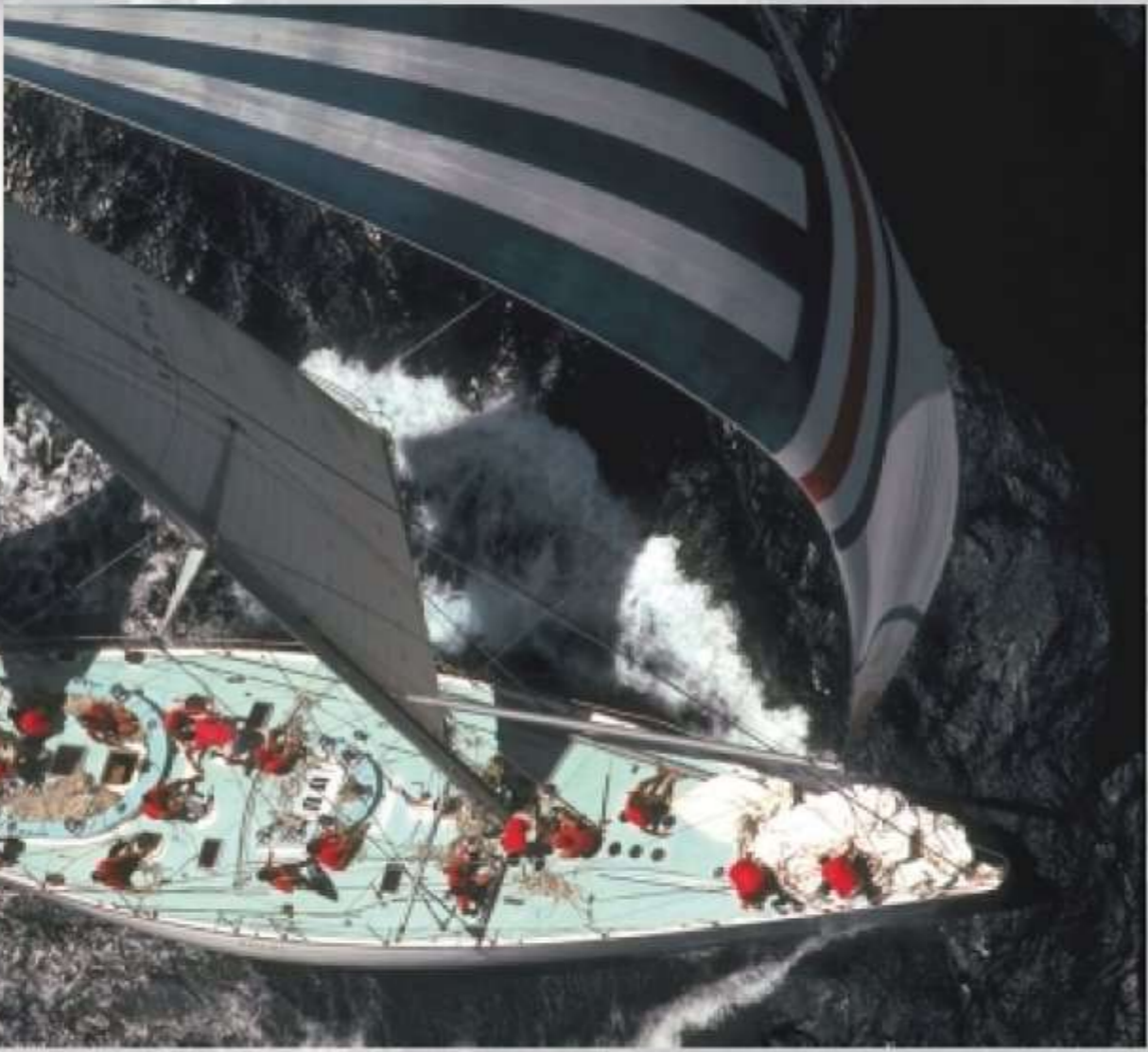


Three-phase motors with squirrel-cage rotor for sea-going vessels

Product specification



VEM motors GmbH



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 the 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	Admissible limit of temperature rise in K (measuring according to rise-of-resistance method)				
		Insulation class				
	C°	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

size	L_S (dB)
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 °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 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 ≥ 100 kW	P ≥ 100 kW	P ≥ 100 kW	P ≥ 100 kW
BV	all	all	all	all
RS	P ≥ 100 kW	—	all	—
GL	P ≥ 50 kW	—	all	—
LRS	P ≥ 100 kW	P ≥ 100 kW	all	—
NV	P ≥ 100 kW	P ≥ 100 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.

