

Three-phase motors with squirrel-cage rotor for sea-going vessels

Product specification



VEM motors GmbH



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Note:

We make all efforts to better our products continuously.

Versions, technical data and figures could be changed therefore.



They are always not binding before written confirmation by the supplier factory.

Introduction

Electrical drives in their many variations are now in use in every branch of industry. In most processes, they determine by virtue of their characteristics the economy of production. The program of the three-phase asynchronous motors for low voltage from VEM motors GmbH meets the needs of operation with regard to universal applicability, superior performance, environment compatibility and high standard of operational reliability. VEM motors, designed for the p-n-European market offer:

- energy-conscious behaviour because of high motor efficiencies
- universal applicability and reduction of stockholding because of standard design in degree of protection IP 55 (higher degrees of protection up to IP 66 on request)
- optional arrangement of the terminal box on the left/ont the top/on the right
- increased lifetime, reliability and thermal overload capacity through standard design in insulation class F with thermal reserve (insulation class H is possible as special design)
- environmental compatibility due to the use of a low-noise and bi-directional ventilation system
- availability in accordance with Eastern European Standards
- attachment options for components, such as pulse transmitters, tacho-generators, brakes, speed controllers and forced ventilation units for solving recent control problems, upon customer's request.

Motors designed for sea-going vessels are provided for the drive of auxiliary sets on bord of sea-going vessels and meet the special climatic and mechanical stresses of these fields of application.

EC-Certificate of Conformity																									
<p>VEM motors GmbH Carl-Friedrich-Gauß-Str. 1 D-38855 Wernigerode</p>																									
<p>The electrical apparatus three-phase asynchronous motors with squirrel cage rotor three-phase asynchronous motors with slip-ring rotor</p>																									
<p>of series</p>																									
<p>KP../KPE../K10../K11../K20../K21..</p>	<p>K30../K31../K32..</p>																								
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<p>R10../R11..</p>	<p>M31F</p>																								
<p>K22.. 355</p>																									
<p>are in conformity with the instructions of</p>																									
<p>73/23/EWG Low Voltage Directive amended by RL 93/68 /EWG</p>																									
<p>89/336/EWG Directive about Electromagnetic Compatibility amended by RL 91/263/EWG. 92/31/EWG and 93/68/EWG</p>																									
<p>The conformity with the instructions of these Directives is proved by the observation of following standards:</p>																									
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<p>Wernigerode, February 14th 2000</p>																									
 Sales Manager	 Beutner Factory Manager																								
<p>This certificate attests the conformity with the named Directives, however, it is not a promise of properties in the meaning of product liability.</p>																									

Standards and specifications

The motors comply with the relevant standards and regulations and in particular with the following:

Title	DIN EN / DIN VDE	IEC
Rotating electrical machines, rating and performance	DIN EN 60034-1/02.99	IEC 34-1 IEC 85
Rotating electrical machines, methods for determining losses and efficiency	DIN EN 60034-2	IEC 34-2
Totally enclosed three-phase induction motors with squirrel-cage, type IM B3	DIN 42673	(IEC 72)
Totally enclosed three-phase induction motors with squirrel-cage, type IM B5, B35 and IM B14	DIN 42677	(IEC 72)
Rotating electrical machines, terminal markings and direction of rotation	DIN VDE 0530 p. 8	IEC 34-8
Rotating electrical machines, symbols for types of construction and mounting arrangements	DIN EN 60034-7	IEC 34-7
Rotating electrical machines, built-in thermal protection	-	IEC 34-11
Rotating electrical machines, methods of cooling	DIN EN 60034-6	IEC 34-6
Rotating electrical machines, classification of degrees of protection	DIN VDE 0530 p. 5	IEC 34-5
Rotating electrical machines, mechanical vibrations of certain machines	DIN EN 60034-14	IEC 34-14
Cylindrical shaft ends for rotating electrical machines	DIN 748 p. 3	IEC 72
Rotating electrical machines, noise limits	DIN EN 60034-9	IEC 34-9
Rotating electrical machines, starting performance of single-speed three-phase cage induction motors for voltages up to 660 V, 50 Hz	DIN EN 60034-12	IEC 34-12
IEC standard voltages	DIN IEC 38	IEC 38

Furthermore, VEM motors comply with various foreign specifications which have been adapted to the IEC 34-1

NF C 51	France	NBNC 51-101	Belgium
ÖVE M10	Austria	CEI 2-3, V1	Italy
SS 426 0101	Sweden	NEK-IEC 34-1	Norway
SEV 3009	Switzerland	BS 5000	Great Britain
		BS 4999	

and they are available according to the specifications of the Classification Authorities

Germanischer Lloyd	Det Norske Veritas
American Bureau of Shipping	Russian Register
Lloyd's Register of Shipping	Bureau Veritas

For these standards and specifications are valid the following admissible limits of temperature rise:

Specifications	Cooling air temperature C°	Admissible limit of temperature rise in K (measuring according to rise-of-resistance method) Insulation class				
		A	E	B	F	H
DIN EN 60034-1/02.99	40	60	75	80	105	125
IEC 34-1	40	60	75	80	105	125
United Kingdom BS	40	60	75	80	105	125
Italy CEI	40	60	70	80	105	125
Sweden SEN	40	60	70	80	105	125
Norway NEK	40	60	-	80	105	125
Belgium NBN	40	60	75	80	105	125
France NF	40	60	75	80	105	125
Switzerland SEV	40	60	75	80	105	125
Germanischer Lloyd	45	55	70	75	100	120
American Bureau of Shipping	50	50	65	70	90	115
Bureau Veritas	50	50	65	70	90	110
Det Norske Veritas	45	50	65	70	90	115
Lloyd's Register of Shipping	45	50	65	70	95	110
Russisches Register	40/45	60	75	85	110	125

The Classification Authorities divide the auxiliary machines on board into those for „essential services“ and those for „non-essential services“. This division plays a part in the prescribed spare parts and in judging the question if for special motors are to be provided approval and construction supervision.

Vibration characteristics

The admissible vibration intensities of electric motors are specified in DIN EN 60034-14.

The vibration intensity stage N (normal) is achieved or is below limit by VEM motors in the basic version. The vibration intensity stages R (reduced) and S (special) can be supplied at extra in dependence on the type, on request.

The following values are recommended according to DIN EN 60034-14:

Vibration intensity stages	Speed range rpm	Limit values of vibration velocity (mm/s) in frequency range 10 to 1000 cps for sizes		
		80 – 112	132 – 200	225 – 400
N (normal)	600-3600	1,8	2,8	3,5
R (reduced)	600-1800 above 1800-3600	0,71 1,12	1,12 1,8	1,8 2,8
S (special)	600-1800 above 1800-3600	0,45 0,71	0,71 1,12	1,12 1,8

All rotors are dynamically balanced with half key inserted. This balancing is documented on the rating plate with the letter H after the Motor Number. On inquiry, the balancing is possible with the complete key; this balancing is documented with the letter F after the Motor Number.

Bearing arrangement / bearing lubrication

VEM motors are equipped with antifriction bearings of well-known manufactures. The bearing have a nominal service life of at least 20.000 hours for maximum permissible load conditions. For motors without additional axial loading, the nominal service life is 40.000 hours for coupling output.

The versions

- fixed bearing N-end
- without fixed bearing
- permanent lubrication
- relubrication facility
- heavy bearing arrangement D-end (for increased lateral forces)
- easy bearing arrangement

as well as the

- antifriction bearing types
- disk spring or wave washer types
- V-rings (V-type rotary seals)

are shown in the bearing arrangement tables. Fixed bearing D-end is possible on request.

The grooved ball bearings are equipped with wave washers or disk spring, respectively, thus they are preloaded.

This is not true for versions with cylindrical roller bearings.

In case of motors „without fixed bearing“ is possible the version „fixed bearing N-end“.

Motors with permanent lubrication are also available with the degree of protection IP 56.

The sizes 63 – 160 are equipped with life-lubricated bearings. For motors from size 180, depending on the useful life of grease, the bearings must be relubricated in good time so that the nominal bearing service life is reached. Under normal operating conditions, the grease packing will last for 10.000 hours of operation with 2-pole version and for 20.000 hours of operation with versions from 4-poles upwards without being renewed. For motors fitted with relubrication facility and working under normal operating conditions, the grease will last for 2.000 hours of operation or for 4.000 hours of operation. The standard grease is a KE2R-40 type according to DIN 51825.

Use of cylindrical roller bearings

Using cylindrical roller bearings („heavy bearing arrangement“), relatively high radial forces or masses can be supported the motor shaft end. Examples: belt-drives, pinions or heavy couplings.

The minimum radial force at the shaft end must be a quarter of the permissible radial force. Account must be taken of permissible shaft end loading. Both values are to be taken from the loading diagrams of the main catalogue. They are identical with the motor design.

Important to note:

Radial forces below the minimum value can lead to bearing damages within a few hours. Test runs in no-load state are only permissible for a short period.

If the specified minimum radial forces cannot be met, we recommend to use grooved ball bearings („easy bearing arrangement“). Bearing change is possible on request.

Noise characteristics

The noise measurement is carried out according to DIN EN 23741/23742 at design output, design voltage and design frequency. In accordance with DIN EN 60034-9, the spatial mean value of the measurement area sound pressure level L_{pA} measured at a distance of 1 m from the machine outline is stated as noise intensity in dB (A).

