L-force

Three-phase AC motors

Efficient and precisely tailored

Lenze

This is what we stand for.
You want to implement your machine and plant concepts efficiently and easily or optimise existing concepts to reduce costs? Then, Lenze is the partner you are looking for. For more than 60 years, drive and automation systems have been our core competence.

Drive and automation technology from Lenze keep things moving – for example in the areas of materials handling, robotics and component handling as well as in packaging facilities for the intralogistics and automotive sectors and the food and beverage industries.

Lenze | about us

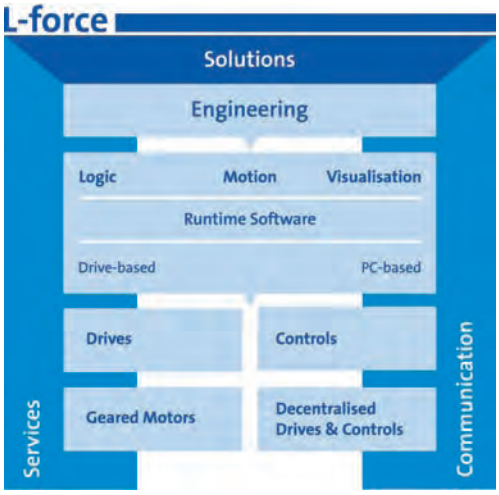
We can offer you automation solutions including control, visualisation and drive technology from a single source. Our drive systems will improve the performance of your machines. From project planning to commissioning, we have the know-how, whilst our international sales and service network can provide you with expert help and advice at any time.

Cut your process costs and increase your ability to compete. Let us analyse your drive technology tasks and support you with made-to-measure solutions. We can take an integrated approach to projects thanks to the scalability of our products and the scope of the overall portfolio. We can get the best from your machines and systems.

At your side all over the world – with thorough and professional support from our motivated team.

L-force | Your future is our drive

Demands are increasing all the time. In future, key challenges will lie in the areas of cost efficiency, time-saving and quality improvements. Faster project planning and commissioning, improved performance and increased flexibility in production are expected. New ideas are therefore needed for the machines of the future.
Lenze has risen to this challenge and, with L-force, we can now not only offer you an innovative family of drive and automation products, but also a new, comprehensive portfolio of solutions.



Driven by innovation – new ideas that open up new opportunities
Always on the lookout. Our idea of innovation is striving for better solutions for our customers every single day.

Driven by flexibility – High degree of scalability for individual solutions
Scalability is an important aspect of the **L-force** philosophy. Performance, scope of functions, software, service provisions and aftersales care – Lenze will provide you with exactly the combination you require.

Driven by usability – Simple solutions, even for complex applications
We always focus on the user. Therefore, when we developed **L-force**, we made sure that people with sufficient practical experience were involved, right from the start.

Driven by compatibility – Universal products and solutions
There is no need to waste time looking for suitable components and the right interfaces. With **L-force**, every element is perfectly matched.

Our drive is "rightsized" – the perfect solution for your application
We call it Rightsizing: Optimise your processes with the new three-phase AC motors from Lenze and increase your added value.

Contents

L-force 3-ph. AC motors

General information

Drive dimensioning

Rated data

Contents | L-force 3-ph. AC motors

Accessories

Contents

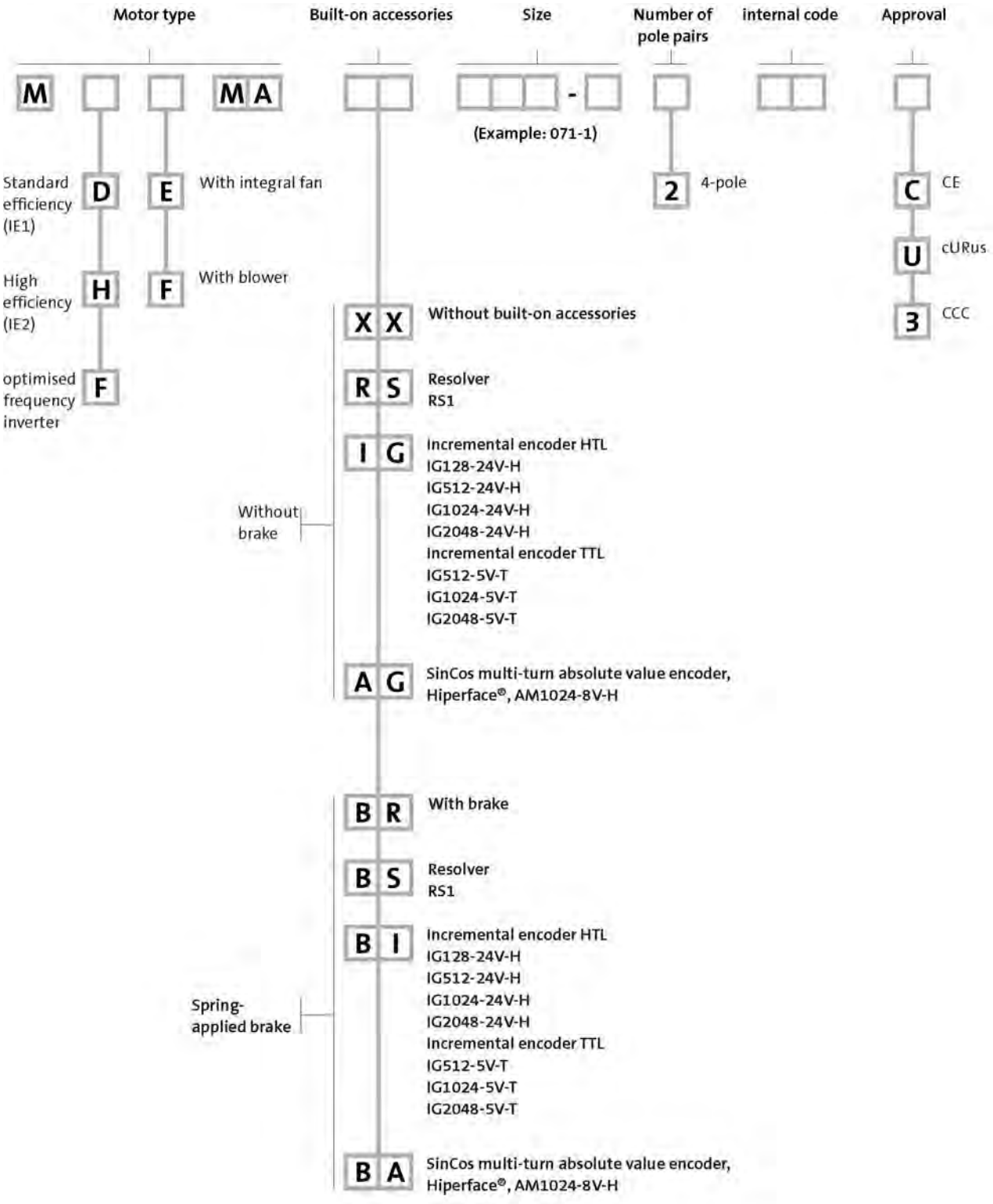
L-force 3-ph. AC motors

Dimensions

Contents | L-force 3-ph. AC motors

Surface and corrosion protection

Three-phase AC motors



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

The motors are available in three versions:

- L-force three-phase AC motors MD (0.12 ... 22 kW)
  Three-phase AC motors of efficiency class IE1 (standard efficiency) corresponding to IEC 60034-30
- L-force three-phase AC motors MH (0.75 ... 30 kW)
  Three-phase AC motors of efficiency class IE2 (high efficiency) corresponding to IEC 60034-30
  Since the IE2 motors are produced in the same dimensions as the standard efficiency motors, it's very easy to change between versions.
- L-force three-phase AC motors MF (0.55 ... 22 kW)
  These motors are optimised for use in an inverter operation.
  Benefits for you:
  - Up to 2 sizes smaller than standard three-phase AC motors
  - The motors exceed the minimum efficiency levels of efficiency class IE2
  - Large setting range: 1:24 (no field weakening)
  - Dynamic thanks to a small moment of inertia

Basic versions

- The motors feature B3, B5 and B14 designs and dimensions standardised in line with IEC 60072-1 and/or DIN EN 50347 which makes then suitable for universal use.
- The motor winding is inverter-compatible even in the standard version.
- The thermal sensors integrated as standard allow for permanent temperature monitoring and are coordinated to the motor winding's temperature class F (155°C).
- The motors of the basic version are adapted to ambient conditions by enclosure IP55.
- In tough operating conditions, the surface and corrosion protection system is provided to reliably protect the motor from corrosive media.
- 9 brake sizes – each available with several braking torques – can be combined with three-phase AC motors.
- The LongLife design of the brake easily enables over 10 x10^6 switching cycles.
- For speed and position detection, a resolver and/or various incremental and absolute value encoders can be mounted.
- Motors are also available with plugs for power connections, brakes, blowers and feedback for fast commissioning.
- The motor can optionally be equipped with a blower instead of an integral fan. At speeds below 20 Hz, a torque reduction is consequently not required.
- For drive tasks in distributed applications, the motor can be supplied with the motec frequency inverter mounted on the terminal box.
- Motors are available with UL/CSA, GOST, CCC and UkrSepro approval.

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

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

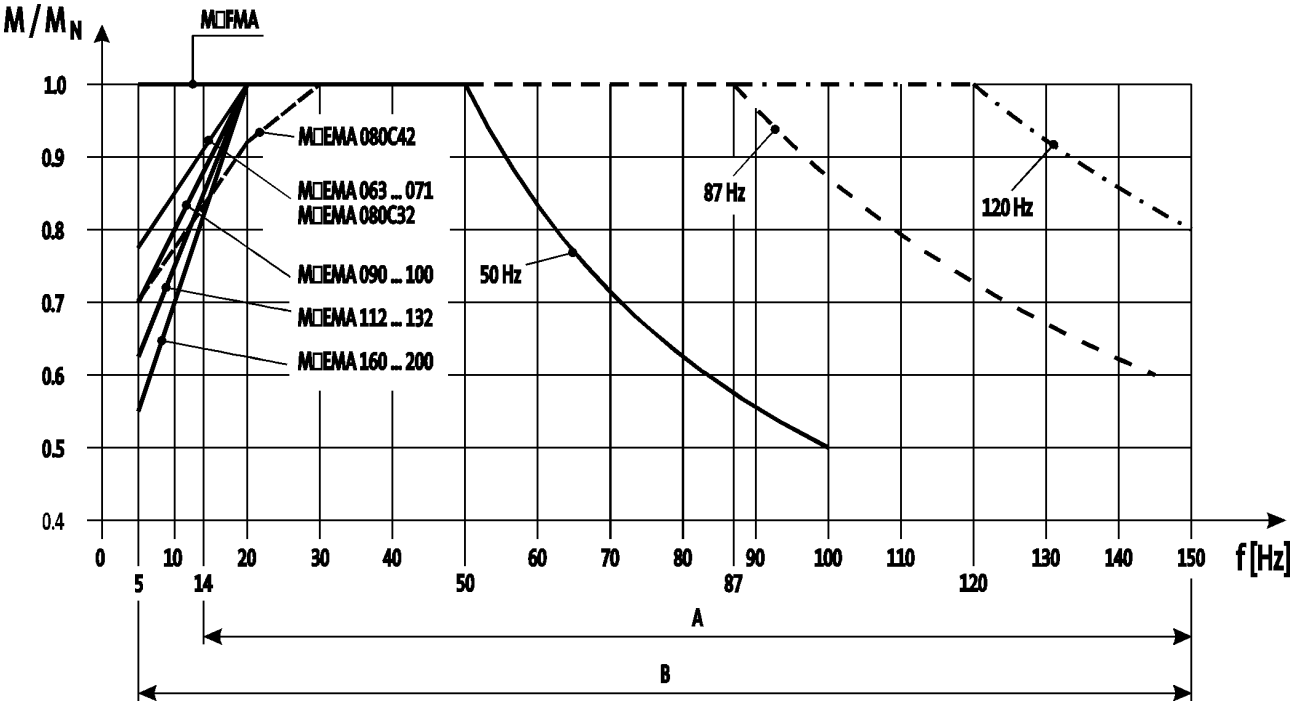
$\mathbf{U_{max}}$	[V]	Max. mains voltage
$\mathbf{U_{min}}$	[V]	Min. mains voltage
$\mathbf{U_{N,\Delta}}$	[V]	Rated voltage
$\mathbf{U_{N,Y}}$	[V]	Rated voltage

Enclosure EN 60529			IP55
Energy efficiency class IEC 60034-30 IEC 60034-2-1			IE1 IE2 Methodology for measuring efficiency
Approval Class			CCC cURus [1)] GOST-R UkrSepro
Temperature class IEC/EN 60034-1; utilisation IEC/EN 60034-1; insulation system (enamel-insulated wire)			B F
Min. ambient operating temperature	$T_{opr,min}$	[°C]	-20
Max. ambient operating temperature With power reduction	$T_{opr,max}$ $T_{opr,max}$	[°C] [°C]	40 60
Site altitude power reduction above 1000 m Amsl	 H_{max}	[%/1000 m] [m]	5.00 4000

[1)] MD/MH motor type: Size 160 to 200 in preparation.
MF motor type in preparation.

Torque derating at low motor frequencies

Torque reduction depending on motor frame size taking into account the thermal behaviour when operated with a frequency inverter.



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

- The technical data listed in this catalogue for motors in inverter operation applies for operation on a Lenze frequency inverter. If you are in any doubt, please ask the manufacturer of the frequency inverter whether the drive is able to operate the motor with the technical data listed (e.g. setting range, base frequency).

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

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

Please contact your Lenze sales office.

		MD□□□□□063-12 MD□□□□□063-32 MD□□□□□063-42 MF□□□□□063-32 MF□□□□□063-42	MD□□□□□071-12 MD□□□□□071-32 MD□□□□□071-42 MF□□□□□071-32 MF□□□□□071-42	MD□□□□□080-12 MD□□□□□080-32 MD□□□□□080-42 MH□□□□□080-32 MF□□□□□080-32 MF□□□□□080-42	MD□□□□□090-12 MD□□□□□090-12 MH□□□□□090-12 MH□□□□□090-12 MF□□□□□090-32
Type		B14 B3 B5			
Shaft journal d x l	[mm]	11 x 23	14 x 30	19 x 40	24 x 50
Spring-applied brake Design		Reduced or standard braking torque Standard or LongLife design With rectifier With manual release lever Low noise		Reduced, standard or increased braking torque Standard or LongLife design With rectifier With manual release lever Low noise	
Feedback Design		Resolver Incremental encoder Absolute value encoder (multi-turn)			
Temperature sensor Thermal contact Thermal detector PTC thermistor		TKO KTY83-110 KTY84-130 PTC			
Motor connection Power connection Brake connection Blower connection Feedback connection Temperature sensor connection		Terminal box HAN modular connector HAN10E connector Terminal box with ICN connector Terminal box HAN modular connector HAN10E connector Connector ICN Terminal box Connector ICN Terminal box Connector ICN Terminal box KTY at connector in the feedback connection TKO or PTC at connector in the power connection			
Shaft bearings Position of the locating bearing Bearing type		Non-drive end Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates			
Colour		Primed Paint in various corrosion-protection designs in accordance with RAL colours Not coated			

		MD□□□□□100-12 MD□□□□□100-32 MH□□□□□100-12 MH□□□□□100-32 MF□□□□□100-12 MF□□□□□100-32	MD□□□□□112-22 MH□□□□□112-22	MF□□□□□112-22
Type		B14 B3 B5		
Shaft journal d x l	[mm]	28 x 60		
Spring-applied brake Design		Reduced, standard or increased braking torque Standard or LongLife design With rectifier With manual release lever Low noise	Reduced, standard or increased braking torque Standard design With rectifier With manual release lever Low noise	
Feedback Design		Resolver Incremental encoder Absolute value encoder (multi-turn)		
Temperature sensor Thermal contact Thermal detector PTC thermistor		TKO KTY83-110 KTY84-130 PTC		
Motor connection Power connection Brake connection Blower connection Feedback connection Temperature sensor connection		Terminal box HAN modular connector HAN10E connector Terminal box with ICN connector Terminal box HAN modular connector HAN10E connector Connector ICN Terminal box Connector ICN Terminal box Connector ICN Terminal box KTY at connector in the feedback connection TKO or PTC at connector in the power connection		Terminal box Terminal box Terminal box KTY at connector in the feedback connection
Shaft bearings Position of the locating bearing Bearing type		Non-drive end Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour		Primed Paint in various corrosion-protection designs in accordance with RAL colours Not coated		

		MD□□□□□132-12 MD□□□□□132-22 MH□□□□□132-12 MH□□□□□132-22	MF□□□□□132-12 MF□□□□□132-22 MF□□□□□132-32	MD□□□□□160-22 MD□□□□□160-32 MH□□□□□160-22 MH□□□□□160-32
Type		B3 B5		
Shaft journal d x l	[mm]	38 x 80		42 x 110
Spring-applied brake Design		Reduced, standard or increased braking torque Standard design With rectifier With manual release lever Low noise		
Feedback Design		Resolver Incremental encoder Absolute value encoder (multi-turn)		
Temperature sensor Thermal contact Thermal detector PTC thermistor		TKO KTY83-110 KTY84-130 PTC		
Motor connection Power connection		Terminal box HAN modular connector Terminal box with ICN connector	Terminal box HAN modular connector	
Brake connection		Terminal box HAN modular connector Connector ICN	Terminal box HAN modular connector	
Blower connection		Terminal box Connector ICN		
Feedback connection		Terminal box Connector ICN		
Temperature sensor connection		Terminal box KTY at connector in the feedback connection TKO or PTC at connector in the power connection		
Shaft bearings Position of the locating bearing		Non-drive end		Drive end
Bearing type		Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates		
Colour		Primed Paint in various corrosion-protection designs in accordance with RAL colours Not coated		

		MD□□□□□180-12 MD□□□□□180-32 MH□□□□□180-12 MH□□□□□180-32	MH□□□□□200-22
Type		B3 B5	
Shaft journal d x l	[mm]	48 x 110	55 x 110
Spring-applied brake Design		Reduced, standard or increased braking torque Standard design With rectifier With manual release lever Low noise	
Feedback Design		Resolver Incremental encoder Absolute value encoder (multi-turn)	
Temperature sensor Thermal contact Thermal detector PTC thermistor		 TKO KTY83-110 KTY84-130 PTC	
Motor connection Power connection Brake connection Blower connection Feedback connection Temperature sensor connection		 Terminal box Terminal box Terminal box Connector ICN Terminal box Connector ICN Terminal box	
Shaft bearings Position of the locating bearing Bearing type		 Drive end Deep-groove ball bearing with high-temperature resistant grease, 2 sealing discs or cover plates	
Colour		Primed Paint in various corrosion-protection designs in accordance with RAL colours Not coated	