Works Certificate

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. 40°C	WKL Inst.class F
Motor-Nr./No.	Schaltung / Connection D/Y		IP 55
V 400 / 690	A 81 / 47	kW 45	
cos phi 0,86	1/min/r.p.m. 1470		L _{pa} /dB 66
Betriebsart Duty type S1	Hz/c/s 50	kg 300	

Normen und Vorschriften: Standard and regulations:	DIN EN 60034-1	IEC 34-1	Allgemeine Bestimmungen für drehende elektrische Maschinen
		IEC 85	Rotating electrical machines, Rating and performance
		IEC 72	Abmessungen und Nennleistungen
			Dimensions and output ratings
	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 u.m.l. 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	IEC 34-12	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 ≤ 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 ≥ 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 be correspond 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	± 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	≤ Ø shaft end 55 mm ≥ Ø 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	± 3,0 mm
	distance from shaft shoulder up to flange attachment surface fixing bearing D-end	± 0,5 mm
	Distance from shaft shoulder up to flange attachment surface	± 3,0 mm
	motor weight	- 5 up to + 10 %

Types of construction

Types	basic type of construction	derived type of construction					
	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				
							

KPER 56-100
 K11R 112-200
 K11R 225-315MY¹⁾
 K11R 315L,LX²⁾
 K22R 355²⁾

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

Motor Selection Data

Design point 380 V, 50 cps; 440 V, 60 cps

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

Technical specification table for three-phase squirrel-cage rotor motors with columns for frame size, frequency, power, torque, efficiency, etc.

Synchronous speed 3000 rpm - two-pole design

Detailed motor selection table for 3000 rpm two-pole design, listing models like 63 K2, 71 K2, 80 K2, etc. with performance parameters.

1) valid for BV, dNV, LR

Motor Selection Data

Design point 380 V, 50 cps; 440 V, 60 cps

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

Technical specification table for three-phase squirrel-cage rotor motors with columns for frame size, frequency, power, torque, efficiency, etc.

Synchronous speed 1500 rpm - four-pole design

Detailed motor selection table for 1500 rpm four-pole design, listing models like 63 K4, 71 K4, 80 K4, etc. with performance parameters.

1) valid for BV, dNV, LR

Constructive selection data

Three-phase motors with squirrel-cage rotor for sea-going vessels with surface cooling, type of cooling IC 144, degree of protection IP 55/56

Table with columns: Motor type, Frame, Power (P), Voltage (U), Current (I), Speed (n), Dimensions (a, b, c, d, e, f, g, h, k, L), and Tolerances (a1, b1, c1, d1, e1, f1, g1, h1, k1, L1).

Tolerance for counter parts: H7. 2nd shaft end or direct coupling only. EI = min. distance for air inlet. -- = air inlet.

Threaded center bores in the shaft end DIN 332-D5:

at diameter 11 up to 13 M4

at diameter 14 up to 16 M5

at diameter 17 up to 21 M6

at diameter 22 up to 24 M8

at diameter 25 up to 30 M10

at diameter 31 up to 38 M12

at diameter 39 up to 50 M16

at diameter 51 up to 90 M20

at diameter 100 M21

at diameter 100 M24

at diameter 100 M24

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Dimensions

Table with columns: Motor type, Frame, Power (P), Voltage (U), Current (I), Speed (n), Dimensions (l, ll, m, mt, n, o, p, q, r, s, t, tt, u, u1, w1, w2, A, B, x(l), z(l), z(l)'), and Tolerances (l1, ll1, m1, mt1, n1, o1, p1, q1, r1, s1, t1, tt1, u1, u11, w11, w21, A1, B1, x(l)1, z(l)1, z(l)1').

* Version with larger terminal box. I terminal box for metric cable DIN 89280. II terminal box with compound sealed connection piece.

Special equipment relubricating facility. Flat grease nipple with head diameter 10 mm.

