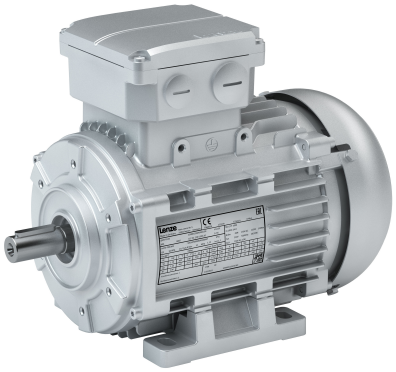
Project planning EN



Three-phase AC motors

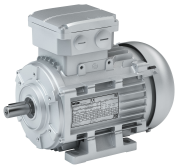
IE2 three-phase AC motor m550-H Version B
IE3 three-phase AC motor m550-P Version B

Lenze

Contents

Contents

Contents



About this document

Document description

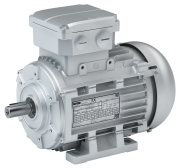
This document addresses to all persons who want to carry out any configurations with the products described.

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!

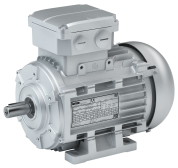
Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

⚠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

Three-phase AC motors for line voltage and inverter operation

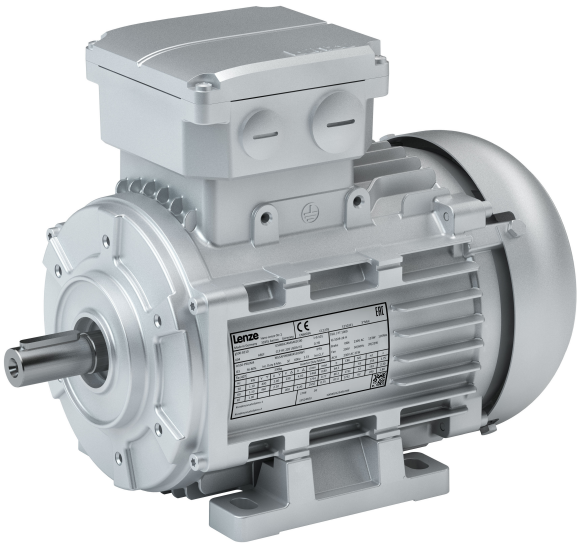
In a power range from 0.12 to 22 KW, Lenze offers three-phase AC motors suitable for inverters for more extensive tasks.

These motors differ in terms of their efficiency class and can be used for the versions required for controlled or uncontrolled inverter operation.

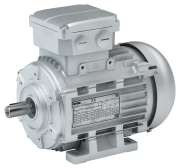
- Efficiency class IE2 in the power range 0.12 ... 0.55 kW
- Efficiency class IE3 in the power range 0.75 ... 22 kW

Customer benefits

- Different efficiency classes for the greatest economic benefit
- Space-saving thanks to compact direct attachment to Lenze gearboxes
- Can be used universally for a wide range of machine tasks due to the market-oriented modular system
- Standard connectors ensure fast connection, even in the event of service



Three-phase AC motor m550-P80/M4



Identification of the products

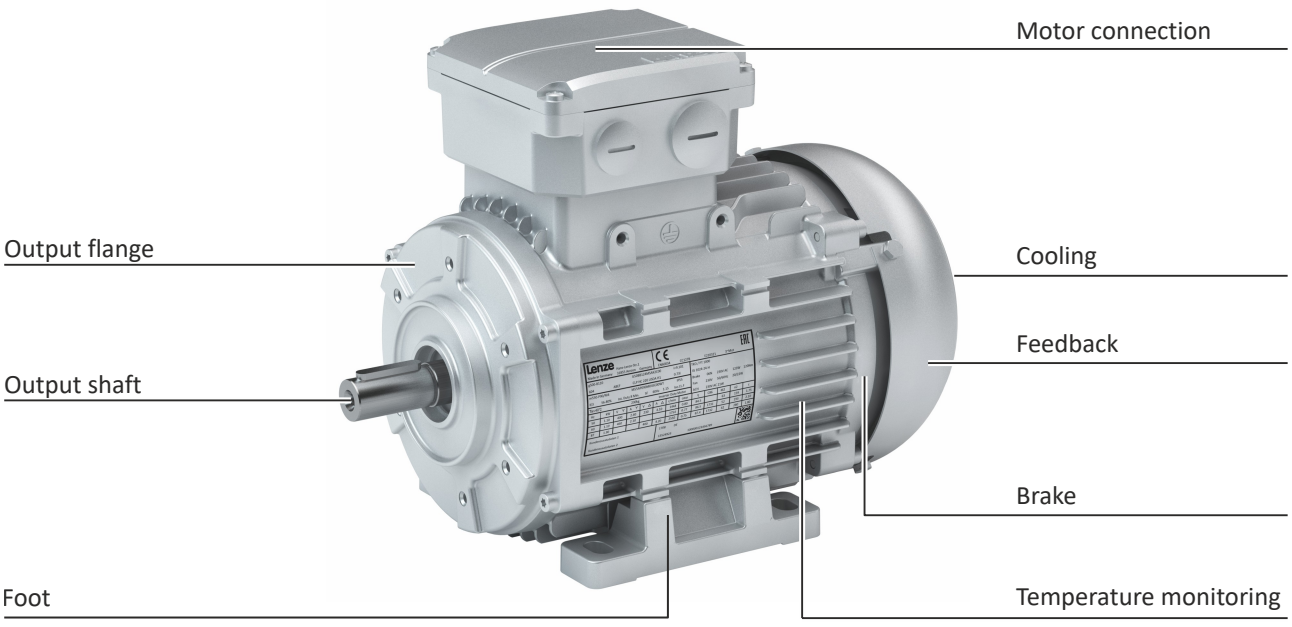
Three-phase AC motor product name

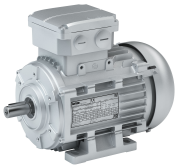
Example	m550	-	P	80	supply	S	4

Meaning	Variant	Product name						
Product family		m550						
Efficiency class	IE2			H				
	IE3			P				
Size					63 71 80 90 100 112 132 160 180			
Motor length	Short						S	
	Medium						M	
	Long						L	
Number of pole pairs	4-pole							4

Features

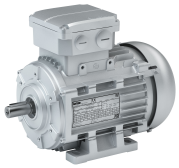
The following figure provides an overview of the elements and connections on the product.
Their position, size and appearance may vary.



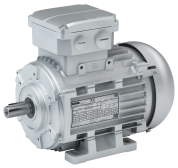


The modular system

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



Motor		m550-H					m550-P				
		63/S4	63/M4	63/L4	71/M4	71/L4	080/M4	090/M4	090/L4	100/M4	100/L4
Technical data											
Rated power	kW	0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3.0
Color		**Unpainted** Grounded/RAL colors									
Surface and corrosion protection		**Without** Different types of OKS									
Dimensions											
Design		B3/B14/B5									
Solid shaft with featherkey	mm	11 x 23			14 x 30		19 x 40	24 x 50		28 x 60	
Output flange	mm	FT75 FF115			FT85 FF130		FT100 FT130 FF165	FT115 FT130 FF165		FT130 FF215	
Cooling		**Integral fan** Blower Heavy-Duty fan									
Product extensions											
Connection method		Y/Δ									
Connection type		**Terminal box** ICN connector HAN connector M12 connector									
Spring-applied brake		**Without** Holding brake Application brake Application brake with safety function									
Feedback		**Without** Resolver Incremental encoder Incremental encoder with safety functions Absolute value encoder									
Temperature monitoring		**TKO thermal contact** PT1000 temperature sensor									
Integral fan		Protection cover 2. Shaft end Handwheel									
Blower		Protection cover									

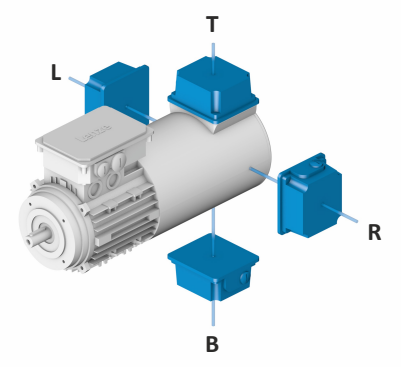


Motor		m550-P						
		112/M	**132/M4**	**132/L4**	**160/M4**	**160/L4**	**180/M4**	**180/L4**
Technical data								
Rated power	kW	4.0	5.5	7.5	11	15	18.5	22
Color		**Unpainted** Grounded/RAL colors						
Surface and corrosion protection		**Without** Different types of OKS						
Dimensions								
Design		B3/B14/B5	B3/B5					
Solid shaft with featherkey	mm	28 x 60	38 x 80		42 x 110		48 x 110	
Output flange	mm	FT130 FF215	FF265		FF300		FF300	
Cooling		**Integral fan** Blower Heavy-Duty fan						
Product extensions								
Connection method		Y/Δ						
Connection type		**Terminal box** ICN connector HAN connector M12 connector			-		-	
Spring-applied brake		**Without** Holding brake Application brake Application brake with safety function						
Feedback		**Without** Resolver Incremental encoder Incremental encoder with safety functions Absolute value encoder						
Temperature monitoring		**TKO thermal contact** PT1000 temperature sensor						
Integral fan		Protection cover 2. Shaft end Handwheel			-		-	
Blower		Protection cover						

Mounting positions

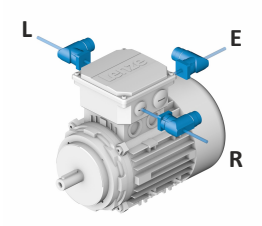
Positions of the terminal boxes/connectors

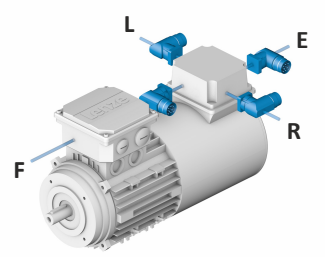
Blower terminal box
with/without ICN connector

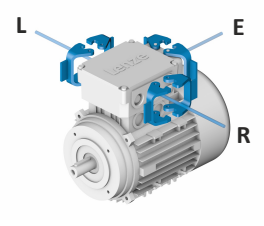


Positions of the connections

Power terminal box	Blower terminal box	HAN connector
ICN cable glands/connectors	ICN cable glands/connectors	

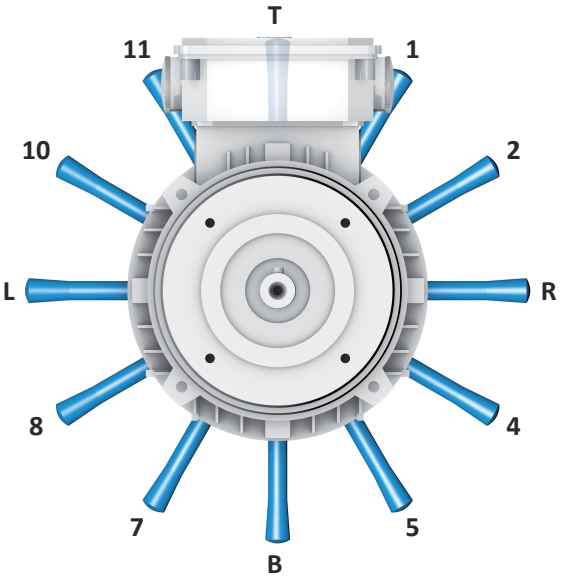


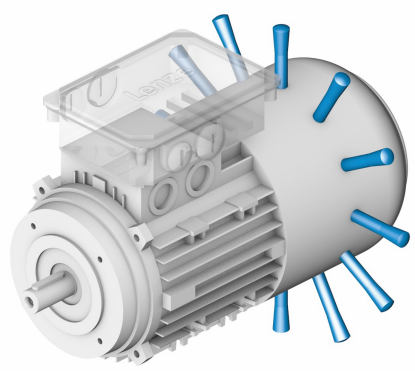


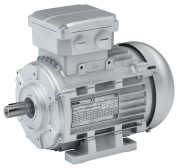


Position of the manual release lever

Only positions T, R, B and L are available for the spring-applied holding brake.







Information on project planning

Safety instructions

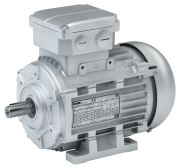
Basic safety instructions

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 be operated on the mains or on the inverter.
- Only certified application brakes may be used as safety brakes for functional safety.
- 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 IEC 61800−5−1 / EN IEC 60204−1

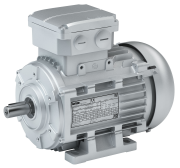
Hot surface:
Use personal protective equipment or wait until the device has cooled down!

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.

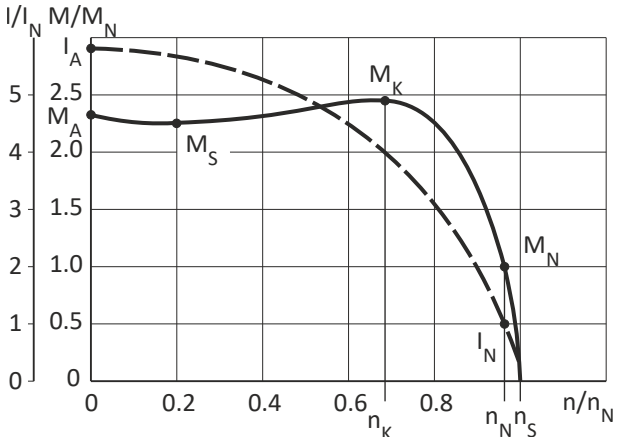


General information

Operation with mains power

If operated with mains power, the three-phase AC motor starts up in accordance with the speed-torque characteristic when switched on. It follows this characteristic until it reaches its stable operating point. The operating point is reached when the load or rated torque (M_N) is smaller than the starting (M_A) and pull-up torque (M_S) . The rated speed (n_N) of the drive is always less than the arithmetic synchronous speed (n_S).

The difference between the rated and synchronous speed relative to the synchronous speed is called the slip.



Supplementary explanation of the service factor:

A motor wound to 50 Hz and 400 V can be operated on 60 Hz mains under rated operating conditions in accordance with the NEMA MG1-2011 standard **for a short time** with 1.15 times the load without suffering damage.

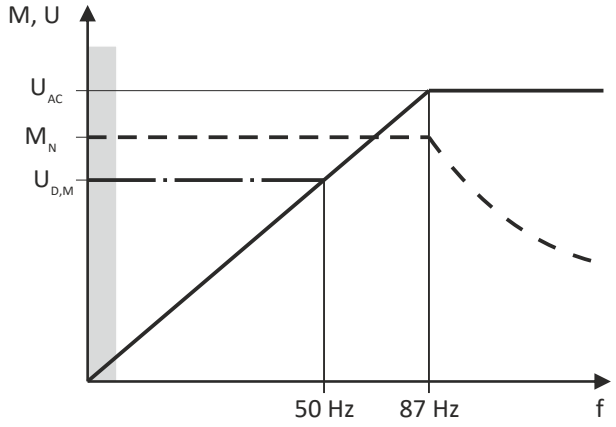
The service factor 1.15 is specified on the nameplate for 60 Hz operation.

Operation on the frequency inverter
Standard setting

The frequency inverter is set for easy operation on a three-phase AC motor with vector control by default. The rated torque of the motor is available in a setting range up to 50 Hz in this mode of operation.

Extended setting range up to 87 Hz

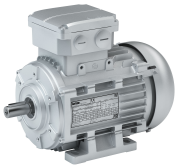
If the frequency inverter's U/f reference point is set to 87 Hz, the rated torque can be taken into account in an extended setting range. A 230/400 V motor is used here, for example, and operated in delta on a 400 V frequency inverter. The setting range is increased by 40 %. The inverter must be dimensioned for a rated motor current of 230 V.



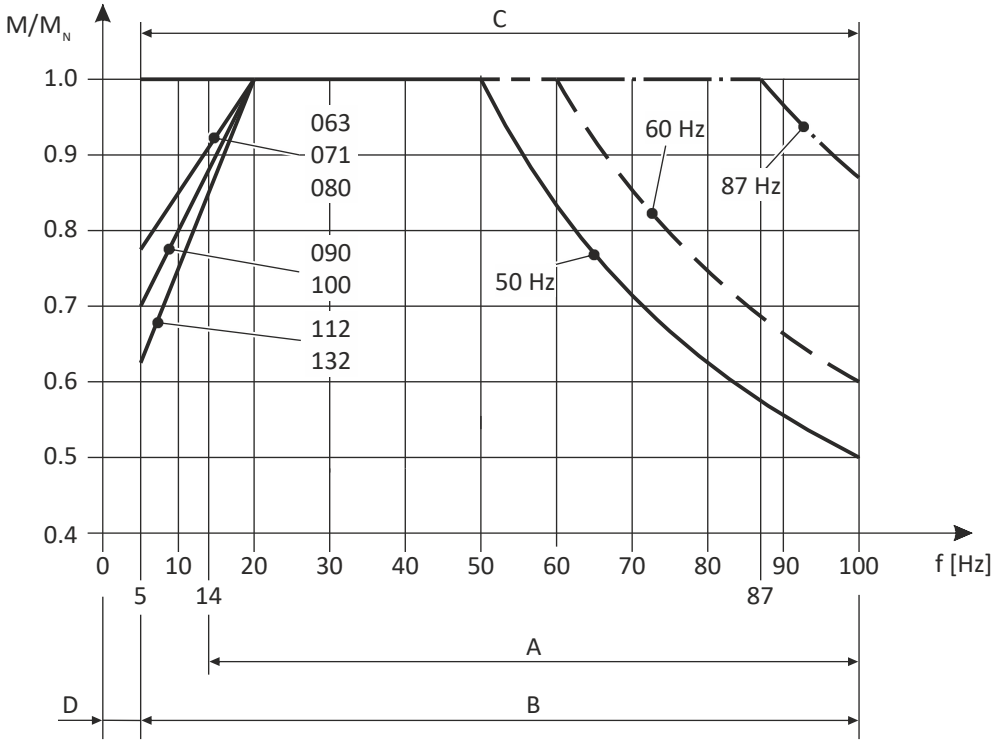
Torque reduction at low motor frequencies

At low motor frequencies (usually < 20 Hz) and with an integral fan, the motor is not cooled sufficiently at the rated torque. The motor can be operated from 5 Hz by reducing the torque accordingly.

Constant cooling takes place over the entire speed range in motors with a blower. This means that they can be used with their rated torque from 5 Hz.



The diagram shows the torque reduction depending on the motor frame size for self-ventilated motors taking into account the thermal behavior during inverter operation.

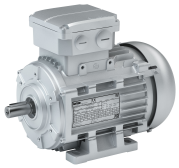


A Operation with integral fan and brake

B Operation with integral fan and brake with wide-range voltage DC 180 ... 205 V or AC 400 ... 460 V
Operation with integral fan and brake control, holding current reduction

C Operation with blower

D Operation is possible below 5 Hz depending on the application and control mode.
The application case must be checked by Lenze.



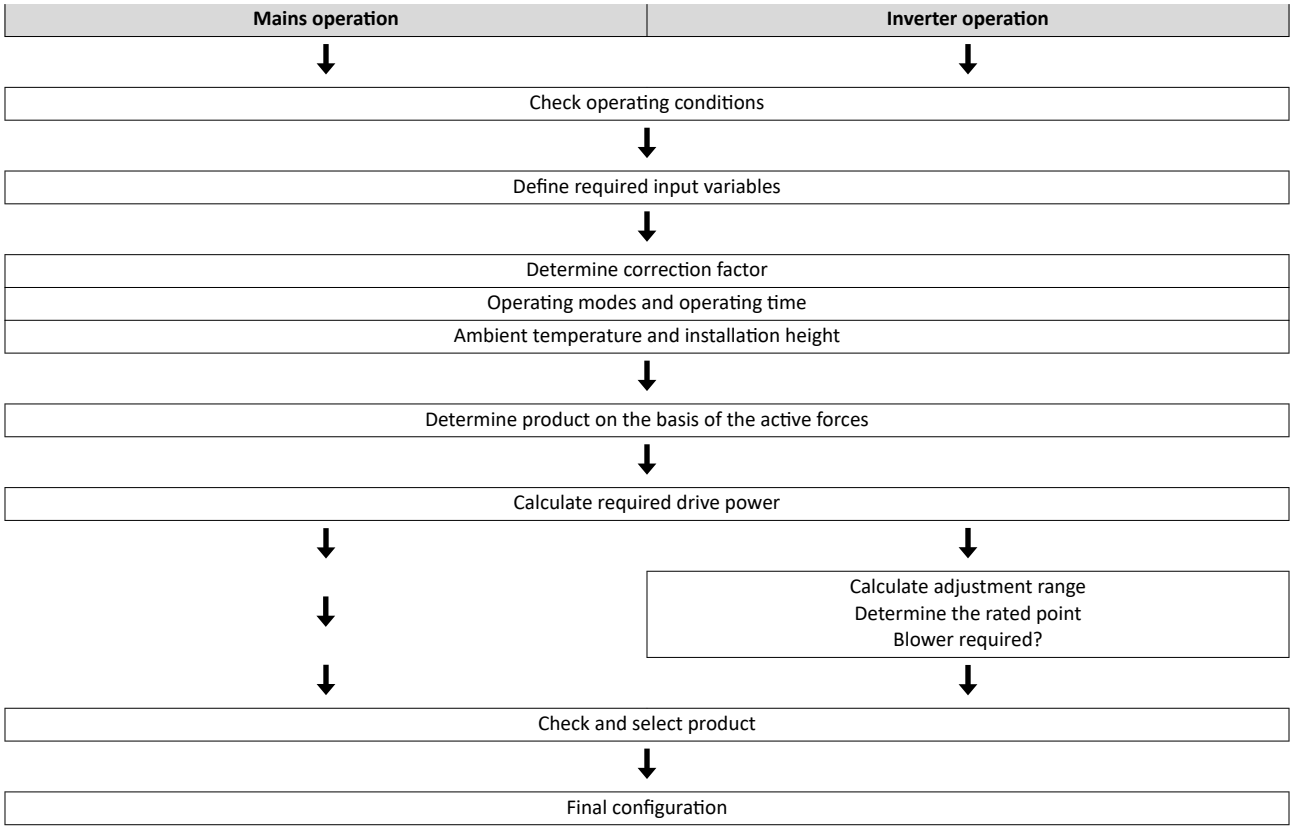
Drive dimensioning

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.

Operation chart

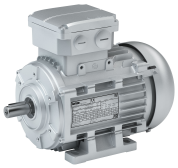


Check operating conditions

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

▸ Standards and operating conditions 📖 27

▸ Surface and corrosion protection 📖 22



Define required input variables

Necessary input variables	Note	Symbol	Unit
Ambient temperature		T_V	°C
Site altitude Amsl		H	m
Radial force		F_{rad}	rated
axial force		F_{ax}	rated
Transmission element at the output	Gear wheels, sprockets …		
Effective diameter of the transmission element		d_w	mm
Load torque		$M_{L,max}$	Nm
Load speed		$n_{L,max}$	rpm
	With inverter operation	$n_{L,min}$	rpm

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 🕮 147

Installation height amsl			
≤ 1000 m	≤ 2000 m	≤ 3000 m	≤ 4000 m
Correction factor			
k_H	k_H	k_H	k_H
1	0.95	.90	.85

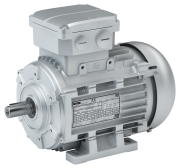
Ambient temperature		
≤ 40 °C	≤ 45 °C	≤ 50 °C
Correction factor		
k_{TU}	k_{TU}	k_{TU}
1	0.95	0.90

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 🕮 30



Calculate required drive power

	Calculation	Symbol	Unit
Drive power	$P_1 = \frac{M_{L,max} \times n_{L,max}}{9549 \times k_L \times k_H \times k_{TU}}$	P_1 Input fields	kW

▸ Rated data 32

Calculate adjustment range (inverter operation) and determine rated point

	Calculation
Adjustment range	$V = \frac{n_{L,max}}{n_{L,min}}$

Cooling	Adjustment range	Rated point
Integral fan	≤ 2.50 (20 - 50 Hz) ≤ 4.35 (20 - 87Hz)	50 Hz 87 Hz
Blower	≤ 10.0 (5 - 50 Hz) ≤ 17.4 (5 - 87Hz)	50 Hz 87 Hz
Integral fan (reduced torque)		

Operation with inverter 19

Inverter operation: Check and select product

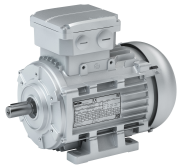
Rated data	Screening	Unit	Note
Rated frequency	50/87	Hz	Depending on the adjustment range
Rated power	$P_{rated} \geq P_1$	kW	
Rated torque	$M_{rated} \geq M_{L,max}$	Nm	
Rated speed	$n_{rated} \geq n_{L,max}$	rpm	

▸ Rated data 32

Mains operation: Check and select product

Rated data	Screening	Unit	Note
Rated frequency	50/60	Hz	
Rated power	$P_{rated} \geq P_1$	kW	
Rated torque	$M_{rated} \geq M_{L,max}$	Nm	
Rated speed	$n_{rated} = n_{L,max}$	rpm	

▸ Rated data 32



Final configuration

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

More information about the final configuration:

▸ The modular system 10

▸ Product extensions 77

Surface and corrosion protection

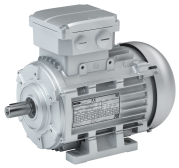
Depending on the ambient conditions, the surface and corrosion protection system (called OKS) offers tailor-made solutions for optimum protection.

Various surface coatings ensure reliable functioning even at high air humidity, in outdoor installations, or in the presence of atmospheric contamination. Any color from the "RAL Classic" collection can be chosen for the top coat.

For indoor installation in buildings and if no special corrosion protection is required, the products are also available unpainted (without surface and corrosion protection system).

Surface and corrosion protection	Applications	Type
without OKS (unpainted)	• Indoor installation, no special corrosion protection necessary • Painting by customer	Standard
OKS-G (primed)	• Dependent on subsequent top coat applied	Optional
OKS-S (small)	• Standard applications • Indoor installation in heated buildings • Air humidity up to 90%	
OKS-M (medium)	• Indoor installation in unheated buildings • Covered, protected outdoor installation • Air humidity up to 95%	
OKS-L (large)	• Outdoor installation • Air humidity above 95% • Chemical industrial plants • Food industry	

Surface and corrosion protection	Corrosivity category	Surface coating	Color	Coating thickness
	DIN EN ISO 12944-2	Design		
Without OKS (unpainted)	-	• Dip priming of the gray cast iron parts	-	30 ... 50 µm
OKS-G (primed)	-	• Dip priming of the gray cast iron parts • 2K PUR priming coat	-	80 ... 120 µm
OKS-S (small)	Comparable to C1	• Dip priming of the gray cast iron parts • 2K-PUR top coat	• Standard: RAL 7012 • Optional: According to RAL Classic possible	80 ... 120 µm
OKS-M (medium)	Comparable to C2	• Dip priming of the gray cast iron parts • 2K PUR priming coat • 2K-PUR top coat		110 ... 160 µm
OKS-L (large)	Comparable to C3			140 ... 200 µm



Temperature ranges

Temperature ranges

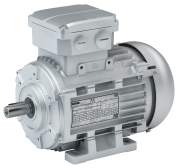
The following temperature ranges are available matched to your ambient conditions:

- Default
- Deep-freeze
- Wide range

Pay attention to the notes on the temperature ranges!

In case of ambient temperatures < -30 °C or > +40 °C, please contact your responsible Lenze sales company.

Temperature ranges	
Default	
Ambient temperature	0 °C … +40 °C
Note	At an ambient temperature generally over +30 °C: • A check of the application case by Lenze is required.
Deep-freeze	
Ambient temperature	-30 °C … +10 °C
Note	When starting a cold motor at below -20 °C, you have to expect an increased starting torque on account of the higher viscosity of the roller bearing grease. • Take a starting torque reserve for the motor of around 20 % into account during the configuration. Commissioning at over +10 °C: • Operate the drive with max. 50 % of the rated torque to avoid any shortening of the service life.
Wide range	
Ambient temperature	-30 °C … +40 °C
Note	When starting a cold motor at below -20 °C, you have to expect an increased starting torque on account of the higher viscosity of the roller bearing grease. • Take a starting torque reserve for the motor of around 30 % into account during the configuration. At an ambient temperature generally over +30 °C: • A check of the application case by Lenze is required. At a temperature constantly between -30 °C and -25 °C, the service life is up to 20 % lower than with the deep-freeze package.



Information on mechanical installation

Important notes

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

  ▸ Standards and operating conditions 📖 27
- 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!

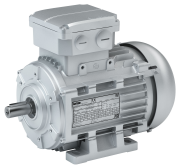
▸ Balance transmission elements with a half featherkey!

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.



Information on 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.

Connection for high leakage current

If the leakage current is greater than 3.5 mA for alternating current or greater than 10 mA for direct current, the standard EN IEC 61800−5−1 requires that at least one or more of the following measures be met:

- The minimum PE conductor cross-section is 10 mm^2 with Cu or 16 mm^2 with Al.
- Attachment of an additional protective grounding conductor with the same cross-section as the original protective grounding conductor.
  - Do not place the additional terminal on the same terminal.
- Provide automatic disconnection of the mains in case of interruption of the protective conductor.

▸ Connection options 📖 77

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

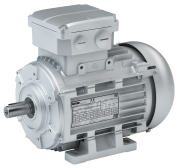
The notes for the electrical connection can be found in

in the terminal box (if motors with a terminal box are used).

the connection plan (if motors with connectors are used).

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

Catalog data

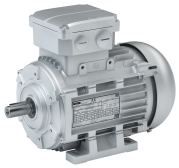
The power values, torques and speeds indicated in the catalog are rounded values and apply to

- Operating time per day = 8 hrs (100 % ED)
- Ambient temperature = -30 ... +40 °C
- Site altitude ≤ 1000 m above sea level
- The specified rated data apply to the operating mode S1 (acc. to EN 60034-1).

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.



Standards and operating conditions

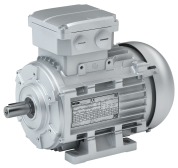
Conformities and approvals

More information and certificates of approval can be found under

E2/IE3 m500 three-phase AC motors (Lenze.com)

Europe					
Country	**Conformity/ approval**	**Law/standard/ regulation**	**Description**	**Special feature**	**Labelling on product**
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		
		(EU) 2019/1781	Regulation laying down ecodesign requirements for electric motors and speed control		
		2009/125/EC	Ecodesign Directive		
Eurasian Economic Union (EAWU)	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. 2016/1101	The Electrical Equipment (Safety) Regulations 2016		
		S.I. 2016/1091	The Electromagnetic Compatibility Regulations 2016		
		S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment 2012		
		S.I. 2021/745	The Ecodesign for Energy-Related Products and Energy Information Regulations 2021		

America					
Country	**Conformity/ approval**	**Law/standard/ regulation**	**Description**	**Special feature**	**Labelling on product**
Brazil	INMETRO	Portaria n.º 1, 2017	MEPS	Approved products	INMETRO mark
		ABNT NBR 17094-1	Rotating electrical machines Part 1: Induction motors three-phase - Requirements		
Canada	CSA	CSA 22.1 No.100	CSA Standard for Motors and Generators		cULus mark
	NrCan	SOR/2016-311 (Division 12 - Subdivision A)	Energy Efficiency Regulations		UL Energy mark
USA	UL	UL 1004-1	UL Standard for Rotating Electrical Machines		cULus mark
	DOE	10 CFR Part 431 - Subpart B	Energy Efficiency Program for Certain Commercial and Industrial Equipment		UL Energy mark + CC number



Asia					
Country	**Conformity/ approval**	**Law/standard/ regulation**	**Description**	**Special feature**	**Labelling on product**
China	CCC	GB 12350	Safety requirements of small power motors		CCC mark
		GB/T 26572	Requirements on concentration limits for certain restricted substances in electrical and electronic products		EFUP mark
		GB 18613	Minimum allowable values of energy efficiency and energy efficiency grades for small and medium three-phase asynchronous motors		CEL mark
Singapore	NEA	Energy Conservation Act 2013	Energy Conservation Act (Cap. 92C) - MEPS		-
		IEC 60034-2-1	Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests		
South Korea	KEA	MOTIE Notification No. 2017-61	Regulation on energy Efficiency Labeling & Standards - MEPS		KEL mark incl. KC mark
		MOTIE Notification No. 2020-225			
		KS C IEC 60034-2-1	Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests		

Australia and Oceania					
Country	**Mark**	**Law/standard/ regulation**	**Description**	**Special feature**	**Labelling on product**
Australia	I3	GEMS Act of 2019	Greenhouse and Energy Minimum Standards (GEMS)	Approved products	-
		AN/NZS 1359.5/2004	Rotating electrical machines - General requirements - Part 5: Three-phase cage induction motors - High efficiency and minimum energy performance standards requirements		
		IEC 60034-2-1	Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests		

Protection of persons and device protection

Degree of protection			
EN	EN IEC 60529,EN IEC 60034-5	IP54	Information applies to the mounted and ready-for-use state
		IP55	
		IP65	
		IP66	

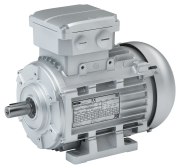
Temperature class			
Utilization	EN IEC 60034-1	B (130 °C)	Utilization
Insulation system		F (155 °C)	Insulation system

Permissible voltage		
IVIC C	IEC 60034-18-41	At 500 V

EMC data

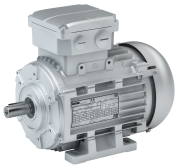
Noise emission		
Fulfills requirements according to	EN IEC 60034-1	A final overall assessment of the drive system is indispensable

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



Environmental conditions

Energy efficiency			
High Efficiency	EN IEC 60034-30-1	Class IE2	
Premium Efficiency		IE3 class	
Climate			
Storage	EN 60721-3-1:1997	1K3 (-25 ... +60 °C)	
Transport	EN 60721-3-2:1997	2K3 (-25 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (0 ... +40 °C)	
	-	-30 ...+10 °C	Depending on the temperature package! Observe ambient temperature on the nameplate!
		-30 ...+40 °C	
Site altitude			
0 … 1000 m amsl	-	Without current derating	
1000 … 4000 m amsl		Reduce power by 5 %/1000 m	
Air humidity			
Without condensation	-	Average relative humidity 85 %	

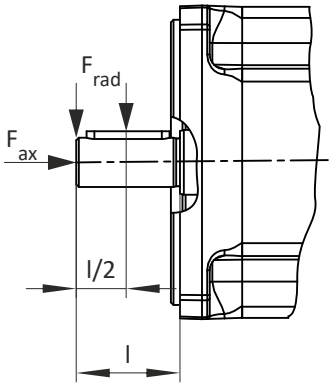


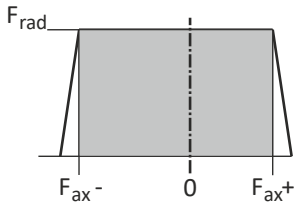
Radial forces and axial forces

The values for the bearing service life L_{10h} refer to an average speed of 2000 rpm for the motor. Depending on the ambient temperatures, they are additionally limited by the grease lifetime.