Rated frequency 50 Hz

- Decentralised frequency inverter 8200 motec (E82MV)
- Inverter Drives 8400 frequency inverter (E84AV)

Rated power	Product key			
	Motor		Inverter	
P_N				
[kW]				
0.12	MD□□□□□□063-12		E82MV251_2B	E84AV□□□2512□□0
0.18	MD□□□□□□063-32			
0.25	MD□□□□□□063-42 MD□□□□□□071-12			
0.37	MD□□□□□□071-32		E82MV371_2B	E84AV□□□3714□□0
0.55	MD□□□□□□071-42 MD□□□□□□080-12		E82MV551_4B	E84AV□□□5514□□0
0.75	MD□□□□□□080-32	MH□□□□□□080-32	E82MV751_4B	E84AV□□□7514□□0
1.10	MD□□□□□□080-42 MD□□□□□□090-12	MH□□□□□□090-12	E82MV152_4B	E84AV□□□1124□□0
1.50	MD□□□□□□090-32	MH□□□□□□090-32		E84AV□□□1524□□0
2.20	MD□□□□□□100-12	MH□□□□□□100-12	E82MV222_4B	E84AV□□□2224□□0
3.00	MD□□□□□□100-32	MH□□□□□□100-32	E82MV302_4B	E84AV□□□3024□□0 E84AV□□□3024□□S
4.00	MD□□□□□□112-22	MH□□□□□□112-22	E82MV402_4B	E84AV□□□4024□□0
5.50	MD□□□□□□132-12	MH□□□□□□132-12	E82MV552_4B	E84AV□□□5524□□0
7.50	MD□□□□□□132-22	MH□□□□□□132-22	E82MV752_4B	E84AV□□□7524□□0
11.0	MD□□□□□□160-22	MH□□□□□□160-22		E84AV□□□1134□□0
15.0	MD□□□□□□160-32	MH□□□□□□160-32		E84AV□□□1534□□0
18.5	MD□□□□□□180-12	MH□□□□□□180-12		E84AV□□□1834□□0
22.0	MD□□□□□□180-32	MH□□□□□□180-32		E84AV□□□2234□□0
30.0		MH□□□□□□200-22		E84AV□□□3034□□0

Rated frequency 87 Hz

Rated power	Product key			
	Motor		Inverter	
P_N				
[kW]				
0.21	MD□□□□□063-12		E82MV551_4B	E84AV□□□5514□□0
0.33	MD□□□□□063-32			
0.45	MD□□□□□063-42 MD□□□□□071-12			
0.66	MD□□□□□071-32		E82MV751_4B	E84AV□□□7514□□0
1.00	MD□□□□□071-42 MD□□□□□080-12		E82MV152_4B	E84AV□□□1124□□0
1.35	MD□□□□□080-32	MH□□□□□080-32		E84AV□□□1524□□0
2.00	MD□□□□□080-42 MD□□□□□090-12	MH□□□□□090-12	E82MV222_4B E82MV222_4B	E84AV□□□2224□□0
2.70	MD□□□□□090-32	MH□□□□□090-32	E82MV302_4B	E84AV□□□3024□□0 E84AV□□□3024□□S
3.90	MD□□□□□100-12	MH□□□□□100-12	E82MV402_4B	E84AV□□□4024□□0
5.40	MD□□□□□100-32	MH□□□□□100-32	E82MV552_4B	E84AV□□□5524□□0
7.10	MD□□□□□112-22	MH□□□□□112-22	E82MV752_4B	E84AV□□□7524□□0
9.70	MD□□□□□132-12	MH□□□□□132-12		E84AV□□□1134□□0
13.2	MD□□□□□132-22	MH□□□□□132-22		E84AV□□□1534□□0
19.3	MD□□□□□160-22	MH□□□□□160-22		E84AV□□□2234□□0
26.4	MD□□□□□160-32	MH□□□□□160-32		E84AV□□□3034□□0
32.4	MD□□□□□180-12	MH□□□□□180-12		E84AV□□□4534□□0

Rated frequency 120 Hz

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

Rated frequency 50 Hz

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-12	0.12	1425	230	0.85	400	0.49	3.10
MD□□□□□063-32	0.18	1365	230	1.00	400	0.58	2.70
MD□□□□□063-42	0.25	1370	230	1.40	400	0.82	2.90
MD□□□□□071-12	0.25	1370	230	1.30	400	0.75	2.90
MD□□□□□071-32	0.37	1410	230	1.60	400	0.95	3.30
MD□□□□□071-42	0.55	1405	230	2.40	400	1.40	3.50
MD□□□□□080-12	0.55	1390	230	2.50	400	1.40	3.80
MD□□□□□080-32	0.75	1410	230	3.30	400	1.90	4.60
MD□□□□□080-42	1.10	1390	230	4.80	400	2.80	4.40
MD□□□□□090-12	1.10	1390	230	4.80	400	2.80	4.10
MD□□□□□090-32	1.50	1410	230	6.60	400	3.80	4.80
MD□□□□□100-12	2.20	1440	230	9.20	400	5.30	6.00
MD□□□□□100-32	3.00	1430	230	12.5	400	7.20	4.60
MD□□□□□112-22	4.00	1450	230	16.1	400	9.30	6.20
MD□□□□□132-12	5.50	1450	230 400 [3]	20.2 11.7	400	11.7	4.00
MD□□□□□132-22	7.50	1455	230 400 [3]	28.6 16.5	400	16.5	5.90

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-12	0.80	2.50	2.64	0.56	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.26	2.50	2.61	0.70	63.0	64.0	3.30	4.10
MD□□□□□063-42	1.74	3.80	4.10	0.67	65.0	66.0	3.70	4.40
MD□□□□□071-12	1.74	3.10	3.10	0.75	65.0	66.0	8.30	5.80
MD□□□□□071-32	2.51	4.76	5.81	0.77	73.0	73.0	10.7	5.80
MD□□□□□071-42	3.74	7.85	9.12	0.77	74.0	74.0	12.8	6.40
MD□□□□□080-12	3.80	6.80	7.20	0.80	70.0	70.0	16.9	10.0
MD□□□□□080-32	5.10	11.0	12.1	0.80	73.0	74.0	26.0	11.0
MD□□□□□080-42	7.50	16.5	18.4	0.80	77.0	77.0	26.0	11.0
MD□□□□□090-12	7.56	15.5	16.0	0.81	75.0	75.0	23.2	12.0
MD□□□□□090-32	10.1	23.7	27.1	0.76	78.0	79.0	28.4	15.0
MD□□□□□100-12	14.6	38.0	44.0	0.73	83.0	84.0	61.0	24.0
MD□□□□□100-32	20.5	43.0	50.0	0.75	83.0	83.0	61.0	24.0
MD□□□□□112-22	26.3	70.0	95.0	0.73	85.0	86.0	107	31.0
MD□□□□□132-12	36.2	100	110	0.75	86.0	86.0	188	56.0
MD□□□□□132-22	49.2	100	150	0.76	87.0	88.0	336	66.0

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose ratings at 50 Hz include voltage values of Δ 230 V.
For motor sizes 132-12 to 180-32, the necessary voltage must also be indicated.
[3] Star/delta start-up at 400 V possible.

Rated data
Standard efficiency

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□160-22	11.0	1460	230 400 [3]	36.5 21.0	400	21.0	7.00
MD□□□□□160-32	15.0	1460	230 400 [3]	48.4 27.8	400	27.8	7.10
MD□□□□□180-12	18.5	1470	230 400 [3]	57.8 32.8	400	32.8	6.80
MD□□□□□180-32	22.0	1465	230 400 [3]	67.4 38.8	400	38.8	7.30

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	71.9	150	204	0.85	89.2	89.0	610	110
MD□□□□□160-32	98.1	214	288	0.87	89.7	90.0	750	130
MD□□□□□180-12	120	260	313	0.90	90.7	90.5	1350	165
MD□□□□□180-32	144	330	360	0.90	91.2	91.0	1550	175

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose ratings at 50 Hz include voltage values of Δ 230 V.
For motor sizes 132-12 to 180-32, the necessary voltage must also be indicated.
[3] Star/delta start-up at 400 V possible.

Rated frequency 60 Hz

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□063-12	0.14	1725	277	0.85	480	0.49	3.10
MD□□□□□063-32	0.22	1665	277	1.00	480	0.58	2.70
MD□□□□□063-42	0.31	1670	277	1.40	480	0.82	2.90
MD□□□□□071-12	0.31	1670	277	1.30	480	0.75	2.90
MD□□□□□071-32	0.45	1710	277	1.60	480	0.95	3.30
MD□□□□□071-42	0.68	1705	277	2.40	480	1.40	3.50
MD□□□□□080-12	0.68	1690	277	2.40	480	1.40	3.80
MD□□□□□080-32	0.92	1710	277	3.30	480	1.90	5.10
MD□□□□□080-42	1.30	1690	277	4.80	480	2.80	5.00
MD□□□□□090-12	1.30	1690	277	4.80	480	2.80	4.10
MD□□□□□090-32	1.80	1710	277	6.60	480	3.80	5.30
MD□□□□□100-12	2.60	1740	277	9.20	480	5.30	6.60
MD□□□□□100-32	3.60	1730	277	12.5	480	7.20	5.20
MD□□□□□112-22	4.80	1750	277	16.1	480	9.30	6.40
MD□□□□□132-12	6.60	1750	277 480 [3]	20.2 11.7	480	11.7	4.20
MD□□□□□132-22	9.00	1755	277 480 [3]	28.6 16.5	480	16.5	6.50

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-12	0.80	2.50	2.60	0.56	58.0	63.0	3.30	4.10
MD□□□□□063-32	1.30	2.50	2.60	0.70	63.0	64.0	3.30	4.10
MD□□□□□063-42	1.80	3.90	4.20	0.67	64.0	66.0	3.70	4.40
MD□□□□□071-12	1.74	3.40	4.20	0.75	65.0	66.0	8.30	5.80
MD□□□□□071-32	2.51	4.80	5.80	0.77	74.0	73.0	10.7	5.80
MD□□□□□071-42	3.74	8.00	9.30	0.77	76.0	74.0	12.8	6.40
MD□□□□□080-12	3.80	8.10	9.10	0.80	74.0	75.0	16.9	10.0
MD□□□□□080-32	5.10	11.6	13.3	0.80	79.0	79.0	26.0	11.0
MD□□□□□080-42	7.50	17.8	21.0	0.80	79.0	79.0	26.0	11.0
MD□□□□□090-12	7.56	21.8	23.1	0.80	79.0	79.0	23.2	12.0
MD□□□□□090-32	10.1	24.7	30.2	0.74	80.0	82.0	28.4	15.0
MD□□□□□100-12	14.6	38.0	47.0	0.73	84.0	85.0	61.0	24.0
MD□□□□□100-32	20.5	43.0	54.0	0.75	87.0	88.0	61.0	24.0
MD□□□□□112-22	26.4	58.0	102	0.73	86.0	87.0	107	31.0
MD□□□□□132-12	36.2	100	115	0.79	87.0	88.0	188	56.0
MD□□□□□132-22	49.2	100	160	0.75	88.0	88.0	336	66.0

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose ratings at 60 Hz include voltage values of Δ 277 V.
For motor sizes 132-12 to 180-32, the necessary voltage must also be indicated.
[3] Star/delta start-up at 480 V possible.

Rated data
Standard efficiency

	P_N	n_N	$U_{N,\Delta}$ [2]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MD□□□□□160-22	13.2	1760	277 480 [3]	36.5 21.0	480	21.0	7.00
MD□□□□□160-32	18.0	1760	277 480 [3]	48.4 27.8	480	27.8	7.10
MD□□□□□180-12	22.2	1770	277 480 [3]	57.8 32.8	480	32.8	6.80
MD□□□□□180-32	26.4	1765	277 480 [3]	67.4 38.8	480	38.8	7.30

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□160-22	71.9	150	204	0.85	90.1	89.0	610	110
MD□□□□□160-32	98.1	214	288	0.87	90.6	90.0	750	130
MD□□□□□180-12	120	260	313	0.90	91.5	90.5	1350	165
MD□□□□□180-32	144	330	360	0.90	92.0	91.0	1550	175

[1] Without accessories
[2] Operation at 87 Hz is possible with 4-pole motors whose ratings at 60 Hz include voltage values of Δ 277 V.
For motor sizes 132-12 to 180-32, the necessary voltage must also be indicated.
[3] Star/delta start-up at 480 V possible.

Rated frequency 87 Hz

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1]	m [1]
					± 10 %						
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[kgcm²]	[kg]
MD□□□□□063-12	0.21	2535	0.80	1.60	400	0.85	0.55	61.0	68.0	3.30	4.10
MD□□□□□063-32	0.33	2475	1.26	5.00	400	1.00	0.65	68.0	70.0	3.30	4.10
MD□□□□□063-42	0.45	2480	1.74	7.00	400	1.40	0.63	66.0	69.0	3.70	4.40
MD□□□□□071-12	0.45	2480	1.74	7.00	400	1.30	0.74	66.0	68.0	8.30	5.80
MD□□□□□071-32	0.66	2520	2.51	10.0	400	1.60	0.72	76.0	78.0	10.7	5.80
MD□□□□□071-42	1.00	2515	3.74	15.0	400	2.40	0.74	79.0	80.0	12.8	6.40
MD□□□□□080-12	1.00	2500	3.80	15.0	400	2.50	0.78	72.0	72.0	16.9	10.0
MD□□□□□080-32	1.35	2520	5.10	20.0	400	3.30	0.80	75.0	77.0	26.0	11.0
MD□□□□□080-42	2.00	2500	7.50	30.0	400	4.80	0.80	81.0	82.0	26.0	11.0
MD□□□□□090-12	2.00	2500	7.56	30.0	400	4.80	0.78	77.0	77.0	23.2	12.0
MD□□□□□090-32	2.70	2520	10.1	40.0	400	6.70	0.73	83.0	85.0	28.4	15.0
MD□□□□□100-12	3.90	2550	14.6	60.0	400	9.20	0.71	87.0	88.0	61.0	24.0
MD□□□□□100-32	5.40	2540	20.5	80.0	400	12.5	0.73	87.0	88.0	61.0	24.0
MD□□□□□112-22	7.10	2560	26.3	105	400	16.1	0.71	87.0	88.0	107	31.0
MD□□□□□132-12	9.70	2560	36.2	145	400	20.1	0.78	90.0	90.0	188	56.0
MD□□□□□132-22	13.2	2565	49.2	200	400	28.6	0.75	90.0	90.0	336	66.0
MD□□□□□160-22	19.3	2565	71.9	280	400	36.5	0.85	91.7	90.0	610	110
MD□□□□□160-32	26.4	2565	98.1	390	400	48.4	0.86	91.9	92.0	750	130
MD□□□□□180-12	32.4	2575	120	480	400	57.8	0.89	92.8	92.0	1350	165
MD□□□□□180-32	38.7	2560	144	572	400	67.4	0.89	92.8	92.0	1550	175

[1] Without accessories

Rated frequency 50 Hz

	P_N	n_N	$U_{N,\Delta}$ [-1)]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MH□□□□□080-32	0.75	1410	230	3.10	400	1.80	5.00
MH□□□□□090-12	1.10	1430	230	4.60	400	2.70	5.40
MH□□□□□090-32	1.50	1435	230	5.80	400	3.30	6.30
MH□□□□□100-12	2.20	1445	230	8.60	400	5.00	6.00
MH□□□□□100-32	3.00	1445	230	12.1	400	7.00	6.50
MH□□□□□112-22	4.00	1455	230	14.5	400	8.40	6.00
MH□□□□□132-12	5.50	1470	230 400 [3)]	20.6 11.9	400	11.9	6.10
MH□□□□□132-22	7.50	1460	230 400 [3)]	27.0 15.6	400	15.6	8.50
MH□□□□□160-22	11.0	1470	230 400 [3)]	37.7 21.8	400	21.8	8.00
MH□□□□□160-32	15.0	1470	230 400 [3)]	50.3 29.1	400	29.1	8.20
MH□□□□□180-12	18.5	1475	230 400 [3)]	58.8 34.0	400	34.0	8.40
MH□□□□□180-32	22.0	1470	230 400 [3)]	68.9 39.8	400	39.8	7.80
MH□□□□□200-22	30.0	1465	230 400 [3)]	93.8 53.9	400	53.9	7.00

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1)]	m [1)]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	5.08	12.0	12.1	0.84	79.6	79.6	28.0	11.0
MH□□□□□090-12	7.35	20.3	24.2	0.76	81.6	82.0	32.0	16.0
MH□□□□□090-32	10.0	33.0	34.0	0.76	83.4	82.8	36.0	18.0
MH□□□□□100-12	14.5	48.0	55.0	0.80	86.7	86.3	61.0	24.0
MH□□□□□100-32	19.8	67.0	76.0	0.73	85.6	85.5	66.0	26.5
MH□□□□□112-22	26.3	81.0	100	0.80	88.2	88.3	135	38.0
MH□□□□□132-12	35.7	90.0	108	0.77	89.3	89.2	290	59.0
MH□□□□□132-22	49.1	110	175	0.79	88.9	88.7	336	66.0
MH□□□□□160-22	71.5	164	243	0.82	89.8	89.8	570	109
MH□□□□□160-32	97.4	224	292	0.82	90.6	90.6	760	124
MH□□□□□180-12	120	359	371	0.86	91.2	91.2	1390	175
MH□□□□□180-32	143	400	372	0.87	91.6	91.6	1440	180
MH□□□□□200-22	196	469	469	0.87	92.3	92.3	1850	315

[1)] Without accessories
[2)] Operation at 87 Hz is possible with 4-pole motors whose ratings at 50 Hz include voltage values of Δ 230 V.
For motor sizes 132-12 to 200-22, the necessary voltage must also be indicated.
[3)] Star/delta start-up at 400 V possible.