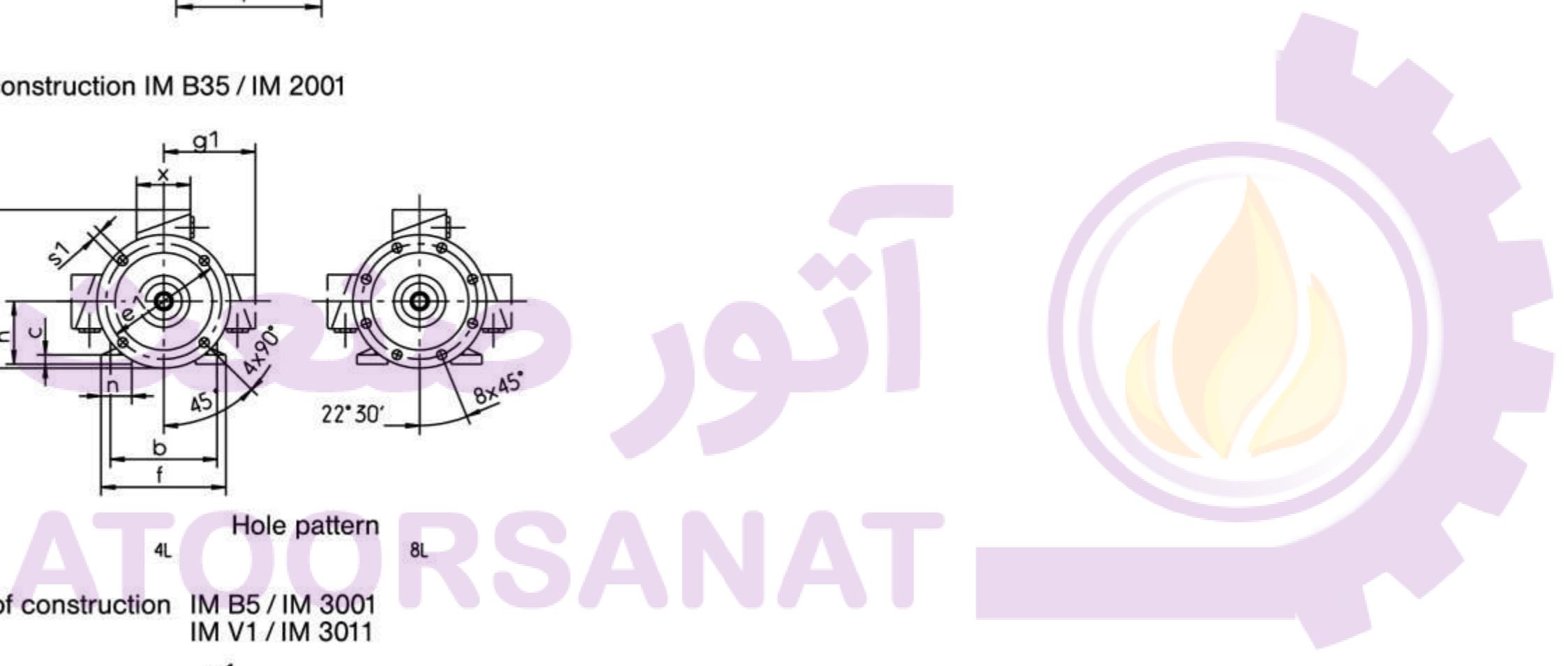
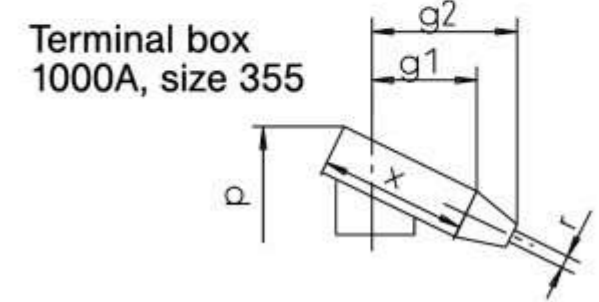