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

Application of forces

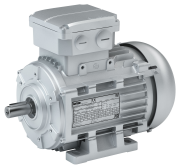




Application of force at l/2

Motor			m550-H	
Size			**063**	**071**
Bearing service life 10000 h				
Radial force	F_{rad}	rated	400	700
Min. axial force	$F_{ax,-}$	rated	-200	-400
Max. axial force	$F_{Fax,+}$	rated	400	600
Bearing service life 20000 h				
Radial force	F_{rad}	rated	280	590
Min. axial force	$F_{ax,-}$	rated	-140	-270
Max. axial force	$F_{Fax,+}$	rated	340	470
Bearing service life 30000 h				
Radial force	F_{rad}	rated	230	500
Min. axial force	$F_{ax,-}$	rated	-110	-230
Max. axial force	$F_{Fax,+}$	rated	310	430

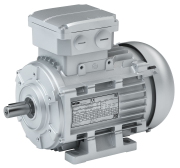
Motor			m550-P						
Size			**080**	**090**	**100**	**112**	**132**	**160**	**180**
Bearing service life 10000 h									
Radial force	F_{rad}	rated	880	1150	1500	2100	2600	4100	5100
Min. axial force	$F_{ax,-}$	rated	-510	-620	-700	-850	-930	-1130	-1360
Max. axial force	$F_{Fax,+}$	rated	680	1070	1200	1350	1550	1870	2140
Bearing service life 20000 h									
Radial force	F_{rad}	rated	770	850	1170	1700	2000	3300	4000
Min. axial force	$F_{ax,-}$	rated	-320	-470	-500	-550	-660	-760	-1010
Max. axial force	$F_{Fax,+}$	rated	490	930	1000	1050	1290	1500	1790
Bearing service life 30000 h									
Radial force	F_{rad}	rated	640	730	1050	1430	1700	3100	3600
Min. axial force	$F_{ax,-}$	rated	-260	-370	-390	-400	-530	-610	-760
Max. axial force	$F_{Fax,+}$	rated	430	830	890	900	1160	1350	1540



Application of force at l

Motor			m550-H	
Size			**063**	**071**
Bearing service life 10000 h				
Radial force	F_{rad}	rated	370	650
Min. axial force	$F_{ax,-}$	rated	-200	-400
Max. axial force	$F_{Fax,+}$	rated	400	600
Bearing service life 20000 h				
Radial force	F_{rad}	rated	260	550
Min. axial force	$F_{ax,-}$	rated	-140	-270
Max. axial force	$F_{Fax,+}$	rated	340	470
Bearing service life 30000 h				
Radial force	F_{rad}	rated	210	460
Min. axial force	$F_{ax,-}$	rated	-110	-230
Max. axial force	$F_{Fax,+}$	rated	310	430

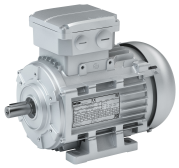
Motor			m550-P						
Size			**080**	**090**	**100**	**112**	**132**	**160**	**180**
Bearing service life 10000 h									
Radial force	F_{rad}	rated	800	1050	1350	1900	2350	3700	4700
Min. axial force	$F_{ax,-}$	rated	-510	-620	-700	-850	-930	-1130	-1360
Max. axial force	$F_{Fax,+}$	rated	680	1070	1200	1350	1560	1870	2140
Bearing service life 20000 h									
Radial force	F_{rad}	rated	700	770	1050	1500	1800	3000	3600
Min. axial force	$F_{ax,-}$	rated	-320	-470	-500	-550	-660	-760	-1010
Max. axial force	$F_{Fax,+}$	rated	490	930	1000	1050	1290	1500	1790
Bearing service life 30000 h									
Radial force	F_{rad}	rated	580	670	950	1300	1500	2800	3200
Min. axial force	$F_{ax,-}$	rated	-260	-370	-390	-400	-530	-610	-760
Max. axial force	$F_{Fax,+}$	rated	430	830	890	900	1160	1350	1540



Rated data

Rated data 50 Hz

Motor			m550-H				
			63/S4	63/M4	63/L4	71/M4	71/L4
Rated power	P_{rated}	kW	0.12	0.18	0.25	0.37	0.55
Rated speed	n_{rated}	rpm	1415	1400	1390	1425	1430
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Delta	$V_{rated, \Delta}$	V	230	230	230	230	230
Star	$V_{rated, Y}$	V	400	400	400	400	400
Rated current							
230 V	$I_{rated, \Delta}$	A	0.710	0.940	1.18	1.71	2.34
400 V	$I_{rated, Y}$	A	0.410	0.540	0.680	0.990	1.35
Starting current	I_a	A	1.40	1.94	2.60	4.23	6.32
Rated torque	M_{rated}	Nm	0.810	1.23	1.72	2.48	3.67
Starting torque	M_a	Nm	1.54	2.46	3.44	4.45	6.95
Stalling torque	M_b	Nm	1.94	2.83	3.78	6.92	11.3
Power factor	cos φ		0.68	0.72	0.76	0.74	0.76
Efficiency							
at 50 % P_{rated}	η		0.549	0.625	0.695	0.695	0.758
at 75 % P_{rated}	η		0.591	0.647	0.685	0.727	0.771
at 100 % P_{rated}	η		0.591	0.647	0.685	0.727	0.771
Moment of inertia	J	$kgcm^2$	2.4	2.9	3.7	9.1	13.3
Weight	m	kg	4.32	4.77	5.77	7.77	8.97



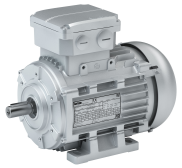
Motor			m550-P				
			80/M4	90/M4	90/L4	100/M4	100/L4
Rated power	P_{rated}	kW	0.75	1.1	1.5	2.2	3
Rated speed	n_{rated}	rpm	1455	1465	1465	1470	1470
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Delta	$V_{rated, \Delta}$	V	230	230	230	230	230
Star	$V_{rated, Y}$	V	400	400	400	400	400
Rated current							
230 V	$I_{rated, \Delta}$	A	2.77	4.00	5.51	7.72	10.6
400 V	$I_{rated, Y}$	A	1.60	2.31	3.18	4.46	6.10
Starting current	I_a	A	8.91	16.4	22.5	35.8	47.1
Rated torque	M_{rated}	Nm	4.92	7.17	9.78	14.3	19.5
Starting torque	M_a	Nm	7.38	14.4	20.6	31.3	43.1
Stalling torque	M_b	Nm	16.2	25.2	34.3	49.8	66.6
Power factor	cos φ		0.84	0.83	0.82	0.83	0.84
Efficiency							
at 50 % P_{rated}	η		0.826	0.844	0.851	0.879	0.883
at 75 % P_{rated}	η		0.825	0.841	0.853	0.867	0.877
at 100 % P_{rated}	η		0.825	0.841	0.853	0.867	0.877
Moment of inertia	J	$kgcm^2$	27.2	53.8	58.3	123	130.3
Weight	m	kg	12.28	17.33	18.43	30.41	31.61

Motor			m550-P				
			112/M4	132/M4	132/L4	160/M4	160/L4
Rated power	P_{rated}	kW	4	5.5	7.5	11	15
Rated speed	n_{rated}	rpm	1470	1480	1480	1485	1485
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Delta	$V_{rated, \Delta}$	V	230	230	230	230	230
Star	$V_{rated, Y}$	V	400	400	400	400	400
Rated current							
230 V	$I_{rated, \Delta}$	A	13.5	18.3	25.4	36.0	49.2
400 V	$I_{rated, Y}$	A	7.82	10.6	14.6	20.8	28.4
Starting current	I_a	A	58.3	84.9	117	163	228
Rated torque	M_{rated}	Nm	26.0	35.5	48.4	70.7	96.5
Starting torque	M_a	Nm	44.1	53.3	77.6	98.9	144
Stalling torque	M_b	Nm	83.1	131	179	226	308
Power factor	cos φ		0.86	0.86	0.85	0.86	0.849
Efficiency							
at 50 % P_{rated}	η		0.898	0.903	0.908	0.920	0.928
at 75 % P_{rated}	η		0.886	0.896	0.904	0.914	0.921
at 100 % P_{rated}	η		0.886	0.896	0.904	0.914	0.921
Moment of inertia	J	$kgcm^2$	198	470.6	485.9	1360	1550
Weight	m	kg	40.38	61.82	64.26	168.4	183.2

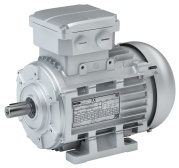
Technical data

Rated data

Rated data 50 Hz



Motor			m550-P	
			180/M4	180/L4
Rated power	P_{rated}	kW	18.5	22
Rated speed	n_{rated}	rpm	1485	1480
Max. speed	n_{max}	rpm	4500	4500
Rated voltage				
Delta	$V_{rated, \Delta}$	V	230	230
Star	$V_{rated, Y}$	V	400	400
Rated current				
230 V	$I_{rated, \Delta}$	A	57.6	67.2
400 V	$I_{rated, Y}$	A	33.3	38.8
Starting current	I_a	A	315	312
Rated torque	M_{rated}	Nm	119	142
Starting torque	M_a	Nm	251	241
Stalling torque	M_b	Nm	465	467
Power factor	cos φ		0.893	0.906
Efficiency				
at 50 % P_{rated}	η		0.932	0.937
at 75 % P_{rated}	η		0.926	0.930
at 100 % P_{rated}	η		0.926	0.930
Moment of inertia	J	$kgcm^2$	2330	2400
Weight	m	kg	244.6	255.3



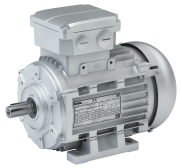
Rated data 60 Hz

Motor			m550-H				
			63/S4	63/M4	63/L4	71/M4	71/L4
Rated power	P_{rated}	kW	0.12	0.18	0.25	0.37	0.55
Rated speed	n_{rated}	rpm	1725	1715	1710	1735	1740
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Star	$V_{rated, Y}$	V	460	460	460	460	460
Rated current							
460 V	$I_{rated, Y}$	A	0.370	0.480	0.600	0.880	1.21
Starting current	I_a	A	1.47	2.07	2.68	4.28	6.32
Rated torque	M_{rated}	Nm	0.700	1.00	1.40	2.00	3.00
Starting torque	M_a	Nm	1.54	2.32	3.08	3.88	5.74
Stalling torque	M_b	Nm	2.01	2.83	3.78	6.94	10.9
Power factor	cos φ		0.62	0.67	0.71	0.7	0.73
Efficiency							
at 50 % P_{rated}	η		0.564	0.640	0.704	0.708	0.762
at 75 % P_{rated}	η		0.637	0.680	0.700	0.720	0.755
at 100 % P_{rated}	η		0.640	0.680	0.700	0.720	0.755
Moment of inertia	J	$kgcm^2$	2.4	2.9	3.7	9.1	13.3
Weight	m	kg	4.32	4.77	5.77	7.77	8.97

Technical data

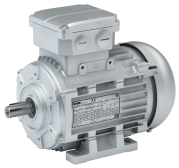
Rated data

Rated data 60 Hz

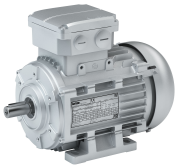


Motor			m550-P				
			80/M4	90/M4	90/L4	100/M4	100/L4
Rated power	P_{rated}	kW	0.75	1.1	1.5	2.2	3
Rated speed	n_{rated}	rpm	1760	1770	1770	1775	1770
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Star	$V_{rated, Y}$	V	460	460	460	460	460
Rated current							
460 V	$I_{rated, Y}$	A	1.40	2.02	2.78	3.93	5.31
Starting current	I_a	A	8.71	16.2	22.0	35.6	46.1
Rated torque	M_{rated}	Nm	4.10	5.90	8.10	11.8	16.2
Starting torque	M_a	Nm	6.09	12.5	17.8	27.3	37.1
Stalling torque	M_b	Nm	15.8	23.8	32.4	46.2	62.9
Power factor	cos φ		0.82	0.81	0.8	0.82	0.82
Efficiency							
at 50 % P_{rated}	η		0.831	0.846	0.855	0.880	0.885
at 75 % P_{rated}	η		0.852	0.865	0.865	0.895	0.895
at 100 % P_{rated}	η		0.855	0.865	0.865	0.895	0.895
Moment of inertia	J	kgcm²	27.2	53.8	58.3	123	130.3
Weight	m	kg	12.28	17.33	18.43	30.41	31.61

Motor			m550-P				
			112/M4	132/M4	132/L4	160/M4	160/L4
Rated power	P_{rated}	kW	4	5.5	7.5	11	15
Rated speed	n_{rated}	rpm	1775	1780	1780	1785	1785
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Rated voltage							
Star	$V_{rated, Y}$	V	460	460	460	460	460
Rated current							
460 V	$I_{rated, Y}$	A	6.82	9.26	12.8	18.2	24.7
Starting current	I_a	A	57.2	81.3	112	156	216
Rated torque	M_{rated}	Nm	21.5	29.5	40.2	58.8	80.2
Starting torque	M_a	Nm	38.7	44.2	64.5	82.1	120
Stalling torque	M_b	Nm	79.6	121	169	205	281
Power factor	cos φ		0.85	0.85	0.83	0.85	0.843
Efficiency							
at 50 % P_{rated}	η		0.901	0.902	0.909	0.919	0.926
at 75 % P_{rated}	η		0.895	0.914	0.917	0.924	0.930
at 100 % P_{rated}	η		0.895	0.917	0.917	0.924	0.930
Moment of inertia	J	kgcm²	198	470.6	485.9	1360	1550
Weight	m	kg	40.38	61.82	64.26	168.4	183.2

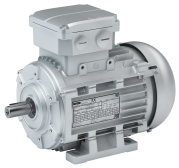


Motor			**m550-P**	
			180/M4	**180/L4**
Rated power	P_{rated}	kW	18.5	22
Rated speed	n_{rated}	rpm	1785	1780
Max. speed	n_{max}	rpm	4500	4500
Rated voltage				
Star	$V_{rated, Y}$	V	460	460
Rated current				
460 V	$I_{rated, Y}$	A	29.0	33.8
Starting current	I_a	A	305	304
Rated torque	M_{rated}	Nm	99.0	118
Starting torque	M_a	Nm	208	212
Stalling torque	M_b	Nm	425	423
Power factor	cos φ		0.885	0.901
Efficiency				
at 50 % P_{rated}	η		0.929	0.936
at 75 % P_{rated}	η		0.936	0.936
at 100 % P_{rated}	η		0.936	0.936
Moment of inertia	J	kgcm²	2330	2400
Weight	m	kg	244.6	255.3



Rated data 87 Hz

Motor			m550-H				
			63/S4	63/M4	63/L4	71/M4	71/L4
Rated power	P_{rated}	kW	0.21	0.33	0.45	0.66	1
Rated speed	n_{rated}	rpm	2525	2505	2500	2535	2540
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Max. torque	M_{max}	Nm	3.20	4.90	6.90	9.90	14.7
Rated voltage							
Delta	$V_{rated, \Delta}$	V	400	400	400	400	400
Rated current							
400 V	$I_{rated, \Delta}$	A	0.740	0.970	1.19	1.75	2.42
Rated torque	M_{rated}	Nm	0.794	1.26	1.72	2.49	3.76
Power factor	cos φ		0.6	0.68	0.72	0.7	0.74
Efficiency							
at 50 % P_{rated}	η		0.598	0.675	0.729	0.730	0.781
at 75 % P_{rated}	η		0.670	0.726	0.768	0.777	0.816
at 100 % P_{rated}	η		0.702	0.744	0.776	0.792	0.826
Moment of inertia	J	$kgcm^2$	2.4	2.9	3.7	9.1	13.3
Weight	m	kg	4.32	4.77	5.77	7.77	8.97



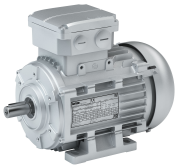
Motor			m550-P				
			80/M4	90/M4	90/L4	100/M4	100/L4
Rated power	P_{rated}	kW	1.35	1.9	2.6	3.9	5.2
Rated speed	n_{rated}	rpm	2565	2575	2575	2580	2580
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Max. torque	M_{max}	Nm	19.7	28.7	39.1	57.2	78.0
Rated voltage							
Delta	$V_{rated, \Delta}$	V	400	400	400	400	400
Rated current							
400 V	$I_{rated, \Delta}$	A	2.82	3.94	5.48	7.83	10.4
Rated torque	M_{rated}	Nm	5.03	7.05	9.64	14.4	19.2
Power factor	cos φ		0.83	0.82	0.8	0.83	0.82
Efficiency							
at 50 % P_{rated}	η		0.845	0.855	0.864	0.889	0.893
at 75 % P_{rated}	η		0.865	0.878	0.883	0.904	0.906
at 100 % P_{rated}	η		0.868	0.882	0.886	0.906	0.907
Moment of inertia	J	$kgcm^2$	27.2	53.8	58.3	123	130.3
Weight	m	kg	12.28	17.33	18.43	30.41	31.61

Motor			m550-P				
			112/M4	132/M4	132/L4	160/M4	160/L4
Rated power	P_{rated}	kW	7.35	9.6	13.1	19.2	26.3
Rated speed	n_{rated}	rpm	2580	2590	2590	2595	2595
Max. speed	n_{max}	rpm	4500	4500	4500	4500	4500
Max. torque	M_{max}	Nm	104	142	194	283	386
Rated voltage							
Delta	$V_{rated, \Delta}$	V	400	400	400	400	400
Rated current							
400 V	$I_{rated, \Delta}$	A	14.1	18.4	25.4	36.1	49.2
Rated torque	M_{rated}	Nm	27.2	35.4	48.3	70.7	96.8
Power factor	cos φ		0.86	0.85	0.84	0.85	0.847
Efficiency							
at 50 % P_{rated}	η		0.909	0.908	0.914	0.922	0.929
at 75 % P_{rated}	η		0.917	0.920	0.925	0.934	0.939
at 100 % P_{rated}	η		0.913	0.922	0.925	0.935	0.940
Moment of inertia	J	$kgcm^2$	198	470.6	485.9	1360	1550
Weight	m	kg	40.38	61.82	64.26	168.4	183.2

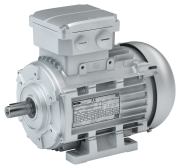
Technical data

Rated data

Rated data 87 Hz



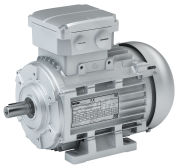
Motor			m550-P	
			180/M4	180/L4
Rated power	P_{rated}	kW	32.2	38.5
Rated speed	n_{rated}	rpm	2590	2590
Max. speed	n_{max}	rpm	4500	4500
Max. torque	M_{max}	Nm	476	568
Rated voltage				
Delta	$V_{rated, \Delta}$	V	400	400
Rated current				
400 V	$I_{rated, \Delta}$	A	57.5	67.6
Rated torque	M_{rated}	Nm	119	142
Power factor	cos φ		0.892	0.906
Efficiency				
at 50 % P_{rated}	η		0.932	0.939
at 75 % P_{rated}	η		0.941	0.945
at 100 % P_{rated}	η		0.942	0.944
Moment of inertia	J	$kgcm^2$	2330	2400
Weight	m	kg	244.6	255.3



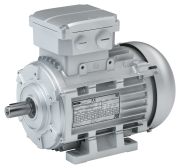
Ecodesign Directive

Product information acc. to REGULATION (EU) 2019/1781 (ANNEX I, Section 4)

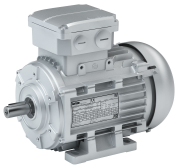
Rated efficiency at full load	η_{rated}	%	59.1	64	64.7	68	68.5	70	72.7	72
Efficiency at 75 % rated load	η	%	59.1	63.7	64.7	68	68.5	70	72.7	72
Efficiency at 50 % rated load	η	%	54.9	56.4	62.5	64	69.5	70.4	69.5	70.8
Efficiency level			IE2							
Name of the manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY							
Commercial register number			Hannover HRB 204803							
Model identifier of the product			M55BH063S04		M55BH063M04		M55BH063L04		M55BH071M04	
Number of poles of the motor			4							
Rated output power	P_{rated}	kW	0.12		0.18		0.25		0.37	
Rated input frequency	f_{rated}	Hz	50	60	50	60	50	60	50	60
Rated voltage	V_{rated}	V	400	460	400	460	400	460	400	460
Rated speed	n_{rated}	min^{-1}	1415	1725	1400	1715	1390	1710	1425	1735
Number of motor phases			Three-phase motor							
Altitudes above sea level		m	0 ... 1000							
Ambient air temperature		°C	-30 ... +40							
Maximum operating temperature		°C	155							
Potentially explosive atmospheres			Operation in explosive atmospheres not permitted							



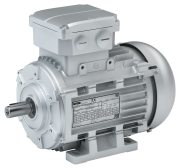
Rated efficiency at full load	η_{rated}	%	77.1	75.5	82.5	85.5	84.1	86.5	85.3	86.5
Efficiency at 75 % rated load	η	%	77.1	75.5	82.5	85.2	84.1	86.5	85.3	86.5
Efficiency at 50 % rated load	η	%	75.8	76.2	82.6	83.1	84.4	84.6	85.1	85.5
Efficiency level			IE2		IE3					
Name of the manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY							
Commercial register number			Hannover HRB 204803							
Model identifier of the product			M55BH071L04		M55BP080M04		M55BP090M04		M55BP090L04	
Number of poles of the motor			4							
Rated output power	P_{rated}	kW	0.55		0.75		1.1		1.5	
Rated input frequency	f_{rated}	Hz	50	60	50	60	50	60	50	60
Rated voltage	V_{rated}	V	400	460	400	460	400	460	400	460
Rated speed	n_{rated}	min^{-1}	1430	1740	1455	1760	1465	1770	1465	1770
Number of motor phases			Three-phase motor							
Altitudes above sea level		m	0 ... 1000							
Ambient air temperature		°C	-30 ... +40							
Maximum operating temperature		°C	155							
Potentially explosive atmospheres			Operation in explosive atmospheres not permitted							



Rated efficiency at full load	η_{rated}	%	86.7	89.5	87.7	89.5	88.6	89.5	89.6	91.7
Efficiency at 75 % rated load	η	%	86.7	89.5	87.7	89.5	88.6	89.5	89.6	91.4
Efficiency at 50 % rated load	η	%	87.9	88	88.3	88.5	89.8	90.1	90.3	90.2
Efficiency level			IE3							
Name of the manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY							
Commercial register number			Hannover HRB 204803							
Model identifier of the product			M55BP100M04		M55BP100L04		M55BP112M04		M55BP132M04	
Number of poles of the motor			4							
Rated output power	P_{rated}	kW	2.2		3		4		5.5	
Rated input frequency	f_{rated}	Hz	50	60	50	60	50	60	50	60
Rated voltage	V_{rated}	V	400	460	400	460	400	460	400	460
Rated speed	n_{rated}	min^{-1}	1470	1775	1470	1770	1470	1775	1480	1780
Number of motor phases			Three-phase motor							
Altitudes above sea level		m	0 ... 1000							
Ambient air temperature		°C	-30 ... +40							
Maximum operating temperature		°C	155							
Potentially explosive atmospheres			Operation in explosive atmospheres not permitted							

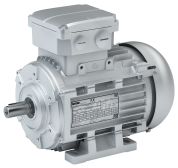


Rated efficiency at full load	η_{rated}	%	90.4	91.7	91.4	92.4	92.1	93	92.6	93.6
Efficiency at 75 % rated load	η	%	90.4	91.7	91.4	92.4	92.1	93	92.6	93.6
Efficiency at 50 % rated load	η	%	90.8	90.9	92	91.9	92.8	92.6	93.2	92.9
Efficiency level			IE3							
Name of the manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY							
Commercial register number			Hannover HRB 204803							
Model identifier of the product			M55BP132L04		M55BP160M04		M55BP160L04		M55BP180M04	
Number of poles of the motor			4							
Rated output power	P_{rated}	kW	7.5		11		15		18.5	
Rated input frequency	f_{rated}	Hz	50	60	50	60	50	60	50	60
Rated voltage	V_{rated}	V	400	460	400	460	400	460	400	460
Rated speed	n_{rated}	min^{-1}	1480	1780	1485	1785	1485	1785	1485	1785
Number of motor phases			Three-phase motor							
Altitudes above sea level		m	0 ... 1000							
Ambient air temperature		°C	-30 ... +40							
Maximum operating temperature		°C	155							
Potentially explosive atmospheres			Operation in explosive atmospheres not permitted							



Rated efficiency at full load	η_{rated}	%	93	93.6
Efficiency at 75 % rated load	η	%	93	93.6
Efficiency at 50 % rated load	η	%	93.7	93.6
Efficiency level			IE3	
Name of the manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY	
Commercial register number			Hannover HRB 204803	
Model identifier of the product			M55BP180L04	
Number of poles of the motor			4	
Rated output power	P_{rated}	kW	22	
Rated input frequency	f_{rated}	Hz	50	60
Rated voltage	V_{rated}	V	400	460
Rated speed	n_{rated}	min^{-1}	1480	1780
Number of motor phases			Three-phase motor	
Altitudes above sea level		m	0 ... 1000	
Ambient air temperature		°C	-30 ... +40	
Maximum operating temperature		°C	155	
Potentially explosive atmospheres			Operation in explosive atmospheres not permitted	

Efficiency (η_N, η) The efficiency refers to the nominal voltage and an ambient reference temperature of 25 °C.



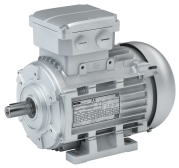
Motor – inverter assignment

Rated frequency 50/60 Hz

Rated power	Motor	8400 motec	i510	i550
kW				
0.12	m550-H63/S4	-	i510-C0.25	i550-C0.25
0.18	m550-H63/M4	-	i510-C0.25	i550-C0.25
0.25	m550-H63/L4	E84DVB☐3714S☐☐☐2☐	i510-C0.25	i550-C0.25
0.37	m550-H71/M4	E84DVB☐3714S☐☐☐2☐	i510-C0.37	i550-C0.37
0.55	m550-H71/L4	E84DVB☐5514S☐☐☐2☐	i510-C0.55	i550-C0.55
0.75	m550-P80/M4	E84DVB☐7514S☐☐☐2☐	i510-C0.75	i550-C0.75
1.1	m550-P90/M4	E84DVB☐1124S☐☐☐2☐	i510-C1.1	i550-C1.1
1.5	m550-P90/L4	E84DVB☐1524S☐☐☐2☐	i510-C1.5	i550-C1.5
2.2	m550-P100/M4	E84DVB☐2224S☐☐☐2☐	i510-C2.2	i550-C2.2
3	m550-P100/L4	E84DVB☐3024S☐☐☐2☐	i510-C3.0	i550-C3.0
4	m550-P112/M4	E84DVB☐4024S☐☐☐2☐	i510-C4.0	i550-C4.0
5.5	m550-P132/M4	E84DVB☐5524S☐☐☐2☐	i510-C5.5	i550-C5.5
7.5	m550-P132/L4	E84DVB☐7524S☐☐☐2☐	i510-C7.5	i550-C7.5
11	m550-P160/M4	-	i510-C11	i550-C11
15	m550-P160/L4	-	-	i550-C15
18.5	m550-P180/M4	-	-	i550-C18
22	m550-P180/L4	-	-	i550-C22

Rated frequency 87 Hz

Rated power	Motor	8400 motec	i510	i550
kW				
0.21	m550-H63/S4	E84DVB☐3714S☐☐☐2☐	i510-C0.37	i550-C0.37
0.33	m550-H63/M4	E84DVB☐3714S☐☐☐2☐	i510-C0.37	i550-C0.37
0.45	m550-H63/L4	E84DVB☐5514S☐☐☐2☐	i510-C0.55	i550-C0.55
0.66	m550-H71/M4	E84DVB☐7514S☐☐☐2☐	i510-C0.75	i550-C0.75
1.0	m550-H71/L4	E84DVB☐1124S☐☐☐2☐	i510-C1.1	i550-C1.1
1.35	m550-P80/M4	E84DVB☐1524S☐☐☐2☐	i510-C1.5	i550-C1.5
1.9	m550-P90/M4	E84DVB☐2224S☐☐☐2☐	i510-C2.2	i550-C2.2
2.6	m550-P90/L4	E84DVB☐3024S☐☐☐2☐	i510-C3.0	i550-C3.0
3.9	m550-P100/M4	E84DVB☐4024S☐☐☐2☐	i510-C4.0	i550-C4.0
5.2	m550-P100/L4	E84DVB☐5524S☐☐☐2☐	i510-C5.5	i550-C5.5
7.35	m550-P112/M4	E84DVB☐7524S☐☐☐2☐	i510-C7.5	i550-C7.5
9.6	m550-P132/M4	-	i510-C11	i550-C11
13.1	m550-P132/L4	-	-	i550-C15
19.2	m550-P160/M4	-	-	i550-C22
26.3	m550-P160/L4	-	-	i550-C30
32.2	m550-P180/M4	-	-	i550-C37
38.5	m550-P180/L4	-	-	i550-C45



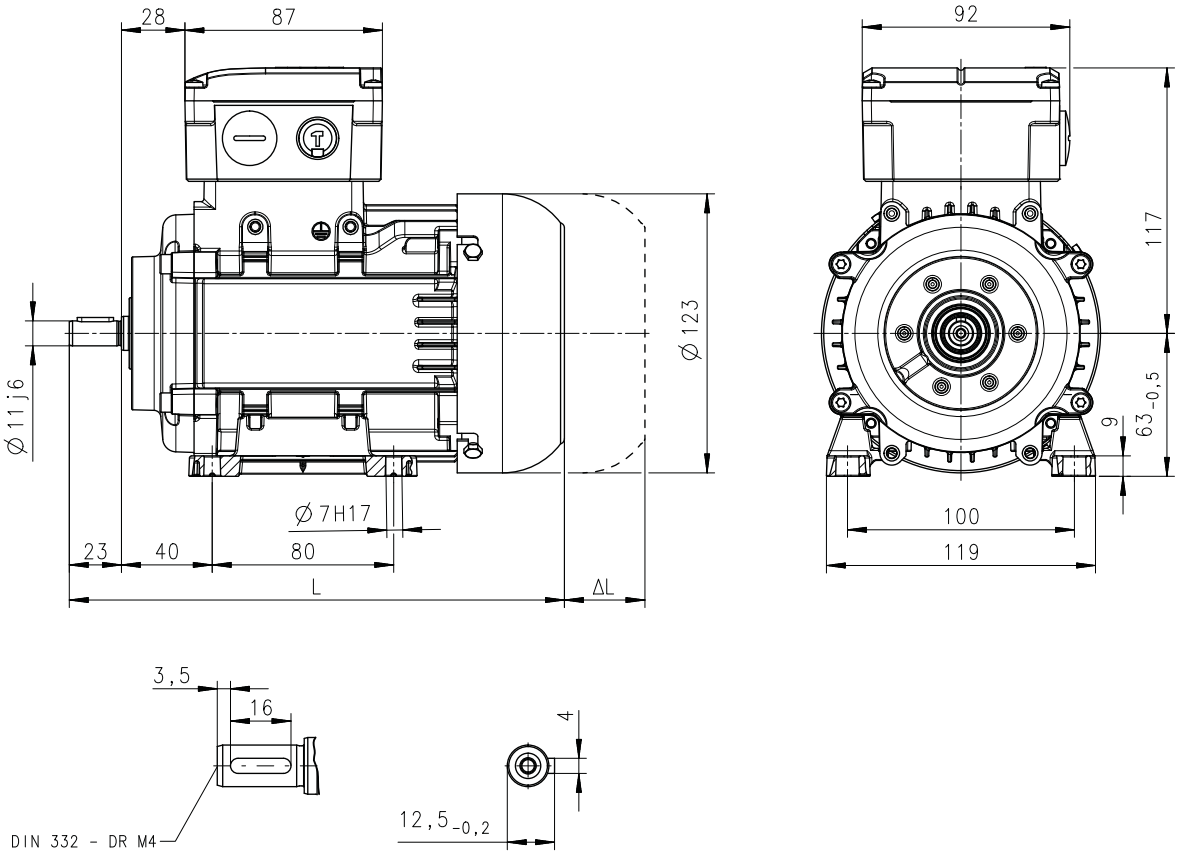
Dimensions

Notes on the basic dimensions

Basic dimensions

m550-H63
Self-ventilated motors

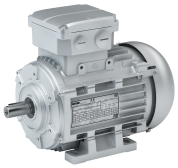
Design B3



8800858-00

Motor			m550-H63/S4	m550-H63/M4	m550-H63/L4
Motor length	L	mm	219		

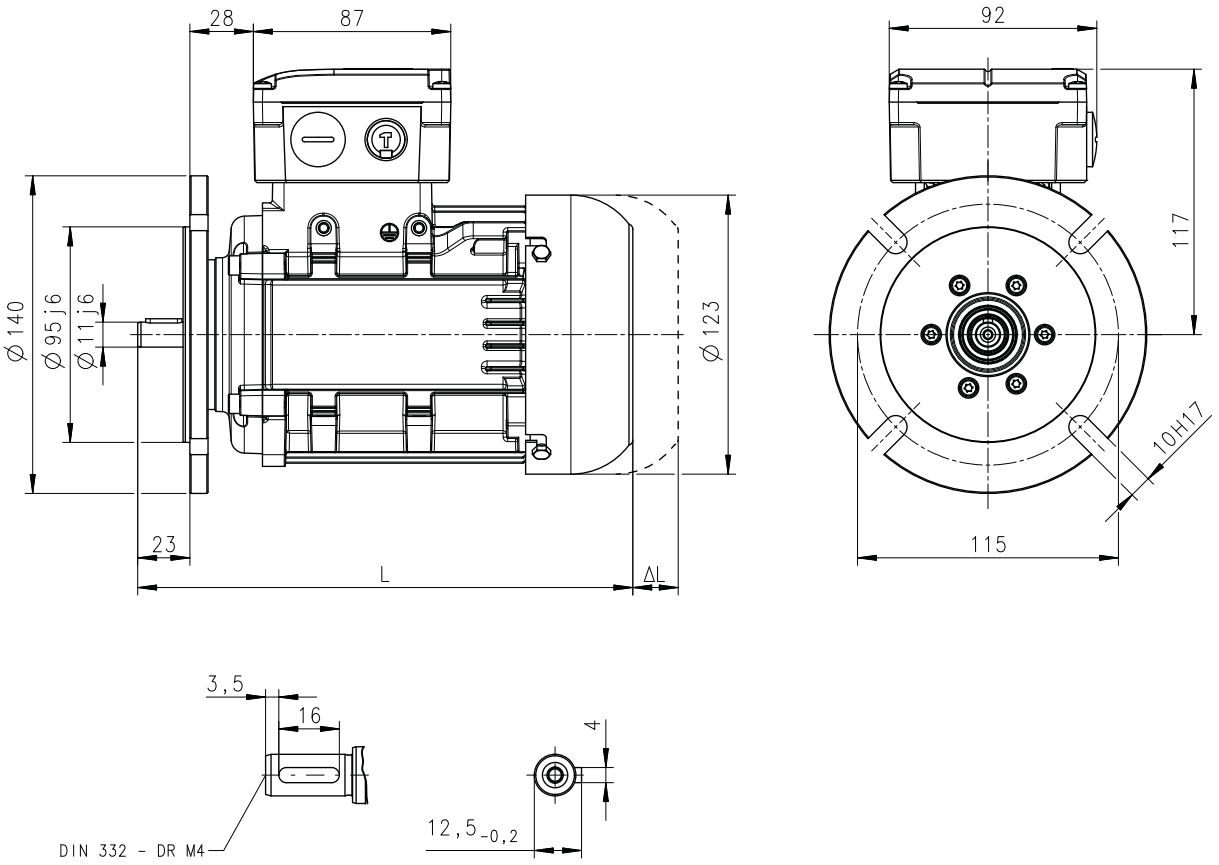
Δ L ▸ Additional lengths 🕮 74



m550-H63

Self-ventilated motors

Design B5



8800859-00

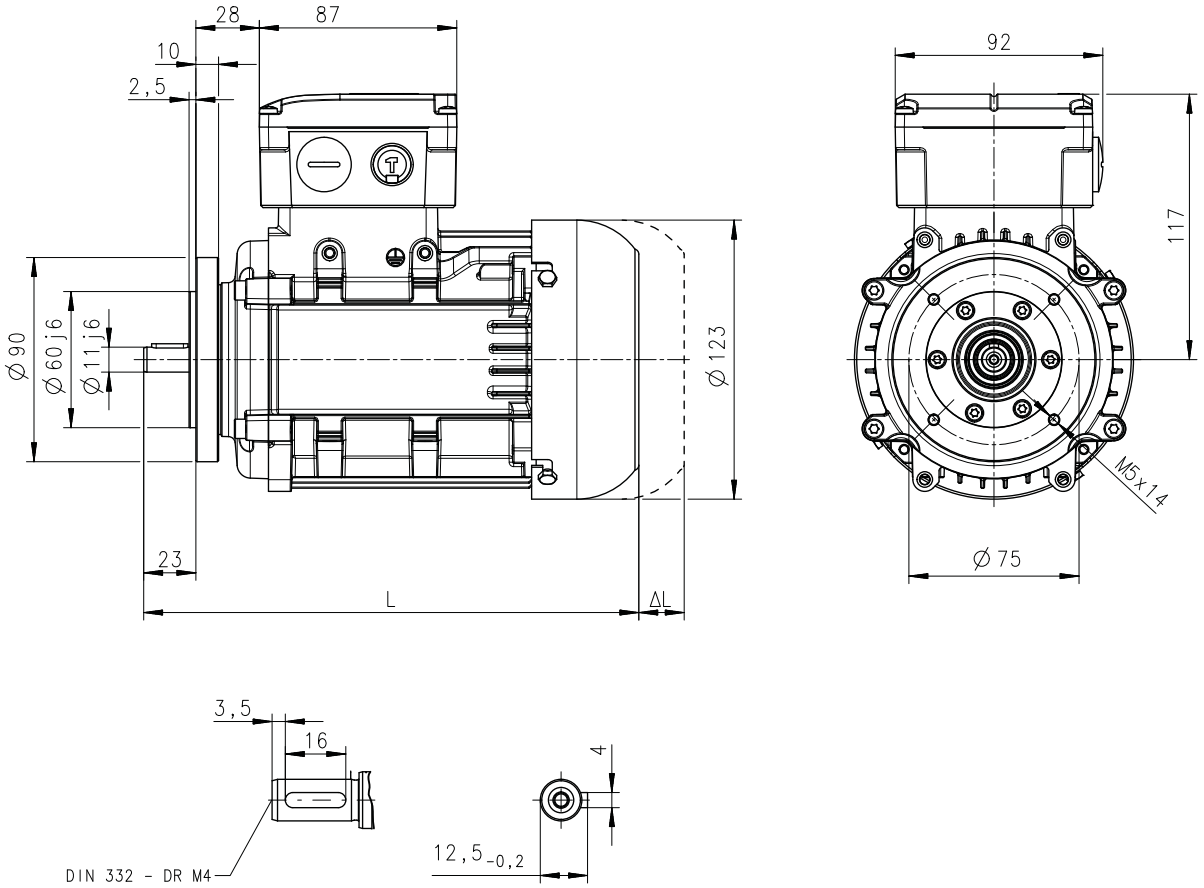
Motor			m550-H63/S4	m550-H63/M4	m550-H63/L4
Motor length	L	mm	219		