The A-sound power level L_{WA} across the measurement area dimension L_S ($d = 1$ m) is also quoted with

$$L_{WA} = L_{pA} + L_S \text{ (dB)}$$

The measurement area dimensions are dependent on the machine geometry and are

		L_S (dB)
size	63 – 132	12
	160 – 225	13
	250 – 315	14

The tabular value + 4 dB (A) applies as an approximate value for motors in 60 cps design. The noise values are corresponding to the values of the standard versions and are to be taken from the main catalogues. In case of special versions, please refer to the manufacturer. Binding data for 60 cps are available on request.

Paint finish

Normal finish

- adapted for group of climates „moderate“ according to IEC 721-2-1
weatherprotected and non-weatherprotected locations, short-time up to 100 % of relative air humidity at temperatures up to + 30 °C, continuously up to 85 % of relative air humidity with temperatures up to + 25 °C

Finish system

Size 63 – 112

- all components except plastic parts (terminal box, fan cover) and aluminium terminal box: primary plastic paint, layer thickness $\geq 30 \mu\text{m}$
- finish coat water-soluble varnish with layer thicknesses $\geq 30 \mu\text{m}$
- special version 2K-varnish, layer thickness $\geq 30 \mu\text{m}$

Size 132 – 355

- synthetic-resin zincphosphate primary coat, layer thickness $\geq 30 \mu\text{m}$
- finish coat: two-component polyurethane, layer thickness $\geq 30 \mu\text{m}$

Special finish

- adapted for group of climates „world wide“ according to IEC 721-2-1
non-weatherprotected location in corrosive chemical and sea atmosphere, short-time up to 100 % of relative air humidity at temperatures up to + 35 °C, continuously up to 98 % of relative air humidity with temperatures up to + 30 °C

Finish system

Size 63 – 112

- all components: primary plastic paint, layer thickness $\geq 30 \mu\text{m}$
- finish coat 2K-varnish, layer thickness $\geq 60 \mu\text{m}$

Size 132 – 355

- synthetic-resin zincphosphate primary coat, layer thickness $\geq 30 \mu\text{m}$
- intermediate coat on two-component base, layer thickness $\geq 30 \mu\text{m}$
- finish coat: two-component varnish, layer thickness $\geq 30 \mu\text{m}$

Standard colour:

RAL 7031 blue-grey

Special coats of varnish on request

Ambient temperature

All VEM motors in the basic version can be used at ambient temperatures from -35 °C up to $+40\text{ °C}$.

When being designed for sea-going vessels, there are valid the coolant temperatures admissible in accordance with the relevant Classification Authorities.

Overload Capacity

In compliance with DIN EN 60034-1 all motors can be exposed to the following overload conditions:

- 1,5 times the rated current during 2 min
- 1,6 times the rated torque for 15 s (1,5 times for $I_A/I_N < 4,5$)

Both conditions apply to design voltage and design frequency.

The motors meet also the following requirement of the Classification Authorities specified in the selection tables:

ABS	no special requirements
BV	160 % nominal torque during 15 s
GL, RS	160 % nominal torque during 15 s. The pull-out torque must never be reached
LRS	such as BV
NV	160 % rated load torque during 15 s with nominal frequency and nominal voltage

Motor protection

The following motor protection versions are available on request:

- motor protection with PTC temperature sensors in the stator winding
- bimetallic temperature sensor as NC contact or NO contact in the stator winding
- resistance thermometer for monitoring the winding or bearing temperature on request.

Operation on deck

Motors for „Operation on deck“ are designed in degree of protection IP 56 without external fan as type series K11W within the size range of 112-180.

As the motors are designed without external fan and therefore the cooling will only be realized through heat emission, the outputs of the motors, compared with the basic construction series, go down to approx. 30 % – 40 % at continuous duty. Exact electrical data on request.

Operation below deck

Motors for „Operation below deck“ are designed, according to mode of application, in

- **degree of protection IP 55** for the general application, e. g. in machinery rooms.
- **degree of protection IP 56** for the application in rooms with splash water or flash water.

The output ratings are to be taken from the tables of the motor selection data.

Approval, construction supervision and type approval certificates

For various motors, the Classification Authorities require tests in the presence of an inspector.

This method is nominated as approval.

Furthermore, several Classification Authorities require, in the course of the manufacturing, a construction supervision. The approval requires increased inspection and test expenses because, in addition to the normal internal quality surveillance of the manufacturer, the approval test is to be carried out.

The customer is charged with extra costs incurred for the approval as overall values in accordance with the price list.

When ordering motors which are subject to the approval or to the approval by part of the construction supervisory authority, this fact is expressly to be notified in the order.

Regulation	Drive motors for auxiliary machine for essential services		Drive motors of the refrigerating systems with refrigerating system certificate	
	Approval	Construction supervision	Approval	Construction supervision
ABS	$P \geq 100 \text{ kW}$	$P \geq 100 \text{ kW}$	$P \geq 100 \text{ kW}$	$P \geq 100 \text{ kW}$
BV	all	all	all	all
RS	$P \geq 100 \text{ kW}$	—	all	—
GL	$P \geq 50 \text{ kW}$	—	all	—
LRS	$P \geq 100 \text{ kW}$	$P \geq 100 \text{ kW}$	all	—
NV	$P \geq 100 \text{ kW}$	$P \geq 100 \text{ kW}$	—	—

Works certificate

When ordering, there are to be specified the type of the works certificate and the required language.

Spare parts

With the exception of vessels with refrigerating systems certificate, the Classification Authorities prescribe only antifriction bearings as spare part or, in case of NV, no spare parts for three-phase asynchronous motors with squirrel-cage rotor.

Werksbescheinigung Work Certificate



Asynchronmotor mit Käfigläufer Three-phase asynchronous motor with squirrel-cage rotor

Erzeugnisbez./Designation Drehstrom-Asynchronmotor Three-phase asynchronous motor		Lieferbedingungen und/od. amtliche Vorschriften: Specifications and/or Official Regulations: DIN EN 60034-1/11.95	
Leistungsschilddaten / Nameplate Data			
Typ/Type:	K11R 225 M4 K10R 200 L4	Kühlmitteltemp./Ambient temp.	WKL F Insl.class
Motor-Nr./No.	Schaltung / Connection D/Y	40°C	IP 55
V	400 / 690	A 81 / 47	kW 45
cos phi	0,86	1/min/r.p.m. 1470	L _{PA} /dB
Betriebsart Duty type	S1	Hz/c/s 50	kg 300 66

Normen und Vorschriften:

Standard and regulations:

DIN EN 60034-1	IEC 34-1	Allgemeine Bestimmungen für drehende elektrische Maschinen Rotating electrical machines, Rating and performance
	IEC 85	Abmessungen und Nennleistungen Dimensions and output ratings
	IEC 72	
DIN 748 T3	(IEC 72)	Zylindrische Wellenende für elektrische Maschinen Cylindrical shaft ends for rotating electrical machines
DIN 42 673	(IEC 72)	Anbauabm. u. Zuordng. der Leistungen, Bauform IM B3 Totally enclosed three-phase induction motors with squirrel-cage rotor, type IM B3
DIN 42 677	(IEC 72)	Anbauabm. u. Zuordng. der Leistungen, Bauform IM B5 Totally enclosed three-phase induction motors with squirrel-cage rotor, type IM B5
DIN VDE 0530 T8	IEC 34-8	Anschlußbezeichnungen u. Drehsinn für uuml. elektr. Maschinen Rotating electrical machines, terminal markings and direction of rotating
DIN EN 60034-7	IEC 34-7	Drehende elektrische Maschinen, Bezeichnungen für Bauformen u. Aufstellung Rotating electrical machines, symbols for types of construction and mounting arrangements
DIN VDE 0530 T5	IEC 34-5	Umlaufende elektrische Maschinen, Schutzarten umlaufender elektr. Maschinen Rotating electrical machines, classification of degrees of protection provided by enclosures
DIN EN 60034-9	IEC 34-9	Drehende elektrische Maschinen, Geräuschgrenzwerte Rotating electrical machines, noise limits
DIN EN 60014-14	IEC 34-14	Schwingstärken von rotierenden elektrischen Maschinen Rotating electrical machines, mechanical vibrations of certain machines
DIN EN 60034-12	IEC34-12	Drehende elektrische Maschinen, Anlaufverhalten von Käfigläufermotoren Rotating electrical machines, starting performance of three-phase cage induction motors
DIN IEC 38	IEC 38	IEC-Normspannungen IEC standard voltages

Normen und Vorschriften: Standards and regulations:

Der Motor ist gebaut und geprüft nach den Vorschriften von:

The motor has been manufactured and tested in accordance with the rules of:

- ABS
- BV
- DNV
- GL
- LRS
- RINa
- CSA
- VIK

American Bureau of shipping
Bureau Veritas
Det Norske Veritas
Germanischer Lloyd
Lloyd's Register of Shipping
Registro Italiano Navale

50°C
50°C
45°C
45°C
45°C
50°C
Kühlmitteltemperatur
Ambient temperature

Für das Erzeugnis ist die elektrische und mechanische Funktionsprüfung durch eine Stückprüfung nachgewiesen.

Es wird bestätigt, das die Lieferung den Vereinbarungen der Bestellung entspricht.

For the product the electrical and mechanical serviceability has been proved by piece testing.

We hereby certify, that the product described above complies the terms of the order.