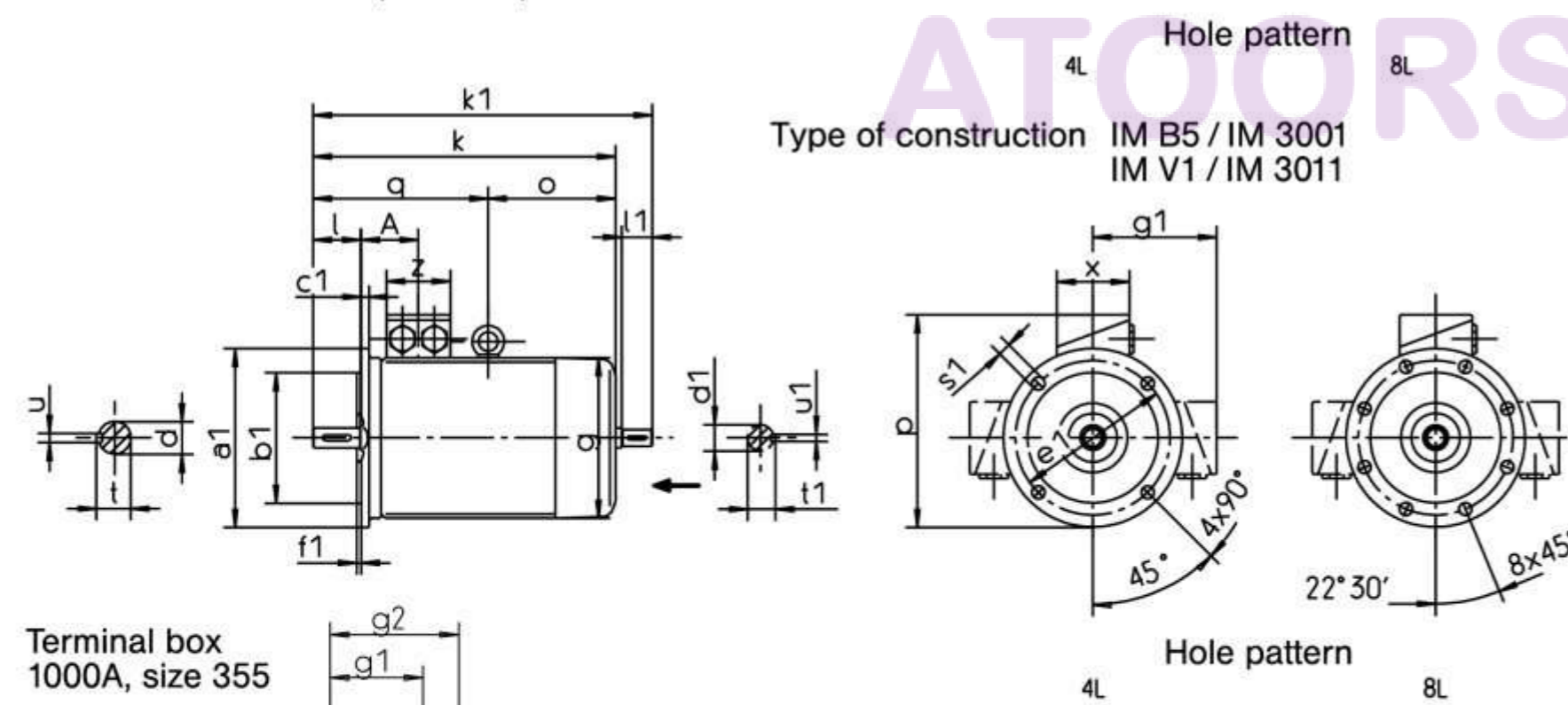
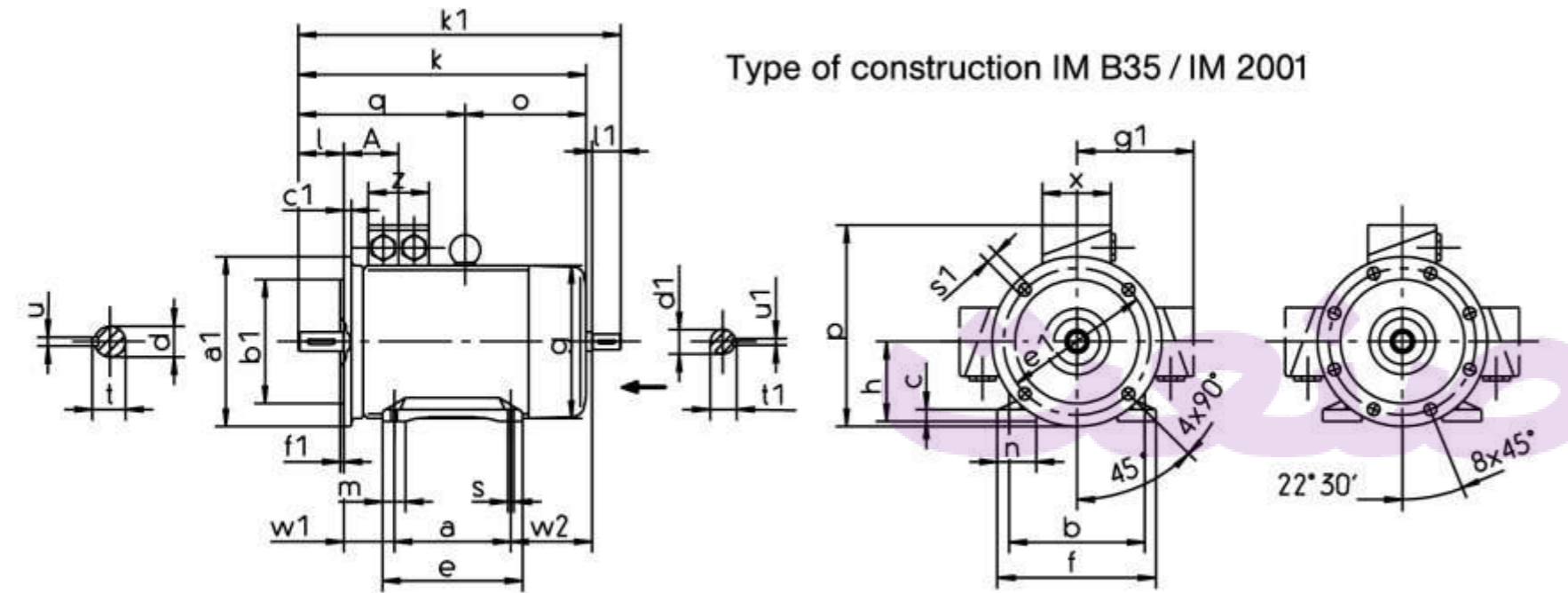