Δ L ▸ Additional lengths 🕮 74

m550-H63

Self-ventilated motors

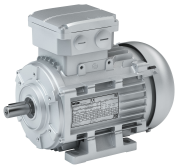
Design B14



8800860-00

Motor			m550-H63/S4	m550-H63/M4	m550-H63/L4
Motor length	L	mm	219		

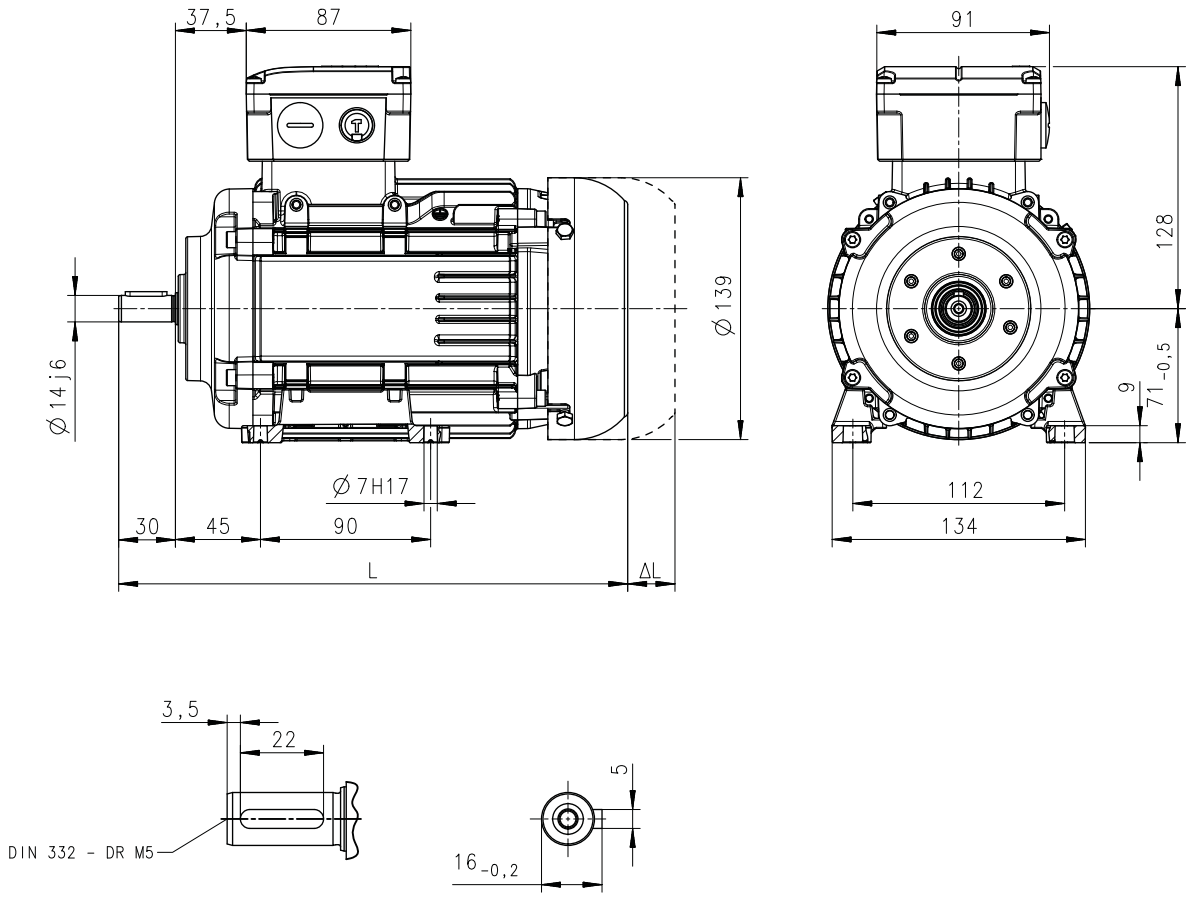
Δ L ▸ Additional lengths 🕮 74



m550-H71

Self-ventilated motors

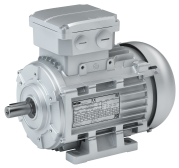
Design B3



8801007-00

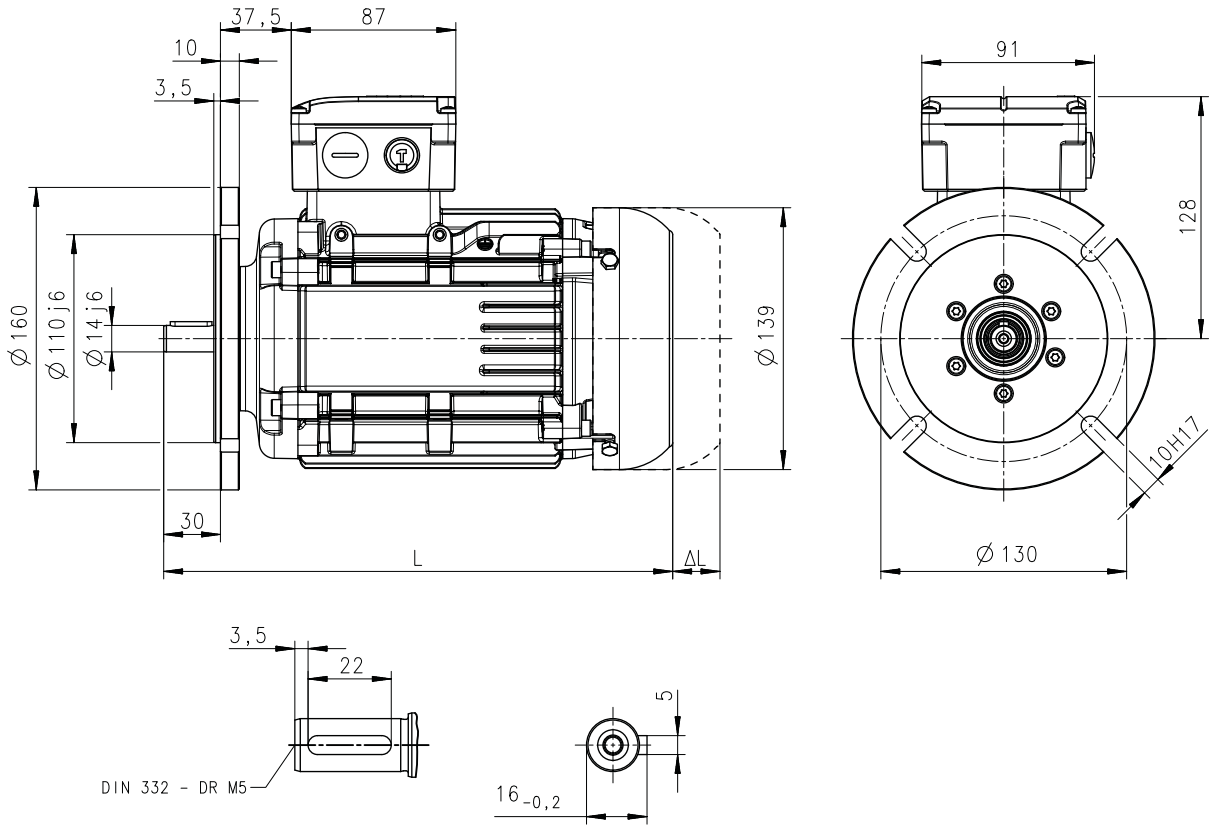
Motor			m550-H71/M4	m550-H71/L4
Motor length	L	mm	269	

Δ L ▸ Additional lengths 🕮 74



m550-H71
Self-ventilated motors

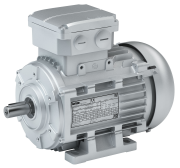
Design B5



8801008-00

Motor			m550-H71/M4	m550-H71/L4
Motor length	L	mm	269	

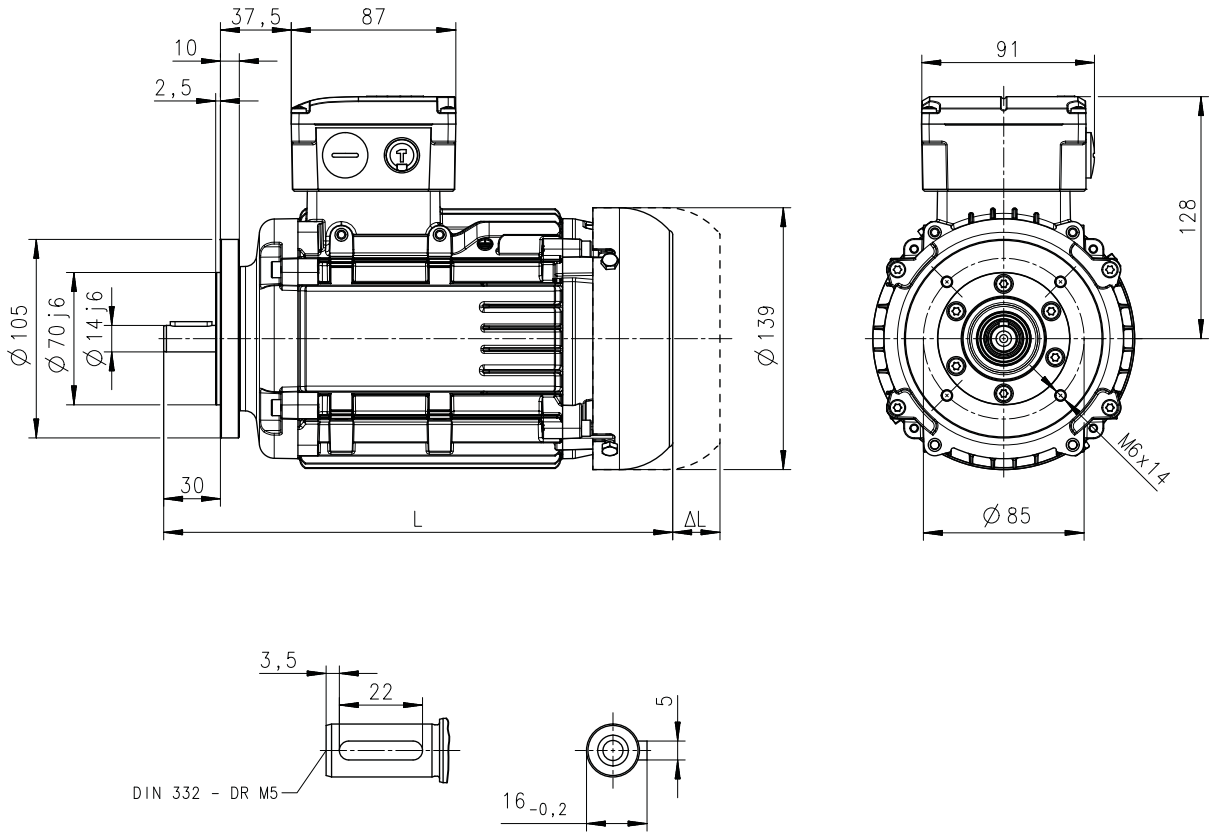
Δ L ▸ Additional lengths 🕮 74



m550-H71

Self-ventilated motors

Design B14

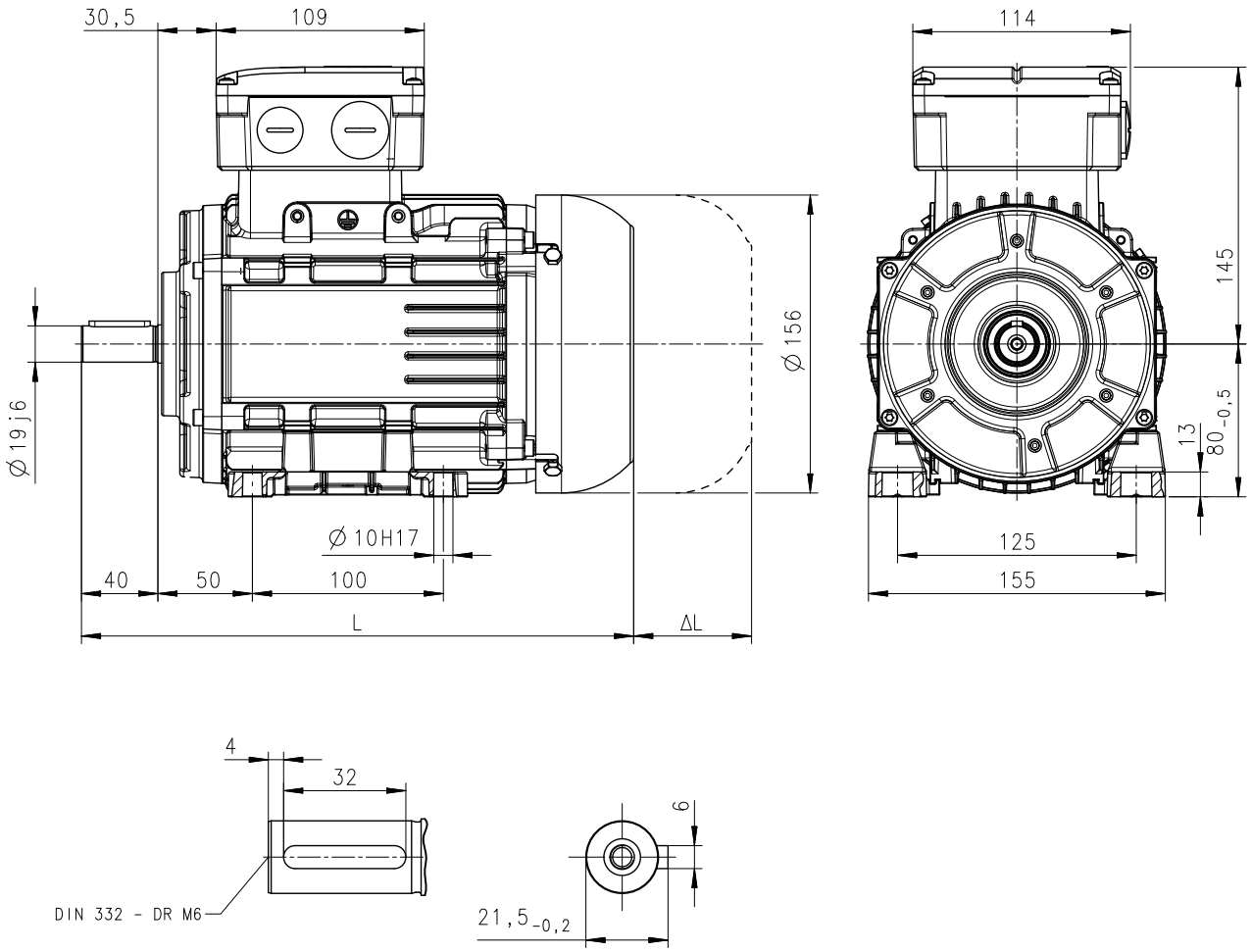


8801009-00

Motor			m550-H71/M4	m550-H71/L4
Motor length	L	mm	269	

Δ L ▸ Additional lengths 🕮 74

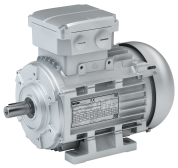
m550-P80
Self-ventilated motors
Design B3



8800861-00

Motor			m550-P80/M4
Motor length	L	mm	290

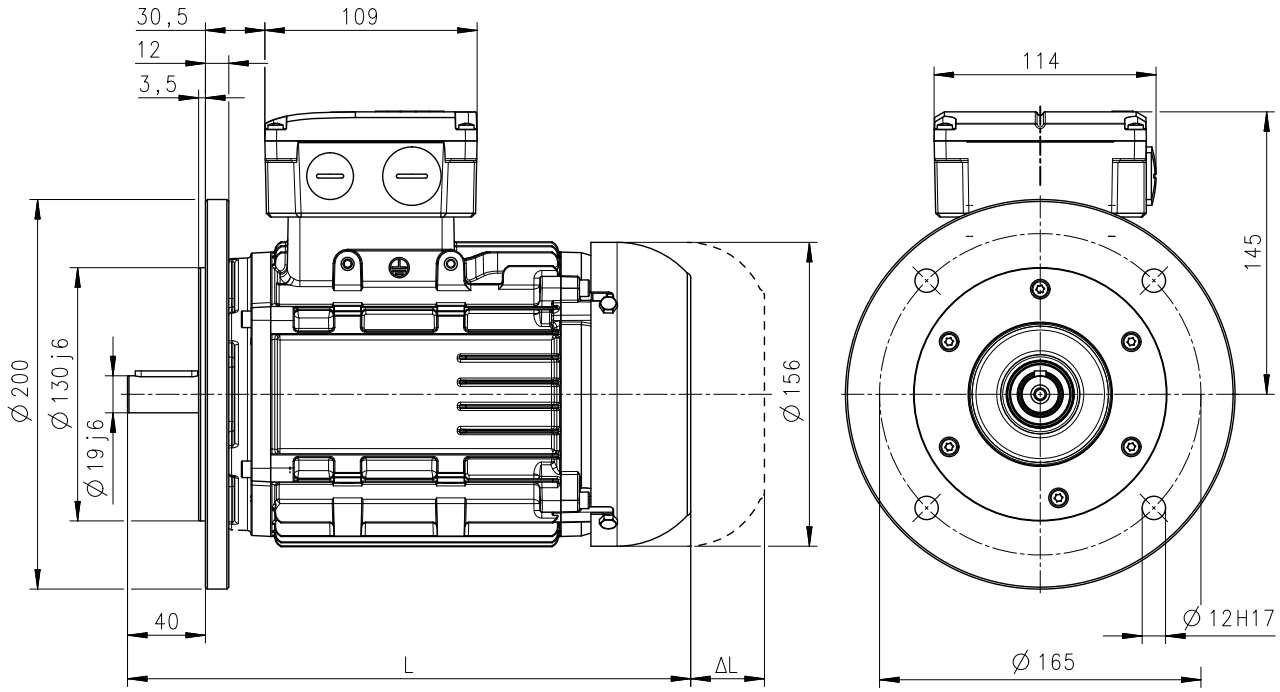
Δ L ▸ Additional lengths 🕮 74

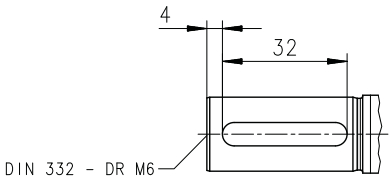


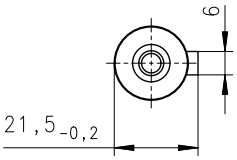
m550-P80

Self-ventilated motors

Design B5





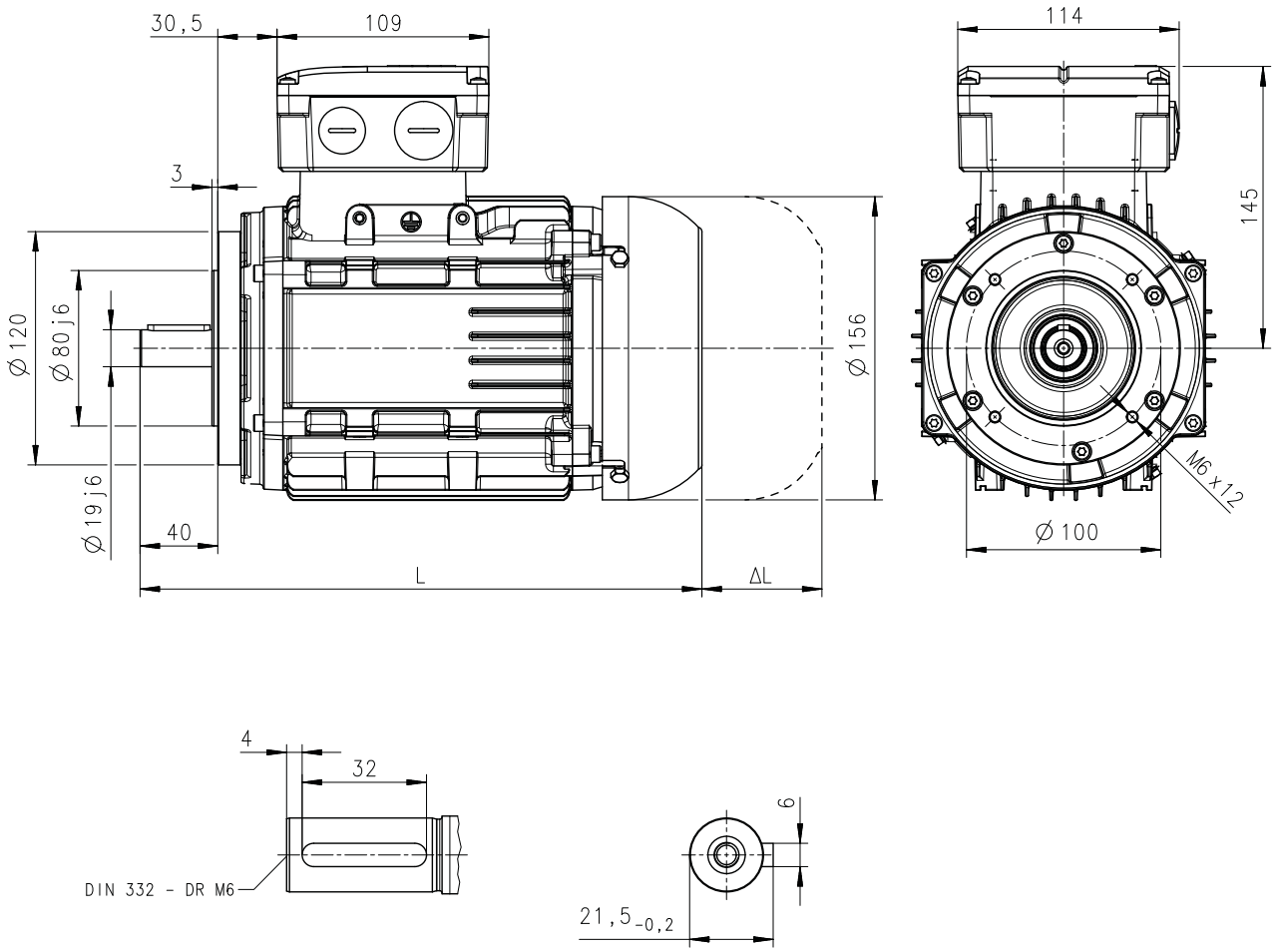


8800862-00

Motor			m550-P80/M4
Motor length	L	mm	290

Δ L ▸ Additional lengths 🕮 74

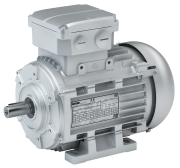
m550-P80
Self-ventilated motors
Design B14 (FT100)



8800863-00

Motor			m550-P80/M4
Motor length	L	mm	290

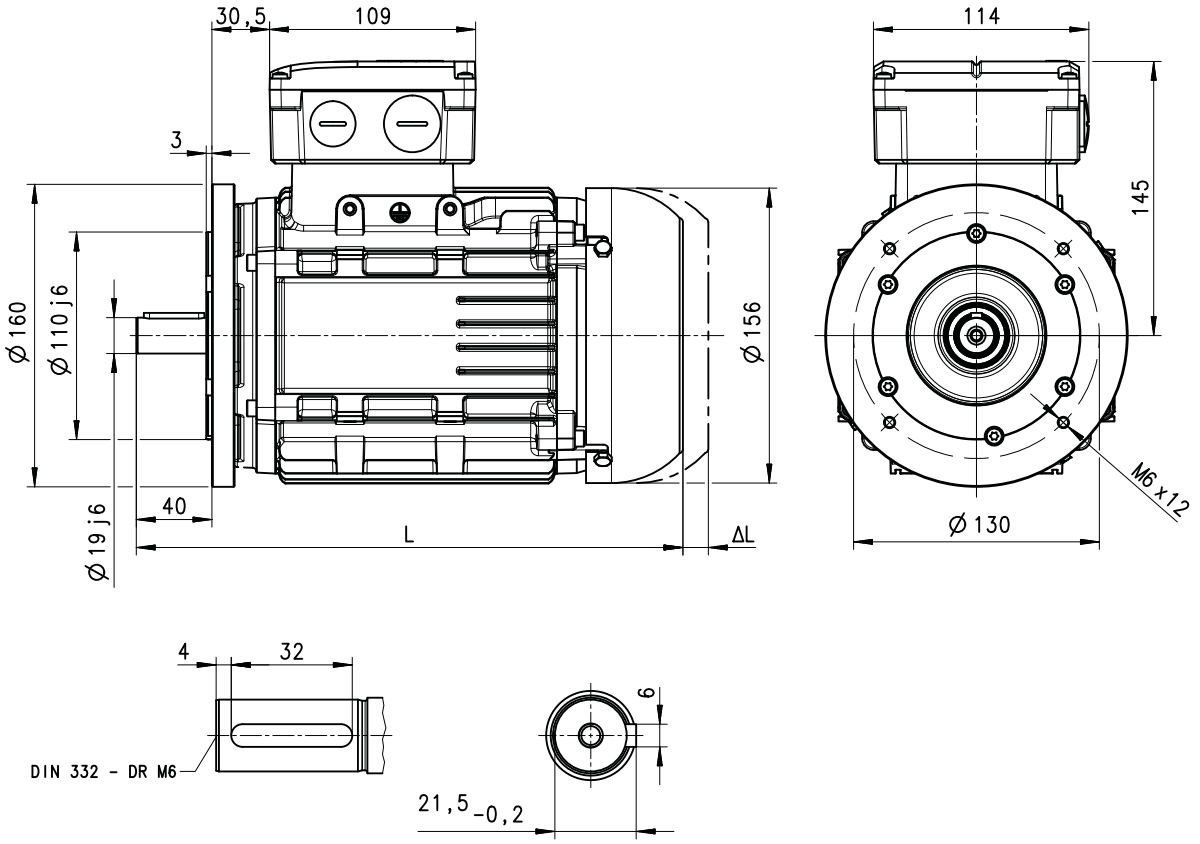
Δ L ▸ Additional lengths 🕮 74



m550-P80

Self-ventilated motors

Design B14 (FT130)



8801579-00

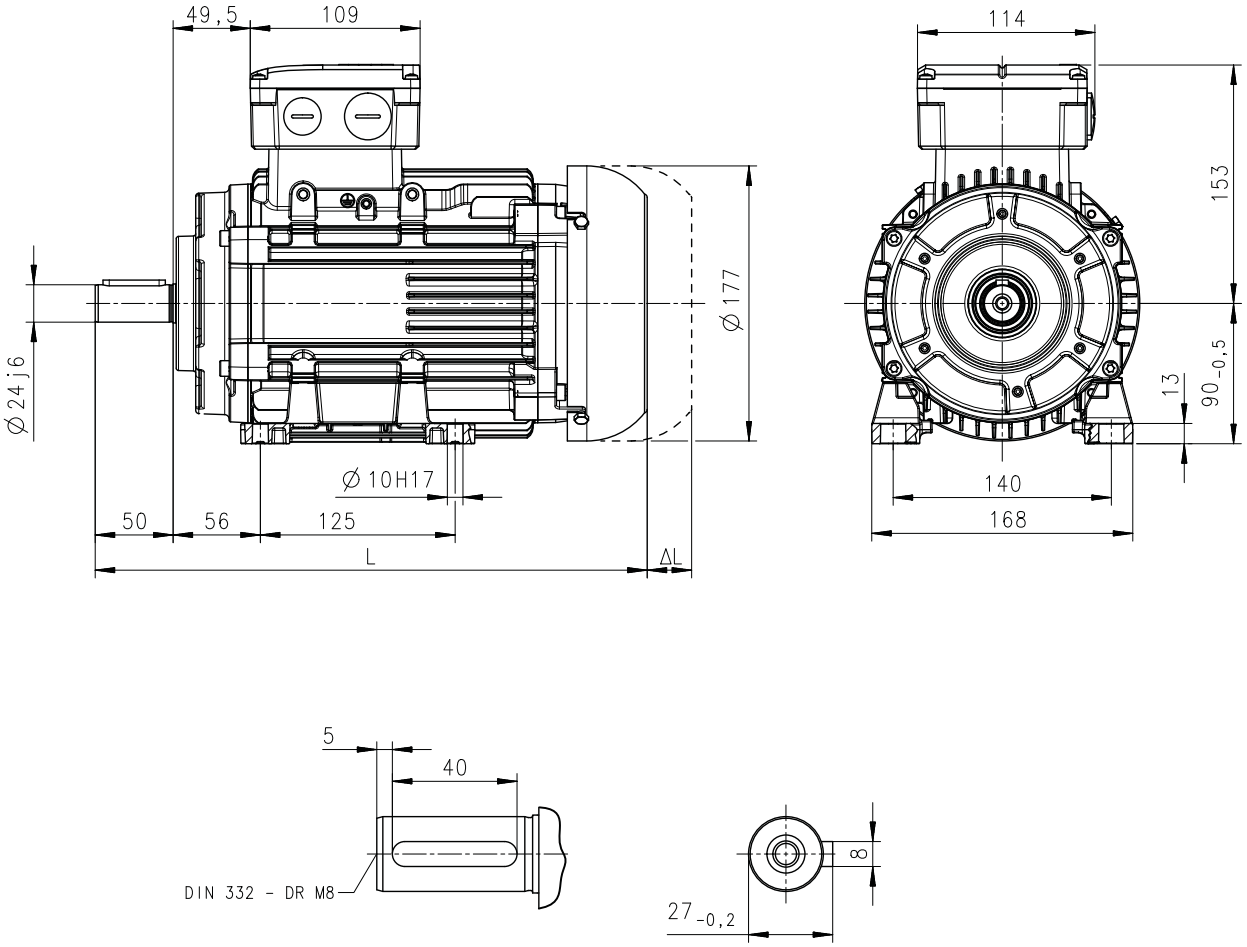
Motor			m550-P80/M4
Motor length	L	mm	290

Δ L ▸ Additional lengths 🕮 74

m550-P90

Self-ventilated motors

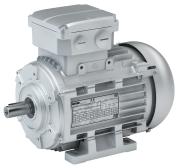
Design B3



8800917-00

Motor			m550-P90/M4	m550-P90/L4
Motor length	L	mm	355	

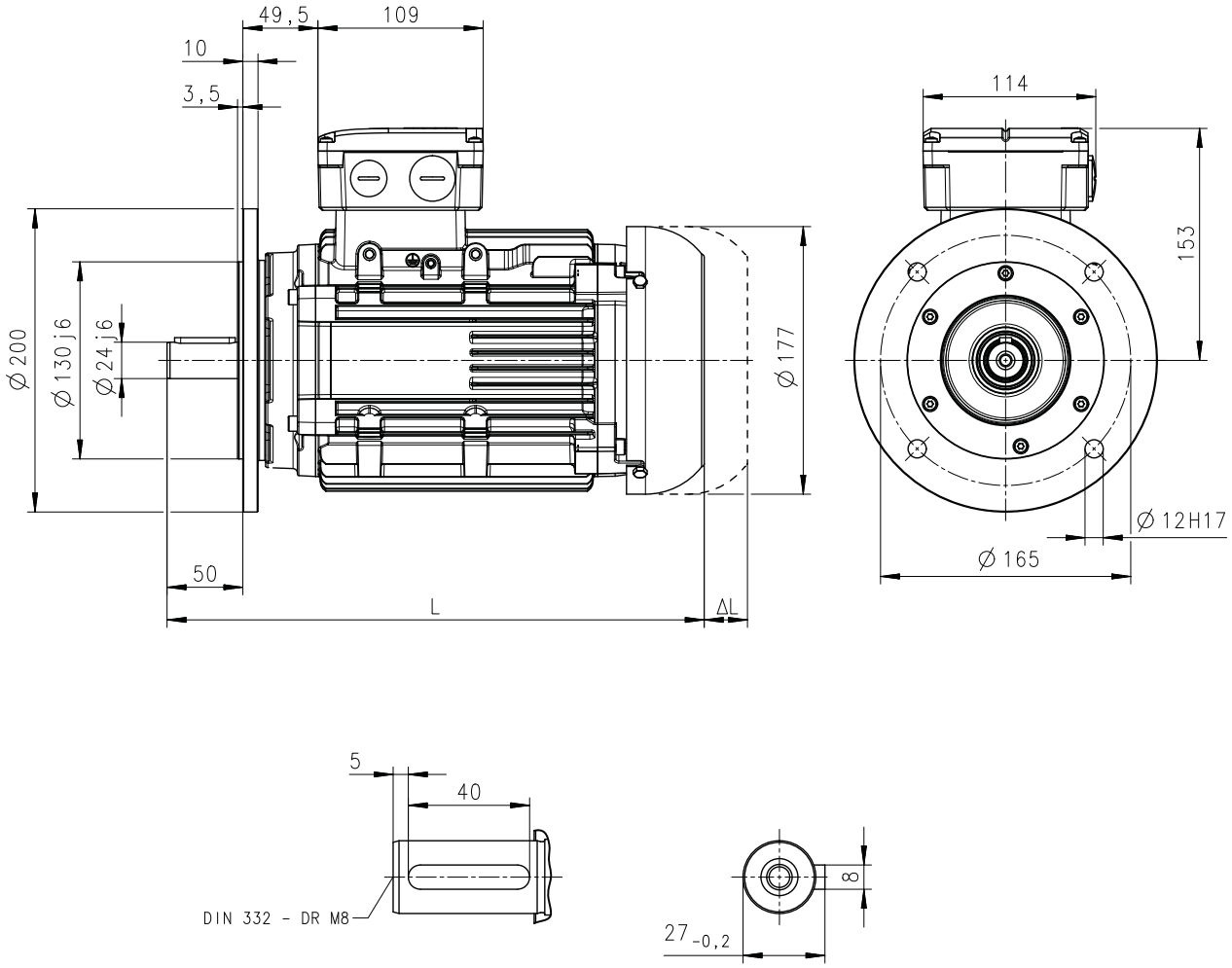
Δ L ▸ Additional lengths 🕮 74



m550-P90

Self-ventilated motors

Design B5



8800918-00

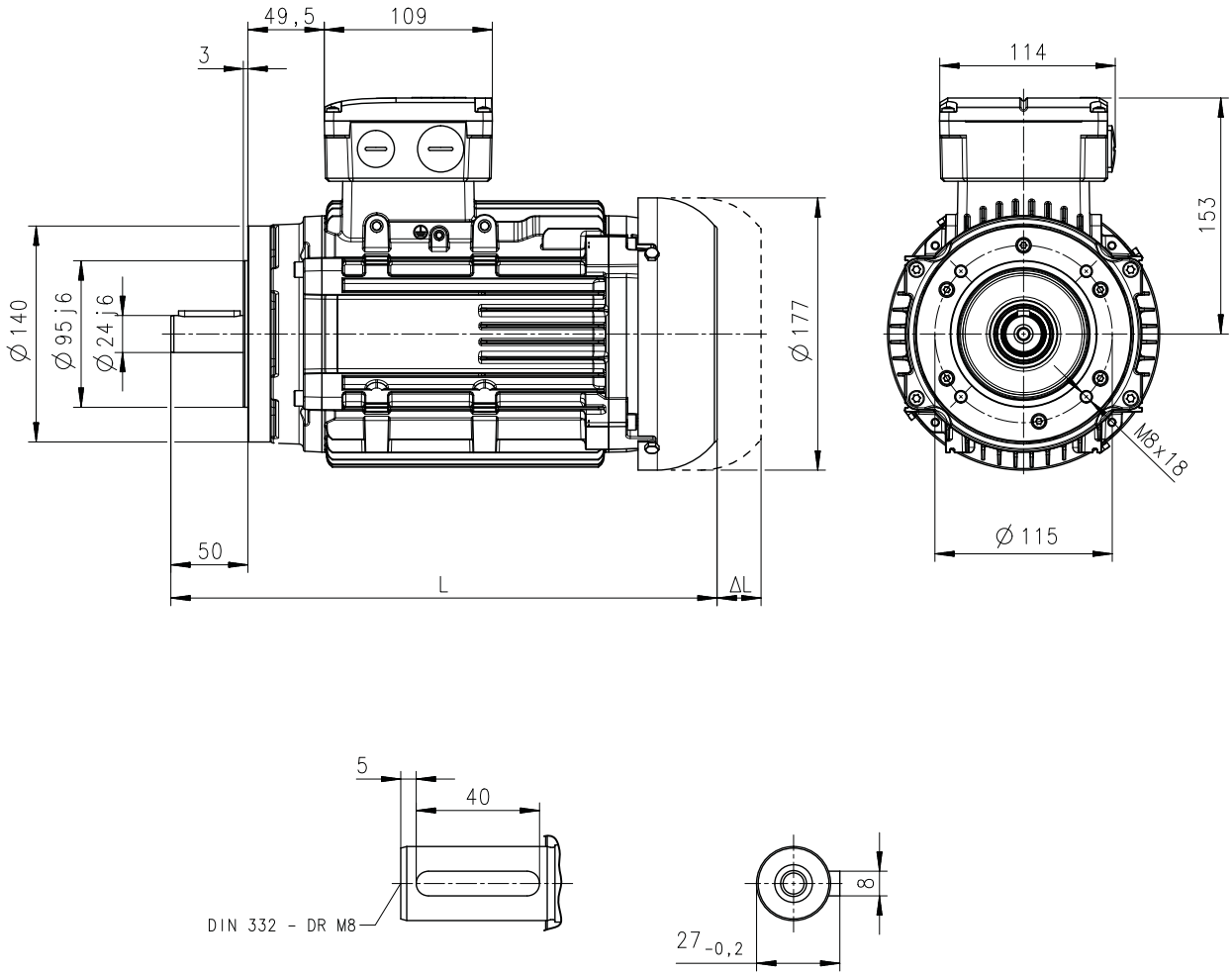
Motor			m550-P90/M4	m550-P90/L4
Motor length	L	mm	355	

Δ L ▸ Additional lengths 🕮 74

m550-P90

Self-ventilated motors

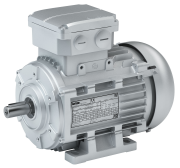
Design B14 (FT115)



8800919-00

Motor			m550-P90/M4	m550-P90/L4
Motor length	L	mm	355	

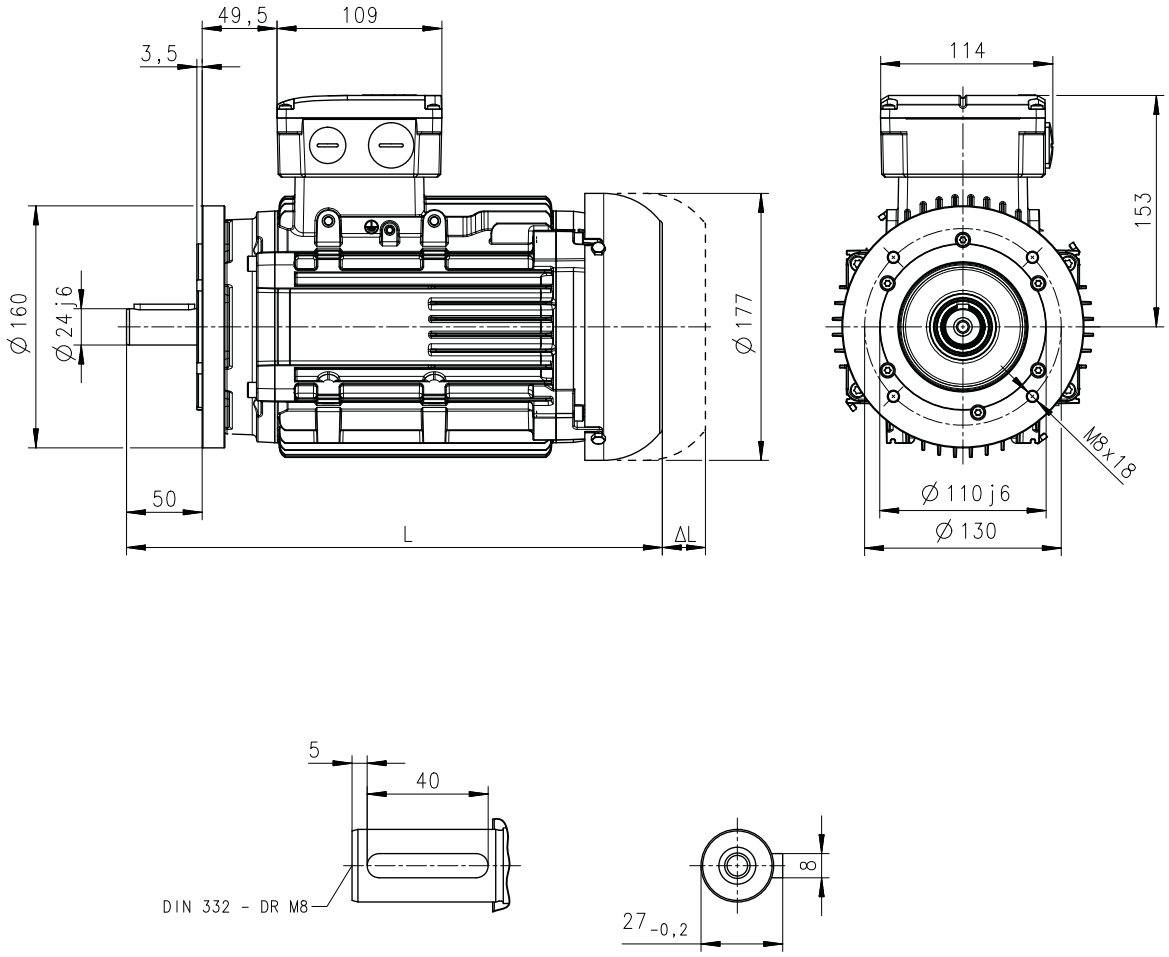
Δ L ▸ Additional lengths 🕮 74



m550-P90

Self-ventilated motors

Design B14 (FT130)