Rated frequency 60 Hz

	P_N	n_N	$U_{N,\Delta}$ [-1)]	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$	I_a / I_N
			± 10 %		± 10 %		
	[kW]	[r/min]	[V]	[A]	[V]	[A]	
MH□□□□□080-32	0.92	1710	277	3.10	480	1.80	5.40
MH□□□□□090-12	1.30	1730	277	4.60	480	2.70	5.80
MH□□□□□090-32	1.80	1735	277	5.80	480	3.30	6.70
MH□□□□□100-12	2.60	1745	277	8.60	480	5.00	6.40
MH□□□□□100-32	3.60	1745	277	12.1	480	7.00	7.00
MH□□□□□112-22	4.80	1755	277	14.5	480	8.40	6.40
MH□□□□□132-12	6.60	1770	277 480 [3)]	20.6 11.9	480	11.9	6.50
MH□□□□□132-22	9.00	1760	277 480 [3)]	27.0 15.6	480	15.6	9.10
MH□□□□□160-22	13.2	1770	277 480 [3)]	37.7 21.8	480	21.8	8.60
MH□□□□□160-32	18.0	1770	277 480 [3)]	50.3 29.1	480	29.1	9.10
MH□□□□□180-12	22.2	1775	277 480 [3)]	58.8 34.0	480	34.0	8.90
MH□□□□□180-32	26.4	1770	277 480 [3)]	68.9 39.8	480	39.8	8.20
MH□□□□□200-22	36.0	1765	277 480 [3)]	93.8 53.9	480	53.9	7.40

	M_N	M_a	M_b	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J [1)]	m [1)]
	[Nm]	[Nm]	[Nm]		[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	5.14	12.6	13.3	0.84	82.5	82.5	28.0	11.0
MH□□□□□090-12	7.18	22.0	26.0	0.76	84.0	84.0	32.0	16.0
MH□□□□□090-32	9.91	35.0	37.0	0.76	84.3	84.0	36.0	18.0
MH□□□□□100-12	14.2	52.0	60.0	0.80	87.5	87.5	61.0	24.0
MH□□□□□100-32	19.7	73.0	84.0	0.73	87.8	87.5	66.0	26.5
MH□□□□□112-22	26.1	90.0	110	0.80	89.5	89.5	135	38.0
MH□□□□□132-12	35.6	97.0	120	0.77	89.5	90.3	290	59.0
MH□□□□□132-22	48.8	120	192	0.79	89.5	89.5	336	66.0
MH□□□□□160-22	71.2	171	256	0.81	90.9	90.9	570	109
MH□□□□□160-32	97.1	243	301	0.82	91.3	91.3	760	124
MH□□□□□180-12	119	370	382	0.86	91.8	91.8	1390	175
MH□□□□□180-32	142	413	384	0.87	92.3	92.3	1440	180
MH□□□□□200-22	195	487	604	0.87	92.7	92.7	1850	315

[1)] Without accessories
[2)] Operation at 87 Hz is possible with 4-pole motors whose ratings at 60 Hz include voltage values of Δ 277 V.
For motor sizes 132-12 to 200-22, the necessary voltage must also be indicated.
[3)] Star/delta start-up at 480 V possible.

Rated frequency 87 Hz

	P_N	n_N	M_N	M_{max}	$U_{N,\Delta}$	$I_{N,\Delta}$	cos φ	$\eta_{75\,\%}$	$\eta_{100\,\%}$	J	m
					± 10 %						
	[kW]	[r/min]	[Nm]	[Nm]	[V]	[A]		[%]	[%]	[kgcm²]	[kg]
MH□□□□□080-32	1.35	2520	5.12	20.0	400	3.10	0.84	81.6	83.5	28.0	11.0
MH□□□□□090-12	2.00	2540	7.52	30.0	400	4.60	0.78	54.9	86.5	32.0	16.0
MH□□□□□090-32	2.70	2545	10.1	40.0	400	5.80	0.76	85.5	86.0	36.0	18.0
MH□□□□□100-12	3.90	2555	14.6	60.0	400	8.60	0.83	89.6	90.0	61.0	24.0
MH□□□□□100-32	5.40	2555	20.2	80.0	400	12.1	0.76	87.9	88.5	66.0	26.5
MH□□□□□112-22	7.10	2565	26.4	106	400	14.5	0.83	90.2	90.9	135	38.0
MH□□□□□132-12	9.70	2580	35.9	144	400	20.6	0.82	91.4	91.8	290	59.0
MH□□□□□132-22	13.2	2570	49.1	196	400	27.0	0.82	90.1	90.7	336	66.0
MH□□□□□160-22	19.4	2580	71.8	287	400	37.7	0.81	91.6	91.6	570	109
MH□□□□□160-32	26.4	2580	97.7	391	400	50.3	0.81	91.6	91.6	760	124
MH□□□□□180-12	32.5	2585	120	480	400	58.8	0.86	92.8	92.8	1390	175
MH□□□□□180-32	38.7	2580	143	573	400	68.9	0.87	93.4	93.4	1440	180
MH□□□□□200-22	52.7	2575	196	782	400	93.8	0.87	93.2	93.2	1850	315

[1] Without accessories

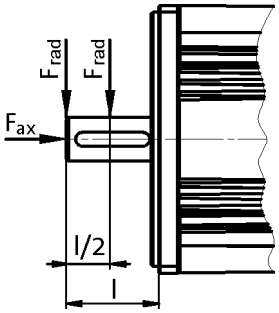
Rated frequency 120 Hz

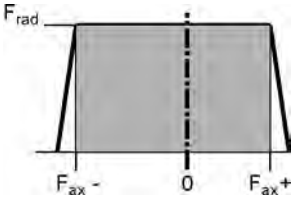
	P_N	n_N	$U_{N,\Delta}$	$I_{N,\Delta}$	$U_{N,Y}$	$I_{N,Y}$
			± 10 %		± 10 %	
	[kW]	[r/min]	[V]	[A]	[V]	[A]
MF□□□□□063-32	0.55	3440	200	3.20	345	1.80
MF□□□□□063-42	0.75	3400	210	4.00	370	2.30
MF□□□□□071-32	1.10	3490	200	5.50	345	3.20
MF□□□□□071-42	1.50	3450	205	6.80	360	3.90
MF□□□□□080-32	2.20	3500	200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

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

[1] Without accessories

Average speed 2000 r/min





Application of force at l/2

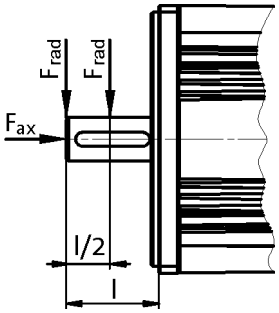
	Bearing service life L_{10}											
	10000 h			20000 h			30000 h			50000 h		
	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$	F_{rad}	$F_{ax,-}$	$F_{ax,+}$
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
063	**600**	-600	300	**470**	-480	180	**410**	-430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

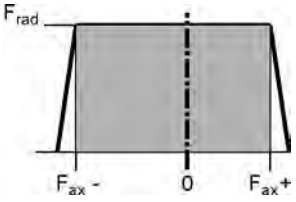
Application of force at l

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

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

Average speed 3500 r/min





Application of force at l/2

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

Application of force at l

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

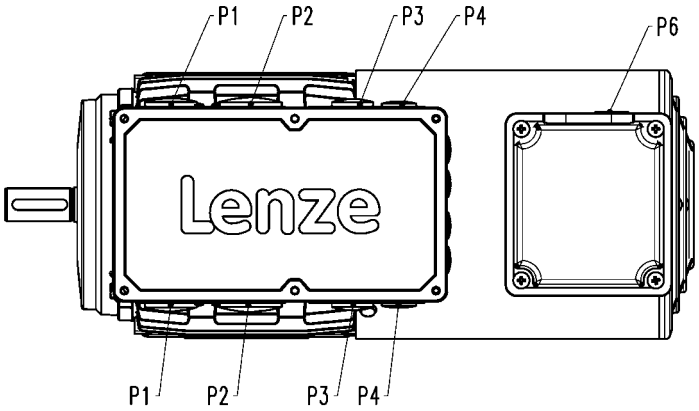
- The values for the bearing service life L_{10} refer to an average speed of 3500 r/min. Depending on the ambient temperatures, the service life of the bearings is also reduced by the grease lifetime.
- Data for axial forces relate to the maximum radial force with the corresponding bearing service life.

MD/MH three-phase AC motors are designed for operation on a fixed mains and for inverter operation.
For operation at 50 Hz, the motors should be operated in a Δconnection at 230 V or in a star connection at 400 V.
For inverter operation, the base frequency has been set at 87 Hz at a rated voltage of 400 V in a Δconnection.

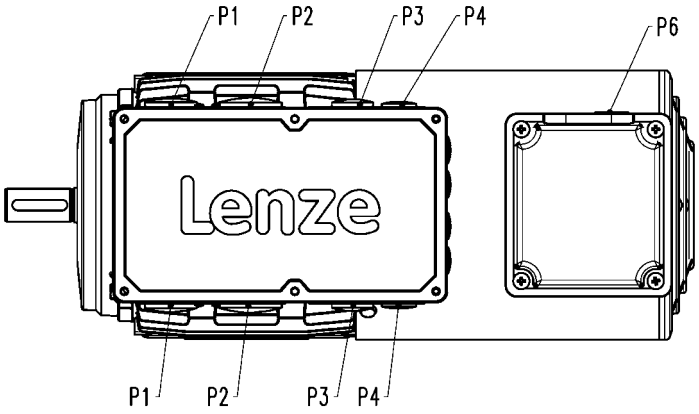
MF three-phase AC motors are designed exclusively for inverter operation. At a base frequency of 120 Hz, the rated voltage has been set to approx. 200 V in a delta connection (up to 2.2 kW) and approx. 350 V in a star connection.

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

Cable glands on terminal box



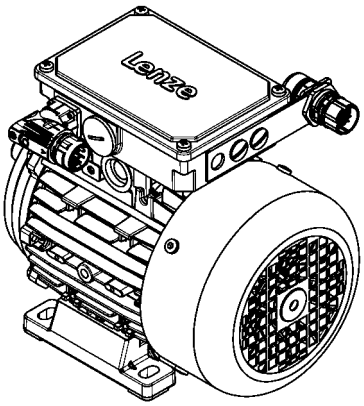
Motor type	M□□MAXX M□□MABR M□□MARS M□□MAIG M□□MAAG				M□□MABS M□□MABI M□□MABA			
	P_1	P_2	P_3	P_4	P_1	P_2	P_3	P_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	M16x1.5	M20x1.5						
071								
080	M20x1.5	M25x1.5			M25x1.5	M32x1.5		
090								
100							M20x1.5	M16x1.5
112								
132	M25x1.5	M32x1.5						
160	M50x1.5	M16x1.5	M20x1.5	M16x1.5	M50x1.5	M16x1.5		
180								
200								



Motor type	M□□MAXX M□□MABR M□□MARS M□□MAIG M□□MAAG					M□□MABS M□□MABI M□□MABA				
	P_1	P_2	P_3	P_4	P_6	P_1	P_2	P_3	P_4	P_6
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	M16x1.5	M20x1.5			M16x1.5	M25x1.5	M32x1.5	M20x1.5	M16x1.5	M16x1.5
071										
080	M20x1.5	M25x1.5								
090										
100										
112										
132	M25x1.5	M32x1.5	M20x1.5	M16x1.5						
160	M50x1.5	M16x1.5				M50x1.5	M16x1.5			
180										
200										

Motor terminal box with ICN connector

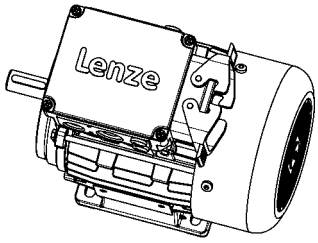
The connectors can be rotated through 270° and fitted with a bayonet fixing. As the connector fixing is also compatible with conventional union nuts, existing mating connectors can continue to be used without difficulty. The motor connection is determined in the terminal box and must be checked before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



Design			ICN 6-pole	ICN 8-pole
Number of power contacts			3	
Number of earthing contacts			1	
Number of signalling contacts Brake/rectifier supply voltage			2	
TKO thermal contacts supply voltage				2
Max. current	I_{max}	[A]	20.0	
Socket identifier for Lenze system cables Counter plug			M04	M08

Motor terminal box with HAN-10 E connector

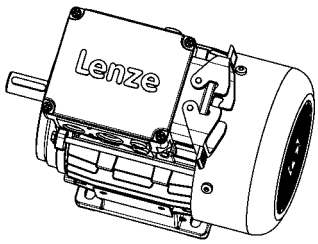
In the case of the rectangular HAN-10E plug-in connectors, all six ends of the three winding phases are taken out to the power contacts. The motor circuit is therefore determined in the mating connector.



Design			HAN-10E
Number of power contacts			6
Number of earthing contacts			1
Number of signalling contacts Brake/rectifier supply voltage TKO thermal contacts supply voltage			2 2
Max. current	I_{max}	[A]	16.0
Socket identifier for Lenze system cables Counter plug			H10 ... H13

Motor terminal box with HAN modular connector

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

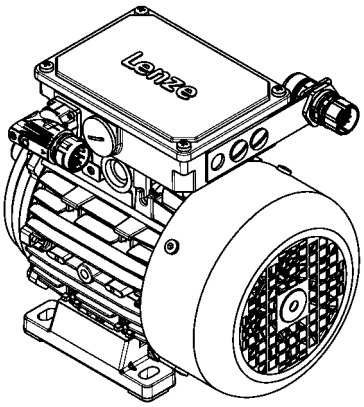


Design			HAN modular
Number of power contacts			3
Number of earthing contacts			1
Number of signalling contacts Brake/rectifier supply voltage Rectifier DC switching contacts supply voltage TKO thermal contacts supply voltage			2 2 2
Max. current	I_{max}	[A]	16.0 40.0
Socket identifier for Lenze system cables Counter plug			H07 ... H09

Connector for feedback

ICN connector

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



Design		Resolver	Incremental encoder SinCos absolute value encoder
Number of signalling contacts		12	
Coding	[°]	0	20
Socket identifier for Lenze system cables Counter plug		F05	F06

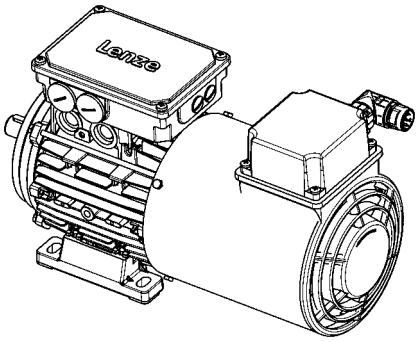
Connector for IG128-24V-H

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

Design		Incremental encoder IG128-24V-H
Number of signalling contacts		4
Coding	[°]	0

ICN connector for blower

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



Design	Blower 1-ph	Blower 3-ph
Number of power contacts	6	
Number of earthing contacts	1	
Socket identifier for Lenze system cables Counter plug	L04	L06

Features and assignments

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

Features

Versions
- **Standard**

1 x 10^6 Repeating switching cycles
1 x 10^6 Reversing switching cycles
- **LongLife**

10 x 10^6 Repeating switching cycles
15 x 10^6 Reversing switching cycles

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

Enclosure
- Without manual release IP55
- With manual release IP54

Friction lining
- Non-asbestos, low wearing

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

Motor – brake assignment

Type	Standard		LongLife	
	Size	rated torque	Size	rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
MD□□□□□063-12 **MD□□□□□063-32** **MD□□□□□063-42** **MF□□□□□063-32** **MF□□□□□063-42**	**06** **06**	2.50 4.00	**06**	4.00
MD□□□□□071-12 **MD□□□□□071-32** **MF□□□□□071-32**	**06** **06** **08**	2.50 4.00 3.50	**06** **08**	4.00 3.50
MD□□□□□071-42 **MF□□□□□071-42**	**06** **06** **08** **08**	2.50 4.00 3.50 8.00	**06** **08** **08**	4.00 3.50 8.00
MD□□□□□080-12 **MD□□□□□080-32** **MH□□□□□080-32** **MF□□□□□080-32**	**08** **08** **10**	3.50 8.00 7.00	**08** **10**	8.00 7.00
MD□□□□□080-42 **MF□□□□□080-42**	**08** **08** **10** **10**	3.50 8.00 7.00 16.0	**08** **10** **10**	8.00 7.00 16.0

Type	Standard		LongLife	
	Size	rated torque	Size	rated torque
	Brake		Brake	
		M_k		M_k
		[Nm]		[Nm]
MD□□□□□090-12	**08**	3.50		
MD□□□□□090-32	**08**	8.00	**08**	8.00
MH□□□□□090-12	**10**	7.00	**10**	7.00
MH□□□□□090-32	**10**	16.0	**10**	16.0
MF□□□□□090-32	**10**	23.0		
MD□□□□□100-12	**10**	7.00		
MH□□□□□100-12	**10**	16.0		
MF□□□□□100-12	**12**	14.0		
	12	32.0	**10**	16.0
MD□□□□□100-32	**10**	7.00	**12**	14.0
MH□□□□□100-32	**10**	16.0	**12**	32.0
MF□□□□□100-32	**12**	14.0		
	12	32.0		
	12	46.0		
MD□□□□□112-22	**12**	14.0		
MH□□□□□112-22	**12**	32.0		
MF□□□□□112-22	**14**	35.0		
	14	60.0		
MD□□□□□132-12				
MD□□□□□132-22	**14**	35.0		
MH□□□□□132-12	**14**	60.0		
MH□□□□□132-22	**16**	60.0		
MF□□□□□132-12	**16**	80.0		
MF□□□□□132-22	**16**	100		
MF□□□□□132-32				
MD□□□□□160-22	**16**	60.0		
MH□□□□□160-22	**16**	80.0		
	18	80.0		
	18	150		
MD□□□□□160-32	**18**	80.0		
MH□□□□□160-32	**18**	150		
	18	200		
MD□□□□□180-12	**18**	80.0		
MH□□□□□180-12	**18**	150		
	20	145		
	20	260		
MD□□□□□180-32	**18**	80.0		
MH□□□□□180-32	**18**	150		
	20	145		
	20	260		
	20	315		
MH□□□□□200-22	**18**	80.0		
	18	150		
	20	145		
	20	260		
	20	315		
	20	400		

Brake connection

Direct connection without rectifier

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

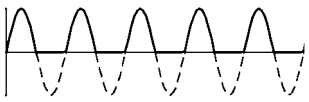
- Supply voltages
  DC 24 V
  DC 180 V
  DC 205 V

Connection via mains voltage with brake rectifier

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

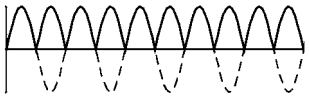
Half-wave rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage = 2.22
- Approved by UL/CSA
- Supply voltages
  AC 230 V
  AC 277 V
  AC 400 V
  AC 460 V
  AC 480 V



Bridge rectifier, 6-pole

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



Bridge/half-wave rectifier, 6-pole

- Ratio of supply voltage to brake coil voltage
  up to overexcitation time = 1.11
  beyond overexcitation time = 2.22

Supply voltages:

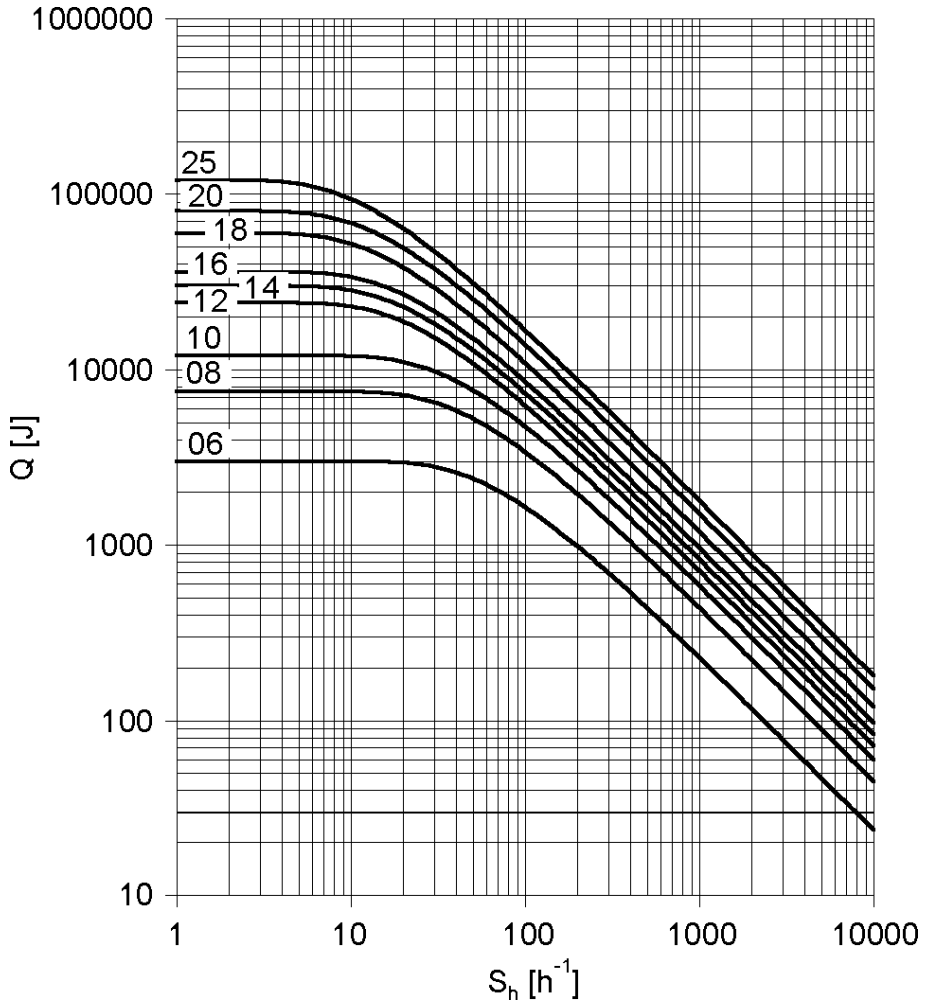
- AC 230 V
- AC 277 V
- AC 400 V

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

- **Short-time overexcitation of the brake coil**
  Activating the brake coil for the overexcitation time $t_{ü}$ with twice the rated voltage allows the disengagement time to be reduced. The brake opens more quickly and wear on the friction lining is reduced.
  These features make this activation version particularly suitable for lifting applications. It is therefore only available in combination with a brake with increased braking torque.