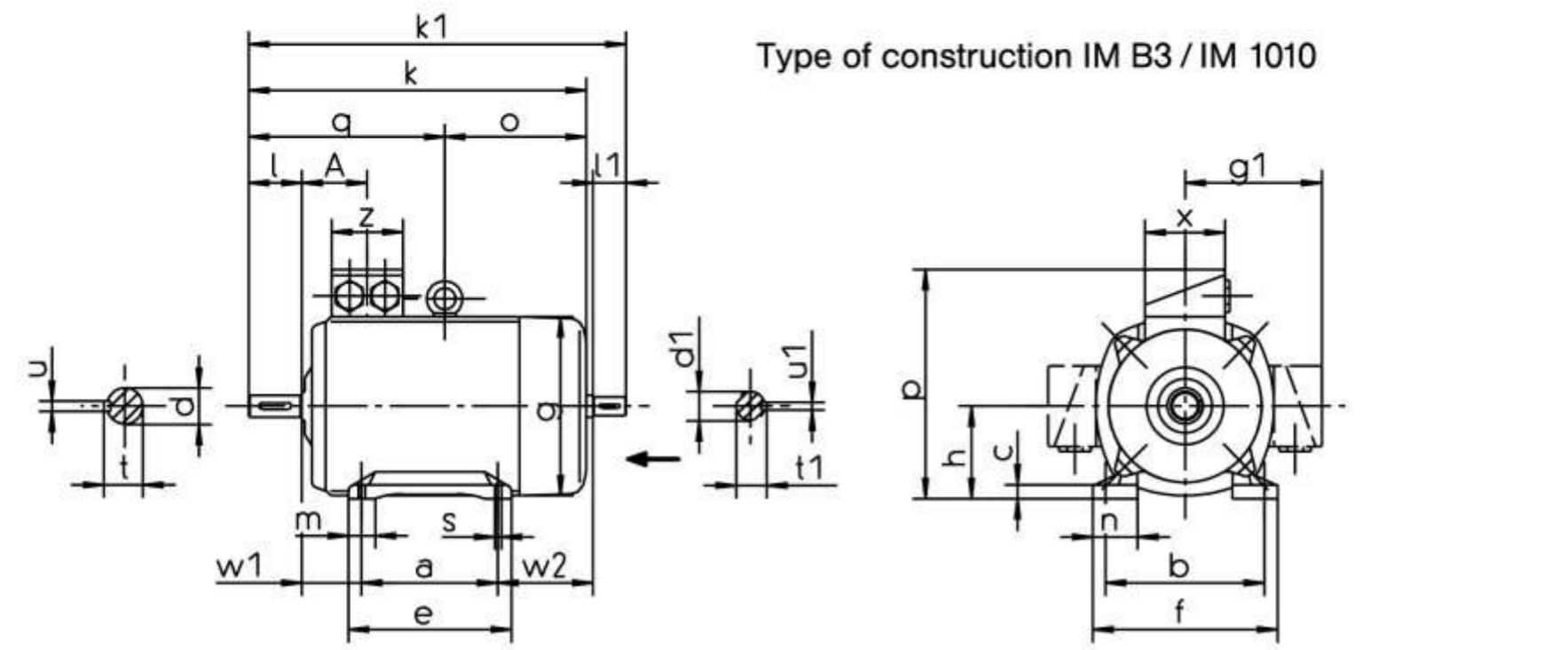
grease outlet opposite to flat grease nipple.