Datum:
Date:

VEM motors GmbH
Carl-Friedrich-Gauß-Str. 1
D-38855 Wernigerode

Tolerances – Electrical parameters

Following tolerances are permitted according to DIN EN 60034-1/02.99:

Efficiency (with indirect calculation)	-0,15 (1- η) at $P_N \leq 50$ kW -0,1 (1- η) at $P_N > 50$ kW
Power factor	$\frac{1-\cos\phi}{6}$ min. 0,02 max. 0,07
Slip (at rated load operating temperature)	± 20 % $P_N \geq 1$ kW ± 30 % $P_N < 1$ kW
Starting current (in the planned starting circuit)	20 % without limiting downwards
Starting torque	- 15 % and + 25 %
Pull-up torque	- 15 %
Pull-out torque	- 10 % (with the application of this tolerance M_k/M at least 1,6)
Moment of inertia	± 10 %
Noise intensity (measurement area sound pressure level)	+ 3 dB (A)

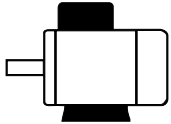
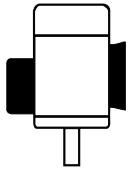
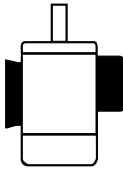
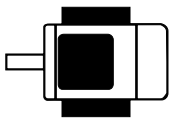
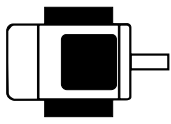
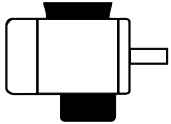
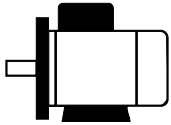
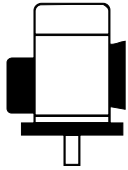
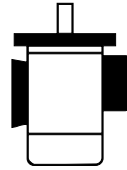
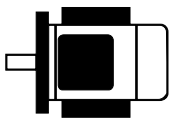
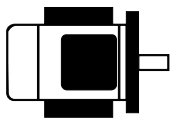
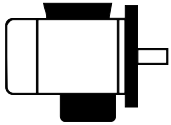
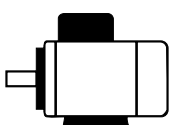
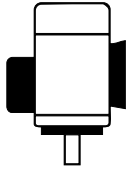
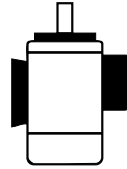
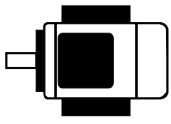
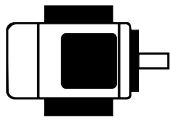
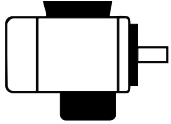
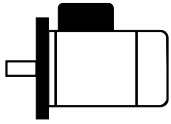
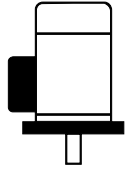
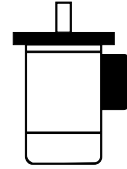
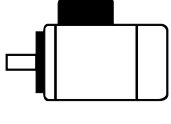
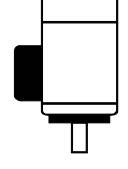
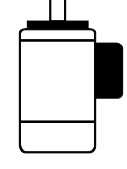
These tolerances are permissible for the values assured for three-phase asynchronous motors, taking the necessary manufacturing tolerances and material variations of the used raw material into account.

The standard contains the following notes to that:

- 1 A guarantee for all or any of the values shown in the table is not mandatory. In tenders, the guaranteed value for which permissible deviations should apply must be expressly specified. The permissible variations must correspond to those stated in the table.
- 2 There is pointed to the distinctions concerning the definition „Guarantee“. In some countries, distinction is drawn between guaranteed values and typical or declared values.
- 3 If a permissible deviation applies only in one direction, then the value in other directions is not limited.

Tolerances – Mechanical parameters

Dimensional short sign acc. to DIN 42939	Meaning of the dimension	Fit or tolerance
a	spacing of housing foot fixing holes in axial direction	± 1 mm
a ₁	diameter or width across corner of the flange	± 1 mm
b	spacing of housing foot fixing holes across the axial direction	± 1 mm
b ₁	diameter of the centering shoulder of the attachment flange	up to diameter 230 mm j6 from diameter 250 mm h6
d, d ₁	diameter of the cylindrical shaft end	up to diameter 48 mm k6 from diameter 55 mm m6
e ₁	pitch circle diameter of the attachment flange	$\pm 0,8$ mm
f, g	largest width of the motor (without terminal box)	+ 2 %
h	shaft height (lower edge foot up to centre of shaft end)	up to 250 mm -0,5 from 250 mm -1
k, k ₁	overall length of the motor	+ 1 %
l	$\leq \varnothing$ shaft end 55 mm $\geq \varnothing$ shaft end 60 mm	- 0,3 mm - 0,5 mm
p	overall height of the motor (lower edge foot, housing or flange up to highest point of the motor)	+ 2 %
s, s ₁	diameter of the fixing holes of the foot or of the flange	+ 3 %
t, t ₁	lower edge of shaft end up to upper edge of key	+ 0,2 mm
u, u ₁	width of the key	h9
w ₁ , w ₂	distance between the centre of the first foot fixing hole up to shaft shoulder of flange attachment surface	$\pm 3,0$ mm
	distance from shaft shoulder up to flange attachment surface fixing bearing D-end	$\pm 0,5$ mm
	Distance from shaft shoulder up to flange attachment surface	$\pm 3,0$ mm
	motor weight	- 5 up to + 10 %

Types	basic type of construction	derived type of construction				
KPER 56-100 K11R 112-200 K11R 225-315MY ¹⁾ K11R 315L,LX ²⁾ K22R 355 ²⁾	IM B3 IM 1001 	IM V5 IM 1011 	IM V6 IM 1031 	IM B6 IM 1051 	IM B7 IM 1061 	IM B8 IM 1071 
	IM B35 ²⁾ IM 2001 ²⁾ 	IM V15 ²⁾ IM 2011 ²⁾ 	IM V36 ^{2) 3)} IM 2031 ^{2) 3)} 	– IM 2051 ²⁾ 	– IM 2061 ²⁾ 	– IM 2071 ²⁾ 
	IM B34 ^{2) 5)} IM 2101 ^{2) 5)} 	– IM 2111 ^{2) 5)} 	– IM 2131 ^{2) 5)} 	– IM 2151 ^{2) 5)} 	– IM 2161 ^{2) 5)} 	– IM 2171 ^{2) 5)} 
	IM B5 IM 3001 	IM V1 IM 3011 	IM V3 ³⁾ IM 3031 ³⁾ 			
	IM B14 ⁵⁾ IM 3601 	IM V18 ⁵⁾ IM 3611 	IM V19 ⁵⁾ IM 3631 			

Basic types of construction could be used in all derived types of construction.

Exceptions:

- ¹⁾ for the types of construction IM V5, IM V6, IM B6, IM B7 and IM B8 further inquiry is necessary.
- ²⁾ on request
- ³⁾ this type of construction must be ordered definitely (due to additional water drain hole in flange end-shield)
- ⁴⁾ in IM B5 and IM V3 not available
- ⁵⁾ only available in sizes 56 -160

Three-phase motors with squirrel-cage rotor for sea-going vessels

Degrees of protection IP 55/56, insulation class F, mode of operation S1, continuous duty

Baugröße KPER bis BG 112 K11R ab BG 132 K22R ab BG 355	Fre- quenz	Bemessungsleistung und max. Kühl- mitteltemperatur (KT)		Bemessungs- drehzahl n	Bemessungs- strom 380 V 440 V	Leistungs- faktor cos φ	Wirkungsgrad η	Anzugs- strom bei direktem Bemessungs- stromes	Anzugs- moment Einschalten als Vielfaches des Bemessungs- drehmomentes	Sattel- moment als Vielfaches des Bemessungs- drehmomentes	Kipp- moment	Trägheits- moment	Gewicht netto etwa
		KT CT °C	Vorschr. Standard										
Frame KPER up to type 112 K11R from type 132 K22R from type 355	Fre- quency	45 45 50 50 45 45	GL RRS ABS BV dNV LRS	Rated speed	Rated current	Power factor	Efficiency	Starting current for direct-on-line rated current	Starting torque for direct-on-line starting as multiples of rated torque	Pull-up torque as multiples of rated torque	Pull-out torque	Moment of inertia	Net weight approx.
	c/s	45 45 50 50 45 45		n	380 V 440 V	cos φ	η			380 V 50 c/s 440 V 60 c/s			
	Hz	KW		1/min	A	-	%	-	-	-	-	kgm ²	kg