8800920-00

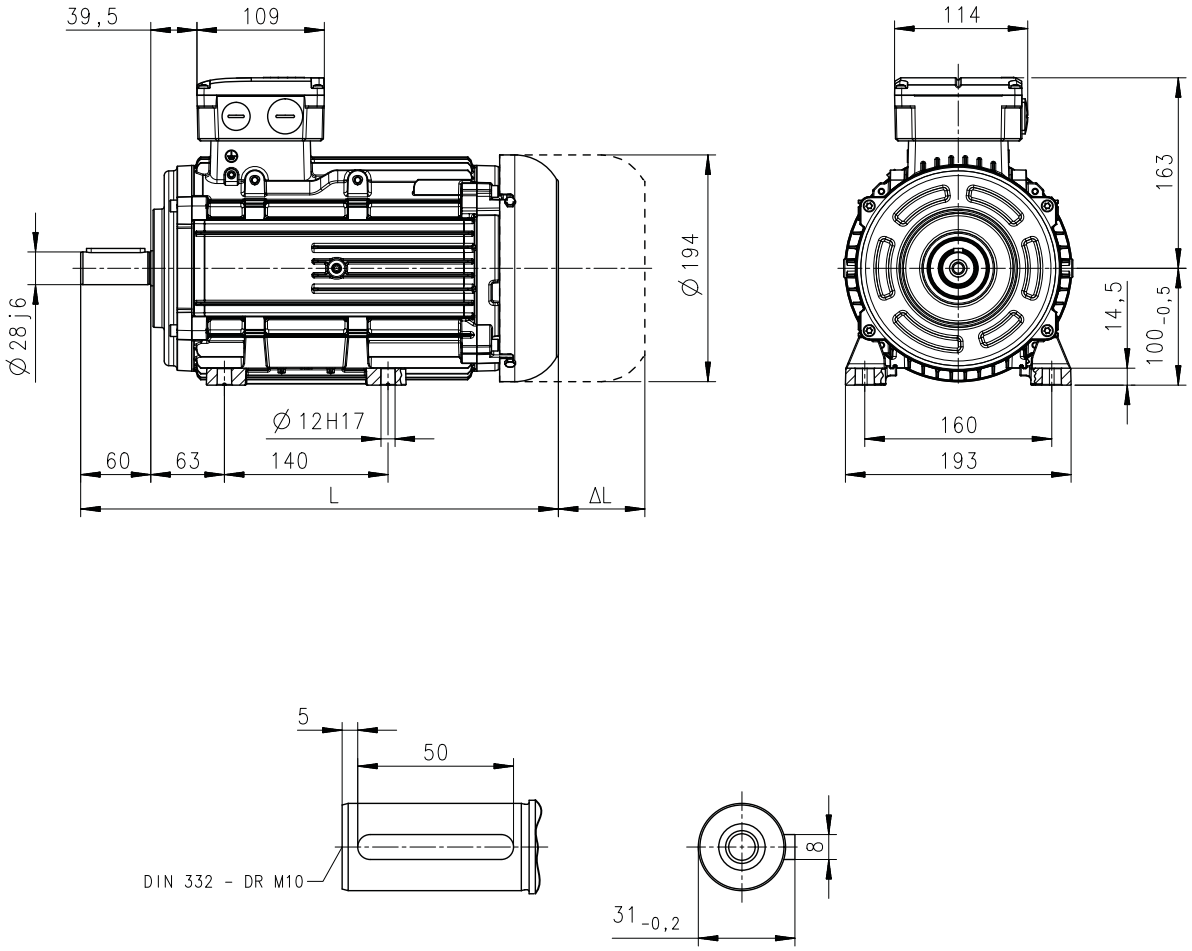
Motor			m550-P90/M4	m550-P90/L4
Motor length	L	mm	355	

Δ L ▸ Additional lengths 🕮 74

m550-P100

Self-ventilated motors

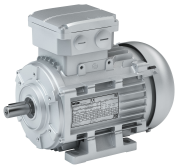
Design B3



8800914-00

Motor			m550-P100/M4	m550-P100/L4
Motor length	L	mm	409	

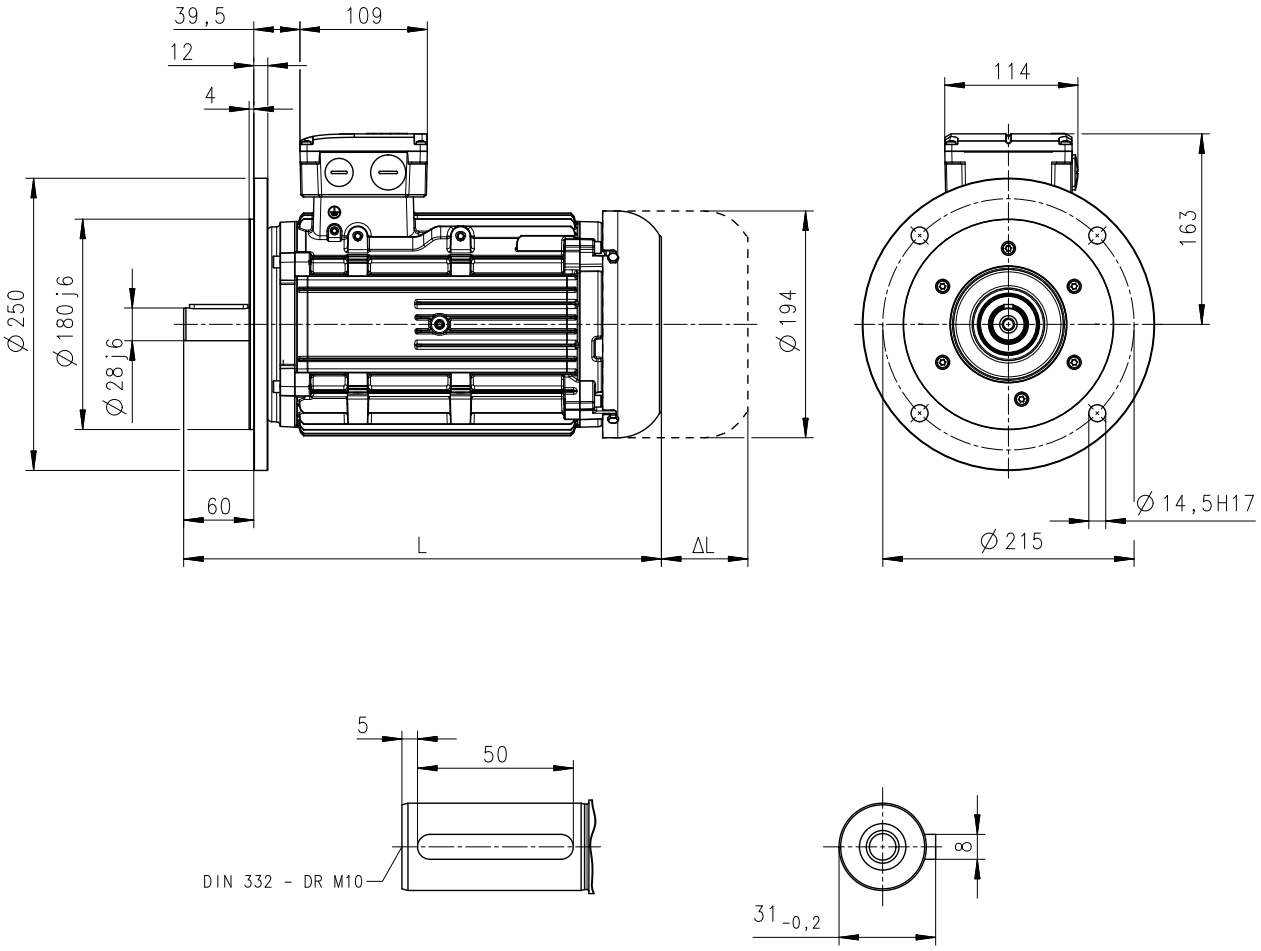
Δ L ▸ Additional lengths 🕮 74



m550-P100

Self-ventilated motors

Design B5



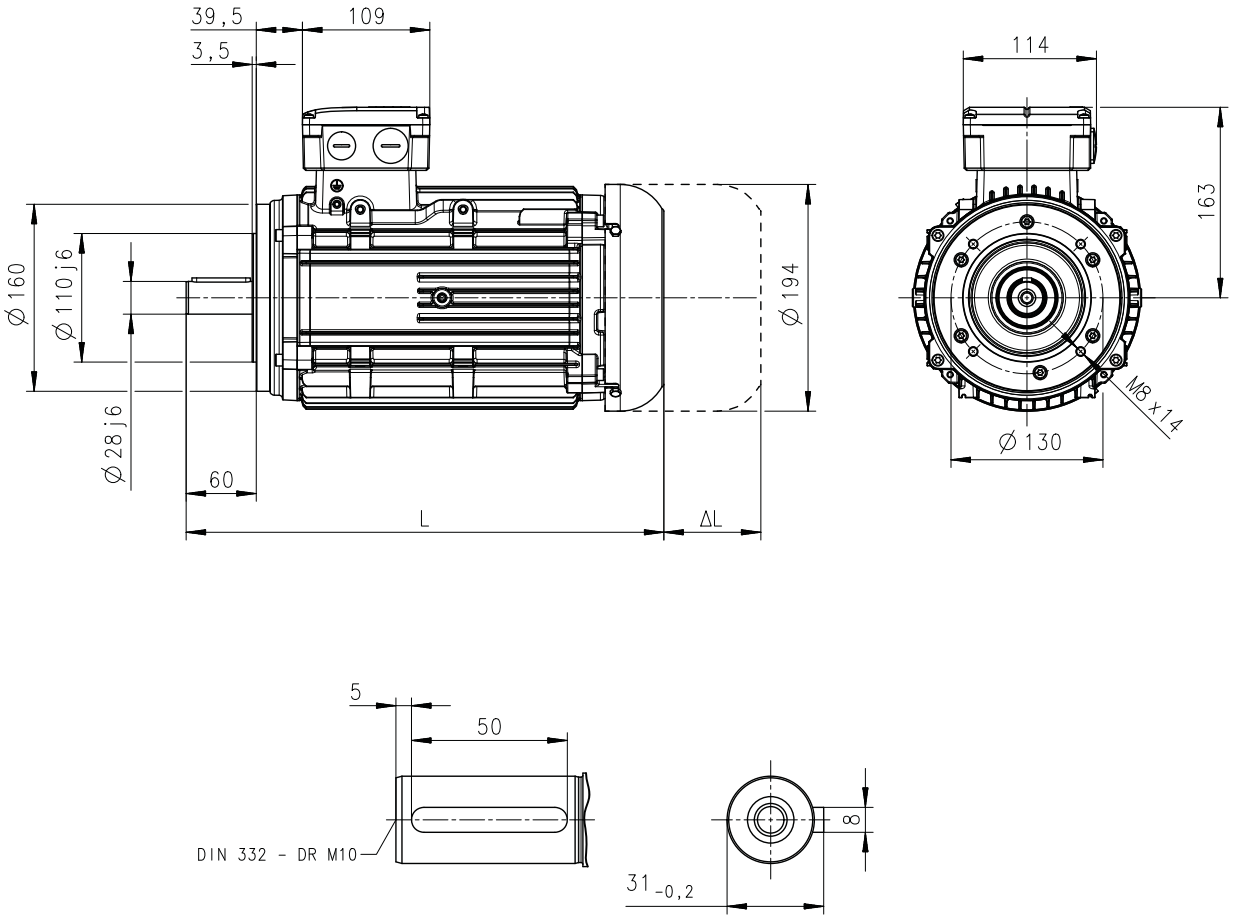
8800915-00

Motor			m550-P100/M4	m550-P100/L4
Motor length	L	mm	409	

Δ L ▸ Additional lengths 74

m550-P100
Self-ventilated motors

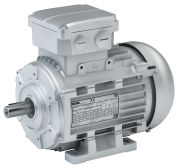
Design B14



8800916-00

Motor			m550-P100/M4	m550-P100/L4
Motor length	L	mm	409	

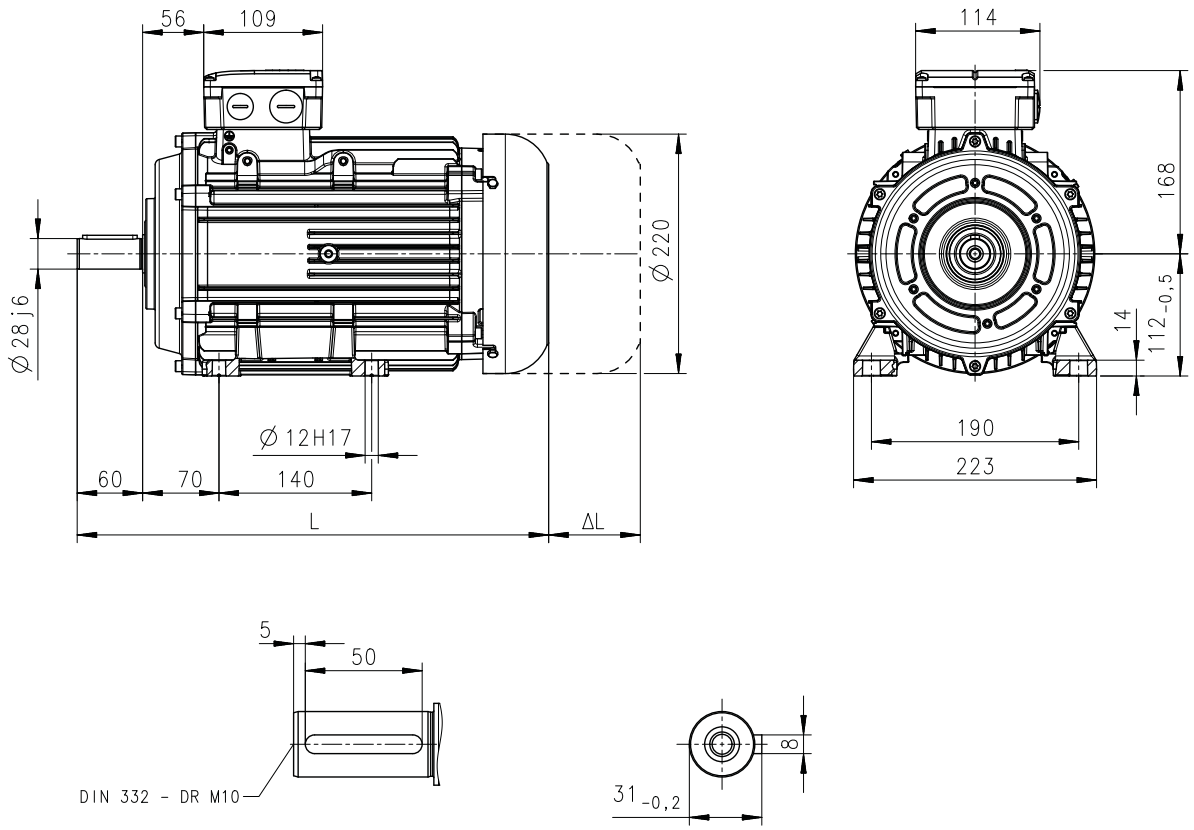
Δ L ▸ Additional lengths 🕮 74



m550-P112

Self-ventilated motors

Design B3

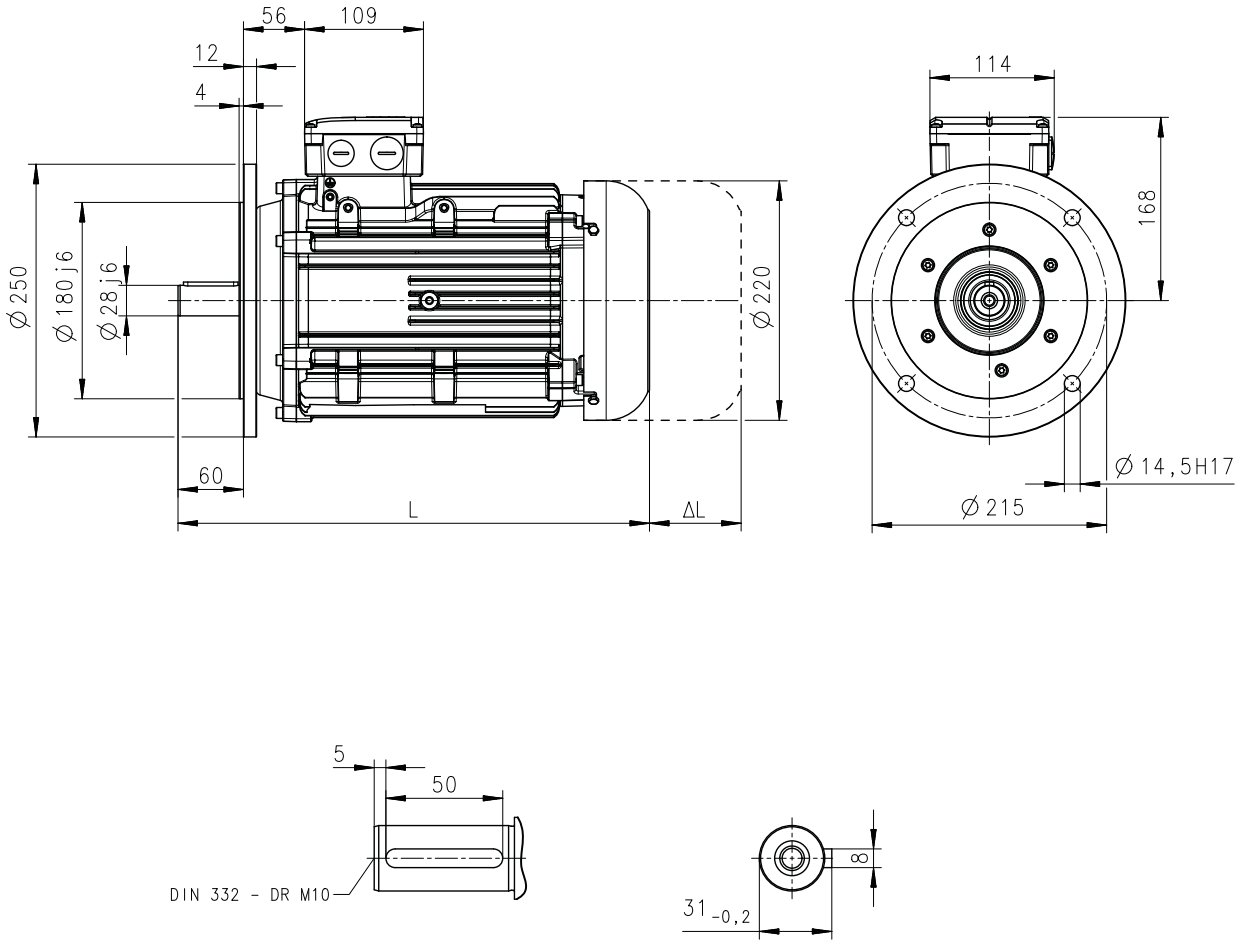


8800964-00

Motor			m550-P112/M4
Motor length	L	mm	433

Δ L ▸ Additional lengths 🕮 74

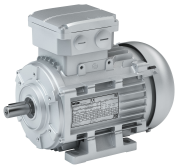
m550-P112
Self-ventilated motors
Design B5



8800965-00

Motor			m550-P112/M4
Motor length	L	mm	433

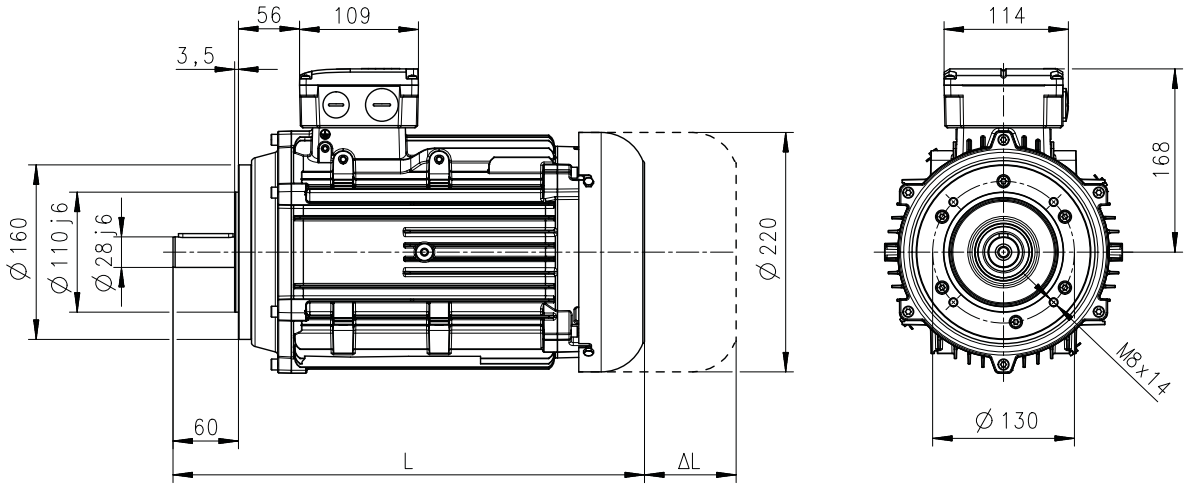
Δ L ▸ Additional lengths 🕮 74

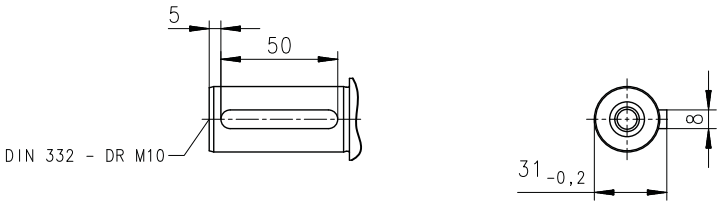


m550-P112

Self-ventilated motors

Design B14

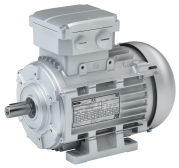




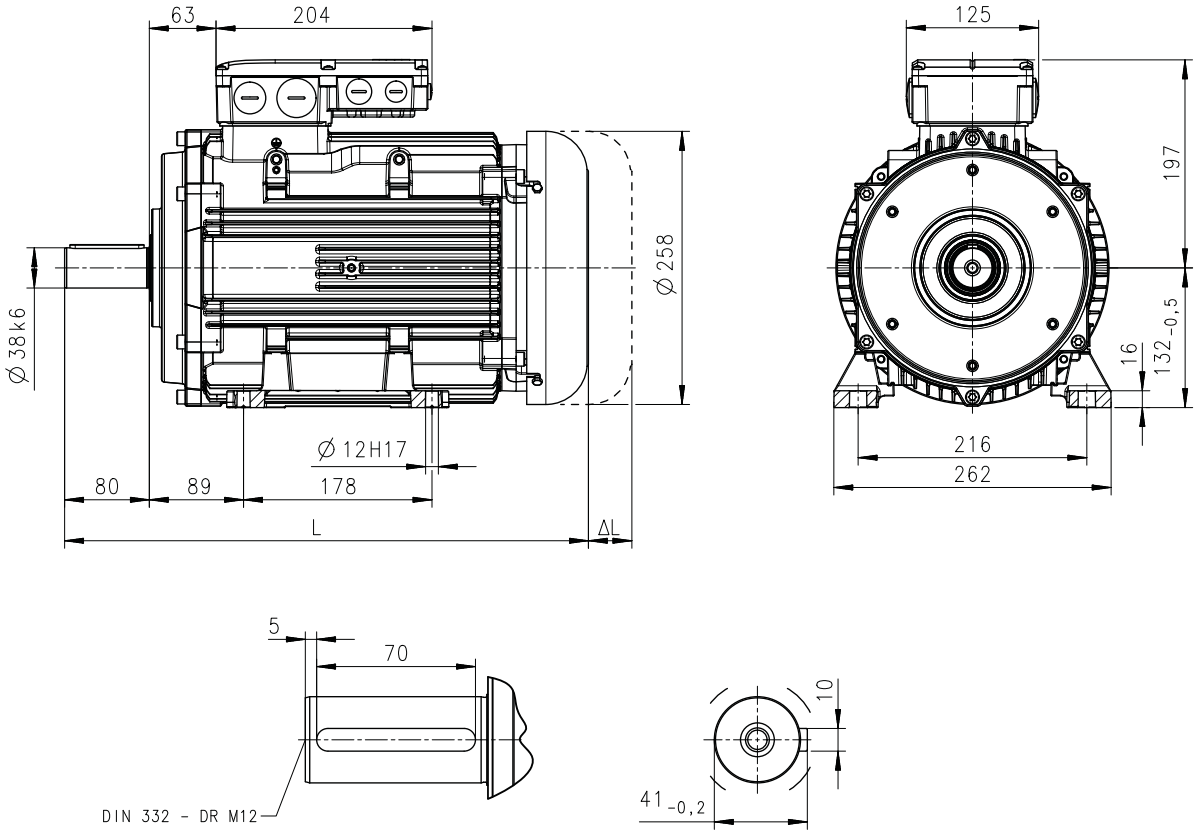
8800966-00

Motor			m550-P112/M4
Motor length	L	mm	433

Δ L ▸ Additional lengths 🕮 74



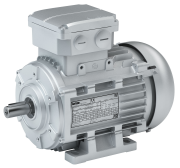
m550-P132
Self-ventilated motors
Design B3



8800948-00

Motor			m550-P132/M4	m550-P132/L4
Motor length	L	mm	495	

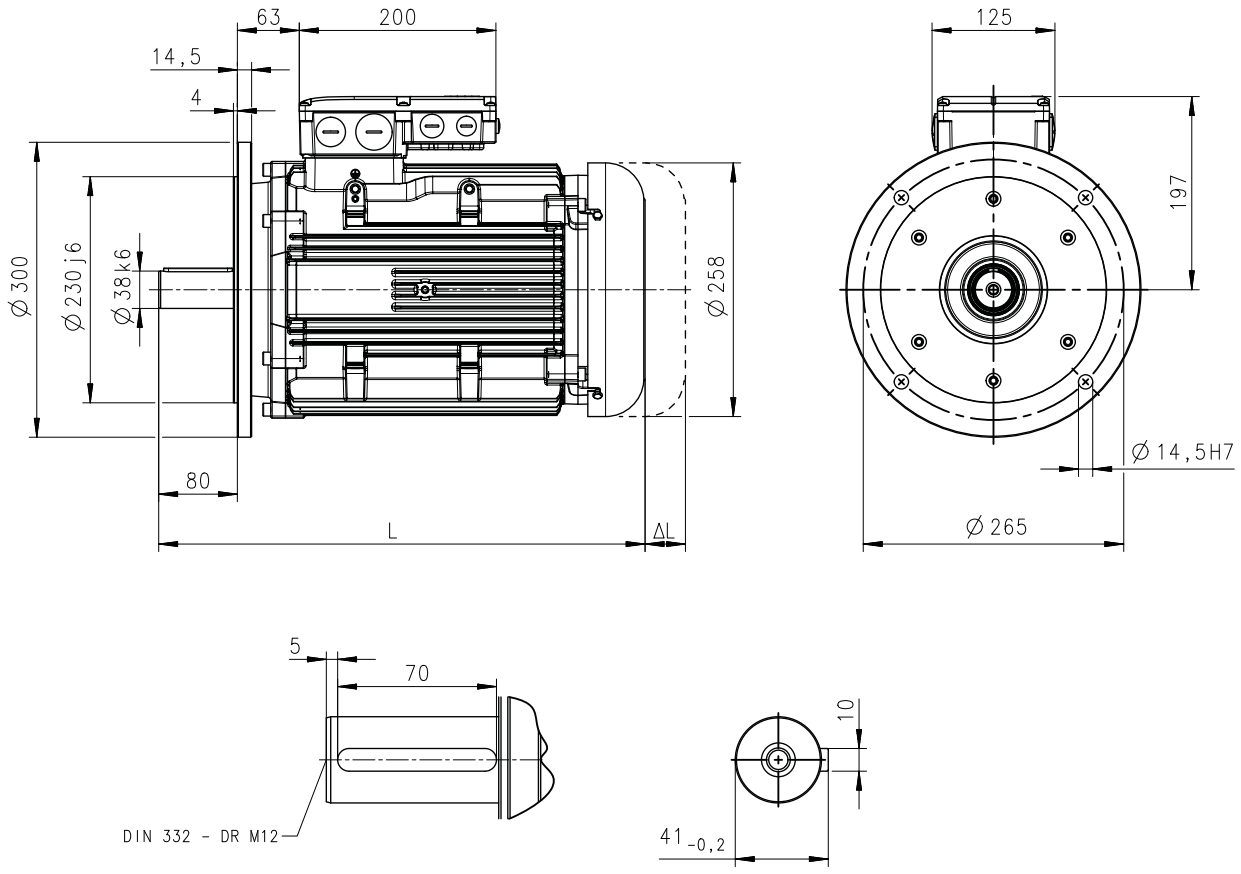
Δ L ▸ Additional lengths 🕮 74



m550-P132

Self-ventilated motors

Design B5



8800949-00

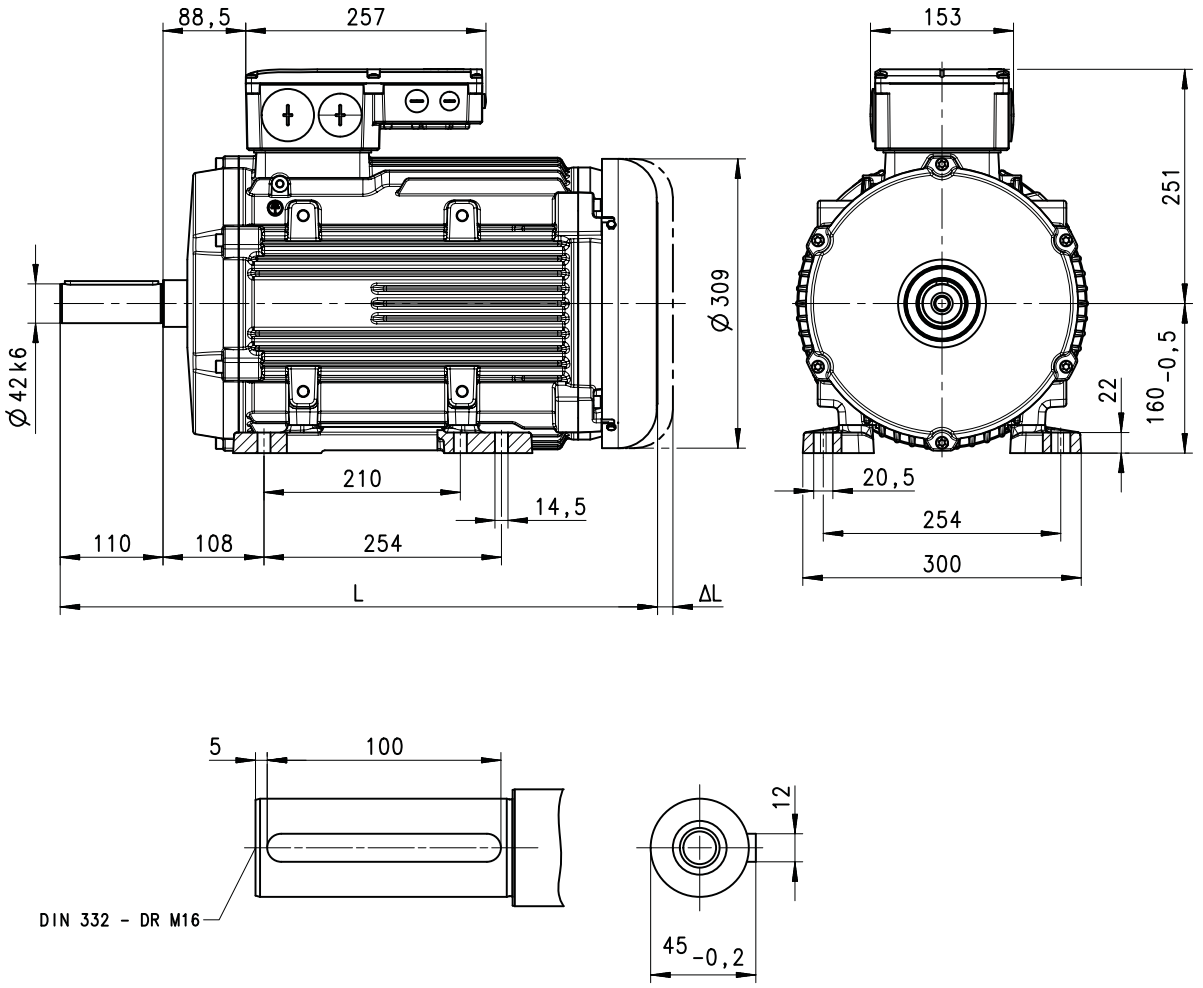
Motor			m550-P132/M4	m550-P132/L4
Motor length	L	mm	495	

Δ L ▸ Additional lengths 🕮 74

m550-P160

Self-ventilated motors

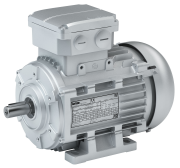
Design B3



8801010-02

Motor			m550-P160/M4	m550-P160/L4
Motor length	L	mm	639	

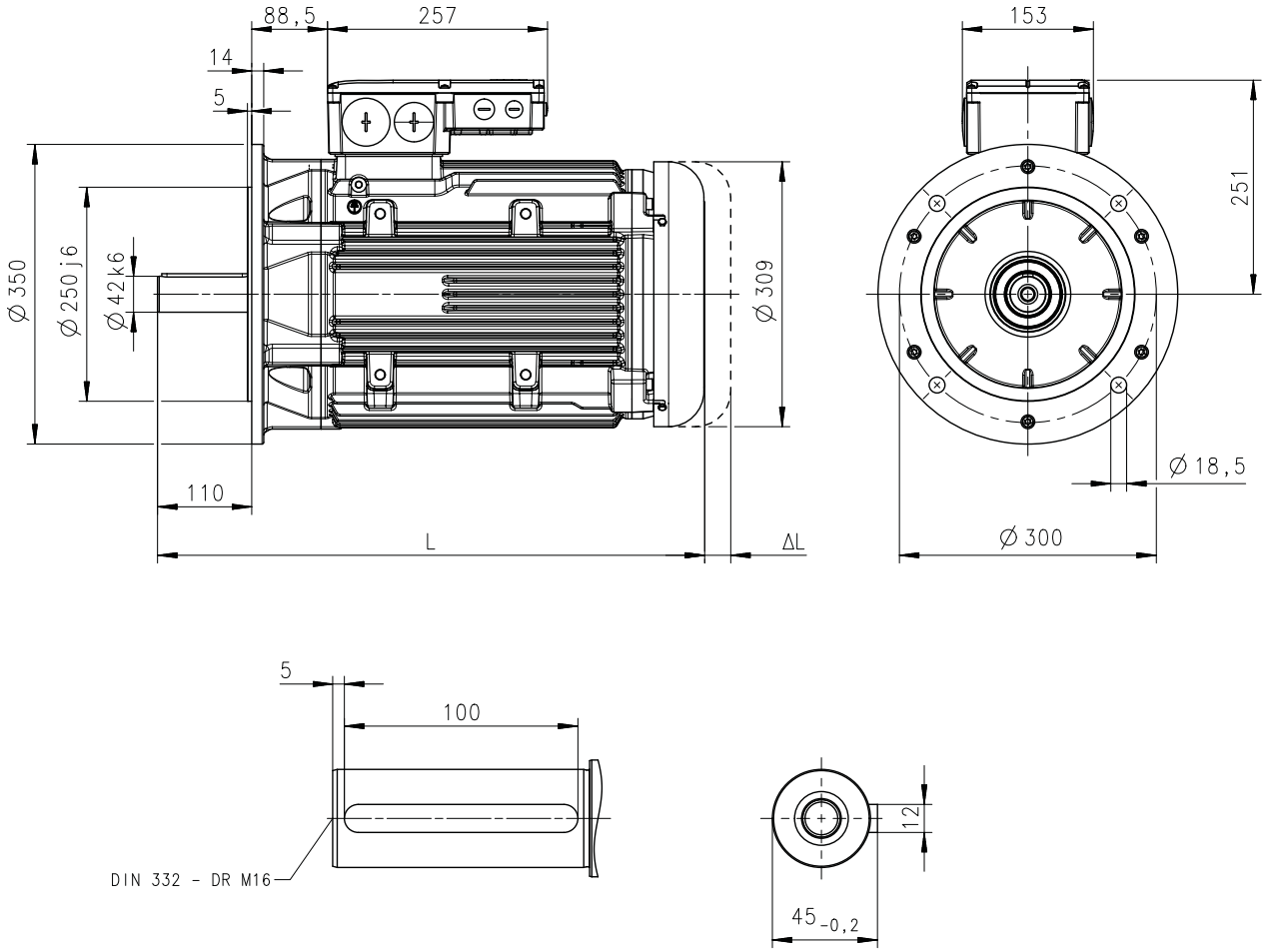
Δ L ▸ Additional lengths 🕮 74



m550-P160

Self-ventilated motors

Design B5



8801011-00

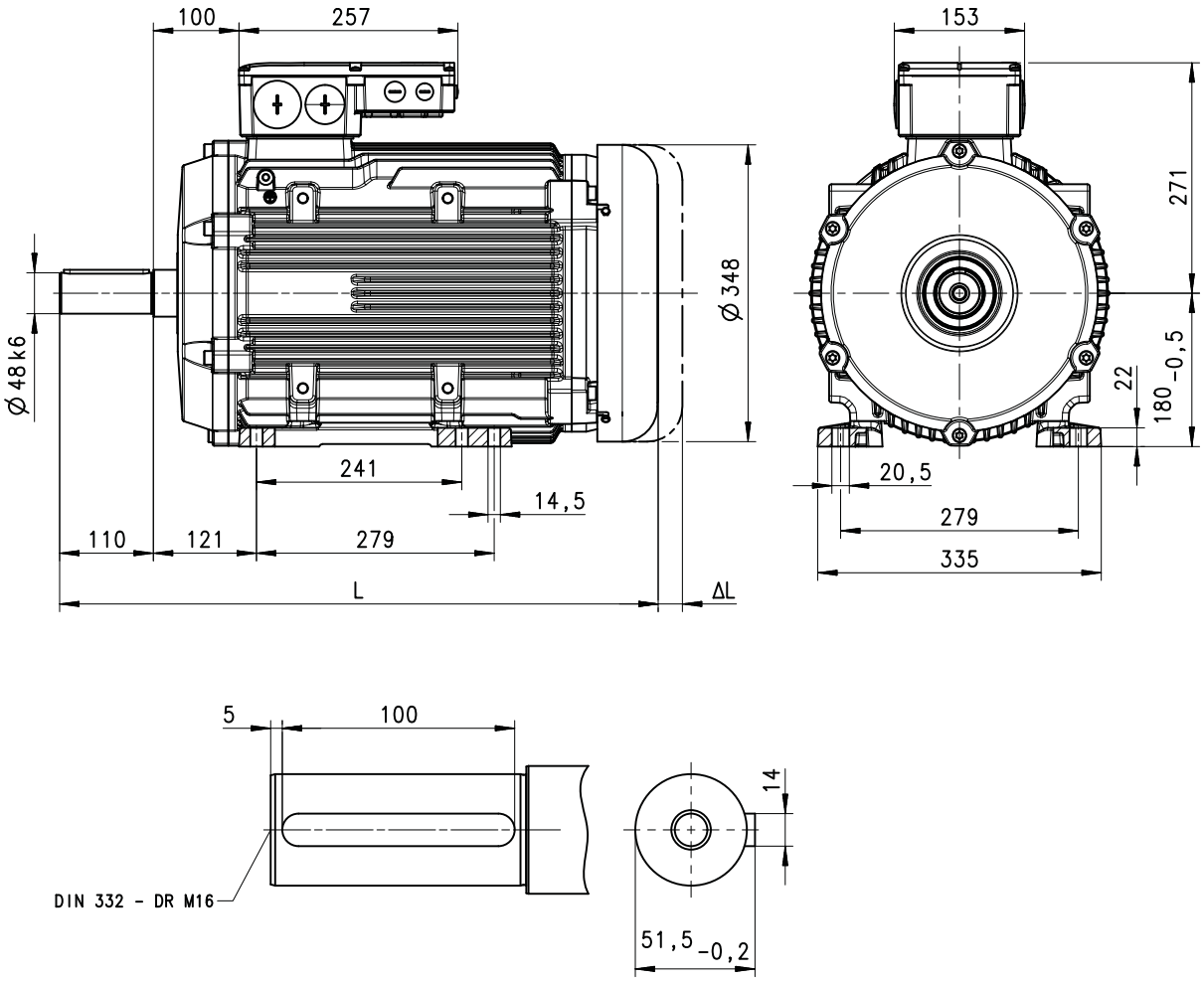
Motor			m550-P160/M4	m550-P160/L4
Motor length	L	mm	639	