special equipment relubricating facility not available for K11R 132 S, SX2, M6, M8 and K11R 160 M, MX8.

Two eye-bolts only for type of construction IM V1 from K11R 180 M2, L4

Constructive selection data

Dimensions



Constructive selection data

Bearing arrangement

Design with grooved ball bearing (easy bearing arrangement)

Type	D-end Antifriction bearing					N-end Antifriction bearing			Figure D-end N-end bearing		Fixed bearing	Relubricating facility possible	
	V-ring	γ-type rotary ring	Felt ring	Wave washer	Disk spring	V-ring	Wave washer	Felt ring	Figure	Fixed			
KPER 63			11,5x19	-	-	6201 2Z C3	-	32	12x22	2/19	2/20	without	no
KPER 71			14,5x21	-	-	6202 2Z C3	-	35	15x24	2/19	2/20	without	no
KPER 80			19,5x26	-	-	6204 2Z C3	-	47	20x32	2/19	2/20	without	no
KPER 90			24,5x35	-	-	6205 2Z C3	-	52	25x40	2/19	2/20	without	no
KPER 100			24,5x35	-	-	6205 2Z C3	-	52	25x40	2/19	2/20	without	no
KPER 100 LX			29,2x40	-	-	6206 2Z C3	-	62	30x50	2/19	2/20	without	no
KPER 112 M			29,2x40	-	-	6206 2Z C3	-	62	30x50	2/19	2/20	without	no
K11R 132 S, SX2,M6,8			-	-	80	6207 2RS C3	-	-	-	2/1	2/2	without	no
K11R 132 M4,MX6			-	-	90	6308 2RS C3	-	-	-	2/1	2/2	without	no
K11R 160 M,MX8			-	-	100	6308 2RS C3	-	-	-	2/1	2/2	without	no
K11R 160 MX2, L			-	-	110	6309 2RS C3	-	-	-	2/1	2/2	without	yes
K11R 180 M4, L6, 8			-	-	110	6309 2RS C3	-	-	-	2/1	2/2	without	yes
K11R 180 M2, L4			-	-	110	6310 C3	50A	-	-	2/3	2/4	N-end	yes
K11R 200 L, LX6			-	-	130	6310 C3	50A	-	-	2/3	2/4	N-end	yes
K11R 200 LX2			-	-	130	6312 C3 ¹⁾	60A	-	-	2/3	2/4	N-end	yes
K11R 225 M2			-	-	130	6312 C3 ¹⁾	60A	-	-	2/3	2/4	N-end	yes
K11R 225 S4, 8, M4,6,8,			-	-	140	6312 C3 ¹⁾	60A	-	-	2/3	2/4	N-end	yes
K11R 250 M2			-	-	140	6313 C3 ¹⁾	65A	-	-	2/3	2/4	N-end	yes
K11R 250 M4,6,8			-	-	150	6313 C3 ¹⁾	65A	-	-	2/3	2/4	N-end	yes
K11R 280 S2,M2			-	-	150	6314 C3 ¹⁾	70A	-	-	2/3	2/4	N-end	yes
K11R 280 S4,6,8,M4,6,8 LL			-	-	-	6314 C3 ¹⁾	70A	-	-	2/3	2/10	N-end	yes
K11R 315 S2,M2			-	-	170	6316 C3 ¹⁾	80A	-	-	2/3	2/4	N-end	yes
K11R 315 S4,6,8,M4,6,8 LL			-	-	-	6316 C3 ¹⁾	80A	-	-	2/3	2/4	N-end	yes
K11R 315 MX2		RB85	-	-	-	6316 C3 ¹⁾	80A	-	-	2/25	2/23	N-end	yes
K11R 315 MX4,6,8 LL		RB100	-	-	-	6316 C3 ¹⁾	80A	-	-	2/25	2/23	N-end	yes
K11R 315 MY2		RB85	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes
K11R 315 MY4,6,8 LL		RB100	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes
K11R 315 L2, LX2		RB85	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes
K11R 315 L4,6,8, LX4,6,8 LL		RB100	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes
K22R 355 M,MY,MX,LY,L2 LL		-	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes
K22R 355 M,MY,MX,LY,L4,6,8 LL		-	-	-	-	6317 C3 ¹⁾	85A	-	-	2/18	2/16	N-end	yes