Synchronous speed 3000 rpm - two-pole design

63 K2	50	0,18	2765	0,51	0,81	66,0	4,1	1,7	1,7	2,0	0,00013	4,9	
	60	0,21	3370	0,49	0,80	70,0	4,4	2,0	1,8	2,3			
63 G2	50	0,25	2775	0,72	0,8	66,0	4,2	2,0	2,0	2,2	0,00015	5,2	
	60	0,3	3390	0,70	0,76	74,0	4,3	2,0	2,0	2,3			
71 K2	50	0,37	2745	0,93	0,86	70,0	4,2	1,9	1,9	2,1	0,00025	6,7	
	60	0,44	3350	0,92	0,85	74,0	4,4	1,9	1,7	2,0			
71 G2	50	0,55	2730	1,33	0,86	73,0	5	1,9	1,9	2,3	0,00032	7,6	
	60	0,65	3380	1,35	0,81	78,0	5,3	1,9	1,9	2,1			
80 K2	50	0,75	2795	1,74	0,85	77,0	5,6	2,2	2,2	2,3	0,00057	10,7	
	60	0,9	3400	1,74	0,85	80,0	5,6	2,1	2,0	2,2			
80 G2	50	1,1	2810	2,59	0,85	76,0	5,6	2,2	2,1	2,4	0,00072	11,5	
	60	1,3	3400	2,54	0,85	79,0	5,8	2,0	2,0	2,3			
90 S2	50	1,5	2830	3,35	0,86	79,0	6,7	2,3	2,3	2,6	0,00132	16	
	60	1,8	3440	3,4	0,85	82,0	6,4	2,2	2,0	2,3			
90 L2	50	2,2	2830	4,65	0,89	81,0	7	2,6	2,1	2,6	0,00170	19	
	60	2,6	3420	4,75	0,88	82,0	7,3	2,4	1,9	2,4			
100 L2	50	3	2840	6,35	0,88	82,0	6,6	2,1	2,1	2,5	0,00275	25	
	60	3,6	3430	6,3	0,88	85,0	6,6	2,0	1,9	2,3			
112 M2	50	4	2885	8,5	0,86	83,0	6,7	2,0	1,9	2,6	0,00450	32	
	60	4,8	3470	8,65	0,86	85,0	7,0	1,8	1,7	2,4			
112MX2	60	6,6	3480	12	0,86	83,0	5,5	1,7	1,5	2,6	0,00550	38	
132 S2	50	5,5	2860	11,5	0,86	85,7	5,5	1,8	1,6	2,2	0,00810	52	
	60	6,6	3430	12	0,85	85,7	5,5	1,7	1,5	2,2			
132 SX2	50	7,5 7,1 ¹⁾	2880 2890	15 14,5	0,86	87,0	7,0 7,2	2,3 2,4	1,8 1,9	2,8 2,8	0,011	57	
	60	9,0 8,1 ¹⁾	3460 3480	16 14	0,86	87,0	7,0 7,7	2,2 2,3	1,8 2,2	2,6 2,8			
160 M2	50	11,0	2900	21	0,90	88,5	7,0	2,4	2,0	3,0	0,026	81	
	60	13,0	3480	21,5	0,90	88,0	7,0	2,4	1,9	3,0			
160 MX2	50	15,0	2930	28,5	0,90	89,4	7,1	2,2	1,7	2,9	0,058	118	
	60	18,0	3530	29,5	0,90	89,6	7,1	2,2	1,7	2,9			
160 L2	50	18,5	2920	34	0,92	90,5	7,2	2,1	1,6	2,6	0,068	134	
	60	22,0	3515	35	0,92	90,0	6,5	1,9	1,4	2,6			
180 M2	50	22,0	2935	39,5	0,92	91,8	6,8	1,7	1,4	2,6	0,105	165	
	60	26,0	3525	40,5	0,92	91,8	6,3	1,5	1,3	2,3			
200 L2	50	30,0	2940	53,5	0,92	92,8	7,3	2,0	1,6	2,9	0,128	195	
	60	36,0	3535	55,5	0,92	92,5	6,9	2,0	1,5	2,7			
200 LX2	50	37,0	2940	67	0,90	93,0	7,0	1,8	1,3	2,4	0,193	255	
	60	44,0	3535	68	0,91	93,0	6,5	1,6	1,2	2,3			
225 M2	50	45,0	2940	80	0,91	93,7	7,5	1,8	1,4	2,7	0,220	290	
	60	54,0	3530	84	0,90	93,5	7,0	1,7	1,3	2,5			
250 M2	50	55,0	2955	98	0,91	93,7	7,5	2,0	1,5	2,6	0,375	360	
	60	66,0	3545	103	0,90	93,5	6,8	1,8	1,4	2,3			
280 S2	50	75,0	2970	131	0,92	94,6	7,5	2,0	1,6	2,6	0,650	490	
	60	90,0	3565	137	0,92	94,0	6,8	1,8	1,4	2,4			
280 M2	50	90	2970	159	0,91	94,7	8,5	2,2	1,8	2,8	0,675	510	
	60	105	3565	160	0,91	94,5	7,6	2,0	1,6	2,6			
315 S2	50	110	2975	193	0,91	95,4	8,5	1,5	1,3	2,5	1,21	720	
	60	132	3970	200	0,91	95,0	7,5	1,3	1,2	2,3			
315 M2	50	132	2975	231	0,91	95,4	8,5	2,0	1,8	2,7	1,44	800	
	60	158 150 ¹⁾	3570 3570	239 227	0,91	95,4	7,7 8,1	1,8 1,9	1,6 1,7	2,3 2,9			
315 MX2	50	160	2975	272	0,93	96,0	8,5	2,0	1,6	2,6	1,76	980	
	60	190	3570	282	0,92	96,0	7,6	1,8	1,5	2,4			
315 MY2	50	200	2970	344	0,92	96,0	8,2	2,6	2,0	2,6	2,82	1170	
	60	225	3568	339	0,91	95,8	8,0	2,6	2,0	2,6			
315 L2	50	250	2973	425	0,93	96,1	7,3	2,1	1,4	2,0	3,66	1460	
	60	280	3570	416	0,92	96,0	6,6	1,9	1,3	1,8			
315 LX2	50	280	2965	478	0,92	96,7	8,2	2,6	1,6	2,2	4,43	1630	
	60	310	3580	462	0,91	96,7	8,8	2,9	1,7	2,4			
355 M2	50	315	2985			Values on request						4,20	2000
	60	340	3585			Values on request							
355 MX2	50	355	2985			Values on request						5,60	2200
	60	390	3585			Values on request							
355 LY2	50	400	2985			Values on request						7,10	2400
	60	440	3585			Values on request							
355 L2	50	450	2985			Values on request						7,10	2400
	60	490	3585			Values on request							

¹⁾ valid for BV, dNV, LR

Three-phase motors with squirrel-cage rotor for sea-going vessels

Degrees of protection IP 55/56, insulation class F, mode of operation S1, continuous duty

Baugröße KPER bis BG 112 K11R ab BG 132 K22R ab BG 355	Fre- quenz	Bemessungsleistung und max. Kühl- mitteltemperatur (KT)		Bemessungs- drehzahl n	Bemessungs- strom 380 V 440 V	Leistungs- faktor cos φ	Wirkungsgrad η	Anzugs- strom bei direktem Bemessungs- stromes	Anzugs- moment Einschalten als Vielfaches des Bemessungs- drehmomentes 380 V 50 Hz 440 V 60 Hz	Sattel- moment	Kipp- moment	Trägheits- moment	Gewicht netto etwa
		KT CT °C	Vorschr. Standard										
Frame KPER up to type 112 K11R from type 132 K22R from type 355	Fre- quency	45 45 50 50 45 45	GL RRS ABS BV dNV LRS	Rated speed	Rated current	Power factor	Efficiency	Starting current for direct-on-line rated current	Starting torque	Pull-up torque starting as multiples of rated torque	Pull-out torque	Moment of inertia	Net weight approx.
	c/s			n	380 V 440 V	cos φ	η			380 V 50 c/s 440 V 60 c/s			
	Hz	kW		1/min	A	-	%	-	-	-	-	kgm ²	kg