Δ L ▸ Additional lengths 🕮 74

m550-P180

Self-ventilated motors

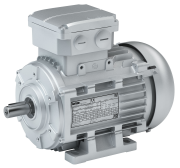
Design B3



8801012-02

Motor			m550-P180/M4	m550-P180/L4
Motor length	L	mm	703	

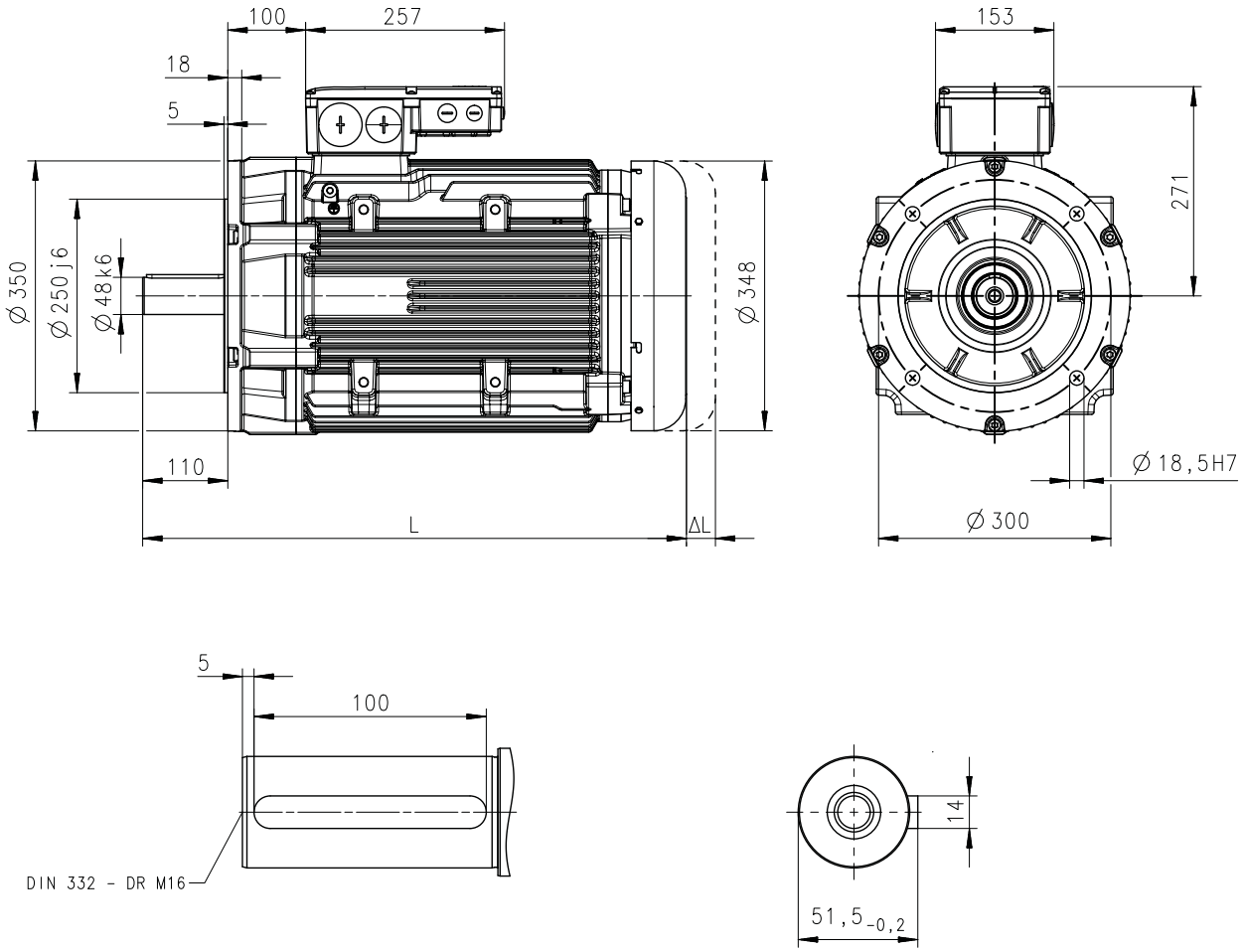
Δ L ▸ Additional lengths 🕮 74



m550-P180

Self-ventilated motors

Design B5



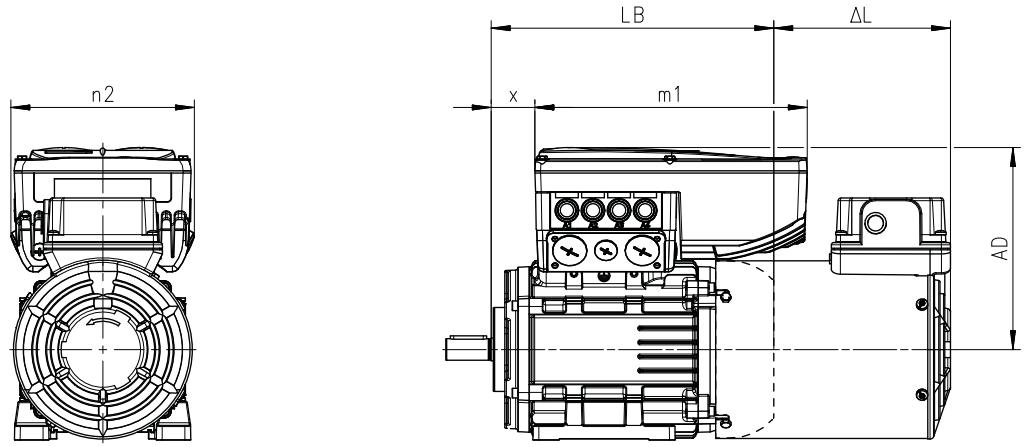
8801013-00

Motor			m550-P180/M4	m550-P180/L4
Motor length	L	mm	703	

Δ L ▸ Additional lengths 74

Integrated inverters

8400 motec



8801070_00

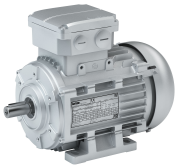
Rated frequency 50/60 Hz

Motor	8400 motec	AD	m_1	n_2	x
		mm	mm	mm	mm
m550-H63/L4	E84DVB☐3714S☐☐☐2☐	151	240	161	31.5
m550-H71/M4	E84DVB☐3714S☐☐☐2☐	172	240	161	41.0
m550-H71/L4	E84DVB☐5514S☐☐☐2☐	172	240	161	41.0
m550-P80/M4	E84DVB☐7514S☐☐☐2☐	178	240	161	45.0
m550-P90/M4	E84DVB☐1124S☐☐☐2☐	186	240	161	64.0
m550-P90/L4	E84DVB☐1524S☐☐☐2☐	186	240	161	64.0
m550-P100/M4	E84DVB☐2224S☐☐☐2☐	225	260	176	46.0
m550-P100/L4	E84DVB☐3024S☐☐☐2☐	225	260	176	46.0
m550-P112/M4	E84DVB☐4024S☐☐☐2☐	284	325	195	50.0.
m550-P132/M4	E84DVB☐5524S☐☐☐2☐	304	325	195	59.0
m550-P132/L4	E84DVB☐7524S☐☐☐2☐	304	325	195	59.0

Rated frequency 87 Hz

Motor	8400 motec	AD	m_1	n_2	x
		mm	mm	mm	mm
m550-H63/S4	E84DVB☐3714S☐☐☐2☐	151	240	161	31.5
m550-H63/M4	E84DVB☐3714S☐☐☐2☐	151	240	161	31.5
m550-H63/L4	E84DVB☐5514S☐☐☐2☐	151	240	161	31.5
m550-H71/M4	E84DVB☐7514S☐☐☐2☐	172	240	161	41.0
m550-H71/L4	E84DVB☐1124S☐☐☐2☐	172	240	161	41.0
m550-P80/M4	E84DVB☐1524S☐☐☐2☐	178	240	161	45.0
m550-P90/M4	E84DVB☐2224S☐☐☐2☐	186	260	176	56.0
m550-P90/L4	E84DVB☐3024S☐☐☐2☐	186	260	176	56.0
m550-P100/M4	E84DVB☐4024S☐☐☐2☐	279	325	195	34.0
m550-P100/L4	E84DVB☐5524S☐☐☐2☐	279	325	195	34.0
m550-P112/M4	E84DVB☐7524S☐☐☐2☐	284	325	195	50.0

Dimensions LB and Δ L ▸ Basic dimensions 📖 47



Additional lengths

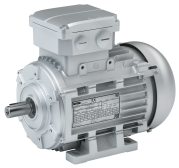
Self-ventilated motors

Motor			m550-H		m550-P						
			63/S4	71/M4	80/M4	90/M4	100/M4	112/M4	132/M4	160/M4	180/M4
			63/M4	71/L4		90/L4	100/L4		132/L4	160/L4	180/L4
			63/L4								
Without feedback/brake											
IP54/IP55 protection	Δ L	mm	0	0	0	0	0	0	0	0	0
IP65/IP66 protection	Δ L	mm	23	9	7	7	13	0	9	14	9
With integrated feedback											
IP54/IP55 protection	Δ L	mm	23	9	7	7	13	0	9	14	9
IP65/IP66 protection	Δ L	mm	23	9	7	7	13	0	9	14	9
With mounted feedback											
IP54/IP55 protection	Δ L	mm	85	75	68	63	74	77	91	109	118
IP65/IP66 protection	Δ L	mm	85	75	68	63	74	77	91	109	118
With spring-applied brake											
IP54/IP55 protection	Δ L	mm	61	60	68	63	74	77	91	109	118
IP65/IP66 protection	Δ L	mm	135	128	136	131	145	-	-	-	-
With spring-applied brake and integrated feedback											
IP54/IP55 protection	Δ L	mm	61	60	68	63	74	77	91	109	118
IP65/IP66 protection	Δ L	mm	135	128	136	131	145	-	-	-	-
With spring-applied brake and mounted feedback											
IP54/IP55 protection	Δ L	mm	135	128	136	131	145	148	162	195	195
IP65/IP66 protection	Δ L	mm	135	128	136	131	145	-	-	-	-
With spring-applied double brake											
IP54/IP55 protection	Δ L	mm	-	-	-	-	-	-	-	298	313
With spring-applied double brake and mounted feedback											
IP54/IP55 protection	Δ L	mm	-	-	-	-	-	-	-	298	313

▸ Protection cover 141

▸ Second shaft end 143

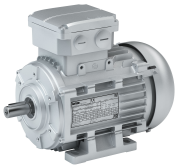
▸ Handwheel 144



Forced ventilated motors

Motor			m550-H		m550-P						
			63/S4	71/M4	80/M4	90/M4	100/M4	112/M4	132/M4	160/M4	180/M4
			63/M4	71/L4		90/L4	100/L4		132/L4	160/L4	180/L4
			63/L4								
Without feedback/brake											
IP54/IP55 protection	Δ L	mm	110	102	98	104	105	92	121	158	149
IP65/IP66 protection	Δ L	mm	110	102	98	104	105	92	121	158	149
With integrated feedback											
IP54/IP55 protection	Δ L	mm	110	102	98	104	105	92	121	158	149
IP65/IP66 protection	Δ L	mm	110	102	98	104	105	92	121	158	149
With mounted feedback											
IP54/IP55 protection	Δ L	mm	171	167	156	159	166	169	202	252	257
IP65/IP66 protection	Δ L	mm	171	167	156	159	166	169	202	252	257
With spring-applied brake											
IP54/IP55 protection	Δ L	mm	171	152	156	159	166	169	202	252	257
IP65/IP66 protection	Δ L	mm	217	221	216	227	236	-	-	-	-
With spring-applied brake and integrated feedback											
IP54/IP55 protection	Δ L	mm	171	152	156	159	166	169	202	252	257
IP65/IP66 protection	Δ L	mm	217	221	216	227	236	-	-	-	-
With spring-applied brake and mounted feedback											
IP54/IP55 protection	Δ L	mm	217	221	216	227	236	245	283	343	342
IP65/IP66 protection	Δ L	mm	217	221	216	227	236	-	-	-	-
With spring-applied double brake											
IP54/IP55 protection	Δ L	mm	-	-	-	-	-	-	-	446	460
With spring-applied double brake and mounted feedback											
IP54/IP55 protection	Δ L	mm	-	-	-	-	-	-	-	446	460

▸ Protection cover 🕮 141



Weights

Basic weights

The basic weights are listed in the rated data.

▸ Rated data 📖32

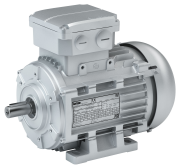
Observe ▸ Additional weights 📖76!

Additional weights

Add the individual additional weights to the basic weight depending on the design.

Motors

Motor			m550-H		m550-P						
			63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4	160/M4 160/L4	180/M4 180/L4
Self-ventilated fan cover											
Prepared for product extension											
Spring-applied brake Feedback 2. Shaft end/hand wheel	m	kg	0.4	0.4	0.5	0.6	0.7	0.8	1.0	1.8	2.0
Spring-applied double brake Spring-applied double brake with feedback	m	kg	-	-	-	-	-	-	-	2.7	3.2
Blower											
Without product extension	m	kg	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	1.0
Prepared for product extension											
Spring-applied brake Feedback	m	kg	0.6	0.6	0.7	0.8	0.9	1.0	1.3	1.8	3.3
Spring-applied double brake Spring-applied double brake with feedback	m	kg	-	-	-	-	-	-	-	2.9	4.8
Spring-applied brake											
06	m	kg	1.5	1.5							
08	m	kg		2.2	2.2	2.2					
10	m	kg				3.9	3.9				
12	m	kg					5.6	5.6			
14	m	kg						8.5	8.5		
16	m	kg							13.1	13.1	
18	m	kg								19.1	19.1
20	m	kg									25.7
Brake release lever	m	kg	0.1	0.1	0.2	0.2	0.2	0.4	0.5	0.9	1.4
Spring-applied double brake											
18	m	kg	-	-	-	-	-	-	-	33.2	33.2
20	m	kg	-	-	-	-	-	-	-	-	52.2
Brake release lever	m	kg	-	-	-	-	-	-	-	0.4	0.5
Feedback	m	kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Protection cover	m	kg	0.2	0.3	0.3	0.4	0.5	0.7	1.3	1.6	2.0
2nd shaft end	m	kg	0.2	0.3	0.3	0.3	0.4	0.4	0.6	-	-
Handwheel	m	kg	0.3	0.7	0.7	0.7	0.8	0.8	1.0	-	-



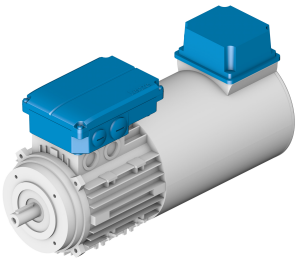
Product extensions

Motor connection

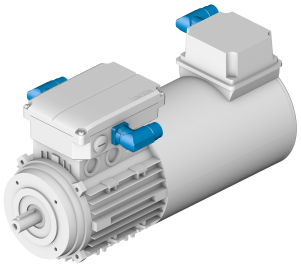
Connection options

The motor are equipped with a terminal box by default.

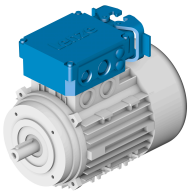
Alternatively, different connectors can be selected for fast commissioning or maintenance.



Terminal box with cable gland



Terminal box with ICN connector



HAN connector

The three-phase AC motors are intended for operation on constant mains and an inverter.

Mains operation

For mains operation, the motors are available in the following mains voltages:

Mains frequency	Mains voltage	Mains voltage range	Circuit
Hz	V	V	
50	400	380 ... 420	Y
	230	220 ... 240	Δ
60	460	440 ... 480	Y

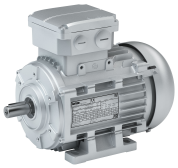
The motors are rated for the specified mains voltage range.

According to EN 60034-1, the motors operate reliably in continuous operation at ±5 % of the line voltage range. This ensures reliable operation in the recommended range ±10 % of the IEC standard voltages 230 V, 400 V and 460 V.

Frequency inverter operation

The base frequencies for frequency inverter operation have been set to the following rated voltages:

Rated frequency	Rated voltage	Circuit
Hz	V	
50	400	Y
	230	Δ
87	400	Δ

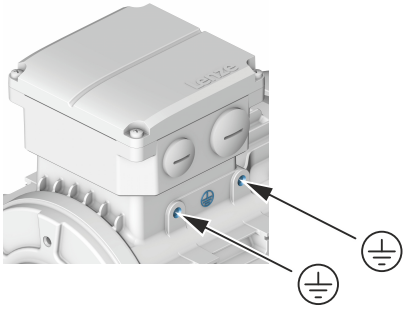


Second ground connection on the motor

According to the EN IEC 61800−5−1 standard, additional measures are required for the protective earth connection if the leakage current is greater than 3.5 mA for alternating current or greater than 10 mA for direct current.

▸ Important notes 📖 25

A possible measure is the execution via a second ground connection.

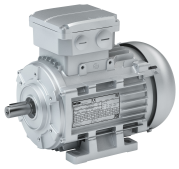


Scope of delivery when a second ground connection is selected:

- Toothed lock washer
- Washer
- Fixing screw

An additional grounding cable is not included in the scope of delivery.

The dimensioning of the grounding is done by the customer.



Assignment of the terminal boxes

Depending on the product extension of the motor, different terminal box sizes (S, M or L) are used.

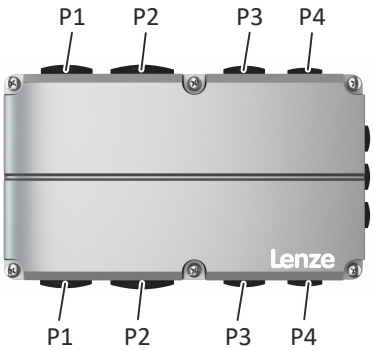
The ICN and M12 connectors are mounted on the terminal boxes (S,M and L) in the positions described. The connector for the separate fan connection is located on the separate fan terminal box.

When brake monitoring is selected, the motor is always supplied with the L terminal box.

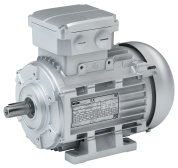
Terminal box S

Terminal box M

Terminal box L

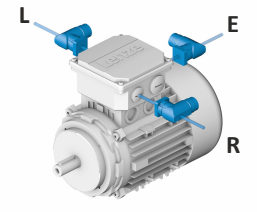


Motor	m550-H		m550-P						
	63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4	160/M4 160/L4	180/M4 180/L4
Without product extensions									
Terminal box	S	S	S	S	S	S	L	L	L
Power: ICN-M23 connector	P1	P1	P1	P1	P1	P1	P1	-	-
Product extension - brake									
Terminal box	M	M	M	M	M	M	L	L	L
Power + brake: ICN-M23 connector	P2	P2	P1	P1	P1	P1	P1	-	-
Product extension - feedback									
Terminal box	M	M	M	M	M	M	L	L	L
Power: ICN-M23 connector	P2	P2	P1	P1	P1	P1	P1	-	-
Feedback: ICN-M23 connector	P2	P2	P2	P2	P2	P2	P3	P3	P3
Feedback: M12 connector	P1	P1	P2	P2	P2	P2	P4	P4	P4
Product extension - brake + feedback									
Terminal box	L	L	L	L	L	L	L	L	L
Power + brake: ICN-M23 connector	P1	P1	P1	P1	P1	P1	P1	-	-
Feedback: ICN-M23 connector	P3	P3	P3	P3	P3	P3	P3	P3	P3
Feedback: M12 connector	P4	P4	P4	P4	P4	P4	P4	P4	P4
Product extension - separate fan									
ICN-M17 connector	●	●	●	●	●	●	●	●	●

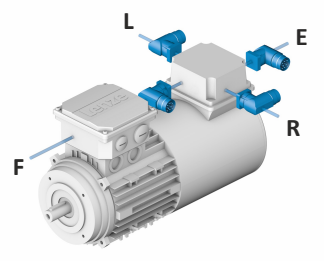


Connection positions

Positions on the motor terminal box

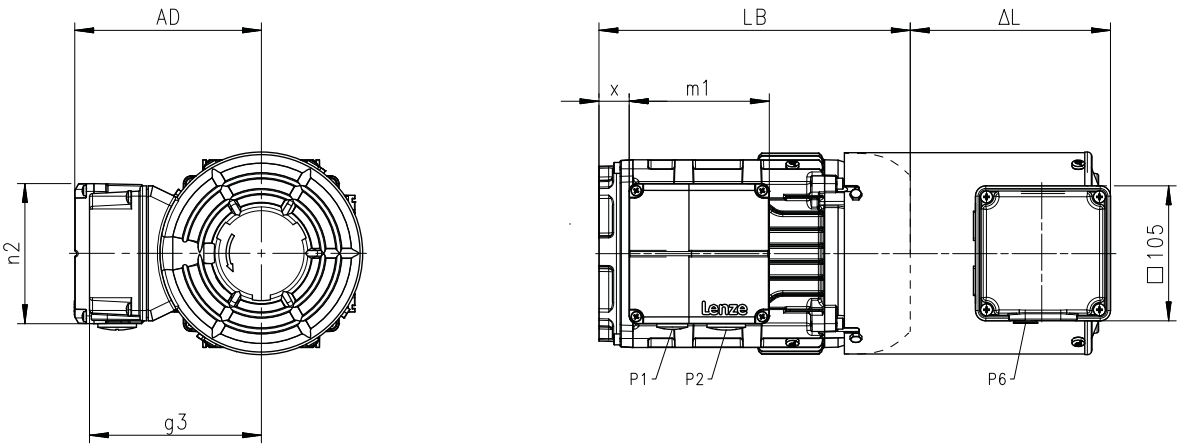


Positions on the blower terminal box



Terminal box	Positions	Note
Motor terminal box S		
Cable glands	L, E or R	
ICN connector: Power	L, E or R	
Motor terminal box M		
Cable glands	L and R	
ICN connector: Power/brake Feedback	L or R R or L	The feedback connector is on the opposite side to the power connector.
M12 connector: Feedback	R or L	
Motor terminal box L		
Cable glands	L and R	
ICN connector: Power/brake Feedback	L or R L or R	The connectors for power/brake and feedback can be arranged on the same or on the opposite side
M12 connector: Feedback	L or R	
Blower terminal box		
Cable glands	L, E or R	
ICN connector	L, E or R	

Power terminal box “S” dimensions

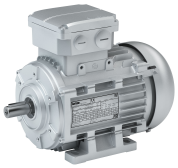


8801072_00

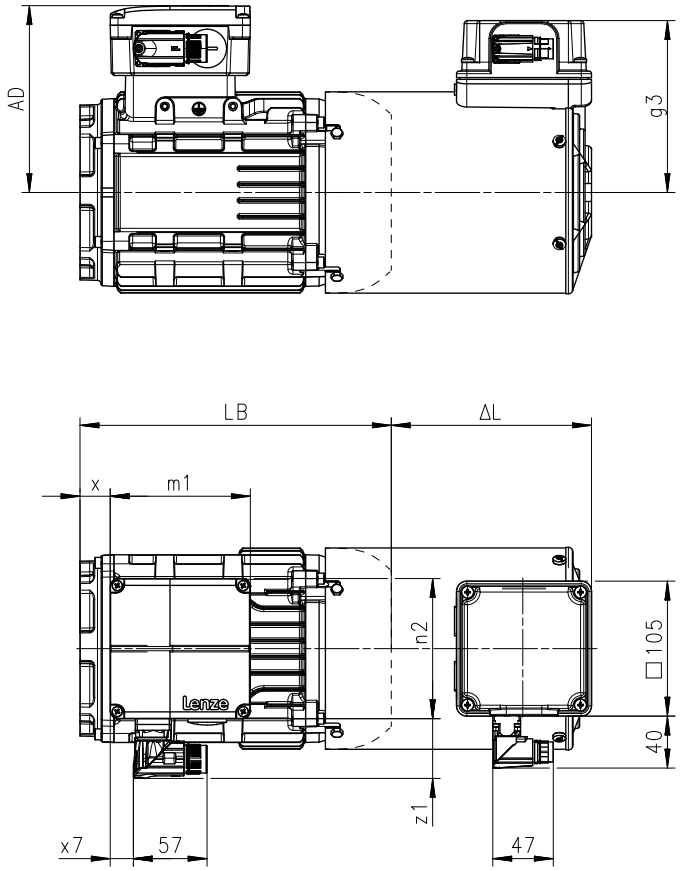
Motor		m550-H		m550-P			
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4
Motor terminal box							
AD	mm	117	128	145	153	163	168
x	mm	22	17	24	30	39	45
m_1	mm	87	87	109	109	109	109
n_2	mm	87	87	109	109	109	109
P_1	mm	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
P_2	mm	-	-	M25x1.5	M25x1.5	M25x1.5	M25x1.5
Blower terminal box							
G_3	mm	118	124	134	143	152	164
P_6	mm	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



Power terminal box “S” dimensions with ICN connector



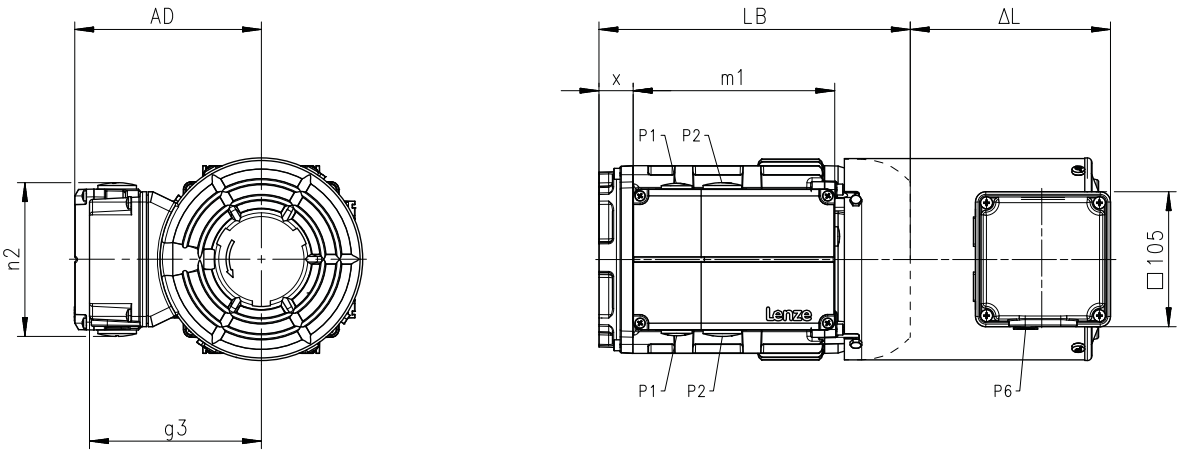
8801075_00

Motor		m550-H		m550-P			
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4
Motor terminal box							
AD	mm	117	128	145	153	163	168
x	mm	22	17	24	30	39	45
m_1	mm	87	87	109	109	109	109
n_2	mm	87	87	109	109	109	109
ICN connector Power							
x_7	mm	13	13	18	18	18	18
z_1	mm	42	42	42	42	42	42
Blower terminal box							
G_3	mm	118	124	134	143	152	164

Dimensions LB ▸ Basic dimensions 🕮 47

Dimensions Δ L ▸ Additional lengths 🕮 74

Power terminal box “M” dimensions

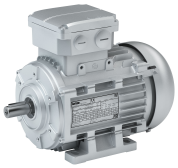


8801073_00

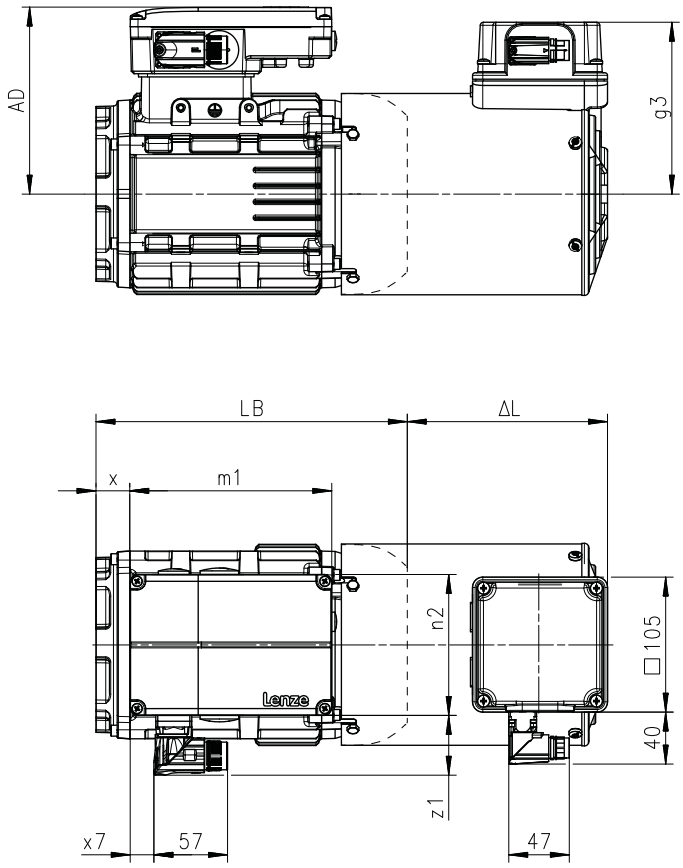
Motor		m550-H		m550-P			
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4
Motor terminal box							
AD	mm	113	124	145	153	163	168
x	mm	21	16	27	34	43	49
m_1	mm	141	141	157	157	157	157
n_2	mm	110	110	110	110	110	110
P_1	mm	M16x1.5	M16x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
P_2	mm	M20x1.5	M20x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5
Blower terminal box							
G_3	mm	118	124	134	143	152	164
P_6	mm	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5

Dimensions LB ▸ Basic dimensions 📖 47

Dimensions Δ L ▸ Additional lengths 📖 74



Power terminal box “M” dimensions with ICN connector

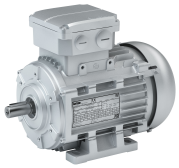


8801076_00

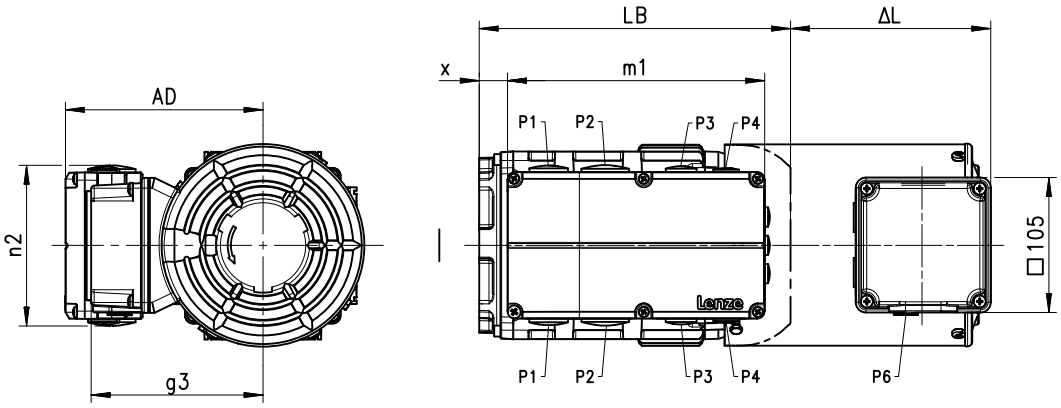
Motor		m550-H		m550-P			
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4
Motor terminal box							
AD	mm	113	124	145	153	163	168
x	mm	21	16	27	34	43	49
m_1	mm	141	141	157	157	157	157
n_2	mm	110	110	110	110	110	110
ICN connector Power/brake							
x_7	mm	45.3	45.3	18	18	18	18
z_1	mm	42	42	42	42	42	42
ICN connector Feedback							
x_7	mm	45.3	45.3	53.5	53.5	53.5	53.5
z_1	mm	42	42	46	46	46	46
Blower terminal box							
G_3	mm	118	124	134	143	152	164

Dimensions LB ▸ Basic dimensions 📖 47

Dimensions Δ L ▸ Additional lengths 📖 74



Power terminal box “L” dimensions

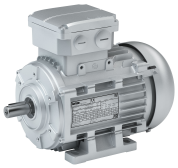


8801074-02

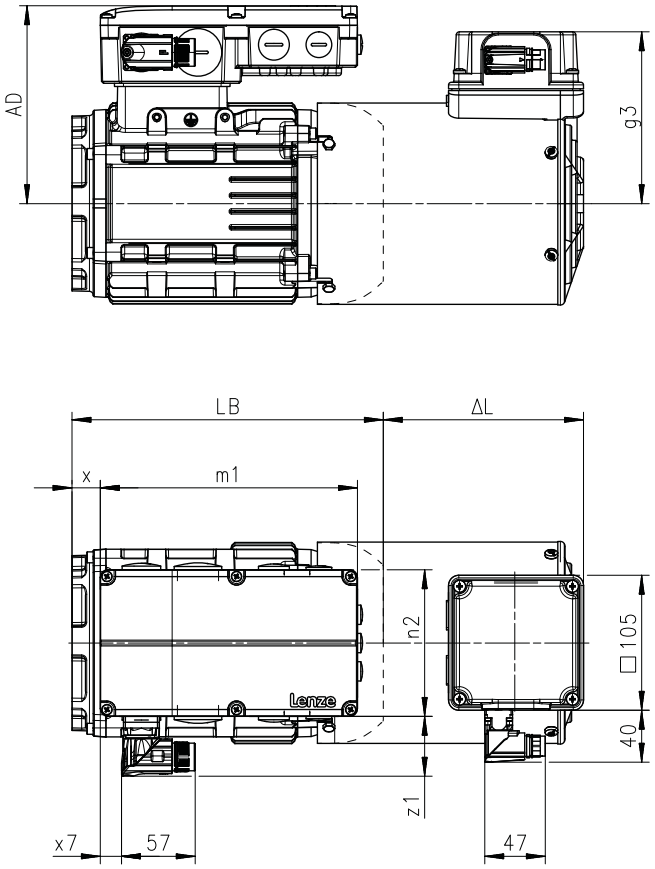
Motor		m550-H		m550-P						
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4	160/M4 160/L4	180/M4 180/L4
Motor terminal box										
AD	mm	113	141	154	162	172	177	197	251	271
x	mm	9	4	22	29	39	44	73	111	139
m_1	mm	141	200	200	200	200	200	200	253	253
n_2	mm	110	114	114	114	114	114	114	143	143
P_1	mm	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M25x1.5	M50x1.5	M50x1.5
P_2	mm	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M32x1.5	M40x1.5	M40x1.5
P_3	mm	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5	M20x1.5
P_4	mm	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5
Blower terminal box										
G_3	mm	118	124	134	143	152	164	185	211	211
P_6	mm	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5	M16x1.5

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



Power terminal box “L” dimensions with ICN connector

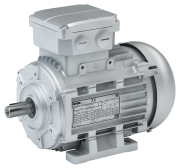


8801077_00

Motor		m550-H		m550-P						
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4	160/M4 160/L4	180/M4 180/L4
Motor terminal box										
AD	mm	113	141	154	162	172	177	197	251	271
x	mm	9	4	22	29	39	44	73	111	139
m_1	mm	141	200	200	200	200	200	200	253	253
n_2	mm	110	114	114	114	114	114	114	143	143
ICN connector Power/brake										
x_7	mm	16	16	16	16	16	16	16	-	-
z_1	mm	46	46	46	46	46	46	46	-	-
ICN connector Feedback										
x_7	mm	120	120	120	120	120	120	120	168	168
z_1	mm	42	42	42	42	42	42	42	42	42
Blower terminal box										
g_3	mm	118	124	134	143	152	164	185	211	211

Dimensions LB ▸ Basic dimensions 📖 47

Dimensions Δ L ▸ Additional lengths 📖 74



Zuordnung der Steckverbinder HAN

The power, brake and temperature monitoring can be connected in the HAN connector.