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 D-end N-end bearing		Fixed bearing	Relubricating facility possible		
	V-ring	γ-type rotary ring	V-ring		Figure	Fixed				
K11R 132 S, SX2,M6,8 VL			40A	-	6207 RS C3	-	2/14	2/21	N-end	no
K11R 132 M4,MX6 VL			40A	-	6308 RS C3	-	2/14	2/21	N-end	no
K11R 160 M, MX8 VL			45A	-	6308 RS C3	-	2/14	2/21	N-end	no
K11R 160 MX2, L VL			50A	-	6309 RS C3	-	2/5	2/21	N-end	yes
K11R 180 M4, L6, 8 VL			50A	-	6309 RS C3	-	2/5	2/21	N-end	yes
K11R 180 M2, L4 VL			50A	-	6310 C3	50A	2/5	2/10	N-end	yes
K11R 200 L, LX6 VL			60A	-	6310 C3	50A	2/5	2/10	N-end	yes
K11R 200 LX2 VL			60A	-	6312 C3	60A	2/5	2/10	N-end	yes
K11R 225 M2 VL		RB60	-	-	6312 C3	60A	2/22	2/23	N-end	yes
K11R 225 S4, 8, M4,6,8 VL		RB65	-	-	6312 C3	60A	2/22	2/23	N-end	yes
K11R 250 M2 VL		RB65	-	-	6313 C3	65A	2/22	2/23	N-end	yes
K11R 250 M4,6,8 VL		RB70	-	-	6313 C3	65A	2/22	2/23	N-end	yes
K11R 280 S2,M2 VL		RB70	-	-	6314 C3	70A	2/22	2/23	N-end	yes
K11R 280 S4,6,8,M4,6,8VL		-	80A	-	6314 C3	70A	2/5	2/10	N-end	yes
K11R 315 S2,M2 VL		RB80	-	-	6316 C3	80A	2/22	2/23	N-end	yes
K11R 315 S4,6,8,M4,6,8 VL		RB80	-	-	6316 C3	80A	2/5	2/10	N-end	yes
K11R 315 MX2 VL		RB85	-	-	6316 C3	80A	2/22	2/23	N-end	yes
K11R 315 MX4,6,8 VL		RB100	-	-	6316 C3	80A	2/22	2/23	N-end	yes
K11R 315 MY2 VL		RB85	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes
K11R 315 MY4,6,8 VL		RB100	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes
K11R 315 L2, LX2 VL		RB85	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes
K11R 315 L4,6,8, LX4,6,8 VL		RB100	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes
K22R 355 M,MY,MX,LY,L2 VL		-	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes
K22R 355 M,MY,MX,LY,L4,6,8 VL		-	-	-	6317 C3 ¹⁾	85A	2/15	2/16	N-end	yes

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

Constructive selection data

Terminal boxes

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

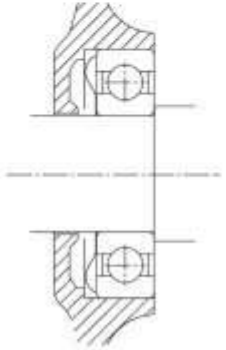
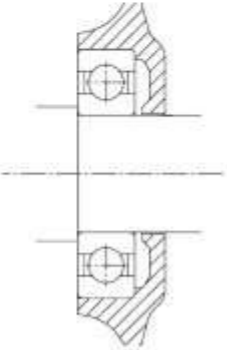
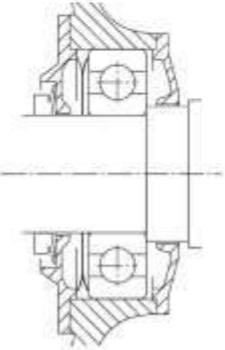
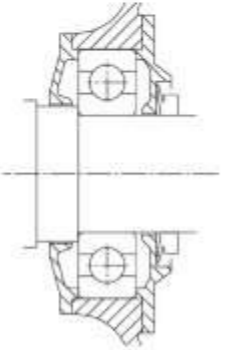
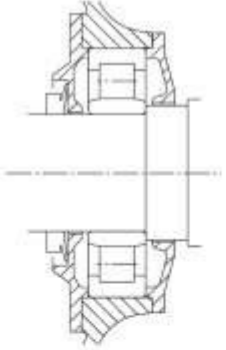
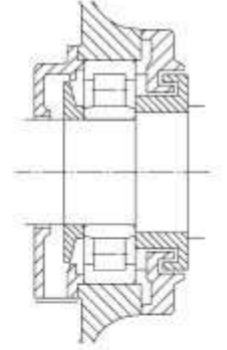
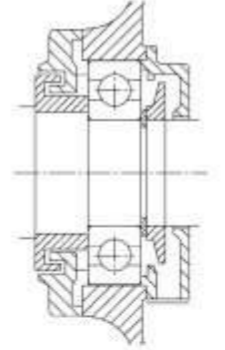
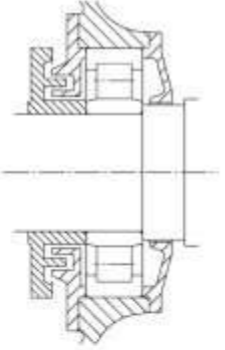
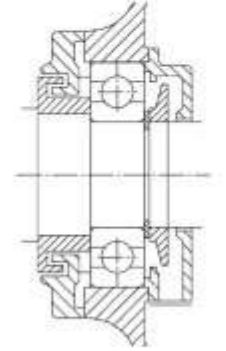
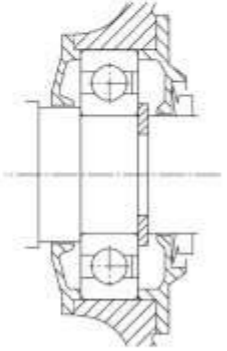
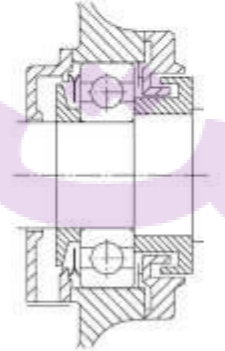
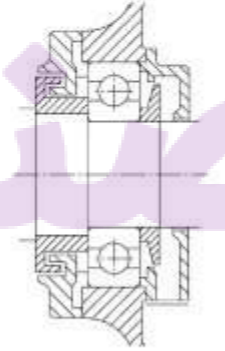
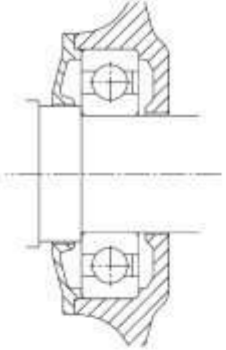
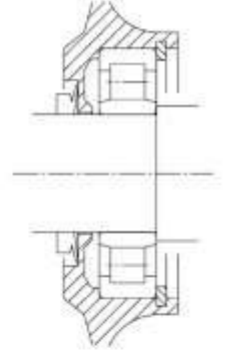
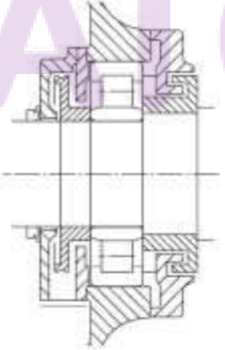
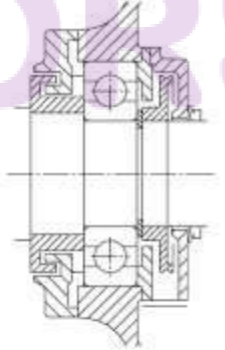
LK...saddle terminal