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

Permissible friction energy



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

Brake data, reduced braking torque

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

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

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

Activation via half-wave or bridge rectifier

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

Activation via bridge/half-wave rectifier

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

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

Brake data, standard braking torque

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

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

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

Activation via half-wave or bridge rectifier

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

Activation via bridge/half-wave rectifier

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

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

Brake data, increased braking torque

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

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

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

Activation via half-wave or bridge rectifier

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

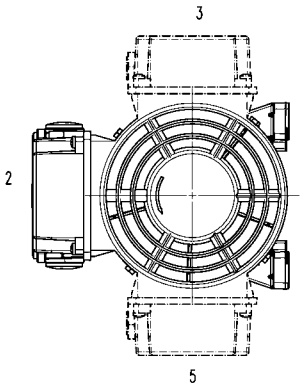
Activation via bridge/half-wave rectifier

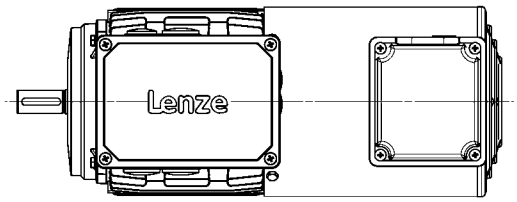
Design			Holding current reduction (cold brake)									
Size			**10**	**12**	**14**	**16**		**18**	**20**		**25**	
Friction energy	Q_{BW}	[MJ]	198	353	253	563	241	578	1596	580	2465	1409
Overexcitation time	$t_{ü}$	[ms]	300			1300						
Min. rest time	t	[ms]	900			3900						
Delay time Engaging	t_{11}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

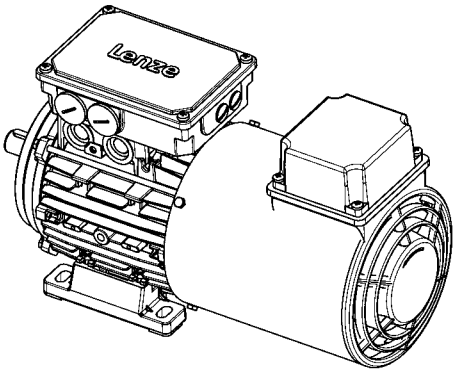
Design			Over-excitation									
Size			**10**	**12**	**14**	**16**		**18**	**20**		**25**	
Friction energy	Q_{BW}	[MJ]	264	706	761	966		1542	2322		3522	
Overexcitation time	$t_{ü}$	[ms]	300			1300						
Min. rest time	t	[ms]	900			3900						
Delay time Engaging	t_{11}	[ms]	29.0	54.0	31.0	70.0	46.0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

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

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







Blower data 50 Hz

	Number of phases	Connection method					
			U_{min}	U_{max}	P_{max}	I_{max}	m
			[V]	[V]	[kW]	[A]	[kg]
063	1		230	277	0.027	0.10	2.00
	3	Δ	220	290	0.029		
		Y	380	500		0.050	
071	1		230	277	0.028	0.10	2.10
	3	Δ	220	290	0.030		
		Y	380	500		0.050	
080	1		230	277	0.029	0.11	2.30
	3	Δ	220	290	0.031	0.10	
		Y	380	500		0.050	
090	1		220	277	0.082	0.30	2.70
	3	Δ		290	0.097	0.34	
		Y	380	500		0.19	
100	1		220	277	0.086	0.31	3.00
	3	Δ		290	0.10	0.35	
		Y	380	500		0.19	
112	1		220	277	0.085	0.31	3.10
	3	Δ		290	0.095	0.33	
		Y	380	500		0.18	

	Number of phases	Connection method					
			U_{min}	U_{max}	P_{max}	I_{max}	m
			[V]	[V]	[kW]	[A]	[kg]
132	1		230	277	0.12	0.40	4.20
	3	Δ	220	290	0.14	0.45	
		Y	380	500		0.24	
160	1		230	277	0.24	0.96	6.20
	3	Δ	220	290	0.22	0.76	
		Y	380	500		0.43	
180	1		230	277	0.24	0.96	8.00
	3	Δ	220	290	0.22	0.76	
		Y	380	500		0.43	
200	1		230	277	0.24	0.96	
	3	Δ	220	290	0.22	0.76	
		Y	380	500		0.43	

Blower data 60 Hz

	Number of phases	Connection method					
			U_{min}	U_{max}	P_{max}	I_{max}	m
			[V]	[V]	[kW]	[A]	[kg]
063	1		230	277	0.038	0.11	2.00
	3	Δ	220	332	0.032		
		Y	380	575		0.060	
071	1		230	277	0.041	0.12	2.10
	3	Δ	220	332	0.033	0.10	
		Y	380	575		0.060	
080	1		230	277	0.044	0.13	2.30
	3	Δ	220	332	0.034	0.10	
		Y	380	575		0.060	
090	1		220	277	0.070	0.25	2.70
	3	Δ		332	0.10	0.30	
		Y	380	575		0.18	
100	1		220	277	0.079	0.29	3.00
	3	Δ		332	0.10	0.32	
		Y	380	575		0.18	
112	1		220	277	0.095	0.39	3.10
	3	Δ		332	0.10	0.31	
		Y	380	575		0.18	
132	1		230	277	0.18	0.59	4.20
	3	Δ	220	332	0.15	0.41	
		Y	380	575		0.24	
160		Δ	220	332	0.28	0.94	6.20
		Y	380	575		0.56	
180		Δ	220	332		0.94	8.00
		Y	380	575		0.56	
200		Δ	220	332		0.94	
		Y	380	575		0.56	

Tailored to meet the requirements of the various applications and necessary accuracies, the following feedback systems are available.

Resolver

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

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

Incremental encoder and SinCos absolute value encoder

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

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

Servo inverter
- Servo Drives 9400 (E94A)
- 9300 servo inverter (EVS93)
- ECS servo system (ECS)

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

TKO thermal contacts

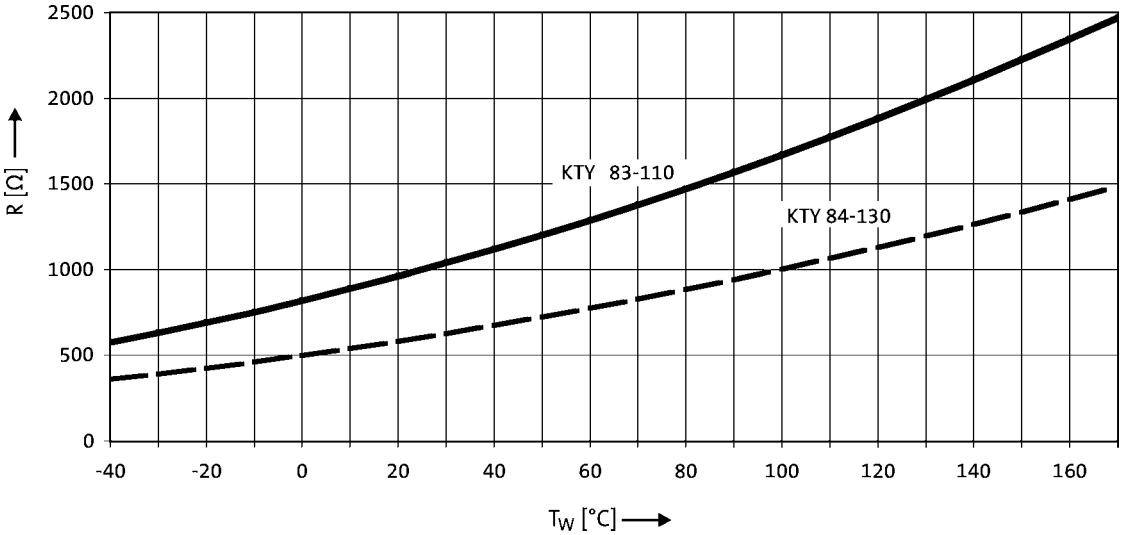
Function	Operating temperature	Min. reset temperature	Max. reset temperature	Max. input current	Max. input voltage
					AC
	T	T_{min}	T_{max}	$I_{in,max}$	$U_{in,max}$
	-5 ... 5				
	[°C]	[°C]	[°C]	[A]	[V]
NC contact	150	90.0	135	2.50	250

PTC thermistor

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

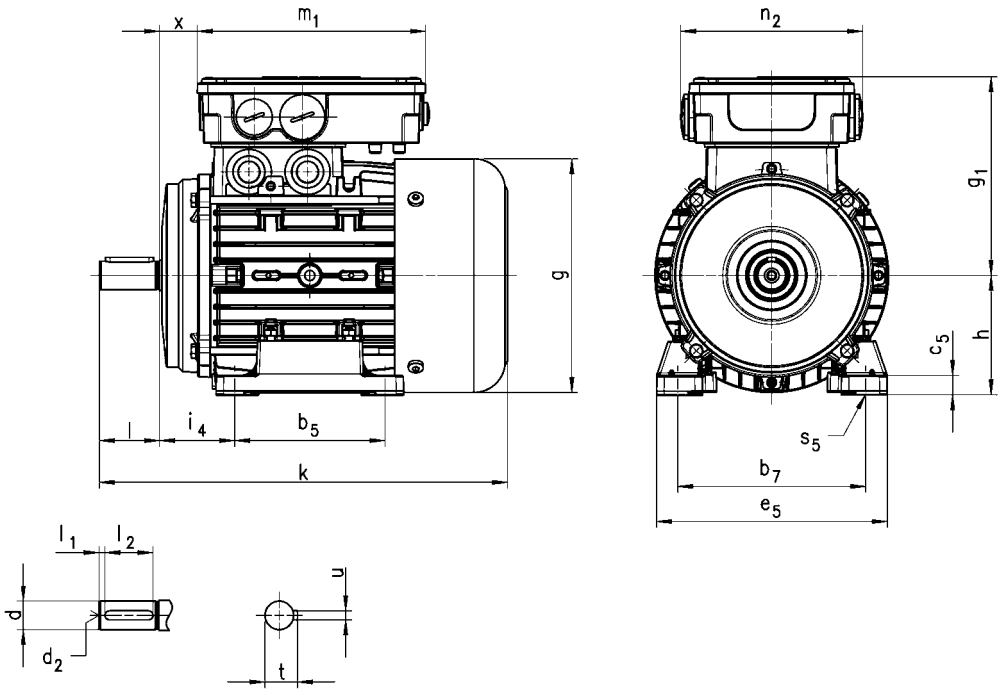
KTY continuous temperature sensor

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



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

Design B3



Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	271	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	311	176	137	29.0			373	176	137	29.0		
100	382	194	147	36.0			463	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125
160	598 [1]	310	210	65.0	226	127	703 [1]	313	210	65.0	226	127
	642 [2]						747 [2]					
180	669	348	230	75.0			784	351	230	75.0		

[1] 160-22
[2] 160-32

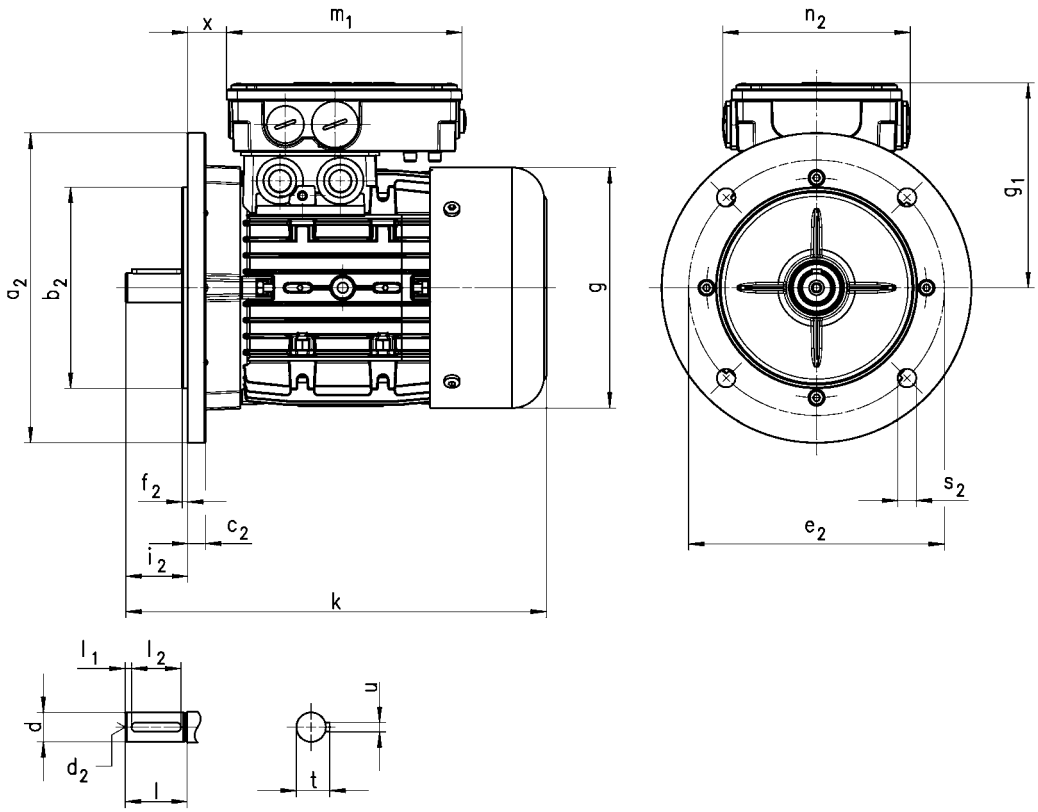
Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			341	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	392	178	137	29.0			410	176	147	28.0		
100	463	196	147	36.0			483	194	158	35.0		
112	472	220	158	38.0			512	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		
160	691 [1]	313	210	65.0	226	127	789 [1]	313	210	65.0	226	127
	735 [2]						833 [2]					
180	750	351	230	75.0			863	351	230	75.0		

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10.0	7.0
071	112	45	90	134	71	10.5	
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	
160	254	108	210 [1]	305	160	22.0	14.5
			254 [2]				
180	279	121	241 [3]	350	180	23.0	
			279 [4]				

[1] 160-22
[2] 160-32
[3] 180-12
[4] 180-32

Design B5



Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	271	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	311	176	137	29.0			373	176	137	29.0		
100	382	194	147	36.0			463	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125
160	598 [1]	310	210	65.0	226	127	703 [1]	313	210	65.0	226	127
	642 [2]						747 [2]					
180	669	348	230	75.0			784	351	230	75.0		

[1] 160-22
[2] 160-32

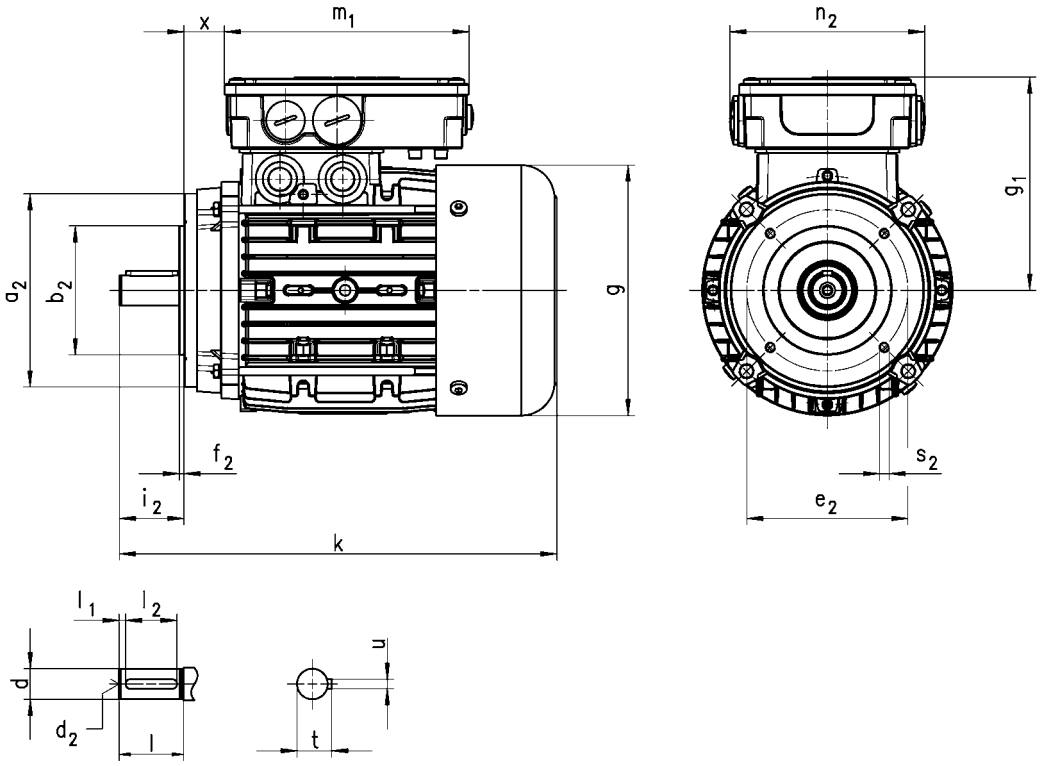
Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			341	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	392	178	137	29.0			410	176	147	28.0		
100	463	196	147	36.0			483	194	158	35.0		
112	472	220	158	38.0			512	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		
160	691 [1]	313	210	65.0	226	127	789 [1]	313	210	65.0	226	127
	735 [2]						833 [2]					
180	750	351	230	75.0			863	351	230	75.0		

