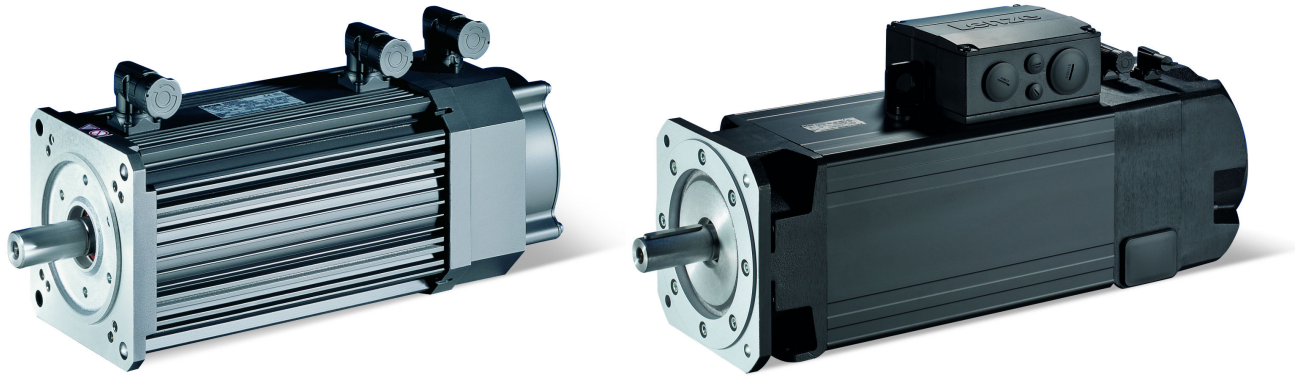
Project planning EN



Servo motors

MCA asynchronous servo motor

Lenze

Contents

Contents

About this document

Document description

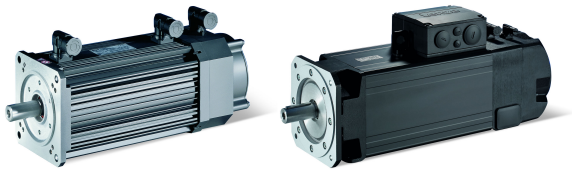
This document addresses to all persons who want to carry out any configurations with the products described.

The data and information compiled in this document serve to support you in the dimensioning and selection processes and in carrying out the electrical and mechanical installation. You will receive information regarding product extensions and accessories.

- The document includes safety instructions which must be observed.
- All persons working on and with the drives must have the documentation at hand during work and observe the information and notes relevant for it.
- The documentation must always be complete and in a perfectly readable state.

Further documents

Information and tools with regard to the Lenze products can be found on the Internet:
www.Lenze.com → Downloads



Notations and conventions

This document uses the following conventions to distinguish different types of information:

Numbers			
	Decimal separator	Point	In general, the decimal point is used. Example: 1 234.56
Warning			
	UL warning	UL	Are used in English and French.
	UR warning	UR	
Text			
	Programs	» «	Software Example: »Engineer«, »EASY Starter«
Icons			
	Page reference	🕮	Reference to another page with additional information Example: 🕮 16 = see page 16
	Documentation reference	🌍	Reference to another documentation with additional information Example: 🌍 EDKxxx = see documentation EDKxxx

Layout of the safety instructions

⚠DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

⚠WARNING!

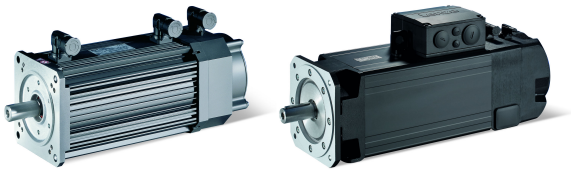
Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

⚠CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.



Product information

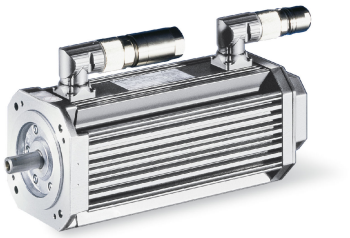
Product description

The MCA asynchronous servo motor for precisely controlled motion.
This asynchronous servo motor is suitable for applications that require a high dynamic performance, high construction-related operational reliability and compact dimensions.

In connection with the i700 and i950 servo inverters, Servo Drives 9400, and Inverter Drives 8400 TopLine, high-performance drive solutions in the torque range from 2 to 1100 Nm can be obtained.

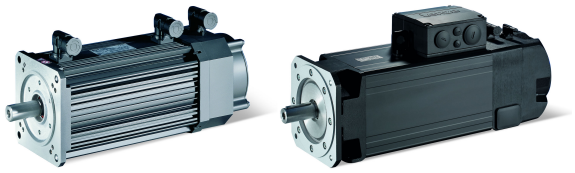
Customer benefit

- Compact design
- Optimum controllability and high dynamic performance thanks to low moments of inertia
- Optimal smooth running characteristics for exact work results
- Wide speed setting range
- Field weakening operation usable
- Robust resolvers are included as a standard, and incremental encoders or absolute value encoders ensure a high precision
- Easy assembly and easy servicing by connectors with bayonet lock and swivel connector boxes



Asynchronous servo motor MCA10I40-

Asynchronous servo motor MCA22P08-



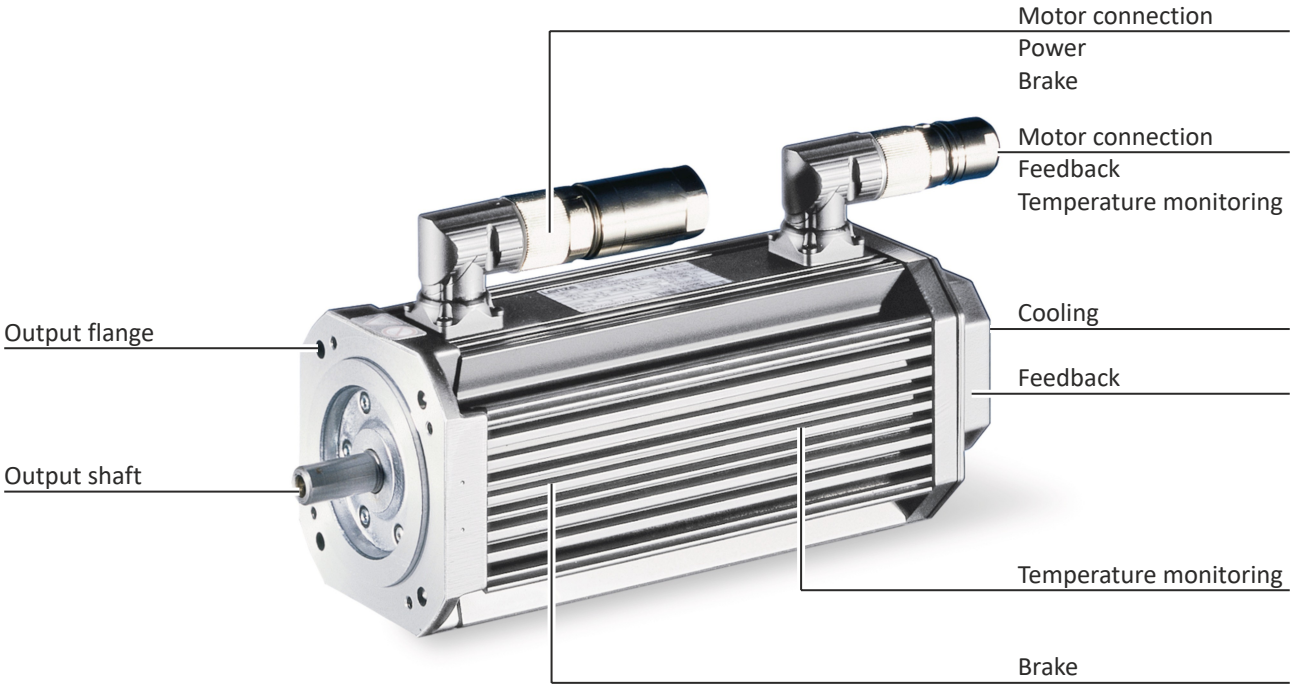
Identification of the products

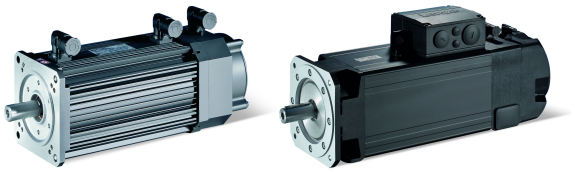
Product name: MCA asynchronous servo motor

Meaning	Variant					
Product family		MCA				
Size			10 13 14 17 19 20 21 22 26			
Overall length				I ... X		
Rated speed	rpm x 100				05 ... 42	
Inverter mains connection	3 x 400 V Degree of protection: IP54 / IP65					-
	3 x 400 V Degree of protection: IP23s					H

Features

The following figure provides an overview of the elements and connections on the product.
Their position, size and appearance may vary.

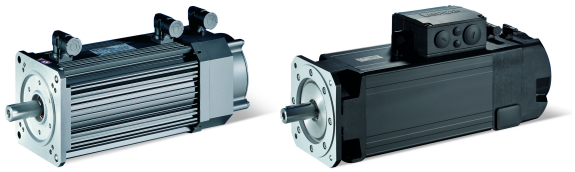




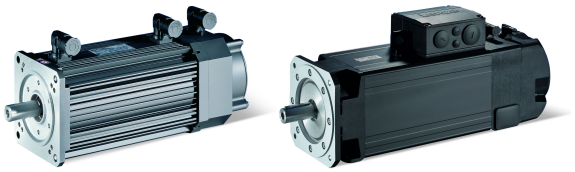
The modular system

Values printed in bold are standard designs. Values that are not printed in bold are potential extensions, some of them including a surcharge.

Motor		MCA10	MCA13	MCA14	MCA17	MCA19	MCA21
Technical data							
Rated power	kW	0.8	1.7 ... 2.2	1.4 ... 3.9	2.6 ... 6.9	4.0 ... 13.2	6.4 ... 20.3
Rated torque	Nm	2.0	4.0 ... 6.3	5.4 ... 12.0	9.5 ... 21.5	12.0 ... 36.3	17.0 ... 61.4
Max. torque	Nm	10	32	60	100	180	300
Rated speed	rpm	3950	3410 ... 4050	1635 ... 4100	1680 ... 4110	1700 ... 4150	1710 ... 4160
Color		**Primed RAL9005 matt jet black** RAL color					
Surface and corrosion protection		**OKS-G** Different types of OKS					
Output shaft							
Solid shaft with featherkey	mm	14 x 30	19 x 40	24 x 50	24 x 50	28 x 60	38 x 80
Solid shaft without keyway	mm	14 x 30	19 x 40	24 x 50	24 x 50	28 x 60	38 x 80
Shaft material		Steel					
Shaft sealing ring material		FKM					
Shaft seal		**Standard** Oil-proof					
Design		With flange (B5/B14)					
Output flange	mm	FF100 FT85	FF130 FT130	FF165 FT130	FF165 FT130	FF215 FT130	FF215 FF265 FT130
Cooling		**Self-ventilated IP54** Self-ventilated IP65 - | Forced ventilated IP54					
Motor connection		**ICN connector** Terminal box					
Permanent magnet holding brake		**Without** With					
Standard braking torque	Nm	2.5	11	12	22	40	80
DC brake voltage	V	24 205 (not for cURus)					
Feedback							
Without functional safety		**Resolver** Absolute value encoder Incremental encoder					
With functional safety		Resolver Incremental encoder					
Temperature monitoring		PT1000 temperature sensor					



Motor		MCA20	MCA22	MCA26
Technical data				
Rated power	kW	9.1 ... 16.4	8.8 ... 33.8	12.4 ... 53.8
Rated torque	Nm	53.5 ... 61.0	100 ... 120	195 ... 280
Max. torque	Nm	250	500	1100
Rated speed	rpm	1420 ... 2930	760 ... 2935	550 ... 2235
Color		**Primed RAL9005 matt jet black** RAL color		
Surface and corrosion protection		**OKS-G** Different types of OKS		
Output shaft				
Solid shaft with featherkey	mm	38 x 80	38 x 80	55 x 110
Solid shaft without keyway	mm	38 x 80	38 x 80	55 x 110
Shaft material		Steel		
Shaft sealing ring material		FKM		
Output shaft bearing		**Normal** Reinforced		
Shaft seal		**Standard** Oil-proof Dust-proof		
Design		**With foot (B3)** With foot and flange (B35)		
Output flange	mm	FF215 FF265	FF265	FF265 FF350
Cooling		**Forced ventilated IP23s**		
		-	Forced ventilated IP54	
Dust filter		**Without** With		
Motor connection				
Power + brake + Blower		**ICN connector** Terminal box	**Terminal box**	
Encoder + temperature monitoring		**ICN connector**		
Spring-applied holding brake		**Without** With		
Standard braking torque	Nm	80	130	260
Increased braking torque		130	260	-
DC brake voltage	V	24		
AC brake voltage	V	230 (not for cURus)		
Feedback				
Without functional safety		**Resolver** Absolute value encoder Incremental encoder		
With functional safety		Resolver Incremental encoder		
Temperature monitoring		PT1000 temperature sensor		



Information on project planning

Safety instructions

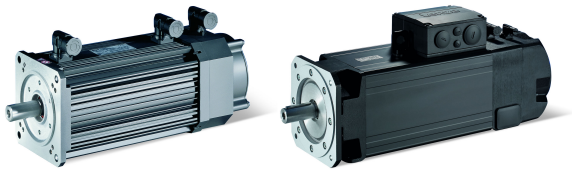
Basic safety instructions

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never modify the product technically.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- The product can – depending on their degree of protection – have live, movable or rotating parts during or after operation. Surfaces can be hot.
- Observe all specifications of the corresponding documentation supplied. This is the condition for safe and trouble-free operation and the achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of these persons:
  - They are familiar with installing, mounting, commissioning, and operating the product.
  - They have the corresponding qualifications for their work.
  - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

Application as directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- Mounted eye bolts on the motor are not suitable for transporting geared motors.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product may only be operated on the inverter.
- Built-in brakes must not be used as safety brakes.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.



Residual hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system.

If the above is disregarded, this can lead to severe injuries to persons and damage to property!

Product

Observe the warning labels on the product!

Dangerous electrical voltage:
Before working on the product, make sure there is no voltage applied to the power terminals! After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!

Electrostatic sensitive devices:
Before working on the product, the staff must ensure to be free of electrostatic charge!

High leakage current:
Carry out fixed installation and PE connection in compliance with:
EN 61800-5-1 / EN 60204-1

Hot surface:
Use personal protective equipment or wait until the device has cooled down!

Protection of persons

- The power terminals may carry voltage in the switched-off state or when the motor is stopped.
  - Before working, check whether all power terminals are deenergized.
- Voltages may occur on the drive components (e.g. capacitive, caused by inverter supply).
  - Careful earthing in the marked positions of the components must be carried out.
- There is a risk of burns from hot surfaces.
  - Provide protection against accidental contact.
  - Use personal protective equipment or wait until the device has cooled down.
  - Prevent contact with flammable substances.
- There is a risk of injury due to rotating parts.
  - Before working on the drive system, ensure that the motor is at a standstill.
- There is a risk of accidental start-up or electric shock.

Motor protection

- Installed temperature sensors are no full protection for the machine.
  - If necessary, limit the maximum current. Parameterize the inverter so that it will be switched off after some seconds of operation with $I > I_{rated}$, especially if there is a risk of blocking.
  - Integrated overload protection does not prevent overloading under all conditions.
- The fuses are no motor protection.
  - Use a current-dependent motor protection switch.
  - Use the built-in temperature sensors.
- Too high torques cause a fraction of the motor shaft.
  - Do not exceed the maximum torques according to the technical data on the nameplate.
- Lateral forces on the motor shaft are possible.
  - Align the shafts of motor and driven machine exactly to each other.

Drive dimensioning

In order to carry out an accurate drive dimensioning process, you can use our configuring software, the »Drive Solution Designer«.

With the «Drive Solution Designer«, you can design the drive both quickly and to a high quality. The software contains profound and proven expertise with regard to drive applications and mechatronic drive components.

Please get in touch with your Lenze representative.

The dimensioning is suitable for:

- kinematic profiles
- operating modes S1, S2, S3, S6 📖 117
- simple linear speed profiles, not for S-curves or similar

The following 3 elements are taken into consideration in the dimensioning process:

Drive function

On the basis of the values required for the process that are specified, a drive is selected, for which all operating points are within the speed-torque characteristic curve of the motor.

As a result, a motor with a suitable speed and an inverter with a sufficient maximum current are selected. Further limits (maximum speed, installation height...) are specified in tables.

Mechanical strength

On the basis of the occurring forces and torques, a drive is selected that has a sufficient mechanical strength (endurance strength for the periodically occurring torques and fatigue strength for the sporadically occurring torques).

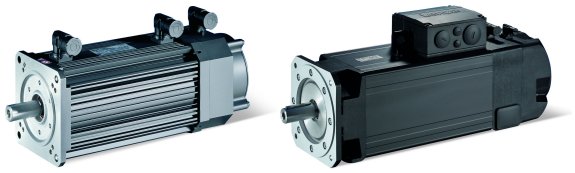
Thermal dimensioning

For the inverter, the thermal dimensioning process is carried out on the basis of the continuous inverter current or on the basis of the continuous torque from the motor-inverter combination, which can be reached.

The motor is thermally dimensioned on the basis of the mean speed and the effective torque.

The mean speed of the drive should not exceed the values specified.

If dimensioning processes are complex or reach limit loads, please refer to your Lenze representative.



Operation chart

S1 operation	S2,S3 and S6 operation	Speed profiles
↓	↓	↓
Check operating conditions		
↓		
Define required input variables		
↓		
Determine correction factor		
Operating modes and operating time	Operating modes and operating time	
Ambient temperature and installation height	Ambient temperature and installation height	Ambient temperature and installation height
↓		
Determine motor on the basis of the forces acting		
↓	↓	↓
↓	↓	Define load characteristic for the individual time segments
↓	↓	↓
↓	↓	Calculation of the values required for the process
↓	↓	↓
Inspect and select motor		
↓		
Final configuration		

Check operating conditions

Check
Approvals
Conformities
Supply voltage
Degree of protection
Ambient temperature
Surface protection

▸ Standards and operating conditions 📖 22

▸ Surface and corrosion protection 📖 18

Define required input variables

Necessary input variables	Note	Symbol	Unit
Mean speed utilisation	Relating to the load speed n_L		%
Ambient temperature		T_U	°C
Site altitude Amsl		H	m
Radial force		F_{rad}	N
Axial force		F_{ax}	N
Transmission element at the output	Gear wheels, sprockets …		
Effective diameter of the transmission element		d_w	mm
Load torque	Only with S1, S2, S3, and S6 operating modes	M_L	Nm
Load speed	Only with S1, S2, S3, and S6 operating modes	n_L	rpm
Short-time maximum torque	Emergency off, quick stop, occasional high starting duty	$M_{L,max}$	Nm
Runtime with maximum torque		t_L	%

Determine correction factor

Operating modes S1, S2, S3, S6, and operating time							
Operating mode S1		Operating mode S2		Operating mode S3		Operating mode S6	
ED	k_L	ED	k_L	ED	k_L	ED	k_L
%		min		%		%	
100	1.0	10	1.4 - 1.5	15	1.4 - 1.5	15	1.5 - 1.6
		30	1.15 - 1.2	25	1.3 - 1.4	25	1.4 - 1.5
		60	1.07 - 1.1	40	1.15 - 1.2	40	1.3 - 1.4
		90	1.0 - 1.05	60	1.05 - 1.1	60	1.15 - 1.2

▸ Operating modes of the motor 🕮 117

Ambient temperature and installation height				
Ambient temperature	Installation height amsl			
	≤ 1000 m	≤ 2000 m	≤ 3000 m	≤ 4000 m
	Correction factor			
T_U	k_H	k_H	k_H	k_H
≤ 20 °C	1.15	1.06	0.97	0.89
30 °C	1.07	0.99	0.90	0.83
40 °C	1.00	0.92	0.83	0.77
50 °C	0.92	0.85	0.76	0.71
60 °C	0.83	0.77	0.70	0.65

Determine product on the basis of the forces

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

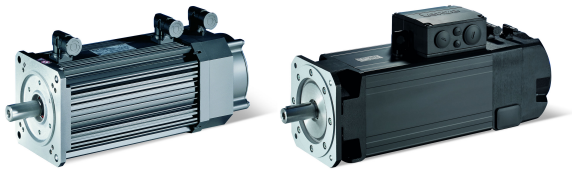
dw Effective diameter of transmission element

▸ Radial forces and axial forces 🕮 24

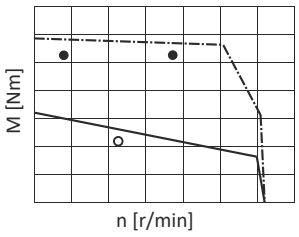
Operating mode S1

Check and select servo motor/inverter combination			
	Check	Selection	Unit
Output torque	$M_{rated} \geq M_L / (k_L \times k_H)$	M_{rated}	Nm
Output speed	$n_{rated} \geq n_L$	n_{rated}	rpm

▸ Rated data 🕮 29



Operating modes S2, S3, and S6

Check and select servo motor/inverter combination			
	Check	**Selection**	**Unit**
Output torque	$M_{rated} \geq M_L / (k_L \times k_H)$	M_{rated}	Nm
Output speed (recommendation)	$n_{rated} \geq n_L$	n_{rated}	rpm
Max. output torque.	$M_{max} \geq M_L$	M_{max}	Nm
Max. output speed	$n_{max} \geq n_L$	n_{max}	rpm
All operating points (●)			
below the maximum torque characteristic of the servo motor/ inverter combination here, $M_{L,max}$ must be considered		n_L M_L	
Thermally effective operating point (○)		n_L	
below the S1 torque characteristic of the servo motor		$M_L / (k_L \times k_H)$	

▸ Rated data 🕮 29

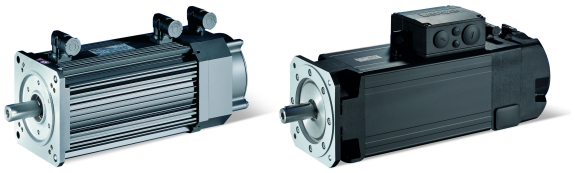
▸ Torque characteristics 🕮 53

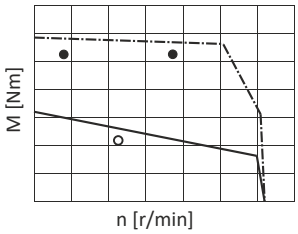
Speed profiles

Temporal load characteristic for the individual time segments z							
Total time	**Individual time segments**	**Load speed**	**Load speed variation**	**Steady-state load torque**	**Torque**	**Acceleration torque**	**Moment of inertia**
t	**Δt_z**	**$n_{L,z}$**	**$\Delta n_{L,z}$**	**$M_{L,z}$**	**M_z**	**$M_{s,z}$**	**J_L**
s	**s**	**rpm**	**rpm**	**Nm**	**Nm**	**Nm**	**kgcm²**

	Calculation	**Symbol**	**Unit**
Load cycle duration	$T = \sum \Delta t_z$	T	s

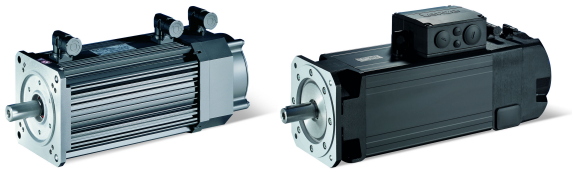
Calculation of the values required for the process			
	Calculation	**Symbol**	**Unit**
Torque per time segment	$M_z = M_{L,z} + J_L \frac{2\pi \times \Delta n_{L,z}}{60 \times \Delta t_z}$	M_z	Nm
Maximum torque of the profile	$M_{P,max} = \max (M_z)$	$M_{P,max}$	Nm
Effective torque	$M_{eff} = \sqrt{\frac{1}{T} \sum_z M_z^2 \times \Delta t_z}$, $T \leq 1min$	M_{eff}	Nm
Mean speed	$n_m = \lvert \overline{n_{L,z}} \rvert = \frac{1}{T} \sum_z \lvert n_{L,z} \rvert \times \Delta t_z$	n_m	rpm
Maximum load speed	$n_{L,max} = \max (n_{L,z})$	$n_{L,max}$	rpm



Check and select servo motor/inverter combination			
	Check	**Preselection**	**Unit**
Output torque	$M_{rated} > M_{eff} / k_H$	M_{rated}	Nm
Output speed	$n_{rated} \geq n_m$	n_{rated}	rpm
Load-matching factor			
for an optimum dynamic performance/ control properties	Requirement k_J = 0.5 ... 10 Optimum k_J = 1	$k_J = J_L / (J_M + J_B)$	
Checking the motor torques			
Acceleration torque	$M_{S,z} = M_z + (J_M + J_B) \times \frac{2\pi \times \Delta n_{L,z}}{60 \times \Delta t_z}$	$M_{S,z}$	Nm
Effective torque	$M_{S,eff} = \sqrt{\frac{1}{T}\sum_z M_{S,z}^2 \times \Delta t_z}$	$M_{S,eff}$	
All operating points (●)			
below the maximum torque characteristic of the servo motor/ inverter combination here, $M_{L,max}$ must be considered		$n_{L,z}$ $M_{S,z}$	
Thermally effective operating point (○)		n_m	
below the S1 torque characteristic of the servo motor		$M_{S,eff} / k_H$	

▸ Rated data 📖 29

▸ Torque characteristics 📖 53



Final configuration

	Check
Connection dimensions	Output shaft Output flange
Product extensions	Motor connection (connector/terminal box) Brake Feedback Blower

More information about the final configuration:

▸ The modular system 📖 9

▸ Product extensions 📖 92

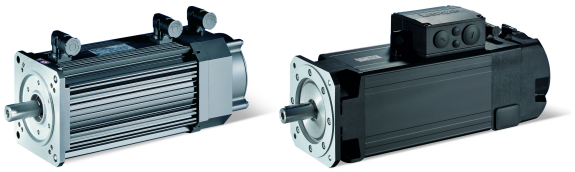
Surface and corrosion protection

Depending on the ambient conditions, the surface and corrosion protection system (called OKS) offers solutions for optimum protection.

Various surface coatings ensure that the motors operate reliably at high air humidity, in outdoor installation or in the presence of atmospheric impurities. Any color from the "RAL Classic" collection can be chosen for the top coat.

Surface and corrosion protection	Applications	Type
OKS-G (primed)	• Dependent on subsequent top coat applied	Standard
OKS-S (small)	• Standard applications • Internal installation in heated buildings • Air humidity up to 90 %	Optional
OKS-M (medium)	• Internal installation in non-heated buildings • Covered, protected external installation • Air humidity up to 95 %	
OKS-L (large)	• External installation • Air humidity above 95 % • Chemical industrial plants • Food industry	

Surface and corrosion protection	Corrosivity category	Surface coating	Colour	Coating thickness
	DIN EN ISO 12944-2	Design		
OKS-G (primed)		• 2K PUR priming coat	• RAL 9005 matt jet black	60 ... 90 µm
OKS-S (small)	Comparable to C1	• 2K-PUR top coat	• According to RAL Classic	80 ... 120 µm
OKS-M (medium)	Comparable to C2	• 2K PUR priming coat • 2K-PUR top coat		110 ... 160 µm
OKS-L (large)	Comparable to C3			140 ... 200 µm



Mechanical installation

Important notes

- Install the product according to the information in the chapter "Standards and operating conditions".

  ▸ Standards and operating conditions 📖 22
- The technical data and the data regarding the supply conditions can be found on the nameplate and in this documentation.
- Ambient media – especially chemically aggressive ones – may damage shaft sealing rings, lacquers and plastics.
- Lenze offers special surface and corrosion protection in this case.

NOTICE

Bearing damage caused by unbalance!

Shafts with keyway are balanced with a half featherkey!

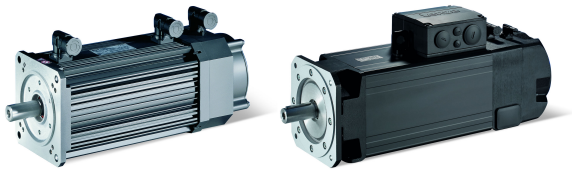
▸ Balance transmission elements with a half featherkey!

Transport

- Ensure appropriate handling.
- Make sure that all component parts are securely mounted. Secure or remove loose component parts.
- Only use safely fixed transport aids (e.g., eye bolts or support plates).
- Do not damage any components during transport.
- Avoid electrostatic discharges on electronic components and contacts.
- Avoid impacts.
- Check the carrying capacity of the hoists and load handling devices. The weights can be found in the shipping documents.
- Secure the load against tipping and falling down.
- Standing beneath suspended loads is prohibited.

Installation

- The mounting surfaces must be plane, torsionally rigid and free from vibrations.
- The mounting areas must be suited to absorb the forces and torques generated during operation.
- Ensure an unhindered ventilation.
- For versions with a fan, keep a minimum distance of 10 % from the outside diameter of the fan cover in intake direction.



Electrical installation

Important notes

⚠ DANGER!

Risk of injury and risk of burns from dangerous voltage

Power terminals may also carry voltage in the switched-off state or when the motor is stopped and may cause life-threatening cardiac arrhythmia and serious burns.

- ▸ Disconnect the product from the mains.
- ▸ Check that the power terminals are deenergized before starting work.

- When working on energized products, comply with the applicable national accident prevention regulations.
- The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE connection).
- The manufacturer of the system or machine is responsible for adherence to the limits required in connection with EMC legislation.

Operation on an external inverter

A max. pulse voltage amplitude of U_{pk} = 1560 V at the motor terminals must not be exceeded. Here, the minimum pulse rise time must be t_R = 0.1 µs.

If it cannot be ruled out that the permissible voltage peaks will be exceeded or that the minimum pulse rise time will not be reached, the following measures must be initiated:

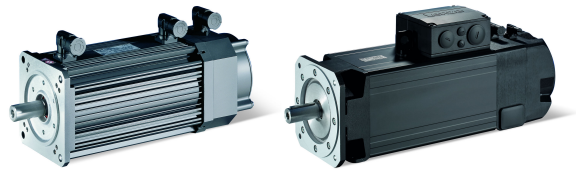
- Reduction of the DC-bus voltage (threshold for brake chopper voltage)
- Use of filters, chokes
- Use of special motor cables

Preparation

The notes for the electrical connection can be found in the enclosed mounting instructions.

EMC-compliant wiring

The EMC-compliant wiring is described in detail in the documentation of the Lenze inverters.



Technical data

Notes regarding the given data

The power values, torques and speeds specified in the configuration are rounded values and apply to:

- ambient temperature T_U = 40 °C for motors (in compliance with EN 60034)
- Site altitude ≤ 1000 m above mean sea level

The selection tables specify the inverter/ motor combination with the achievable torques.

The rated data applies to the S1 operating mode S1 (in accordance with EN 60034-1) and the operation on a servo inverter with a switching frequency of at least 4 kHz.

NOTICE

In case of other operating conditions, the achievable values can differ for those mentioned.

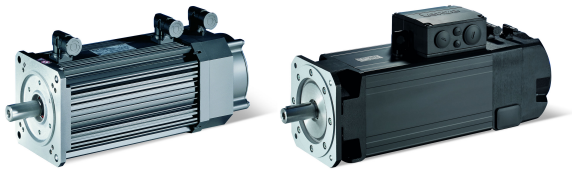
▶ In case of extreme operating conditions, please get in touch with your Lenze representative.

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:

Motor	Width	Height
	mm	mm
MCA10 ... 13	270	270
MCA14 ... 17	330	330
MCA19 ... 26	450	450



Standards and operating conditions

Conformities and approvals

More information and certificates of approval can be found under

MCA asynchronous servo motors (Lenze.com)

Europe					
Country	**Conformity/ approval**	**Law/standard**	**Description**	**Special feature**	**Product representation**
European Union	CE	2006/42/EC	Machinery Directive	Only for safety-relevant components	CE mark
		2014/35/EU	Low-Voltage Directive	-	
		2014/30/EU	EMC Directive		
		2011/65/EU	RoHS		
Eurasian Economic Union (EAC)	EAC	TP TC 004/2011	Eurasian conformity: safety of low voltage equipment		EAC mark
		TP TC 020/2011	Eurasian conformity: electromagnetic compatibility		
Great Britain	UKCA	S.I. 2008/1597	The Supply of Machinery (Safety) Regulations 2008	Only for safety-relevant components	UKCA mark
		S.I. 2016/1091	The Electromagnetic Compatibility Regulations 2016	-	
		S.I. 2016/1101	The Electrical Equipment (Safety) Regulations 2016		
		S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012		

America					
Country	**Conformity/ approval**	**Law/standard**	**Description**	**Special feature**	**Product representation**
Canada	CSA	CSA 22.1 No. 100	CSA Standard for Motors and Generators	-	cURus mark
USA	UL	UL 1004-1	UL Standard for Rotating Electrical Machines		

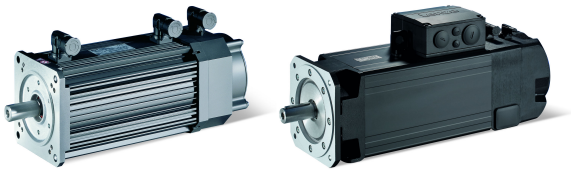
Asia					
Country	**Conformity/ approval**	**Law/standard**	**Description**	**Special feature**	**Product representation**
China	-	GB/T 26572	Requirements on concentration limits for certain restricted substances in electrical and electronic products	-	EFUP mark

Protection of persons and device protection

Degree of protection			
-	EN IEC 60529, EN IEC 60034-5	IP23S	Forced ventilated: MCA20, MCA22, MCA26
		IP54	Self-ventilated: MCA10 ... MCA19, MCA21
			Forced ventilated: MCA13 ... MCA19, MCA21 ... MCA26
		IP65	Self-ventilated: MCA10 ... MCA19, MCA21

Temperature class			
-	EN IEC 60034-1	F (155 °C)	Insulation system

Permissible voltage			
-	IEC 60034-18-41	IVIC C	At 500 V
	IEC/TS 60034-25:2007	Limit curve A	Of the pulse voltage



EMC data

Noise emission		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable

Noise immunity		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable

Environmental conditions

Climate			
Storage	EN 60721-3-1:1997	1K3 (-20 ... +40 °C)	>3 months
		1K3 (-20 ... +60 °C)	<3 months
Transport	EN 60721-3-2:1997	2K3 (-20 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-10 ... +40 °C)	Operation with brake
		3K3 (-15 ...+40 °C)	Operation without brake, forced ventilated
		3K3 (-20 ...+40 °C)	Operation without brake, self-ventilated

Site altitude		
0 … 1000 m amsl	-	Without current derating
1000 … 4000 m amsl		Reduce rated output current by 5 %/1000 m

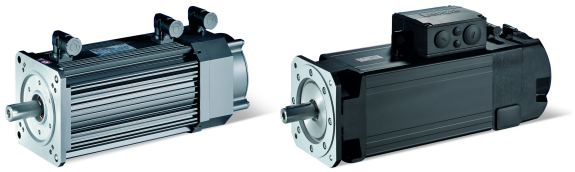
Air humidity			
-	-	Average relative humidity 85 %	Without condensation

Vibration resistance		
Operation	EN 60721-3-3:1995 + A2:1997	3M6

Vibration severity			
-	EN IEC 60034-14	A	MCA10, MCA13, MCA20, MCA22, MCA26
		B	MCA14, MCA17, MCA19, MCA21

Vibration velocity			
Free suspension	-	0.7 mm/s	MCA14, MCA17, MCA19, MCA21
		1.6 mm/s	MCA10, MCA13, MCA20, MCA22, MCA26

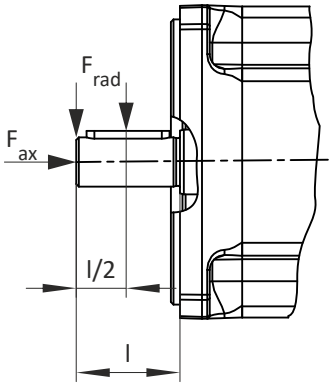
Radial runout, axial runout, concentricity			
-	EN 50347 / IEC 60072-1	Normal Class	MCA10, MCA13, MCA20, MCA22, MCA26
		Precision Class	MCA14, MCA17, MCA19, MCA21

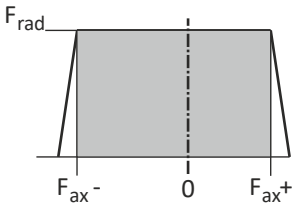


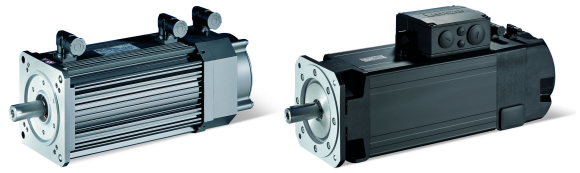
Radial forces and axial forces

The values of the bearing service life L_{10h} refer to the an average motor speed of 4000 rpm. With MCA 20/22/26 to 3000 rpm. Depending on the ambient temperatures, they are additionally limited by the grease lifetime.

