

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 minimum 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 nominal 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

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

If the voltages deviate from their nominal value (within the admissible limits), starting torque, pull-up torque and pull-out torque change about quadratically and the starting current changes about linearly with the voltage variation.

Design output

The nominal output applies for continuous operation as specified in DIN EN 60034-1/02.99 at a coolant temperature of 40 °C and a site altitude of ≤ 1000 m above M.S.L. On account of the thermal reserve, the nominal output can be maintained up to 50 °C coolant temperature or up to 2.500 m site altitude. These conditions can only be applied alternatively. The output must be reduced in case of coupling. In case of motors in design for sea-going vessels, the output is possibly reduced according to the Classification Rules.

Additional thermal winding protection

The additional thermal winding protection is exclusively provided as additional protective device for monitoring the temperature of the stator winding and is not regarded as protective device according to VDE 0170/0171 part 6 / DIN EN 50019 appendix A.

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 for 2 min.
- 1,6 times the rated torque for 15 s

Both conditions apply to design voltage and design frequency.

Design efficiency and design power factor

The efficiency η and the power factor $\cos \varphi$ are stated in the Motor Selection Data lists. Partial load ratings on demand.

Re-starting with residual field and phase opposition

A re-starting after mains failure against 100 % residual field is possible for all motors.

Project planning and application instructions

Hazardous areas

Which zones in the open or in closed areas are to be considered hazardous within the relevant rules or regulations is to be leaved exclusively to the user or, in case of doubt about the definition of hazardous areas, to the competent inspectorate.

Electrical motors for potentially explosive atmospheres correspond to the standards of the series DIN EN 60034 (VDE 0530) as well as DIN EN 50014-50020, DIN EN 50281-1-1. In hazardous areas they can only be placed in accordance with the competent inspectorate being responsible for the assignment of potentially explosive atmospheres (zonal classification). The type of protection, the temperature class as well as special requirements are indicated on the rating plate or in the certificate of conformity.

Apparatus group I, category M2

Under this category come electrical machines of increased-safety types protections, of flameproof enclosure types of protection, of pressurized enclosure types of protection for being used in the mining area.

Apparatus group II, category 2 (up to now zone 1)

Under this category come electrical machines of increased-safety types protections, of flameproof enclosure types of protection, of pressurized enclosure types of protection for being used in the other areas endangered through an explosive atmosphere.

Apparatus group II, category 3 (up to now zone 2)

Under this category come electrical machines of the type of protection „Ex n“.

If the certificate number is completed by the letter X, special requirements in the certificate of conformity are to be observed.

The operation at the converter must be certified specially. The special manufacturer's instructions are to be observed absolutely. For the type of protection EEx e, motor, converter and protective device must be marked as components belonging together and the admissible operating data must be determined in the common test certificate (VDE 0165).

Through the interconnecting cable installed between converter and electrical machine, the voltage peaks generated by the converter can be badly influenced in their magnitude. In the system converter - cable - electrical machine, the maximum value of the voltage peaks at the terminals of the machine must never exceed the value indicated in the special manufacturer's instructions.