[1] 160-22
[2] 160-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23
071	FF130	160	110		130	3.5		30
080	FF165	200	130	11	165		12.0	40
090								50
100	FF215	250	180	15	215	4.0	14.5	60
112								
132	FF265	300	230	20	265			80
160	FF300	350	250	13	300	5.0	18.5	110
180								

Design B14



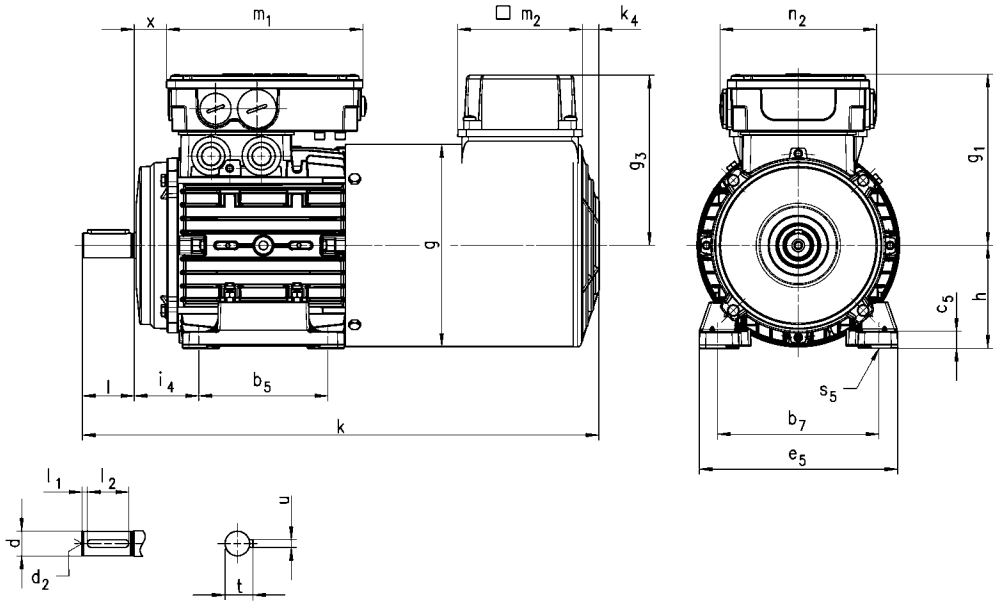
Motor type	MDEMAXX						MDEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	271	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	311	176	137	29.0			373	176	137	29.0		
100	382	194	147	36.0			463	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		

Motor type	MDEMARS MDEMAIG MDEMAAG						MDEMABS MDEMABI MDEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			341	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	392	178	137	29.0			410	176	147	28.0		
100	463	196	147	36.0			483	194	158	35.0		
112	472	220	158	38.0			512	218	168	37.0		

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

	Flange size							
		a_2	b_2	e_2	f_2	s_2	i_2	
			j6				-0.6 ... 0.5	
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
063	FT75	90	60	75	2.5	M5x10	23	
071	FT85	105	70	85		M6x10	30	
080	FT100	120	80	100	3.0	M6x12	40	
	FT130	160	110	130	3.5	M8x14		
090	FT115	140	95	115	3.0	M8x16	50	
	FT130	160	110	130	3.5			
100						M8x14	60	
112						M8x16		

Design B3



Motor type	MDFMAXX									MDFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	434	176	137	29.0			141	22	95	487	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	
160	747 [1]	309	210	65.0	226	127	209	31	96	777 [1]	309	210	65.0	226	127	209	31	96
	791 [2]									821 [2]								
180	820	348	230	75.0						871	348	230	75.0					

[1] 160-22
[2] 160-32

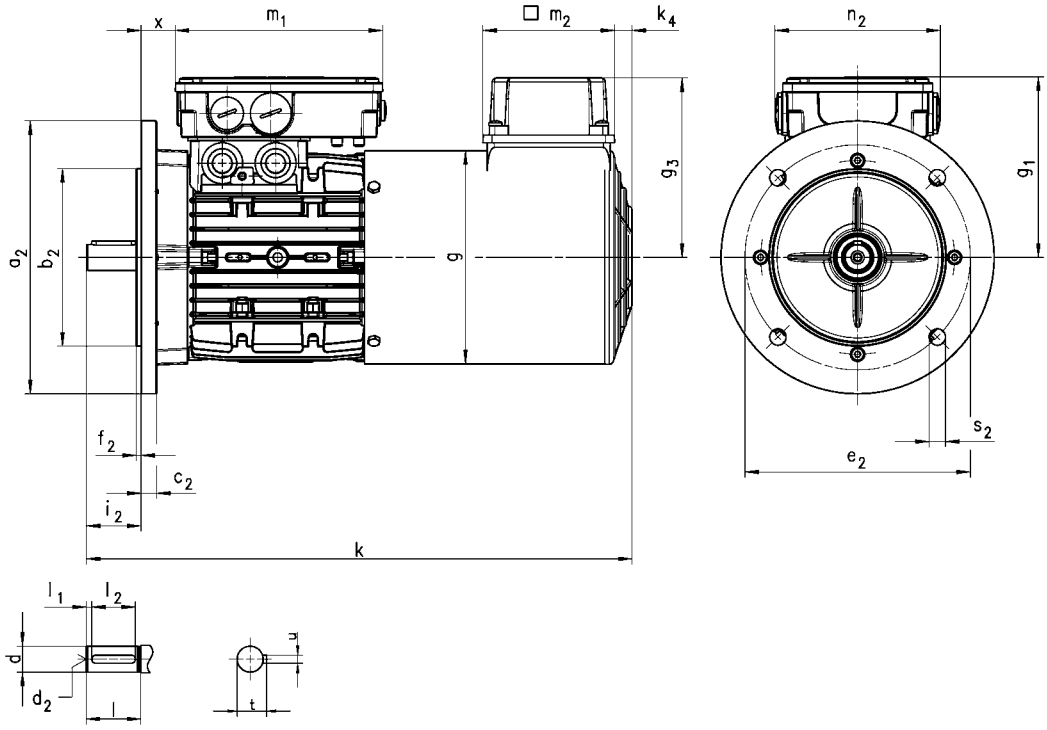
Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	434	176	137	29.0			141	22	95	487	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	
160	822 [1]	309	210	65.0	226	127	209	31	96	777 [1]	309	210	65.0	226	127	209	31	96
	866 [2]									821 [2]								
180	886	348	230	75.0						931	348	230	75.0					

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10.0	7.0
071	112	45	90	134	71	10.5	
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	
160	254	108	210 [1]	305	160	22.0	14.5
			254 [2]				
180	279	121	241 [3]	350	180	23.0	
			279 [4]				

[1] 160-22
[2] 160-32
[3] 180-12
[4] 180-32

Design B5



Motor type	MDFMAXX									MDFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	434	176	137	29.0			141	22	95	487	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	
160	747 [1]	309	210	65.0	226	127	209	31	96	777 [1]	309	210	65.0	226	127	209	31	96
	791 [2]									821 [2]								
180	820	348	230	75.0						871	348	230	75.0					

[1] 160-22
[2] 160-32

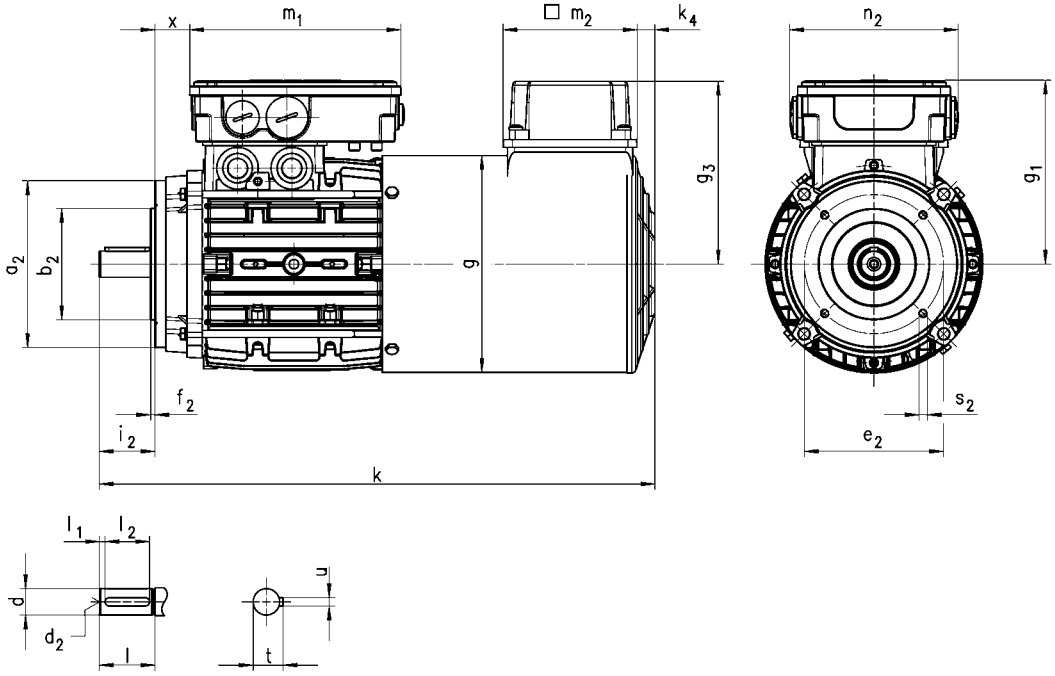
Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	434	176	137	29.0			141	22	95	487	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	
160	822 [1]	309	210	65.0	226	127	209	31	96	777 [1]	309	210	65.0	226	127	209	31	96
	866 [2]									821 [2]								
180	886	348	230	75.0						931	348	230	75.0					

[1] 160-22
[2] 160-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19		M6	40		32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								
132		38	M12	80		70	41.0	10.0
160		42	M16	110		100	45.0	12.0
180		48					51.5	14.0

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23
071	FF130	160	110		130	3.5		30
080	FF165	200	130	11	165		12.0	40
090								50
100	FF215	250	180	15	215	4.0	14.5	60
112								
132	FF265	300	230	20	265			80
160	FF300	350	250	13	300	5.0	18.5	110
180								

Design B14



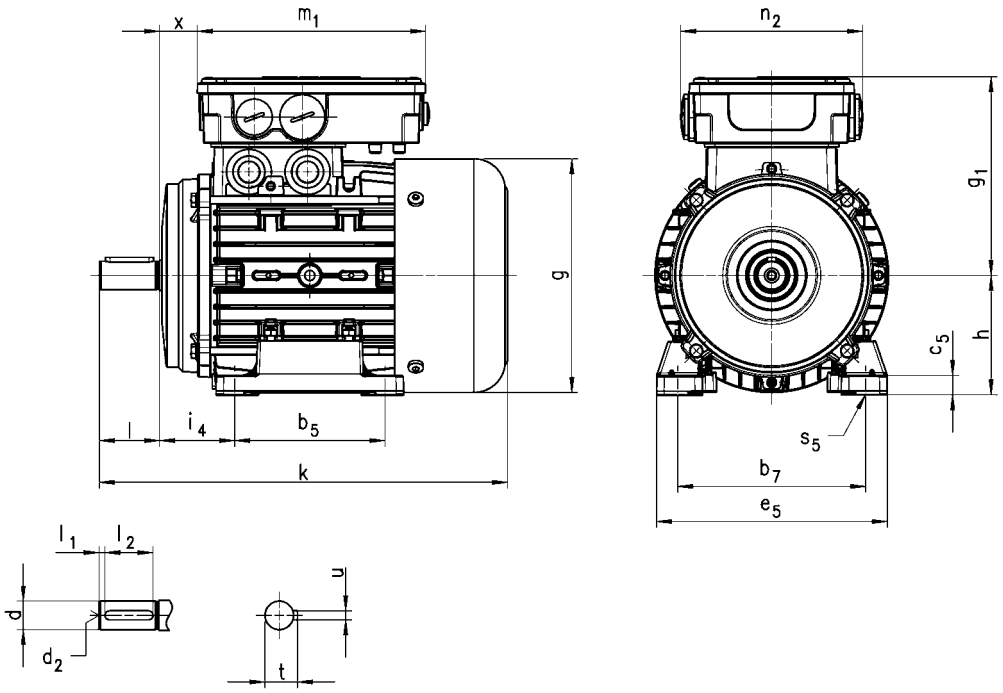
Motor type	MDFMAXX									MDFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	434	176	137	29.0			141	22	95	487	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		

Motor type	MDFMARS MDFMAIG MDFMAAG									MDFMABS MDFMABI MDFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	434	176	137	29.0			141	22	95	487	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		

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

	Flange size							
		a_2	b_2	e_2	f_2	s_2	i_2	
			j6				-0.6 ... 0.5	
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
063	FT75	90	60	75	2.5	M5x10	23	
071	FT85	105	70	85		M6x10	30	
080	FT100	120	80	100	3.0	M6x12	40	
	FT130	160	110	130	3.5	M8x14		
090	FT115	140	95	115	3.0	M8x16	50	
	FT130	160	110	130	3.5			
100						M8x14	60	
112						M8x16		

Design B3



Motor type	MHEMAXX						MHEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	331	176	137	29.0			399	176	137	29.0		
100	382 [1]	194	147	36.0			463 [1]	194	147	36.0		
	397 [2]						489 [2]					
112	436	218	158	38.0			526	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125
160	598 [3]	310	210	65.0	226	127	703 [3]	313	210	65.0	226	127
	642 [4]						747 [4]					
180	669	348	230	75.0			784	351	230	75.0		
200	728	351					841					

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

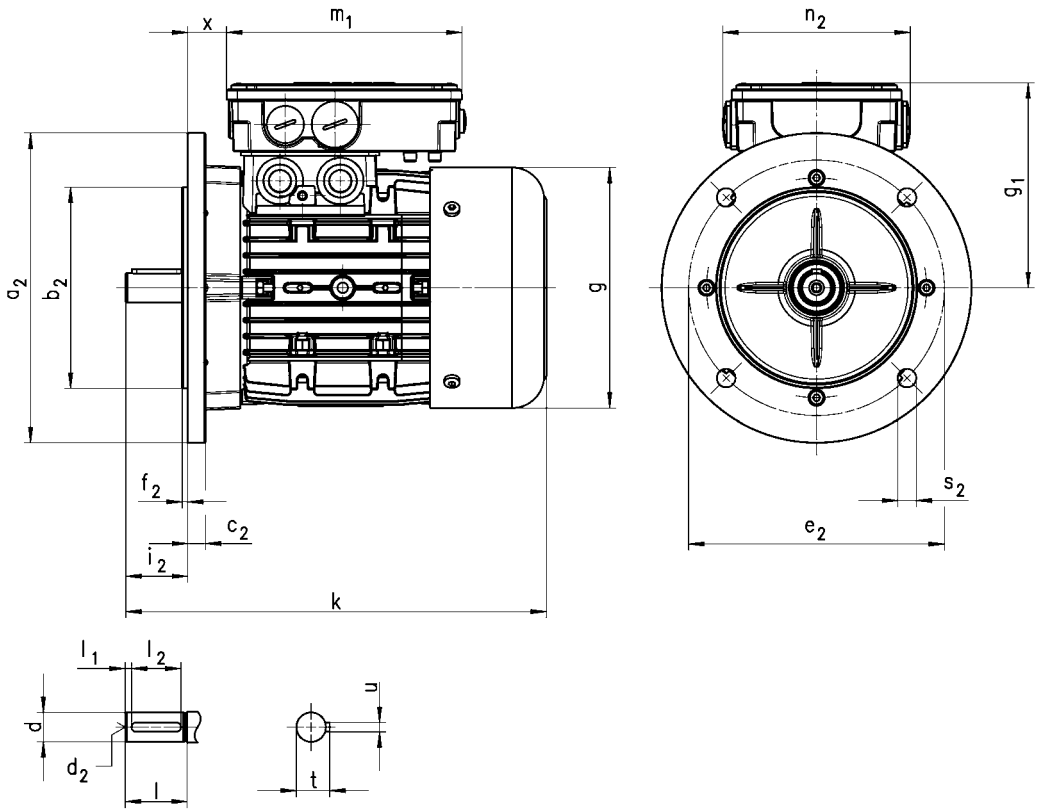
Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	158	132	25.0	152	121	383	156	142	24.0	194	125
090	418	178	137	29.0			436	176	147	28.0		
100	463 [1]	196	147	36.0			479 [1]	194	158	35.0		
	478 [2]						494 [2]					
112	516	220	158	38.0			556	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		
160	691 [3]	313	210	65.0	226	127	789 [3]	313	210	65.0	226	127
	735 [4]						833 [4]					
180	750	351	230	75.0			863	351	230	75.0		
200	807						920					

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	
160	254	108	210 [3]	305	160	22.0	14.5
			254 [4]				
180	279	121	241 [5]	350	180	23.0	
			279 [6]				
200	318	133	305	400	200	32.0	18.5

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32
[5] 180-12
[6] 180-32

Design B5



Motor type	MHEMAXX						MHEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	331	176	137	29.0			399	176	137	29.0		
100	382 [1]	194	147	36.0			463 [1]	194	147	36.0		
	397 [2]						489 [2]					
112	436	218	158	38.0			526	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125
160	598 [3]	310	210	65.0	226	127	703 [3]	313	210	65.0	226	127
	642 [4]						747 [4]					
180	669	348	230	75.0			784	351	230	75.0		
200	728	351					841					