Application of forces





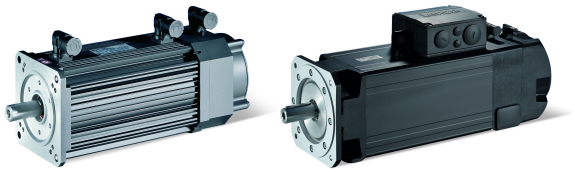


Application of force at l/2

Motor			MCA 10	MCA 13	MCA 14	MCA 17	MCA 19	MCA 20
Bearing service life 5000								
Radial force	F_{rad}	rated	630	850	1000	1380	1880	3400
Min. axial force	$F_{ax,-}$	rated	-130	-110	-140	-180	-50	-1330
Max. axial force	$F_{Fax,+}$	rated	320	570	500	790	1530	690
Bearing service life 10000								
Radial force	F_{rad}	rated	500	700	780	1040	1080	2500
Min. axial force	$F_{ax,-}$	rated	-60	-10	-60	-70	-30	-1020
Max. axial force	$F_{Fax,+}$	rated	250	450	420	680	1510	380
Bearing service life 20000								
Radial force	F_{rad}	rated	400	470	550	660	500	1950
Min. axial force	$F_{ax,-}$	rated	-30	0	-30	-40	-100	-780
Max. axial force	$F_{Fax,+}$	rated	210	450	380	650	1490	140
Bearing service life 30000								
Radial force	F_{rad}	rated	330	330	400	440	160	1700
Min. axial force	$F_{ax,-}$	rated	-10	0	-10	-20	0	-690
Max. axial force	$F_{Fax,+}$	rated	190	450	360	630	1470	40
Bearing service life 50000								
Radial force	F_{rad}	rated	230	-	250	280	-	-
Min. axial force	$F_{ax,-}$	rated	0	-	0	0	-	-
Max. axial force	$F_{Fax,+}$	rated	200	-	350	610	-	-

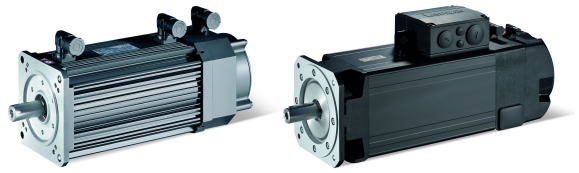
Motor			MCA 21	MCA 22	MCA 26
Bearing service life 5000					
Radial force	F_{rad}	rated	3200	3600	6950
Min. axial force	$F_{ax,-}$	rated	-260	-2370	-2500
Max. axial force	$F_{Fax,+}$	rated	1740	1700	1580
Bearing service life 10000					
Radial force	F_{rad}	rated	2360	2800	5400
Min. axial force	$F_{ax,-}$	rated	-70	-1740	-1800
Max. axial force	$F_{Fax,+}$	rated	1550	1090	880
Bearing service life 20000					
Radial force	F_{rad}	rated	1470	2200	4300
Min. axial force	$F_{ax,-}$	rated	-20	-1280	-1300
Max. axial force	$F_{Fax,+}$	rated	1504	640	380
Bearing service life 30000					
Radial force	F_{rad}	rated	1030	1900	3700
Min. axial force	$F_{ax,-}$	rated	0	-1080	-1090
Max. axial force	$F_{Fax,+}$	rated	1480	440	160
Bearing service life 50000					
Radial force	F_{rad}	rated	-	1600	-
Min. axial force	$F_{ax,-}$	rated	-	-880	-
Max. axial force	$F_{Fax,+}$	rated	-	240	-

Technical data
Radial forces and axial forces



Reinforced bearing

Motor			MCA 20	MCA 22	MCA 26
Bearing service life 5000					
Radial force	F_{rad}	rated	7100	8500	10500
Min. axial force	$F_{ax,-}$	rated	-970	-1850	-2180
Max. axial force	$F_{Fax,+}$	rated	330	1200	1250
Bearing service life 10000					
Radial force	F_{rad}	rated	5100	7000	8370
Min. axial force	$F_{ax,-}$	rated	-800	-1400	-1530
Max. axial force	$F_{Fax,+}$	rated	160	760	600
Bearing service life 20000					
Radial force	F_{rad}	rated	3900	5600	6670
Min. axial force	$F_{ax,-}$	rated	-640	-1030	-1130
Max. axial force	$F_{Fax,+}$	rated	0	390	200
Bearing service life 30000					
Radial force	F_{rad}	rated	-	4350	5840
Min. axial force	$F_{ax,-}$	rated	-	-930	-960
Max. axial force	$F_{Fax,+}$	rated	-	290	30
Bearing service life 50000					
Radial force	F_{rad}	rated	-	3200	-
Min. axial force	$F_{ax,-}$	rated	-	-800	-
Max. axial force	$F_{Fax,+}$	rated	-	160	-

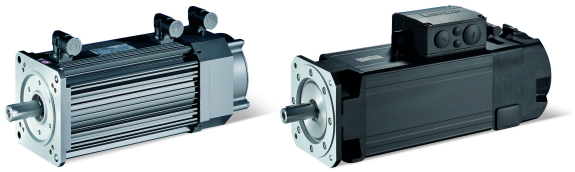


Application of force at l

Motor			MCA 10	MCA 13	MCA 14	MCA 17	MCA 19	MCA 20
Bearing service life 5000								
Radial force	F_{rad}	rated	590	780	930	1270	1740	3150
Min. axial force	$F_{ax,-}$	rated	-130	-110	-140	-180	-50	-1170
Max. axial force	$F_{Fax,+}$	rated	320	570	500	790	1530	530
Bearing service life 10000								
Radial force	F_{rad}	rated	470	640	710	960	1000	2300
Min. axial force	$F_{ax,-}$	rated	-60	-10	-60	-70	-30	-920
Max. axial force	$F_{Fax,+}$	rated	250	450	420	680	1510	280
Bearing service life 20000								
Radial force	F_{rad}	rated	370	430	490	610	420	1800
Min. axial force	$F_{ax,-}$	rated	-30	0	-30	-40	-100	-710
Max. axial force	$F_{Fax,+}$	rated	210	450	380	650	1490	70
Bearing service life 30000								
Radial force	F_{rad}	rated	310	300	370	400	140	1400
Min. axial force	$F_{ax,-}$	rated	-10	0	-10	-20	0	-650
Max. axial force	$F_{Fax,+}$	rated	190	450	360	630	1470	0
Bearing service life 50000								
Radial force	F_{rad}	rated	220	-	230	260	-	-
Min. axial force	$F_{ax,-}$	rated	0	-	0	0	-	-
Max. axial force	$F_{Fax,+}$	rated	200	-	350	610	-	-

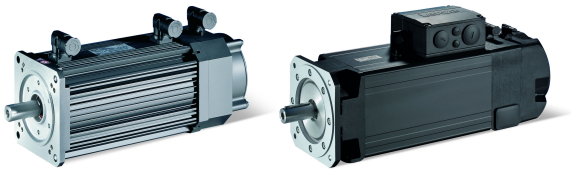
Motor			MCA 21	MCA 22	MCA 26
Bearing service life 5000					
Radial force	F_{rad}	rated	2940	3500	6400
Min. axial force	$F_{ax,-}$	rated	-260	-2240	-2080
Max. axial force	$F_{Fax,+}$	rated	1740	1600	1150
Bearing service life 10000					
Radial force	F_{rad}	rated	2160	2600	5000
Min. axial force	$F_{ax,-}$	rated	-70	-1640	-1600
Max. axial force	$F_{Fax,+}$	rated	1550	1100	680
Bearing service life 20000					
Radial force	F_{rad}	rated	1350	2050	4000
Min. axial force	$F_{ax,-}$	rated	-20	-1200	-1160
Max. axial force	$F_{Fax,+}$	rated	1504	560	230
Bearing service life 30000					
Radial force	F_{rad}	rated	950	1800	3400
Min. axial force	$F_{ax,-}$	rated	0	-1020	-1090
Max. axial force	$F_{Fax,+}$	rated	1480	380	50
Bearing service life 50000					
Radial force	F_{rad}	rated	-	1450	-
Min. axial force	$F_{ax,-}$	rated	-	-850	-
Max. axial force	$F_{Fax,+}$	rated	-	200	-

Technical data
Radial forces and axial forces



Reinforced bearing

Motor			MCA 20	MCA 22	MCA 26
Bearing service life 5000					
Radial force	F_{rad}	rated	6350	7000	9600
Min. axial force	$F_{ax,-}$	rated	-720	-1750	-2200
Max. axial force	$F_{Fax,+}$	rated	80	1100	1280
Bearing service life 10000					
Radial force	F_{rad}	rated	4100	5500	7700
Min. axial force	$F_{ax,-}$	rated	-680	-1300	-1280
Max. axial force	$F_{Fax,+}$	rated	40	660	360
Bearing service life 20000					
Radial force	F_{rad}	rated	2800	4700	6000
Min. axial force	$F_{ax,-}$	rated	-640	-920	-960
Max. axial force	$F_{Fax,+}$	rated	0	280	30
Bearing service life 30000					
Radial force	F_{rad}	rated	-	3900	-
Min. axial force	$F_{ax,-}$	rated	-	-820	-
Max. axial force	$F_{Fax,+}$	rated	-	180	-
Bearing service life 50000					
Radial force	F_{rad}	rated	-	3000	-
Min. axial force	$F_{ax,-}$	rated	-	-700	-
Max. axial force	$F_{Fax,+}$	rated	-	60	-



Rated data

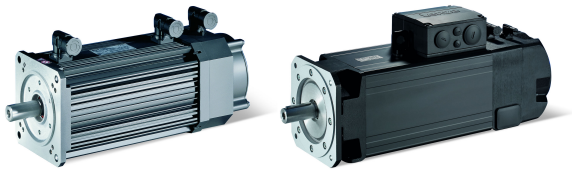
NOTICE

- The specification of the maximum torque refers to the mechanical load capacity and not to the maximum current.

Technical data

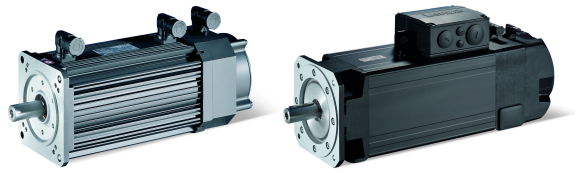
Rated data

Inverter mains connection 400 V, Self-ventilated motors



Inverter mains connection 400 V, Self-ventilated motors

Motor			MCA 10I40-	MCA 13I41-	MCA 14L41-	MCA 14L20-	MCA 17N23-	MCA 17N41-
Degree of protection			IPxx	IPxx	IPxx	IPxx	IPxx	IPxx
Standstill torque	M_0	Nm	2.30	4.60	8.00	8.00	12.8	12.8
Rated torque	M_{rated}	Nm	2.00	4.00	5.40	6.70	10.8	9.50
Max. torque	M_{max}	Nm	10.0	32.0	60.0	60.0	100	100
Rated speed	n_{rated}	rpm	3950	4050	4100	2000	2300	4110
Max. speed	n_{max}	rpm	8000	8000	8000	8000	8000	8000
Rated power	P_{rated}	kW	0.8	1.7	2.3	1.4	2.6	4.1
Standstill current	I_0	A	2.55	4.60	7.70	3.85	6.00	12.0
Rated current	I_{rated}	A	2.40	4.40	5.80	3.30	5.50	10.2
Max. current	I_{max}	A	9.60	17.6	23.2	13.2	22.0	40.8
Rated voltage	V_{rated}	V	390	390	390	390	390	350
Rated frequency	f_{rated}	Hz	140	140	140	70	80	140
Moment of inertia	J	kgcm²	2.40	8.30	19.2	19.2	36.0	36.0
Efficiency	η		0.700	0.750	0.780	0.840	0.860	0.830
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	9.4	3.4	1.5	6	3.04	0.76
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	14.166	5.124	2.261	9.042	4.581	1.145
Mutual inductance	L_H	mH	169.15	92.64	65.8	268.7	176.4	43.4
Stator leakage inductance	$L_{1\sigma}$	mH	9.8	5.408	2.493	9.971	6.162	1.536
Rotor leakage inductance	$L_{2\sigma}$	mH	10	4.896	2.503	10.016	6.836	1.703
Stator resistance	$R_{1,\ 20}$	Ω	4.7	1.7	0.75	3	1.52	0.38
Rotor resistance	$R_{2',\ 20}$	Ω	5.2	1.4	0.781	3.13	1.37	0.342
Weight	m	kg	6.40	10.4	15.1	15.1	22.9	22.9

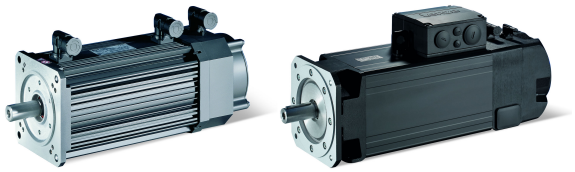


Motor			MCA 19S42-	MCA 19S23-	MCA 21X42-	MCA 21X25-
Degree of protection			IPxx	IPxx	IPxx	IPxx
Standstill torque	M_0	Nm	22.5	22.5	39.0	39.0
Rated torque	M_{rated}	Nm	12.0	16.3	17.0	24.6
Max. torque	M_{max}	Nm	180	180	300	300
Rated speed	n_{rated}	rpm	4150	2340	4160	2490
Max. speed	n_{max}	rpm	8000	8000	8000	8000
Rated power	P_{rated}	kW	5.2	4	7.4	6.4
Standstill current	I_0	A	19.7	9.85	31.8	15.9
Rated current	I_{rated}	A	14.0	8.20	19.8	13.5
Max. current	I_{max}	A	56.0	32.8	79.2	54.0
Rated voltage	V_{rated}	V	330	390	320	390
Rated frequency	f_{rated}	Hz	140	80	140	85
Moment of inertia	J	kgcm²	72.0	72.0	180	180
Efficiency	η		0.830	0.900	0.840	0.850
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	0.35	1.38	0.18	0.72
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	0.527	2.08	0.271	1.085
Mutual inductance	L_H	mH	27.98	110.6	19.5	78.1
Stator leakage inductance	$L_{1\sigma}$	mH	0.822	3.245	0.563	2.263
Rotor leakage inductance	$L_{2\sigma}$	mH	0.99	3.902	0.701	2.819
Stator resistance	$R_{1,\ 20}$	Ω	0.175	0.69	0.09	0.36
Rotor resistance	$R_{2',\ 20}$	Ω	0.154	0.616	0.0894	0.358
Weight	m	kg	44.7	44.7	60.0	60.0

Technical data

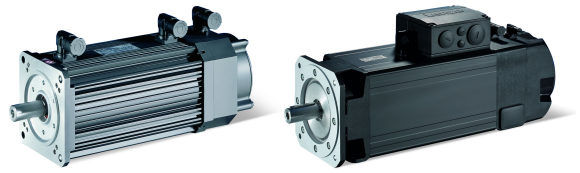
Rated data

Inverter mains connection 400 V, Forced ventilated motors



Inverter mains connection 400 V, Forced ventilated motors

Motor			MCA 13I34-	MCA 14L35-	MCA 14L16-	MCA 17N35-	MCA 17N17-	MCA 19S35-
Degree of protection			IP54	IP54	IP54	IP54	IP54	IP54
Standstill torque	M_0	Nm	7.00	13.5	13.5	23.9	23.9	40.0
Rated torque	M_{rated}	Nm	6.30	10.8	12.0	19.0	21.5	36.0
Max. torque	M_{max}	Nm	32.0	60.0	60.0	100	100	180
Rated speed	n_{rated}	rpm	3410	3455	1635	3480	1680	3510
Max. speed	n_{max}	rpm	8000	8000	8000	8000	8000	8000
Rated power	P_{rated}	kW	2.2	3.9	2.1	6.9	3.8	13.2
Standstill current	I_0	A	6.30	10.5	5.25	18.1	9.05	30.8
Rated current	I_{rated}	A	6.00	9.10	4.80	15.8	8.50	28.7
Max. current	I_{max}	A	24.0	36.4	19.2	63.2	34.0	115
Rated voltage	V_{rated}	V	390	390	390	390	390	390
Rated frequency	f_{rated}	Hz	120	120	60	120	60	120
Moment of inertia	J	kgcm²	8.30	19.2	19.2	36.0	36.0	72.0
Efficiency	η		0.720	0.790	0.800	0.810	0.830	0.850
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	3.4	1.5	6	0.76	3.04	0.35
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	5.124	2.261	9.042	1.145	4.581	0.527
Mutual inductance	L_H	mH	76.7	56.7	224.34	36.9	143.66	20.32
Stator leakage inductance	$L_{1\sigma}$	mH	4.949	2.365	9.464	1.396	5.585	0.652
Rotor leakage inductance	$L_{2\sigma}$	mH	4.392	2.324	9.303	1.51	6.042	0.765
Stator resistance	$R_{1,\ 20}$	Ω	1.7	0.75	3	0.38	1.52	0.175
Rotor resistance	$R_{2',\ 20}$	Ω	1.41	0.781	3.13	0.342	1.37	0.154
Weight	m	kg	12.0	16.9	16.9	25.5	25.5	48.2

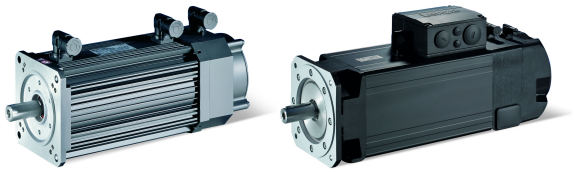


Motor			MCA 19S17-	MCA 20X29H	MCA 20X14H	MCA 21X35-	MCA 21X17-	MCA 22P29-
Degree of protection			IP54	IP23	IP23	IP54	IP54	IP54
Standstill torque	M_0	Nm	40.0	68.0	68.0	75.0	75.0	120
Rated torque	M_{rated}	Nm	36.3	53.5	61.0	55.0	61.4	100
Max. torque	M_{max}	Nm	180	250	250	300	300	500
Rated speed	n_{rated}	rpm	1700	2930	1420	3520	1710	2935
Max. speed	n_{max}	rpm	8000	6500	6500	8000	8000	6500
Rated power	P_{rated}	kW	6.4	16.4	9.1	20.3	11	30.7
Standstill current	I_0	A	15.4	52.0	26.0	49.5	25.8	80.9
Rated current	I_{rated}	A	13.9	42.4	23.0	42.5	22.5	72.1
Max. current	I_{max}	A	55.6	170	92.0	170	90.0	288
Rated voltage	V_{rated}	V	390	350	350	390	390	360
Rated frequency	f_{rated}	Hz	60	100	50	120	60	100
Moment of inertia	J	kgcm²	72.0	171	171	180	180	487
Efficiency	η		0.820	0.870	0.820	0.880	0.850	0.870
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	1.38	0.183	0.731	0.18	0.72	0.089
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	2.08	0.276	1.102	0.271	1.085	0.134
Mutual inductance	L_H	mH	80.92	14.28	60.16	16.8	68.9	22.93
Stator leakage inductance	$L_{1\sigma}$	mH	2.608	0.5	2.01	0.519	2.076	0.901
Rotor leakage inductance	$L_{2\sigma}$	mH	3.063	0.54	2.14	0.645	2.58	1.213
Stator resistance	$R_{1,\ 20}$	Ω	0.69	0.0915	0.365	0.09	0.36	0.134
Rotor resistance	$R_{2',\ 20}$	Ω	0.616	0.09	0.361	0.0894	0.358	0.12
Weight	m	kg	48.2	64	64	63.5	63.5	105

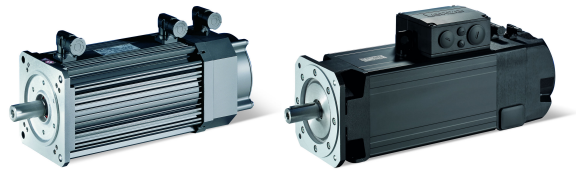
Technical data

Rated data

Inverter mains connection 400 V, Forced ventilated motors



Motor			MCA 22P17-	MCA 22P14-	MCA 22P08-	MCA 22P29H	MCA 22P17H	MCA 22P14H
Degree of protection			IP54	IP54	IP54	IP23	IP23	IP23
Standstill torque	M_0	Nm	120	120	120	135	135	135
Rated torque	M_{rated}	Nm	106	107	110	110	112	115
Max. torque	M_{max}	Nm	500	500	500	500	500	500
Rated speed	n_{rated}	rpm	1670	1425	760	2935	1670	1425
Max. speed	n_{max}	rpm	6500	6500	6500	6500	6500	6500
Rated power	P_{rated}	kW	18.5	16	8.8	33.8	19.6	17.2
Standstill current	I_0	A	46.7	40.5	23.4	90.2	52.1	45.1
Rated current	I_{rated}	A	42.7	37.7	22.1	77.8	44.5	40.0
Max. current	I_{max}	A	171	151	88.4	311	178	160
Rated voltage	V_{rated}	V	360	350	345	360	360	360
Rated frequency	f_{rated}	Hz	58	50	28	100	58	50
Moment of inertia	J	kgcm²	487	487	487	487	487	487
Efficiency	η		0.880	0.870	0.800	0.890	0.880	0.860
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	0.268	0.357	1.072	0.089	0.268	0.357
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	0.404	0.538	1.616	0.134	0.404	0.538
Mutual inductance	L_H	mH	23.35	94.23	94.89	22.9	23.46	90.94
Stator leakage inductance	$L_{1\sigma}$	mH	0.901	3.601	3.56	0.901	0.902	3.552
Rotor leakage inductance	$L_{2\sigma}$	mH	1.214	4.852	4.802	1.214	1.215	4.794
Stator resistance	$R_{1,\ 20}$	Ω	0.134	0.536	0.536	0.134	0.134	0.536
Rotor resistance	$R_{2',\ 20}$	Ω	0.12	0.477	0.477	0.12	0.12	0.477
Weight	m	kg	105	105	105	105	105	105

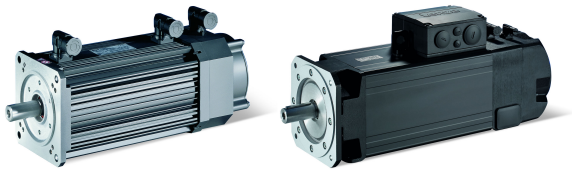


Motor			MCA 22P08H	MCA 26T22-	MCA 26T12-	MCA 26T10-	MCA 26T05-	MCA 26T22H
Degree of protection			IP23	IP54	IP54	IP54	IP54	IP23
Standstill torque	M_0	Nm	135	220	220	220	220	290
Rated torque	M_{rated}	Nm	120	195	207	210	216	230
Max. torque	M_{max}	Nm	500	1100	1100	1100	1100	1100
Rated speed	n_{rated}	rpm	760	2235	1200	1030	550	2235
Max. speed	n_{max}	rpm	6500	5500	5500	5500	5500	5500
Rated power	P_{rated}	kW	9.6	45.6	26	22.7	12.4	53.8
Standstill current	I_0	A	26.0	125	78.4	62.9	35.4	160
Rated current	I_{rated}	A	23.5	113	75.1	61.5	34.9	127
Max. current	I_{max}	A	94.0	452	300	246	140	507
Rated voltage	V_{rated}	V	355	340	350	350	350	340
Rated frequency	f_{rated}	Hz	28	76	41	35	19	76
Moment of inertia	J	kgcm²	487	1340	1340	1340	1340	1340
Efficiency	η		0.800	0.920	0.870	0.880	0.830	0.920
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	1.072	0.05	0.15	0.196	0.589	0.05
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	1.616	0.075	0.226	0.295	0.888	0.075
Mutual inductance	L_H	mH	91.93	19.84	18.1	69.24	66.8	20.2
Stator leakage inductance	$L_{1\sigma}$	mH	3.5	0.778	0.74	2.932	2.862	0.78
Rotor leakage inductance	$L_{2\sigma}$	mH	4.738	1.29	1.29	5.117	5.037	1.3
Stator resistance	$R_{1,\ 20}$	Ω	0.536	0.075	0.075	0.294	0.294	0.075
Rotor resistance	$R_{2',\ 20}$	Ω	0.477	0.0621	0.0621	0.25	0.25	0.0621
Weight	m	kg	105	194	194	194	194	194

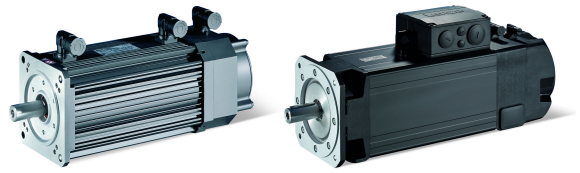
Technical data

Rated data

Inverter mains connection 400 V, Forced ventilated motors



Motor			MCA 26T12H	MCA 26T10H	MCA 26T05H
Degree of protection			IP23	IP23	IP23
Standstill torque	M_0	Nm	290	290	290
Rated torque	M_{rated}	Nm	255	260	280
Max. torque	M_{max}	Nm	1100	1100	1100
Rated speed	n_{rated}	rpm	1200	1030	550
Max. speed	n_{max}	rpm	5500	5500	5500
Rated power	P_{rated}	kW	32	28	16.1
Standstill current	I_0	A	101	78.0	44.0
Rated current	I_{rated}	A	83.3	69.6	42.4
Max. current	I_{max}	A	333	278	170
Rated voltage	V_{rated}	V	350	350	350
Rated frequency	f_{rated}	Hz	41	36	20
Moment of inertia	J	kgcm²	1340	1340	1340
Efficiency	η		0.870	0.870	0.810
Stator terminal resistance	$R_{UV\ 20\ °C}$	Ω	0.15	0.196	0.589
Stator terminal resistance	$R_{UV\ 150\ °C}$	Ω	0.226	0.295	0.888
Mutual inductance	L_H	mH	18.64	71.4	72.1
Stator leakage inductance	$L_{1\sigma}$	mH	0.78	3.165	3.112
Rotor leakage inductance	$L_{2\sigma}$	mH	1.3	5.135	5.08
Stator resistance	$R_{1,\ 20}$	Ω	0.075	0.294	0.294
Rotor resistance	$R_{2',\ 20}$	Ω	0.0621	0.25	0.25
Weight	m	kg	194	194	194

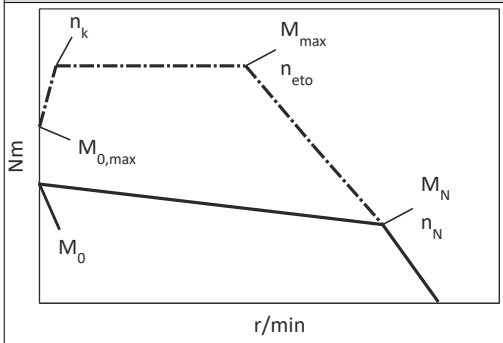


Selection tables

Notes on the selection tables

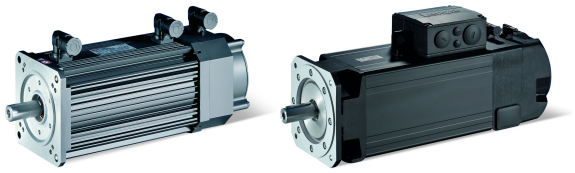
The selection tables represent the combinations of servo motors and servo inverters. The serve as a rough overview.

In the case of the servo inverters, the overload capacity depending on the switching frequency in the default setting is taken into consideration. For more information, please refer to the inverter documentation.

Graphical representation of the operating points		Explanation	Notes
	M_0	Standstill torque	
	$M_{0,max}$	Max. standstill torque	With an active load observe (e. g. vertical drive axes, hoists, test benches, unwinders).
	M_{rated}	Rated torque	
	n_{rated}	Rated speed	
	M_{max}	Max. torque	Can usually be used with a passive load (e. g. horizontal drive axes).
	n_{eto}	Transition speed	
	n_k	Derating speed	Due to a derating of the inverter output current to the derating speed, for some inverters the achievable max. standstill torque is smaller than the max. speed when the value of 5 Hz is not reached.

Derating speed

Motor	Derating speed
	n_k
	rpm
MCA10	150
MCA13	
MCA14	
MCA17	
MCA19	
MCA20	
MCA21	
MCA22	
MCA26	



i950 cabinet servo inverter

The following data apply to a mains voltage 3x 400 V and a switching frequency 4 kHz of the inverter

MCA10 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 10I40-	I95AE175F	2.1	2.0	4.7	4.7
	I95AE222F	2.3		9.7	9.7

MCA13 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I41-	I95AE222F	4.6	4.0	12.1	12.1
	I95AE240F			19.4	19.4

MCA14 Self-ventilated

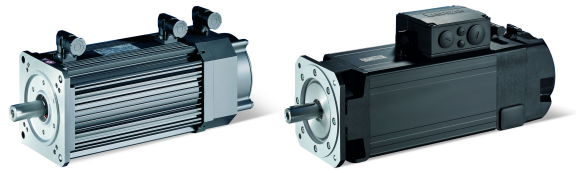
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L20-	I95AE222F	8.0	6.7	26.5	26.5
	I95AE240F			31.4	31.4
MCA 14L41-	I95AE222F	5.0	5.1	12.8	12.8
	I95AE240F	8.0	5.4	22.5	22.5
	I95AE275F			27.6	27.6

MCA17 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N23-	I95AE222F	11.8	10.8	23.8	23.8
	I95AE240F	12.8		40.9	40.9
	I95AE275F			47.5	47.5
MCA 17N41-	I95AE240F	9.5	8.6	19.6	19.6
	I95AE275F	12.8	9.5	34.9	34.9
	I95AE311F			43.3	43.3

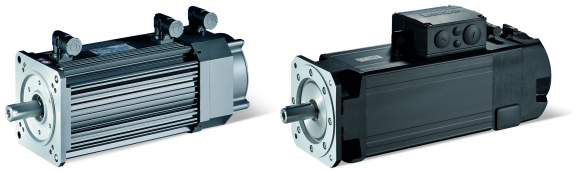
MCA19 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S23-	I95AE240F	21.6	16.3	41.8	41.8
	I95AE275F	22.5		73.2	73.2
MCA 19S42-		18.2	12.0	32.5	32.5
	I95AE311F	22.5		46.9	46.9
	I95AE315F			56.1	56.1



MCA21 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X25-	I95AE275F	39.0	24.6	64.2	64.2
	I95AE311F			92.0	92.0
	I95AE315F			106	106
MCA 21X42-	I95AE275F	16.6	12.9	31.6	31.6
	I95AE311F	27.3	17.0	46.3	46.3
	I95AE315F	39.0		63.7	63.7
	I95AE322F			79.2	79.2



The following data apply to a mains voltage 3x 400 V and a switching frequency of 4 kHz of the inverter with MCA 13 ... 19/21 and 8 kHz of the inverter with MCA 20/22/26.

When operating the MCA motors 20/22/26 with a lower switching frequency, please contact your Lenze representative!

When operating the MCA motors 20/22/26 at 4 kHz, the motor only produces 95 % of its rated torque at increased noise emission.

MCA13 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I34-	I95AE222F	5.8	5.7	13.8	13.8
	I95AE240F	7.0	6.3	24.1	24.1
	I95AE275F			30.7	30.7

MCA14 Forced-ventilated

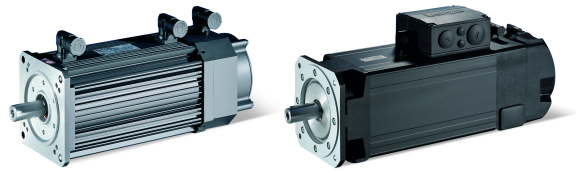
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L16-	I95AE222F	13.5	12.0	31.5	31.5
	I95AE240F			54.2	54.2
	I95AE275F			54.8	54.8
MCA 14L35-	I95AE240F	11.8	10.8	25.9	25.9
	I95AE275F	13.5		46.0	46.0
	I95AE311F			50.8	50.8

MCA17 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N17-	I95AE240F	23.9	21.5	52.5	52.5
	I95AE275F			92.4	92.4
	I95AE311F			95.2	95.2
MCA 17N35-	I95AE275F	21.4	19.0	43.4	43.4
	I95AE311F	23.9		62.6	62.6
	I95AE315F			84.7	84.7

MCA19 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S17-	I95AE275F	40.0	36.3	96.7	96.7
	I95AE311F			139	139
	I95AE315F			165	165
MCA 19S35-	I95AE311F	27.6	27.2	64.3	64.3
	I95AE315F	40.0	36.0	89.4	89.4
	I95AE322F			133	133
	I95AE330F			163	163



MCA20 Forced-ventilated

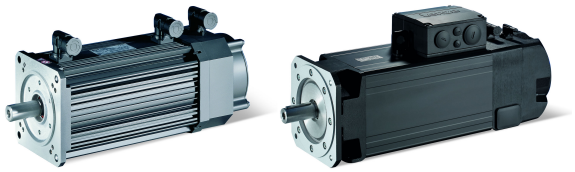
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 20X14H	I95AE311F	60.3	61.0	135	135
	I95AE315F	68.0		186	186
	I95AE322F			269	269
MCA 20X29H		60.0	53.5	134	134
	I95AE330F	68.0		176	176
	I95AE345F			247	247

MCA21 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X17-	I95AE311F	67.5	61.4	135	135
	I95AE315F	75.0		186	186
	I95AE322F			262	262
MCA 21X35-		70.7	55.0	131	131
	I95AE330F	75.0		171	171
	I95AE345F			239	239

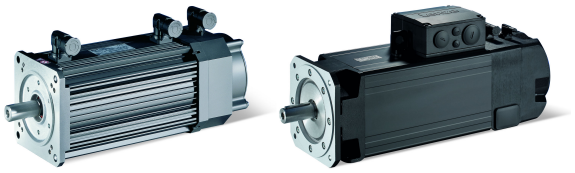
MCA22 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 22P08-	I95AE311F	120	110	261	261
	I95AE315F			361	361
	I95AE322F			501	501
MCA 22P08H	I95AE311F	119	120	267	267
	I95AE315F	135		369	369
	I95AE322F			546	546
MCA 22P14-	I95AE315F	86.3	84.6	201	201
	I95AE322F	120	107	303	303
	I95AE330F			396	396
	I95AE345F			493	493
MCA 22P14H	I95AE315F	82.9	82.5	203	203
	I95AE322F	135	115	306	306
	I95AE330F			401	401
	I95AE345F			530	530
MCA 22P17-	I95AE322F	120	106	268	268
	I95AE330F			353	353
	I95AE345F			499	499
MCA 22P17H	I95AE322F	119	112	267	267
	I95AE330F	135		351	351
	I95AE345F			517	517
MCA 22P29-	I95AE330F	77.8	76.2	194	194
	I95AE345F	120	100	292	292
	I95AE355F			364	364
	I95AE375F			480	480
MCA 22P29H	I95AE345F	133	110	288	288
	I95AE355F	135		359	359
	I95AE375F			494	494
	I95AE390F			513	513



MCA26 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 26T05-	I95AE315F	183	184	487	487
	I95AE322F	220	216	742	742
	I95AE330F			976	976
	I95AE345F			1124	1124
MCA 26T05H	I95AE322F	290	280	689	689
	I95AE330F			903	903
	I95AE345F			1266	1266
MCA 26T10-	I95AE330F	210	207	495	495
	I95AE345F	220	210	740	740
	I95AE355F			922	922
	I95AE375F			1034	1034
MCA 26T10H	I95AE330F	208	216	505	505
	I95AE345F	290	260	754	754
	I95AE355F			938	938
	I95AE375F			1191	1191
MCA 26T12-	I95AE330F	150	150	376	376
	I95AE345F	220	207	566	566
	I95AE355F			706	706
	I95AE375F			970	970
MCA 26T12H	I95AE345F	249	255	599	599
	I95AE355F	290		747	747
	I95AE375F			1025	1025
	I95AE390F			1140	1140
MCA 26T22-	I95AE355F	185	188	429	429
	I95AE375F	220	195	595	595
	I95AE390F			719	719
	I95AE411F			850	850
MCA 26T22H	I95AE355F	182	190	432	432
	I95AE375F	269	230	599	599
	I95AE390F	290		723	723
	I95AE411F			855	855



9400 HighLine servo drives

The following data apply to a mains voltage 3x 400 V and a switching frequency 4 kHz of the inverter.

MCA10 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 10I40-	E94AXXE0024	1.1	1.0	6.9	6.9
	E94AXXE0034	2.3	2.0	10.0	10.0

MCA13 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I41-	E94AXXE0044	4.6	4.0	18.9	18.9
	E94AXXE0074			20.8	20.8

MCA14 Self-ventilated

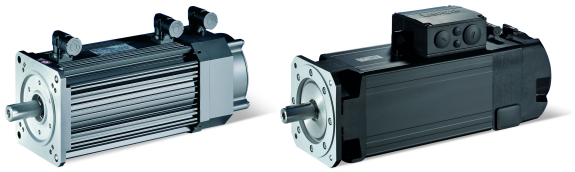
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L20-	E94AXXE0034	5.1	4.4	25.0	25.0
	E94AXXE0044	8.0	6.7	42.8	42.8
MCA 14L41-		3.5	3.5	21.5	21.5
	E94AXXE0074	8.0	5.4	27.0	27.0
	E94AXXE0094			31.3	31.3

MCA17 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N23-	E94AXXE0044	9.5	9.0	38.0	38.0
	E94AXXE0074	12.8	10.8	50.0	50.0
MCA 17N41-		7.1	6.7	24.0	24.0
	E94AXXE0094	11.5	9.5	33.3	33.3
	E94AXXE0134	12.8		45.8	45.8
	E94AXXE0174			49.9	49.9

MCA19 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S23-	E94AXXE0074	18.4	15.6	55.0	55.0
	E94AXXE0094	22.5	16.3	73.7	73.7
	E94AXXE0134			86.0	86.0
MCA 19S42-		15.0	12.0	48.8	48.8
	E94AXXE0174	22.5		62.0	62.0
	E94AXXE0244			70.0	70.0



MCA21 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X25-	E94AXXE0094	21.4	19.6	71.7	71.7
	E94AXXE0134	39.0	24.6	96.0	96.0
	E94AXXE0174			126	126
	E94AXXE0244			136	136
MCA 21X42-	E94AXXE0174	31.3	17.0	71.7	71.7
	E94AXXE0244	39.0		91.0	91.0

The following data apply to a mains voltage 3x 400 V and a switching frequency of 4 kHz of the inverter with MCA 13 ... 19/21 and 8 kHz of the inverter with MCA 20/22/26.

When operating the MCA motors 20/22/26 with a lower switching frequency, please contact your Lenze representative!

When operating the MCA motors 20/22/26 at 4 kHz, the motor only produces 95 % of its rated torque at increased noise emission.

MCA13 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I34-	E94AXXE0044	4.6	4.4	20.8	20.8
	E94AXXE0074	7.0	6.3	26.0	26.0
	E94AXXE0094			29.2	29.2

MCA14 Forced-ventilated

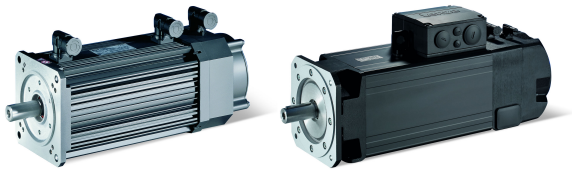
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L16-	E94AXXE0044	12.0	12.0	45.4	45.4
	E94AXXE0074	13.5		52.6	52.6
MCA 14L35-		10.1	9.7	32.4	32.4
	E94AXXE0094	13.5	10.8	46.0	46.0
	E94AXXE0134			60.0	60.0

MCA17 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N17-	E94AXXE0074	21.6	21.5	59.4	59.4
	E94AXXE0094	23.9		81.4	81.4
	E94AXXE0134			84.5	84.5
MCA 17N35-		19.4	19.0	59.2	59.2
	E94AXXE0174	23.9		75.0	75.0
	E94AXXE0244			90.0	90.0

MCA19 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S17-	E94AXXE0134	40.0	36.3	105	105
	E94AXXE0174			133	133
	E94AXXE0244			148	148
MCA 19S35-		36.9	36.0	82.0	82.0
	E94AXXE0324	40.0		112	112
	E94AXXE0474			132	132
	E94AXXE0594			160	160



MCA20 Forced-ventilated

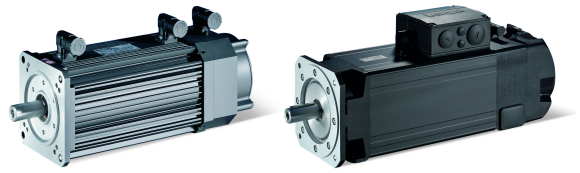
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 20X14H	E94AXXE0174	32.5	32.5	154	154
	E94AXXE0244	66.0	61.0	190	190
MCA 20X29H	E94AXXE0324	28.0	28.0	116	116
	E94AXXE0474	51.6	51.6	148	148
	E94AXXE0594			193	193

MCA21 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X17-	E94AXXE0174	54.4	50.4	134	134
	E94AXXE0244	75.0	61.4	158	158
	E94AXXE0324			215	215
	E94AXXE0474			246	246
MCA 21X35-		63.9	55.0	134	134
	E94AXXE0594	75.0		167	167
	E94AXXE0864			232	232

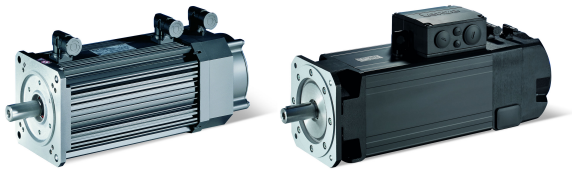
MCA22 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 22P08-	E94AXXE0174	64.0	64.0	261	261
	E94AXXE0244	110	110	313	313
	E94AXXE0324	120		402	402
MCA 22P08H	E94AXXE0244		120	313	313
	E94AXXE0324	135		402	402
MCA 22P14-		82.0	82.0	242	242
	E94AXXE0474	120	107	300	300
	E94AXXE0594			372	372
MCA 22P14H	E94AXXE0474	118	115	300	300
	E94AXXE0594			372	372
MCA 22P17-		99.0	99.0	325	325
	E94AXXE0864	120	106	463	463
MCA 22P17H	E94AXXE0594	99.0	99.0	325	325
	E94AXXE0864	135	112	463	463
MCA 22P29-	E94AXXE1044	110	100	335	335
	E94BxxE1454	120		416	416
	E94BxxE1724			465	465
MCA 22P29H	E94AXXE1044	110	110	335	335
	E94BxxE1454	135		416	416
	E94BxxE1724			486	486



MCA26 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 26T05-	E94AXXE0324	191	191	531	531
	E94AXXE0474	220	216	665	665
	E94AXXE0594			826	826
	E94AXXE0864			1010	1010
MCA 26T05H	E94AXXE0474	268	268	665	665
	E94AXXE0594			826	826
	E94AXXE0864	290	290	1100	1100
MCA 26T10-	E94AXXE0594	77.0	77.0	472	472
	E94AXXE0864	220	210	713	713
	E94AXXE1044			855	855
	E94BxxE1454			1044	1044
MCA 26T10H	E94AXXE0864	270	260	713	713
	E94AXXE1044	290		855	855
	E94BxxE1454			1044	1044
MCA 26T12-	E94AXXE0864	204	204	502	502
	E94AXXE1044	219	207	609	609
	E94BxxE1454	220		739	739
	E94BxxE1724			819	819
MCA 26T22-	E94BxxE1454	154	154	523	523
	E94BxxE1724	211	195	611	611
	E94BxxE2024	220		711	711
	E94BxxE2454			843	843



8400 TopLine inverter drives

The following data apply to a mains voltage 3x 400 V and a switching frequency 8 kHz of the inverter.