Synchronous speed 1500 rpm - four-pole design

63 K4	50	0,12	1360	0,45	0,72	56,0	3,1	1,7	1,6	2,0	0,00019	4,8	
	60	0,14	1660	0,43	0,70	61,0	3,2	1,7	1,7	2,1			
63 G4	50	0,18	1340	0,62	0,73	60,0	3,2	1,8	1,8	2,1	0,00024	5,2	
	60	0,21	1660	0,62	0,68	65,0	3,3	1,9	1,9	2,2			
71 K4	50	0,25	1370	0,77	0,77	64,0	3,5	1,6	1,6	1,9	0,00040	6,8	
	60	0,3	1660	0,77	0,76	67,0	3,7	1,6	1,6	1,8			
71 G4	50	0,37	1345	1,06	0,80	66,0	3,8	1,8	1,8	2,0	0,00050	7,8	
	60	0,44	1660	1,06	0,77	71,0	3,9	1,8	1,8	2,0			
80 K4	50	0,55	1390	1,60	0,77	68,0	4,2	2,0	1,9	2,1	0,00087	10,6	
	60	0,65	1690	1,54	0,75	74,0	4,5	2,0	1,7	2,1			
80 G4	50	0,75	1380	2,15	0,76	70,0	4,4	2,1	2,0	2,2	0,00107	11,7	
	60	0,9	1685	2,05	0,76	76,0	4,8	1,9	1,8	2,0			
90 S4	50	1,1	1400	2,65	0,84	75,0	5,0	2,1	2,0	2,2	0,00207	15,5	
	60	1,3	1700	2,65	0,83	78,0	5,2	1,9	1,8	2,2			
90 L4	50	1,5	1390	3,50	0,86	76,0	5,2	2,3	2,2	2,4	0,00260	18	
	60	1,8	1690	3,50	0,84	80,0	5,2	2,1	2,0	2,2			
100 L4	50	2,2	1410	5,15	0,81	80,0	5,8	2,7	2,5	2,8	0,00400	23,5	
	60	2,6	1705	5,20	0,80	82,0	6,2	2,5	2,3	2,6			
100 LX4	50	3,0	1425	6,75	0,82	81,0	6,1	2,1	1,9	2,6	0,00725	30	
	60	3,6	1715	6,95	0,83	82,0	6,2	1,9	1,8	2,5			
112 M4	50	4,0	1425	9	0,82	82,0	6,7	2,4	2,3	2,8	0,0090	37	
	60	4,8	1720	9	0,83	85,0	6,6	2,3	2,1	2,8			
112 MX4	60	6,6	1730	11,5	0,90	84,0	6,1	1,6	1,5	2,7	0,0110	45	
132 S4	50	5,5	1440	11	0,89	85,7	6,5	1,9	1,7	3,0	0,0150	50	
	60	6,6	1745	11,5	0,88	86,0	6,5	1,9	1,7	3,0			
132 M4	50	7,5	1450	16	0,84	86,0	6,0	2,0	1,7	2,9	0,0280	70	
	60	9,0	1750	16	0,84	87,0	6,0	2,0	1,7	2,8			
160 M4	50	11,0	1450	22,5	0,85	88,0	6,8	2,2	1,9	3,3	0,0350	92	
	60	13,0	1750	22,5	0,86	88,0	6,5	2,0	1,7	3,0			
160 L4	50	15,0	1465	29,5	0,86	89,4	7,3	2,5	2,0	3,0	0,0780	120	
	60	18,0	1765	30,5	0,86	89,4	7,6	2,5	2,0	3,0			
180 M4	50	18,5 17,5 ¹⁾	1460	36,5 34,5	0,86	90,0	6,8 7,2	2,5 2,6	2,0 2,1	2,9 3,1	0,0900	136	
	60	22,0 20,0 ¹⁾	1760	37,5 34,5	0,85	90,0	6,7 7,1	2,5 2,6	2,0 2,1	2,8 2,9			
180 L4	50	22,0	1465	44	0,84	90,5	6,5	2,0	1,8	2,6	0,138	170	
	60	26,0	1765	44,5	0,85	90,5	6,1	1,8	1,6	2,4			
200 L4	50	30,0	1465	58,5	0,85	91,5	7,0	2,0	1,7	2,4	0,168	200	
	60	36,0 34,0 ¹⁾	1765	59,5 56,5	0,86	92,0	6,6 6,9	1,8 1,9	1,6 1,7	2,2 2,3			
225 S4	50	37,0	1470	70,5	0,86	92,5	7,0	2,0	1,7	2,5	0,275	270	
	60	44,0	1765	72,5	0,86	92,5	6,6	1,8	1,5	2,3			
225 M4	50	45,0 43,0 ¹⁾	1470	85,5 81,5	0,86	93,0	7,0 7,3	2,0 2,1	1,7 1,8	2,5 2,6	0,313	300	
	60	54,0 49,5 ¹⁾	1770	89,5 82	0,86	92,0	6,5 7,1	1,8 2,0	1,5 1,6	2,3 2,5			
250 M4	50	55,0	1475	104	0,86	93,5	7,0	2,2	1,7	2,3	0,525	375	
	60	66,0 63,0 ¹⁾	1770	109 104	0,86	92,5	6,5 6,8	2,0 2,1	1,5 1,6	2,0 2,1			
280 S4	50	75	1480	141	0,86	94,1	7,0	2,0	1,7	2,2	0,950	520	
	60	90	1777	148	0,85	94,0	6,5	1,8	1,6	1,9			
280 M4	50	90	1480	168	0,86	94,6	7,0	2,1	1,6	2,2	1,100	580	
	60	105	1777	170	0,86	94,4	6,5	1,9	1,4	1,9			
315 S4	50	110	1485	204	0,86	95,1	7,5	1,8	1,6	2,2	1,96	740	
	60	132	1780	214	0,85	95,0	7,3	1,6	1,4	2,0			
315 M4	50	132	1485	245	0,86	95,1	7,0	1,8	1,5	2,2	2,27	840	
	60	158	1777	257	0,85	95,0	6,6	1,6	1,3	2,0			
315 MX4	50	160	1480	294	0,87	95,0	7,0	1,8	1,5	2,0	2,73	1000	
	60	190	1775	307	0,86	94,5	6,6	1,6	1,4	1,8			
315 MY4	50	200	1485	360	0,88	96,0	7,5	2,0	1,8	2,4	4,82	1200	
	60	225	1785	349	0,88	96,0	7,4	1,9	1,8	2,3			
315 L4	50	250	1485	439	0,90	96,1	8,0	2,0	1,6	2,3	5,93	1450	
	60	280	1785	434	0,88	96,1	7,4	1,9	1,5	2,2			
315 LX4	50	280	1490	501	0,88	96,5	8,6	1,9	1,5	2,5	6,82	1630	
	60	310	1790	478	0,88	96,8	8,8	1,9	1,6	2,5			
355 M4	50	315	1492				Values on request					7,90	2150
	60	340	1790										
355 MX4	50	355	1495				Values on request					9,50	2400
	60	390	1790										
355 LY4	50	400	1495				Values on request					10,0	2500
	60	440	1790										

¹⁾ valid for BV, dNV, LR

Three-phase motors with squirrel-cage rotor for sea-going vessels

Degrees of protection IP 55/56, insulation class F, mode of operation S1, continuous duty

Baugröße KPER bis BG 112 K11R ab BG 132 K22R ab BG 355	Fre- quenz	Bemessungsleistung und max. Kühl- mitteltemperatur (KT)		Bemessungs- drehzahl n	Bemessungs- strom 380 V 440 V	Leistungs- faktor cos φ	Wirkungsgrad η	Anzugs- strom bei direktem Bemessungs- stromes	Anzugs- moment Einschalten als Vielfaches des Bemessungs- drehmomentes	Sattel- moment als Vielfaches des Bemessungs- drehmomentes	Kipp- moment	Trägheits- moment	Gewicht netto etwa
		KT CT °C	Vorschr. Standard										
Frame KPER up to type 112 K11R from type 132 K22R from type 355	Fre- quency	45 45 50 50 45 45	GL RRS ABS BV dNV LRS	Rated speed	Rated current	Power factor	Efficiency	Starting current for direct-on-line rated current	Starting torque for direct-on-line starting as multiples of rated torque	Pull-up torque	Pull-out torque	Moment of inertia	Net weight approx.
	c/s	45 45 50 50 45 45		n	380 V 440 V	cos φ	η			380 V 50 c/s 440 V 60 c/s			
	Hz	KW		1/min	A	-	%	-	-	-	-	kgm ²	kg

