9



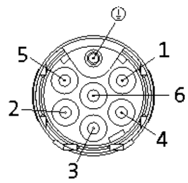
ICN connector

Blower connection

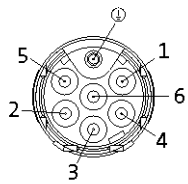
The blower is also optionally available with an ICN connector fixed to the terminal box of the blower for exceptionally fast commissioning. The connectors are fitted with a bayonet fixing, which is also compatible with conventional union nuts. Existing counter plugs can therefore continue to be used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



► Blower 1-ph

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

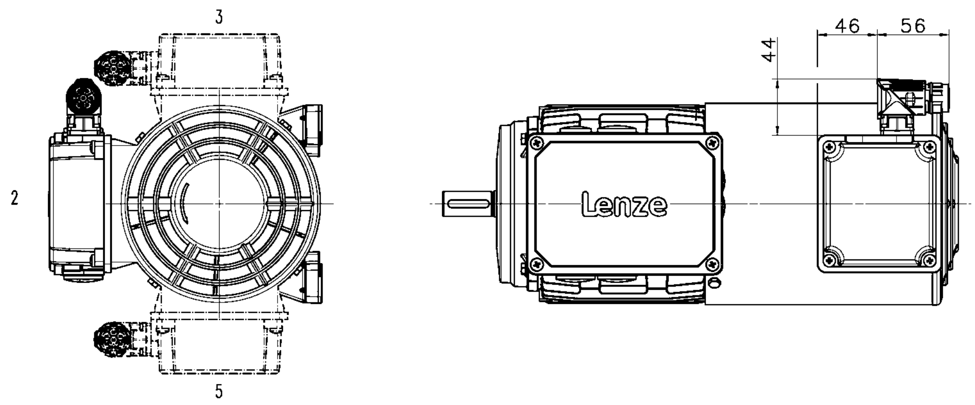
► Blower 3-ph

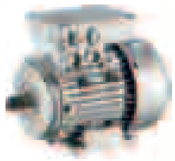
Pin assignment			
Contact	Designation	Meaning	
PE	PE	PE conductor	
1	U	Phase U power	
2		Not assigned	
3	V	Phase V power	
4		Not assigned	
5			
6	W	Phase W power	

ICN connector

Blower connection

- ► The blower terminal box is available in positions 2, 3 or 5.
- ► In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.



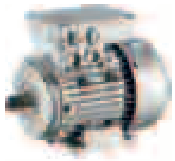


M12 connector

IG128-24V-H incremental encoder connection

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

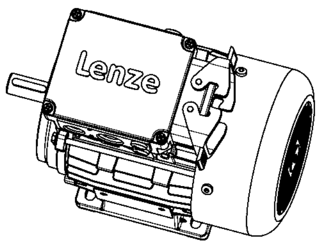
Pin assignment			
Contact	Designation	Meaning	
1	$+U_B$	Supply +	
2	B	Track B	
3	GND	Mass	
4	A	Track A	

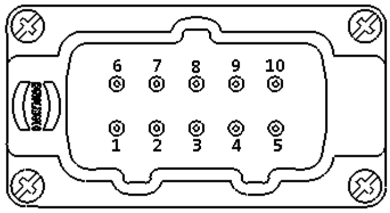


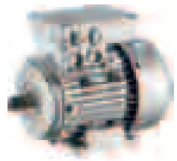
HAN connector

10E

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



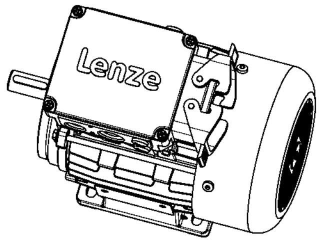
Pin assignment		
Contact	Meaning	
1	Terminal board: U1	
2	Terminal board: V1	
3	Terminal board: W1	
4	Brake +/AC	
5	Brake -/AC	
6	Terminal board: W2	
7	Terminal board: U2	
8	Terminal board: V2	
9	Thermal sensor: +KTY/PTC/TKO	
10	Thermal sensor: KTY/PTC/TKO	



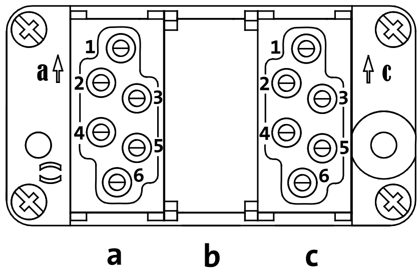
HAN connector

HAN modular

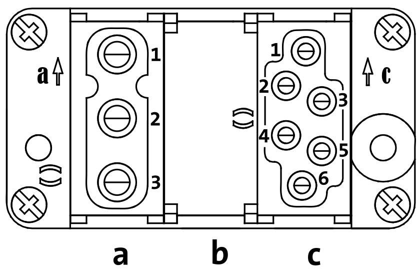
The connector is available with two different power modules (16 A or 40 A), depending on the rated motor current. The motor connection is determined in the terminal box and must be checked before commissioning.