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

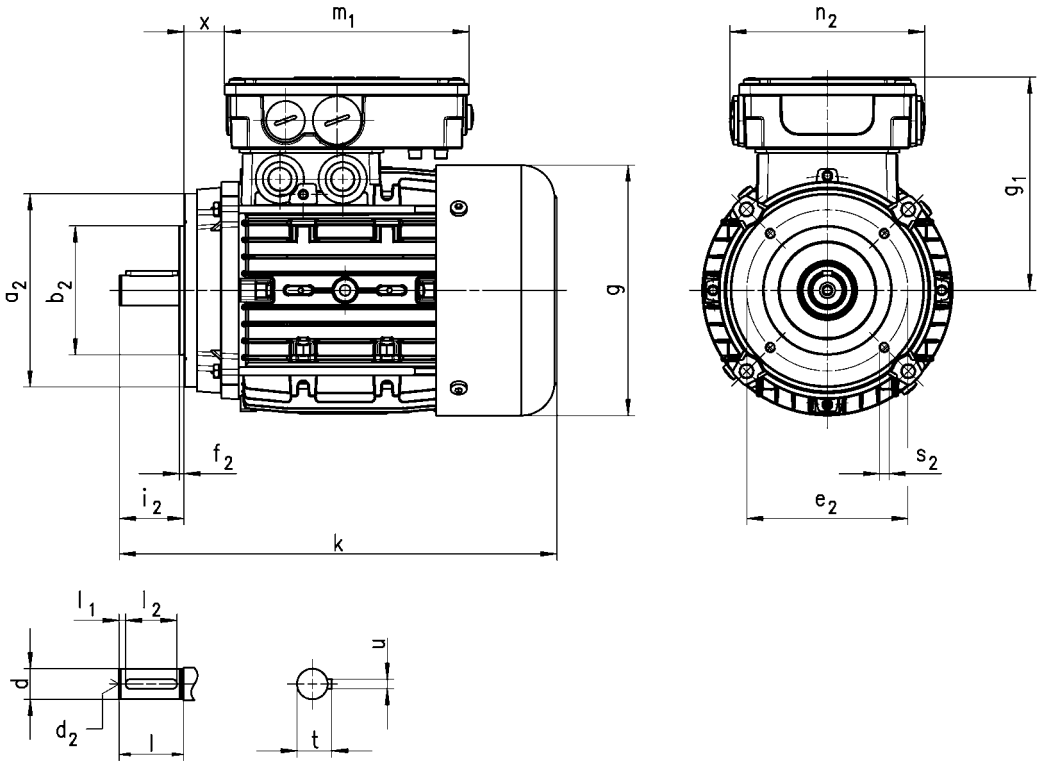
Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	158	132	25.0	152	121	383	156	142	24.0	194	125
090	418	178	137	29.0			436	176	147	28.0		
100	463 [1]	196	147	36.0			479 [1]	194	158	35.0		
	478 [2]						494 [2]					
112	516	220	158	38.0			556	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		
160	691 [3]	313	210	65.0	226	127	789 [3]	313	210	65.0	226	127
	735 [4]						833 [4]					
180	750	351	230	75.0			863	351	230	75.0		
200	807						920					

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0

	Flange size								
		a_2	b_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6	h6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FF165	200	130		11	165	3.5	12.0	40
090									50
100	FF215	250	180		15	215	4.0	14.5	60
112									
132	FF265	300	230		20	265			80
160	FF300	350	250		13	300	5.0	18.5	110
180									
200	FF350	400		300	17	350			

Design B14



Motor type	MHEMAXX						MHEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	331	176	137	29.0			399	176	137	29.0		
100	382 [1]	194	147	36.0			463 [1]	194	147	36.0		
	397 [2]						489 [2]					
112	436	218	158	38.0			526	218	158	38.0		

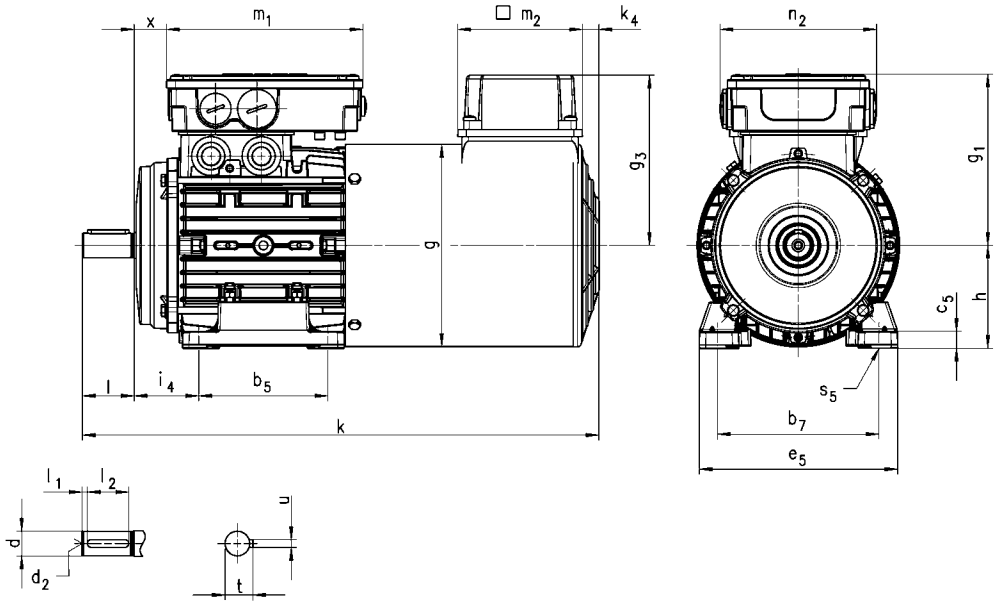
Motor type	MHEMARS MHEMAIG MHEMAAG						MHEMABS MHEMABI MHEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	369	158	132	25.0	152	121	383	156	142	24.0	194	125
090	418	178	137	29.0			436	176	147	28.0		
100	463 [1]	196	147	36.0			479 [1]	194	158	35.0		
	478 [2]						494 [2]					
112	516	220	158	38.0			556	218	168	37.0		

[1] 100-12
[2] 100-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19		M6	40	4.0	32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FT100	120	80	100	3.0	M6x12	40
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50
100	FT130	160	110	130	3.5	M8x14	60
112						M8x16	

Design B3



Motor type	MHFMAXX									MHFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	147	36.0			150		
	506 [2]									567 [2]								
112	538	218	158	38.0			162			619	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	
160	747 [3]	309	210	65.0	226	127	209	31	96	777 [3]	309	210	65.0	226	127	209	31	96
	791 [4]									821 [4]								
180	820	348	230	75.0						871	348	230	75.0					
200	883	351							106	943	351							106

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

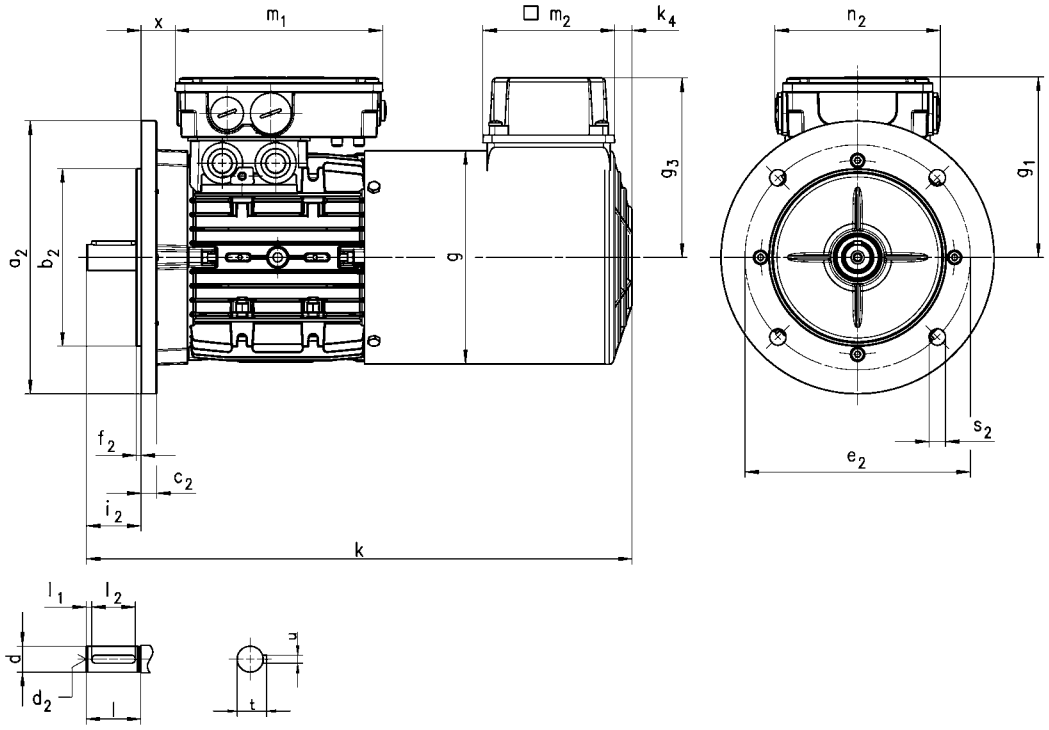
Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0	194	125	132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	158	35.0			150		
	506 [2]									567 [2]								
112	619	218	158	38.0			162			619	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	
160	822 [3]	309	210	65.0	226	127	209	31	96	777 [3]	309	210	65.0	226	127	209	31	96
	866 [4]									821 [4]								
180	886	348	230	75.0						931	348	230	75.0					
200	943	351							106	1003	351							106

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	
160	254	108	210 [3]	305	160	22.0	14.5
			254 [4]				
180	279	121	241 [5]	350	180	23.0	
			279 [6]				
200	318	133	305	400	200	32.0	18.5

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32
[5] 180-12
[6] 180-32

Design B5



Motor type	MHFMAXX									MHFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	147	36.0			150		
	506 [2]									567 [2]								
112	538	218	158	38.0			162			619	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	
160	747 [3]	309	210	65.0	226	127	209	31	96	777 [3]	309	210	65.0	226	127	209	31	96
	791 [4]									821 [4]								
180	820	348	230	75.0						871	348	230	75.0					
200	883	351							106	943	351							106

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

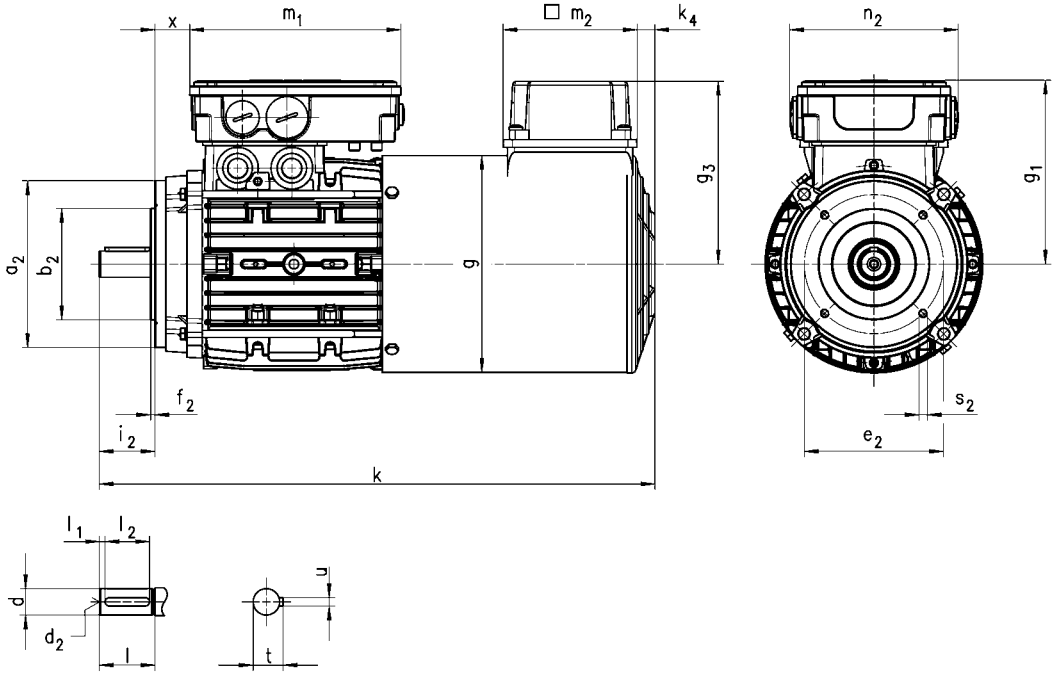
Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0	194	125	132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	158	35.0			150		
	506 [2]									567 [2]								
112	619	218	158	38.0			162			619	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	
160	822 [3]	309	210	65.0	226	127	209	31	96	777 [3]	309	210	65.0	226	127	209	31	96
	866 [4]									821 [4]								
180	886	348	230	75.0						931	348	230	75.0					
200	943	351							106	1003	351							106

[1] 100-12
[2] 100-32
[3] 160-22
[4] 160-32

	d	d	d	d_2	l	l_1	l_2	t	u
	j6	k6	m6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19			M6	40	4.0	32	21.5	6.0
090	24			M8	50	5.0	40	27.0	8.0
100	28			M10	60		50	31.0	
112									
132		38		M12	80		70	41.0	10.0
160		42		M16	110		100	45.0	12.0
180		48						51.5	14.0
200			55	M20				59.0	16.0

	Flange size								
		a_2	b_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6	h6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FF165	200	130		11	165	3.5	12.0	40
090									50
100	FF215	250	180		15	215	4.0	14.5	60
112									
132	FF265	300	230		20	265			80
160	FF300	350	250		13	300	5.0	18.5	110
180									
200	FF350	400		300	17	350			

Design B14



Motor type	MHFMAXX									MHFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	147	36.0			150		
	506 [2]									567 [2]								
112	538	218	158	38.0			162			619	218	158	38.0			162		

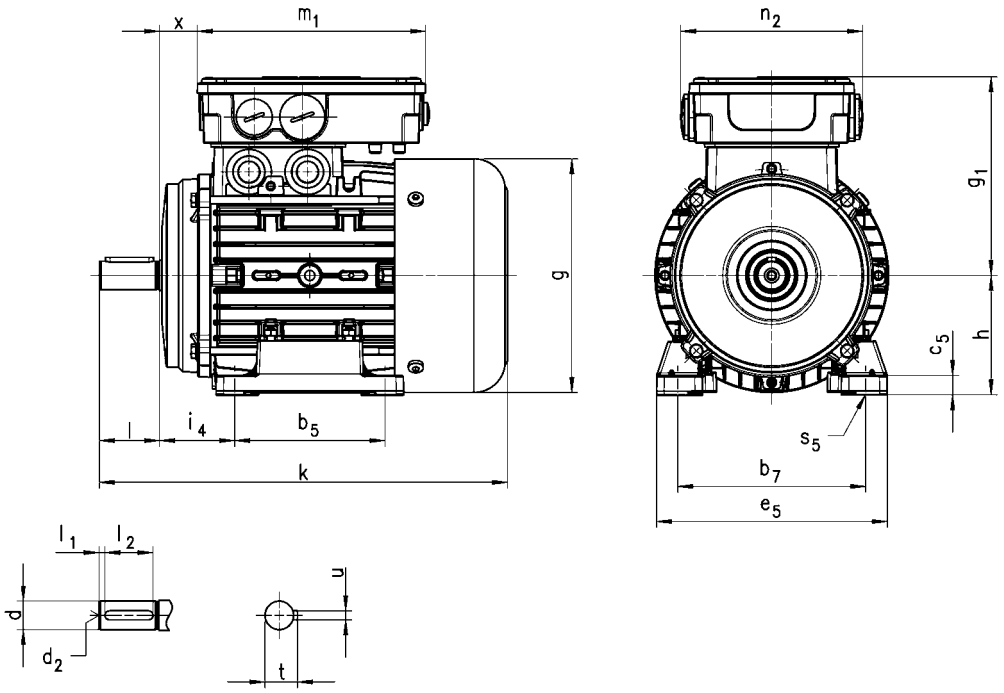
Motor type	MHFMARS MHFMAIG MHFMAAG									MHFMABS MHFMABI MHFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0	194	125	132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491 [1]	194	147	36.0			150			552 [1]	194	158	35.0			150		
	506 [2]									567 [2]								
112	619	218	158	38.0			162			619	218	168	37.0			162		

[1] 100-12
[2] 100-32

	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	19		M6	40	4.0	32	21.5	6.0
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

	Flange size						
		a_2	b_2	e_2	f_2	s_2	i_2
			j6				-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
080	FT100	120	80	100	3.0	M6x12	40
	FT130	160	110	130	3.5	M8x14	
090	FT115	140	95	115	3.0	M8x16	50
100	FT130	160	110	130	3.5	M8x14	60
112						M8x16	

Design B3



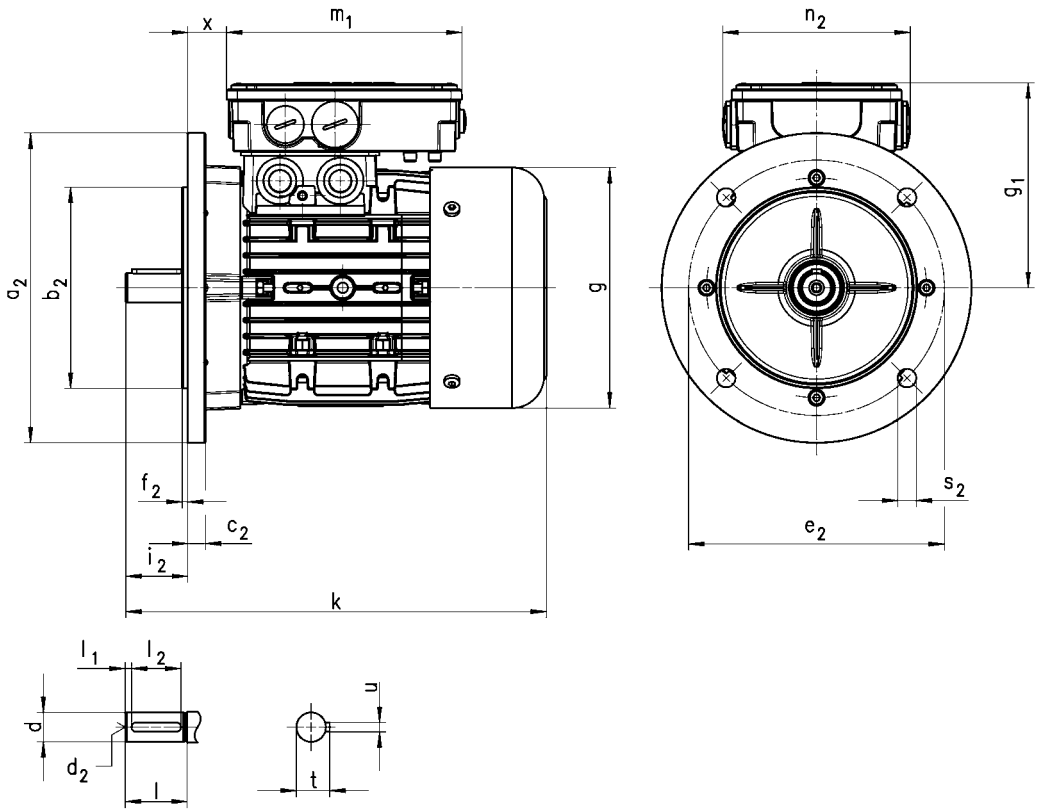
Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	255	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	327	176	137	29.0			399	176	137	29.0		
100	382	194	147	36.0			458	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			338	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	418	178	137	29.0			436	176	147	28.0		
100	463	196	147	36.0			479	194	158	35.0		
112	472	220	158	38.0			509	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		