The designs HAN 10E or HAN modular with two power modules (16 A or 40 A) are available.

The HAN 10E connector is only available for motors with the connection method Y/Δ.

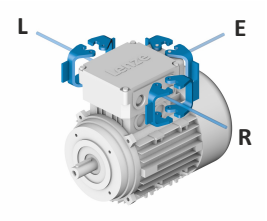
An additional rectifier can be connected with HAN modular.

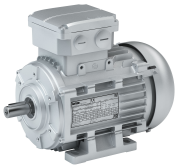
Feedback in conjunction with the HAN plug connector is only available with the IG128-24V-H add-on incremental encoder (with 0.5 m cable tail and M12 plug connector).

Motor	m550-H		m550-P						
	63/S4 63/M4 63/L4	71/M4 71/L4	80/S4 80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4	160/M4 160/L4	180/M4 180/L4
HAN 10E connector									
Connection: • Power • Brake • Temperature monitoring TK0 or PT1000	•	•	•	•	•	•	-	-	-
HAN modular connector									
Connection: • Power • Brake • Temperature monitoring TK0 or PT1000	•	•	•	•	•	•	•	-	-

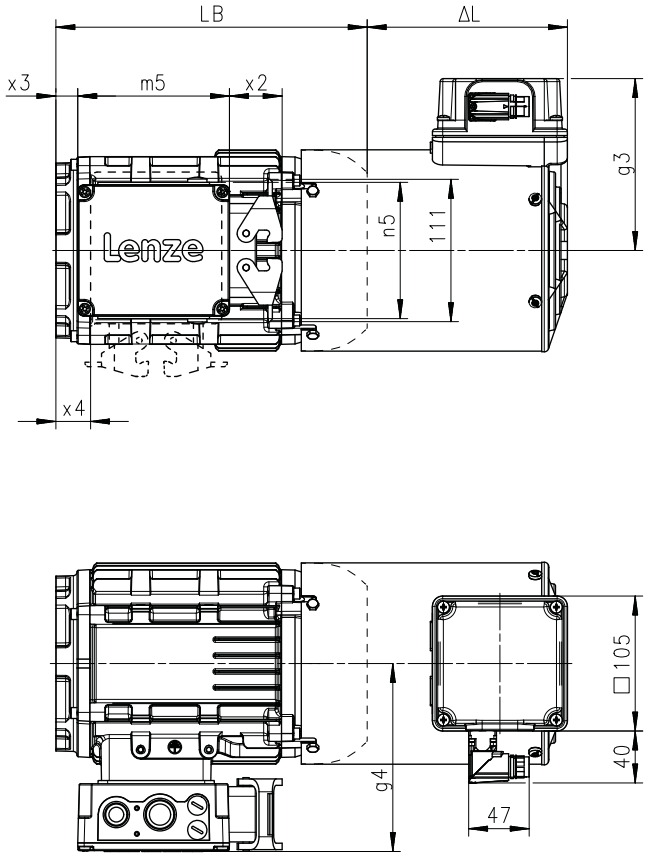
Positions of the connections

HAN connector positions





Dimensions of HAN connector

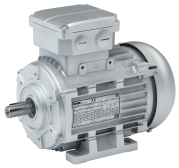


8801078_00

Motor		m550-H		m550-P				
		63/S4 63/M4 63/L4	71/M4 71/L4	80/S4 80/M4 80/L4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4
HAN connector Power/brake								
G_4	mm	123	134	147	155	165	170	237
x_2	mm	41	41	41	41	41	41	47
x_3	mm	6	1	19	25	34.5	40	39
m_5	mm	118	118	118	118	118	118	120
x_4	mm	7	2	20	26	35.5	41	9
n_5	mm	106	106	106	106	106	106	180
Blower terminal box								
G_3	mm	118	124	134	143	152	164	185

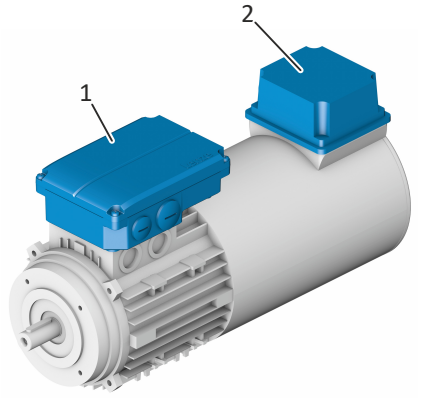
Dimensions LB ▸ Basic dimensions 🕮 47

Dimensions Δ L ▸ Additional lengths 🕮 74



Connection via terminal box

Position of the connections

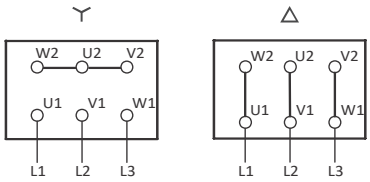


Position	Meaning	Note
1	Power connection Brake connection PE connection Feedback connection Connection of temperature monitoring	For the "S" terminal box, specify the position of the "L", "R" or "E" line connections.
2	Blower connection	When ordering, specify the mounting position of the terminal box: • Shown here: "T" • "L", "R" or "B" If required, the terminal box can be rotated step by step by 90 ° after loosening the screws in the terminal box.

Power connection

Bridge arrangement

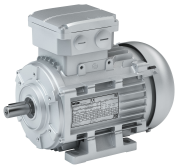
Y/Δ circuit



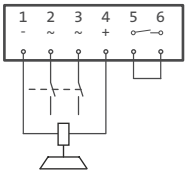
Terminal box, power		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
U1	L1	Motor winding phase
V1	L2	
W1	L3	

DC brake connection

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



AC brake connection



Switching contact - DC switching

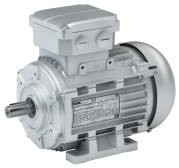
Terminal box, AC brake		
Contact	**Name**	**Meaning**
~	L1	Mains
	N	
+	+	Holding brake (factory-wired)
-	-	
Schalter		Switching contact - DC switching

Feedback connection

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

Terminal box, incremental encoder HTL/TTL		
Contact	**Name**	**Meaning**
+	+ UB	Supply +
-	GND	Mass
A	A/+COS	Track A / + COS
A^-	A^-/Ref COS	Track A inverse /-COS
B	B/+SIN	Track B / +SIN
B^-	B^-/Ref SIN	Track B inverse/-SIN
0	0	Zero track / + RS485
0^-	0^-	Zero track inverse /-RS485

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



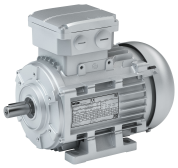
Connection of temperature monitoring

Terminal box, temperature monitoring		
Contact	**Name**	**Meaning**
TB1		Temperature monitoring: TCO
TB2		
1TP1		PTC150 thermistor
2TP1		PTC130 thermistor
R1	+	Temperature sensor PT1000 +
R2	-	Temperature sensor PT1000 -
1TP2		PTC150 thermistor
2TP2		PTC130 thermistor

Blower connection

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

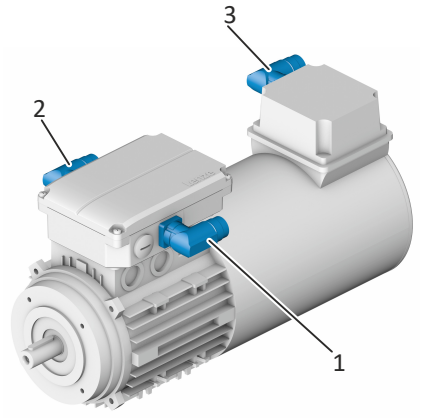
Terminal box, 3-phase separate fan		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
U1	L1	Mains connection
V1	L2	
W1	L3	



Connection via ICN connector

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

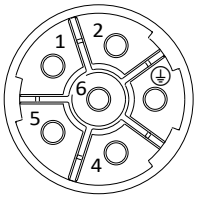


Position	Meaning	Note
1	ICN-M23 6-pin connector • Power connection • Brake connection • PE connection	Indicate the mounting position of connectors in the order: • Shown “R” • On the opposite side “L”
	Additionally for ICN-M23 8-pin connector: • Thermal contact temperature monitoring connection	Caution: Max. Brake connection voltage ≤ 230 V
2	ICN-M23 connector • Feedback connection • PT1000 temperature sensor connection	The mounting position for the feedback connector is on the opposite side to the power connection (position L/R).
3	ICN-M17 connector • Blower connection	Indicate the mounting position of terminal boxes in the order: • Shown “T” • L, R or B If required, the terminal box cover can be gradually rotated by 90° after loosening the screws on the terminal box.

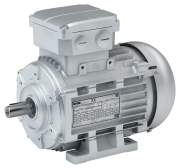
Power and brake connection

ICN-M23 connector assignment

6-pole

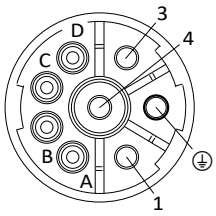


ICN M23 6-pole		
Contact	**Name**	**Meaning**
1	BD1	DC +/AC brake
2	BD2	DC -/AC brake
PE	PE	PE conductor
4	U	Power phase U
5	V	Power phase V
6	W	Power phase W



ICN-M23 connector assignment

8-pole

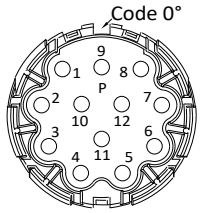


ICN M23 8-pole		
Contact	**Name**	**Meaning**
1	U	Power phase U
PE	PE	PE conductor
3	W	Power phase W
4	V	Power phase V
A	TB1	Temperature monitoring: TCO
B	TB2	Temperature monitoring: TCO
C	BD1 / BA1	Brake DC +/AC ≤ 230 V
D	BD2 / BA2	Brake DC-/AC ≤ 230V

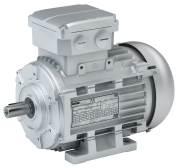
Feedback and temperature monitoring connection

ICN-M23 connector assignment

Resolver

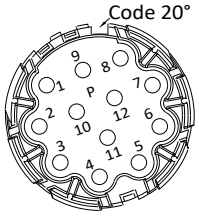


ICN M23 for resolvers		
Contact	**Name**	**Meaning**
1	+Ref	Transformer windings
2	-Ref	Transformer windings
3	+VCC ETS	Supply: Electronic nameplate (Only for motors and inverters that support this function)
4	+COS	Cosine stator windings
5	-COS	Cosine stator windings
6	+SIN	Sine stator windings
7	-SIN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



ICN-M23 connector assignment

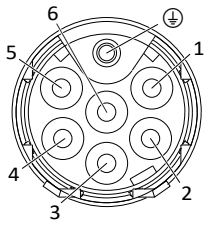
Incremental and SinCos absolute value encoder Hiperface©



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		Not assigned
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000

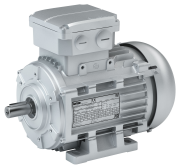
Blower

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

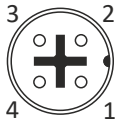
ICN M17 for blowers 3-ph		
Contact	**Name**	**Meaning**
PE	PE	PE conductor
1	U	Power phase U
2		Not assigned
3	V	Power phase V
4		Not assigned
5		Not assigned
6	W	Power phase W



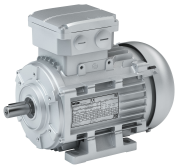
Connection via M12 connector

M12 pin assignment

Incr. encoder IG128-24V-H

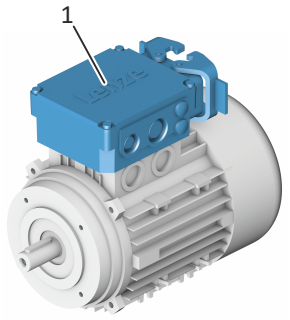


ICN M12		
Contact	**Name**	**Meaning**
1	+UB	Supply +
2	B	Track B
3	GND	Mass
4	A	Track A



Connection via HAN connector

Position of the connections



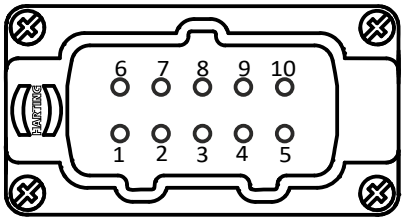
Note	Meaning
1	Power connection Brake connection PE connection Connection of temperature monitoring
	Additionally for HAN-Modular: • Rectifier connection

HAN 10E connector

The motor connection is specified in the counter plug.

The connector is only suitable for motors with the connection method Y/Δ.

HAN 10E connector assignment



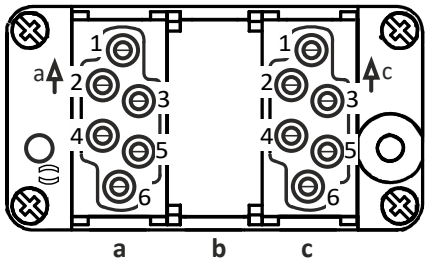
Bridge arrangement in the HAN 10E mating connector		
Contact	**Name**	**Meaning**
6-7-8	Y	Connection
1-6 2-7 3-8	Δ	

HAN 10 E		
Contact	**Name**	**Meaning**
1	U1	Motor winding phase
2	V1	
3	W1	
4	+/AC	Brake
5	-/AC	
6	W2	Motor winding phase
7	U2	
8	V2	
9	TKO/+PT1000	Temperature monitoring
10	TKO/-PT1000	

HAN modular connector

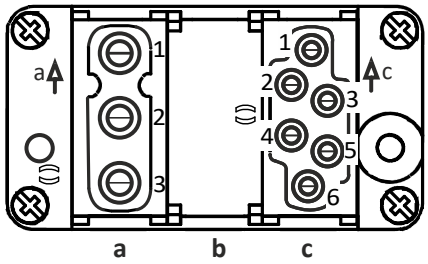
The motor connection is specified in the terminal box.

HAN modular 16 A pin assignment

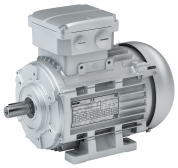


HAN modular 16 A			
Module	**Contact**	**Name**	**Meaning**
a	1	U1	Motor winding phase
	2	V1	
	3	W1	
b			Blank module
c	1	TKO +PT1000	Temperature monitoring
	2	+/AC	Brake
	3	-/AC	
	4	Schaltkontakt	Rectifier
	5		
	6	TKO -PT1000	Temperature monitoring

HAN modular 40 A pin assignment



HAN modular 40 A			
Module	**Contact**	**Name**	**Meaning**
a	1	U1	Motor winding phase
	2	V1	
	3	W1	
b			Blank module
c	1	TKO +PT1000	Temperature monitoring
	2	+/AC	Brake
	3	-/AC	
	4	Schaltkontakt	Rectifier
	5		
	6	TKO -PT1000	Temperature monitoring



Brakes

The motors can be ordered with a spring-applied brake to allow stopping or deceleration of the moving masses. The spring-applied brake operates according to the closed-circuit principle. In the deenergized state, the brake is closed, preventing possible movement of the motor shaft or the load after switching off or in the event of a power failure.

The spring-applied brakes are available purely as holding brakes or as application brakes. The application brake can be used as a holding brake and service brake.

⚠CAUTION!

The brake may not be used as a safety element (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 friction surfaces must always be free from oil and grease because even small amounts of grease or oil will considerably reduce the braking torque.

Brake connection

If the installation is already supplied with DC voltage, a direct connection without rectifier is possible. High induction peaks may occur and a freewheeling diode or a spark suppressor should be provided.

A rectifier is required if the brake is connected to the mains. This is included in the scope of supply and is located in the motor's terminal box.

Rectifier

The rectifier converts the connection's AC voltage into a DC voltage.

Alternatively, a half-wave bridge rectifier can be used for the application brake. This provides twice the voltage for a very short time (300 ms). As a result, the features of the brake – depending on the assignment of the brake's coil voltage and supply voltage – can be optimized in the form of a short-term overexcitation of the brake coil or a reduction of the holding current.

AC or DC voltage switching

Brakes can be switched both before the rectifier (AC voltage switching) as well as after the rectifier (DC voltage switching). The choice of control system influences the engagement time of the armature plate, inter alia.

AC switching increases the engagement time by a factor of 5 to 10 compared to DC switching. This is to be observed taken into account when choosing the control system. DC switching is possible by simply removing a bridge and using the switching contact connection. However, this calls for two additional cores in the control cabinet.

DC switching is particularly expedient for lifting applications because a short engagement time is necessary here to guarantee a secure hold without any prior slipping of the load.

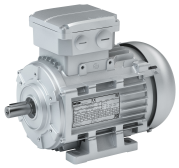
Motor supply cables

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:

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

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



Manual release lever

To make positioning and maintenance work easier, the holding and application brake can be ordered with a manual release lever. By using the manual release lever, the brake can be released manually in deenergized operating state.

A lockable manual release lever can be ordered as an option. This is equipped with a clamping device to hold the brake in the released position.

Spring-applied holding brake

NOTICE

If the specified wide voltage range is not reached (DC 180 V ... 205 V/AC 400 V ... 460 V), this will negatively affect how the brake works.

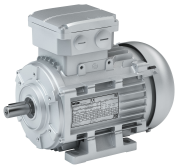
For example, greater wear can be expected.

▸ The application case must be checked by Lenze.

Types	
Degree of protection	IP54/IP55
Control	DC supply AC supply via rectifier in the terminal box
Supply voltages	
DC voltage	DC 24 V ±10% DC 180 V ... 205 V +10%
Mains voltage	AC 230 V ±10% AC 400 V ... 460 V +10%
Switching cycles	
Standard design	Repeating: 1 x 10^6 Reversing: 1 x 10^6
Friction lining	Standard
Options	Manual release UL/CSA approval Low noise during operation (noise-reduced rotor)

Assignment of braking torques

Motor	Standard design						
	HBR 06	HBR 08	HBR 10	HBR 12	HBR 14	HBR 16	HBR 18
	Nm	Nm	Nm	Nm	Nm	Nm	Nm
m550-H63/S4	4						
m550-H63/M4							
m550-H63/L4							
m550-H71/M4							
m550-H71/L4							
m550-P80/M4		8					
m550-P90/M4							
m550-P90/L4			16				
m550-P100/M4			23				
m550-P100/L4							
m550-P112/M4				32			
m550-P132/M4					60		
m550-P132/L4							
m550-P160/M4						80	
m550-P160/L4							150
m550-P180/M4							
m550-P180/L4							



Rated data

Spring-applied holding brake

Holding brake			HBR 06	HBR 08	HBR 10	HBR 10	HBR 12	HBR 14	HBR 16	HBR 18
Moment of inertia		$kgcm^2$	0.128	0.401	2	2	4.5	6.3	15	29
Power input										
Braking torque is static		Nm	4	8	16	23	32	60	80	150
Min. static braking torque tolerance		%	0	0	0	0	0	0	0	0
Max. static braking torque tolerance		%	80	80	80	80	80	80	80	80
Reversing cycles			1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Repetitive cycles			1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Maximum switching energy	Q_E	J	3000	7500	12000	12000	24000	30000	36000	60000

NOTICE

Maximum switching energy per emergency stop with n= 2700 rpm for at least 100 emergency stops.

Emergency stops are possible during commissioning of the holding brake - if emergency stops are required during operation, an application brake must be used.

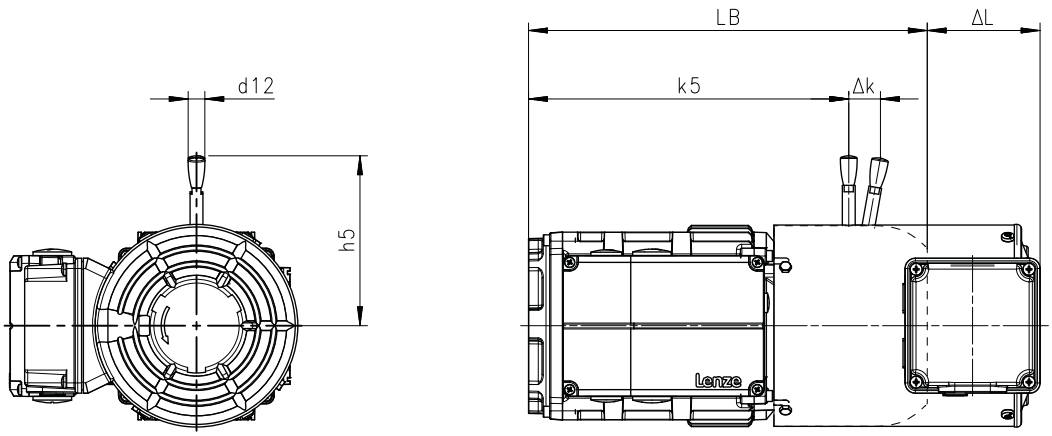
⚠ DANGER!

An emergency stop during operation can lead to malfunction of the holding brake.

Possible consequences: Personal injury and/or damage to property.

- ▸ After an emergency stop, check the air gap and the friction lining for damage.
- ▸ Change the brake rotor if the air gap is too large or the friction lining is damaged.

Dimensions of the manual release lever



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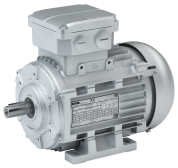
Motor	Brake	Dimensions			
		k_5	Δ k	H_5	d_{12}
		mm	mm	mm	mm
m550-H63/S4 m550-H63/M4 m550-H63/L4	HBR 06	193	25	107	13
m550-H71/M4 m550-H71/L4	HBR 06	211	25	107	13
m550-P80/M4	HBR 08	231	27	116	13
m550-P90/M4	HBR 08	270	27	116	13
m550-P90/L4	HBR 10	286	23	131	13
m550-P100/M4 m550-P100/L4	HBR 10	344	23	131	13
m550-P112/M4	HBR 12	345	37	161	13
m550-P132/M4 m550-P132/L4	HBR 14	408	53	229	20
m550-P160/M4	HBR 16	556	67	267	20
m550-P160/L4	HBR 18		100	347	25
m550-P180/M4 m550-P180/L4	HBR 18	627	100	347	25

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



Spring-applied application brake

Application brakes in the functional safety environment

Motors can implement the safe brake control (SBC) function in the drive system through Lenze inverters or controllers. In case of inverters, this function is 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:

- The ABR 06 ... 20 (IP54/55) application brakes can achieve the **SIL 1** safety level in the standard version as a safety brake. The designation of these brakes is: **ABRS1** 06 ... 20.
- The ABR 16 ... 20 (IP54/55) double brakes can achieve the **SIL 2** safety level in the standard version as a safety brake. The designation of these brakes is: **ABRS2** 16 ... 20.
- The extended functions long-life version, holding current reduction (cold brake) and brief overexcitation of the brake coil are not possible as functional safety.

The technical data can be found in the following tables for the individual brakes.

NOTICE

If used as a service brake, the braking torques are dependent on the motor speed to be braked.

▶ During braking from a high speed and in the event of emergency stops, the braking torque is significantly reduced.

LongLife version

The application brake is available in a LongLife version for applications with very high switching frequencies. The standard design has a guaranteed service life for the brake mechanism of 1 million switching cycles.

The LongLife version has a reinforced brake mechanism and up to 10 million repeating or 15 million reversing switching cycles possible.

Double brake

With the double brake, two application brakes are arranged one behind the other. The resulting data are given in the tables.

Friction linings

Friction linings are available for the application brake in standard or low-wear versions.

Standard friction lining

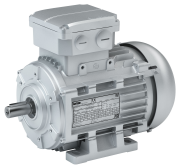
- Universally applicable
- Wide speed range
- Short run-in process required
- Can be used for holding and service brake

Low-wear friction lining

- Long service life
- Can be used for standard applications
- Restricted maximum speed
- Short run-in process required
- Preferably used as service brake
- Higher friction work until the brake is replaced
- Higher maximum switching work

Reduction of the holding current (cold brake)

By reducing the holding current, the half-wave bridge rectifier reduces the power input of the released brake. As the brake heats up less, this type of control is known as "cold brake". This is necessary at low speeds to counteract any impermissible heating up. This means that no blower is needed at a speed setting range under 14 Hz. Additionally, only one quarter of the braking power is required, thus saving energy.



Short-time overexcitation of the brake coil

The disengagement time can be reduced by triggering the brake coil with twice the rated voltage for an overexcitation time. The brake releases much faster and the wear on the friction lining decreases. As a result of these features, this control variant is particularly ideal for lifting applications.

Brake monitoring

The application brake is optionally available with a microswitch to monitor the air gap or wear. It is connected in the motor terminal box.

Monitoring of the air gap

A microswitch monitors the air gap between the armature plate and the stator.

If the microswitch is activated, it e.g. triggers a motor contactor and the motor starts up.

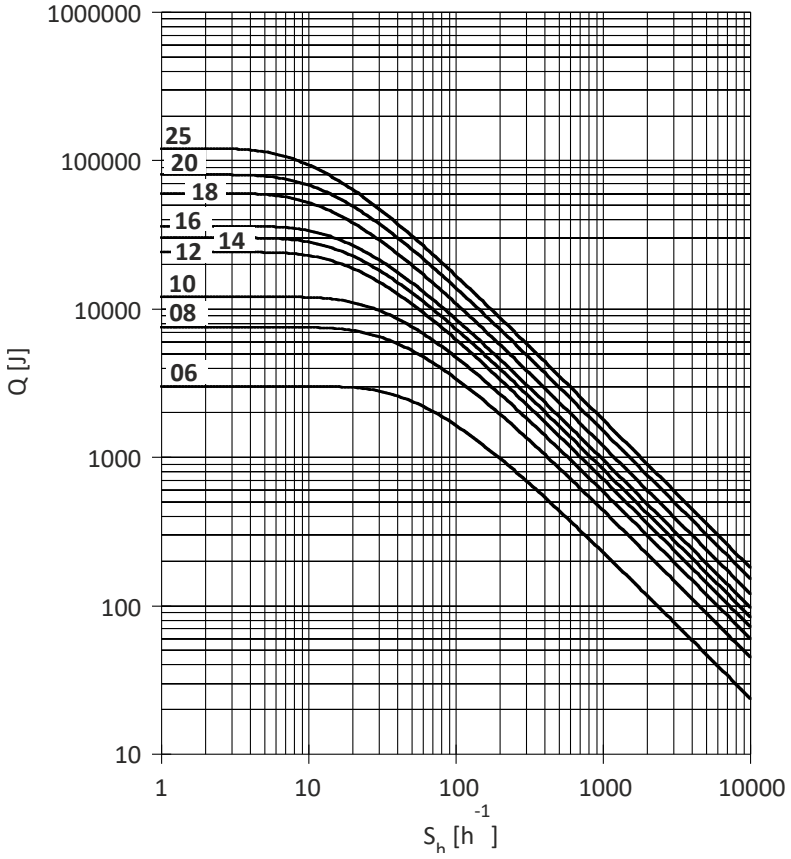
If the brake is switched off, the microswitch opens, the motor contactor is not triggered and the motor does not start up.

This is used for machines and aggregates that require a precisely defined start-up and brake reaction and for the error monitoring of defective rectifiers, broken connecting cables, defective coils, and an excessively large air gap.

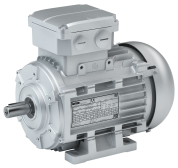
Wear control

A microswitch monitors the wear at the friction lining. If the wear limit is exceeded, the microswitch opens, the motor contactor is not triggered and the motor does not start.

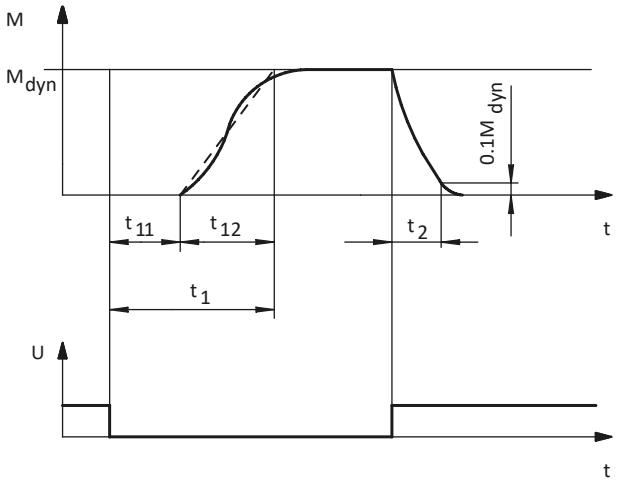
Permissible friction energy



Q	Switching energy per switching cycle
S_h	Switching rate
06 ... 25	Brake size



Switching times of the spring-applied brakes



t_1	Engagement time	t_{11}	Delay time during linking
t_2	Disengagement time (up to M = 0.1 M_{dyn})	t_{12}	Rise time of the braking torque
M_{dyn}	Braking torque at constant speed	U	Voltage

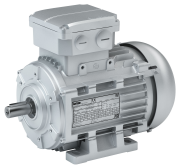
NOTICE

Falling below the specified wide voltage range (DC 180 V ... 205 V/AC 400 V ... 460 V) has a negative influence on the functioning of the brake.

For example, higher wear and tear is to be expected.

▸ A review of the application by Lenze is required.

Versions	IP54/55 protection			IP65/66 protection
	Standard	Long-life	Double brake	Standard
Control	DC supply AC supply via rectifier in the terminal box			
Supply voltages				
DC voltage	DC 24 V ±10 % DC 180 V ±10 % DC 205 V ±10 % DC 180 V ... 205 V +10 %			
Mains voltage	AC 115 V ±10 % AC 230 V ±10 % AC 400 V ±10 % AC 460 V ±10 % AC 400 V ... 460 V +10 %			
Switching cycles				
Repetitive	1×10^6	10×10^6	1×10^6	2×10^6
Reversing	1×10^6	15×10^6	1×10^6	2×10^6
Friction lining	Standard Low-wear			
Options	Manual release UL/CSA-approved Low noise during operation (noise-reduced rotor) Low noise during operation and switching on (noise-reduced rotor and noise-reduced armature plate)			
	Air gap control (from brake size ABR 12) Wear control (from brake size ABR 12)		-	-



Braking torques

An application brake with several braking torques is available for every motor frame size for an optimum adjustment of the brake motor to the application. Starting from a standard braking torque, the braking torques can be adjusted up or down.

When the braking torque is reduced, great wear reserves can be attained. A higher braking torque is to be provided for lifting applications. In this case, the earth's gravity acts as an additional acceleration in a negative direction.

In addition, some applications require a 2-fold safety factor for the braking torque.

NOTICE

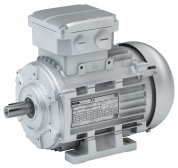
The following motor and brake combinations may only be used if

- the motor moment of inertia is at least 40% of the total moment of inertia (motor + gearbox + load).
- no dynamic braking is performed.
- there are no active loads.

Motor	Brake	Braking torque	Calculation
		Nm	
m550-H63/S4 m550-H63/M4	ABR 06	4	$\frac{\frac{J_L}{i^2}+J_M+J_B+J_Z}{J_M+J_B+J_Z} \le 2.5$
m550-H71/M4	ABR 08	8	
m550-P80/M4	ABR 10	16	

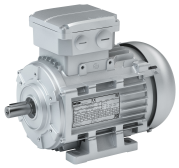
Assignment of braking torques

Motor	Standard design							
	ABR 06	ABR 08	ABR 10	ABR 12	ABR 14	ABR 16	ABR 18	ABR 20
	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
m550-H63/S4	2.5 4							
m550-H63/M4								
m550-H63/L4								
m550-H71/M4		8						
m550-H71/L4								
m550-P80/M4		3.5 8	16					
m550-P90/M4								
m550-P90/L4		8	16 23					
m550-P100/M4				32				
m550-P100/L4				46				
m550-P112/M4				14 32	60			
m550-P132/M4					35 60	80		
m550-P132/L4						100		
m550-P160/M4						60 80	150	
m550-P160/L4							80 150 200	
m550-P180/M4							80 150	260
m550-P180/L4								315



Motor	LongLife design			
	ABR 06	ABR 08	ABR 10	ABR 12
	Nm	Nm	Nm	Nm
m550-H63/S4	2.5 4			
m550-H63/M4				
m550-H63/L4				
m550-H71/M4		8		
m550-H71/L4				
m550-P80/M4		3.5 8	16	
m550-P90/M4				
m550-P90/L4		8		
m550-P100/M4				32
m550-P100/L4				
m550-P112/M4				14 32

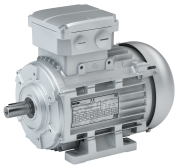
Motor	Double brake		
	ABR 16	ABR 18	ABR 20
	Nm	Nm	Nm
m550-P160/M4	90 110	130 160	
m550-P160/L4		130 160 200	
m550-P180/M4			230
m550-P180/L4			



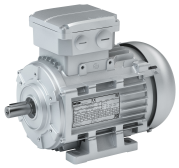
Rated data, Standard design, IP54/55

Application brake ABR 06, ABR 08

Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Power input									
DC 24 V	W	20	20	20	20	25	25	25	25
DC 180 V	W	20	20	20	20	25	25	25	25
DC 205 V	W	20	20	20	20	25	25	25	25
DC 180 V … 205 V	W	20	20	20	20	25	25	25	25
AC 115 V	W	20	20	20	20	25	25	25	25
AC 230 V	W	20	20	20	20	25	25	25	25
AC 400 V	W	20	20	20	20	25	25	25	25
AC 460 V	W	20	20	20	20	25	25	25	25
AC 400 V … 460 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 230 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 400 V	W	23	23	23	23	27	27	27	27
Übererregung AC 230 V	W	20	20	20	20	25	25	25	25
Übererregung AC 400 V	W	20	20	20	20	25	25	25	25
Moment of inertia	kgcm²	0.15	0.15	0.15	0.15	0.61	0.61	0.61	0.61
Braking torque is static	Nm	2.5	2.5	4	4	3.5	3.5	8	8
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35
Dynamic braking torque									
100 rpm	Nm	2.5	2.5	4.0	4.0	3.5	3.5	8.0	8.0
1000 rpm	Nm	2.3	2.3	3.7	3.7	3.1	3.1	7.1	7.1
1200 rpm	Nm	2.3	2.3	3.6	3.6	3.0	3.0	7.0	7.0
1500 rpm	Nm	2.2	2.2	3.5	3.5	3.0	3.0	6.8	6.8
1800 rpm	Nm	2.2	2.2	3.4	3.4	2.9	2.9	6.6	6.6
2500 rpm	Nm	2.1	2.1	3.3	3.3	2.8	2.8	6.4	6.4
3000 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.2	6.2
3600 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.1	6.1
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35
Friction energy									
100 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1200 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1800 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
2500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3600 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
Maximum speed - operation	rpm	6000	3600	6000	3600	5000	3600	5000	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	79	79	79	79	50	50	50	50



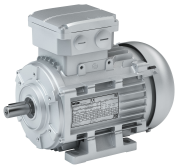
Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Delay time t11									
DC voltage	ms	25	25	15	15	14	14	15	15
AC mains voltage	ms	25	25	15	15	14	14	15	15
Cold - Brake 230 V	ms	24	24	16	16	22	22	25	25
Cold - Brake 400 V	ms	27	27	19	19	28	28	28	28
Over-excitation 230 V	ms	31	31	20	20	33	33	31	31
Over-excitation 400 V	ms	24	24	16	16	22	22	25	25
Rise time t12									
DC voltage	ms	13	13	13	13	10	10	16	16
AC mains voltage	ms	13	13	13	13	10	10	16	16
Cold - Brake 230 V	ms	12	12	14	14	16	16	27	27
Cold - Brake 400 V	ms	14	14	16	16	20	20	30	30
Over-excitation 230 V	ms	16	16	17	17	24	24	33	33
Over-excitation 400 V	ms	12	12	14	14	16	16	27	27
Engagement time t1									
DC voltage	ms	38	38	28	28	24	24	31	31
AC mains voltage	ms	38	38	28	28	24	24	31	31
Cold - Brake 230 V	ms	36	36	30	30	38	38	52	52
Cold - Brake 400 V	ms	41	41	35	35	48	48	58	58
Over-excitation 230 V	ms	47	47	37	37	57	57	64	64
Over-excitation 400 V	ms	36	36	30	30	38	38	52	52
Overexcitation time									
Cold - Brake 230 V	ms	300	300	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300	300	300
Min. break time t									
Cold - Brake 230 V		-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-
Friction energy QBW									
DC voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
AC mains voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 230 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 400 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 230 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 400 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Wear limit of brake pad	MJ	210	420	210	420	350	790	350	790
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$