MCA10 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 10I40-	E84AVTCX7514	2.3	1.9	5.8	5.8
	E84AVTCX1124			8.0	8.0
	E84AVTCX1524			9.8	9.8
	E84AVTCX2224			10.0	10.0

MCA13 Self-ventilated

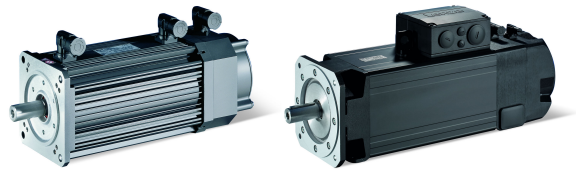
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I41-	E84AVTCX2224	4.6	4.0	14.3	14.3
	E84AVTCX3024			18.9	18.9
	E84AVTCX4024			22.9	22.9

MCA14 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L20-	E84AVTCX1524	8.0	6.7	20.1	20.1
	E84AVTCX2224			29.4	29.4
	E84AVTCX3024			34.7	34.7
MCA 14L41-			5.4	19.0	19.0
	E84AVTCX4024			25.1	25.1
	E84AVTCX5524			31.0	31.0

MCA17 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N23-	E84AVTCX2224	12.8	10.8	25.3	25.3
	E84AVTCX3024			33.3	33.3
	E84AVTCX4024			43.8	43.8
	E84AVTCX5524			51.1	51.1
MCA 17N41-	E84AVTCX7524		9.5	31.1	31.1
	E84AVTCX1134			49.5	49.5

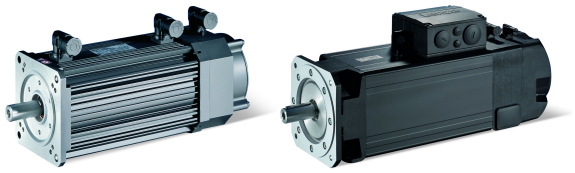


MCA19 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S23-	E84AVTCX4024	22.5	16.3	43.6	43.7
	E84AVTCX5524			60.9	61.0
	E84AVTCX7524			77.5	77.5
MCA 19S42-	E84AVTCX7524		12.0	37.0	37.0
	E84AVTCX1134			53.7	53.8
	E84AVTCX1534			64.7	64.7

MCA21 Self-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X25-	E84AVTCX7524	39.0	24.5	59.3	59.3
	E84AVTCX1134			85.9	85.9
	E84AVTCX1534			97.3	97.6
MCA 21X42-	E84AVTCX1134		17.0	52.2	52.2
	E84AVTCX1534			72.1	72.1
	E84AVTCX1834			88.5	88.5



The data apply to a mains voltage of 3x 400 V and a switching frequency of 8 kHz of the inverter.

If the motors are operated at a lower switching frequency, please get in touch with your Lenze representative!

When operating at 4 kHz, the motor generates just 95 % of its rated torque with increased noise emissions.

MCA13 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 13I34-	E84AVTCX3024	7.0	6.2	21.4	21.4
	E84AVTCX4024			28.2	28.2
	E84AVTCX5524			32.0	32.0

MCA14 Forced-ventilated

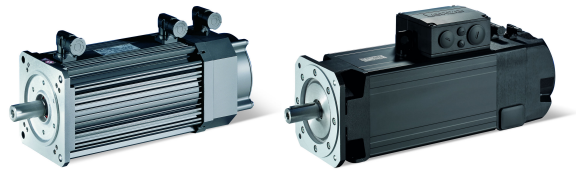
Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 14L16-	E84AVTCX2224	13.5	12.3	34.7	34.7
	E84AVTCX3024			45.5	45.5
	E84AVTCX4024			50.8	50.8
MCA 14L35-			10.8	28.4	28.4
	E84AVTCX5524			39.8	39.8
	E84AVTCX7524			51.1	51.1
	E84AVTCX1134			56.5	56.6

MCA17 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 17N17-	E84AVTCX4024	23.9	21.6	55.9	56.0
	E84AVTCX5524			77.5	77.5
	E84AVTCX7524			93.3	93.3
MCA 17N35-			18.9	49.5	49.5
	E84AVTCX1134			72.5	72.5
	E84AVTCX1534			97.8	97.8

MCA19 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 19S17-	E84AVTCX7524	40.0	36.0	94.7	94.7
	E84AVTCX1134			139	139
	E84AVTCX1534			165	165
MCA 19S35-			35.9	78.8	78.8
	E84AVTCX1834			97.8	97.8
	E84AVTCX2234			113	113
	E84AVTCX3034			146	146

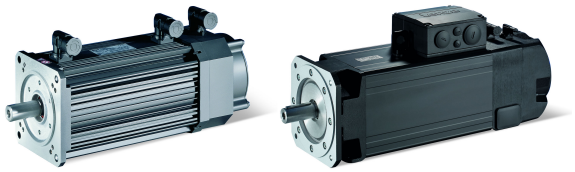


MCA20 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 20X14H	E84AVTCX1134	67.0	61.2	140	140
	E84AVTCX1534	68.0		193	193
	E84AVTCX1834			236	236
	E84AVTCX2234			250	250
MCA 20X29H		57.0	53.4	140	140
	E84AVTCX3034	68.0		183	183
	E84AVTCX3734			222	223
	E84AVTCX4534			250	250

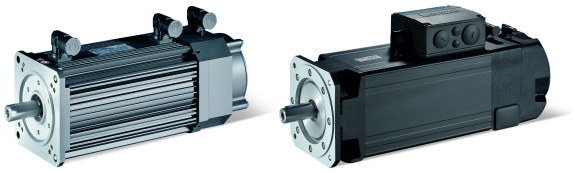
MCA21 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 21X17-	E84AVTCX1134	75.0	61.4	144	144
	E84AVTCX1534			199	199
	E84AVTCX1834			242	242
	E84AVTCX2234			277	277
MCA 21X35-			55.1	139	139
	E84AVTCX3034			178	178
	E84AVTCX3734			217	218
	E84AVTCX4534			268	270



MCA22 Forced-ventilated

Motor	Inverter	Standstill torque	Rated torque	Max. standstill torque	Max. torque
		M_0	M_{rated}	$M_{0, max}$	M_{max}
		Nm	Nm	Nm	Nm
MCA 22P08-	E84AVTCX1134	120	111	233	234
	E84AVTCX1534			323	323
	E84AVTCX1834			397	397
	E84AVTCX2234			394	394
MCA 22P08H	E84AVTCX1134	135	121	234	235
	E84AVTCX1534			325	326
	E84AVTCX1834			401	401
	E84AVTCX2234				
MCA 22P14-	E84AVTCX1834	120	107	233	233
	E84AVTCX2234			269	269
	E84AVTCX3034			346	346
	E84AVTCX3734			423	424
	E84AVTCX4534			459	461
MCA 22P14H	E84AVTCX2234	135	115	271	271
	E84AVTCX3034			350	350
	E84AVTCX3734			426	428
	E84AVTCX4534			494	496
MCA 22P17-	E84AVTCX1834	120	107	204	204
	E84AVTCX2234			237	237
	E84AVTCX3034			308	308
	E84AVTCX3734			375	377
	E84AVTCX4534			461	462
MCA 22P17H	E84AVTCX2234	135	112	238	238
	E84AVTCX3034			310	311
	E84AVTCX3734			377	379
	E84AVTCX4534			463	465
MCA 22P29-	E84AVTCX3734	120	99.9	225	226
	E84AVTCX4534			271	271
MCA 22P29H		135	110	268	269

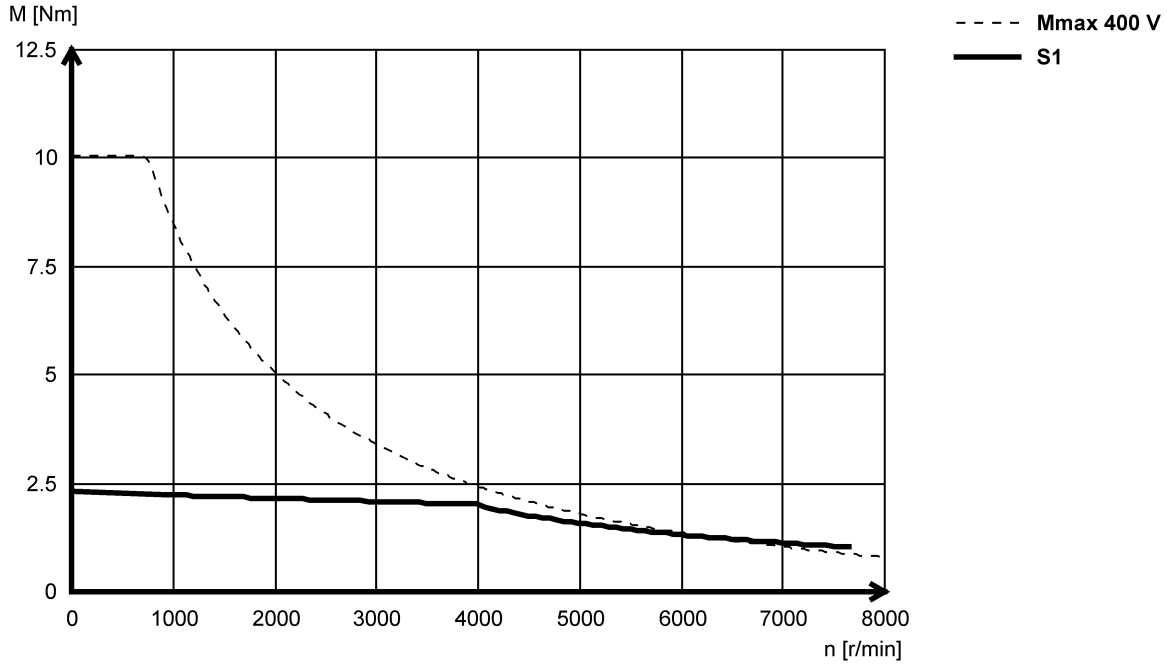


Torque characteristics

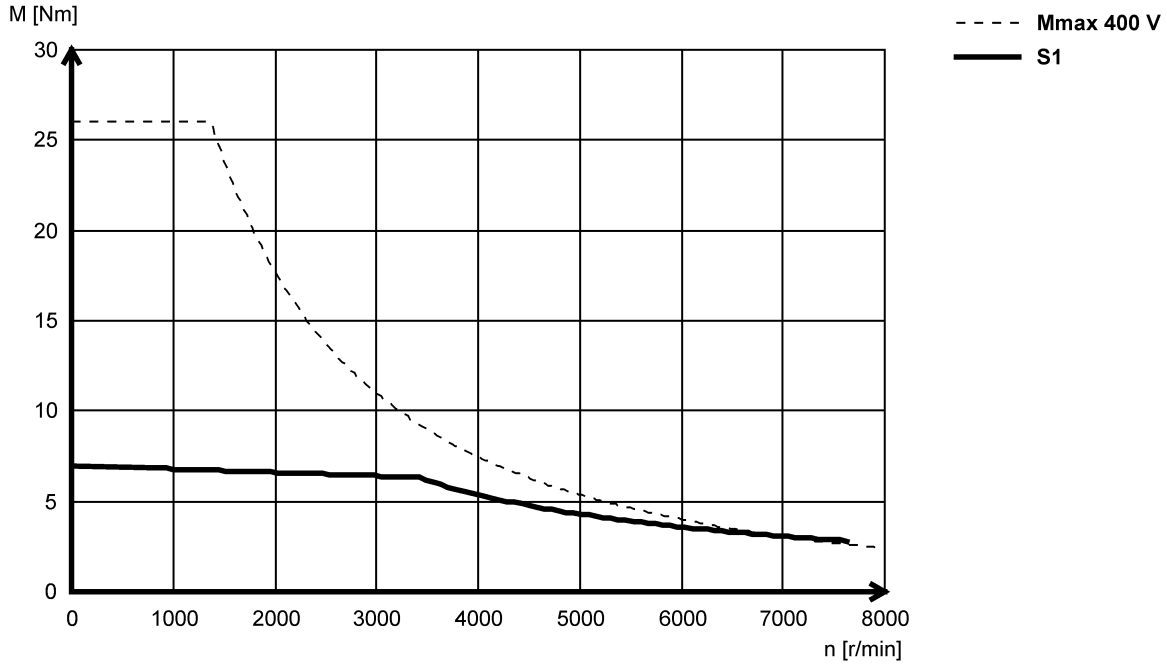
The torque/speed characteristic for your motor/inverter combination can be found on the Internet:
http://www.lenze.com → Product Finder → M-n characteristics

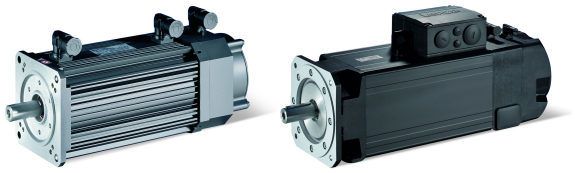
The following data apply to a mains voltage 3 x 400 V of the inverter.

MCA10I40- (self-ventilated)

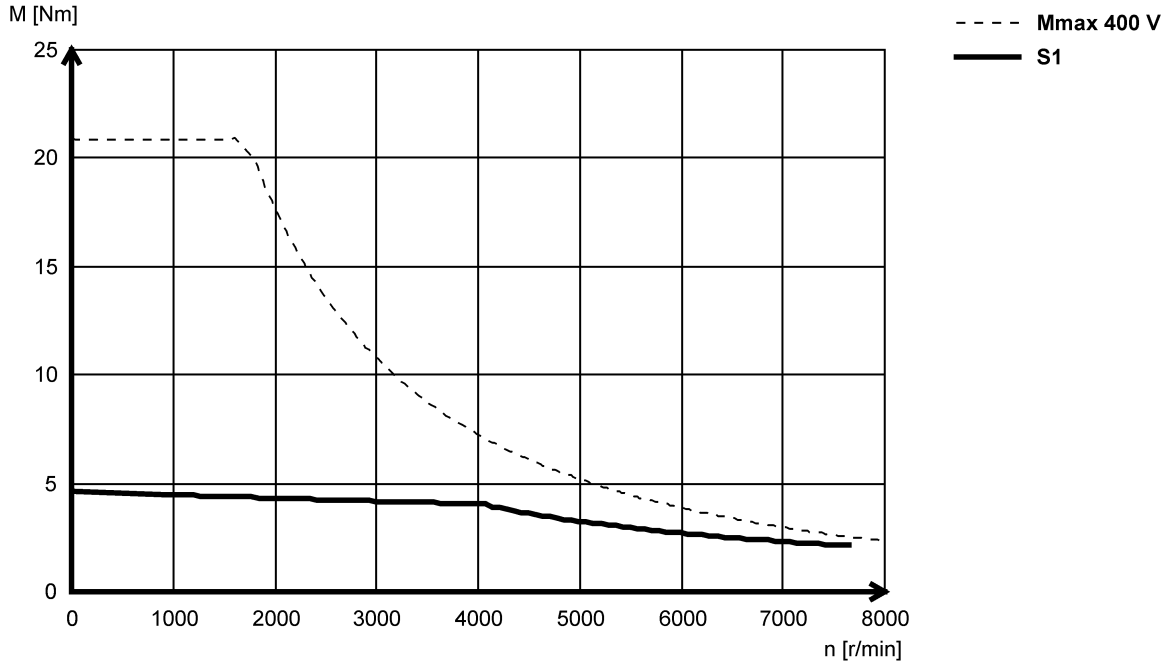


MCA13I34- (forced ventilated)

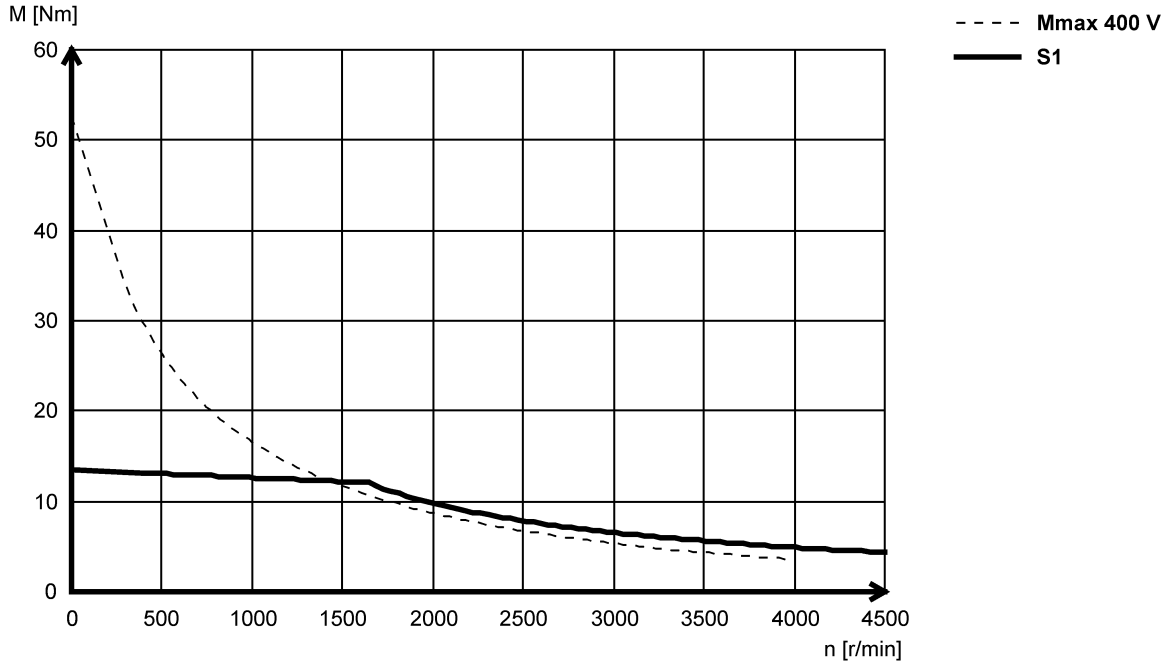


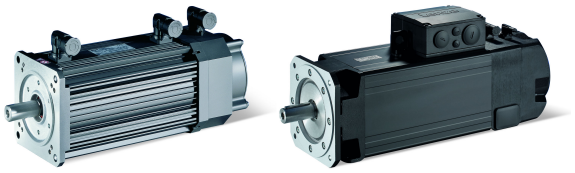


MCA13I41- (self-ventilated)

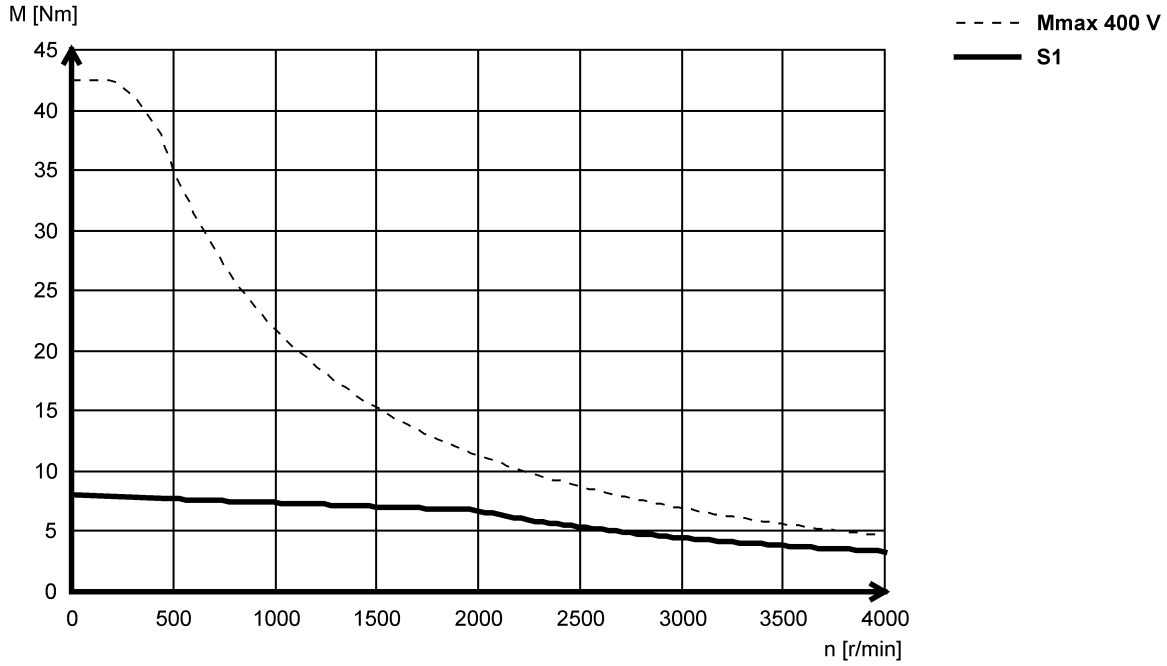


MCA14L16- (forced ventilated)

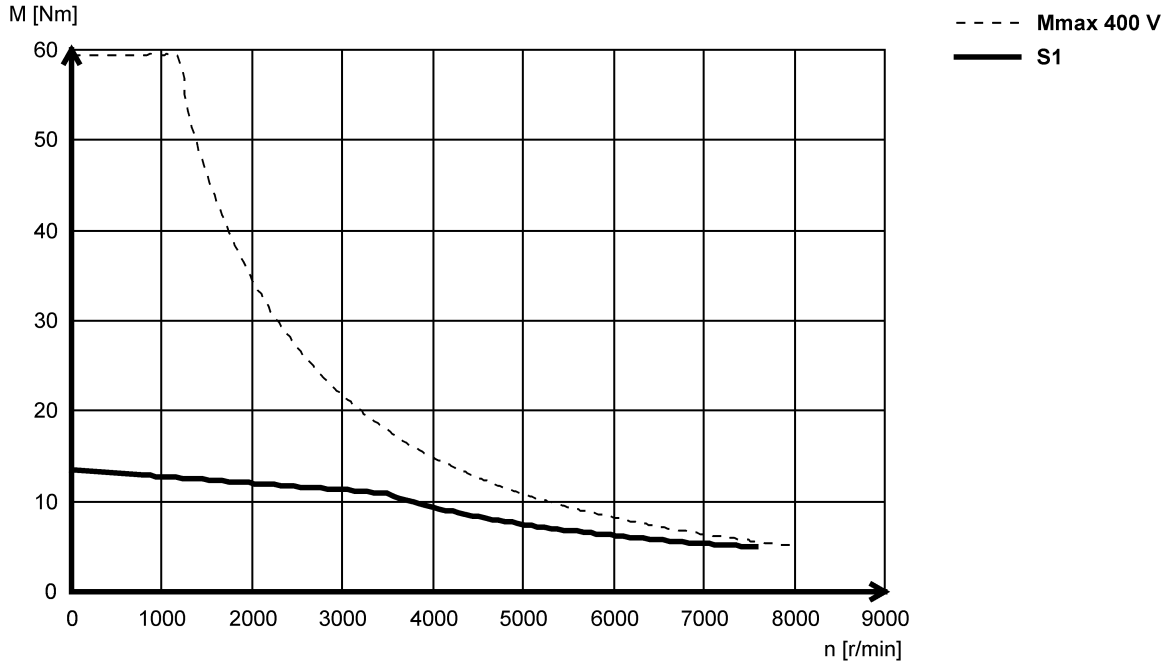


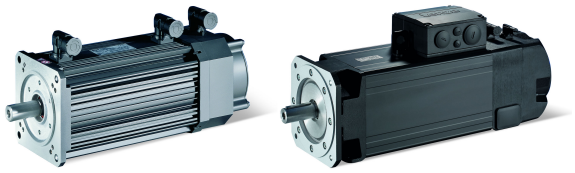


MCA14L20- (self-ventilated)

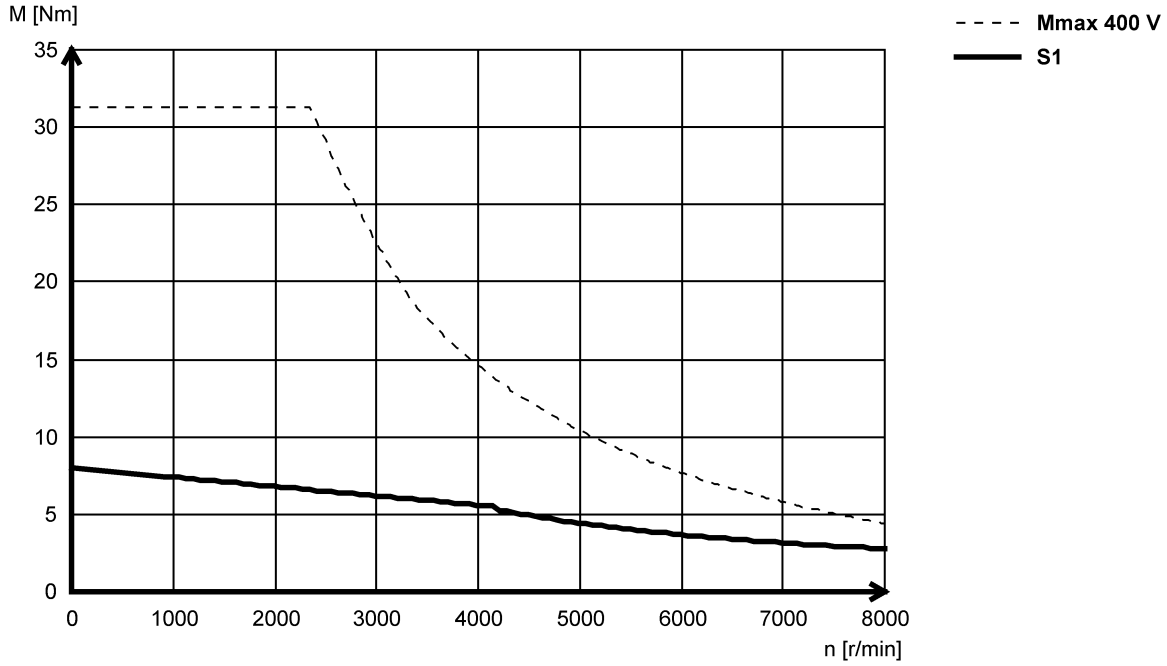


MCA14L35- (forced ventilated)

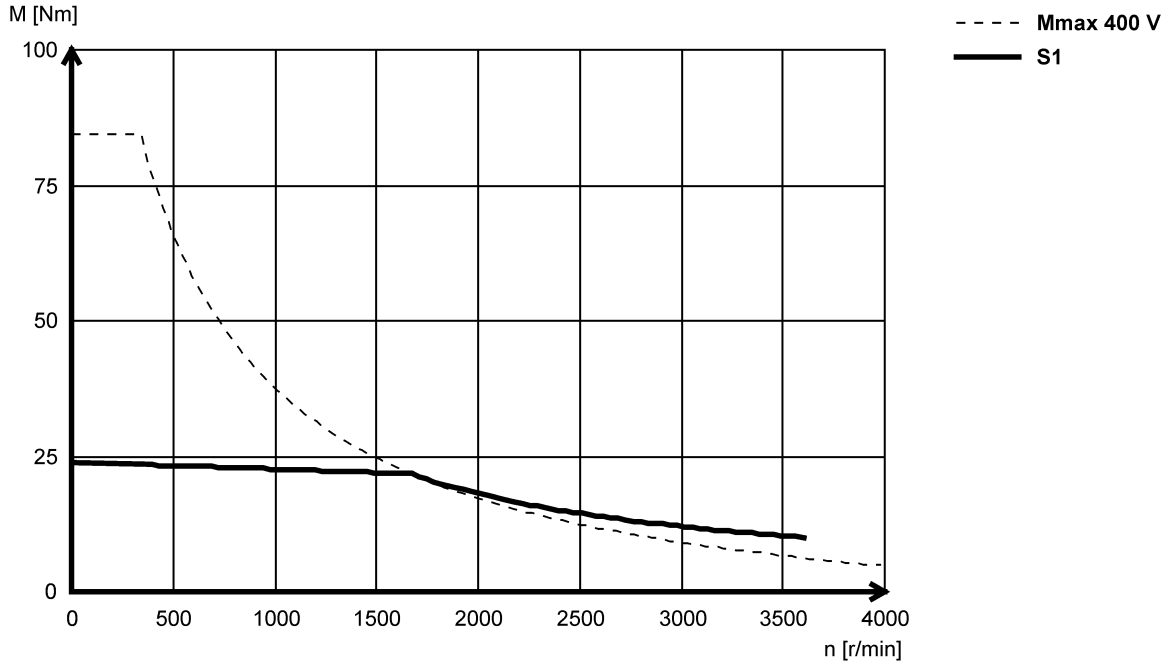


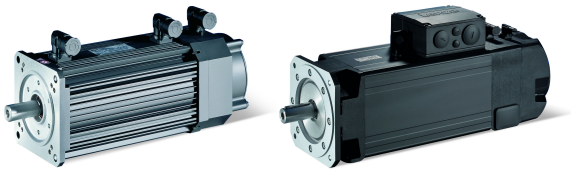


MCA14L41- (self-ventilated)

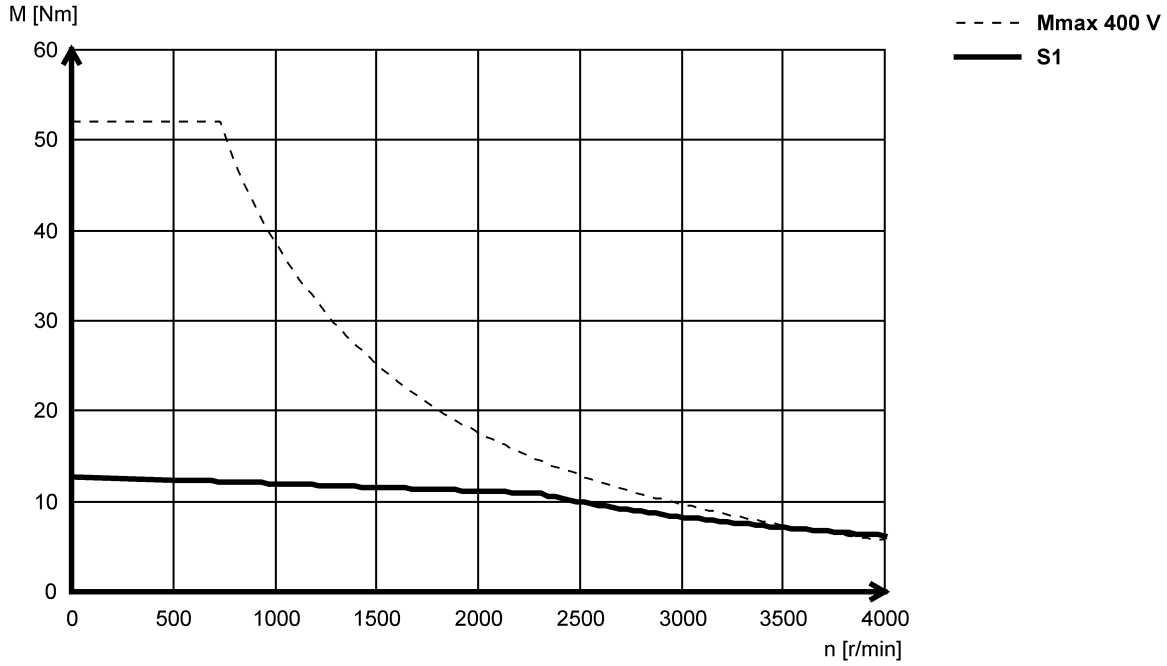


MCA17N17- (forced ventilated)





MCA17N23- (self-ventilated)



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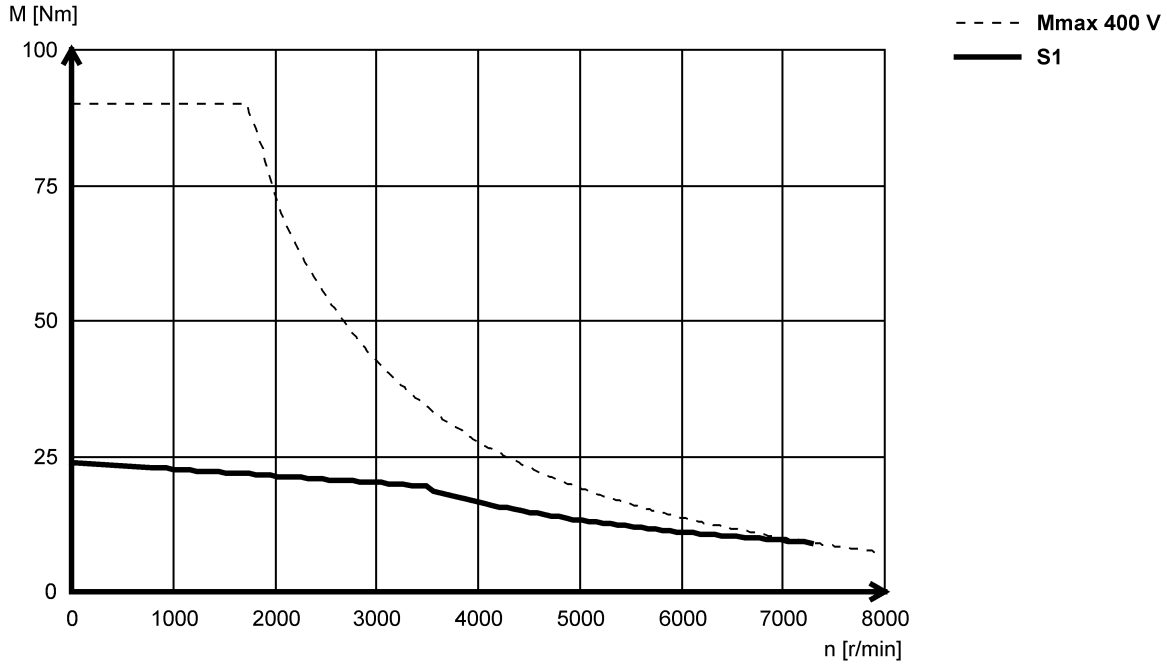
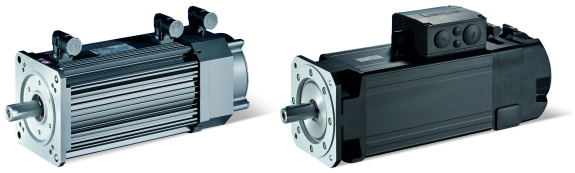
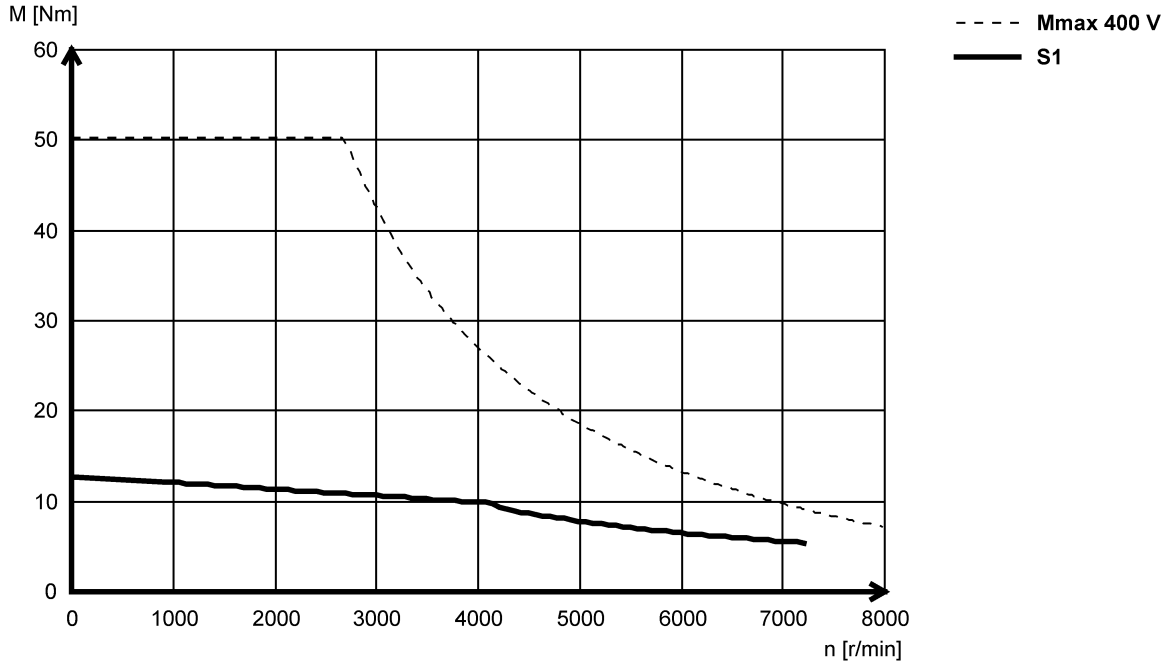
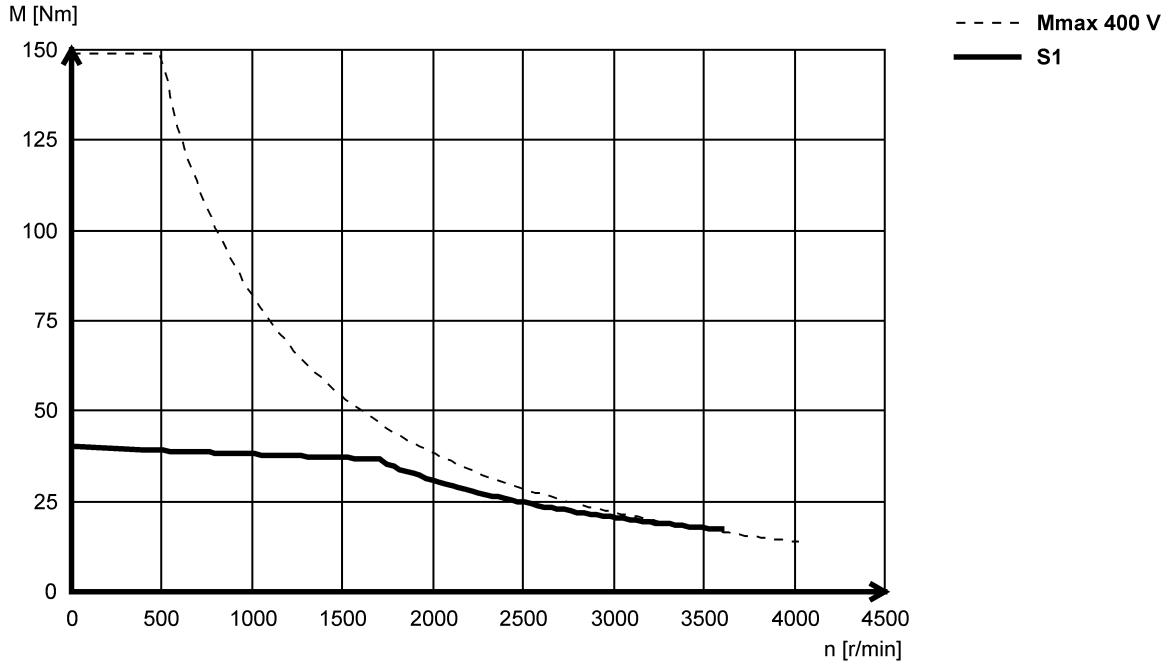