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

Constructive selection data

Bearing arrangement

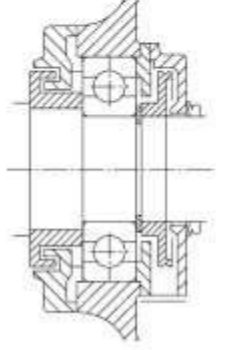
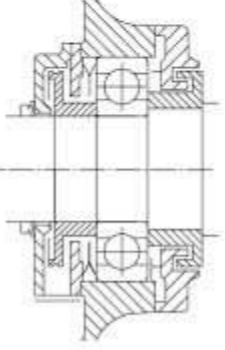
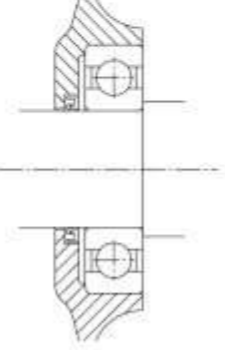
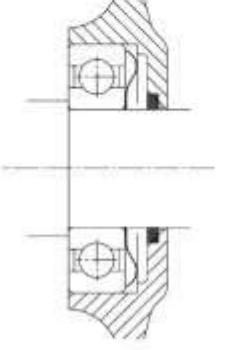
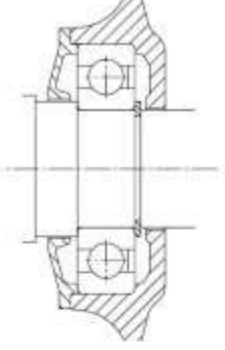
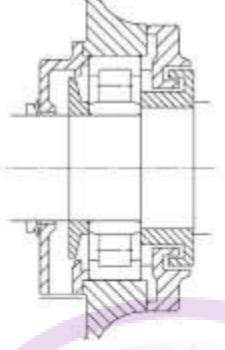
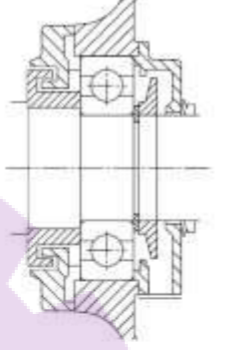
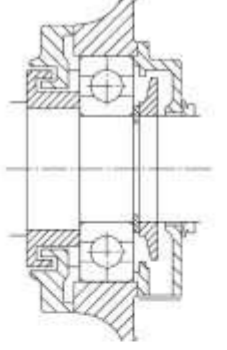
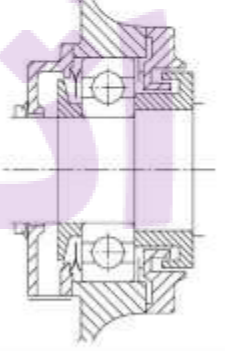
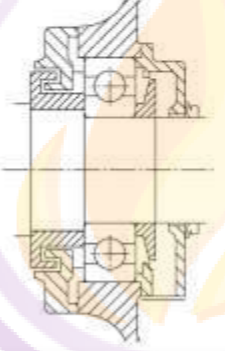
Figures

			
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

Constructive selection data

Bearing arrangement

Figures

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