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

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10.0	7.0
071	112	45	90	134	71	10.5	
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	

Design B5



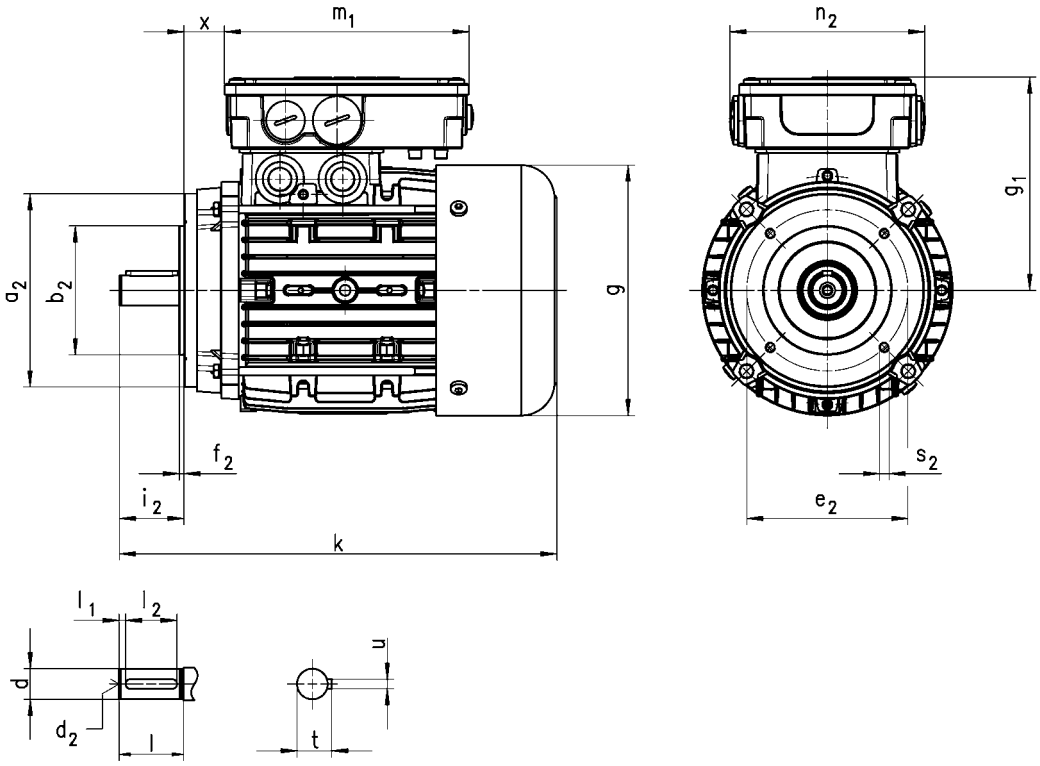
Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	255	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	327	176	137	29.0			399	176	137	29.0		
100	382	194	147	36.0			458	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		
132	497	258	187	51.0	194	125	576	258	187	51.0	194	125

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			338	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	418	178	137	29.0			436	176	147	28.0		
100	463	196	147	36.0			479	194	158	35.0		
112	472	220	158	38.0			509	218	168	37.0		
132	599	261	187	51.0	194	125	621	258	187	51.0		

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

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23
071	FF130	160	110		130	3.5		30
080	FF165	200	130	11	165		12.0	40
090								50
100	FF215	250	180	15	215	4.0	14.5	60
112								
132	FF265	300	230	20	265			80

Design B14



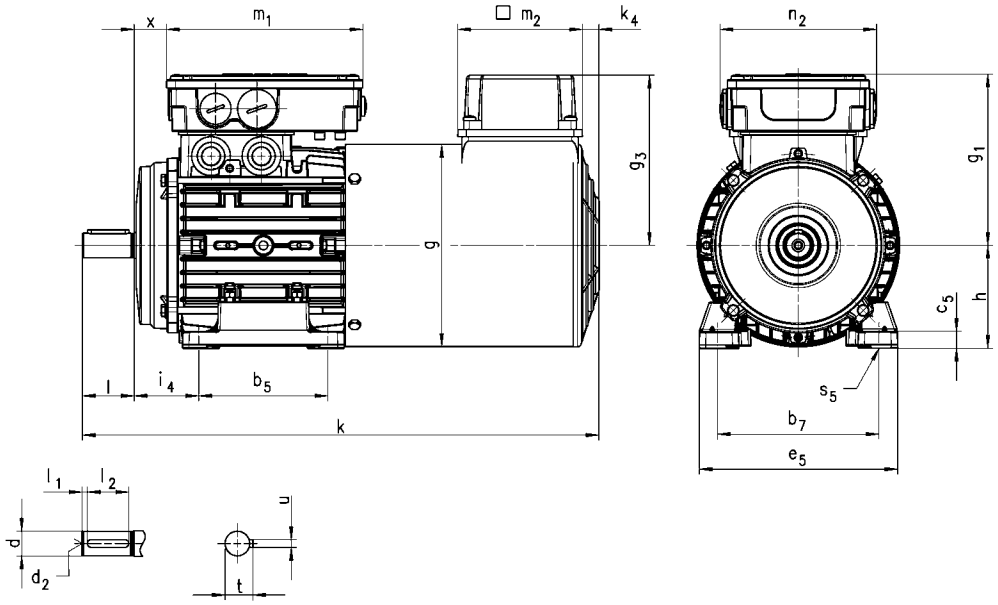
Motor type	MFEMAXX						MFEMABR					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	215	123	109	17.0	136	103	255	123	109	17.0	136	103
071	246	139	118	23.5			297	139	118	23.5		
080	272	156	132	25.0	152	121	345	154	132	25.0	152	121
090	327	176	137	29.0			399	176	137	29.0		
100	382	194	147	36.0			458	194	147	36.0		
112	392	218	158	38.0			479	218	158	38.0		

Motor type	MFEMARS MFEMAIG MFEMAAG						MFEMABS MFEMABI MFEMABA					
	k	g	g_1	x	m_1	n_2	k	g	g_1	x	m_1	n_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	255	123	109	17.0	136	103	318	123	109	17.0	136	103
071	297	139	118	23.5			338	139	133	13.0	194	125
080	369	158	132	25.0	152	121	383	156	142	24.0		
090	418	178	137	29.0			436	176	147	28.0		
100	463	196	147	36.0			479	194	158	35.0		
112	472	220	158	38.0			509	218	168	37.0		

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

	Flange size							
		a_2	b_2	e_2	f_2	s_2	i_2	
			j6				-0.6 ... 0.5	
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
063	FT75	90	60	75	2.5	M5x10	23	
071	FT85	105	70	85		M6x10	30	
080	FT100	120	80	100	3.0	M6x12	40	
	FT130	160	110	130	3.5	M8x14		
090	FT115	140	95	115	3.0	M8x16	50	
	FT130	160	110	130	3.5			
100						M8x14	60	
112						M8x16		

Design B3



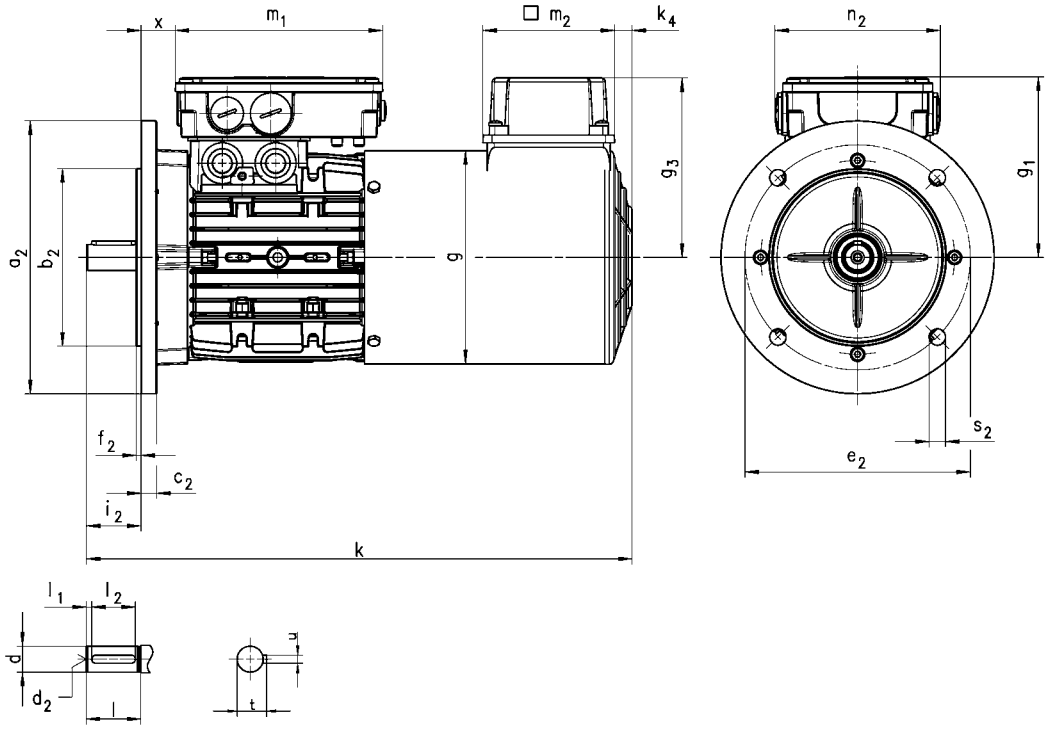
Motor type	MFFMAXX									MFFMABR								
	k	g	g1	x	m1	n2	g3	k4	m2	k	g	g1	x	m1	n2	g3	k4	m2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g1	x	m1	n2	g3	k4	m2	k	g	g1	x	m1	n2	g3	k4	m2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	

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

	b_7	i_4	b_5	e_5	h	c_5	s_5
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	100	40	80	120	63	10.0	7.0
071	112	45	90	134	71	10.5	
080	125	50	100	154	80	13.0	10.0
090	140	56		174	90		
100	160	63	140	194	100	15.0	12.0
112	190	70		223	112	14.0	
132	216	89	178	260	132	18.0	

Design B5



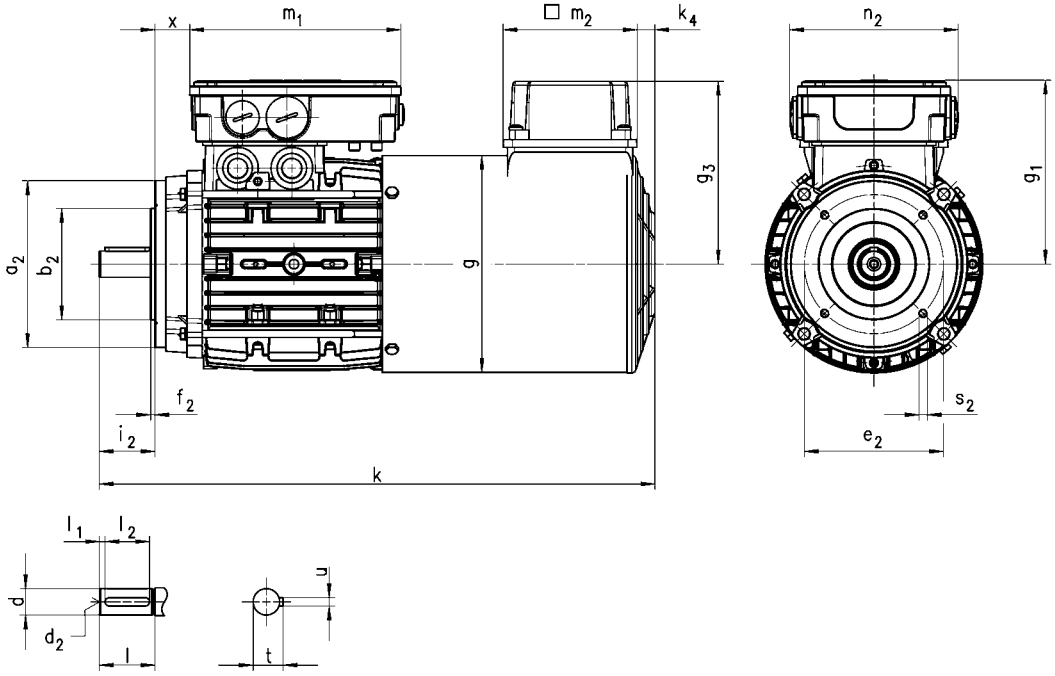
Motor type	MFFMAXX									MFFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		
132	612	257	187	51.0	194	125	182	32		698	257	187	51.0	194	125	182	32	

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		
132	698	257	187	51.0	194	125	182	32		698	257	187	51.0			182	32	

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

	Flange size							
		a_2	b_2	c_2	e_2	f_2	s_2	i_2
			j6					-0.6 ... 0.5
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	FF115	140	95	10	115	3.0	10.0	23
071	FF130	160	110		130	3.5		30
080	FF165	200	130	11	165		12.0	40
090								50
100	FF215	250	180	15	215	4.0	14.5	60
112								
132	FF265	300	230	20	265			80

Design B14



Motor type	MFFMAXX									MFFMABR								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	118	23.5			122		
080	400	156	132	25.0	152	121	132	13	96	455	156	132	25.0	152	121	132	13	96
090	460	176	137	29.0			141	22	95	513	176	137	29.0			141	22	95
100	491	194	147	36.0			150			552	194	147	36.0			150		
112	494	218	158	38.0			162			575	218	158	38.0			162		

Motor type	MFFMARS MFFMAIG MFFMAAG									MFFMABS MFFMABI MFFMABA								
	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2	k	g	g_1	x	m_1	n_2	g_3	k_4	m_2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	345	123	109	17.0	136	103	115	12	95	385	123	109	17.0	136	103	115	12	95
071	373	138	118	23.5			122			410	138	133	13.0	194	125	122		
080	400	156	132	25.0	152	121	132	13	96	455	156	142	24.0			132	13	96
090	460	176	137	29.0			141	22	95	513	176	147	28.0			141	22	95
100	491	194	147	36.0			150			552	194	158	35.0			150		
112	575	218	158	38.0			162			575	218	168	37.0			162		

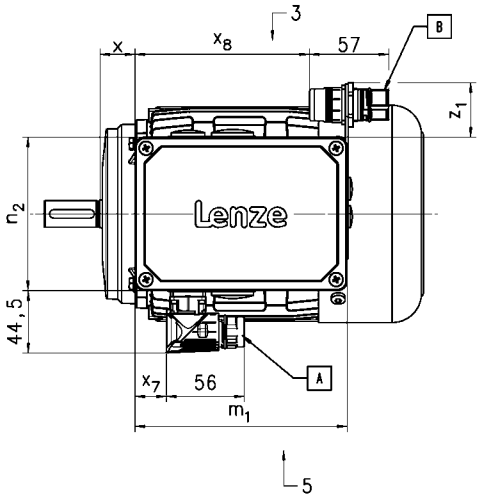
	d	d	d_2	l	l_1	l_2	t	u
	j6	k6						
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	11		M4	23	3.5	16	12.5	4.0
071	14		M5	30	4.0	22	16.0	5.0
080	19							
090	24		M8	50	5.0	40	27.0	8.0
100	28		M10	60		50	31.0	
112								

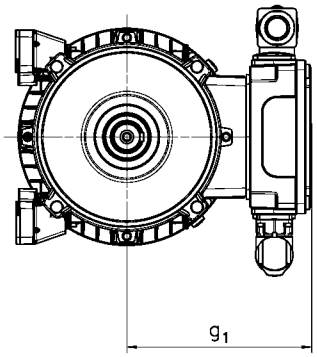
	Flange size							
		a_2	b_2	e_2	f_2	s_2	i_2	
			j6				-0.6 ... 0.5	
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
063	FT75	90	60	75	2.5	M5x10	23	
071	FT85	105	70	85		M6x10	30	
080	FT100	120	80	100	3.0	M6x12	40	
	FT130	160	110	130	3.5	M8x14		
090	FT115	140	95	115	3.0	M8x16	50	
100	FT130	160	110	130	3.5	M8x14	60	
112						M8x16		

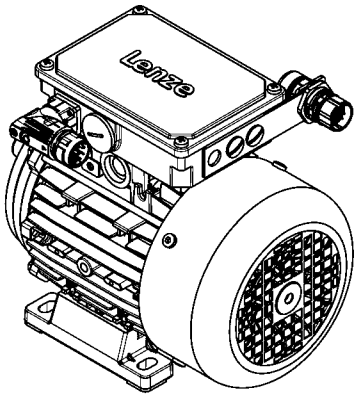
Motor terminal box with ICN connector

The following connector positions are possible:
- power connection (A) in position 5 and feedback connection (B) in position 3
- power connection (A) in position 3 and feedback connection (B) in position 5

Only the feedback connection (B) in position 3 or 5 is available for the following motors:
- motor type MD/MH and motor frame size 132 ... 180
- motor type MF and motor frame size 112 ... 132



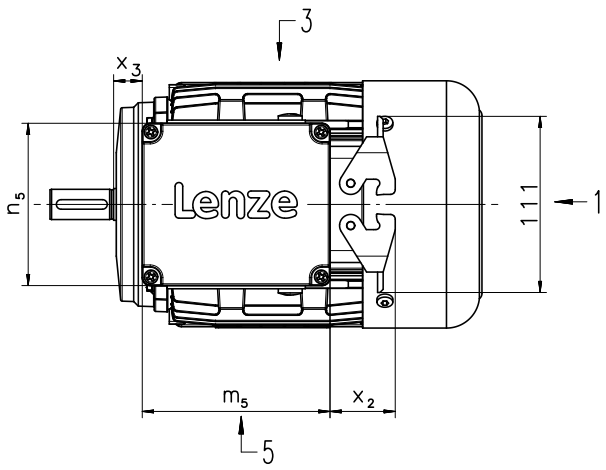


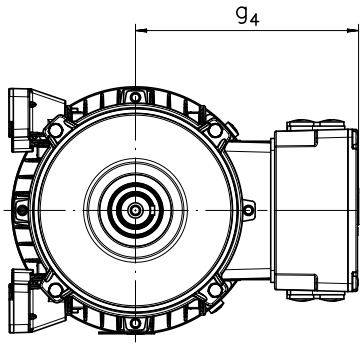


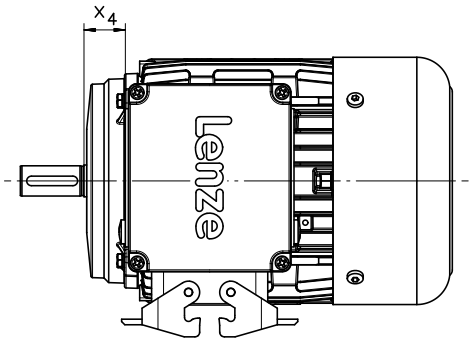
Motor type	M□□MAXX M□□MARS M□□MAIG M□□MAAG				M□□MABR M□□MABS M□□MABI M□□MABA		
	g_1	x	m_1	n_2	x_7	x_8	$z_{1, max}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	109	17.0	136	103	16	109	43
071	118	23.5					
080	132	25.0	152	121	23	125	41
090	137	29.0					
100	147	36.0					
112	158	38.0					
132	187	51.0	194	125	27	166	71
160	210	65.0	226	127	83	200	65
180	230	75.0					
200							

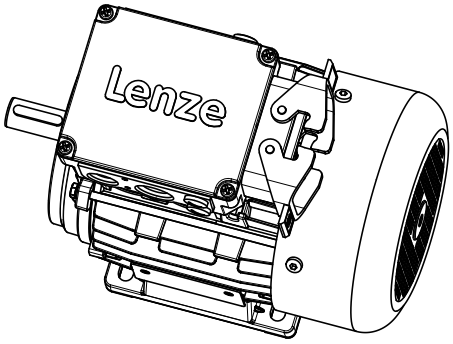
Motor terminal box with HAN-10E / HAN-Modular connector

The connection position for the connector is shown in position 1. Positions 3 and 5 are also possible.