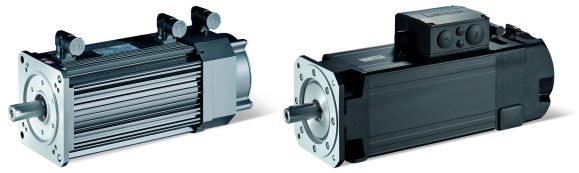


MCA17N41- (self-ventilated)



MCA19S17- (forced ventilated)





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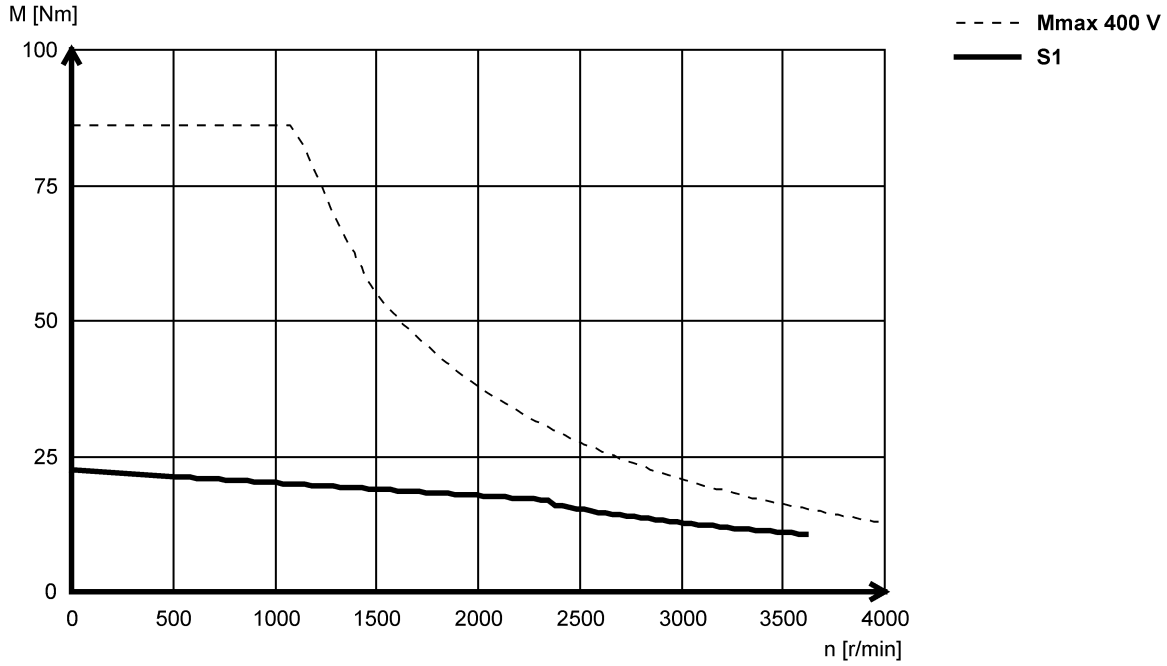

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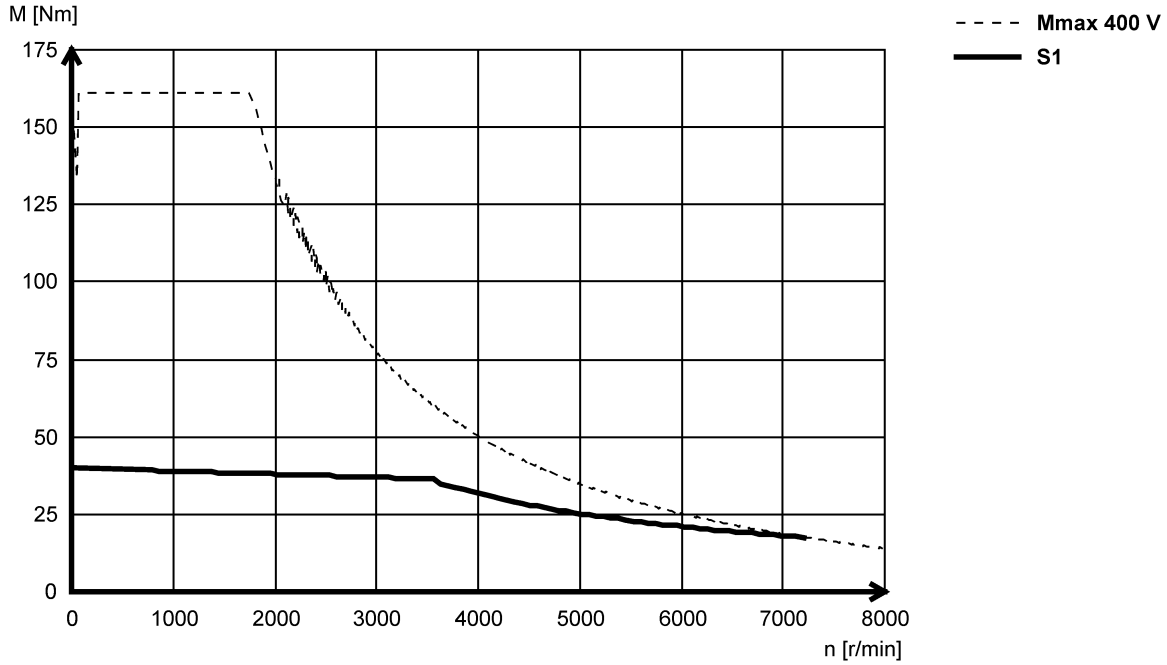
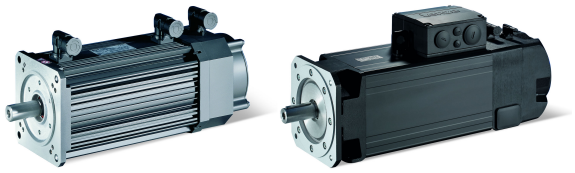
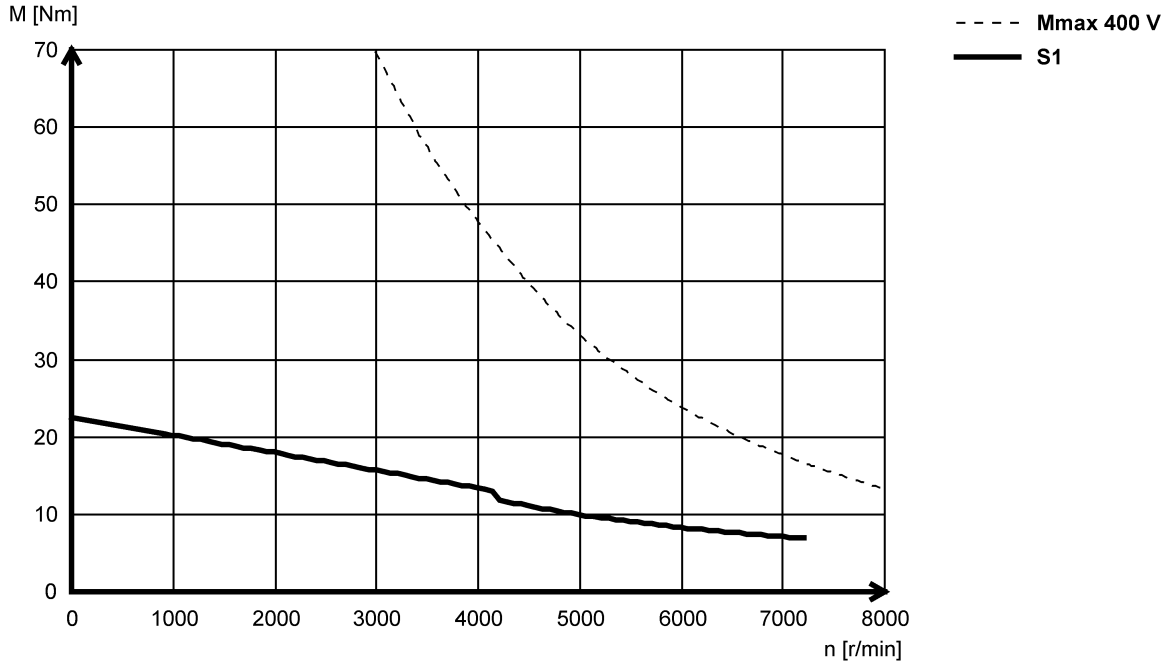
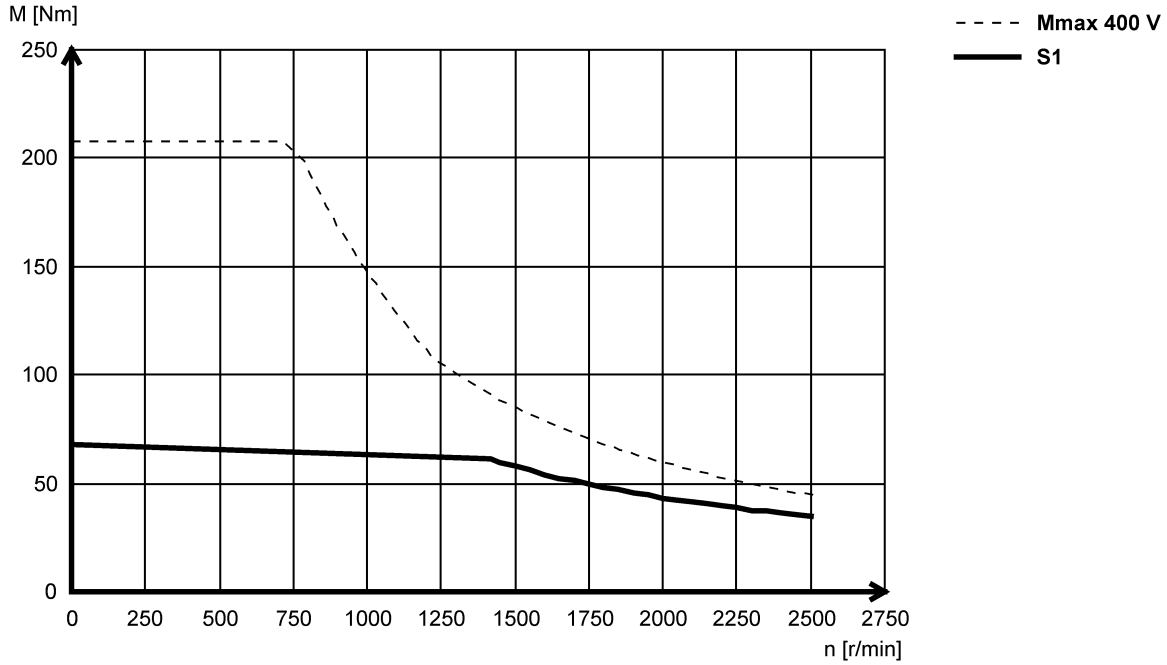


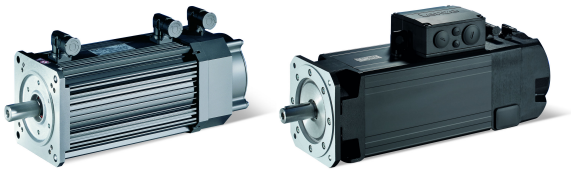


MCA19S42- (self-ventilated)



MCA20X14H (forced ventilated, IP23s)





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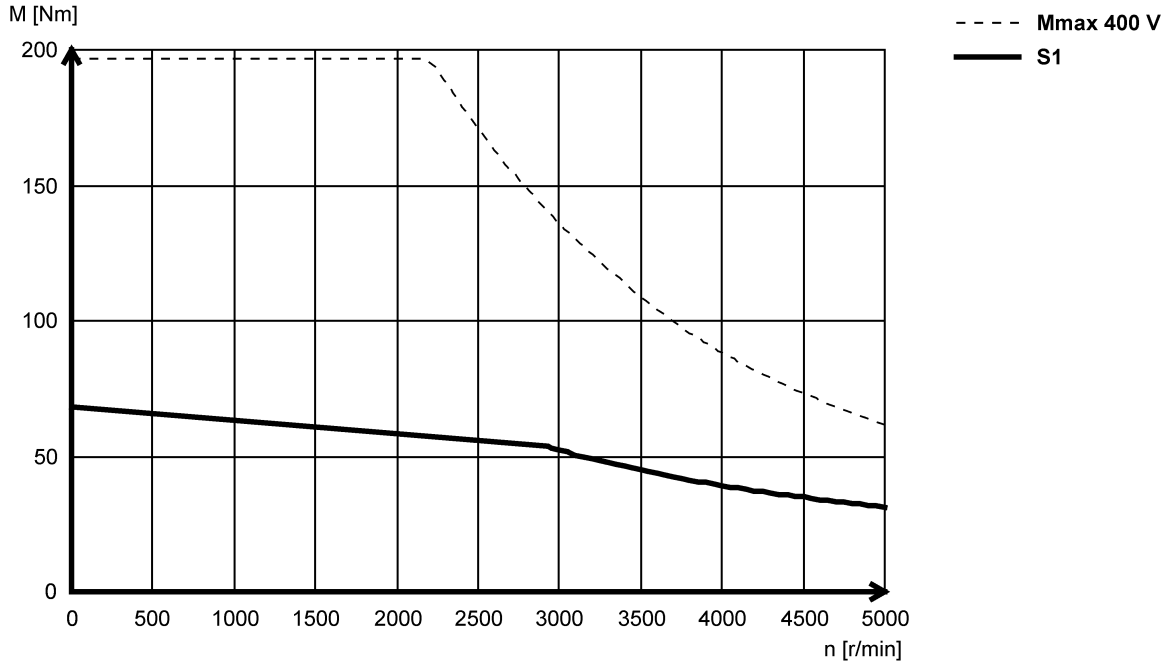
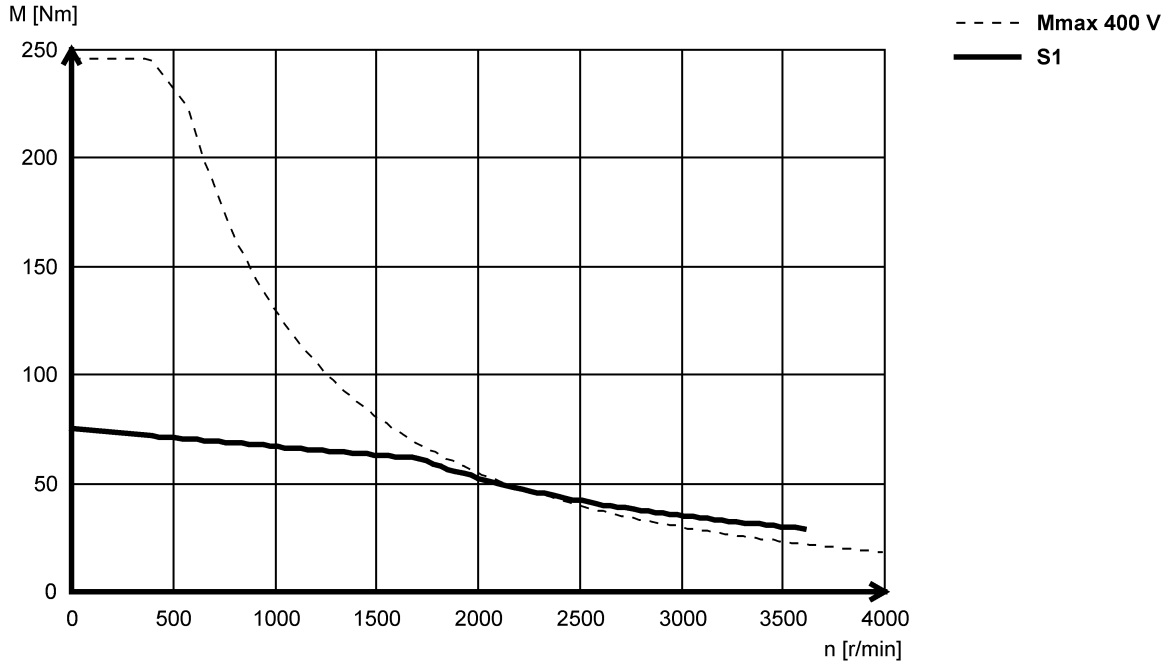
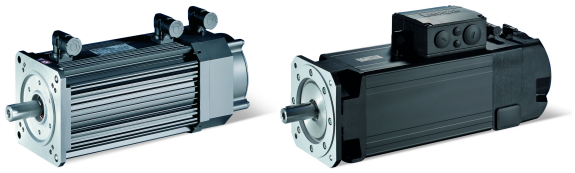
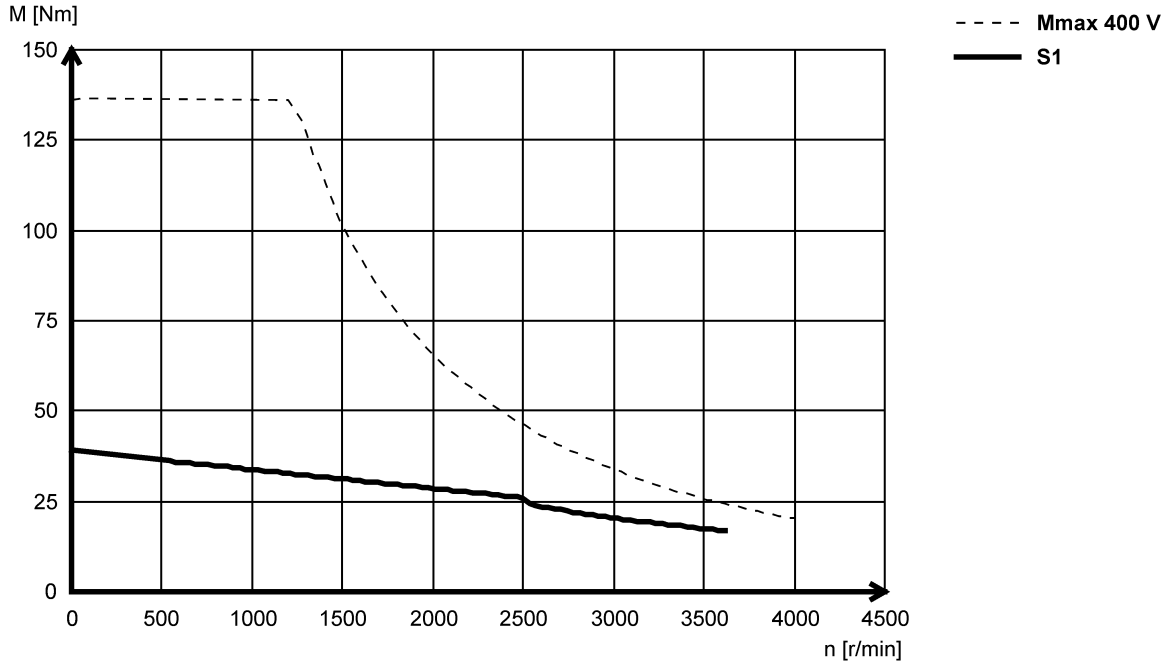


MCA21X17- (forced ventilated)





MCA21X25- (self-ventilated)



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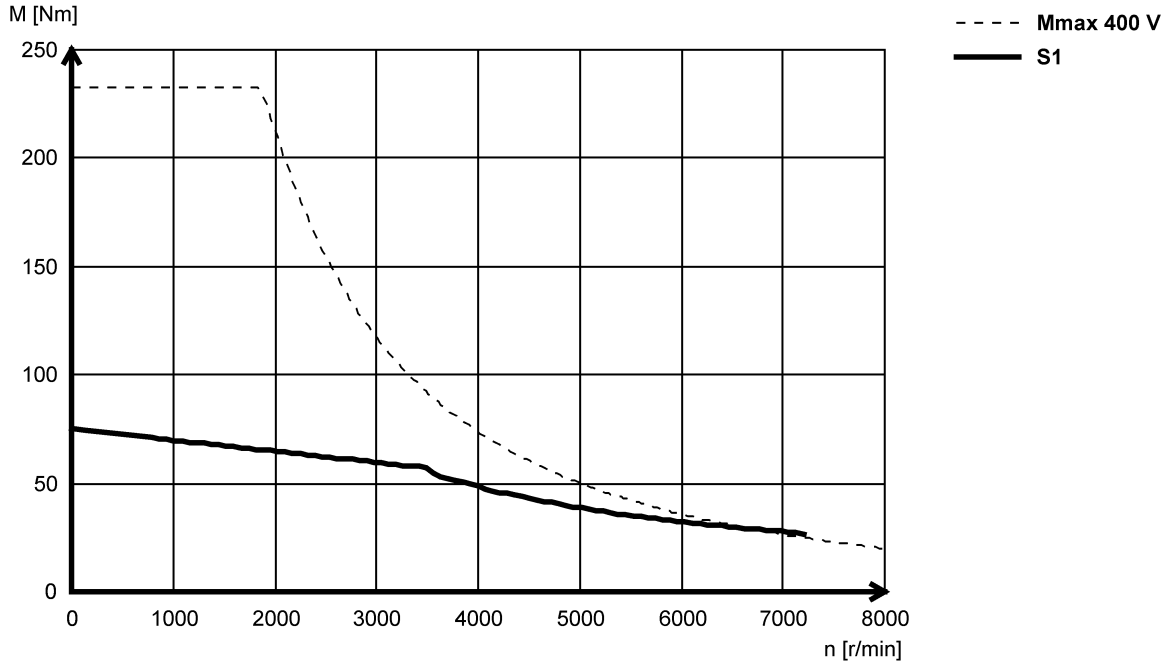

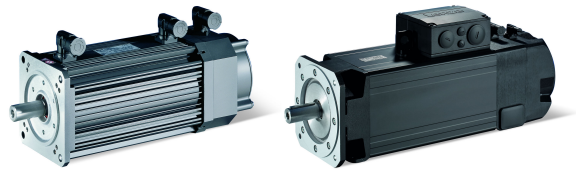

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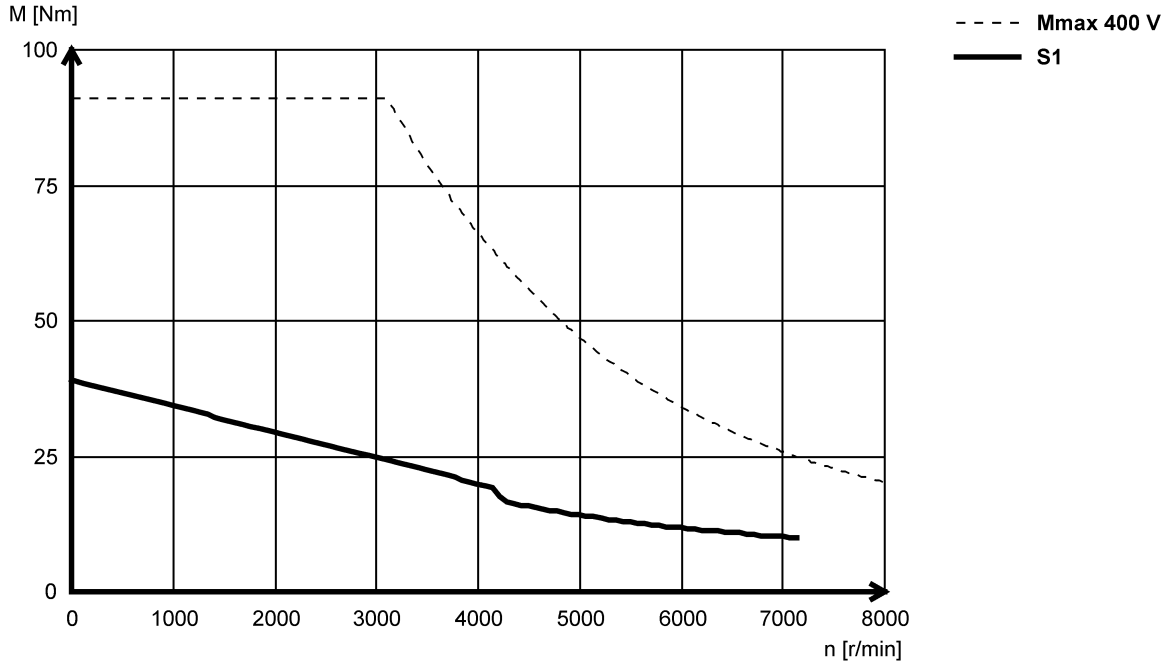
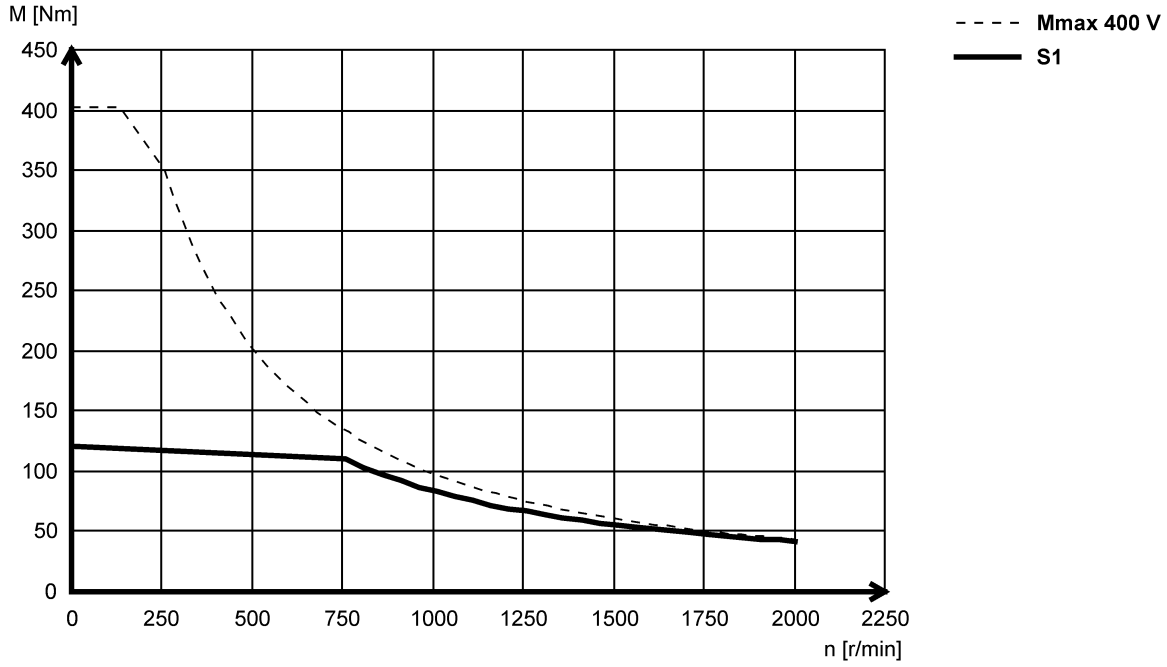
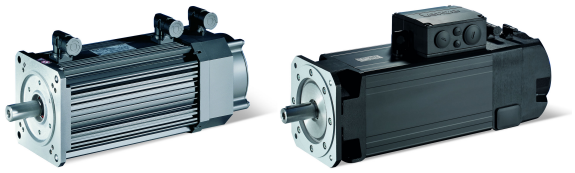
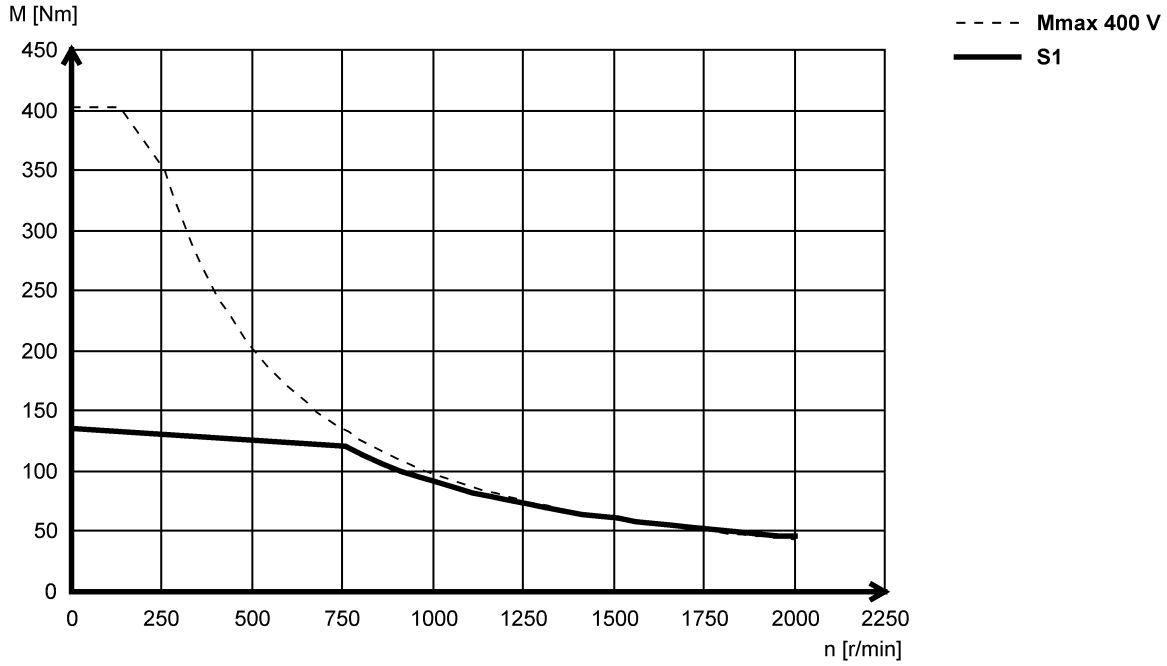


MCA22P08- (forced ventilated)





MCA22P08H (forced ventilated, IP23s)



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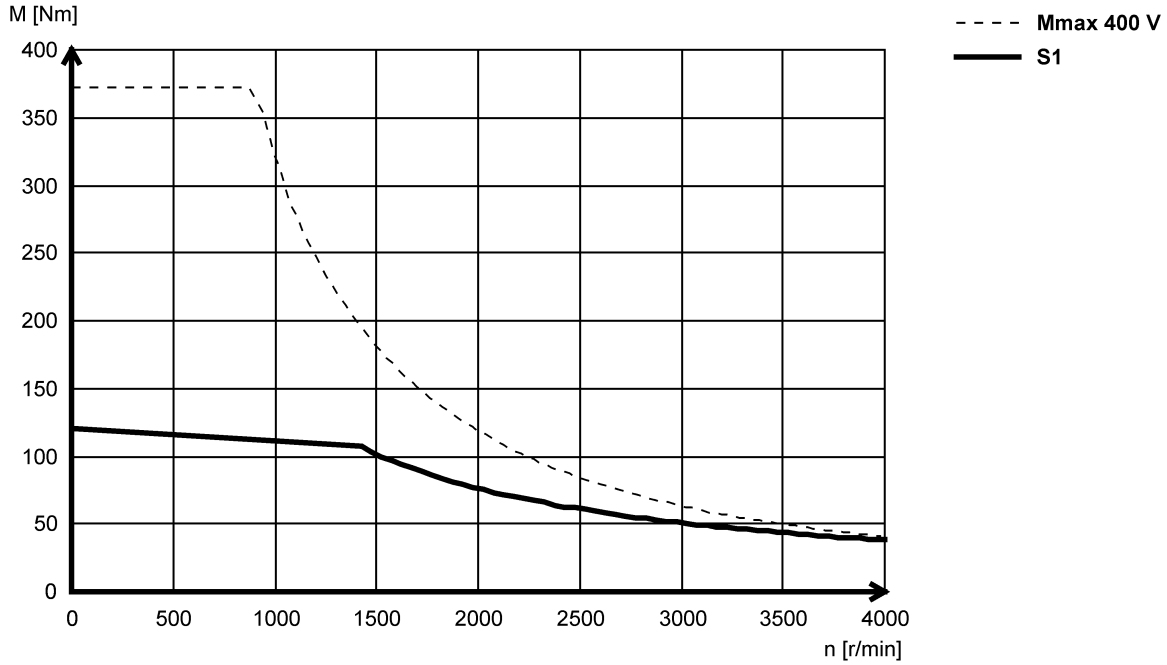
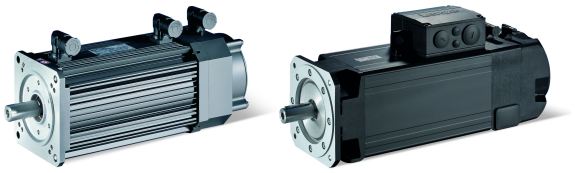
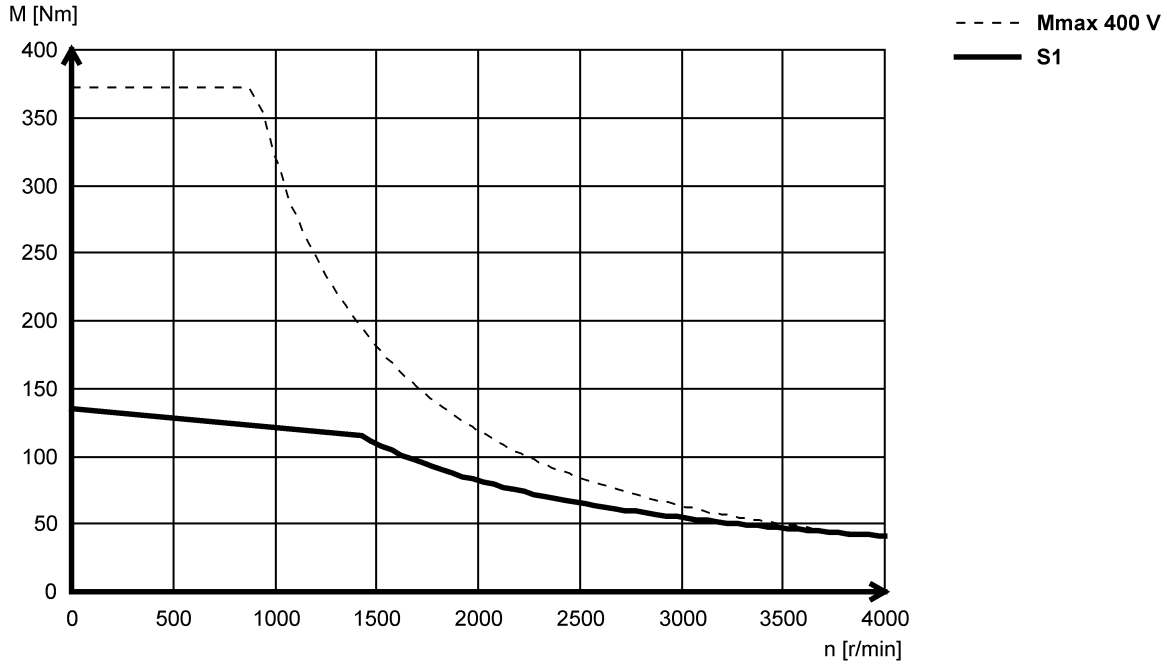
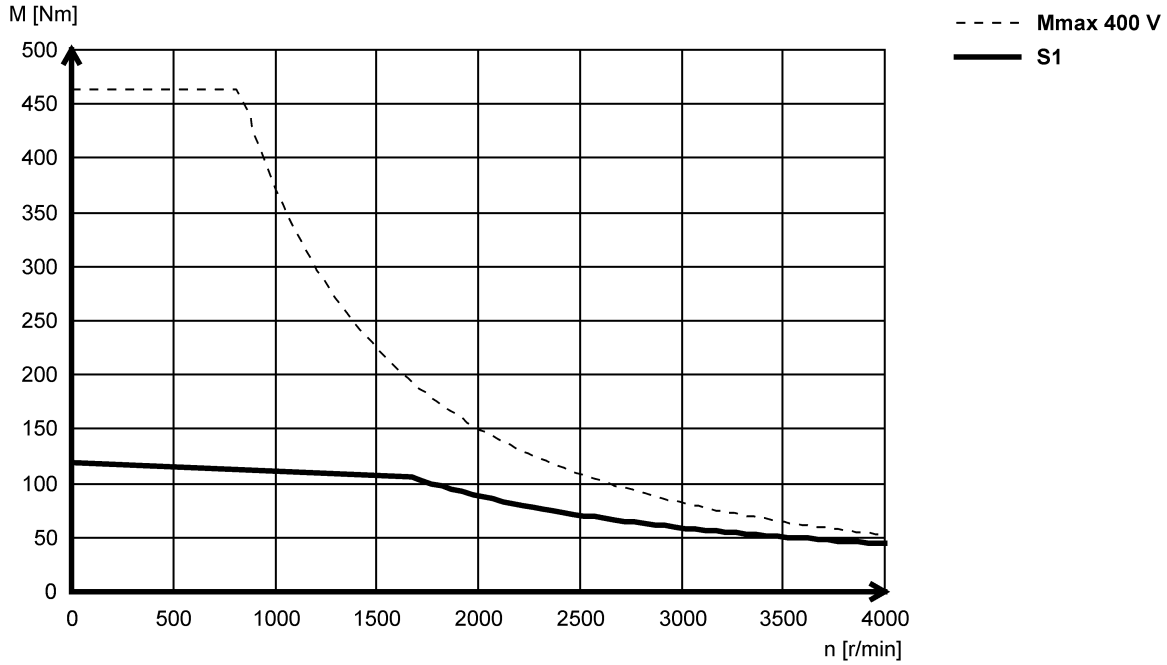


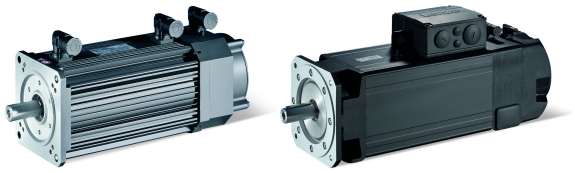


MCA22P14H (forced ventilated, IP23s)

