

General information

Ex motors in vertical type of construction with shaft extension pointing down must have a protective cover.

Extensive operating instructions are supplied as standard with explosion-proof motors.

For all explosion-proof motors, designs according to UL (order code **D31**) and CSA (order code **D40**) are not possible.

Motor connection

For motors in Ex version (except for Zone 22, VIK, certified metric cable glands/sealing plugs are included in the scope of supply.

Mains-fed operation

Motors to type of protection

- Ex e are only certified for mains-fed operation.
2-pole motors 1MA frame sizes 132 to 160 are designed with double rating plate (T1/T2 and T3) as standard. For motor versions with order codes A11/A12 or with voltage code "9" T3-output is then stamped on the rating plate as standard. Alternatively, "T1/T2-output on the rating plate" can be stamped – order code **C30**
- Ex de/Ex d are designed in the basic version for mains-fed operation
- Motors 1MJ6/1MJ7 for use in type of protection Ex d/de (Zone 1)/dust-Ex Zone 21, as well as Zone 22 for conducting dust – order code **M76**
- Motors 1LA/1LG can be modified for use in Zones 2, 21 or 22 if they are ordered using order codes:
 - Design for Zone 2 for mains-fed operation – (order code **M72**)
 - Design for Zones 2 and 22 for non-conducting dust (IP55) for mains-fed operation – (order code **M74**)
 - Design for Zone 21¹⁾, as well as Zone 22 for conducting dust (IP65) for mains-fed operation – (order code **M34**)
 - Design for Zone 22 for non-conducting dust (IP55) for mains-fed operation – (order code **M35**)

Certified motor protection switches/tripping units must be used for motor protection, see Catalog LV 1.

¹⁾ Zone 21 takes into account conducting and non-conducting dust.

Converter-fed operation

The motors are suitable for use with converters for voltage rise times $t_s > 0.1 \mu s$ for $U \leq 460 V$ (for motor series 1LA8 up to 500 V).

For converter-fed operation, Ex motors must always be monitored using PTC thermistors. Certified tripping units are required for this purpose, see Catalog LV 1.

For converter-fed operation with frame size 225 and above, it is recommended that an "Insulated bearing cartridge" – order code **L27** is used.

Type of protection "Explosion-proof enclosure" Ex de IIC T4/Ex d IIC T4

The motors must be ordered with:

- Motor protection with PTC thermistors for converter-fed operation with 4 embedded temperature sensors for tripping – Order code **A15**

or

- Motor protection with PTC thermistors for converter-fed operation with 8 embedded temperature sensors for alarm and tripping – Order code **A16**

or

- Design for Zones 1 and 21, as well as Zone 22 for conducting dust (IP65) for converter-fed operation, derating – order code **M77** (incl.order code **A15**)

For motor series 1MJ6 and 1MJ7, a fourth PTC thermistor is installed in the connection box.

Thermal utilization is according to temperature class 155 (F).

The EU type test certificate and factory certificate 2.1 also cover converter-fed operation.

General converters for Zone 2/21/22

1LA and 1LG motors for Zones 2, 21 and 22 for converter-fed operation have 3 PTC thermistors for tripping as standard. 1LG4/1LG6 motors also have an additional PTC thermistor in the connection box.

Optionally available: PTC thermistors for alarm for converter-fed operation in Zones 2, 21, 22 – Order code **A10**

For all motors, "MICROMASTER DUTY S9" is stamped on the rating plate complete with the relevant rating data. (Exception: Motor series 1LA8 and 1PQ8).

These rated operating points apply for both constant torque drives and pump/fan/compressor drives. For a constant torque drive, the resulting thermal motor torques in the positioning range must be taken into account.

On the rating plate, four rated operating points are possible in the following variants:

Possible variants:	Rated operating points in Hz				Additional order information
50 Hz field weakening range	5	25	50	$f_{max.}$	50 Hz voltage: e.g. "9" and L1A
60 Hz field weakening range	6	30	60	$f_{max.}$	60 Hz voltage: e.g. "9" and L2E
87 Hz characteristic	5	25	87	$f_{max.}$	87 Hz at 400 VΔ: "9" and L3A

Alternatively, rated operating points for SIMOVERT MASTERDRIVES, SINAMICS G110, SINAMICS S120 or ET 200S FC on the rating plate can be ordered as follows:

Y68 with plain text (C text): Y68:SIMOVERT MASTERDRIVES

Y68 with plain text (C text): Y68:SINAMICS G110

Y68 with plain text (C text): Y68:ET 200S FC

Y68 with plain text (C text): Y68:SINAMICS S120

- The converter type and the associated rating data are on the rating plate

The reasons for this are the different control levels for the converter with a converter output frequency of 45 Hz and above and the associated derating of the motor.

For compliance with temperature class 130 (B), derating is necessary in the case of converter-fed operation in Zones 2, 21 and 22. Derating information is available in the configuration tool SIZER (see Appendix).

The certificates for the motors and converters for hazardous areas are stored under "Documentation" in the SD configurator tool for low-voltage motors.

Only "one" voltage must be assigned to voltage codes/ order codes:

Voltage code	Order code	Mains voltage
3	-	500 VY 50 Hz
5	-	500 VΔ 50 Hz
9	L1A	400 VY 50 Hz
9	L1B	400 VΔ 50 Hz
9	L1C	415 VY 50 Hz
9	L1D	415 VΔ 50 Hz
9	L2E	460 VY 60 Hz
9	L2F	460 VΔ 60 Hz
9	L2W	440 VY 60 Hz
9	L2X	440 VΔ 60 Hz
9	L1Y (non-standard winding)	Plain text (max. 460 VY 50 or 60 Hz)
9	L3A ¹⁾	For 87 Hz 400 VΔ (4 to 8-pole)

¹⁾ Not technically possible for 1LG, FS 315 L.