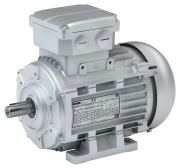
Rated data, Standard design, IP54/55

Application brake ABR 10, ABR 12

Application brake		**ABR 10**				**ABR 12**					
Braking torque											
Standard friction lining	**Nm**	**16**		**23**		**14**		**32**		**46**	
Low-wear friction lining	**Nm**		**16**		**23**		**14**		**32**		**46**
Power input											
DC 24 V	W	30	30	30	30	40	40	40	40	40	40
DC 180 V	W	32	32	32	32	40	40	40	40	40	40
DC 205 V	W	33	33	33	33	40	40	40	40	40	40
DC 180 V … 205 V	W	33	33	33	33	40	40	40	40	40	40
AC 115 V	W	32	32	32	32	40	40	40	40	40	40
AC 230 V	W	33	33	33	33	40	40	40	40	40	40
AC 400 V	W	32	32	32	32	40	40	40	40	40	40
AC 460 V	W	33	33	33	33	40	40	40	40	40	40
AC 400 V … 460 V	W	33	33	33	33	40	40	40	40	40	40
Cold Brake AC 230 V	W	33	33	33	33	40	40	40	40	40	40
Cold Brake AC 400 V	W	30	30	30	30	42	42	42	42	42	42
Übererregung AC 230 V	W	32	32	32	32	40	40	40	40	40	40
Übererregung AC 400 V	W	32	32	32	32	40	40	40	40	40	40
Moment of inertia	kgcm²	2	2	2	2	4.5	4.5	4.5	4.5	4.5	4.5
Braking torque is static	Nm	16	16	23	23	14	14	32	32	46	46
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Dynamic braking torque											
100 rpm	Nm	16	16	23	23	14	14	32	32	46	46
1000 rpm	Nm	14	14	20	20	12	12	28	28	40	40
1200 rpm	Nm	14	14	20	20	12	12	27	27	39	39
1500 rpm	Nm	13	13	19	19	11	11	26	26	38	38
1800 rpm	Nm	13	13	19	19	11	11	26	26	37	37
2500 rpm	Nm	12	12	18	18	11	11	24	24	35	35
3000 rpm	Nm	12	12	17	17	11	11	24	24	35	35
3600 rpm	Nm	12	12	17	17	10	10	23	23	34	34
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Friction energy											
100 rpm	kJ	12	12	12	12	24	24	24	24	24	24
1000 rpm	kJ	12	12	12	12	24	24	24	24	24	24
1200 rpm	kJ	12	12	12	12	24	24	24	24	24	24
1500 rpm	kJ	12	12	12	12	24	24	24	24	24	24
1800 rpm	kJ	12	12	12	12	24	24	24	24	24	24
2500 rpm	kJ	12	12	12	12	24	24	24	24	24	24
3000 rpm	kJ	12	12	12	12	24	24	24	24	24	24
3600 rpm	kJ	12	12	12	12	24	7	24	7	24	7
Maximum speed - operation	rpm	4000	3600	4000	3600	3600	3600	3600	3600	3600	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	40	40	40	40	30	30	30	30	30	30



Application brake		**ABR 10**				**ABR 12**					
Braking torque											
Standard friction lining	**Nm**	**16**		**23**		**14**		**32**		**46**	
Low-wear friction lining	**Nm**		**16**		**23**		**14**		**32**		**46**
Delay time t11											
DC voltage	ms	28	28	10	10	21	21	28	28	16	16
AC mains voltage	ms	28	28	10	10	21	21	28	28	16	16
Cold - Brake 230 V	ms	31	31	24	24	49	49	48	48	27	27
Cold - Brake 400 V	ms	34	34	27	27	64	64	55	55	42	42
Over-excitation 230 V	ms	44	44	29	29	73	73	62	62	54	54
Over-excitation 400 V	ms	31	31	24	24	49	49	48	48	27	27
Rise time t12											
DC voltage	ms	19	19	19	19	19	19	25	25	25	25
AC mains voltage	ms	19	19	19	19	19	19	25	25	25	25
Cold - Brake 230 V	ms	21	21	46	46	44	44	43	43	42	42
Cold - Brake 400 V	ms	23	23	51	51	58	58	49	49	66	66
Over-excitation 230 V	ms	30	30	55	55	66	66	55	55	84	84
Over-excitation 400 V	ms	21	21	46	46	44	44	43	43	42	42
Engagement time t1											
DC voltage	ms	47	47	29	29	40	40	53	53	41	41
AC mains voltage	ms	47	47	29	29	40	40	53	53	41	41
Cold - Brake 230 V	ms	52	52	70	70	93	93	91	91	69	69
Cold - Brake 400 V	ms	57	57	78	78	122	122	104	104	108	108
Over-excitation 230 V	ms	74	74	84	84	139	139	117	117	138	138
Over-excitation 400 V	ms	52	52	70	70	93	93	91	91	69	69
Overexcitation time											
Cold - Brake 230 V	ms	300	300	300	300	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300	300	300	300	300
Min. break time t											
Cold - Brake 230 V		-	-	-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-	-	-
Friction energy QBW											
DC voltage	MJ	98	264	50.3	198	236.4	706.2	177.3	529.6	75.7	353.1
AC mains voltage	MJ	98	264	50.3	198	236.4	706.2	177.3	529.6	75.7	353.1
Cold - Brake 230 V	MJ	98	264	50.3	198	236.4	706.2	177.3	529.6	75.7	353.1
Cold - Brake 400 V	MJ	98	264	67.1	264	236.4	706.2	236.4	706.2	151.4	706.2
Over-excitation 230 V	MJ	98	264	67.1	264	236.4	706.2	236.4	706.2	151.4	706.2
Over-excitation 400 V	MJ	98	264	50.3	198	236.4	706.2	177.3	529.6	75.7	353.1
Wear limit of brake pad	MJ	370	990	250	990	790	2350	790	2350	500	2350
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$



Rated data, Standard design, IP54/55

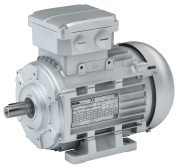
Application brake ABR 14, ABR 16

Application brake		**ABR 14**				**ABR 16**					
Braking torque											
Standard friction lining	**Nm**	**35**		**60**		**60**		**80**		**100**	
Low-wear friction lining	**Nm**		**35**		**60**		**60**		**80**		**100**
Power input											
DC 24 V	W	50	50	50	50	55	55	55	55	55	55
DC 180 V	W	53	53	53	53	55	55	55	55	55	55
DC 205 V	W	53	53	53	53	56	56	56	56	56	56
DC 180 V … 205 V	W	53	53	53	53	56	56	56	56	56	56
AC 115 V	W	53	53	53	53	56	56	56	56	56	56
AC 230 V	W	53	53	53	53	56	56	56	56	56	56
AC 400 V	W	53	53	53	53	55	55	55	55	55	55
AC 460 V	W	53	53	53	53	56	56	56	56	56	56
AC 400 V … 460 V	W	53	53	53	53	56	56	56	56	56	56
Cold Brake AC 230 V	W	53	53	53	53	56	56	56	56	56	56
Cold Brake AC 400 V	W	54	54	54	54	55	55	55	55	55	55
Übererregung AC 230 V	W	53	53	53	53	56	56	56	56	56	56
Übererregung AC 400 V	W	53	53	53	53	55	55	55	55	55	55
Moment of inertia	kgcm²	6.3	6.3	6.3	6.3	15	15	15	15	15	15
Braking torque is static	Nm	35	35	60	60	60	60	80	80	100	100
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Dynamic braking torque											
100 rpm	Nm	35	35	60	60	60	60	80	80	100	100
1000 rpm	Nm	30	30	51	51	50	50	66	66	83	83
1200 rpm	Nm	29	29	50	50	49	49	65	65	81	81
1500 rpm	Nm	28	28	49	49	47	47	63	62	78	78
1800 rpm	Nm	28	28	47	47	46	46	62	62	77	77
2500 rpm	Nm	26	26	45	45	44	44	58	58	73	73
3000 rpm	Nm	26	26	44	44	43	43	57	57	71	71
3600 rpm	Nm	25	-	43	-	42	-	56	-	70	-
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Friction energy											
100 rpm	kJ	30	30	30	30	36	36	36	36	36	36
1000 rpm	kJ	30	30	30	30	36	36	36	36	36	36
1200 rpm	kJ	30	30	30	30	36	36	36	36	36	36
1500 rpm	kJ	30	30	30	30	36	36	36	36	36	36
1800 rpm	kJ	30	30	30	30	36	36	36	36	36	36
2500 rpm	kJ	30	30	30	30	36	36	36	36	36	36
3000 rpm	kJ	30	18	30	18	36	11	36	11	36	11
3600 rpm	kJ	30	-	30	-	36	-	36	-	36	-
Maximum speed - operation	rpm	3600	3000	3600	3000	3600	3000	3600	3000	3600	3000
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	28	28	28	28	27	27	27	27	27	27

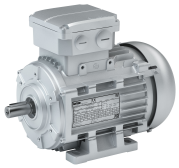
Product extensions

Brakes

Spring-applied application brake



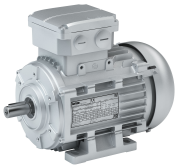
Application brake		ABR 14				ABR 16					
Braking torque											
Standard friction lining	**Nm**	**35**		**60**		**60**		**80**		**100**	
Low-wear friction lining	**Nm**		**35**		**60**		**60**		**80**		**100**
Delay time t11											
DC voltage	ms	37	37	17	17	53	53	27	27	22	22
AC mains voltage	ms	37	37	17	17	53	53	27	27	22	22
Cold - Brake 230 V	ms	61	61	33	33	114	114	58	58	41	41
Cold - Brake 400 V	ms	69	69	43	43	133	133	74	74	56	56
Over-excitation 230 V	ms	76	76	47	47	145	145	89	89	70	70
Over-excitation 400 V	ms	61	61	33	33	114	114	58	58	41	41
Rise time t12											
DC voltage	ms	22	22	25	25	30	30	30	30	30	30
AC mains voltage	ms	22	22	25	25	30	30	30	30	30	30
Cold - Brake 230 V	ms	36	36	47	47	65	65	64	64	56	56
Cold - Brake 400 V	ms	41	41	63	63	75	75	82	82	76	76
Over-excitation 230 V	ms	45	45	69	69	82	82	99	99	95	95
Over-excitation 400 V	ms	36	36	47	47	65	65	64	64	56	56
Engagement time t1											
DC voltage	ms	59	59	42	42	83	83	57	57	52	52
AC mains voltage	ms	59	59	42	42	83	83	57	57	52	52
Cold - Brake 230 V	ms	97	97	80	80	179	179	122	122	97	97
Cold - Brake 400 V	ms	110	110	106	106	208	208	156	156	132	132
Over-excitation 230 V	ms	121	121	116	116	227	227	188	188	165	165
Over-excitation 400 V	ms	97	97	80	80	179	179	122	122	97	97
Overexcitation time											
Cold - Brake 230 V	ms	300	300	300	300	1300	1300	1300	1300	1300	1300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	1300	1300	1300	1300	1300	1300
Min. break time t											
Cold - Brake 230 V		-	-	-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-	-	-
Friction energy QBW											
DC voltage	MJ	238.2	761.4	178.7	571	257.9	965.7	257.9	965.7	120.5	643.8
AC mains voltage	MJ	238.2	761.4	178.7	571	257.9	965.7	257.9	965.7	120.5	643.8
Cold - Brake 230 V	MJ	238.2	761.4	178.7	571	257.9	965.7	257.9	965.7	120.5	643.8
Cold - Brake 400 V	MJ	238.2	761.4	238.2	761.4	257.9	965.7	257.9	965.7	180.8	965.7
Over-excitation 230 V	MJ	238.2	761.4	238.2	761.4	257.9	965.7	257.9	965.7	180.8	965.7
Over-excitation 400 V	MJ	238.2	761.4	178.7	571	257.9	965.7	257.9	965.7	120.5	643.8
Wear limit of brake pad	MJ	990	3170	990	3170	1500	5630	1500	5630	1050	5630
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$



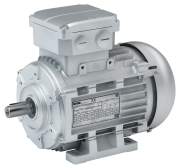
Rated data, Standard design, IP54/55

Application brake ABR 18, ABR 20

Application brake		**ABR 18**						**ABR 20**			
Braking torque											
Standard friction lining	**Nm**	**80**		**150**		**200**		**260**		**315**	
Low-wear friction lining	**Nm**		**80**		**150**		**200**		**260**		**315**
Power input											
DC 24 V	W	85	85	85	85	85	85	100	100	100	100
DC 180 V	W	85	85	85	85	85	85	100	100	100	100
DC 205 V	W	85	85	85	85	85	85	100	100	100	100
DC 180 V … 205 V	W	85	85	85	85	85	85	100	100	100	100
AC 115 V	W	85	85	85	85	85	85	100	100	100	100
AC 230 V	W	85	85	85	85	85	85	100	100	100	100
AC 400 V	W	85	85	85	85	85	85	100	100	100	100
AC 460 V	W	85	85	85	85	85	85	100	100	100	100
AC 400 V … 460 V	W	85	85	85	85	85	85	100	100	100	100
Cold Brake AC 230 V	W	85	85	85	85	85	85	100	100	100	100
Cold Brake AC 400 V	W	85	85	85	85	85	85	100	100	100	100
Übererregung AC 230 V	W	85	85	85	85	85	85	100	100	100	100
Übererregung AC 400 V	W	85	85	85	85	85	85	100	100	100	100
Moment of inertia	kgcm²	29	29	29	29	29	29	73	73	73	73
Braking torque is static	Nm	80	80	150	150	200	200	260	260	315	315
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Dynamic braking torque											
100 rpm	Nm	80	80	150	150	200	200	260	260	315	315
1000 rpm	Nm	65	65	122	122	162	162	205	205	249	249
1200 rpm	Nm	63	63	119	119	158	158	200	200	243	243
1500 rpm	Nm	62	62	116	116	154	154	195	195	236	236
1800 rpm	Nm	60	60	113	113	150	150	190	-	230	-
2500 rpm	Nm	58	-	108	-	144	-	182	-	221	-
3000 rpm	Nm	56	-	105	-	140	-	177	-	214	-
3600 rpm	Nm	54	-	102	-	136	-	172	-	208	-
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Friction energy											
100 rpm	kJ	60	60	60	60	60	60	80	80	80	80
1000 rpm	kJ	60	60	60	60	60	60	80	80	80	80
1200 rpm	kJ	60	60	60	60	60	60	80	80	80	80
1500 rpm	kJ	60	60	60	60	60	60	80	24	80	24
1800 rpm	kJ	60	36	60	36	60	36	80	-	80	-
2500 rpm	kJ	60	-	60	-	60	-	80	-	80	-
3000 rpm	kJ	60	-	60	-	60	-	80	-	80	-
3600 rpm	kJ	60	-	60	-	60	-	80	-	80	-
Maximum speed - operation	rpm	3600	1800	3600	1800	3600	1800	3600	1500	3600	1500
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	20	20	20	20	20	20	19	19	19	19



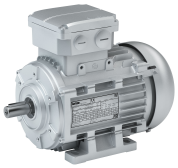
Application brake		**ABR 18**						**ABR 20**			
Braking torque											
Standard friction lining	**Nm**	**80**		**150**		**200**		**260**		**315**	
Low-wear friction lining	**Nm**		**80**		**150**		**200**		**260**		**315**
Delay time t11											
DC voltage	ms	77	77	33	33	24	24	65	65	46	46
AC mains voltage	ms	77	77	33	33	24	24	65	65	46	46
Cold - Brake 230 V	ms	145	145	80	80	60	60	102	102	69	69
Cold - Brake 400 V	ms	160	160	93	93	72	72	121	121	88	88
Over-excitation 230 V	ms	174	174	108	108	86	86	133	133	103	103
Over-excitation 400 V	ms	145	145	80	80	60	60	102	102	69	69
Rise time t12											
DC voltage	ms	20	20	45	45	45	45	100	100	100	100
AC mains voltage	ms	20	20	45	45	45	45	100	100	100	100
Cold - Brake 230 V	ms	38	38	109	109	113	113	157	157	150	150
Cold - Brake 400 V	ms	42	42	127	127	135	135	186	186	191	191
Over-excitation 230 V	ms	45	45	147	147	161	161	205	205	224	224
Over-excitation 400 V	ms	38	38	109	109	113	113	157	157	150	150
Engagement time t1											
DC voltage	ms	97	97	78	78	69	69	165	165	146	146
AC mains voltage	ms	97	97	78	78	69	69	165	165	146	146
Cold - Brake 230 V	ms	183	183	189	189	173	173	259	259	219	219
Cold - Brake 400 V	ms	202	202	220	220	207	207	307	307	279	279
Over-excitation 230 V	ms	219	219	255	255	247	247	338	338	327	327
Over-excitation 400 V	ms	183	183	189	189	173	173	259	259	219	219
Overexcitation time											
Cold - Brake 230 V	ms	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Min. break time t											
Cold - Brake 230 V		-	-	-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-	-	-
Friction energy QBW											
DC voltage	MJ	358.2	1542.1	358.2	1542.1	81.9	578.3	474.7	2322.1	246.6	1741.6
AC mains voltage	MJ	358.2	1542.1	358.2	1542.1	81.9	578.3	474.7	2322.1	246.6	1741.6
Cold - Brake 230 V	MJ	358.2	1542.1	358.2	1542.1	81.9	578.3	474.7	2322.1	246.6	1741.6
Cold - Brake 400 V	MJ	358.2	1542.1	358.2	1542.1	218.3	1542.1	474.7	2322.1	328.8	2322.1
Over-excitation 230 V	MJ	358.2	1542.1	358.2	1542.1	218.3	1542.1	474.7	2322.1	328.8	2322.1
Over-excitation 400 V	MJ	358.2	1542.1	358.2	1542.1	81.9	578.3	474.7	2322.1	246.6	1741.6
Wear limit of brake pad	MJ	1340	5780	1340	5780	820	5780	2370	11610	1640	11610
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$



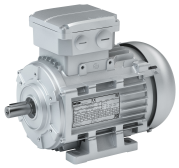
Rated data, Standard design, IP65/66

Application brake ABR 06, ABR 08

Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Power input									
DC 24 V	W	20	20	20	20	25	25	25	25
DC 180 V	W	20	20	20	20	25	25	25	25
DC 205 V	W	20	20	20	20	25	25	25	25
DC 180 V … 205 V	W	20	20	20	20	25	25	25	25
AC 115 V	W	20	20	20	20	25	25	25	25
AC 230 V	W	20	20	20	20	25	25	25	25
AC 400 V	W	20	20	20	20	25	25	25	25
AC 460 V	W	20	20	20	20	25	25	25	25
AC 400 V … 460 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 230 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 400 V	W	23	23	23	23	27	27	27	27
Übererregung AC 230 V	W	20	20	20	20	25	25	25	25
Übererregung AC 400 V	W	20	20	20	20	25	25	25	25
Moment of inertia	kgcm²	0.15	0.15	0.15	0.15	0.61	0.61	0.61	0.61
Braking torque is static	Nm	2.5	2.5	4	4	3.5	3.5	8	8
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35
Dynamic braking torque									
100 rpm	Nm	2.5	2.5	4.0	4.0	3.5	3.5	8.0	8.0
1000 rpm	Nm	2.3	2.3	3.7	3.7	3.1	3.1	7.1	7.1
1200 rpm	Nm	2.3	2.3	3.6	3.6	3.0	3.0	7.0	7.0
1500 rpm	Nm	2.2	2.2	3.5	3.5	3.0	3.0	6.8	6.8
1800 rpm	Nm	2.2	2.2	3.4	3.4	2.9	2.9	6.6	6.6
2500 rpm	Nm	2.1	2.1	3.3	3.3	2.8	2.8	6.4	6.4
3000 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.2	6.2
3600 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.1	6.1
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35
Friction energy									
100 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1200 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1800 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
2500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3600 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
Maximum speed - operation	rpm	6000	3600	6000	3600	5000	3600	5000	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	79	79	79	79	50	50	50	50



Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Delay time t11									
DC voltage	ms	24	24	16	16	38	38	30	30
AC mains voltage	ms	24	24	16	16	38	38	30	30
Cold - Brake 230 V	ms	26	26	17	17	41	41	32	32
Cold - Brake 400 V	ms	28	28	18	18	44	44	34	34
Over-excitation 230 V	ms	29	29	19	19	46	46	36	36
Over-excitation 400 V	ms	26	26	17	17	41	41	32	32
Rise time t12									
DC voltage	ms	34	34	25	25	46	46	26	26
AC mains voltage	ms	34	34	25	25	46	46	26	26
Cold - Brake 230 V	ms	43	43	31	31	58	58	33	33
Cold - Brake 400 V	ms	43	43	31	31	58	58	33	33
Over-excitation 230 V	ms	43	43	31	31	58	58	33	33
Over-excitation 400 V	ms	43	43	31	31	58	58	33	33
Engagement time t1									
DC voltage	ms	58	58	41	41	84	84	56	56
AC mains voltage	ms	58	58	41	41	84	84	56	56
Cold - Brake 230 V	ms	69	69	48	48	99	99	65	65
Cold - Brake 400 V	ms	71	71	49	49	102	102	67	67
Over-excitation 230 V	ms	72	72	50	50	104	104	69	69
Over-excitation 400 V	ms	69	69	48	48	99	99	65	65
Overexcitation time									
Cold - Brake 230 V	ms	300	300	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300	300	300
Min. break time t									
Cold - Brake 230 V		-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-
Friction energy QBW									
DC voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
AC mains voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 230 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 400 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 230 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 400 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Wear limit of brake pad	MJ	210	420	210	420	350	790	350	790
Reversing cycles		$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$
Repetitive cycles		$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$



Rated data, Standard design, IP65/66

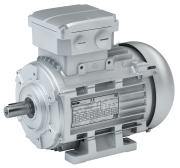
Application brake ABR 10, ABR 12

Application brake		**ABR 10**				**ABR 12**			
Braking torque									
Standard friction lining	**Nm**	**16**		**23**		**32**		**46**	
Low-wear friction lining	**Nm**		**16**		**23**		**32**		**46**
Power input									
DC 24 V	W	30	30	30	30	40	40	40	40
DC 180 V	W	32	32	32	32	40	40	40	40
DC 205 V	W	33	33	33	33	40	40	40	40
DC 180 V … 205 V	W	33	33	33	33	40	40	40	40
AC 115 V	W	32	32	32	32	40	40	40	40
AC 230 V	W	33	33	33	33	40	40	40	40
AC 400 V	W	32	32	32	32	40	40	40	40
AC 460 V	W	33	33	33	33	40	40	40	40
AC 400 V … 460 V	W	33	33	33	33	40	40	40	40
Cold Brake AC 230 V	W	33	33	33	33	40	40	40	40
Cold Brake AC 400 V	W	30	30	30	30	42	42	42	42
Übererregung AC 230 V	W	32	32	32	32	40	40	40	40
Übererregung AC 400 V	W	32	32	32	32	40	40	40	40
Moment of inertia	kgcm²	2	2	2	2	4.5	4.5	4.5	4.5
Braking torque is static	Nm	16	16	23	23	32	32	46	46
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35
Dynamic braking torque									
100 rpm	Nm	16	16	23	23	32	32	46	46
1000 rpm	Nm	14	14	20	20	28	28	40	40
1200 rpm	Nm	14	14	20	20	27	27	39	39
1500 rpm	Nm	13	13	19	19	26	26	38	38
1800 rpm	Nm	13	13	19	19	26	26	37	37
2500 rpm	Nm	12	12	18	18	24	24	35	35
3000 rpm	Nm	12	12	17	17	24	24	35	35
3600 rpm	Nm	12	12	17	17	23	23	34	34
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35
Friction energy									
100 rpm	kJ	12	12	12	12	24	24	24	24
1000 rpm	kJ	12	12	12	12	24	24	24	24
1200 rpm	kJ	12	12	12	12	24	24	24	24
1500 rpm	kJ	12	12	12	12	24	24	24	24
1800 rpm	kJ	12	12	12	12	24	24	24	24
2500 rpm	kJ	12	12	12	12	24	24	24	24
3000 rpm	kJ	12	12	12	12	24	24	24	24
3600 rpm	kJ	12	12	12	12	24	7	24	7
Maximum speed - operation	rpm	4000	3600	4000	3600	3600	3600	3600	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	28	28	28	28	21	21	21	21

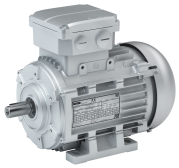
Product extensions

Brakes

Spring-applied application brake



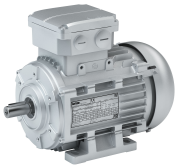
Application brake		ABR 10				ABR 12			
Braking torque									
Standard friction lining	**Nm**	**16**		**23**		**32**		**46**	
Low-wear friction lining	**Nm**		**16**		**23**		**32**		**46**
Delay time t11									
DC voltage	ms	40	40	23	23	47	47	65	65
AC mains voltage	ms	40	40	23	23	47	47	65	65
Cold - Brake 230 V	ms	43	43	25	25	50	50	70	70
Cold - Brake 400 V	ms	46	46	27	27	53	53	74	74
Over-excitation 230 V	ms	48	48	28	28	56	56	78	78
Over-excitation 400 V	ms	43	43	25	25	50	50	70	70
Rise time t12									
DC voltage	ms	46	46	46	46	34	34	34	34
AC mains voltage	ms	46	46	46	46	34	34	34	34
Cold - Brake 230 V	ms	58	58	58	58	43	43	43	43
Cold - Brake 400 V	ms	58	58	58	58	43	43	43	43
Over-excitation 230 V	ms	58	58	58	58	43	43	43	43
Over-excitation 400 V	ms	58	58	58	58	43	43	43	43
Engagement time t1									
DC voltage	ms	86	86	69	69	81	81	99	99
AC mains voltage	ms	86	86	69	69	81	81	99	99
Cold - Brake 230 V	ms	101	101	83	83	93	93	113	113
Cold - Brake 400 V	ms	104	104	85	85	96	96	117	117
Over-excitation 230 V	ms	106	106	86	86	99	99	121	121
Over-excitation 400 V	ms	101	101	83	83	93	93	113	113
Overexcitation time									
Cold - Brake 230 V	ms	300	300	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300	300	300
Min. break time t									
Cold - Brake 230 V		-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-
Friction energy QBW									
DC voltage	MJ	73.5	198	30.7	121	118.2	353.1	64.1	298.8
AC mains voltage	MJ	73.5	198	30.7	121	118.2	353.1	64.1	298.8
Cold - Brake 230 V	MJ	73.5	198	30.7	121	118.2	353.1	64.1	298.8
Cold - Brake 400 V	MJ	98	264	62.9	247.5	216.7	647.3	134	624.7
Over-excitation 230 V	MJ	98	264	67.1	264	216.7	647.3	138.8	647.3
Over-excitation 400 V	MJ	73.5	198	30.7	121	118.2	353.1	64.1	298.8
Wear limit of brake pad	MJ	370	990	250	990	790	2350	510	2350
Reversing cycles		$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$
Repetitive cycles		$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$	$2x\ 10^6$



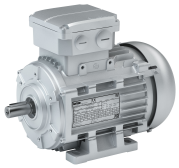
Rated data, LongLife design, IP54/55

Application brake ABR 06, ABR 08

Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Power input									
DC 24 V	W	20	20	20	20	25	25	25	25
DC 180 V	W	20	20	20	20	25	25	25	25
DC 205 V	W	20	20	20	20	25	25	25	25
DC 180 V … 205 V	W	20	20	20	20	25	25	25	25
AC 115 V	W	20	20	20	20	25	25	25	25
AC 230 V	W	20	20	20	20	25	25	25	25
AC 400 V	W	20	20	20	20	25	25	25	25
AC 460 V	W	20	20	20	20	25	25	25	25
AC 400 V … 460 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 230 V	W	20	20	20	20	25	25	25	25
Cold Brake AC 400 V	W	23	23	23	23	27	27	27	27
Übererregung AC 230 V	W	20	20	20	20	25	25	25	25
Übererregung AC 400 V	W	20	20	20	20	25	25	25	25
Moment of inertia	kgcm²	0.15	0.15	0.15	0.15	0.61	0.61	0.61	0.61
Braking torque is static	Nm	2.5	2.5	4	4	3.5	3.5	8	8
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35
Dynamic braking torque									
100 rpm	Nm	2.5	2.5	4.0	4.0	3.5	3.5	8.0	8.0
1000 rpm	Nm	2.3	2.3	3.7	3.7	3.1	3.1	7.1	7.1
1200 rpm	Nm	2.3	2.3	3.6	3.6	3.0	3.0	7.0	7.0
1500 rpm	Nm	2.2	2.2	3.5	3.5	3.0	3.0	6.8	6.8
1800 rpm	Nm	2.2	2.2	3.4	3.4	2.9	2.9	6.6	6.6
2500 rpm	Nm	2.1	2.1	3.3	3.3	2.8	2.8	6.4	6.4
3000 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.2	6.2
3600 rpm	Nm	2.0	2.0	3.2	3.2	2.7	2.7	6.1	6.1
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35
Friction energy									
100 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1200 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
1800 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
2500 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3000 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
3600 rpm	kJ	3	3	3	3	7.5	7.5	7.5	7.5
Maximum speed - operation	rpm	6000	3600	6000	3600	5000	3600	5000	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	79	79	79	79	50	50	50	50



Application brake		**ABR 06**				**ABR 08**			
Braking torque									
Standard friction lining	**Nm**	**2.5**		**4**		**3.5**		**8**	
Low-wear friction lining	**Nm**		**2.5**		**4**		**3.5**		**8**
Delay time t11									
DC voltage	ms	25	25	15	15	14	14	15	15
AC mains voltage	ms	25	25	15	15	14	14	15	15
Cold - Brake 230 V	ms	24	24	16	16	22	22	25	25
Cold - Brake 400 V	ms	27	27	19	19	28	28	28	28
Over-excitation 230 V	ms	31	31	20	20	33	33	31	31
Over-excitation 400 V	ms	24	24	16	16	22	22	25	25
Rise time t12									
DC voltage	ms	13	13	13	13	10	10	16	16
AC mains voltage	ms	13	13	13	13	10	10	16	16
Cold - Brake 230 V	ms	12	12	14	14	16	16	27	27
Cold - Brake 400 V	ms	14	14	16	16	20	20	30	30
Over-excitation 230 V	ms	16	16	17	17	24	24	33	33
Over-excitation 400 V	ms	12	12	14	14	16	16	27	27
Engagement time t1									
DC voltage	ms	38	38	28	28	24	24	31	31
AC mains voltage	ms	38	38	28	28	24	24	31	31
Cold - Brake 230 V	ms	36	36	30	30	38	38	52	52
Cold - Brake 400 V	ms	41	41	35	35	48	48	58	58
Over-excitation 230 V	ms	47	47	37	37	57	57	64	64
Over-excitation 400 V	ms	36	36	30	30	38	38	52	52
Overexcitation time									
Cold - Brake 230 V	ms	300	300	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300	300	300
Min. break time t									
Cold - Brake 230 V		-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-
Friction energy QBW									
DC voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
AC mains voltage	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 230 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Cold - Brake 400 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 230 V	MJ	56.5	113.1	56.5	113.1	92.1	210.4	92.1	210.4
Over-excitation 400 V	MJ	56.5	113.1	42.4	84.8	92.1	210.4	69.1	157.8
Wear limit of brake pad	MJ	210	420	210	420	350	790	350	790
Reversing cycles		$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$
Repetitive cycles		$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$



Rated data, LongLife design, IP54/55

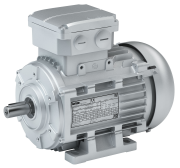
Application brake ABR 10, ABR 12

Application brake		**ABR 10**		**ABR 12**			
Braking torque							
Standard friction lining	**Nm**	**16**		**14**		**32**	
Low-wear friction lining	**Nm**		**16**		**14**		**32**
Power input							
DC 24 V	W	30	30	40	40	40	40
DC 180 V	W	32	32	40	40	40	40
DC 205 V	W	33	33	40	40	40	40
DC 180 V … 205 V	W	33	33	40	40	40	40
AC 115 V	W	32	32	40	40	40	40
AC 230 V	W	33	33	40	40	40	40
AC 400 V	W	32	32	40	40	40	40
AC 460 V	W	33	33	40	40	40	40
AC 400 V … 460 V	W	33	33	40	40	40	40
Cold Brake AC 230 V	W	33	33	40	40	40	40
Cold Brake AC 400 V	W	30	30	42	42	42	42
Übererregung AC 230 V	W	32	32	40	40	40	40
Übererregung AC 400 V	W	32	32	40	40	40	40
Moment of inertia	kgcm²	2	2	4.5	4.5	4.5	4.5
Braking torque is static	Nm	16	16	14	14	32	32
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35
Dynamic braking torque							
100 rpm	Nm	16	16	14	14	32	32
1000 rpm	Nm	14	14	12	12	28	28
1200 rpm	Nm	14	14	12	12	27	27
1500 rpm	Nm	13	13	11	11	26	26
1800 rpm	Nm	13	13	11	11	26	26
2500 rpm	Nm	12	12	11	11	24	24
3000 rpm	Nm	12	12	11	11	24	24
3600 rpm	Nm	12	12	10	10	23	23
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35
Friction energy							
100 rpm	kJ	12	12	24	24	24	24
1000 rpm	kJ	12	12	24	24	24	24
1200 rpm	kJ	12	12	24	24	24	24
1500 rpm	kJ	12	12	24	24	24	24
1800 rpm	kJ	12	12	24	24	24	24
2500 rpm	kJ	12	12	24	24	24	24
3000 rpm	kJ	12	12	24	24	24	24
3600 rpm	kJ	12	12	24	7	24	7
Maximum speed - operation	rpm	4000	3600	3600	3600	3600	3600
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	40	40	30	30	30	30

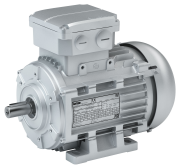
Product extensions

Brakes

Spring-applied application brake



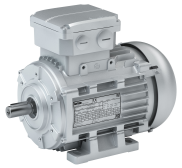
Application brake		ABR 10		ABR 12			
Braking torque							
Standard friction lining	**Nm**	**16**		**14**		**32**	
Low-wear friction lining	**Nm**		**16**		**14**		**32**
Delay time t11							
DC voltage	ms	28	28	21	21	28	28
AC mains voltage	ms	28	28	21	21	28	28
Cold - Brake 230 V	ms	31	31	49	49	48	48
Cold - Brake 400 V	ms	34	34	64	64	55	55
Over-excitation 230 V	ms	44	44	73	73	62	62
Over-excitation 400 V	ms	31	31	49	49	48	48
Rise time t12							
DC voltage	ms	19	19	19	19	25	25
AC mains voltage	ms	19	19	19	19	25	25
Cold - Brake 230 V	ms	21	21	44	44	43	43
Cold - Brake 400 V	ms	23	23	58	58	49	49
Over-excitation 230 V	ms	30	30	66	66	55	55
Over-excitation 400 V	ms	21	21	44	44	43	43
Engagement time t1							
DC voltage	ms	47	47	40	40	53	53
AC mains voltage	ms	47	47	40	40	53	53
Cold - Brake 230 V	ms	52	52	93	93	91	91
Cold - Brake 400 V	ms	57	57	122	122	104	104
Over-excitation 230 V	ms	74	74	139	139	117	117
Over-excitation 400 V	ms	52	52	93	93	91	91
Overexcitation time							
Cold - Brake 230 V	ms	300	300	300	300	300	300
Cold - Brake 400 V	ms	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300
Over-excitation 400 V	ms	300	300	300	300	300	300
Min. break time t							
Cold - Brake 230 V		-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-
Friction energy QBW							
DC voltage	MJ	98	264	236.4	706.2	177.3	529.6
AC mains voltage	MJ	98	264	236.4	706.2	177.3	529.6
Cold - Brake 230 V	MJ	98	264	236.4	706.2	177.3	529.6
Cold - Brake 400 V	MJ	98	264	236.4	706.2	236.4	706.2
Over-excitation 230 V	MJ	98	264	236.4	706.2	236.4	706.2
Over-excitation 400 V	MJ	98	264	236.4	706.2	177.3	529.6
Wear limit of brake pad	MJ	370	990	790	2350	790	2350
Reversing cycles		$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$	$15x\ 10^6$
Repetitive cycles		$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$	$10x\ 10^6$



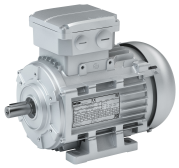
Rated data, Double brake, IP54/55

Application brake ABR 16, ABR 18, ABR 20

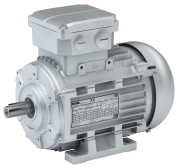
Application brake		**ABR 16**				**ABR 18**					
Braking torque											
Standard friction lining	**Nm**	**90**		**110**		**130**		**160**		**200**	
Low-wear friction lining	**Nm**		**90**		**110**		**130**		**160**		**200**
Power input											
24 V DC	W	110	110	110	110	170	170	170	170	170	170
103 V DC	W	112	112	112	112	170	170	170	170	170	170
127 V DC	W	110	110	110	110	170	170	170	170	170	170
180 V - 205 V DC	W	110	110	110	110	170	170	170	170	170	170
180 V DC	W	110	110	110	110	170	170	170	170	170	170
205 V DC	W	112	112	112	112	170	170	170	170	170	170
215 V DC	W	110	110	110	110	174	174	174	174	174	174
250 V DC	W	110	110	110	110	170	170	170	170	170	170
Moment of inertia	kgcm²	30	30	30	30	58	58	58	58	58	58
Braking torque is static	Nm	90	90	110	110	130	130	160	160	200	200
Min. static braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. static braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Dynamic braking torque											
100 rpm	Nm	90	90	110	110	130	130	160	160	200	200
1000 rpm	Nm	75	75	91	91	105	105	130	130	162	162
1200 rpm	Nm	73	73	89	89	103	103	126	126	158	158
1500 rpm	Nm	70	70	86	86	100	100	123	123	154	154
1800 rpm	Nm	69	69	85	85	98	98	120	120	150	150
2500 rpm	Nm	66	66	80	80	94	-	115	-	144	-
3000 rpm	Nm	64	64	78	78	91	-	112	-	140	-
3600 rpm	Nm	63	-	77	77	88	-	109	-	136	-
Min. dynamic braking torque tolerance	%	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Max. dynamic braking torque tolerance	%	35	35	35	35	35	35	35	35	35	35
Friction energy											
100 rpm	kJ	72	72	72	72	120	120	120	120	120	120
1000 rpm	kJ	72	72	72	72	120	120	120	120	120	120
1200 rpm	kJ	72	72	72	72	120	120	120	120	120	120
1500 rpm	kJ	72	72	72	72	120	120	120	120	120	120
1800 rpm	kJ	72	72	72	72	120	72	120	72	120	72
2500 rpm	kJ	72	72	72	72	120	-	120	-	120	-
3000 rpm	kJ	72	22	72	22	120	-	120	-	120	-
3600 rpm	kJ	72	-	72	22	120	-	120	-	120	-
Maximum speed - operation	rpm	3600	3000	3600	3000	3600	1800	3600	1800	3600	1800
Maximum speed - idle state	rpm	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Transition operating frequency	/h	18	18	18	18	14	14	14	14	14	14