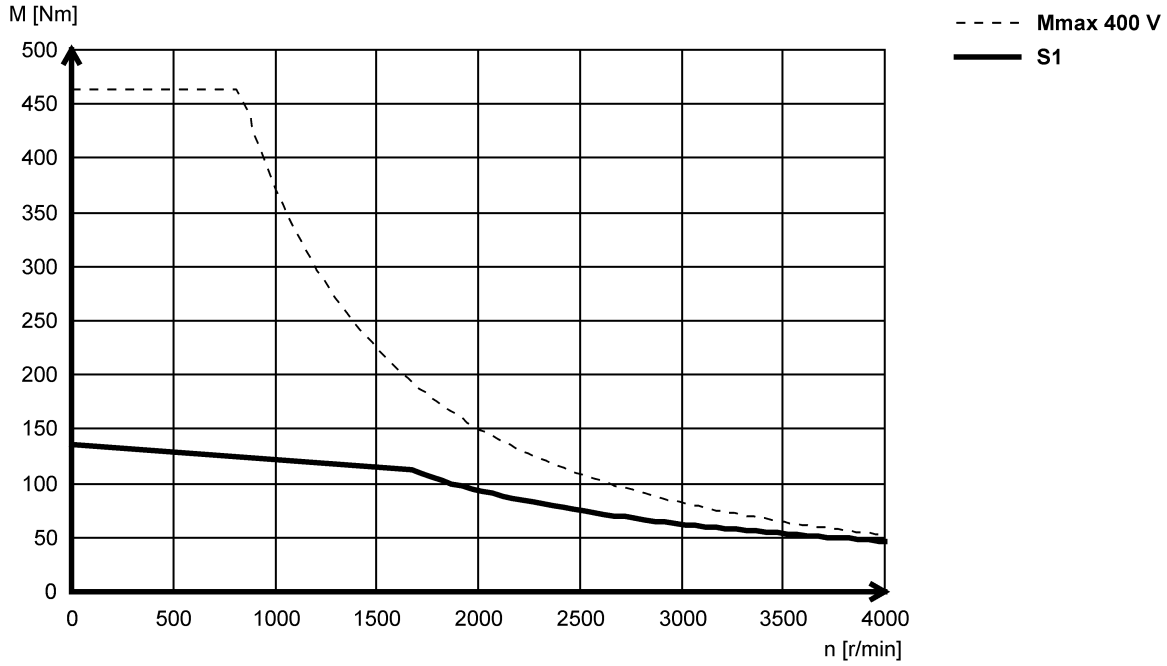


MCA22P17- (forced ventilated)





MCA22P17H (forced ventilated, IP23s)



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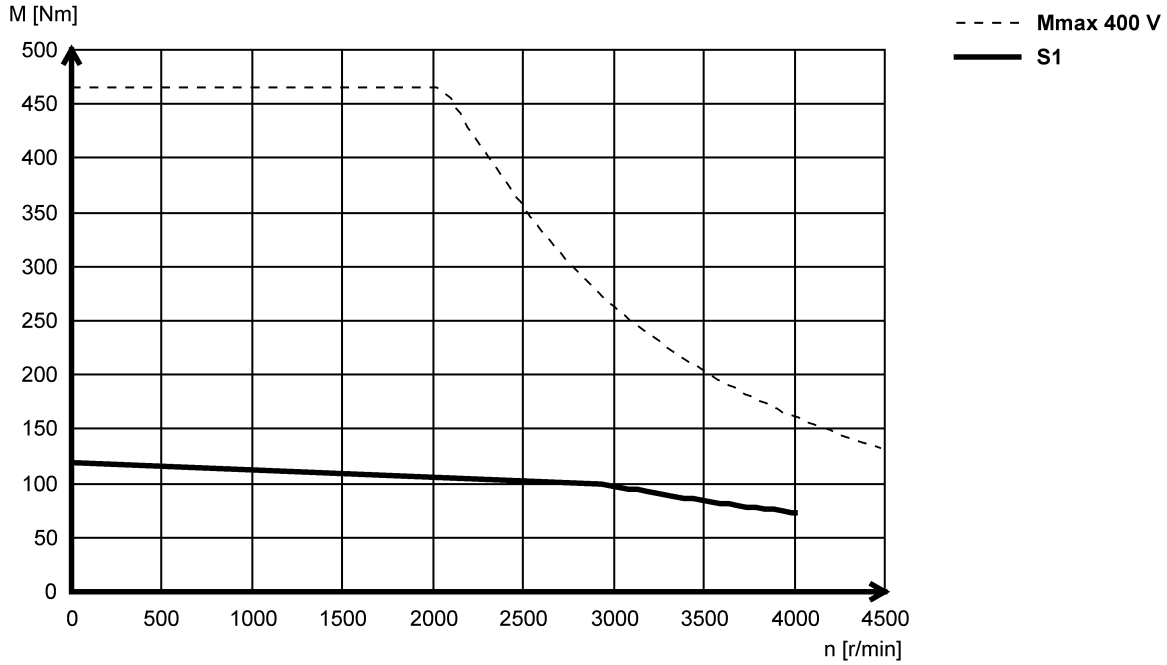
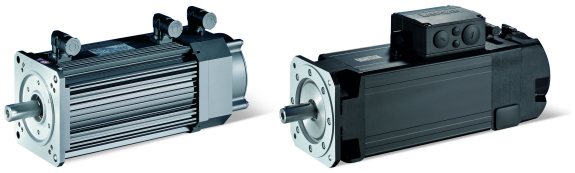
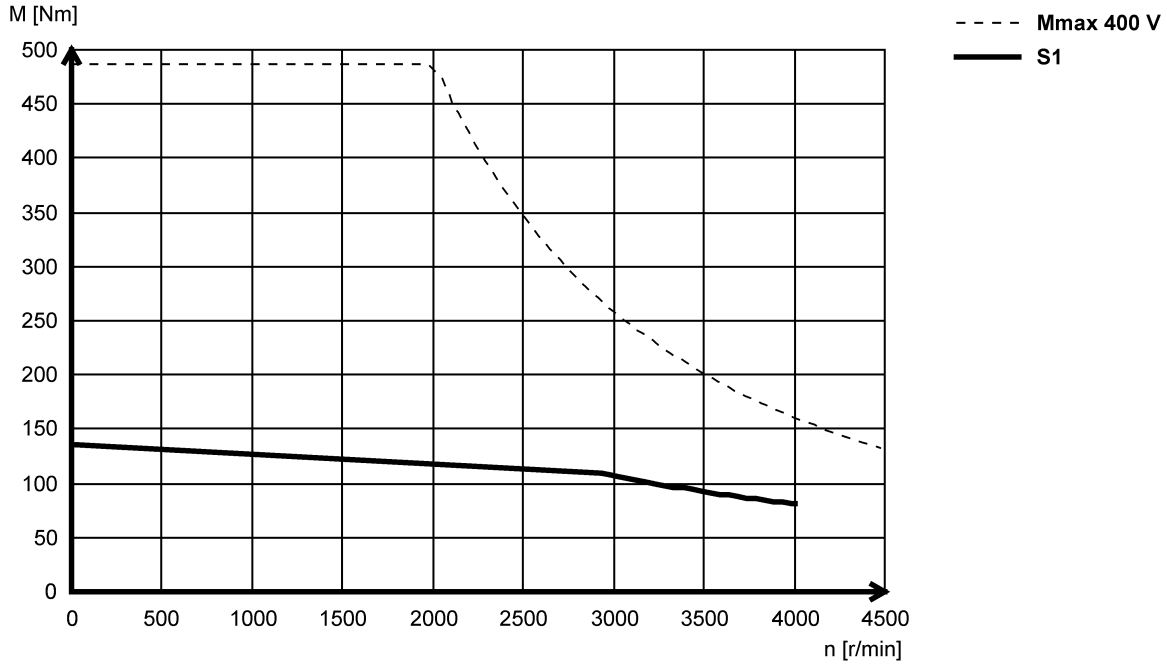
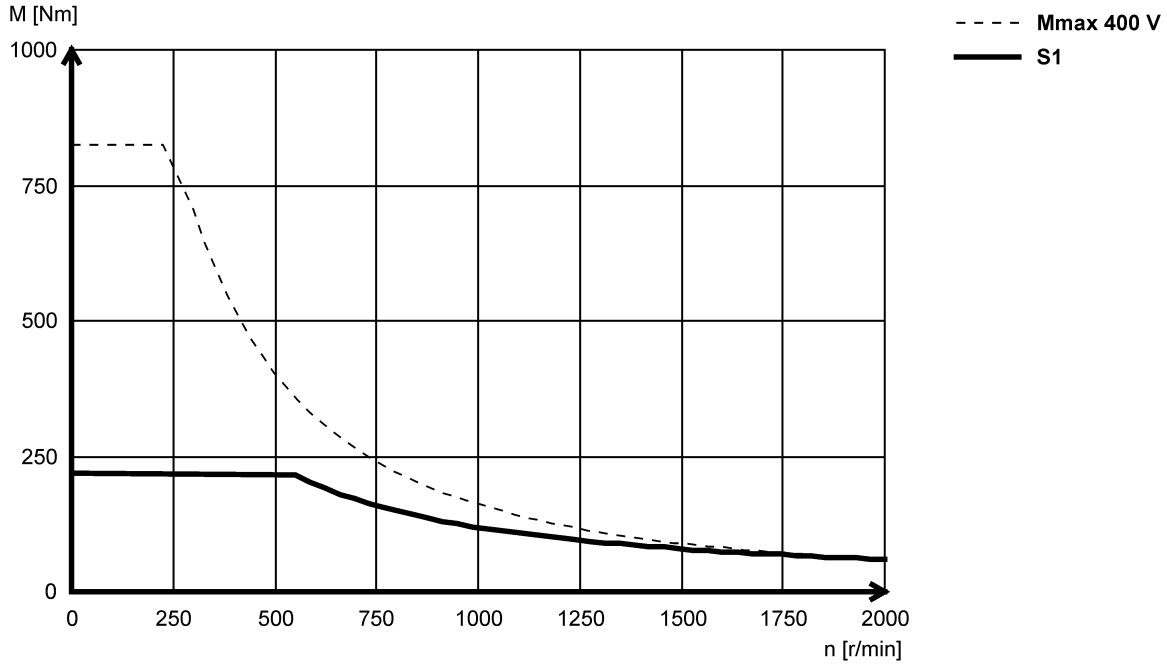


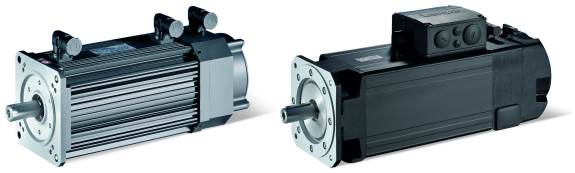


MCA22P29H (forced ventilated, IP23s)

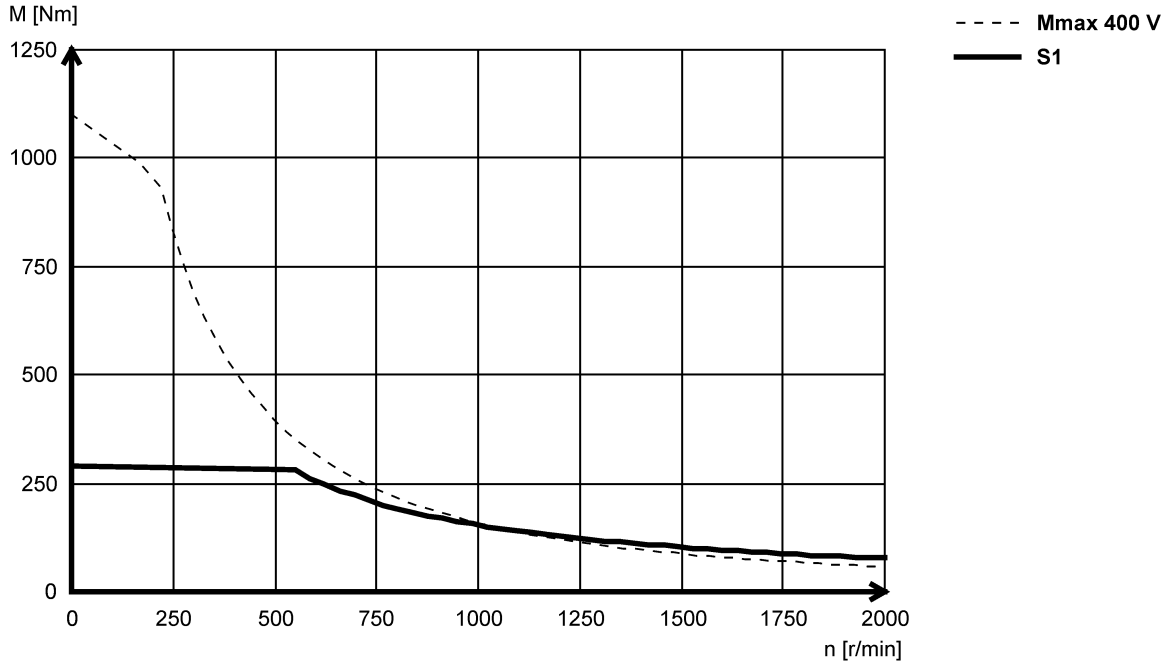


MCA26T05- (forced ventilated)

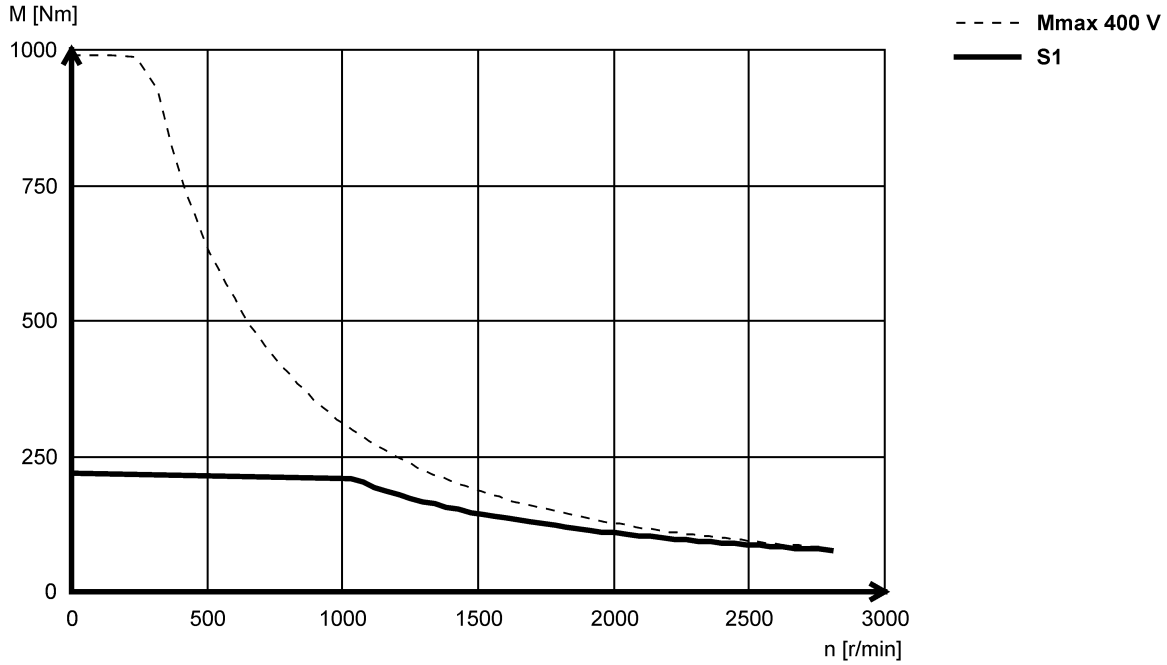


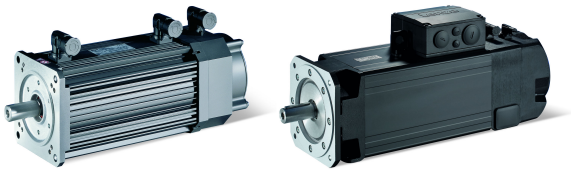


MCA26T05H (forced ventilated, IP23s)

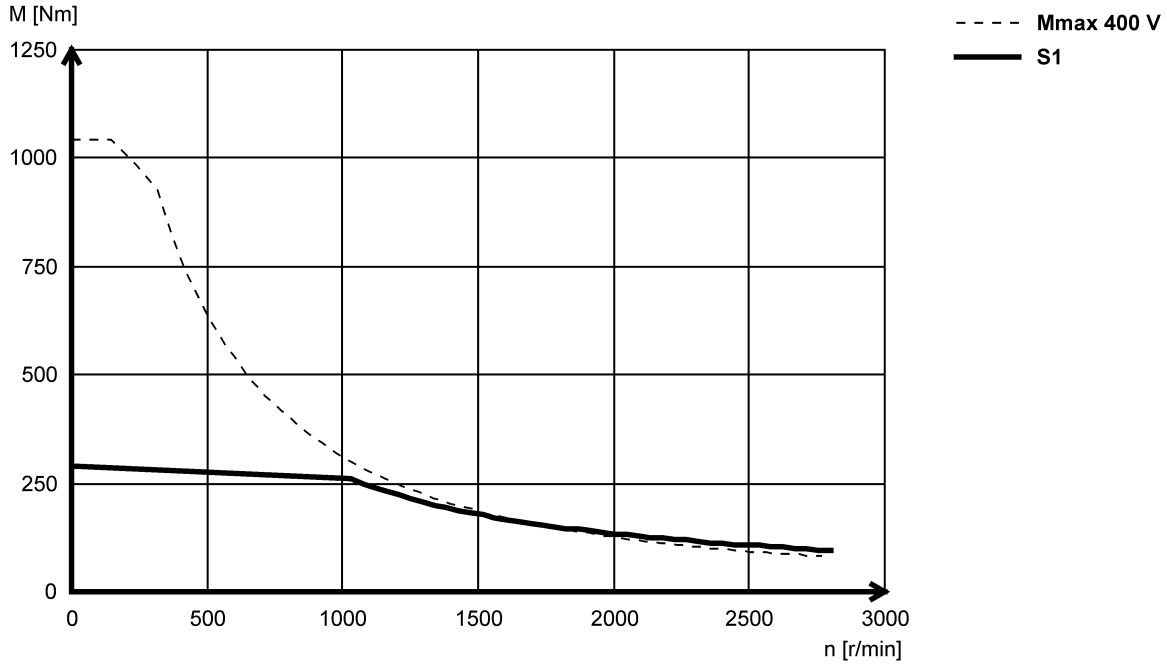


MCA26T10- (forced ventilated)

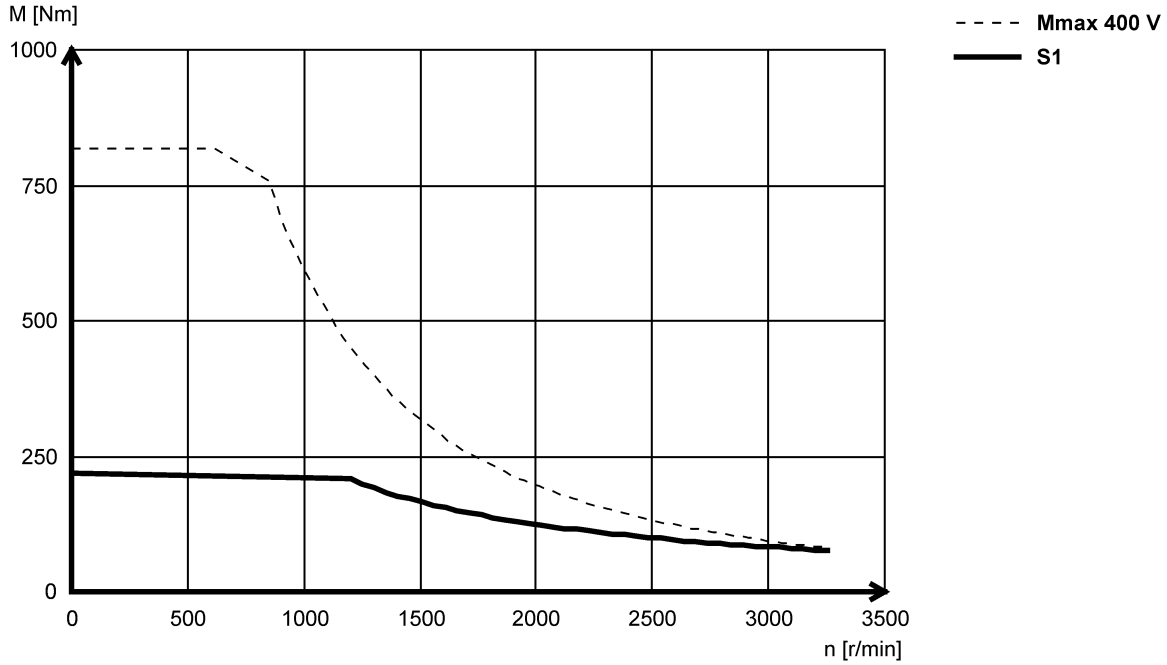


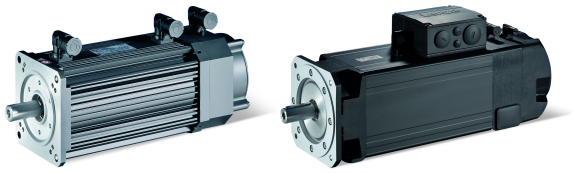


MCA26T10H (forced ventilated, IP23s)

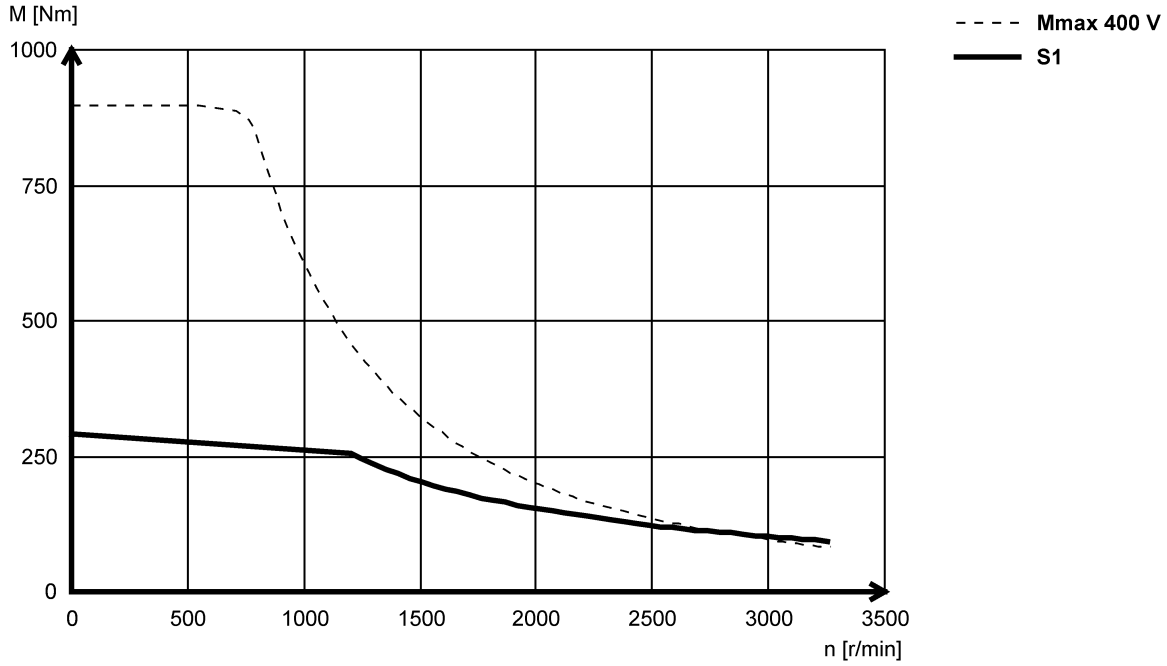


MCA26T12- (forced ventilated)

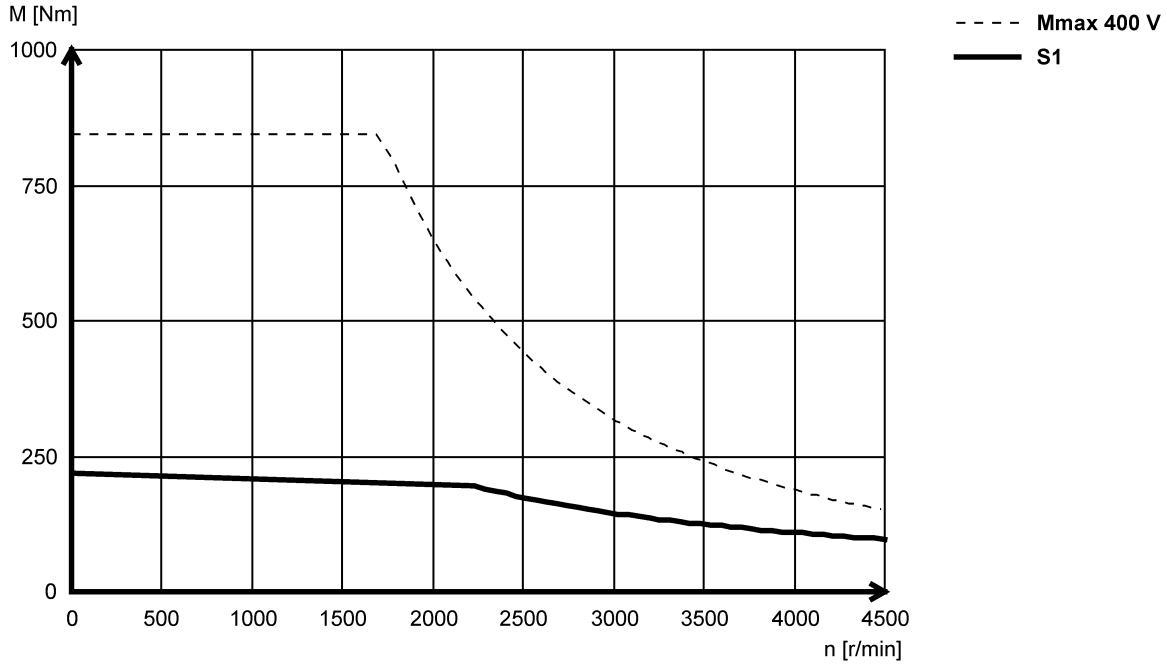


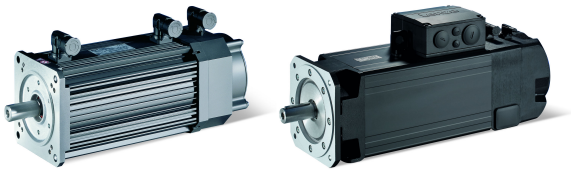


MCA26T12H (forced ventilated, IP23s)

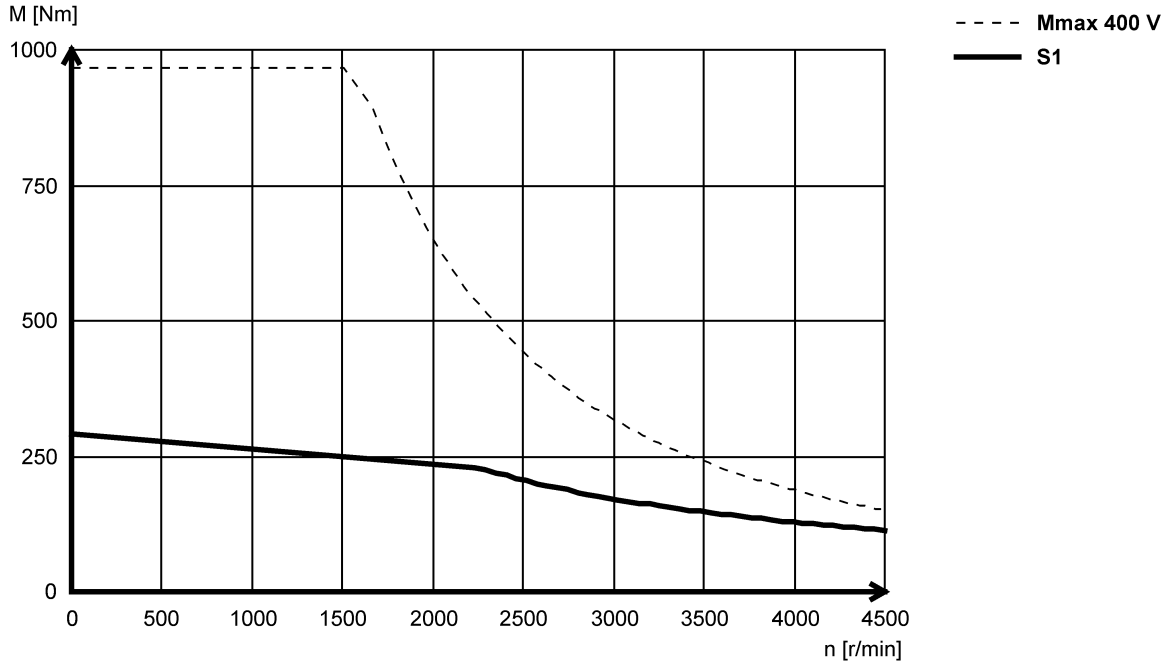


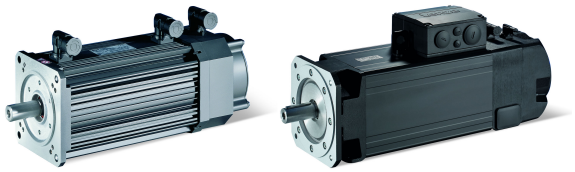
MCA26T22- (forced ventilated)





MCA26T22H (forced ventilated, IP23s)

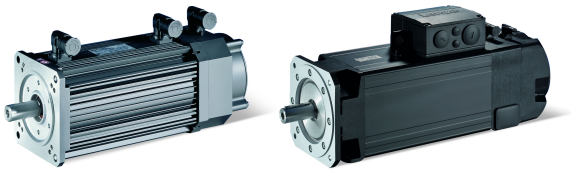




Dimensions

Notes on the basic dimensions

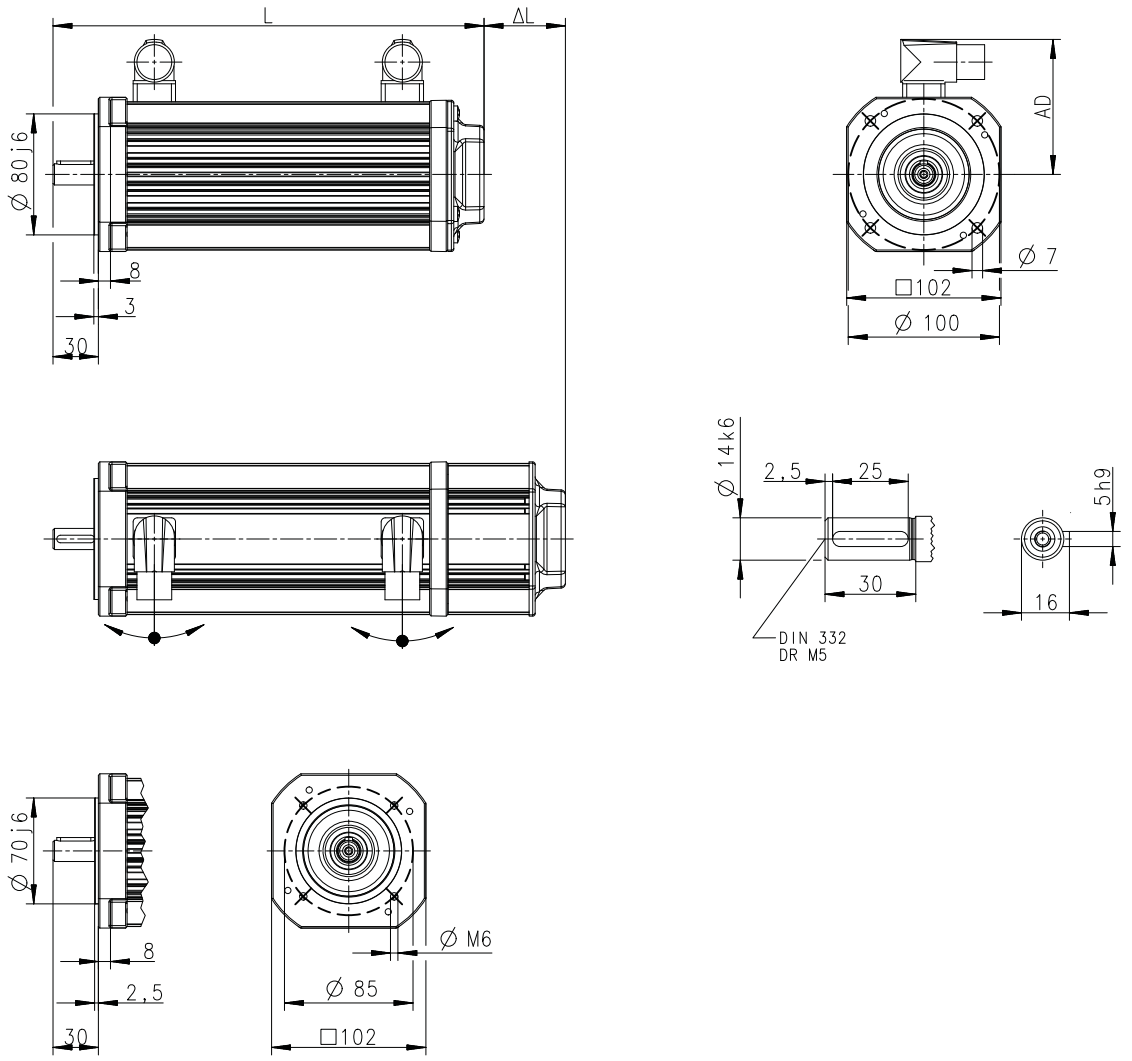
Table content		Explanation
Total length without brake	L	Total length of the drive with resolver
Total length with brake	L	Total length of the drive with resolver
Motor/connection distance	AD	Distance from center of motor to end of connector/terminal box



Basic dimensions

MCA10, self-ventilated

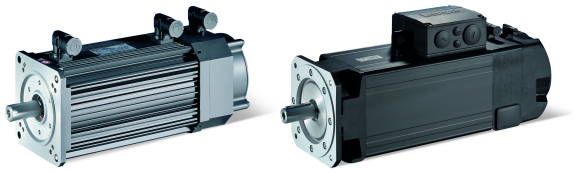
Design B5-FF100 / B14-FT85



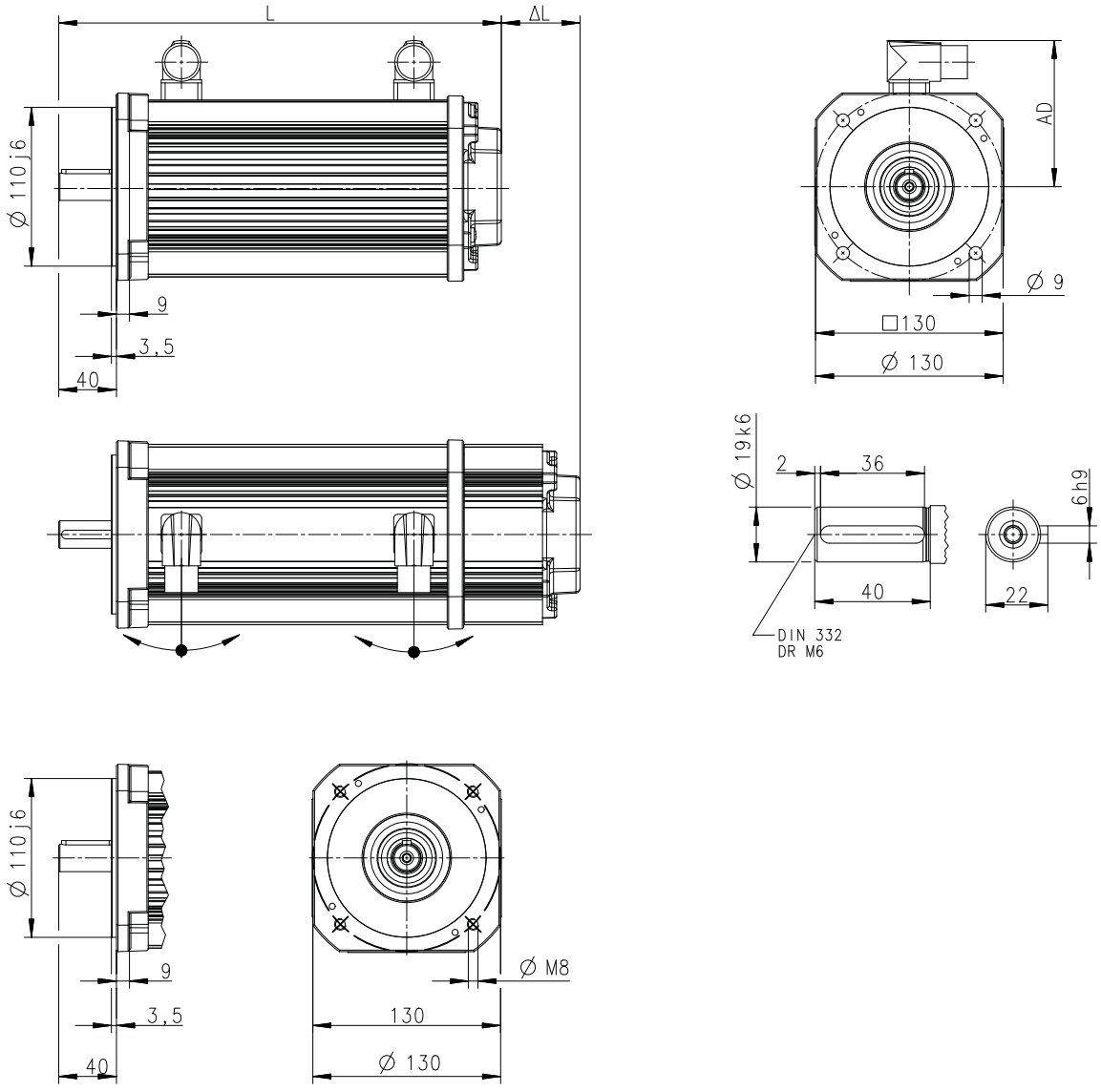
8800661-00

Motor			MCA 10I40-
Total length without brake	L	mm	292
Total length with brake	L	mm	317
Motor/connection distance	AD	mm	90

Δ L ▸ Additional lengths 🕮 90



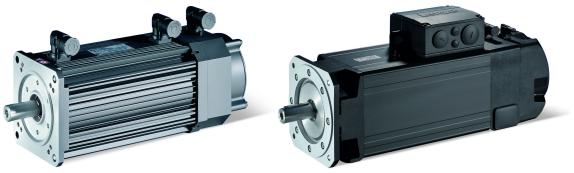
MCA13, self-ventilated
Design B5-FF130 / B14-FT130