Synchronous speed 1000 rpm - six-pole design

63 K6	50	0,09	880	0,45	0,62	49,0	2,4	1,9	1,9	2,2	0,00024	4,9	
	60	0,105	1085	0,45	0,58	53,0	2,7	1,9	1,9	2,2			
63 G6	50	0,12	865	0,57	0,64	50,0	2,4	1,8	1,8	2,0	0,00027	5,7	
	60	0,14	1080	0,58	0,57	56,0	2,5	1,9	1,9	2,1			
71 K6	50	0,18	920	0,82	0,56	60,0	2,8	1,5	1,5	1,8	0,00045	7,4	
	60	0,21	1120	0,80	0,53	65,0	3,2	1,4	1,4	1,7			
71 G6	50	0,25	900	1,07	0,59	60,0	2,8	1,8	1,8	2,0	0,00060	8,3	
	60	0,30	1100	1,06	0,58	64,0	3,2	1,6	1,6	1,8			
80 K6	50	0,37	905	1,23	0,73	63,0	3,3	1,8	1,8	1,8	0,00130	11	
	60	0,44	1110	1,17	0,74	67,0	3,6	1,7	1,6	1,7			
80 G6	50	0,55	895	1,74	0,73	66,0	3,5	2,0	2,0	2,2	0,00175	12,5	
	60	0,65	1110	1,7	0,71	71,0	3,8	1,9	1,8	2,0			
90 S6	50	0,75	930	2,32	0,70	70,0	4,4	2,1	2,1	2,4	0,00325	16	
	60	0,9	1130	2,4	0,68	73,0	4,7	1,9	1,9	2,2			
90 L6	50	1,1	925	3,15	0,73	73,0	4,5	2,0	2,0	2,2	0,00425	19	
	60	1,3	1120	3,25	0,70	75,0	4,5	1,8	1,8	2,0			
100 L6	50	1,5	935	4	0,75	76,0	4,5	1,9	1,8	2,2	0,00625	24	
	60	1,8	1130	4	0,75	79,0	4,8	1,7	1,6	2,0			
112 M6	50	2,2	940	5,35	0,80	78,0	5,1	2,0	1,9	2,5	0,01125	33,5	
	60	2,6	1140	5,2	0,81	81,0	5,8	1,8	1,7	2,3			
132 S6	50	3,0	955	7,1	0,82	78,2	5,7	1,8	1,6	2,7	0,0180	46	
	60	3,6	1155	7,4	0,80	80,0	5,5	1,7	1,4	2,4			
132 M6	50	4,0	955	9,5	0,80	80,0	6,0	2,2	2,0	3,1	0,0230	53	
	60	4,8	1152	9,8	0,79	81,0	5,8	2,0	1,8	2,7			
132 MX6	50	5,5	955	12	0,83	83,0	5,0	1,8	1,5	2,3	0,0430	70	
	60	6,6	1145	12,5	0,82	83,0	4,8	1,6	1,3	2,0			
160 M6	50	7,5	960	16,5	0,82	85,0	5,5	2,0	1,6	2,5	0,0530	86	
	60	9	1145	17	0,82	85,0	5,2	1,8	1,4	2,2			
160 L6	50	11	965	23	0,86	85,2	5,0	2,0	1,7	2,3	0,1130	114	
	60	13	1155	23	0,86	85,5	4,6	1,8	1,5	2,0			
180 L6	50	14,0 13,5 ¹⁾	965	30 28,5	0,83	86,0	6,0 6,3	2,4 2,5	2,1 2,2	2,7 2,8	0,1450	136	
	60	16,0 15,5 ¹⁾	1165	29 28	0,83	87,0	5,8 6,0	2,2 2,3	1,9 2,0	2,6 2,7			
200 L6	50	18,5	970	36,5	0,87	88,1	5,5	2,0	1,7	2,4	0,228	175	
	60	21	1168	36	0,87	88,4	5,5	1,9	1,6	2,3			
200 LX6	50	22	970	43,5	0,87	88,8	6,2	2,2	1,8	2,6	0,268	200	
	60	26	1170	44	0,87	89,3	5,9	1,9	1,6	2,5			
225 M6	50	30	973	56,5	0,89	90,4	6,5	2,2	1,7	2,5	0,443	265	
	60	34	1170	56	0,88	90,3	5,9	1,8	1,5	2,4			
250 M6	50	37	975	69,5	0,89	91,0	6,5	2,2	1,7	2,3	0,825	360	
	60	42	1172	68,5	0,88	91,5	5,8	2,0	1,6	2,1			
280 S6	50	45	980	85,5	0,87	92,0	6,0	2,0	1,5	2,0	1,280	465	
	60	54	1180	88,5	0,87	92,0	5,5	1,8	1,4	1,8			
280 M6	50	55	980	103	0,88	92,5	6,5	2,3	1,7	2,4	1,480	520	
	60	66	1180	106	0,88	92,5	6,5	2,2	1,7	2,2			
315 S6	50	75	985	140	0,87	93,7	7,0	2,0	1,6	2,4	2,630	690	
	60	90	1182	145	0,87	93,5	6,5	1,8	1,4	2,2			
315 M6	50	90	990	165	0,88	94,4	7,0	2,0	1,7	2,4	3,330	800	
	60	108	1185	172	0,87	94,5	6,5	1,8	1,5	2,1			
315 MX6	50	110	990	202	0,88	94,0	7,5	2,2	1,7	2,6	3,60	880	
	60	132	1185	209	0,88	94,0	7,0	2,0	1,6	2,4			
315 MY6	50	132	990	240	0,88	95,0	7,5	2,0	1,7	2,4	6,00	1050	
	60	158	1190	248	0,88	95,0	7,0	1,9	1,6	2,3			
315 L6	50	160	985	287	0,89	95,3	7,5	2,3	1,9	2,4	6,67	1250	
	60	190 180 ¹⁾	1185	294 279	0,89	95,2	7,0 7,4	2,2 2,3	1,8 1,9	2,3 2,4			
315 LX6	50	200 190 ¹⁾	990	368 349	0,87	95,0	8,3 8,8	2,2 2,3	2,0 2,1	2,7 2,8	8,60	1460	
	60	230 220 ¹⁾	1185	356 341	0,89	95,2	7,7 8,0	2,0 2,1	1,8 1,9	2,5 2,6			
355 M6	50	220	994	Values on request								8,20	1650
	60	240	1190	Values on request									
355 MX6	50	250	990	Values on request								12,10	2200
	60	270	1190	Values on request									
355 LY6	50	315	990	Values on request								14,0	2400
	60	340	1190	Values on request									

¹⁾ valid for BV, dNV, LR

Three-phase motors with squirrel-cage rotor for sea-going vessels

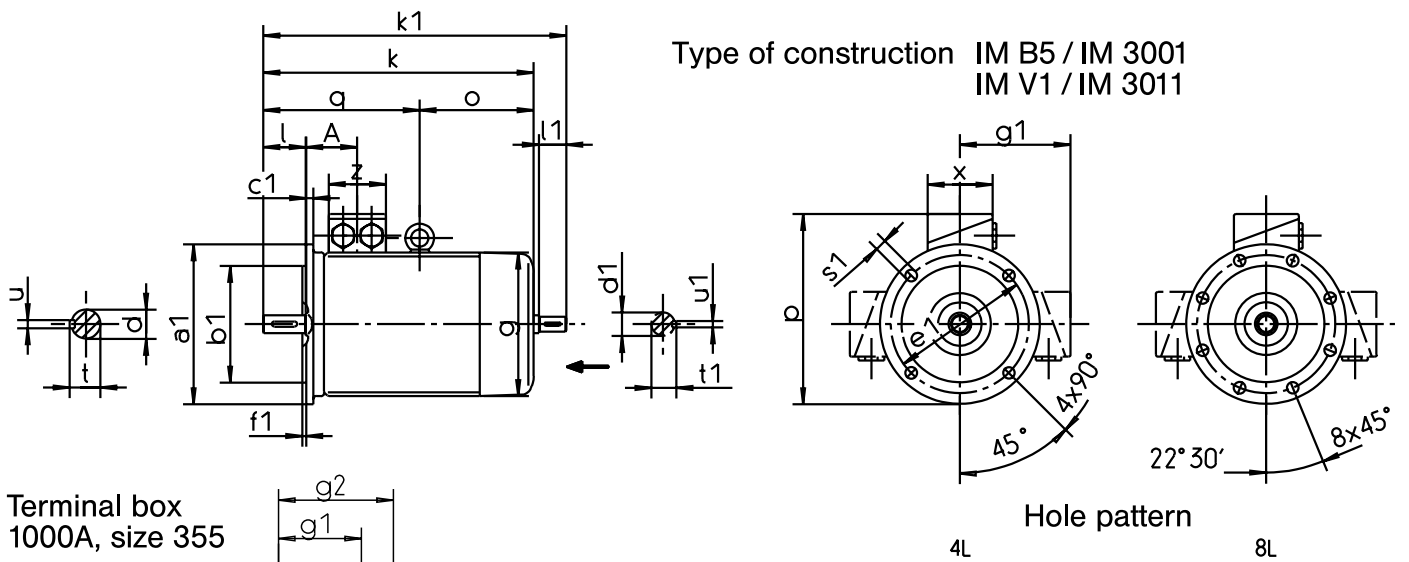
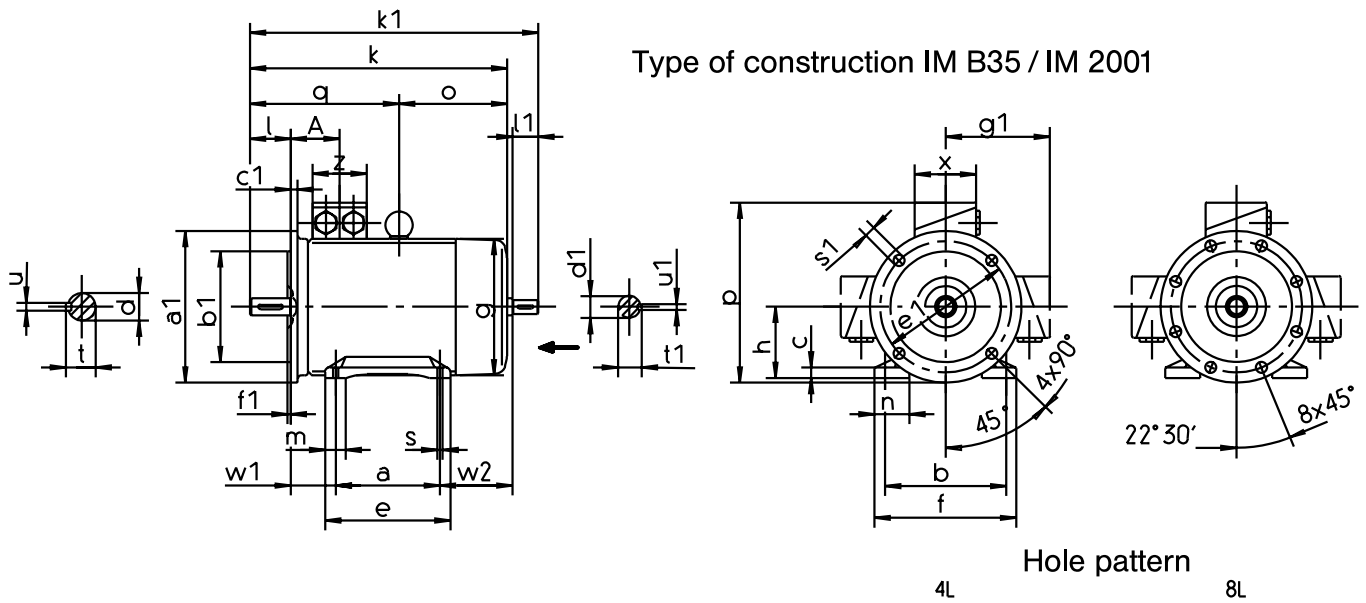
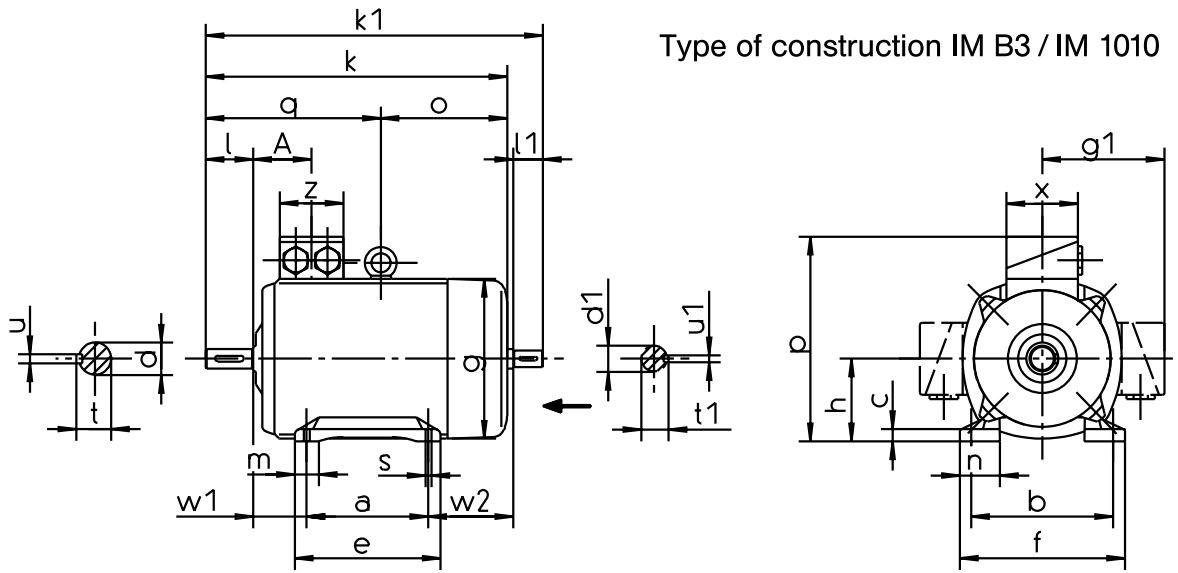
Degrees of protection IP 55/56, insulation class F, mode of operation S1, continuous duty