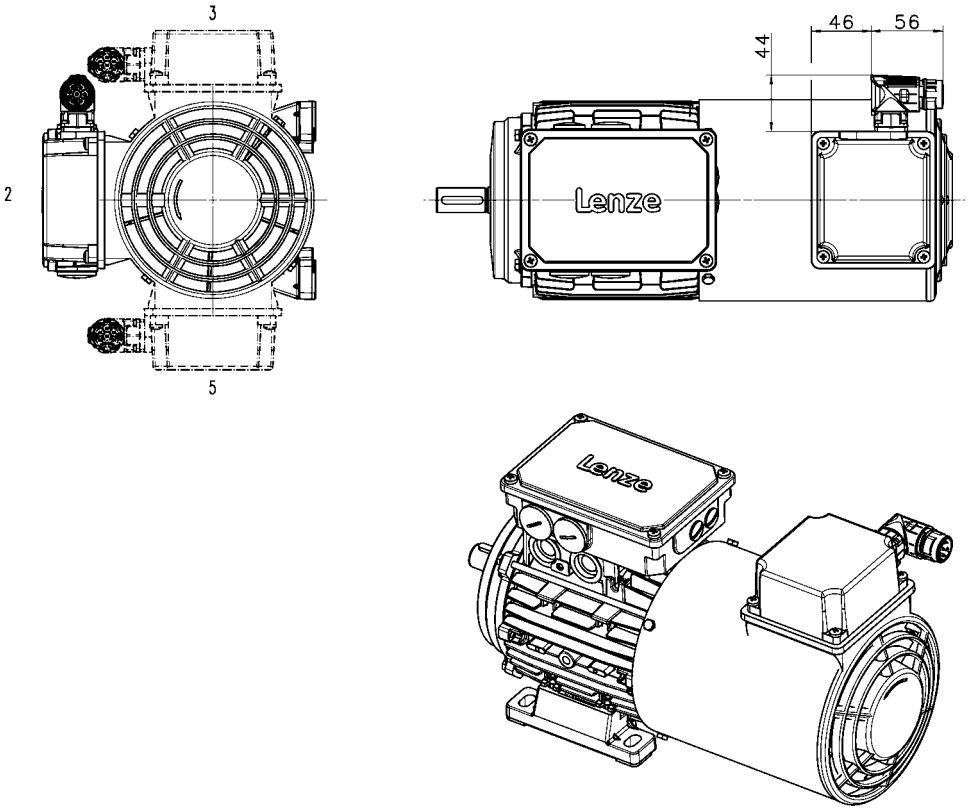


Motor type	M□□MAXX M□□MABR					
	g_4	m_5	n_5	x_2	x_3	x_4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
063	120	118	102	41	11	12
071	129				16	17
080	138				18	26
090	143				22	30
100	154				29	37
112	164				28	36
132 [1)]	233	120	180	47	48	18
160	248				72	42

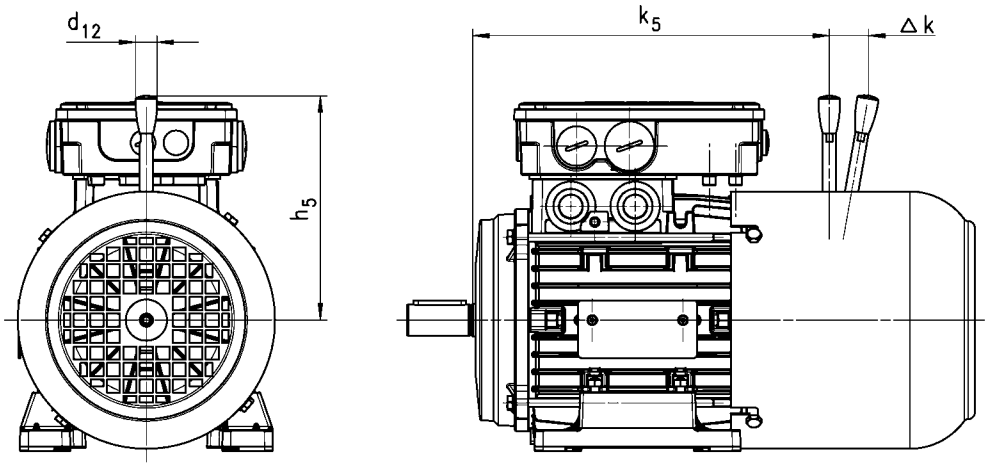
[1)] In the case of the B5 type of motor construction, it is not possible to connect the plug-in connector at position 3 or 5.

ICN connector for blower

- The blower terminal box is available in positions 2, 3 and 5.
- In addition, the cover of the blower terminal box (including connectors) can be rotated progressively through 90° if necessary.



MD□MA (IE1)

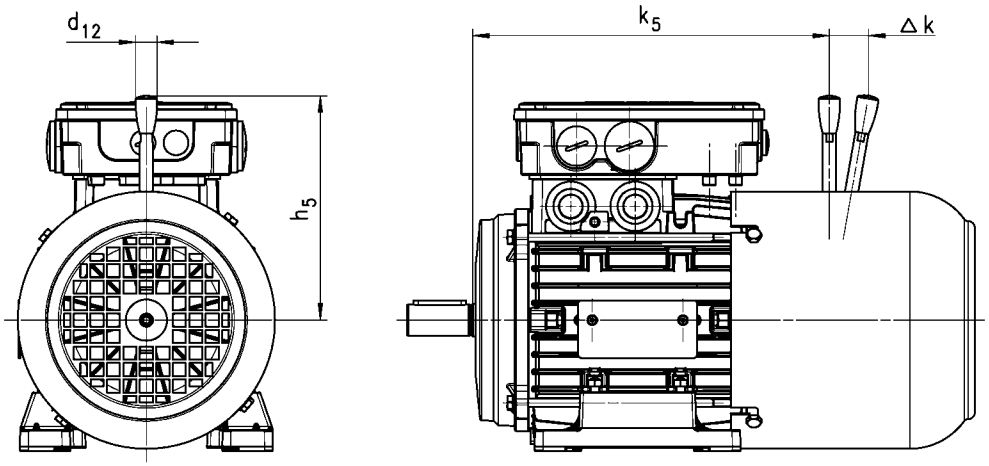


	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
063	**06**	178	29	107	13.0
071	**06**	205	29	107	13.0
	08	206	27	116	13.0
080	**08**	224	27	116	13.0
	10	239	28	132	13.0
090	**08**	238	27	116	13.0
	10	251	28	132	13.0
100	**10**	305	28	132	13.0
	12	307	37	161	13.0
112	**12**	320	37	161	13.0
	14	323	41	195	24.0
132	**14**	400	41	195	24.0
	16	406	55	240	24.0
160	**16**	505	55	240	24.0
	18	509	59	279	24.0
180	**18**	540	59	279	24.0
	20	546	74	319	24.0

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

- HAN connector with connection in position 1
- motec inverter
- Terminal boxes for motor sizes 071, 080, 090 for brake and feedback (M□□MA BR/BS/BA/BI)

MH□MA (IE2)



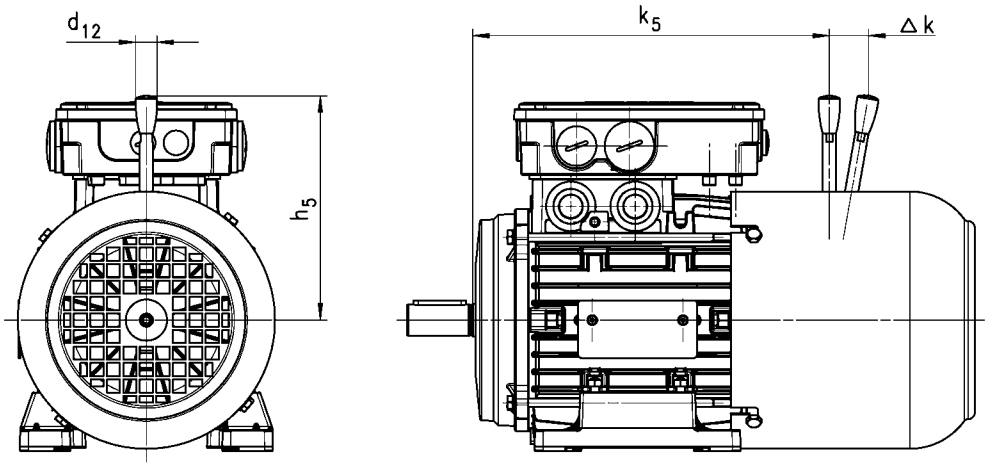
	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
080	**08**	224	27	116	13.0
	10	239	28	132	13.0
090	**08**	264	27	116	13.0
	10	277	28	132	13.0
100 [1]	**10**	305	28	132	13.0
	12	307	37	161	13.0
100 [2]	**10**	320	28	132	13.0
	12	322	37	161	13.0
112	**12**	320	37	161	13.0
	14	323	41	195	24.0
132	**14**	400	41	195	24.0
	16	406	55	240	24.0
160	**16**	505	55	240	24.0
	18	509	59	279	24.0
180	**18**	540	59	279	24.0
	20	546	74	319	24.0
200	**18**	597	59	279	24.0
	20	603	74	319	24.0

[1] 100-12
[2] 100-32

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

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

MF□MA

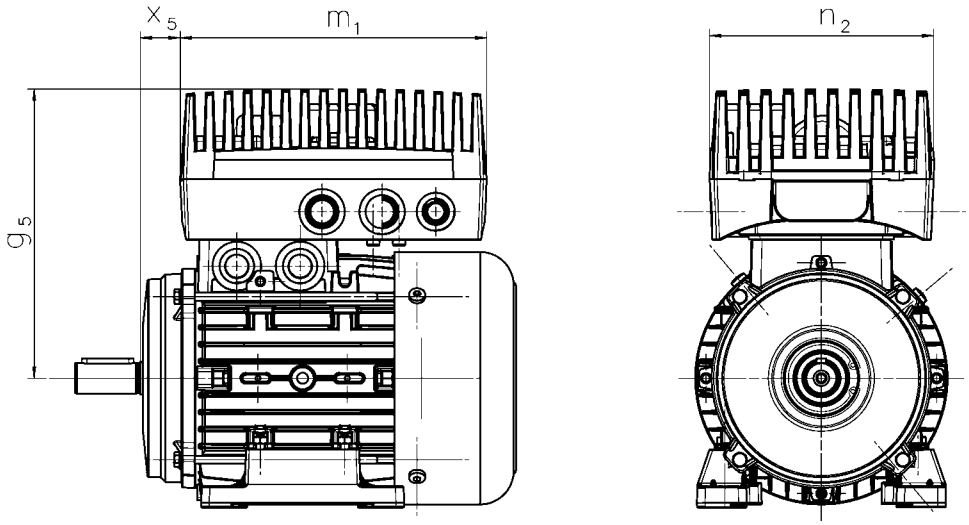


	Brake				
		k_5	Δ k	h_5	d_{12}
		[mm]	[mm]	[mm]	[mm]
063	**06**	178	29	107	13.0
071	**06**	205	29	107	13.0
	08	206	27	116	13.0
080	**08**	224	27	116	13.0
	10	239	28	132	13.0
090	**08**	264	27	116	13.0
	10	277	28	132	13.0
100	**10**	305	28	132	13.0
	12	307	37	161	13.0
112	**12**	320	37	161	13.0
	14	323	41	195	24.0
132	**14**	400	41	195	24.0
	16	406	55	240	24.0

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

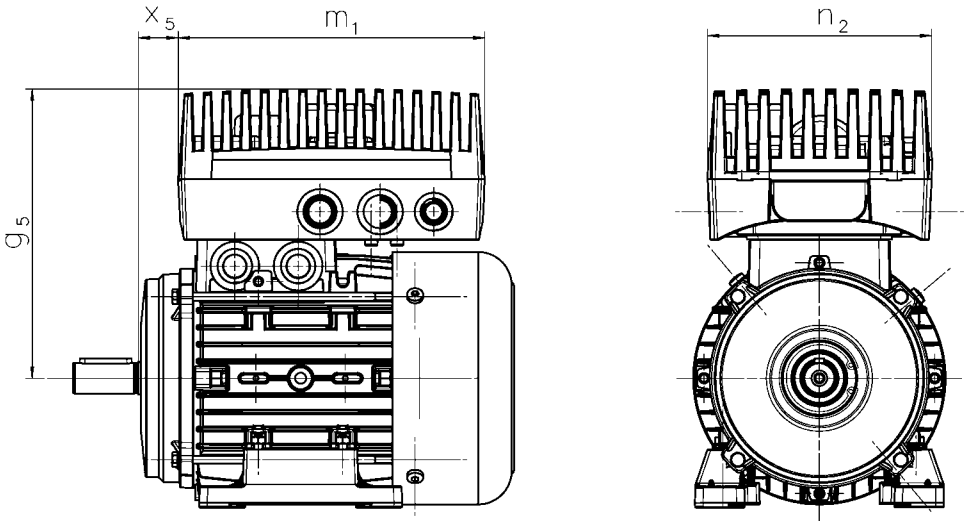
- HAN connector with connection in position 1
- motec inverter
- Terminal boxes for motor sizes 071, 080, 090 for brake and feedback (M□□MA BR/BS/BA/BI)

Rated frequency 50 Hz



Product key						
Motor		Inverter				
			g_5	x_5	m_1	n_2
			[mm]	[mm]	[mm]	[mm]
MD□□□□□063-12 MD□□□□□063-32 MD□□□□□063-42		E82MV251_2B	171	28	190	103
MD□□□□□071-12			180	32		
MD□□□□□071-32		E82MV371_2B				138
MD□□□□□071-42		E82MV551_4B	228	20	202	156
MD□□□□□080-12			223	30		
MD□□□□□080-32	MH□□□□□080-32	E82MV751_4B				
MD□□□□□080-42		E82MV152_4B	239	29	230	176
MD□□□□□090-12	MH□□□□□090-12		244	33		
MD□□□□□090-32	MH□□□□□090-32					
MD□□□□□100-12	MH□□□□□100-12	E82MV222_4B	255	40		
MD□□□□□100-32	MH□□□□□100-32	E82MV302_4B	271	14	325	211
MD□□□□□112-22	MH□□□□□112-22	E82MV402_4B	281	16		
MD□□□□□132-12	MH□□□□□132-12	E82MV552_4B	300	41		
MD□□□□□132-22	MH□□□□□132-22	E82MV752_4B				

Rated frequency 87 Hz



Product key						
Motor		Inverter				
			g_5	x_5	m_1	n_2
			[mm]	[mm]	[mm]	[mm]
MD□□□□□063-12 MD□□□□□063-32 MD□□□□□063-42		E82MV551_4B	216	16	202	156
MD□□□□□071-12			228	20		
MD□□□□□071-32		E82MV751_4B				
MD□□□□□071-42		E82MV152_4B	244		230	176
MD□□□□□080-12			239	29		
MD□□□□□080-32	MH□□□□□080-32					
MD□□□□□080-42		E82MV222_4B				
MD□□□□□090-12	MH□□□□□090-12		244	33		
MD□□□□□090-32	MH□□□□□090-32	E82MV302_4B	260	7	325	211
MD□□□□□100-12	MH□□□□□100-12	E82MV402_4B	271	14		
MD□□□□□100-32	MH□□□□□100-32	E82MV552_4B				
MD□□□□□112-22	MH□□□□□112-22	E82MV752_4B	281	16		

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

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

OKS-G (primed)

Applications
- Dependent on subsequent top coat applied

Measures
- One-component priming coat (grey)

OKS-S

Applications
- Standard applications
- Indoor installation in heated buildings
- Air humidity up to 90%

Measures
- Surface coating in accordance with corrosivity class C1 (in accordance with EN 12944-2)

OKS-M

Applications
- Indoor installation in unheated buildings
- Outdoor installation in covered, protected area
- Air humidity up to 95 %

Measures
- Surface coating in accordance with corrosivity class C2 (in accordance with EN 12944-2)

OKS-L

Applications
- Outdoor installation
- Air humidity over 95%
- Chemical industrial plants
- Food industry

Measures
- Surface coating complies with corrosivity class C3 (in accordance with EN 12944-2)
- Additional priming coat on fan cover and B-end shield
- Galvanised bolts
- Cable glands with sealing rings
- Corrosion-resistant brake with seal, non-rusting friction plate and chrome-plated armature plate (on request)

Optional measures
- Sealed recesses on motor (on request)

A blower cannot be used in combination with OKS-L.

Structure of surface coating

Surface and corrosion protection system	Without	OKS-G	OKS-S	OKS-M	OKS-L
Corrosivity category according to DIN EN ISO			C1	C2	C3
Structure of the surface coating					
1K primer					
2K-EP primer					
2K-PUR top coat					
Colour		Grey	Standard: RAL 7012 Optional: According to RAL Classic		