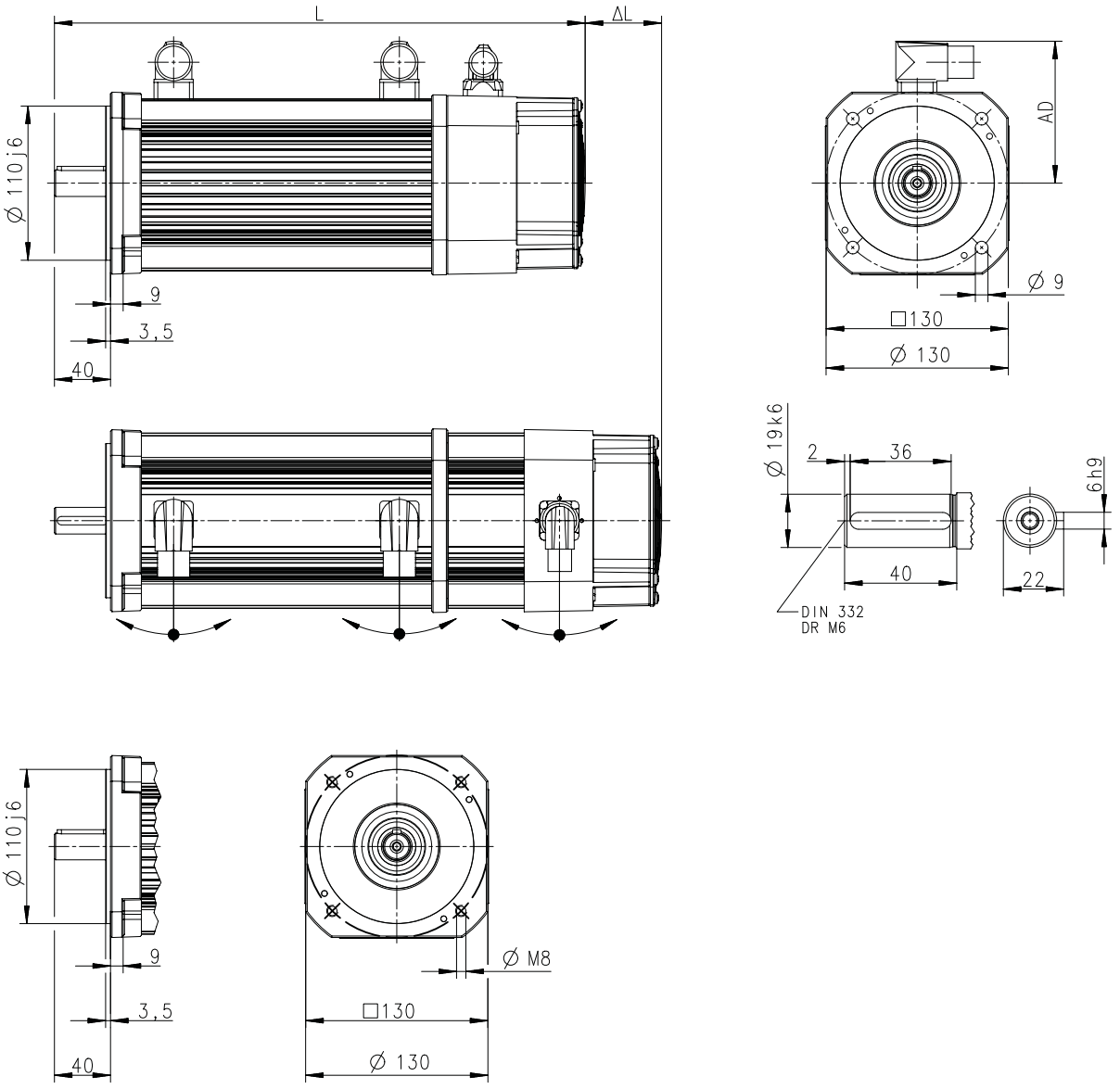
8800683-00

Motor			MCA 13I41-
Total length without brake	L	mm	311
Total length with brake	L	mm	346
Motor/connection distance	AD	mm	102

Δ L ▸ Additional lengths 🕮 90



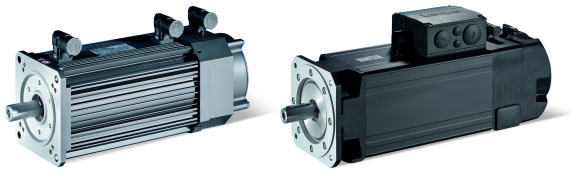
MCA13, forced ventilated
Design B5-FF130 / B14-FT130



8800662-00

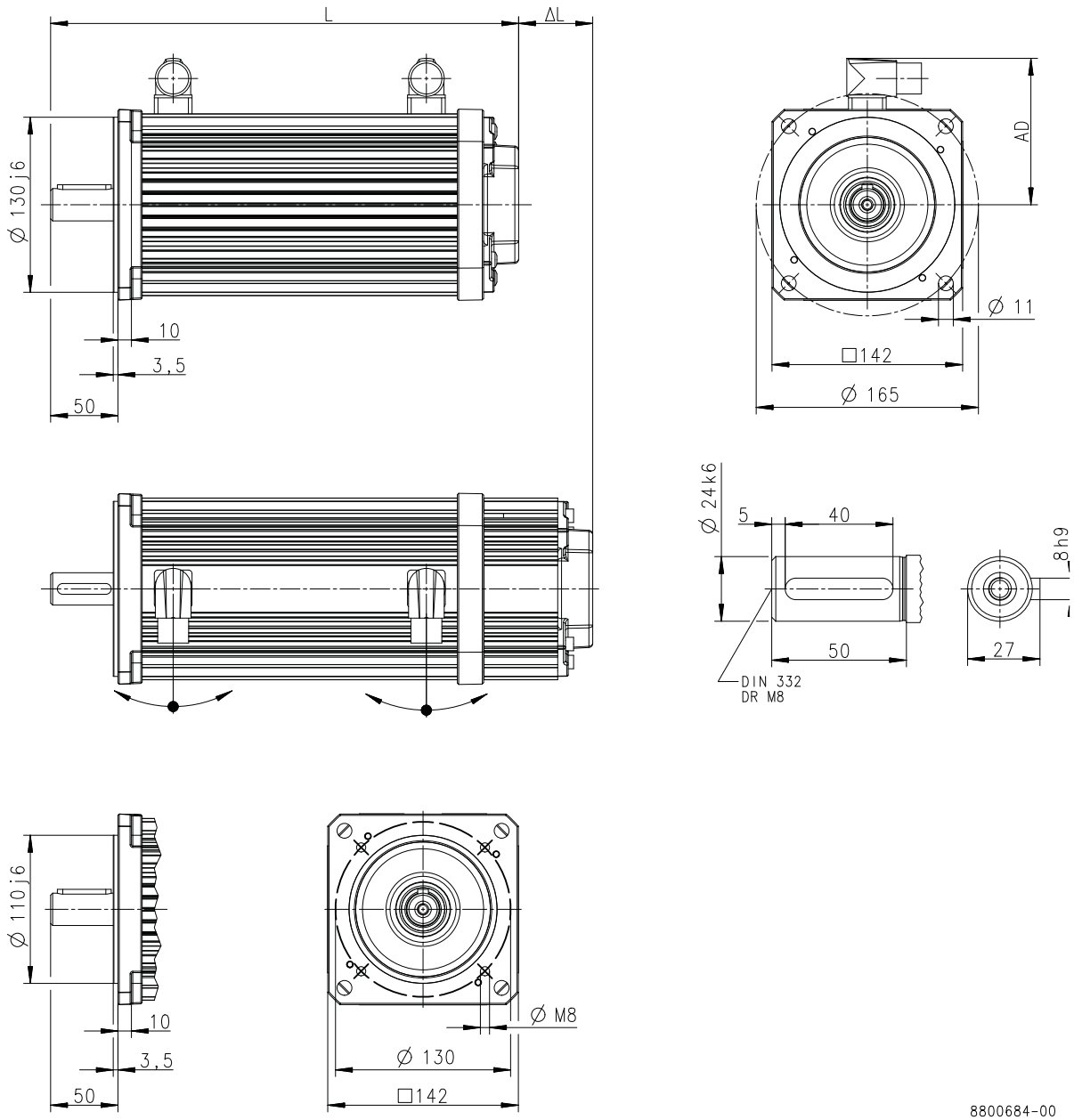
Motor			MCA 13I34-
Total length without brake	L	mm	379
Total length with brake	L	mm	414
Motor/connection distance	AD	mm	102

Δ L ▸ Additional lengths 🕮 90



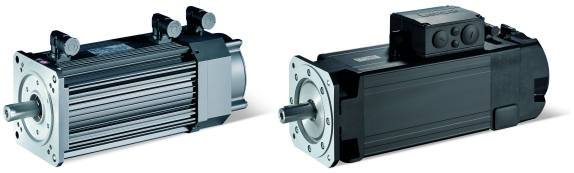
MCA14, self-ventilated

Type B5-FF165 / B14-FT130

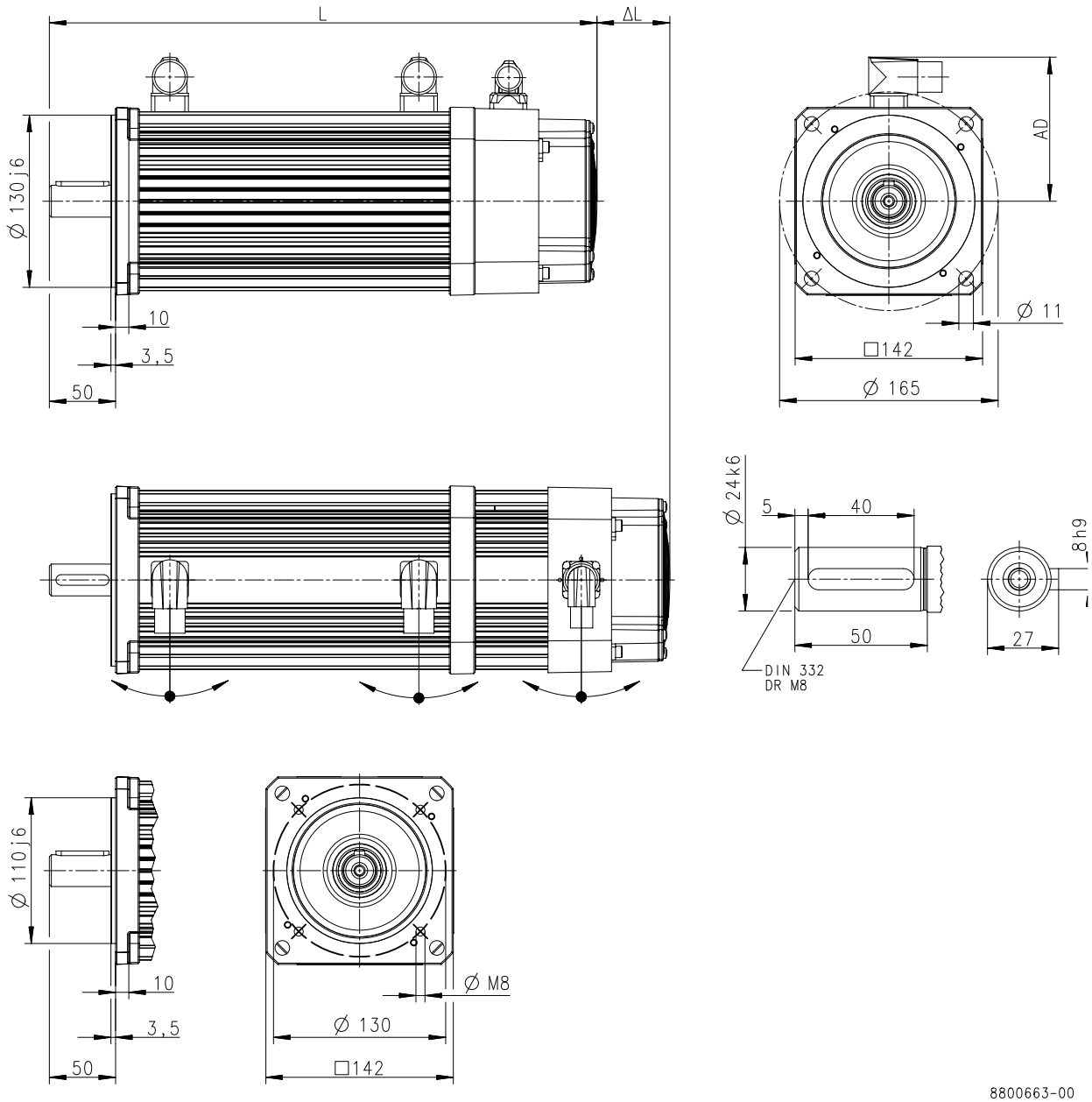


Motor			MCA 14L20-	MCA 14L41-
Total length without brake	L	mm	352	
Total length with brake	L	mm	385	
Motor/connection distance	AD	mm	109	

Δ L ▸ Additional lengths 🕮 90

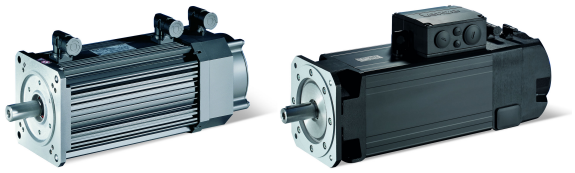


MCA14, forced ventilated
Type B5-FF165 / B14-FT130



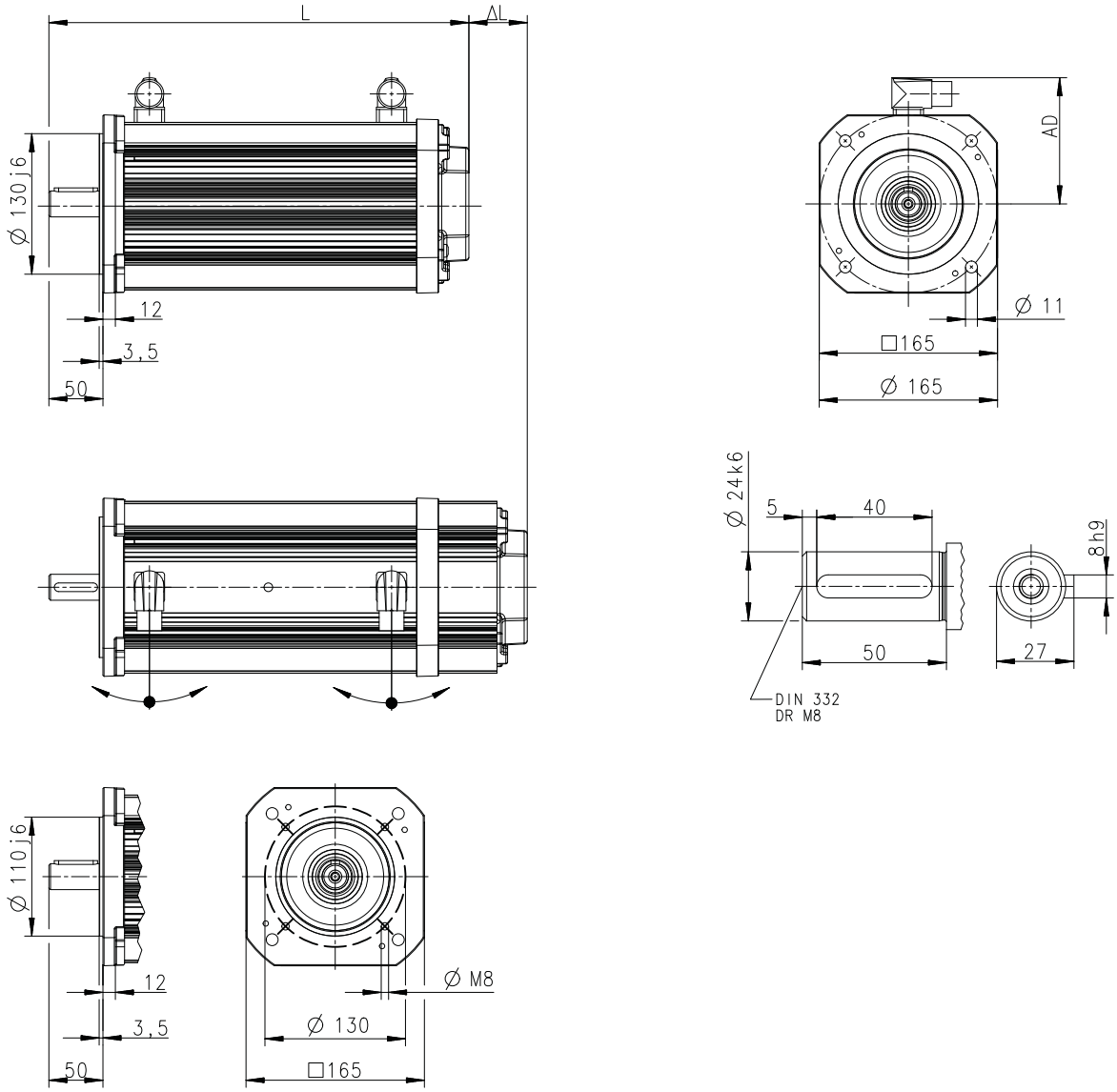
Motor			MCA 14L16-	MCA 14L35-
Total length without brake	L	mm	414	
Total length with brake	L	mm	447	
Motor/connection distance	AD	mm	109	

Δ L ▸ Additional lengths 🕮 90



MCA17, self-ventilated

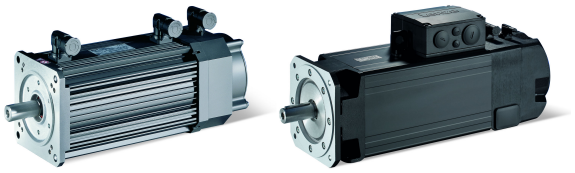
Type B5-FF165 / B14-FT130



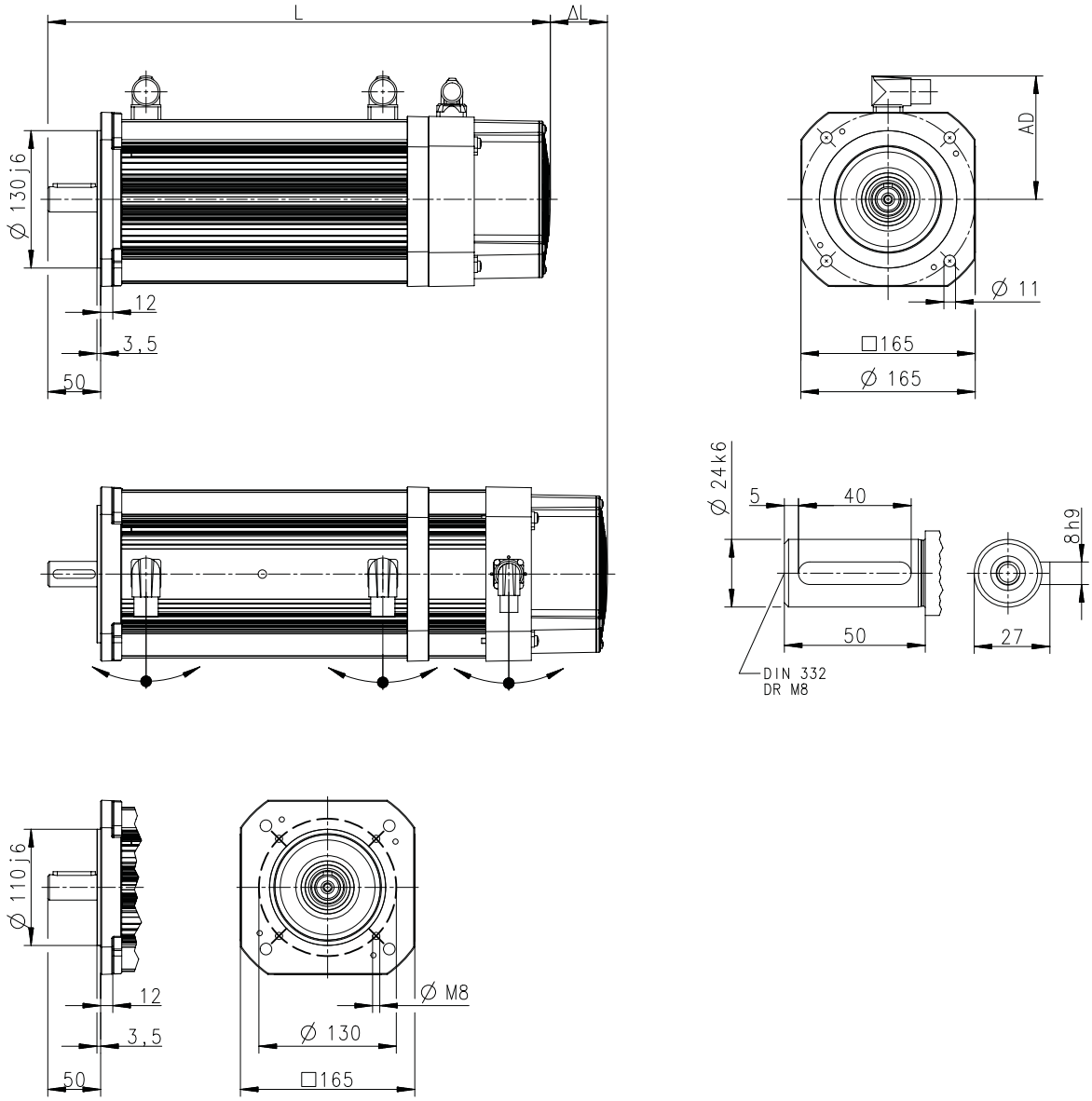
8800685-00

Motor			MCA 17N23-	MCA 17N41-
Total length without brake	L	mm	390	
Total length with brake	L	mm	425	
Motor/connection distance	AD	mm	118	

Δ L ▸ Additional lengths 🕮 90



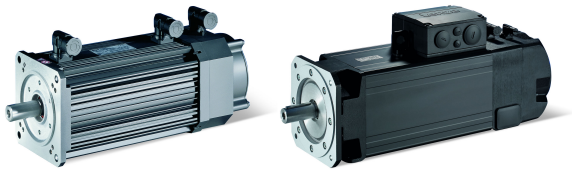
MCA17, forced ventilated
Type B5-FF165 / B14-FT130



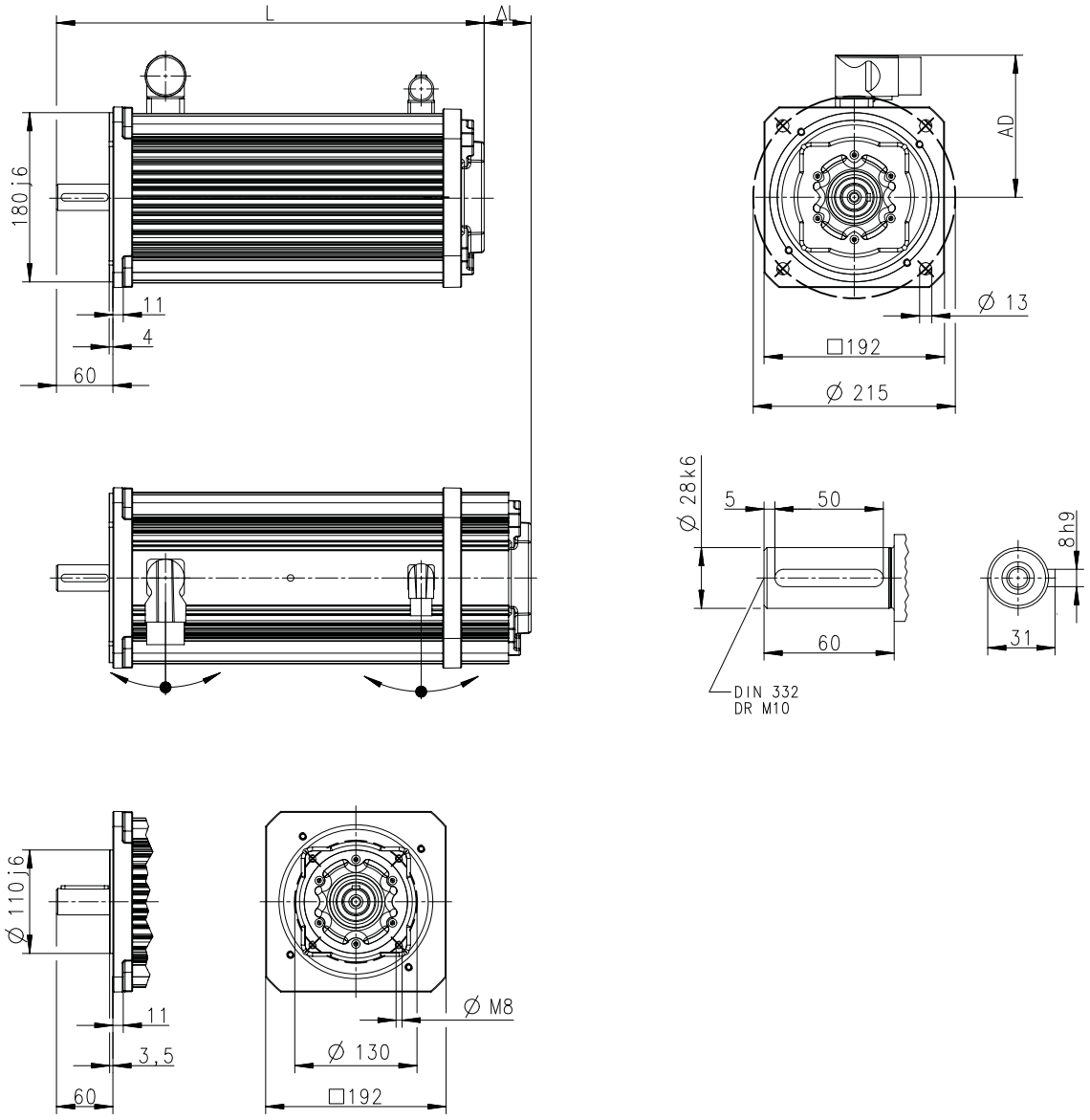
8800664-00

Motor			MCA 17N17-	MCA 17N35-
Total length without brake	L	mm	476	
Total length with brake	L	mm	511	
Motor/connection distance	AD	mm	118	

Δ L ▸ Additional lengths 🕮 90



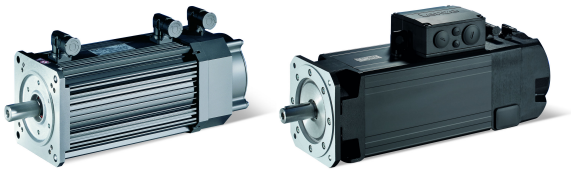
MCA19, self-ventilated
Design B5-FF215 / B14-FT130



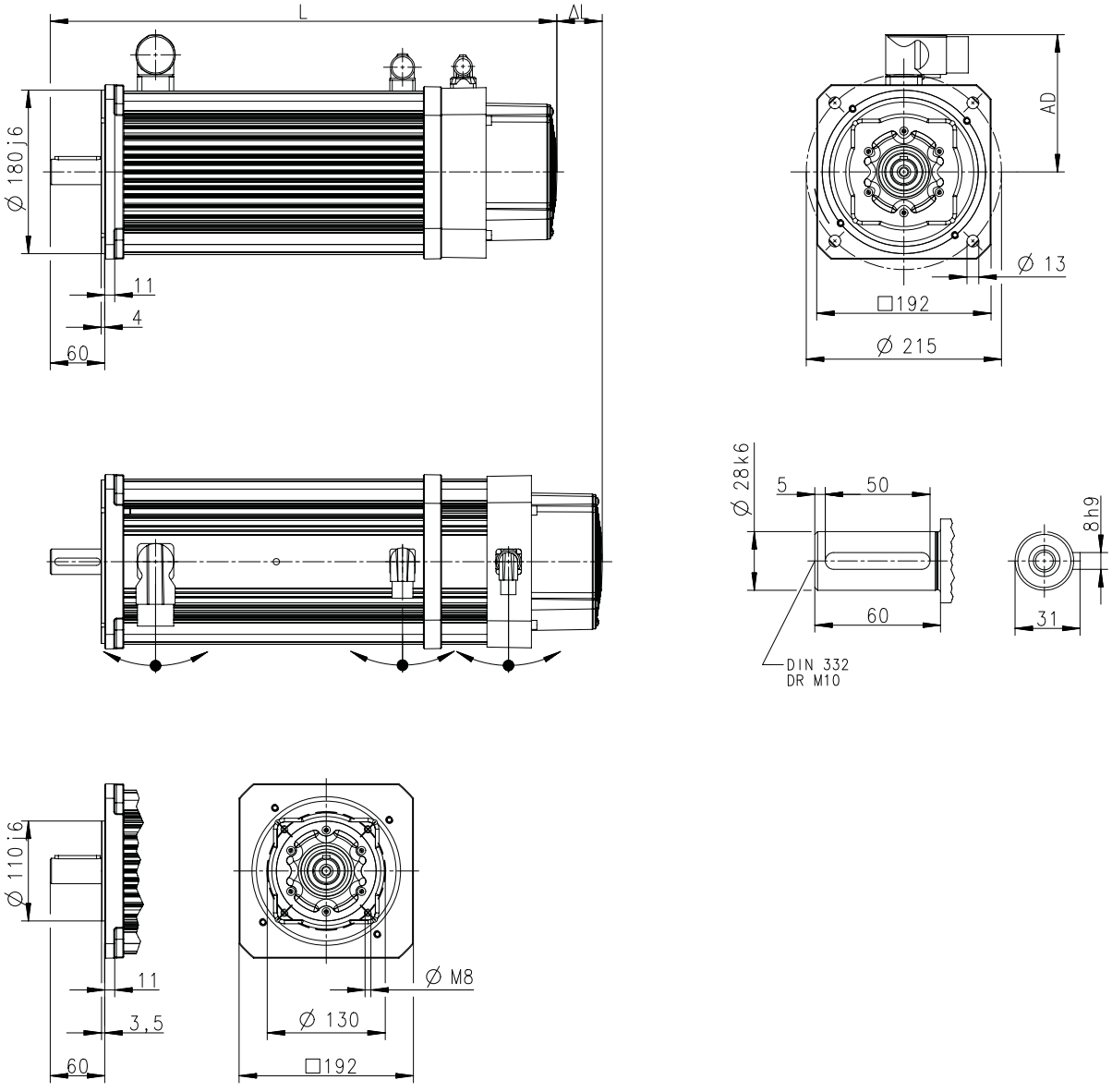
8800686-00

Motor			MCA 19S23-	MCA 19S42-
Total length without brake	L	mm	461	
Total length with brake	L	mm	499	
Motor/connection distance	AD	mm	151	

Δ L ▸ Additional lengths 🕮 90



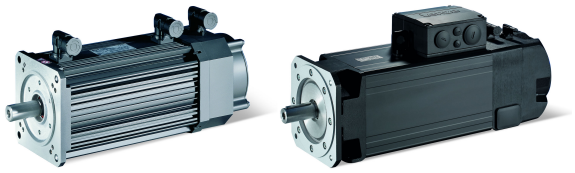
MCA19, forced ventilated
Design B5-FF215 / B14-FT130



8800665-00

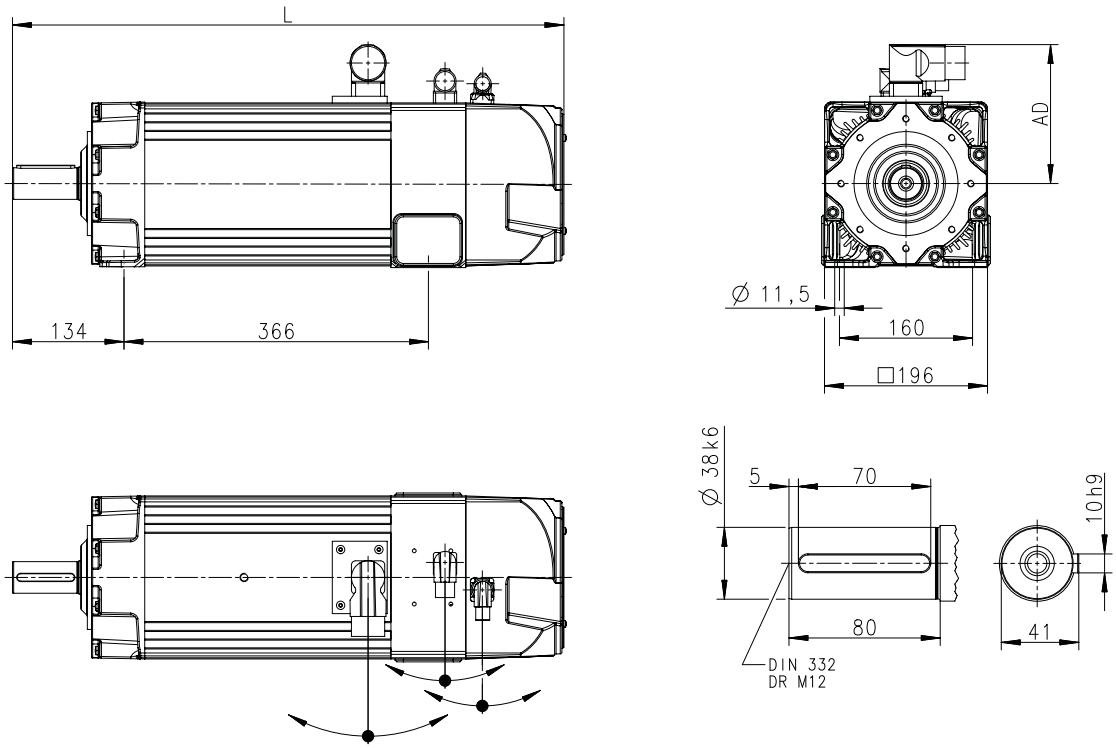
Motor			MCA 19S17-	MCA 19S35-
Total length without brake	L	mm	558	
Total length with brake	L	mm	596	
Motor/connection distance	AD	mm	151	

Δ L ▸ Additional lengths 🕮 90



MCA20, forced ventilated

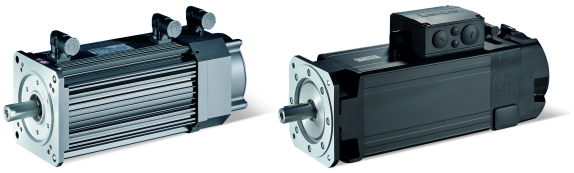
Design B3



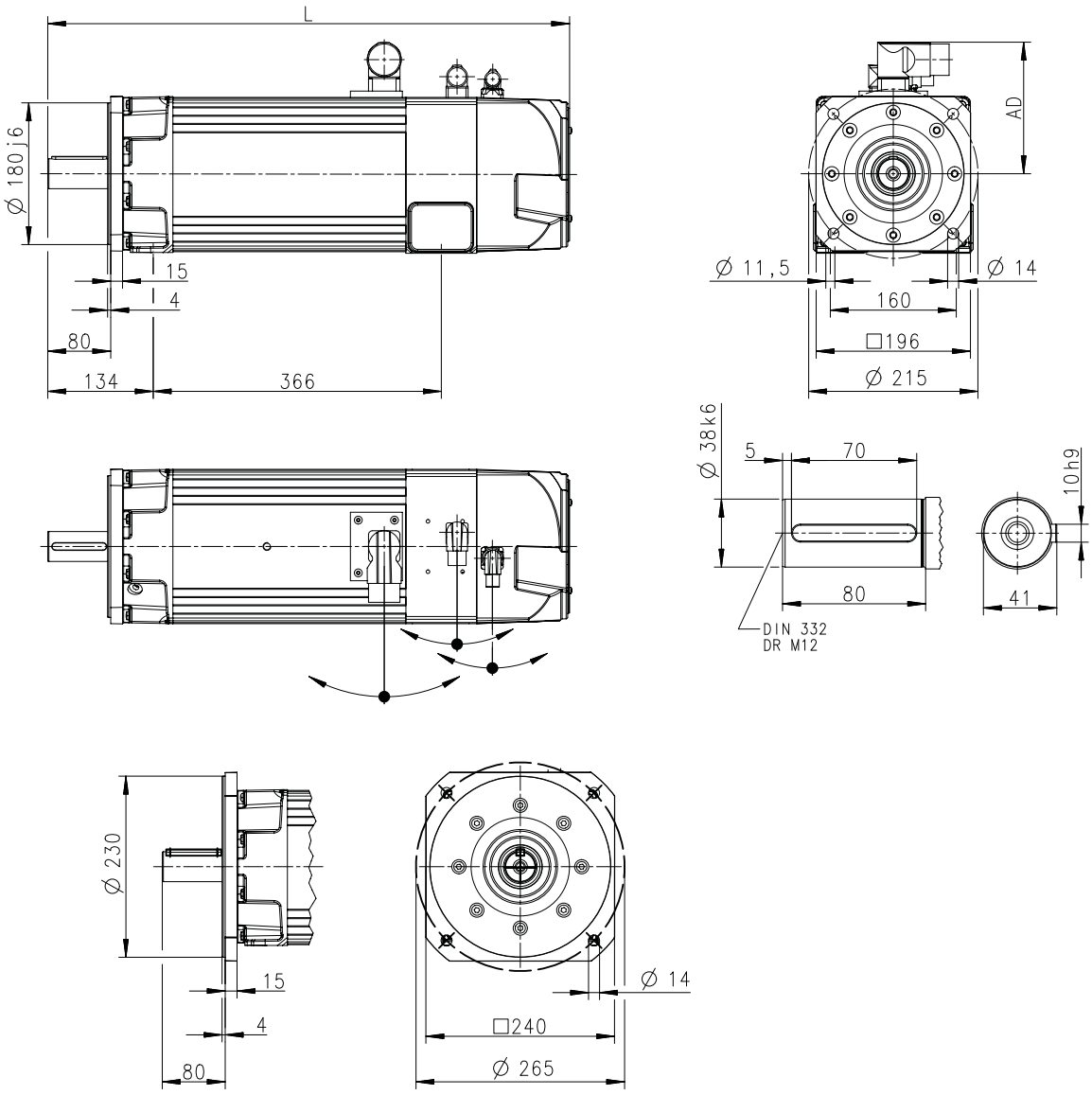
8800687-00

Motor			MCA 20X14H	MCA 20X29H
Total length without brake	L	mm	666	
Motor/connection distance	AD	mm	171	

Δ L ▸ Additional lengths 🕮 90

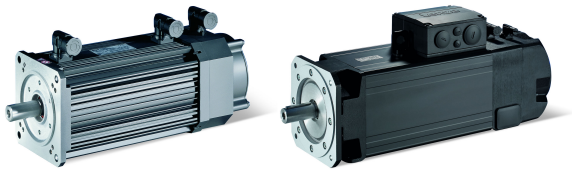


MCA20, forced ventilated
Design B35-FF215/265



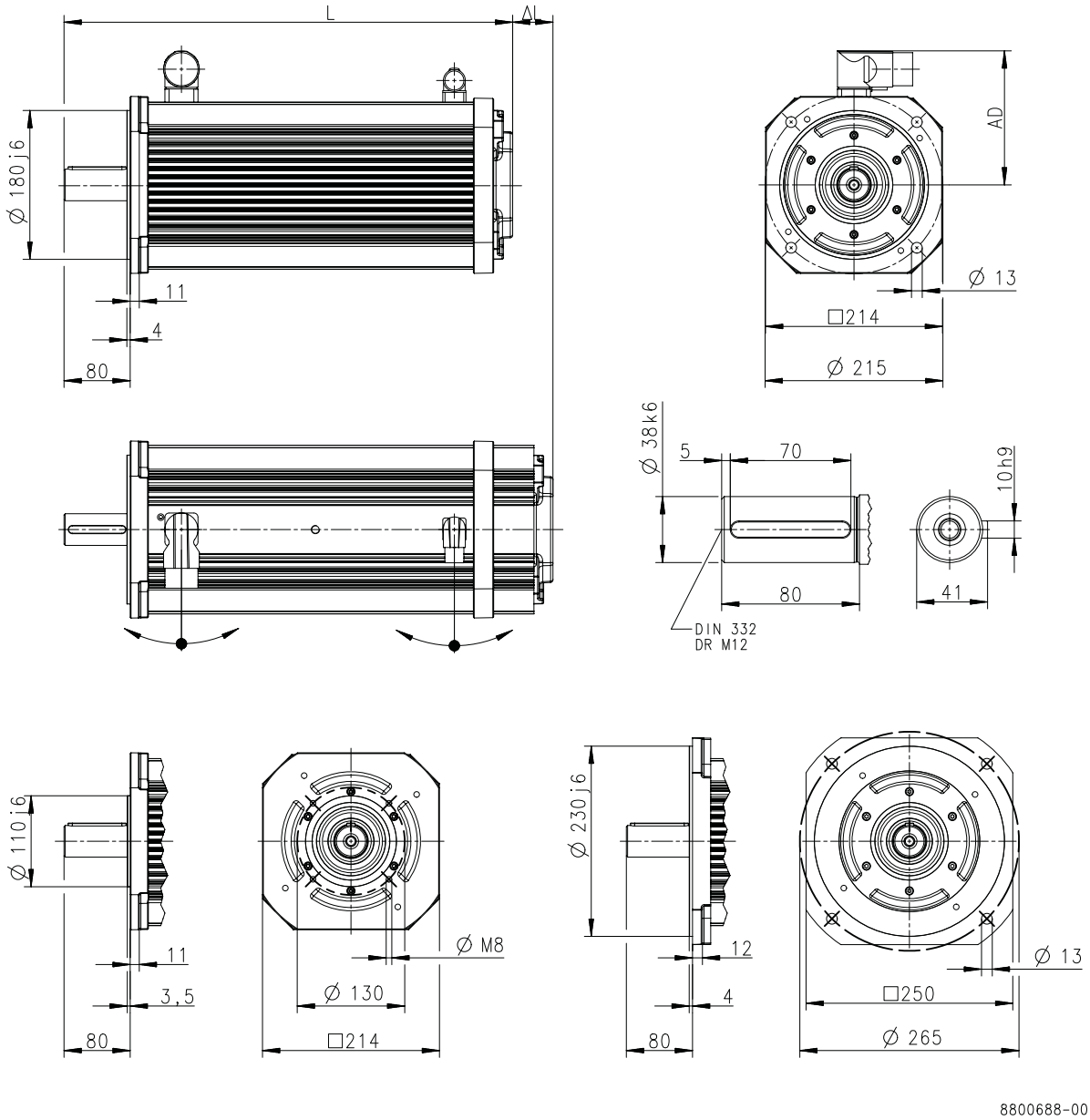
Motor			MCA 20X14H	MCA 20X29H
Total length without brake	L	mm	666	
Motor/connection distance	AD	mm	171	