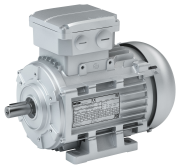
Application brake		**ABR 20**	
Braking torque			
Standard friction lining	**Nm**	**230**	
Low-wear friction lining	**Nm**		**230**
Power input			
24 V DC	W	200	200
103 V DC	W	200	200
127 V DC	W	200	200
180 V - 205 V DC	W	200	200
180 V DC	W	200	200
205 V DC	W	200	200
215 V DC	W	200	200
250 V DC	W	200	200
Moment of inertia	$kgcm^2$	146	146
Braking torque is static	Nm	230	230
Min. static braking torque tolerance	%	-25	-25
Max. static braking torque tolerance	%	35	35
Dynamic braking torque			
100 rpm	Nm	230	230
1000 rpm	Nm	182	182
1200 rpm	Nm	177	177
1500 rpm	Nm	173	173
1800 rpm	Nm	168	-
2500 rpm	Nm	161	-
3000 rpm	Nm	156	-
3600 rpm	Nm	152	-
Min. dynamic braking torque tolerance	%	-25	-25
Max. dynamic braking torque tolerance	%	35	35
Friction energy			
100 rpm	kJ	160	160
1000 rpm	kJ	160	160
1200 rpm	kJ	160	160
1500 rpm	kJ	160	48
1800 rpm	kJ	160	-
2500 rpm	kJ	160	-
3000 rpm	kJ	160	-
3600 rpm	kJ	160	-
Maximum speed - operation	rpm	3600	1500
Maximum speed - idle state	rpm	10000	10000
Transition operating frequency	/h	13	13



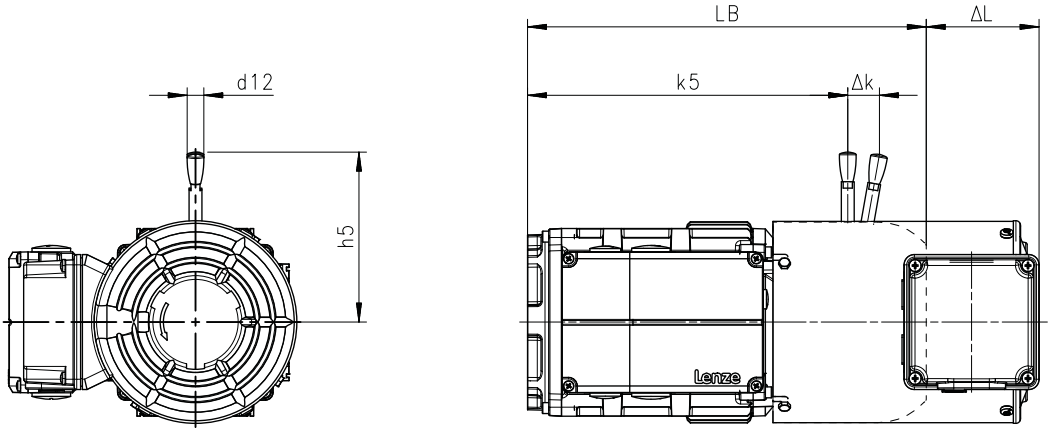
Application brake		**ABR 16**				**ABR 18**					
Braking torque											
Standard friction lining	**Nm**	**90**		**110**		**130**		**160**		**200**	
Low-wear friction lining	**Nm**		**90**		**110**		**130**		**160**		**200**
Delay time t11											
DC voltage	ms	72	72	59	59	35	35	77	77	64	64
AC mains voltage	ms	72	72	59	59	35	35	77	77	64	64
Cold - Brake 230 V	ms	157	157	129	129	101	101	145	145	126	126
Cold - Brake 400 V	ms	178	178	148	148	120	120	160	160	141	141
Over-excitation 230 V	ms	186	186	159	159	136	136	174	174	156	156
Over-excitation 400 V	ms	157	157	129	129	101	101	145	145	126	126
Rise time t12											
DC voltage	ms	25	25	30	30	35	35	20	20	45	45
AC mains voltage	ms	25	25	30	30	35	35	20	20	45	45
Cold - Brake 230 V	ms	55	55	66	66	101	101	38	38	89	89
Cold - Brake 400 V	ms	62	62	75	75	120	120	42	42	99	99
Over-excitation 230 V	ms	65	65	81	81	136	136	45	45	110	110
Over-excitation 400 V	ms	55	55	66	66	101	101	38	38	89	89
Engagement time t1											
DC voltage	ms	97	97	89	89	70	70	97	97	109	109
AC mains voltage	ms	97	97	89	89	70	70	97	97	109	109
Cold - Brake 230 V	ms	212	212	195	195	202	202	183	183	215	215
Cold - Brake 400 V	ms	240	240	223	223	240	240	202	202	240	240
Over-excitation 230 V	ms	251	251	240	240	272	272	219	219	266	266
Over-excitation 400 V	ms	212	212	195	195	202	202	183	183	215	215
Overexcitation time											
Cold - Brake 230 V	ms	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Cold - Brake 400 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 230 V	ms	300	300	300	300	300	300	300	300	300	300
Over-excitation 400 V	ms	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Min. break time t											
Cold - Brake 230 V		-	-	-	-	-	-	-	-	-	-
Cold - Brake 400 V	ms	322	322	322	322	322	322	322	322	322	322
Over-excitation 230 V	ms	900	900	900	900	900	900	900	900	900	900
Over-excitation 400 V		-	-	-	-	-	-	-	-	-	-
Friction energy QBW											
DC voltage	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
AC mains voltage	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
Cold - Brake 230 V	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
Cold - Brake 400 V	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
Over-excitation 230 V	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
Over-excitation 400 V	MJ	515.8	1931.4	515.8	1931.4	716.4	3084.2	716.4	3084.2	716.4	3084.2
Wear limit of brake pad	MJ	3000	11260	3000	11260	2680	11560	2680	11560	2680	11560
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$	$1x\ 10^6$



Application brake		**ABR 20**	
Braking torque			
Standard friction lining	**Nm**	**230**	
Low-wear friction lining	**Nm**		**230**
Delay time t11			
DC voltage	ms	53	53
AC mains voltage	ms	53	53
Cold - Brake 230 V	ms	151	151
Cold - Brake 400 V	ms	173	173
Over-excitation 230 V	ms	195	195
Over-excitation 400 V	ms	151	151
Rise time t12			
DC voltage	ms	100	100
AC mains voltage	ms	100	100
Cold - Brake 230 V	ms	285	285
Cold - Brake 400 V	ms	326	326
Over-excitation 230 V	ms	368	368
Over-excitation 400 V	ms	285	285
Engagement time t1			
DC voltage	ms	153	153
AC mains voltage	ms	153	153
Cold - Brake 230 V	ms	436	436
Cold - Brake 400 V	ms	499	499
Over-excitation 230 V	ms	563	563
Over-excitation 400 V	ms	436	436
Overexcitation time			
Cold - Brake 230 V	ms	1300	1300
Cold - Brake 400 V	ms	300	300
Over-excitation 230 V	ms	300	300
Over-excitation 400 V	ms	1300	1300
Min. break time t			
Cold - Brake 230 V		-	-
Cold - Brake 400 V	ms	322	322
Over-excitation 230 V	ms	900	900
Over-excitation 400 V		-	-
Friction energy QBW			
DC voltage	MJ	949.4	4644.2
AC mains voltage	MJ	949.4	4644.2
Cold - Brake 230 V	MJ	949.4	4644.2
Cold - Brake 400 V	MJ	949.4	4644.2
Over-excitation 230 V	MJ	949.4	4644.2
Over-excitation 400 V	MJ	949.4	4644.2
Wear limit of brake pad	MJ	4740	23220
Reversing cycles		$1x\ 10^6$	$1x\ 10^6$
Repetitive cycles		$1x\ 10^6$	$1x\ 10^6$



Dimensions of the manual release lever
Standard design, degree of protection IP54/55



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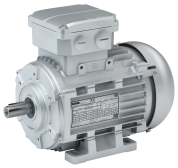
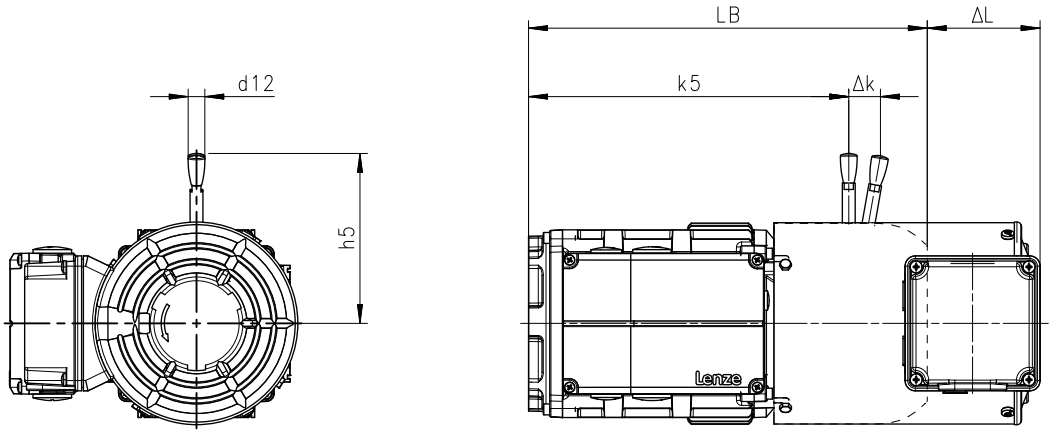
Motor	Brake	Dimensions			
		k_5	Δ k	H_5	d_{12}
		mm	mm	mm	mm
m550-H63/S4 m550-H63/M4 m550-H63/L4	ABR 06	193	25	107	13
m550-H71/M4 m550-H71/L4	ABR 06	211	25	107	13
	ABR 08	212	27	116	13
m550-P80/M4	ABR 08	231	27	116	13
	ABR 10	242	30	132	13
m550-P90/M4 m550-P90/L4	ABR 08	270	27	116	13
	ABR 10	281	30	132	13
m550-P100/M4 m550-P100/L4	ABR 10	346	30	132	13
	ABR 12	348	37	161	13
m550-P112/M4	ABR 12	345	37	161	13
	ABR 14	350	45	195	24
m550-P132/M4 m550-P132/L4	ABR 14	416	45	195	24
	ABR 16	419	55	240	24
m550-P160/M4	ABR 16	551	55	240	24
	ABR 18	565	64	279	24
m550-P160/L4	ABR 18	565	64	279	24
m550-P180/M4 m550-P180/L4	ABR 18	626	64	279	24
	ABR 20	632	74	319	24

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



Standard design, degree of protection IP65/66



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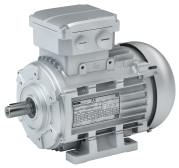
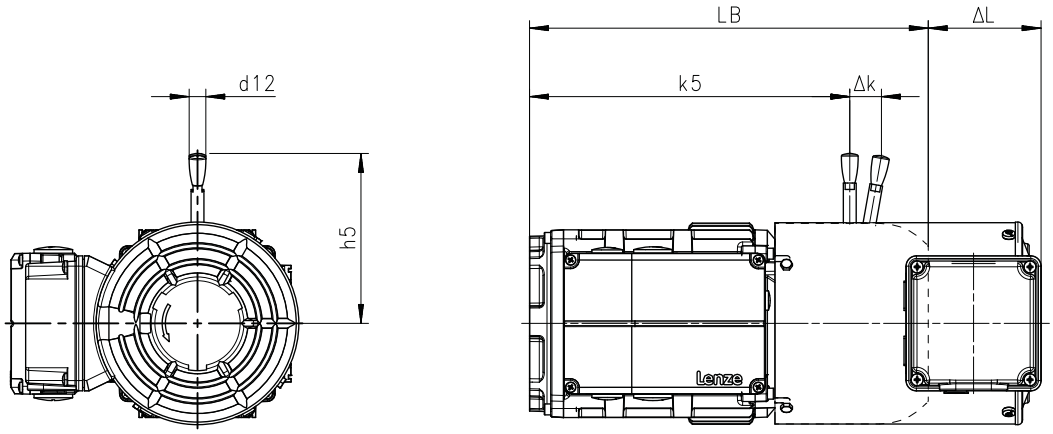
Motor	Brake	Dimensions			
		k_5	Δ k	H_5	d_{12}
		mm	mm	mm	mm
m550-H63/S4 m550-H63/M4 m550-H63/L4	ABR 06	200	22	112	8
m550-H71/M4 m550-H71/L4	ABR 06	218	22	112	8
	ABR 08	223	23	120	8
m550-P80/M4	ABR 08	242	23	120	8
	ABR 10	244	20	143	10
m550-P90/M4 m550-P90/L4	ABR 08	281	23	120	8
	ABR 10	283	20	143	10
m550-P100/M4 m550-P100/L4	ABR 10	348	25	143	10
	ABR 12	352	34	175	12

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



Longlife design, degree of protection IP54/55



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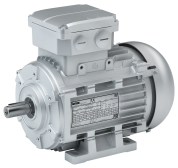
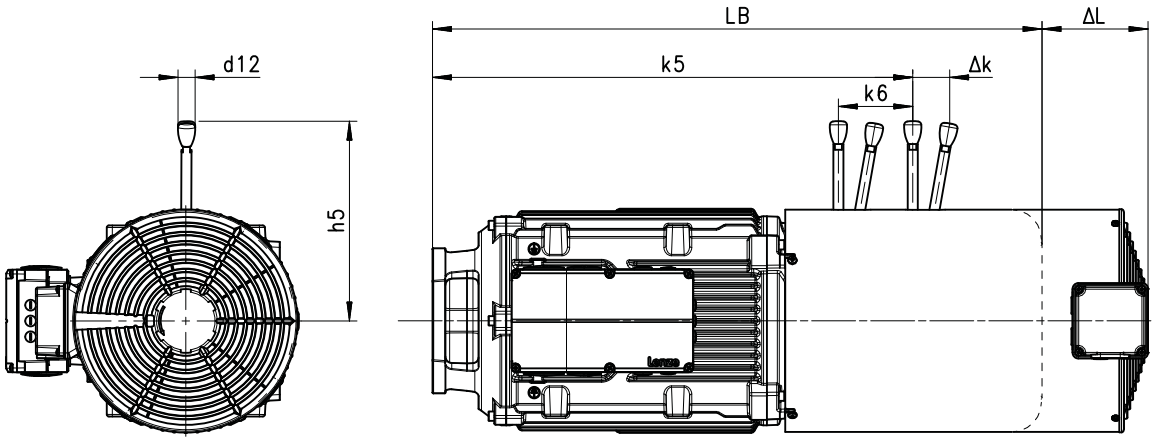
Motor	Brake	Dimensions			
		k_5	Δ k	H_5	d_{12}
		mm	mm	mm	mm
m550-H63/S4 m550-H63/M4 m550-H63/L4	ABR 06	198	25	107	13
m550-H71/M4 m550-H71/L4	ABR 06	216	25	107	13
	ABR 08	217	27	116	13
m550-P80/M4	ABR 08	236	27	116	13
	ABR 10	250	30	132	13
m550-P90/M4 m550-P90/L4	ABR 08	275	27	116	13
	ABR 10	289	30	132	13
m550-P100/M4 m550-P100/L4	ABR 10	354	30	132	13
	ABR 12	355	37	161	13
m550-P112/M4	ABR 12	353	37	161	13

Dimensions LB ▸ Basic dimensions 47

Dimensions Δ L ▸ Additional lengths 74



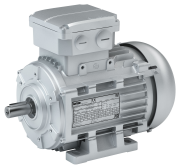
Double brake, IP54/55 protection



Motor	Brake	Dimensions				
		k_5	k_6	Δ k	h_5	d_{12}
		mm	mm	mm	mm	mm
m550-P160/M4	ABR 16	560	93	45	240	24
	ABR 18	565	104	50	279	24
m550-P160/L4	ABR 18	565	104	50	279	24
m550-P180/M4	ABR 18	626	104	50	279	24
m550-P180/L4	ABR 20	632	118	58	319	24

Dimensions LB ▸ Basic dimensions 🕮 47

Dimensions Δ L ▸ Additional lengths 🕮 74



Feedback

A resolver, incremental encoder and SinCos absolute value encoder are optionally available to evaluate the speed and position of the motor shaft.

The resolver can be used to measure an absolute value within one revolution of the rotor. A SinCos absolute value encoder is used if not only the angle within one revolution is to be made available immediately but also the revolution within a set range. The SinCos absolute value encoder detects not only the speed and rotor position but also the position of the machine. It consists of a speed sensor system, for example TTL, and an absolute value information recorder, for example Hyperface.

The HTL incremental encoder is used in the frequency inverter range for less dynamic applications.

The TTL incremental encoder can generate a higher number of pulses. It is used for dynamic applications with very high requirements regarding accuracy. If the absolute angular position of the drive is required directly after the system is switched on without performing additional homing, this can be realized via a resolver or SinCos absolute value encoder.

Resolver, absolute encoder and the IG128-24V-H add-on incremental encoder are mounted behind the B-bearing shield under the fan cover.

All other incremental encoders are integrated in the B-bearing shield, which usually makes the drive shorter.

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:

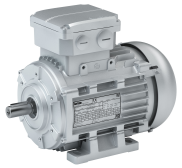
- When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard EN IEC 61800−5−2 (adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional) stipulates special requirements for the connection between feedback system and motor shaft.
- This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip". As such, 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:

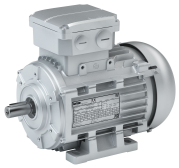
- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely limited speed (SLS)
- Safe maximum speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI)



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			**RS1**
Design			Mounting
Resolution - angle		'	0.8
Min. accuracy		'	-10
Max. accuracy		'	10
Absolute positioning			1 revolution
Max. speed	n_{max}	rpm	8000
Max. DC input voltage	$V_{in,max}$	V	10
Max. input frequency	$f_{in,max}$	kHz	4
Ratio stator/rotor			0.3
Min ratio tolerance		%	-5
Max ratio tolerance		%	5
Rotor impedance	Z_{ro}	Ω	51+j90
Stator impedance	Z_{so}	Ω	102+j150
Impedance	Z_{rs}	Ω	44+j76
Min. insulation resistance at DC 500 V	R_{min}	MΩ	10
Number of pole pairs			1
Max. angle error Min		'	-10
Max. angle error Max		'	10



Incremental encoder

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

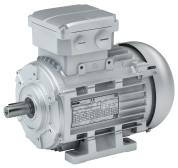
Incremental HTL encoder

Feedback in conjunction with the HAN connector or the integrated 8400 motec is only available with the IG128-24V-H add-on incremental encoder (with 0.5 m cable tail and M12 plug connector).

Feedback type			**Encoder**			
Feedback			**IG128-24V-H**		**IG1024-24V-H**	**IG2048-24V-H**
Design			Mounting	integrated	integrated	integrated
Pulses			128	128	1024	2048
Output signals			HTL	HTL	HTL	HTL
Interfaces			A, B	A, B	A, B; N; Ai, Bi; Ni	A, B; N; Ai, Bi; Ni
Absolute revolution			0	0	0	0
Min. accuracy		'	-22.5	-2	-2	-2
Max. accuracy		'	22.5	2	2	2
Min. DC input voltage	$V_{in,min}$	V	8	10	10	10
Max. DC input voltage	$V_{in,max}$	V	26	30	30	30
Max. current consumption	I_{max}	A	0.04	0.15	0.15	0.15
Limit frequency	f_{max}	kHz	30	200	200	200

TTL incremental encoder

Feedback type			**Encoder**	
Feedback			**IG1024-5V-T**	**IG2048-5V-T**
Design			integrated	
Pulses			1024	2048
Output signals			TTL	TTL
Interfaces			A, B; N; Ai, Bi; Ni	A, B; N; Ai, Bi; Ni
Absolute revolution			0	0
Min. accuracy		'	-2	-2
Max. accuracy		'	2	2
Min. DC input voltage	$V_{in,min}$	V	4.75	4.75
Max. DC input voltage	$V_{in,max}$	V	5.5	5.5
Max. current consumption	I_{max}	A	0.15	0.15
Limit frequency	f_{max}	kHz	300	300



SinCos-incremental encoder with safety functions

The connection of the safety sensors to the terminal box is only available in conjunction with a ICN connector.

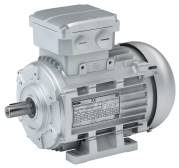
Feedback type			Encoder	
Feedback			**IG2048-5V-V2**	**IG2048-5V-V3**
Design			Mounting	
Encoder type			Inkrementalgeber	Inkrementalgeber
Pulses			2048	2048
Output signals			SinCos 1 Vss	SinCos 1 Vss
Interfaces			SinCos	SinCos
Absolute revolution			0	0
Min. accuracy			-	-
Max. accuracy			-	-
Min. DC input voltage	$V_{in,min}$	V	4.75	4.75
Max. DC input voltage	$V_{in,max}$	V	5.25	5.25
Max. current consumption	I_{max}	A	0.07	0.07
Limit frequency	f_{max}	kHz	400	400
Max. Safety Integrity Level			SIL 2	SIL 3
Max. Safety Performance Level			d	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.

SinCos absolute value encoder

Feedback type			Absolutwertgeber
Feedback			**AM1024-8V-H**
Design			Mounting
Encoder type			Multi-turn
Pulses			1024
Output signals			SinCos 1 Vss
Interfaces			Hiperface
Absolute revolution			4096
Min. accuracy		'	-0.8
Max. accuracy		'	0.8
Min. DC input voltage	$V_{in,min}$	V	7
Max. DC input voltage	$V_{in,max}$	V	12
Max. current consumption	I_{max}	A	0.08
Limit frequency	f_{max}	kHz	200



Blower

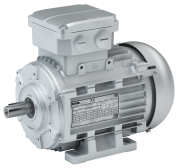
The motor is optionally available with a blower for operation with the rated torque and low motor speeds or a higher switching frequency.

The blower cools the motor independent of the motor speed.

If a blower is used, the torque does not have to be reduced if operated below 20 Hz.

A higher powered motor with simultaneous derating can be used in many cases instead of a blower.

Torque reduction at low motor frequencies ▸ General information 16



Standard version

Rated data 50 Hz, 230/400 V

Motor series			m550-H						m550-P		
Size			063			071			080		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	230	230	400	230	230	400	230	230	400
Rated power	P_{rated}	kW	0.034	0.015	0.015	0.035	0.016	0.016	0.036	0.02	0.02
Rated current	I_{rated}	A	0.15	0.083	0.05	0.15	0.083	0.05	0.16	0.088	0.05

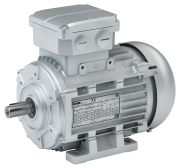
Motor series			m550-P								
Size			090			100			112		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	230	230	400	230	230	400	230	230	400
Rated power	P_{rated}	kW	0.038	0.036	0.036	0.044	0.043	0.043	0.05	0.054	0.054
Rated current	I_{rated}	A	0.19	0.19	0.11	0.2	0.19	0.11	0.23	0.2	0.11

Motor series			m550-P								
Size			132			160			180		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	230	230	400	230	230	400	230	230	400
Rated power	P_{rated}	kW	0.095	0.091	0.091	0.223	0.213	0.213	0.223	0.213	0.213
Rated current	I_{rated}	A	0.42	0.33	0.19	0.97	0.68	0.39	0.97	0.68	0.39

Rated data 50 Hz, 115/200 V

Motor series			m550-H						m550-P		
Size			063			071			080		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	115	115	200	115	115	200	115	115	200
Rated power	P_{rated}	kW	0.047	0.039	0.039	0.047	0.041	0.041	0.048	0.044	0.044
Rated current	I_{rated}	A	0.68	0.67	0.39	0.65	0.67	0.39	0.65	0.66	0.38

Motor series			m550-P								
Size			090			100			112		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	115	115	200	115	115	200	115	115	200
Rated power	P_{rated}	kW	0.051	0.051	0.051	0.057	0.051	0.051	0.064	0.068	0.068
Rated current	I_{rated}	A	0.67	0.67	0.37	0.66	0.64	0.37	0.67	0.64	0.37



Rated data 60 Hz, 115/200 V

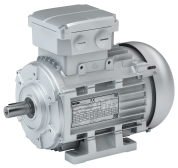
Motor series			m550-H						m550-P		
Size			063			071			080		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	115	115	200	115	115	200	115	115	200
Rated power	P_{rated}	kW	0.036	0.029	0.029	0.04	0.032	0.032	0.044	0.04	0.04
Rated current	I_{rated}	A	0.42	0.47	0.27	0.43	0.46	0.27	0.45	0.47	0.27

Motor series			m550-P								
Size			090			100			112		
Number of phases			1	3	3	1	3	3	1	3	3
Wiring			Delta	Delta	Star	Delta	Delta	Star	Delta	Delta	Star
Rated voltage	V_{rated}	V	115	115	200	115	115	200	115	115	200
Rated power	P_{rated}	kW	0.053	0.051	0.051	0.064	0.058	0.058	0.083	0.082	0.082
Rated current	I_{rated}	A	0.52	0.51	0.29	0.57	0.51	0.29	0.75	0.56	0.32

Rated data 60 Hz, 265/460 V

Motor series			m550-H				m550-P				
Size			063		071		080		090		100
Number of phases			1	3	1	3	1	3	1	3	1
Wiring			Delta	Star	Delta	Star	Delta	Star	Delta	Star	Delta
Rated voltage	V_{rated}	V	265	460	265	460	265	460	265	460	265
Rated power	P_{rated}	kW	0.05	0.018	0.052	0.02	0.055	0.028	0.058	0.047	0.069
Rated current	I_{rated}	A	0.19	0.05	0.2	0.05	0.21	0.05	0.22	0.11	0.26

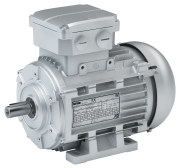
Motor series			m550-P								
Size			100	112		132		160		180	
Number of phases			3	1	3	1	3	1	3	1	3
Wiring			Star	Delta	Star	Delta	Star	Delta	Star	Delta	Star
Rated voltage	V_{rated}	V	460	265	460	265	460	265	460	265	460
Rated power	P_{rated}	kW	0.059	0.085	0.074	0.156	0.134	0.379	0.33	0.379	0.33
Rated current	I_{rated}	A	0.11	0.32	0.12	0.59	0.21	1.44	0.47	1.44	0.47



Heavy-duty blower

The heavy-duty blower is an optional fan design for operation in environments with higher dust and fiber contamination, e.g. in the textile industry.

Heavy-duty blowers have the same electrical data and dimensions as the standard design.



Temperature monitoring

The thermal sensors are integrated in the windings. We recommend the use of an additional motor protection switch.

Only one temperature monitoring device can be connected with the ICN-M23 8-pin and HAN 10E/modular connectors.

The following temperature monitoring systems are available to protect the motor from overheating:

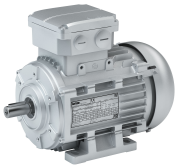
Connection via cable gland in the terminal box
- TCO thermal contact
- TCO thermal contact and PT1000 temperature sensor

Connection via ICN or HAN connector
- TCO thermal contact
- Thermal detectors PT1000

Thermal contacts TC0

The TCO thermal contact (thermal break contact) is a bimetallic switch. The thermal contact monitors the motor winding temperature; e.g., at excessively high temperatures, it switches the upstream motor relay. The motor is disconnected from the line voltage and coasts down via the relay.

Function			Normally-closed contact
Operating temperature		°C	150
Min. operating temperature tolerance		°C	-5
Max operating temperature tolerance		°C	5
Min. reset temperature		°C	90
Max. reset temperature		°C	135
Max. AC input current		A	2.5
Max. AC input voltage		V	250
Max. DC input current		A	40
Max. DC input voltage		V	12

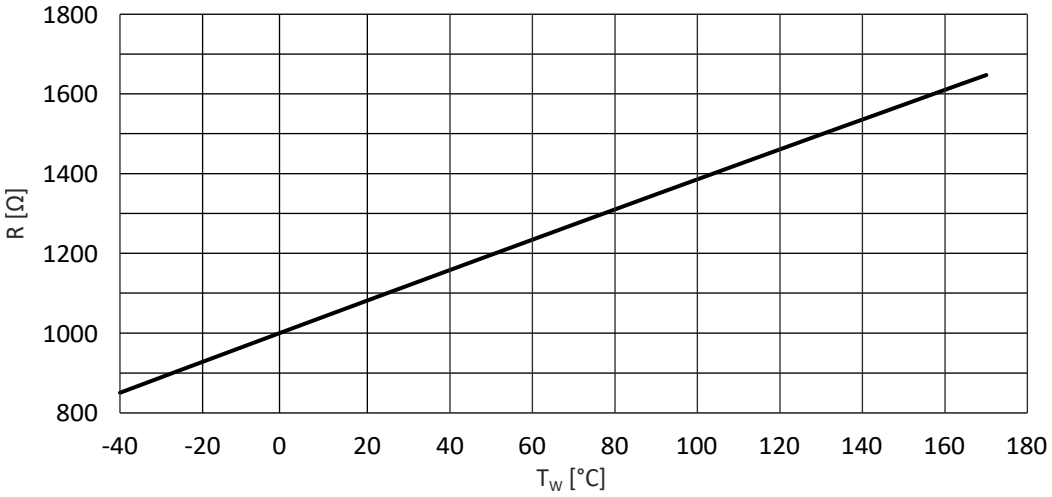


Thermal detectors PT1000

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!**

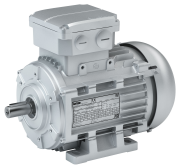
This makes it possible to determine the motor temperature in the permissible operating range with great accuracy.

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



R Resistance

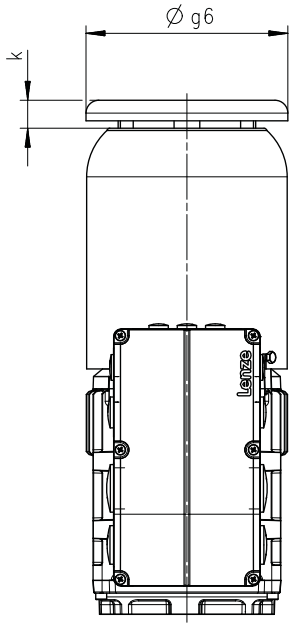
T_W Winding temperature



Protection cover

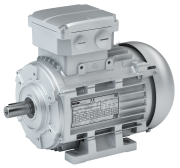
If the motor is installed vertically with the shaft end pointing down, a protection cover is recommended for the fan cover to prevent any foreign bodies falling into the fan.

Protection cover for self-ventilated motors

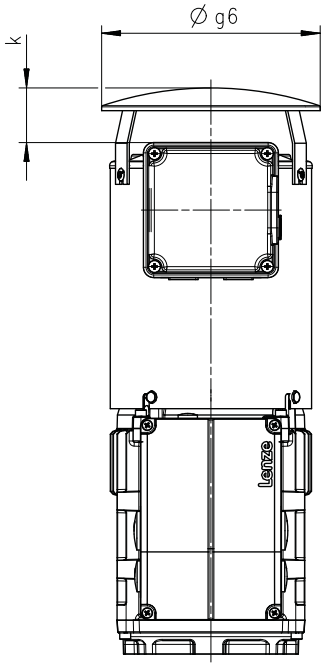


8801079_00

Motor series			m550-H		m550-P						
Motor			**63/S4 63/M4 63/L4**	**71/M4 71/L4**	**80/M4**	**90/M4 90/L4**	**100/M4 100/L4**	**112/M4**	**132/M4 132/L4**	**160/M4 160/L4**	**180/M4 180/L4**
Additional length	k	mm	25	25	25	25	30	30	30	35	35
Diameter	g_6	mm	124	138	157	177	196	218	260	310	348



Protection cover for forced ventilation motors

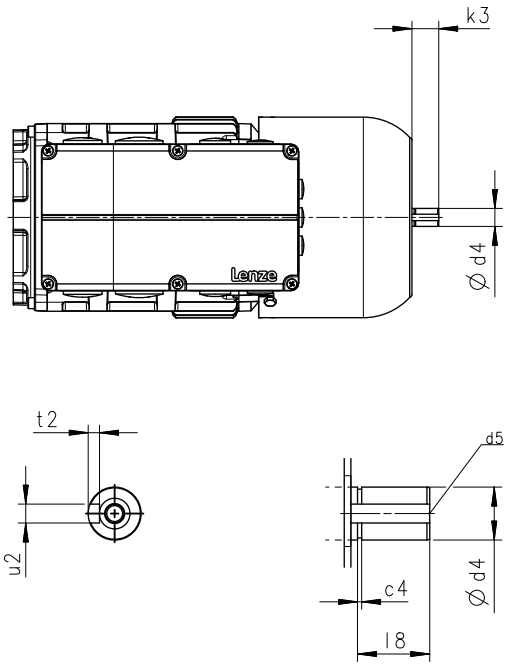


8801083_00

Motor series			m550-H		m550-P						
Motor			**63/S4 63/M4 63/L4**	**71/M4 71/L4**	**80/M4**	**90/M4 90/L4**	**100/M4 100/L4**	**112/M4**	**132/M4 132/L4**	**160/M4 160/L4**	**180/M4 180/L4**
Additional length	k	mm	32	32	32	32	32	42	56	56	56
Diameter	g_6	mm	133	150	170	188	210	249	300	338	338

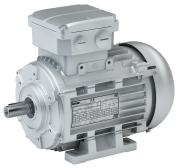
Second shaft end

The second motor shaft end on the drive side is intended for customer applications (e.g. further feedback systems).



8801082_00

Motor series			m550-H		m550-P				
Motor			**63/S4 63/M4 63/L4**	**71/M4 71/L4**	**80/M4**	**90/M4 90/L4**	**100/M4 100/L4**	**112/M4**	**132/M4 132/L4**
Shaft length	k_3	mm	18	18	20.5	24	28	28	32.5
Shaft diameter	d_4	mm	14	14	14	14	14	14	25
	l_8	mm	15	15	19	19	23	23	27
	c_4	mm	1.1	1.1	1.1	1.1	1.1	1.1	
Keyway width	u_2	mm	5	5	5	5	5	5	8
Keyway depth	t_2	mm	3	3	3	3	3	3	4.5
	d_5		M5	M5	M5	M5	M5	M5	M10

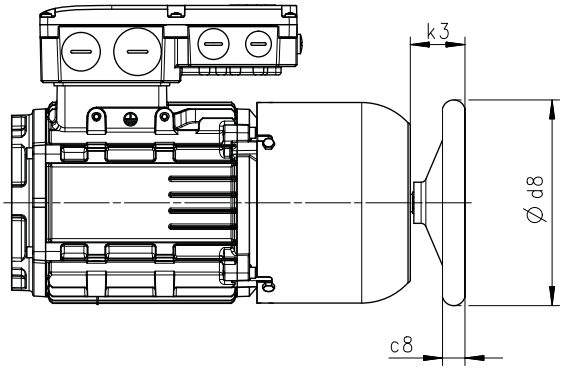


Handwheel

In a deenergized state or during emergency operation, the motor shaft can be rotated with the hand wheel and the machine can be set up.

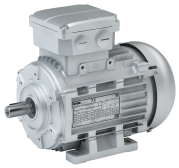
The hand wheel is made of a light alloy and has a smooth surface.

Pay attention to the higher moment of inertia during configuration! With frequent switching operations, in particular when changing the direction of rotation, please contact your Lenze representative.



8801080_00

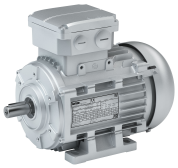
Motor		m550-H		m550-P				
		63/S4 63/M4 63/L4	71/M4 71/L4	80/M4	90/M4 90/L4	100/M4 100/L4	112/M4	132/M4 132/L4
Dimensions								
k_3	mm	29	40	40	40	45	45	50
d_8	mm	80	160	160	160	200	200	250
c_8	mm	14	18	18	18	22	22	26
Moment of inertia								
J	$kgcm^2$	0.6	18.5	18.5	18.5	25.8	25.8	155.4



Product codes

Motor product code

Example		M	55	B	H	063	S	04	5	E	0	0	C	C
Product type	Motor	M												
Product family			55											
Version				B										
Efficiency class	IE2				H									
	IE3				P									
Size						063 071 080 090 100 112 132 160 180									
Overall length	Short						S							
	Medium						M							
	Long						L							
Number of poles	4-pole							04						
Degree of protection	IP54/IP55								5					
	IP65/IP66								6					
Cooling	Self-ventilation									E				
	Forced ventilation									F				
Brake	Without										0			
	Spring-applied brakes										F			
Feedback	Without											0		
	Absolute value encoder											A		
	Incremental encoder											E		
	Resolver											R		
Approvals	None												N	
	CE												C	
	CE, CCC												3	
	CE, cULus												L	
	CE, cULus, CCC												5	
	CE, cURus												U	
	CE, cURus, CCC												W	
Design type	Internal key													C



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.

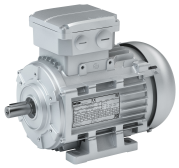
Lenze products are industrial electrical and electronic products and are disposed of professionally. Both the mechanical and electrical components such as electric motors, gearboxes or inverters contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the 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

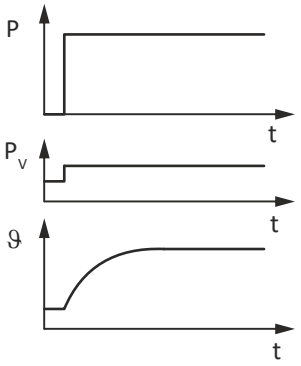
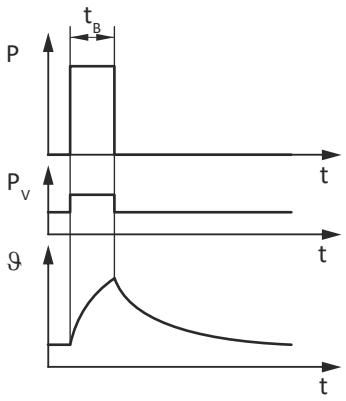
Operating modes of the motor

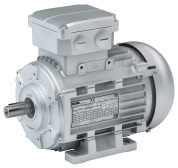
Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

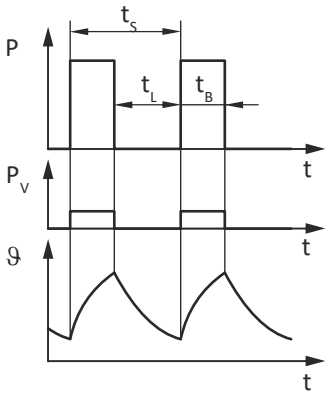
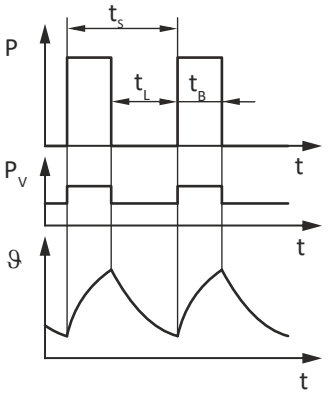
In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature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