Baugröße KPER bis BG 112 K11R ab BG 132 K22R ab BG 355	Fre- quenz	Bemessungsleistung und max. Kühl- mitteltemperatur (KT)		Bemessungs- drehzahl n	Bemessungs- strom 380 V 440 V	Leistungs- faktor cos φ	Wirkungsgrad η	Anzugs- strom bei direktem Bemessungs- stromes	Anzugs- moment Einschalten als Vielfaches des Bemessungs- drehmomentes 380 V 50 Hz 440 V 60 Hz	Sattel- moment	Kipp- moment	Trägheits- moment	Gewicht netto etwa
		KT CT °C	Vorschr. Standard										
Frame KPER up to type 112 K11R from type 132 K22R from type 355	Fre- quency	45 45 50 50 45 45	GL RRS ABS BV dNV LRS	Rated speed	Rated current	Power factor	Efficiency	Starting current for direct-on-line rated current	Starting torque for starting as multiples of rated torque	Pull-up torque	Pull-out torque	Moment of inertia	Net weight approx.
	c/s			n	380 V 440 V	cos φ	η			380 V 50 c/s 440 V 60 c/s			
	Hz	kW		1/min	A	-	%	-	-	-	-	kgm ²	kg

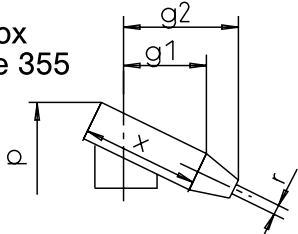
Synchronous speed 750 rpm - eight-pole design

71 K8	50	0,09	665	0,57	0,57	42,0	2,1	1,7	1,7	1,9	0,00050	6,6	
	60	0,105	820	0,51	0,54	50,0	2,3	1,6	1,6	1,7			
71 G8	50	0,12	660	0,7	0,58	45,0	2,3	1,6	1,6	2,0	0,00060	8,1	
	60	0,14	815	0,68	0,53	51,0	2,5	1,5	1,5	1,8			
80 K8	50	0,18	675	0,76	0,65	55,0	2,7	1,8	1,8	2,0	0,00130	10,5	
	60	0,21	830	0,74	0,62	60,0	2,8	1,6	1,6	1,8			
80 G8	50	0,25	685	1,07	0,61	58,0	3,0	2,1	2,1	2,3	0,00175	12	
	60	0,30	835	1,06	0,60	62,0	3,1	1,9	1,9	2,1			
90 S8	50	0,37	695	1,56	0,61	59,0	2,9	1,7	1,7	1,9	0,00300	15	
	60	0,44	850	1,56	0,57	65,0	3,6	1,6	1,6	1,7			
90 L8	50	0,55	690	2,07	0,64	63,0	3,1	1,7	1,7	2,0	0,00375	18	
	60	0,65	840	2,03	0,60	70,0	3,7	1,7	1,7	1,8			
100 L8	50	0,75	700	2,75	0,62	67,0	3,2	1,8	1,8	2,1	0,00625	23	
	60	0,9	850	2,7	0,63	69,0	3,7	1,6	1,6	1,9			
100 LX8	50	1,1	695	3,3	0,70	72,0	3,9	1,8	1,8	2,2	0,00900	28	
	60	1,3	850	3,25	0,69	76,0	4,2	1,6	1,6	2,0			
112 M8	50	1,5	695	4,2	0,73	74,0	4,1	2,0	1,9	2,3	0,01225	33,5	
	60	1,8	840	4,15	0,73	78,0	4,2	1,8	1,7	2,1			
132 S8	50	2,2	705	5,8	0,76	75,5	4,5	1,7	1,6	2,3	0,0180	46	
	60	2,6	855	6,0	0,74	76,5	4,3	1,6	1,5	2,2			
132 M8	50	3,0	705	7,8	0,75	78,0	4,5	1,7	1,6	2,3	0,0230	53	
	60	3,6	850	8,0	0,76	78,0	4,2	1,5	1,4	2,1			
160 M8	50	4,0	710	9,8	0,78	79,3	4,0	1,6	1,3	1,9	0,0430	70	
	60	4,8	850	10,5	0,75	79,5	3,8	1,4	1,1	1,7			
160 MX8	50	5,5	710	13	0,78	81,4	4,5	1,7	1,6	2,1	0,0530	86	
	60	6,6	860	13,5	0,77	82,3	4,1	1,5	1,4	2,0			
160 L8	50	7,5	725	17,5	0,78	83,0	4,5	1,8	1,6	2,1	0,1130	114	
	60	9,0	870	18	0,79	83,5	4,0	1,6	1,4	1,9			
180 L8	50	11,0 10,5 ¹⁾	720	25 24	0,78	85,0	4,5 4,7	2,0 2,1	1,7 1,8	2,1 2,2	0,1450	136	
	60	13,0 12,0 ¹⁾	865	25,5 23,5	0,78	86,0	4,1 4,4	1,8 2,0	1,6 1,7	2,0 2,2			
200 L8	50	15,0	725	33,5	0,79	86,5	5,0	2,0	1,7	2,3	0,2280	175	
	60	18,0	875	34	0,79	87,4	4,7	1,8	1,5	2,0			
225 S8	50	18,5 17,5 ¹⁾	725	38 36	0,83	89,2	5,5 5,8	2,0 2,1	1,6 1,7	2,2 2,3	0,4400	265	
	60	22,0 20,0 ¹⁾	875	40 36,5	0,81	89,0	5,0 5,5	1,8 2,0	1,4 1,5	2,0 2,2			
225 M8	50	22	725	44,5	0,84	89,2	5,0	1,8	1,5	2,2	0,4400	265	
	60	26	870	45,5	0,84	89,5	4,7	1,6	1,4	2,0			
250 M8	50	30	730	64	0,79	90,2	5,5	2,2	1,8	2,2	0,8250	360	
	60	36	880	67	0,78	90,5	5,1	2,0	1,6	2,0			
280 S8	50	37	735	77	0,80	91,0	5,5	2,0	1,5	2,0	1,350	465	
	60	44	882	79,5	0,80	90,5	4,9	1,9	1,4	1,9			
280 M8	50	45	735	97	0,77	91,5	6,0	2,3	1,8	2,4	1,550	520	
	60	54	884	99,5	0,78	91,5	5,5	2,1	1,6	2,1			
315 S8	50	55	740	112	0,80	93,1	6,5	1,8	1,6	2,3	2,630	690	
	60	66	889	116	0,80	93,3	6,1	1,6	1,5	2,0			
315 M8	50	75	740	151	0,81	93,3	6,0	2,0	1,6	2,3	3,330	800	
	60	90	879	157	0,81	93,0	5,7	1,8	1,4	2,0			
315 MX8	50	90	740	181	0,81	93,5	6,0	1,9	1,6	2,2	3,60	880	
	60	108	883	187	0,81	93,5	5,4	1,6	1,4	1,8			
315 MY8	50	110	740	218	0,81	94,6	6,5	2,1	1,8	2,4	6,00	1050	
	60	132	888	226	0,81	94,5	6,3	1,9	1,7	2,3			
315 L8	50	132	740	254	0,83	95,0	6,3	2,0	1,7	2,1	6,76	1250	
	60	158	890	267	0,82	94,8	6,0	1,9	1,6	2,0			
315 LX8	50	160	740	323	0,79	95,2	7,2	2,2	1,9	2,5	8,71	1430	
	60	190	890	327	0,80	95,3	6,8	2,0	1,7	2,3			
355 M8	50	180	745	Values on request								9,50	1600
	60	200	890	Values on request									
355 MX8	50	200	745	Values on request								13,40	2200
	60	220	890	Values on request									
355 LY8	50	250	745	Values on request								15,80	2400
	60	270	890	Values on request									