Δ L ▸ Additional lengths 🕮 90



MCA21, self-ventilated

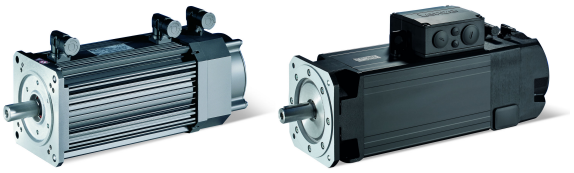
Design B5-FF215/265 / B14-FT130



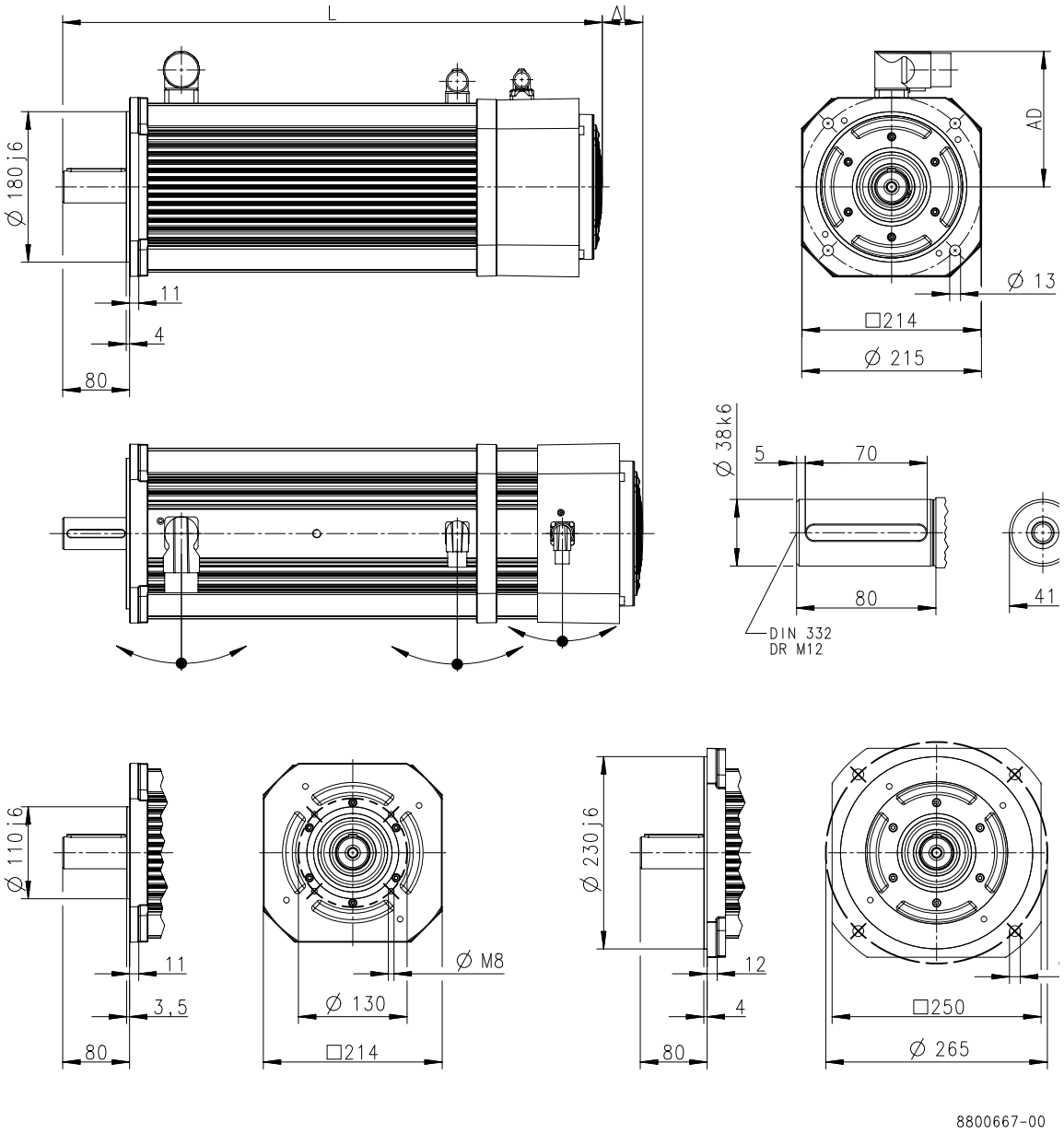
8800688-00

Motor			MCA 21X25-	MCA 21X42-
Total length without brake	L	mm	550	
Total length with brake	L	mm	592	
Motor/connection distance	AD	mm	162	

Δ L ▸ Additional lengths 🕮 90

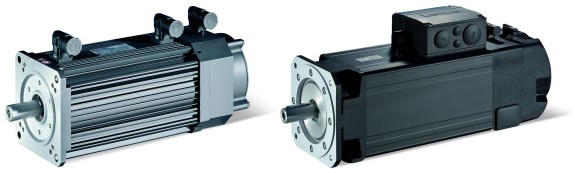


MCA21, forced ventilated
Design B5-FF215/265 / B14-FT130



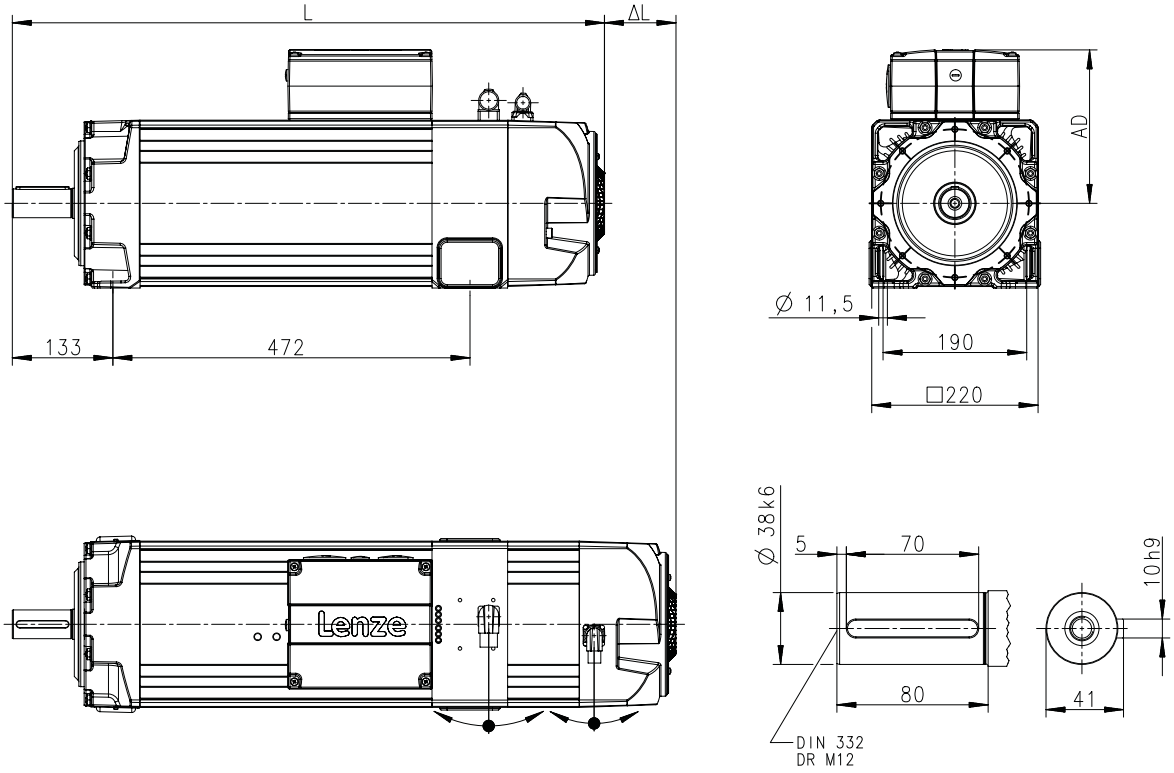
Motor			MCA 21X17-	MCA 21X35-
Total length without brake	L	mm	646	
Total length with brake	L	mm	688	
Motor/connection distance	AD	mm	162	

Δ L ▸ Additional lengths 🕮 90



MCA22, forced ventilated

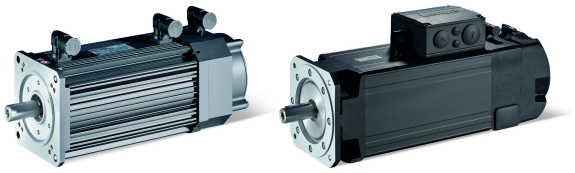
Design B3



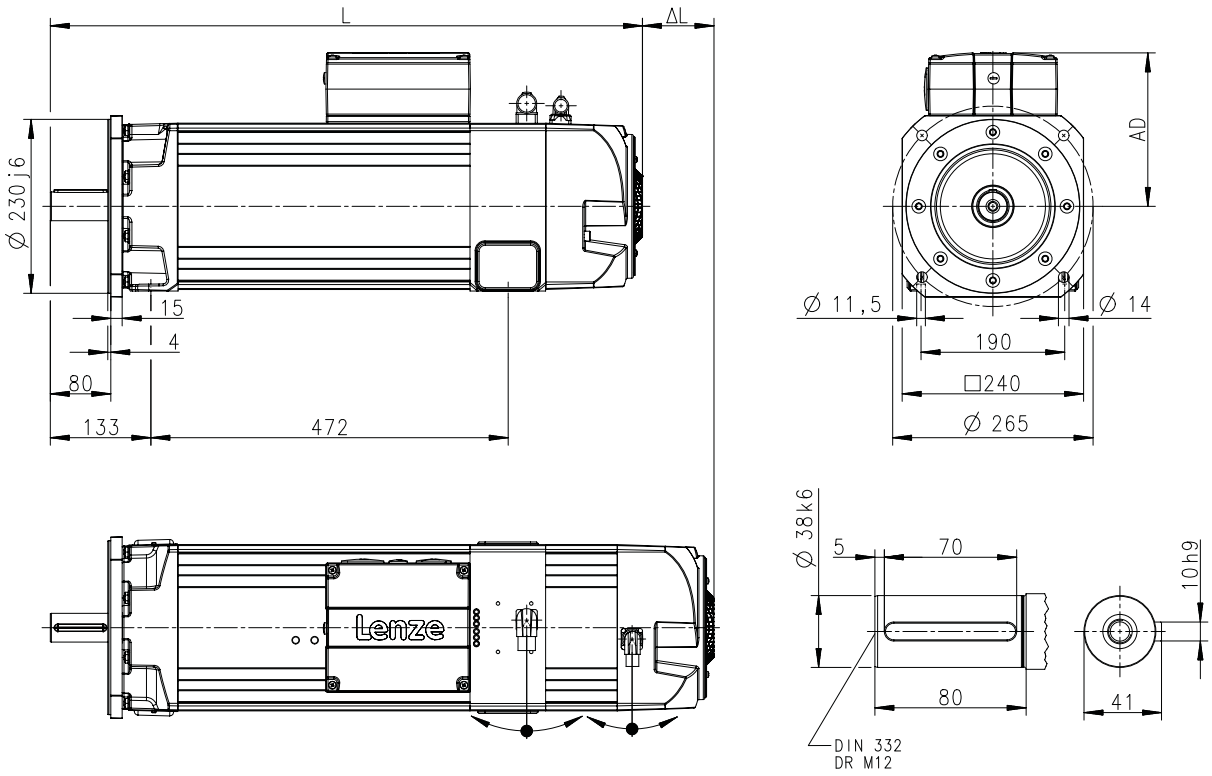
8800708-00

Motor			MCA 22P08- MCA 22P08H	MCA 22P14- MCA 22P14H	MCA 22P17- MCA 22P17H	MCA 22P29- MCA 22P29H
Total length without brake	L	mm	783			
Motor/connection distance	AD	mm	203			

Δ L ▸ Additional lengths 🕮 90



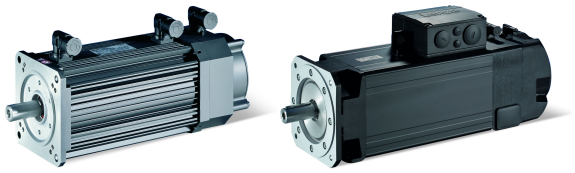
MCA22, forced ventilated
Design B35-FF215/265



8800668-00

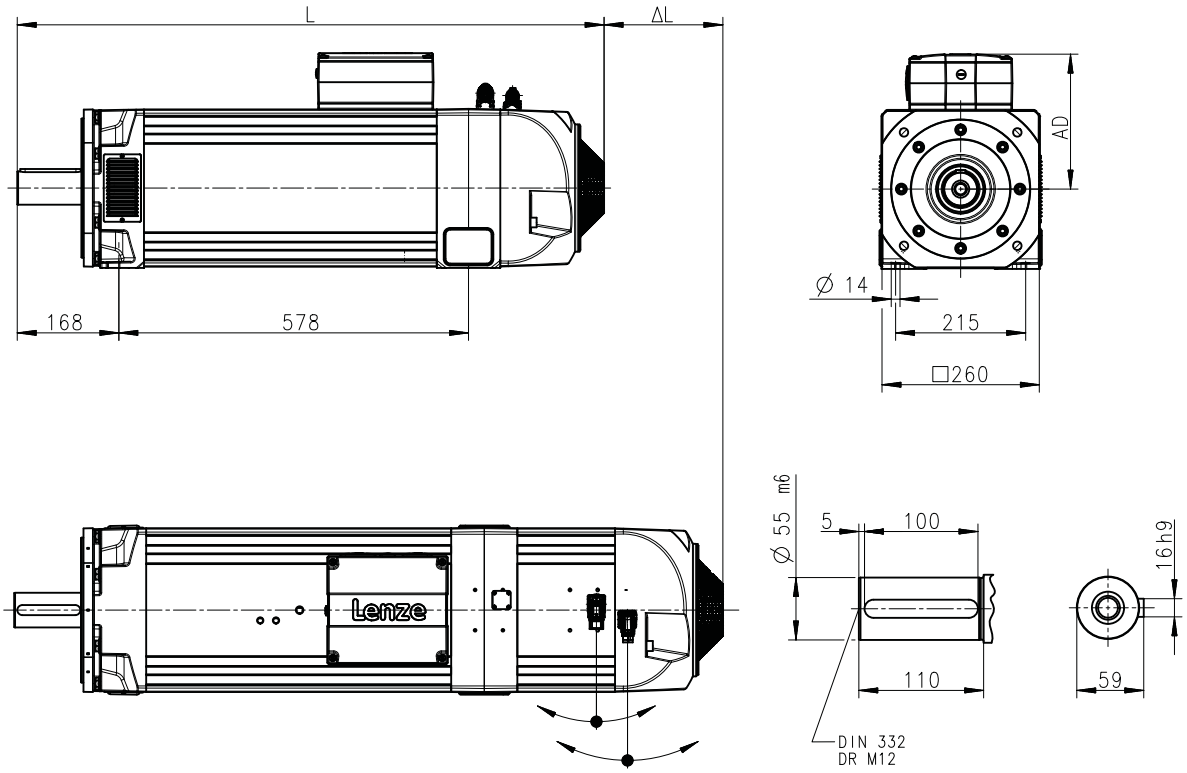
Motor			MCA 22P08- MCA 22P08H	MCA 22P14- MCA 22P14H	MCA 22P17- MCA 22P17H	MCA 22P29- MCA 22P29H
Total length without brake	L	mm	783			
Motor/connection distance	AD	mm	203			

Δ L ▸ Additional lengths 🕮 90



MCA26, forced ventilated

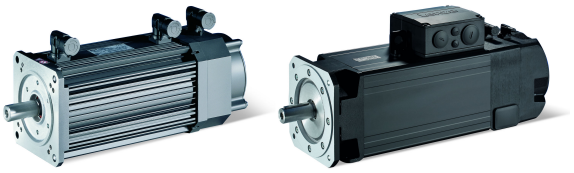
Design B3



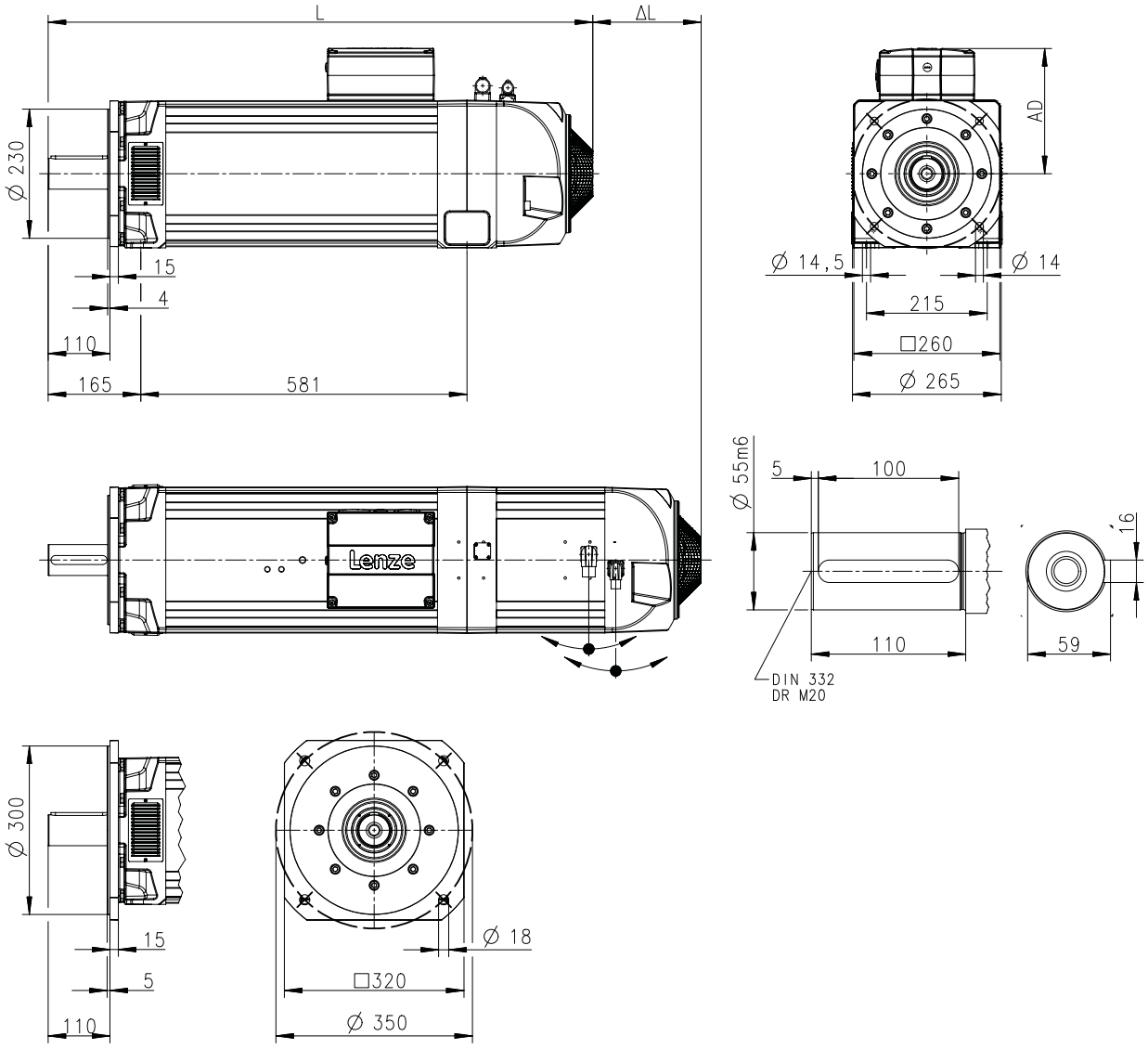
8800710-02

Motor			MCA 26T05- MCA 26T05H	MCA 26T10- MCA 26T10H	MCA 26T12- MCA 26T12H	MCA 26T22- MCA 26T22H
Total length without brake	L	mm	970			
Motor/connection distance	AD	mm	256			

Δ L ▸ Additional lengths 🕮 90



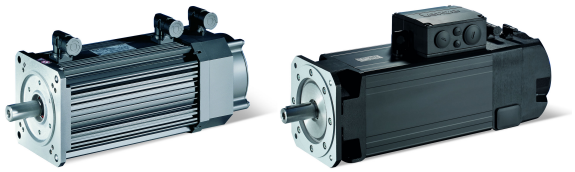
MCA26, forced ventilated
Design B35-FF265/350



8800709-00

Motor			MCA 26T05- MCA 26T05H	MCA 26T10- MCA 26T10H	MCA 26T12- MCA 26T12H	MCA 26T22- MCA 26T22H
Total length without brake	L	mm	970			
Motor/connection distance	AD	mm	256			

Δ L ▸ Additional lengths 📖 90



Additional lengths

The motor code indicates the short designation of the brake and feedback.
Detailed information can be found for

- Product codes 📖 114
- Brakes 📖 102
- Feedback 📖 108

MCA10

Motor			MCA10I40-
Cooling type			Natural
R☐0	Δ L	mm	0
SR☐ / T☐☐ / E☐☐	Δ L	mm	54

MCA13

Motor			MCA13I34-	MCA13I41-
Cooling type			Forced	Natural
R☐0	Δ L	mm	0	0
SR☐ / T☐☐ / E☐☐	Δ L	mm	54	54

MCA14

Motor			MCA14L16-	MCA14L20-	MCA14L35-	MCA14L41-
Cooling type			Forced	Natural	Forced	Natural
R☐0	Δ L	mm	0	0	0	0
SR☐ / T☐☐ / E☐☐	Δ L	mm	55	55	55	55

MCA17

Motor			MCA17N17-	MCA17N23-	MCA17N35-	MCA17N41-
Cooling type			Forced	Natural	Forced	Natural
R☐0	Δ L	mm	0	0	0	0
SR☐ / T☐☐ / E☐☐	Δ L	mm	54	54	54	54

MCA19

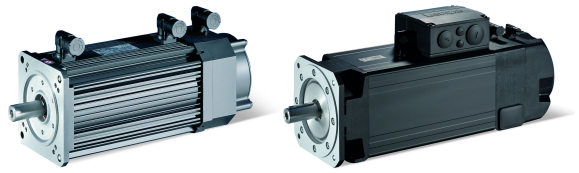
Motor			MCA19S17-	MCA19S23-	MCA19S35-	MCA19S42-
Cooling type			Forced	Natural	Forced	Natural
R☐0	Δ L	mm	0	0	0	0
SR☐ / T☐☐ / E☐☐	Δ L	mm	50	50	50	50

MCA20

Motor			MCA20X14H		MCA20X29H	
Cooling type			Forced		Forced	
Fan filter			Without	With	Without	With
Feedback (without brake B0)						
R☐0	Δ L	mm	0	88	0	88
S☐☐ / T☐☐ / E☐☐	Δ L	mm	0	88	0	88
Brake (F1/FG) and feedback						
R☐0	Δ L	mm	87	176	87	176
S☐☐ / T☐☐ / E☐☐	Δ L	mm	131	219	131	219
Brake (F2/FH) and feedback						
R☐0	Δ L	mm	156	244	156	244
S☐☐ / T☐☐ / E☐☐	Δ L	mm	156	244	156	244

MCA21

Motor			MCA21X17-	MCA21X25-	MCA21X35-	MCA21X42-
Cooling type			Forced	Natural	Forced	Natural
R☐0	Δ L	mm	0	0	0	0
SR☐ / T20 / E☐☐	Δ L	mm	49	49	49	49



MCA22

Motor			MCA22P08-		MCA22P14-		MCA22P17-		MCA22P29-	
			MCA22P08H		MCA22P14H		MCA22P17H		MCA22P29H	
Cooling type			Forced		Forced		Forced		Forced	
Fan filter			Without	With	Without	With	Without	With	Without	With
Feedback (without brake B0)										
R☐0	Δ L	mm	0	82	0	82	0	82	0	82
S☐☐ / T☐☐ / E☐☐	Δ L	mm	0	82	0	82	0	82	0	82
Brake (F1/FG) and feedback										
R☐0	Δ L	mm	95	176	95	176	95	176	95	176
S☐☐ / T☐☐ / E☐☐	Δ L	mm	133	215	133	215	133	215	133	215
Brake (F2/FH) and feedback										
R☐0	Δ L	mm	165	247	165	247	165	247	165	247
S☐☐ / T☐☐ / E☐☐	Δ L	mm	165	247	165	247	165	247	165	247

MCA26

Motor			MCA26T05-		MCA26T10-		MCA26T12-		MCA26T22-	
			MCA26T05H		MCA26T10H		MCA26T12H		MCA26T22H	
Cooling type			Forced		Forced		Forced		Forced	
Fan filter			Without	With	Without	With	Without	With	Without	With
Feedback (without brake B0)										
R☐0	Δ L	mm	0	52	0	52	0	52	0	52
S☐☐ / T☐☐ / E☐☐	Δ L	mm	0	52	0	52	0	52	0	52
Brake (F1/FG) and feedback										
R☐0	Δ L	mm	155	207	155	207	155	207	155	207
S☐☐ / T☐☐ / E☐☐	Δ L	mm	193	245	193	245	193	245	193	245
Brake (F2/FH) and feedback										
R☐0	Δ L	mm	193	245	193	245	193	245	193	245
S☐☐ / T☐☐ / E☐☐	Δ L	mm	193	245	193	245	193	245	193	245

Weights

Basic weights

The basic weights are listed in the rated data.

▸ Rated data 29

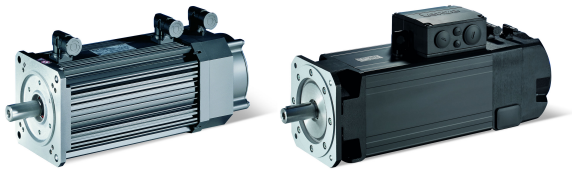
Observe ▸ Additional weights 91!

Additional weights

Motors

Motor			MCA10	MCA13	MCA14	MCA17	MCA19	MCA21
Permanent magnet holding brake	m	kg	0.9	0.8	1.5	1.5	2.7	5.0

Motor			MCA20		MCA22		MCA26	
Spring-applied holding brake								
Rated voltage	V_{rated}	V	24	230	24	230	24	230
Standard braking torque	m	kg	13.0	13.0	20.5	20.5	26.0	30.7
Increased braking torque	m	kg	15.4	15.4	26.0	26.0	-	-



Product extensions

Motor connection

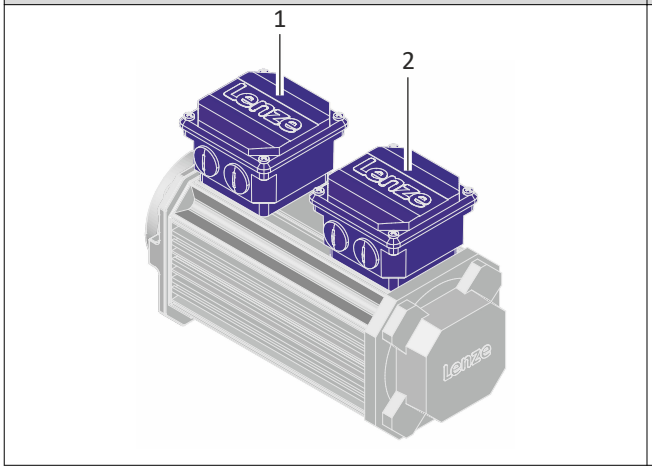
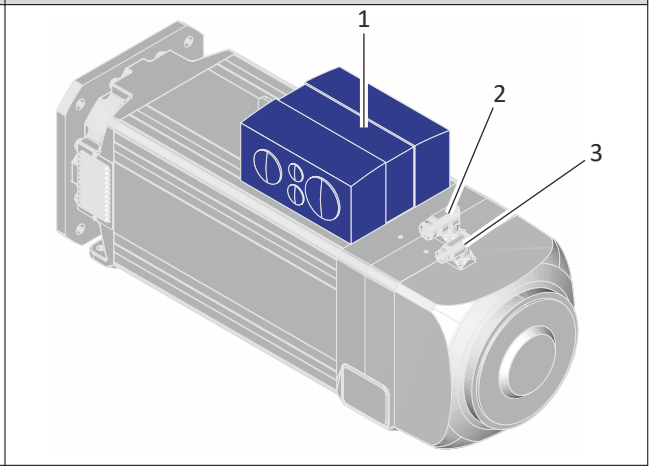
Connection via terminal box

If a 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.

With MCA20/22/26, the connection for feedback, temperature monitoring, and a separate fan is generally via an ICN connector.

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.

Position of the connections

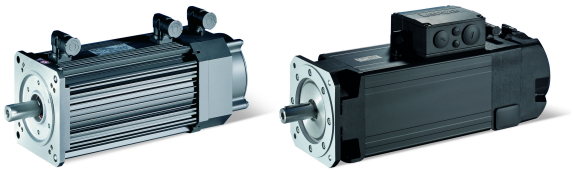
MCA10 ... 19/21	MCA20/22/26
	

Position	Meaning	Position	Meaning
1	Power connection Brake connection PE connection	1	Power connection Brake connection PE connection
2	Feedback connection Connection of temperature monitoring Blower connection	2	Feedback connection Connection of temperature monitoring
		3	Blower connection

Cable glands MCA10 ... 19/21

The openings for the cable glands are closed with plugs and arranged on one side. If required, the terminal box can be rotated step by step by 90 ° after loosening the screws in the terminal box.

Motor		MCA10 MCA13	MCA14 MCA17	MCA19 MCA21
Screwed connections		2x M20 x 1.5		1x M32 x 1.5 1x M25 x 1.5
cable cross-section	mm^2	0.08 ... 2.5		0.2 ... 10
Stripping length	mm	10 ... 11		
Terminal design		Spring-loaded terminal		



MCA20/22/26 cable glands

The cut-outs for the cable glands are closed with sealing plugs.

The cable glands are arranged on both sides with the MCA20 variant.

The cable glands are arranged on one side with the MCA22 and MCA26 variants. If required, the terminal box can be rotated by 180 ° after loosening the screws in the terminal box.

Motor		MCA20	MCA22	MCA26
Screwed connections		2x M20 x 1.5 2x M25 x 1.5 2x M32 x 1.5	1x M40 x 1.5 1x M50 x 1.5 1x M20 x 1.5 1x M16 x 1.5	1x M50 x 1.5 1x M63 x 1.5 1x M20 x 1.5 1x M16 x 1.5
Cable cross-section	mm^2	2.5 ... 16	10 ... 35	-
Terminal design		Spring-loaded terminal	Screw terminal	Threaded bolt
Stripping length	mm	18 ... 20	18	-
Threaded bolt		-	-	M12
Tightening torque	Nm	-	3.2	15.5

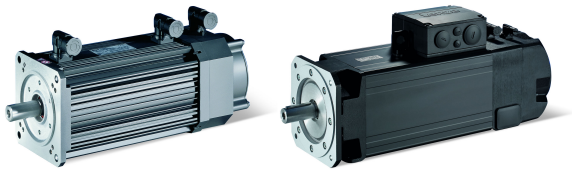
Terminal box, power		
Contact	**Name**	**Meaning**
U1	L1	Motor winding phase
V1	L2	
W1	L3	
PE	PE	PE conductor

Terminal box, DC brake		
Contact	**Name**	**Meaning**
BD1	+	Brake +
BD2	-	Brake -

Terminal box, AC brake		
Contact	**Name**	**Meaning**
~	L1	Mains
	N	
+	+	Holding brake (factory-wired)
-	-	
Schalter		Switching contact - DC switching

Terminal box, resolver		
Contact	**Name**	**Meaning**
B1	+Ref	Transformer windings (reference windings)
B2	-Ref	
B3	+VCC ETS	Supply: Electronic nameplate (only for variant with electronic nameplate ETS)
B4	+COS	Cosine stator windings
B5	-COS	
B6	+SIN	Sine stator windings
B7	-SIN	
B8		Not assigned

Product extensions
Motor connection
Connection via terminal box

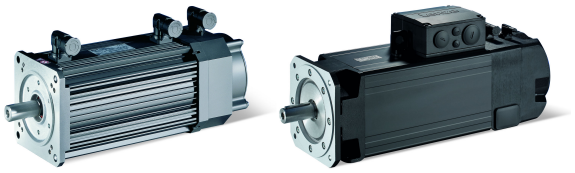


Terminal box, SinCos absolute value encoder with Hiperface		
Contact	**Name**	**Meaning**
B1	+ UB	Supply +
B2	GND	Mass
B3	A	Track A / + COS
B4	A^-	Track A inverse /-COS
B5	B	Track B / +SIN
B6	B^-	Track B inverse/-SIN
B7	Z	Zero track / + RS485
B8	Z^-	Zero track inverse /-RS485
B10		Incremental encoder shield

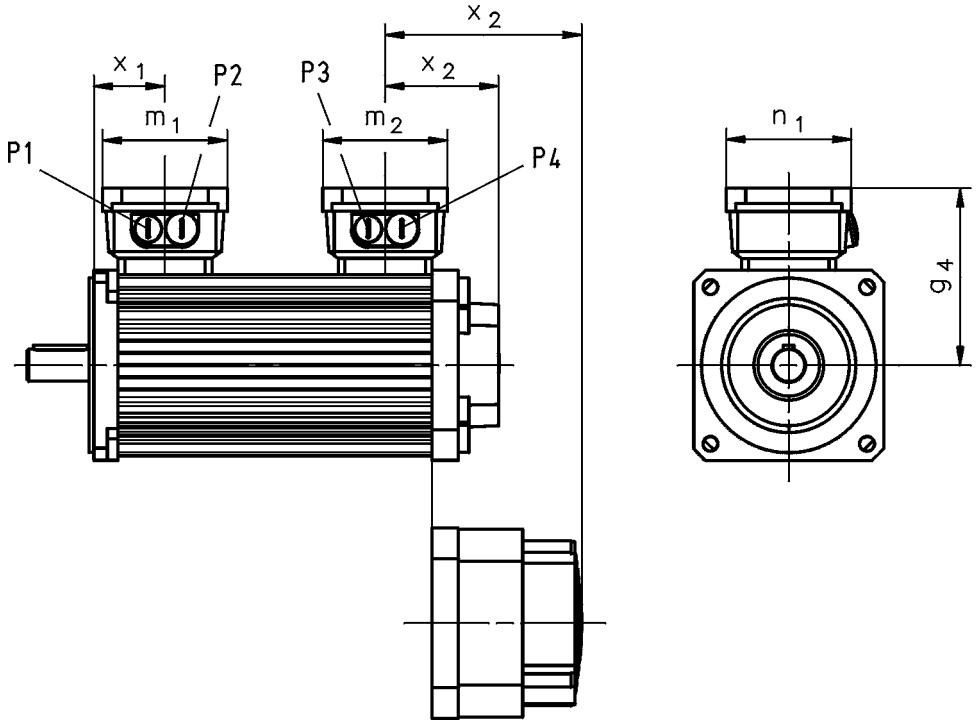
Terminal box, SinCos absolute value encoder with EnDat		
Contact	**Name**	**Meaning**
B1	+ UB	Supply +
B2	GND	Mass
B3	A	Track A / + COS
B4	A-	Track A inverse /-COS
B5	B	Track B / +SIN
B6	B-	Track B inverse/-SIN
B7	Daten	EnDat interface data
B8	Daten-	Data inverse EnDat interface
B20	Takt	EnDat interface cycle
B21	Takt-	Inverse EnDat interface cycle
B22	Up Sensor	Up Sensor
B23	0 V Sensor	0 V sensor
B24	Schirm	Encoder housing shield
B25		Not assigned

Terminal box with temperature monitoring R		
Contact	**Name**	**Meaning**
R1	+	Temperature sensor +
R2	-	Temperature sensor -

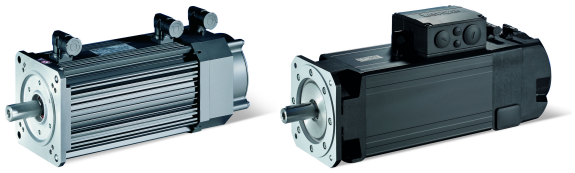
Terminal box, 1-phase separate fan		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
U1	L1	Mains
U2	N	



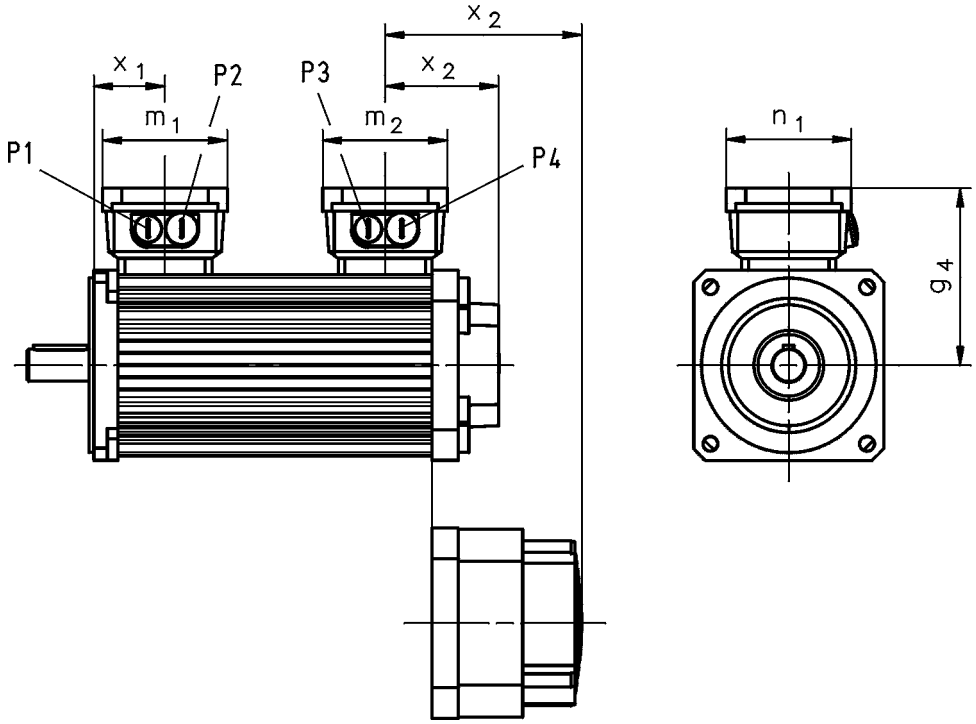
Terminal box dimensions MCA10 ... 17



Motor			MCA						
			10I40-	13I34-	13I41-	14L16- 14L35-	14L20- 14L41-	17N17- 17N35-	17N23- 17N41-
Cooling type			**Natural**	**Forced**	**Natural**	**Forced**	**Natural**	**Forced**	**Natural**
Motor/connection distance	g_4	mm	113	125		133		141	
Power connection, brake									
Screwed connections	P_1	mm	M20x1.5						
	P_2	mm	M20x1.5						
Terminal box	m_1	mm	93						
	n_1	mm	93						
	x_1		54	57		53		55	
Feedback connection, temperature monitoring									
Screwed connections	P_3	mm	M20x1.5						
	P_4	mm	M20x1.5						
Terminal box	m_2	mm	93						
	n_1	mm	93						
Resolver	x_2	mm	78	145	77	147	85	171	85
Absolute value encoder/incremental encoder	x_2	mm	132	199	131	202	140	225	139



Terminal box dimensions MCA19 ... 26



Motor			MCA						
			19S17- 19S35-	19S23- 19S42-	20X14H 20X29H	21X17- 21X35-	21X25- 21X42-	MCA22P	MCA26T
Cooling type			**Forced**	**Natural**	**Forced**	**Forced**	**Natural**	**Forced**	**Forced**
Motor/connection distance 11	g_4	mm	158		171	169		203	256
Power connection, brake									
Screwed connections	P_1	mm	M25x1.5		M32x1.5 M25x1.5	M25x1.5		M50x1.5 M40x1.5	M63x1.5 M50x1.5
	P_2	mm	M32x1.5		M20x1.5	M32x1.5		M20x1.5 M16x1.5	M20x1.5 M16x1.5
Terminal box	m_1	mm	115		154	115		190	234
	n_1	mm	115		128	115		171	212
	x_1		64		299	70		380	465
Feedback connection, temperature monitoring									
Screwed connections	P_3	mm	M20x1.5		-	M20x1.5		-	
	P_4	mm	M20x1.5		-	M20x1.5		-	
Terminal box	m_2	mm	115		-	115		-	
	n_1	mm	115		-	115		-	
Resolver	x_2	mm	190	93	-	193	97	-	
Absolute value encoder/incremental encoder	x_2	mm	240	143	-	243	147	-	

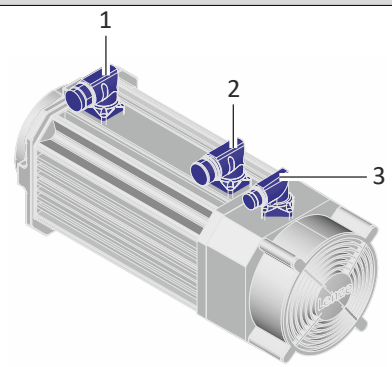
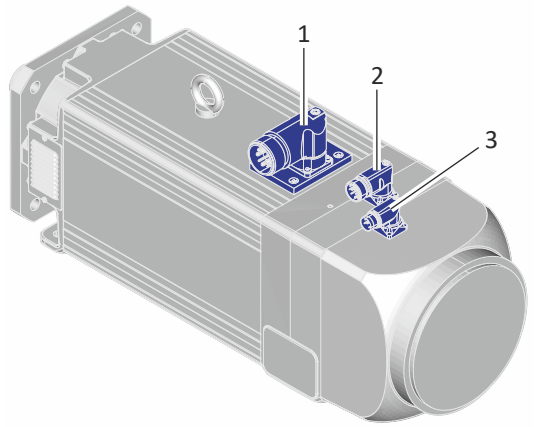
Connection via ICN connector

The electrical connection to the servo motors as a standard is established via ICN connectors.