1LA8, 1PQ8 motors for converter-fed operation

When 1LA8 and 1PQ8 motors are ordered, the speed setting range and the load torque must be specified as well as whether the application is for a "Constant torque drive" or a "Fan/pump/compressor drive".

In some cases, a system test must be performed to ensure that the admissible limit temperature is not exceeded.

- A system test is not generally required for motors for applications with quadratic load torque ($M \sim n^2$).
- A system test is usually required for motors for applications with constant load torque. In individual cases in which the motor type has already been measured once using the same speed setting range, a new system test is not necessary.

Please inquire in such cases.

For all motors, an additional rating plate complete with the rating data for the converter is fitted.

Converters specially for Zone 2, type of protection "n" or Ex nA II T3

The motors must be ordered with

- **Design for Zone 2 for converter-fed operation, derating**
Ex nA II T3 acc. to IEC/EN 60079-15 – Order code **M73**.

In the version for order code **M73**, PTC thermistors are included in accordance with temperature class 130 (B).

The IEC/EN 60079-15 standard requires that the converter drive for motors is subjected to the "non-sparking" test. The test is available for Siemens motors Ex nA II on Siemens converters in accordance with Factory Certificate 2.1.

Please inquire in the case of a non-Siemens converter (additional charge).

The test will cost more in the case of non-Siemens converters (especially on commissioning).

Commissioning personnel must be provided by the customer for setting up and operating the non-Siemens converter during the test, if required.

Converters specially for Zone 21/22

The motors must be ordered with:

- Design for Zone 21 ¹⁾, as well as Zone 22 for conducting dust (IP65) for converter-fed operation, derating – Order code **M38**
- Design for Zone 22 for non-conducting dust (IP55) for converter-fed operation, derating – Order code **M39**

In order codes **M38/M39**, PTC thermistors are included in accordance with temperature class 130 (B).

Please inquire in the case of a non-Siemens converter (additional charge).

Converters for Zone 2/22

The motors must be ordered with:

- Design for Zones 2 and 22 for non-conducting dust (IP55) for converter-fed operation, derating – Order code **M75**

In order code **M75**, PTC thermistors are included in accordance with temperature class 130 (B).

Please inquire in the case of a non-Siemens converter (additional charge).

VIK version

VIK standard version:

- VIK version – Order code **K30**

VIK version "Non-sparking":

- "Ex nA II T3" marking on VIK rating plate according to Directive 94/9/EU (ATEX) – Order code **C27**

The motors in VIK design (**K30**) contain technology for Zone 2 in Ex nA II T3 type of protection. In accordance with VIK recommendations, "Ex nA II T3" will only be stamped on the rating plate on the express wish of the customer when ordering with order code **C27**.

Note: When ordering, **C27** must be specified in addition to **K30**.

Motors up to frame size 355 can be supplied in accordance with the technical requirements of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V.). Not possible for 1LA5 motors, 1LG4 motors will be supplied.

1LG4, 1LG6, 1MJ6 and 1MJ7 motors in frame size 315 are supplied with special connection boxes with a removable cable entry plate.

Note the output and dimensions in the case of 1LA8 motors. With 1LA8 motors the connection boxes cannot be rotated by 4 x 90°. Motors in a vertical type of construction with the shaft extension pointing down must have a protective cover (e.g. type of construction code **4**). Use according to temperature class 130 (B) is mandatory. Frame sizes 400 and 450 are not included in VIK.

Please inquire about converter-fed operation in all cases.

Motors in VIK design with mounted technology (brake, rotary pulse encoder, separately driven fan and anti-condensation heater) are not compatible with Zone 2. Designs for Zone 21/22 are not possible.

Chinese explosion-proof certification

For projects in China in particular, explosion-proof motors are required that have been approved by a named Chinese testing authority.

Ex certification for China – Order code **D32**

The following motor series have Chinese Ex certification:

- Zone 1 type of protection "d" or Ex de IIC T4/Ex d IIC T4: 1MJ6, 1MJ7
- Zone 2 type of protection "n" or Ex nA II T3: 1LA6, 1LA7, 1LA9, 1LG when ordered in:
 - **Design for Zone 2 for mains-fed operation**
Ex nA II T3 acc. to IEC/EN 60079-15 – Order code **M72**.
 - **Design for Zone 2 for converter-fed operation, derating**
Ex nA II T3 acc. to IEC/EN 60079-15 – Order code **M73**.

In addition, the VIK design for motor series 1MJ6, 1MJ7, 1LA, 1LG can also be ordered with Ex certification for China.

When these motors are ordered in the version

- "Ex certification for China" – Order code **D32**

the "NEPSI ²⁾ certificate number" and the "NEPSI" logo are stamped on the rating plate.

For motor series 1LA8, the "CQST ³⁾ certificate number" and the logo: "CQST" are then stamped on the rating plate.

¹⁾ Zone 21 takes into account conducting and non-conducting dust.

²⁾ NEPSI = National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation.

³⁾ CQST = China National Quality Supervision and Test Centre for Explosion Protected Electrical Products.