¹⁾ valid for BV, dNV, LR



Terminal box
1000A, size 355



Design with grooved ball bearing (easy bearing arrangement)

Type	D-end Antifriction bearing						N-end Antifriction bearing			Figure	Fixed	Relubricating facility possible
	V-ring	γ-type rotary ring	Felt ring	Wave washer	Disk spring	V-ring	Wave washer	Felt ring	D-end	N-end bearing		
KPER 63												
KPER 71												
KPER 80												
KPER 90												
KPER 100												
KPER 100 LX												
KPER 112 M												
K11R 132 S, SX2,M6,8												
K11R 132 M4,MX6												
K11R 160 M,MX8												
K11R 160 MX2, L												
K11R 180 M4, L6, 8												
K11R 180 M2, L4												
K11R 200 L, LX6												
K11R 200 LX2												
K11R 225 M2												
K11R 225 S4, 8, M4,6,8,												
K11R 250 M2												
K11R 250 M4,6,8												
K11R 280 S2,M2												
K11R 280 S4,6,8,M4,6,8 LL												
K11R 315 S2,M2												
K11R 315 S4,6,8,M4,6,8 LL												
K11R 315 MX2												
K11R 315 MX4,6,8 LL												
K11R 315 MY2												
K11R 315 MY4,6,8 LL												
K11R 315 L2, LX2												
K11R 315 L4,6,8, LX4,6,8 LL												
K22R 355 M,MY,MX,LY,L2 LL												
K22R 355 M,MY,MX,LY,L4,6,8 LL												

¹⁾ For vertical types of construction Q317 C3; figures 2/18 , 2/17 from size 315 MX as standard with relubricating facility

Design with roller bearing (heavy bearing arrangement VL)

Type	D-end Antifriction bearing				N-end Antifriction bearing		Figure	Fixed	Relubricating facility possible
	V-ring	γ-type rotary ring	V-ring	V-ring	D-end	N-end	bearing		
K11R 132 S, SX2,M6,8 VL									
K11R 132 M4,MX6 VL									
K11R 160 M, MX8 VL									
K11R 160 MX2, L VL									
K11R 180 M4, L6, 8 VL									
K11R 180 M2, L4 VL									
K11R 200 L, LX6 VL									
K11R 200 LX2 VL									
K11R 225 M2 VL									
K11R 225 S4, 8, M4,6,8 VL									
K11R 250 M2 VL									
K11R 250 M4,6,8 VL									
K11R 280 S2,M2 VL									
K11R 280 S4,6,8,M4,6,8VL									
K11R 315 S2,M2 VL									
K11R 315 S4,6,8,M4,6,8 VL									
K11R 315 MX2 VL									
K11R 315 MX4,6,8 VL									
K11R 315 MY2 VL									
K11R 315 MY4,6,8 VL									
K11R 315 L2, LX2 VL									
K11R 315 L4,6,8, LX4,6,8 VL									
K22R 355 M,MY,MX,LY,L2 VL									
K22R 355 M,MY,MX,LY,L4,6,8 VL									

¹⁾ For vertical types of construction Q317 C3 from size 315 MX as standard with relubricating facility

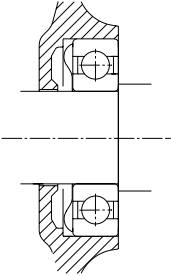
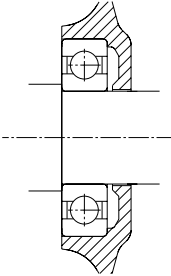
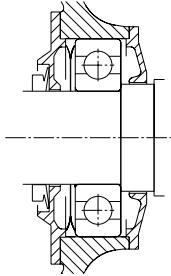
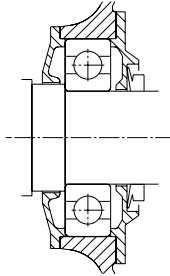
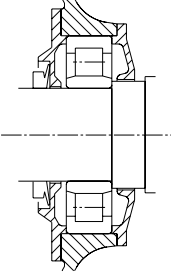
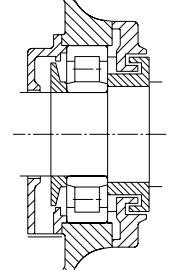
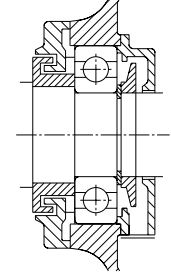
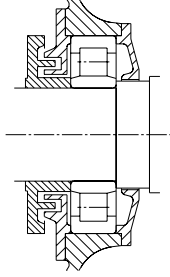
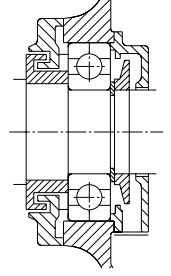
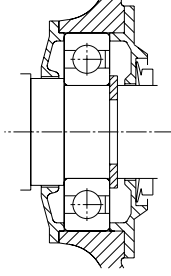
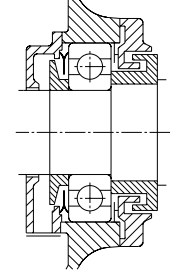
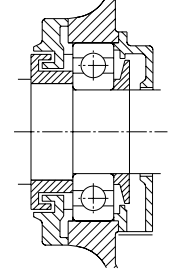
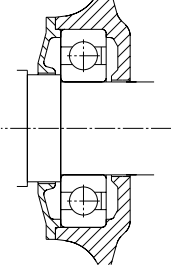
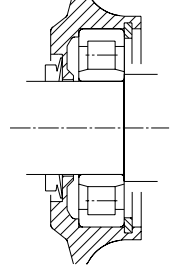
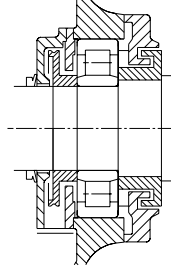
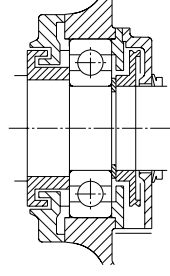
Type	Size	Material	Thread of the terminal studs	Thread protective conductor	Thread for cable gland acc. to DIN 89 280	for cable diameter mm
KPER 63-80	16A	die-cast aluminium	M4	M4	M20 x 1,5 ³⁾	7...13
KPER 90-112	16A	die-cast aluminium	M4	M4	M25 x 1,5 ³⁾	9...17
K11R 132	25A	GG	M5	M6	M30	14,5...20,5
K11R 160 M2 - 8 MX8	25A	GG	M5	M6	M30	14,5...20,5
K11R 160 L MX2	63A	GG	M6	M6	M36	16,5...26,5
K11R 180	63A	GG	M6	M6	M36	16,5...26,
K11R 200 L LX6	63A	GG	M6	M6	M36	16,5...26,
K11R 200 LX2	100A	GG	SB8	M8	M45	27...32,5
K11R 225	100A	GG	SB8	M8	M45	27...32,5
K11R 250	100A	GG	SB8	M8	M45	27...32,5
K11R 280	200A	GG	M10	M10	M56	33...41,5
K11R 315S M	200A	GG	M10	M10	M72	42...56,5
K11R 315MX	200A	GG	M10	M10	M72	42...56,5
K11R 315S M	400A ¹⁾	GG	M12	M10	M72	42...56,5
K11R 315 MX	400A ¹⁾	GG	M12	M10	M72	42...56,5
K11R 315 MY, L, LX	400A ²⁾	GG	M12 or M16	M10	M72	42...56,5
	1000A	GG	4xM10	LK	M80	62...68
K22R 355 MY, M	400A ²⁾	GG	M12 or M16	LK	M72	42...56,5
	1000A	GG	4xM10	LK	M80	62...6
K22R 355 MX, LY, L, LX	1000A	GG	4xM10	LK	M80	62...68

LK...saddle terminal

¹⁾ design 220/380 V D/Y or 230/400 V D/Y

²⁾ design 220/380 V D/Y or 230/400 V D/Y not available

³⁾ according to DIN 50262

			
Fig. 2/1	Fig. 2/2	Fig. 2/3	Fig. 2/4
			
Fig. 2/5	Fig. 2/6	Fig. 2/7	Fig. 2/8
			
Fig. 2/9	Fig. 2/10	Fig. 2/11	Fig. 2/12
			
Fig. 2/13	Fig. 2/14	Fig. 2/15	Fig. 2/16

<p>Fig. 2/17</p>	<p>Fig. 2/18</p>	<p>Fig. 2/19</p>	<p>Fig. 2/20</p>
<p>Fig. 2/21</p>	<p>Fig. 2/22</p>	<p>Fig. 2/23</p>	<p>Fig. 2/24</p>
<p>Fig. 2/25</p>	<p>Fig. 2/26</p>		

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with slip-ring rotor, 4,0 - 315 kW
Synchronous speed 3000, 1500, 1000, 750 rpm

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- Versions with feet and flanges
- pole-changing motor
- motors with star-delta switch
- motors with design in explosion proof EEx e, EEx d and Ex nA
- special motors in marine design
- motors with winding protection (thermal)
- higher degrees of protection up to IP 67 S
- Brake motors
- Built-in motors 0,06 - 90 kW
- motors in acc. CSA

Geared motor units

- Spur-g geared motors
- Spur-worm geared motors
- variable speed geared motors

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