Basic Type of Construction	Derived Types of Construction				
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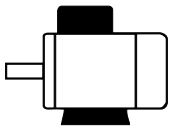	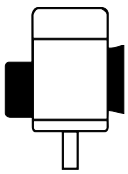	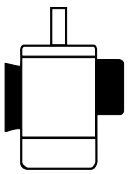	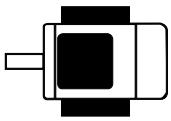	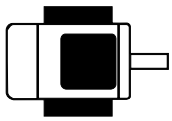	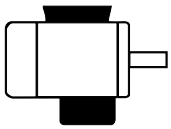
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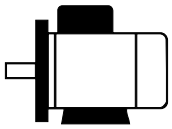	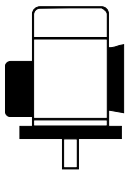	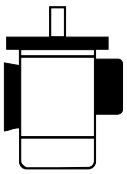		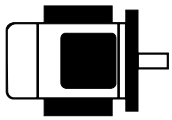	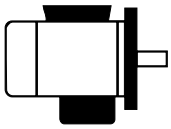
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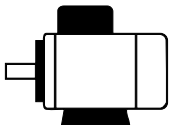
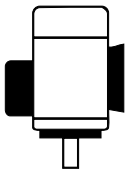
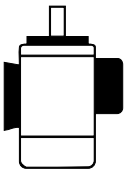
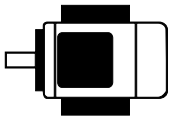
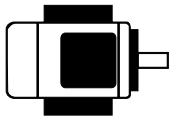
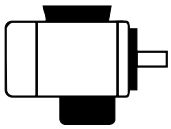
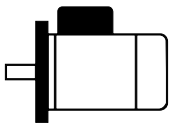
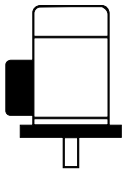
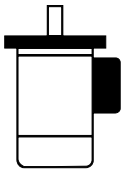
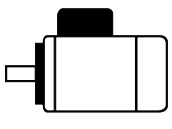
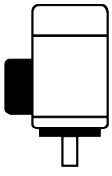
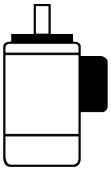
					
IM B5 IM 3001	IM V1 IM 3011	IM V3 3) IM 3031 3)			
					
IM B14 2) IM 3601	IM V18 2) IM 3611	IM V19 2) IM 3631			
					

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

Exceptions:

[1] On inquiry

[2] Only available in the types of construction 56 - 160

[3] This type of construction is to be ordered directly because of additional water return hole in the flange end shield

Shaft ends

As specified in IEC 34-7, the definition of the motor ends is as follows :
D-end (DS): Drive end of the motor (Driving side)
N-end (NS): Non-driving end (opposite end to the drive end) (Non-driving side)
The motors are always supplied with the key fitted. The second shaft end can transmit the full nominal output with coupling service. The power transmission capability at belt service, chain service or pinion service for the second shaft end is available on request.

Degrees of protection

Degrees of protection for electrical machines are indicated according to DIN VDE 0530 part 5 through the identification marking „IP“ and two characteristic numerals for the degree of protection. The first characteristic numeral specifies the protection against damaging ingress of dust and foreign particles and against contact with inner moving or live parts, the second characteristic numeral specifies the protection against the penetration of water having an effect on the machine from different directions and with different intensities.
The respective degrees of protection of the various series of motors are to be taken from the tables of the electrical selection data.

Sense of rotation

When connecting a VEM motor with the stator terminals U, V, W to a three-phase mains with the phase sequence L1, L2 and L3, the direction of rotation of the motor goes clockwise as seen on the D-end. In case of required alteration of the direction of rotation, two terminals are to be exchanged.

Bearing arrangement / bearing lubrication

VEM motors are equipped with antifriction bearings of well-known manufacturers. The bearings 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 service.
The sizes 56 - 160 are equipped with life-lubricated bearings. For motors from size 180, depending on the useful life of grease, 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 relubricating 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 at 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.

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.

Transport locking

According to the specific conditions of transport, motors with cylindrical roller bearing can be provided, according to DIN 5412, with a transport locking on the driving end as protection against transport shocks.

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. On demand, the vibration intensity stages R (reduced) and S (special) can be delivered in dependence on the type at extra charge.

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		
		56 - 132	160 - 225	250 - 450
N (normal)	600-3600	1,8	2,8	3,5
R (reduced)	600-1800 up to 1800-3600	0,71 1,12	1,12 1,8	1,8 2,8
S (special)	600-1800 up to 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.

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 tabular value + 5 dB (A) applies as an approximate value for motors in 60 cps design. Binding data for 60 cps are available on request. For the main type series, the noise values are specified in the main catalogue in form of tables. In case of special versions, please refer to the manufacturer.

Cooling and ventilation

The motors are equipped with radial fans which cool the motor, whatever is the direction of rotation (IC 411 according to DIN EN 60034-6). When installing the motors, care should be taken that a minmum distance from the fan cover to the wall (dimension B) is maintained.

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 at up to + 25 °C.

Finish system Sizes 56 - 112
All components except aluminium terminal boxes : prime plastic paint, layer thickness approx. 30µm
Finish coat water-soluble varnish with layer thicknesses from 30 µm to 60 µm
Sizes 132 - 355
Synthetic-resin zincphosphate primary coat, layer thickness approx. 30 µm
Finish coat : two-component polyurethane, layer thickness approx. 30 µm

Special finish
Adapted for group of climates „World-wide“ according to IEC 721-2-1
- Non-weather-protected 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
Sizes 56 - 112
All components with prime plastic paint, layer thicknesses: approx. 30 µm
Finish coat water-soluble varnish with layer thicknesses from 60 µm to 90 µm
Two-component coating varnish on demand
BG 132 - 355
Synthetic-resin zincphosphate primary coat, layer thickness approx. 30 µm
Intermediate coat on two-component base, layer thickness approx. 30 µm
Finish coat: two-component coating varnish on demand
Standard colour RAL 7031 blue-grey
Further special coating systems:
Version for excessive thermal stresses
Version for excessive chemical and radiation stresses
Special finish upon customer’s request

Design voltage and frequency

In the basic version, the motors are supplied for following design voltages:

230/400 V Δ/Y 50 cps	690 V Δ	50 cps
400/690 V Δ/Y 50 cps	480 V Δ	60 cps

The motors can run without changing the nominal output in mains, in which the voltage at nominal frequency deviates from the nomianl value up to ± 5 % (design voltage range A). The above mentioned standard voltages according to DIN IEC 38 are taken as design point. Application for voltage range is possible, limits see tables of the electrical selection data.
Special voltages and frequencies upon customer’s request.

Design torque

The nominal torque in Nm given at the motor shaft is calculated by

$$M = \frac{9550 \times P}{n}$$ with P = nominal output in kW, n = speed in rpm