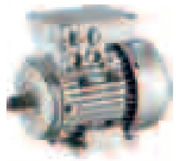


► HAN modular 16 A

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	

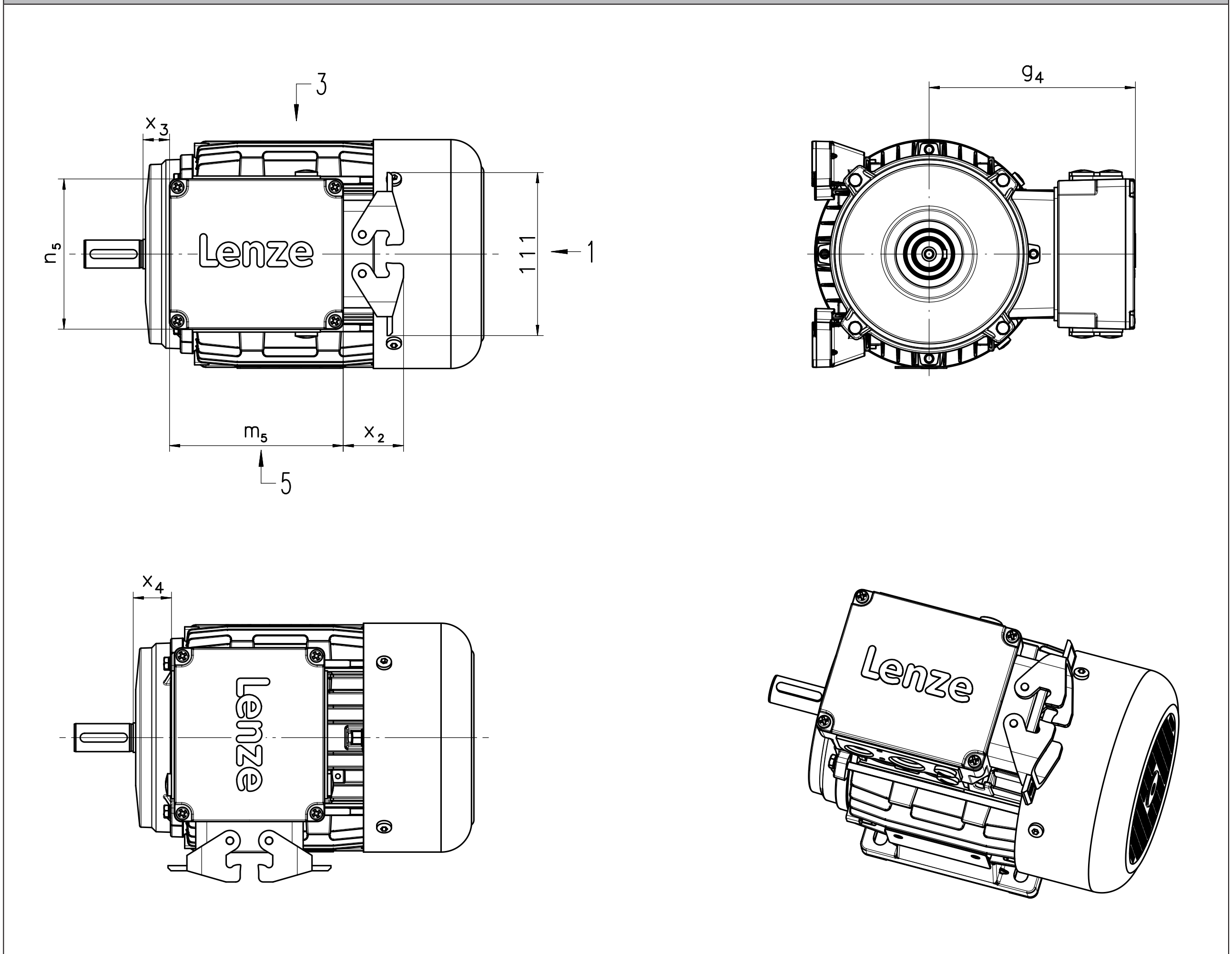
► HAN modular 40 A

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	



HAN connector

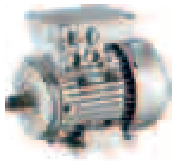
► The connection position for the connector is shown in position 1. Positions 3 and 5 are also possible.

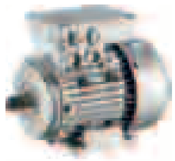


Motor type	M□□MAXX M□□MABR

	g_4 [mm]	m_5 [mm]	n_5 [mm]	x_2 [mm]	x_3 [mm]	x_4 [mm]
063	120	118	102	41	11	12
071	129				16	17
080	138				18	26
090	143				22	30
100	154				29	37
112	164				28	36
132 1)	233	120	180	47	48	18
160	248				72	42

1) In the case of the B5 design motors, it is not possible to connect the connector at position 3 or 5.





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