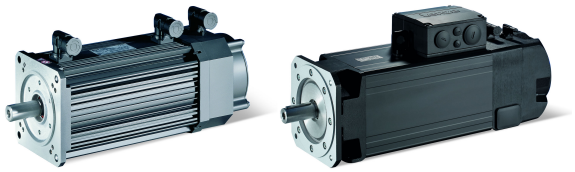
The connectors can be rotated by 270 ° and are provided with a bayonet catch. Since the catch of the connector is also compatible with conventional box nuts, existing mating connectors with a screw plug can continue to be used without any problems.

In order to provide for a quick and error-free connection of Lenze motors to Lenze inverters, we recommend using prefabricated Lenze system cables.

Position of the connections

MCA10 ... 17	MCA20 ... 26
	

Position	Meaning	Position	Meaning
1	Power connection Brake connection PE connection	1	**Only with MCA20:** Power connection Brake connection PE connection
2	Feedback connection Connection of temperature monitoring	2	Feedback connection Connection of temperature monitoring
3	Blower connection	3	Blower connection

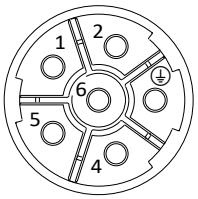


Power and brake connection

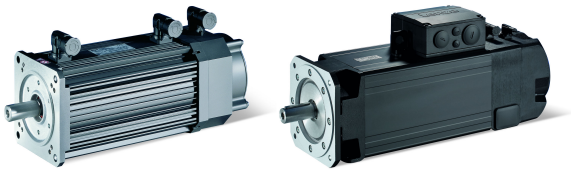
Valid for MCA10 ... 17

ICN-M23 connector assignment

6-pole



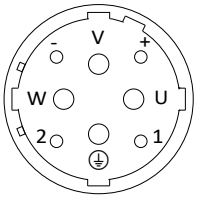
ICN M23 6-pole		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
1	BD1	DC +/AC brake
2	BD2	DC -/AC brake
4	U	Power phase U
5	V	Power phase V
6	W	Power phase W



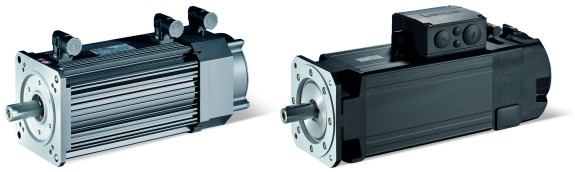
Valid for MCA19 ... 21

ICN-M40 connector assignment

8-pole



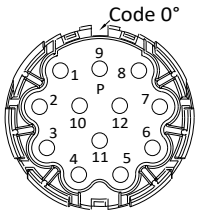
ICN M40 8-pole		
Contact	**Name**	**Meaning**
+	BD1	Holding brake +
-	BD2	Holding brake -
PE	PE	PE conductor
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
1		Not assigned
2		Not assigned



Feedback and temperature monitoring connection

ICN-M23 connector assignment

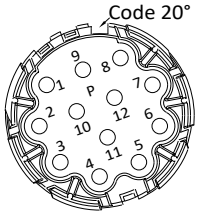
Resolver



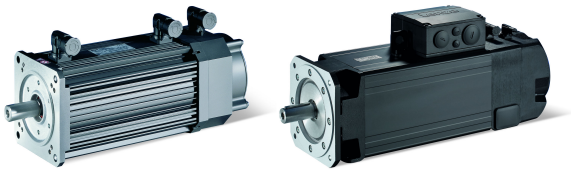
ICN M23 for resolvers		
Contact	**Name**	**Meaning**
1	+Ref	Transformer windings
2	-Ref	Transformer windings
3	+VCC ETS	Supply: Electronic nameplate (Only for motors and inverters that support this function)
4	+COS	Cosine stator windings
5	-COS	Cosine stator windings
6	+SIN	Sine stator windings
7	-SIN	Sine stator windings
8		Not assigned
9		Not assigned
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000

ICN-M23 connector assignment

Incremental and SinCos absolute value encoder Hiperface©

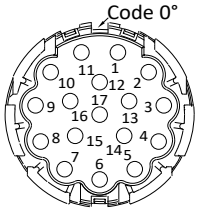


ICN M23 for incremental and SinCos absolute value encoder Hiperface		
Contact	**Name**	**Meaning**
1	B	Track B / +SIN
2	A^-	Track A inverse /-COS
3	A	Track A / + COS
4	+UB	Supply +
5	GND	Mass
6	Z^-	Zero track inverse /-RS485
7	Z	Zero track / + RS485
8		Not assigned
9	B^-	Track B inverse/-SIN
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000



ICN-M23 connector assignment

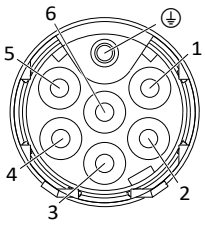
SinCos absolute value encoder with EnDat interface



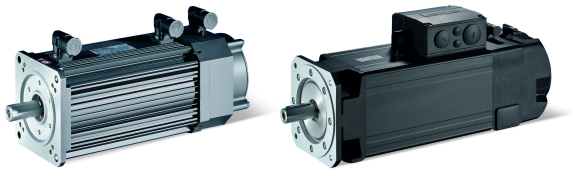
ICN M23 SinCos absolute value encoder with EnDat		
Contact	**Name**	**Meaning**
1	UP Sensor	Up Sensor
2		Not assigned
3		Not assigned
4	0 V Sensor	0 V sensor
5	+	PT1000/KTY temperature sensor
6	-	PT1000/KTY temperature sensor
7	+UB	Supply +
8	Takt	EnDat interface cycle
9	Takt-	Inverse EnDat interface cycle
10	GND	Mass
11	Schirm	Encoder housing shield
12	B	Track B
13	B-	Track B inverse/-SIN
14	Daten	EnDat interface data
15	A	Track A
16	A-	Track A inverse /-COS
17	Daten-	Data inverse EnDat interface

Blower

Pin assignment ICN-M17



ICN M17 for blowers 1-ph		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
1	U1	Fan
2	U2	Fan
3		Not assigned
4		Not assigned
5		Not assigned
6		Not assigned



Brakes

Optionally, the MCA10 ... 19 and MCA21 motors can be ordered with a permanent magnet brake as the holding brake.

Spring-applied brakes are available as holding brakes for the MCA20, 22 and 26 motors.

⚠CAUTION!

They may not be used as safety elements (particularly with hoist axes) without additional measures being implemented.

The brakes used are not fail-safe brakes in the sense that prospective disruptive factors, e.g. oil ingress, can lead to a reduction in torque!

- The brakes must only be used as holding brakes for holding the axes at a standstill or in the deenergised state.
- The brake must not be used as a service brake.

⚠CAUTION!

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.

Motor supply cables

If long motor supply cables are used, pay attention to the ohmic voltage drop along the cable and compensate for it with a higher voltage at the input end of the cable.

The following applies to Lenze system cables:

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

U	V	Resulting supply voltage
U_B	V	Rated voltage of the brake
l_{Lg}	m	Cable length
I_B	A	Rated current of the brake

NOTICE

- The brakes become active when the supply voltage has been switched off (closed-circuit principle).
- When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.
- The friction surfaces must always be free from oil and grease because even small amounts of grease or oil will considerably reduce the braking torque.

NOTICE

In case of these permanent magnet brakes, the rated torque applies solely as holding torque at standstill.

- Emergency stops at higher speeds are possible but high switching energy increases wear on the friction surfaces and the hub.
- During braking from full motor speed, e .g. in the event of emergency stops, the braking torque is significantly reduced.

NOTICE

In case of travel axes, the compliance of the permissible ratio of mass inertia load/brake motor (J_L/J_{MB}) ensures that the permissible maximum switching energy of the brake will not be exceeded and at least the values given for the emergency stop functions from the given speed (see rated data) are applied.

For hoist axes, the load torque resulting from the weight acts additionally. In this case, the specifications for (J_L/J_{MB}) do not apply.

To simplify matters, the friction energy per switching cycle can be calculated using the formula below and must not exceed the limit value for emergency stops, which depends on the switching rate:

$$Q = \frac{1}{2} \times J_{ges} \times \left(2\pi \times \frac{\Delta n}{60} \right)^2 \times \frac{M_N}{M_N - M_L}$$

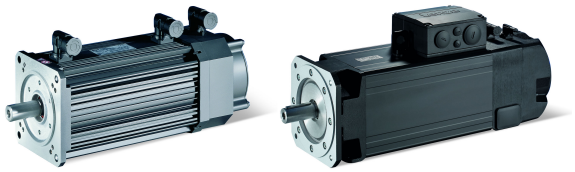
Q	J	Friction energy
J_{total}	kgm^2	Total mass inertia (motor + load)
Δn	rpm	Differential speed
M_N	Nm	Rated torque of the brake
M_L	nM	Load torque

The shortest operating times of the brakes are achieved by DC switching of the voltage and an external suppressor circuit (varistor or spark suppressor).

Without suppressor circuit, the operating times may increase. A varistor/ spark suppressor limits the breaking voltage peaks. It must be ensured that the power limit of the suppressor circuit is not exceeded. This limit depends on the brake current, brake voltage, disengagement time and the switching operations per time unit.

Furthermore the suppressor circuit is necessary for interference suppression and for increasing the service life of the relay contacts (external, is not integrated into the motor).

It is not possible to readjust the brake.



Permanent magnet brakes

Rated data

Engagement and disengagement times apply to rated voltage (± 0 %) and suppressor circuit of the brakes with a varistor with DC switching. Without a suppressor circuit, the times may be longer.

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.

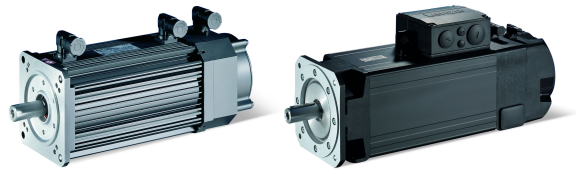
With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.

With 205 V DC brake: connection to 230 V AC via external rectifier (no cURus possible).

Maximum switching energy per emergency stop with n= 3000 rpm for at least 2000 emergency stops.

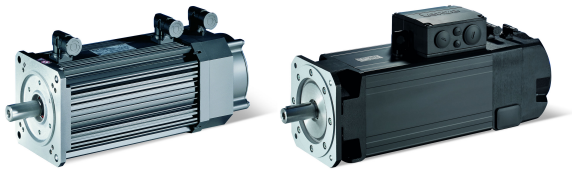
Supply voltage DC 24 V

Motor			**MCA10I**	**MCA13I**	**MCA14L**	**MCA17N**	**MCA19S**	**MCA21X**
Motor code			**P1**	**P1**	**P4**	**P1**	**P1**	**P1**
Supply voltage range	V_{in}	V	21.84 ... 25.2					
Supply voltage	V_{rated}	V	24					
Bemessungsdrehmoment								
At 20 °C	M_{rated}	Nm	3.30	12	26	24	46	88
At 120 °C	M_{rated}	Nm	2.50	11	22		40	80
Rated current	I_{rated}	A	0.50	0.67	0.75		0.81	1.46
Engagement time t1	t_1	ms	10	20	16	25		23
Disengagement time t2	t_2	ms	20	29	70	50	73	140
Friction energy	Q_E	kJ	0.35	0.40	0.7	1.2	1.90	2.80
Weight	m	kg	0.3	0.80	1.1	1.50	1.9	3.9
Massenträgheitsmoment								
Brake	J	kgcm²	0.38	1.06	3.60		9.50	31.8
Brake motor	J_{MB}	kgcm²	2.78	9.36	22.8	39.6	81.5	212
Load/brake motor ratio	J_L/J_{MB}		24.5	7.7	5.2	5.1	3.7	1.7



Supply voltage DC 205 V

Motor			MCA10I	MCA13I	MCA14L	MCA17N	MCA19S	MCA21X
Motor code			**P5**	**P5**	**P8**	**P5**	**P5**	**P5**
Supply voltage range	V_{in}	V	186.55 ... 215.25					
Supply voltage	V_{rated}	V	205					
Bemessungsdrehmoment								
At 20 °C	M_{rated}	Nm	3.30	12	26	24	46	88
At 120 °C	M_{rated}	Nm	2.50	11	22		40	80
Rated current	I_{rated}	A	0.059	0.08	0.088		0.11	0.18
Engagement time t1	t_1	ms	10	20	16	25		23
Disengagement time t2	t_2	ms	20	29	70	50	73	140
Friction energy	Q_E	kJ	0.35	0.40	0.7	1.2	1.90	2.80
Weight	m	kg	0.3	0.80	1.1	1.50	1.9	3.9
Massenträgheitsmoment								
Brake	J	kgcm²	0.38	1.06	3.60		9.50	31.8
Brake motor	J_{MB}	kgcm²	2.78	9.36	22.8	39.6	81.5	212
Load/brake motor ratio	J_L/J_{MB}		24.5	7.7	5.2	5.1	3.7	1.7



Spring-applied brakes

Rated data

Engagement and disengagement times apply to rated voltage (± 0 %) and suppressor circuit of the brakes with a varistor with DC switching. Without a suppressor circuit, the times may be longer.

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.

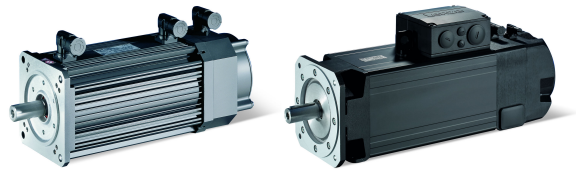
With 24 V DC brake: smoothed DC voltage, ripple ≤ 1 %.

With 230 V AC brake: connection to an integrated rectifier (no cURus possible).

Maximum switching energy for each emergency stop with n= 3000 rpm for at least 300 , and a maximum of 4 emergency stops per hour.

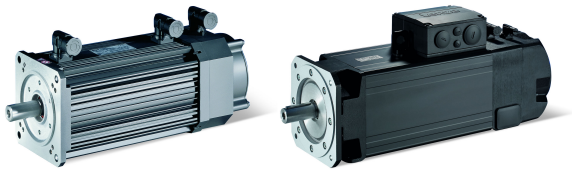
Supply voltage DC 24 V

Motor			**MCA20X**		**MCA22P**		**MCA26T**
Motor code			**F1**	**F2**	**F1**	**F2**	**F1**
Supply voltage range	V_{in}	V	21.6 ... 26.4				
Supply voltage	V_{rated}	V	24				
Bemessungsdrehmoment							
At 20 °C	M_{rated}	Nm	90	150		300	
At 120 °C	M_{rated}	Nm	80	130		260	
Rated current	I_{rated}	A	3.13	2.58	3.75		
Engagement time t1	t_1	ms	70		50	175	
Disengagement time t2	t_2	ms	220	240	260	320	
Friction energy	Q_E	kJ	18	31	23	39	51
Weight	m	kg	13	15.4	20.5	26	30.7
Massenträgheitsmoment							
Brake	J	kgcm²	6.88	14.1	18.1	36.3	70.4
Brake motor	J_{MB}	kgcm²	177	189	505	523	1405
Load/brake motor ratio	J_L/J_{MB}		19.6	33	8.2	14.1	12.7



Supply voltage AC 230 V

Motor			MCA20X		MCA22P		MCA26T
Motor code			**FG**	**FH**	**FG**	**FH**	**FG**
Supply voltage range	V_{in}	V	207 ... 253				
Supply voltage	V_{rated}	V	230				
Bemessungsdrehmoment							
At 20 °C	M_{rated}	Nm	90	150		300	
At 120 °C	M_{rated}	Nm	80	130		260	
Rated current	I_{rated}	A	0.37	0.3	0.44		0.37
Engagement time t1	t_1	ms	70		130		175
Disengagement time t2	t_2	ms	220	240	260	310	360
Friction energy	Q_E	kJ	18	31	23	39	51
Weight	m	kg	13	15.4	20.5	26	30.7
Massenträgheitsmoment							
Brake	J	kgcm²	6.88	14.1	18.1	36.3	70.4
Brake motor	J_{MB}	kgcm²	177	189	505	523	1405
Load/brake motor ratio	J_L/J_{MB}		19.6	33	8.2	14.1	12.7



Feedback

For speed control with a servo inverter, the servo motor can be equipped with the following feedback systems:

Inverter	Feedback without functional safety		
	Resolver	Absolute value encoder	Incremental encoder
i950 servo inverter	RS0	AM1024-8V-H AS1024-8V-H	-
i700 servo inverter	RS0	AM1024-8V-H AS1024-8V-H	-
8400 TopLine inverter drives	RS0	AM1024-8V-H AS1024-8V-H	IG2048-5V-S IG2048-5V-T IG4096-5V-T
9400 HighLine servo drives	RS0	AM32-5V-E AM1024-8V-H AM2048-5V-E AS1024-8V-H AS2048-5V-E	IG2048-5V-S IG2048-5V-T IG4096-5V-T

Inverter	Feedback with functional safety		
	Resolver	Absolute value encoder	Incremental encoder
i950 servo inverter	RV03	-	-
9400 HighLine servo drives	RV03	-	IG1024-5V-V3

Feedbacks in the environment of functional safety

Motors can perform speed-dependent safety functions for safe speed and/or safe relative position monitoring in a drive system by Lenze inverters or Controllers. In case of inverters, these functions are implemented by integrable safety modules and in case of Controllers by the additionally required Safety Controller.

When planning systems/installations of this kind, always observe the following:

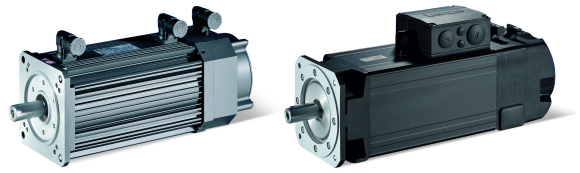
- When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard EN 61800-5-2 (adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional) stipulates special requirements for the connection between 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, the permissible angular 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

Examples of speed-dependent safety functions:

- 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)



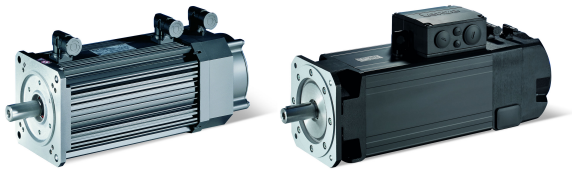
Resolver

The stator-supplied, 2-pole resolver with two stator windings shifted by 90 degrees and a rotor winding with a transformer winding can record both the speed and the rotor position, just like a single-turn absolute value encoder. The rotor position can be determined within one mechanical motor revolution after a voltage failure.

Feedback type			**Resolver**	
Feedback			**RS0**	**RV03**
Speed-dependent safety functions			No	Yes
Design			Mounting	
Resolution - angle		'	0.8	0.8
Min. accuracy		'	-10	-10
Max. accuracy		'	10	10
Absolute positioning			1 revolution	1 revolution
Max. speed	n_{max}	rpm	8000	8000
Max. DC input voltage	$V_{in,max}$	V	10	10
Max. input frequency	$f_{in,max}$	kHz	4	4
Ratio stator/rotor			0.3	0.3
Min ratio tolerance		%	-5	-5
Max ratio tolerance		%	5	5
Rotor impedance	Z_{ro}	Ω	51+j90	51+j90
Stator impedance	Z_{so}	Ω	102+j150	102+j150
Impedance	Z_{rs}	Ω	44+j76	44+j76
Min. insulation resistance at DC 500 V	R_{min}	MΩ	10	10
Number of pole pairs			1	1
Max. angle error Min		'	-10	-10
Max. angle error Max		'	10	10

Speed-dependent safety functions

Feedback			**RV03**
Motor code			**RV03**
Max. permissible angular acceleration	α	rad/s^2	22000
Functional safety			
IEC 61508			SIL3
EN 13849-1			Up to Performance Level e



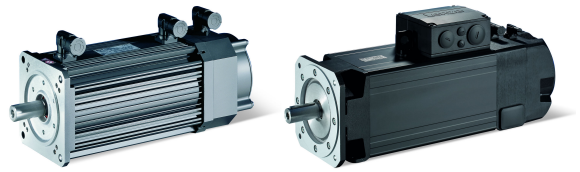
Incremental encoder

Incremental encoders can be used for speed measurement. Homing is required in order to enable positioning later.

Feedback type			**SinCos-Inkremental**		**TTL-Inkremental**	
Feedback			**IG1024-5V-V3**	**IG2048-5V-S**	**IG2048-5V-T**	**IG4096-5V-T**
Speed-dependent safety functions			Yes	No	No	No
Design			Mounting			
Pulses			1024	2048	2048	4096
Output signals			SinCos 1 Vss	SinCos 1 Vss	TTL	TTL
Interfaces			SinCos		A, B; N; Ai, Bi; Ni	
Absolute revolution			0	0	0	0
Min. accuracy		'	-0.8	-0.8	-2	-2
Max. accuracy		'	0.8	0.8	2	2
Min. DC input voltage	$V_{in,min}$	V	4.75	4.5	4.75	4.75
Max. DC input voltage	$V_{in,max}$	V	5.25	5.5	5.25	5.25
Max. current consumption	I_{max}	A	0.07	0.1	0.15	0.15
Limit frequency	f_{max}	kHz	200	180	300	300

Speed-dependent safety functions

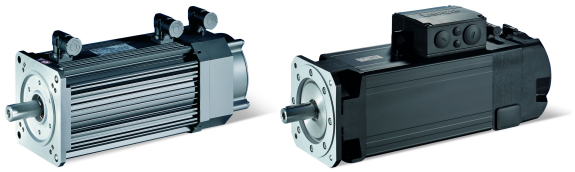
Feedback type			**SinCos incremental**
Feedback			**IG1024-5V-V3**
Motor code			**S1S**
Functional safety			
IEC 61508			SIL3
EN 13849-1			Up to Performance Level e



Absolute value encoder

Absolute value encoders can detect the speed, the rotor position, and the machine position with a very high resolution. They are used for the positioning of dynamic applications and do not require homing.

Feedback type			**SinCos absolute value encoder**				
Feedback			**AM32-5V-E**	**AM1024-8V-H**	**AM2048-5V-E**	**AS1024-8V-H**	**AS2048-5V-E**
Speed-dependent safety functions			No	No	No	No	No
Design			Mounting	Mounting	Mounting	Mounting	Mounting
Encoder type			Multi-turn	Multi-turn	Multi-turn	Single-turn	Single-turn
Resolution		bit	-	-	-	-	-
Pulses			32	1024	2048	1024	2048
Output signals			SinCos 1 Vss	SinCos 1 Vss	SinCos 1 Vss	SinCos 1 Vss	SinCos 1 Vss
Interfaces			EnDat	Hiperface	EnDat	Hiperface	EnDat
Absolute revolution			4096	4096	4096	1	1
Resolution - angle			0.4	0.4	0.4	0.4	0.4
Min. accuracy		'	-5	-0.8	-0.6	-0.8	-0.6
Max. accuracy		'	5	0.8	0.6	0.8	0.6
Fehlergrenze Positionswert							
System accuracy			-	-	-	-	-
Integral nonlinearity			-	-	-	-	-
Min. DC input voltage	$V_{in,min}$	V	4.75	7	4.75	7	4.75
Max. DC input voltage	$V_{in,max}$	V	5.25	12	5.25	12	5.25
Max. current consumption	I_{max}	A	0.17	0.08	0.25	0.08	0.15
Limit frequency	f_{max}	kHz	600	200	200	200	200



Blower

The forced ventilation motors are cooled as a standard by means of a separate axial fan.

The separate fans for the MCA20, MCA22 and MCA26 motors are optionally available with a dust filter.

Rated data 50 Hz

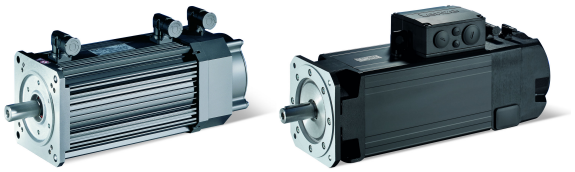
Motor series			**MCA**								
Size			**13**	**14**	**17**	**19**	**20**	**21**	**22**		**26**
Degree of protection			IP54				IP23	IP54		IP23	IP54
Number of phases			1	1	1	1	1	1	1	1	1
Rated voltage	V_{rated}	V	230	230	230	230	230	230	230	230	230
Rated power	P_{rated}	kW	0.019	0.019	0.05	0.05	0.165	0.055	0.085	0.085	0.1
Rated current	I_{rated}	A	0.115	0.115	0.3	0.3	0.73	0.25	0.75	0.75	0.45

Motor series			**MCA**
Size			**26**
Degree of protection			IP23
Number of phases			1
Rated voltage	V_{rated}	V	230
Rated power	P_{rated}	kW	0.1
Rated current	I_{rated}	A	0.45

Rated data 60 Hz

Motor series			**MCA**								
Size			**13**	**14**	**17**	**19**	**20**	**21**	**22**		**26**
Degree of protection			IP54				IP23	IP54		IP23	IP54
Number of phases			1	1	1	1	1	1	1	1	1
Rated voltage	V_{rated}	V	230	230	230	230	230	230	230	230	230
Rated power	P_{rated}	kW	0.018	0.018	0.039	0.039	0.205	0.065	0.085	0.085	0.138
Rated current	I_{rated}	A	0.105	0.105	0.25	0.25	0.9	0.29	0.75	0.75	0.61

Motor series			**MCA**
Size			**26**
Degree of protection			IP23
Number of phases			1
Rated voltage	V_{rated}	V	230
Rated power	P_{rated}	kW	0.138
Rated current	I_{rated}	A	0.61



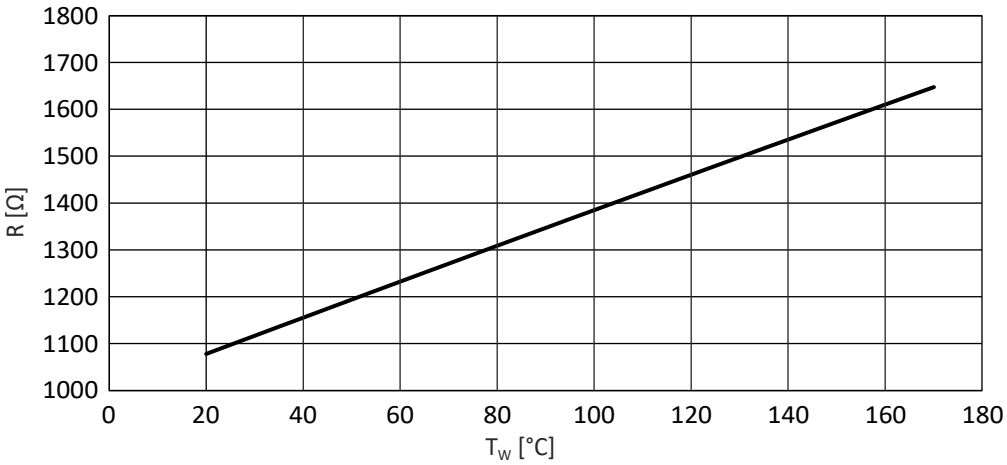
Temperature monitoring

Thermal detectors PT1000

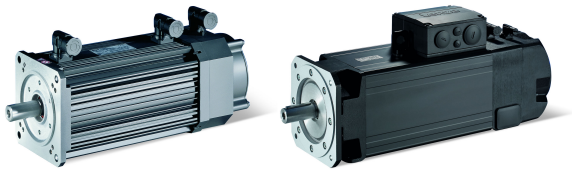
The thermal detector used continuously monitors the motor temperature. The temperature information is transferred to the inverter using the system cable of the feedback system. **This is not a full motor protection!**

This makes it possible to determine the motor temperature in the permissible operating range with great accuracy.

When supplying the thermal sensors with a measurement current of 1 mA, the connection between the temperature and the resistance measured applies.



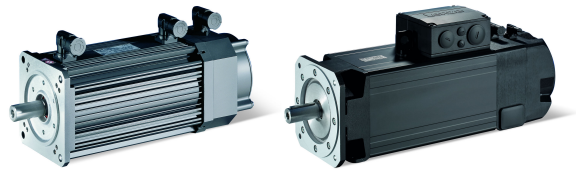
R	Resistance
T_W	Winding temperature



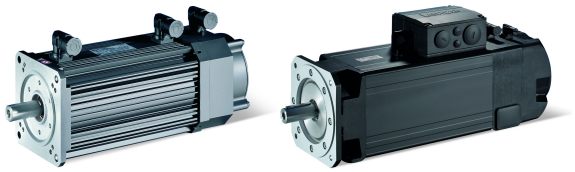
Product codes

Product code of MCA asynchronous servo motor

Example	M	C	A	10	C	40	-	RS0	B0



Meaning	Variant	Product code								
Product family	Motor	M								
Type	Compact servo motors		C							
Version	Asynchronous			A						
Motor frame size	Square dimension 102 mm				10					
	Square dimension 130 mm				13					
	Square dimension 142 mm				14					
	Square dimension 165 mm				17					
	Square dimension 192 mm				19					
	Square dimension 200 mm				20					
	Square dimension 214 mm				21					
	Square dimension 220 mm				22					
	Square dimension 260 mm				26					
Overall length						I ... X				
Rated speed	rpm x 100						05 ... 42			
Inverter mains connection Motor protection class	3 x 400 V Degree of protection: IP54 / IP65							-		
	3 x 400 V Degree of protection: IP23							H		
Feedback	SinCos absolute value encoder, single-turn, EnDat AS2048-5V-E								ECN	
	SinCos absolute value encoder, multi-turn, EnDat AM32-5V-E								EQI	
	SinCos absolute value encoder, multi-turn, EnDat AM2048-5V-E								EQN	
	Resolver								RS0	
	Safety resolver RV03								RV0	
	SinCos safety incremental encoder, single-turn IG1024-5V-V3								S1S	
	SinCos incremental encoder, single-turn IG2048-5V-S								S20	
	SinCos absolute value encoder, multi-turn, Hiperface® AM1024-8V-H								SRM	
	SinCos absolute value encoder, single-turn, Hiperface® AS1024-8V-H								SRS	
	TTL incremental encoder IG2048-5V-T								T20	
	TTL incremental encoder IG4096-5V-T								T40	
Brake	Without brake									B0
	Spring-applied brake DC 24 V									F1
	Spring-applied brake DC 24 V, reinforced									F2
	Spring-applied brake AC 230 V									FG
	Spring-applied brake AC 230 V, reinforced									FH
	Permanent magnet brake DC 24V									P1 ... P4
	Permanent magnet brake DC 205 V									P5 ... P8



Environmental notes and recycling

Lenze has been certified to the worldwide environmental management standard for many years (DIN EN ISO 14001). As part of our environmental policy and the associated climate responsibility, please note the following information on hazardous ingredients and the recycling of Lenze products and their packaging:

CE

Lenze products are partly subject to the EU Directive on the restriction of certain hazardous substances in electrical and electronic equipment 2011/65/EU: RoHS Directive [UKCA: S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012] . This is documented accordingly in the EU declaration of conformity and with the CE mark.

Lenze products are not subject to EU Directive 2012/19/EU: Directive on waste electrical and electronic equipment (WEEE) [UKCA: S.I. 2013/3113 - The Waste Electrical and Electronic Equipment Regulations 2013] , but some contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC: Battery Directive [UKCA: S.I. 2009/890 - The Waste Batteries and Accumulators Regulations 2009] . The disposal route, which is separate from household waste, is indicated by corresponding labels with the "crossed-out trash can".
Any batteries/rechargeable batteries included are designed to last the life of the product and do not need to be replaced or otherwise removed by the end user.

21 PAP

Lenze products are usually sold with cardboard or plastic packaging. This packaging complies with EU Directive 94/62/EC: Directive on packaging and packaging waste [UKCA: S.I. 1997/648 - The Producer Responsibility Obligations (Packaging Waste) Regulations 1997] .
The required disposal route is indicated by material-specific labels with the "recycling triangle".
Example: "21 - other cardboard"

REACH

Lenze products are subject to REGULATION (EC) No 1907/2006: REACH Regulation [UKCA: S.I. 2008/2852 - The REACH Enforcement Regulations 2008] . When used as intended, exposure of substances to humans, animals and the environment is excluded.

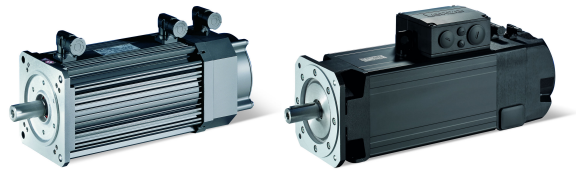
Lenze products are industrial electrical and electronic products and are disposed of professionally. Both the mechanical and electrical components such as electric motors, gearboxes or inverters contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the highest possible level of recyclability is therefore important and sensible from an economic and ecological point of view.

- Coordinate professional disposal with your waste disposal company.
- Separate mechanical and electrical components, packaging, hazardous waste (e.g. gear oils) and batteries/rechargeable batteries wherever possible.
- Dispose of the separated waste in an environmentally sound and proper manner (no household waste or municipal bulky waste).

What?	Material	Disposal instructions
Pallets	Wood	Return to manufacturers, freight forwarders or reusable materials collection system
Packaging material	Paper, cardboard, pasteboard, plastics	Collect and dispose of separately
Products		
Electronic devices	Metal, plastics, circuit boards, heatsinks	As electronic waste give to professional disposer for recycling
Gearbox	Oil	Drain oil and dispose of separately
	Casting, steel, aluminium	Dispose as metal scrap
Motors	Casting, copper, rotors, magnets, potting compound	As engine scrap give to professional disposer for recycling
Dry-cell batteries/rechargeable batteries		As used batteries give to professional disposer for recycling

Further information on Lenze's environmental and climate responsibility and on the topic of energy efficiency can be found on the Internet:

www.Lenze.com → search word: "Sustainability"



Appendix

Good to know

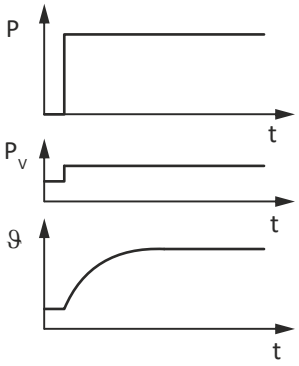
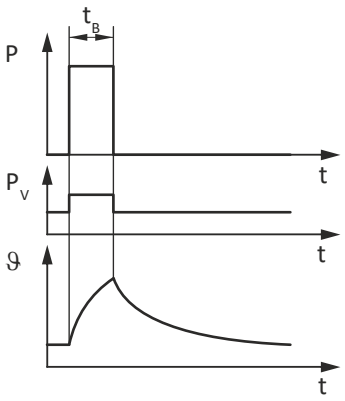
Operating modes of the motor

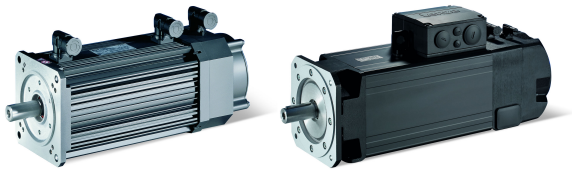
Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

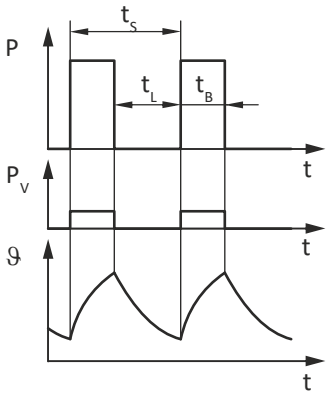
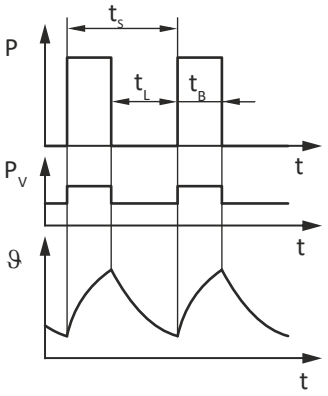
In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature limit. This behaviour is referred to as overload capacity.

Depending on the duration of the load and the resulting temperature rise, the required motor can be selected reduced by the overload capacity.

The most important operating modes

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



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

P	Power	P_V	Power loss
t	Time	t_B	Load period
t_L	Idle time	t_S	Cycle duration
ϑ	Temperature		

Enclosures

The protection class indicates the suitability of a product for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The protection classes are classified in the EN 60034-5/ EN IEC 60529.

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

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

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