

(1) **EU-Type-Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 2014/34/EU**



(3) **Certificate Number** TÜV CY 17 ATEX 0205845 X **Issue:** 04

(4) for the equipment: Three-phase Asynchronous Electrical Motors
Types: E3AC****; E3AB****; E3AM****; E4AC****; E4AB****; E4AM****

(5) of the manufacturer: **CEMP S.r.l.**

(6) Address: Via Piemonte, 16 - 20030 Senago (MI) - ITALY

Order number: 0205845-04

Date of issue: 2019-08-08

(7) The design of this equipment or protective system and any acceptable variation thereto are specified in the schedule to this EU-Type-Examination Certificate and the documents therein referred to.



(8) TÜV CYPRUS Ltd, notified body No. 2261 in accordance with Article 17 of the Council Directive of 2014/34/EU of February 26, 2014, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 17 0205845-04.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2012/A11:2013 EN 60079-1:2014 EN 60079-7:2015/A1:2018
EN 60079-31:2014

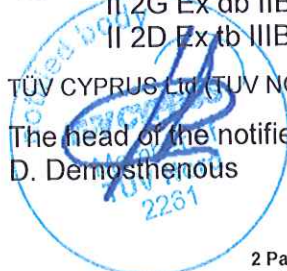
(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EU-Type-Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment which are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:

 <p>I M2 Ex db I Mb, or II 2G Ex db IIB or IIC T6...T3 Gb, or II 2D Ex tb IIB or IIC T85°C... T150°C Db, or</p>	 <p>I M2 Ex db eb I Mb, or II 2G Ex db eb IIB or IIC T6...T3 Gb, or II 3D Ex tc IIB or IIC T85°C... T150°C Dc</p>
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TÜV CYPRUS Ltd (TUV NORD Group),
The head of the notified body,
D. Demosthenous



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(13) SCHEDULE

(14) EU-Type-Examination Certificate No. TÜV CY 17 ATEX 0205845 X Issue 04

(15) Description of equipment

The three-phase asynchronous motors **E*A*******, sizes 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315 mm are made of cast iron enclosure material with separate compartments: motor enclosure and terminal box for supply and auxiliary circuits connection. Motor enclosure is designed in Ex-db type of protection, while the terminal boxes can be designed in Ex-db or Ex-eb type of protection. The terminal boxes with type of protection Ex-db are available in cast iron material, while the terminal boxes with type of protection Ex-eb are available in cast iron, carbon steel or stainless-steel material.

The motor and terminal box enclosures satisfy also the Ex-tb type of protection with mechanical protection degree IP65.

Special solution provides the motor without terminal box, the motor enclosure is closed by metallic plate and suitable cable glands for the stator winding cables.

The motors can be equipped with auxiliary devices: thermal detectors, encoders, anti-condensation heaters, motor-fan. The anti-condensation heaters installed inside the motor enclosure have a maximum power of 200W and are allowed to be in operation only when motor is not powered.

The motor supplied by inverter is equipped inside of stator winding with PTC or PT100 thermal detectors for temperature control. Rating data are specified on supplementary nameplate. The presence of the thermal detectors inside the motor is shown by appropriated warning label.

The thermal detectors are calibrated for cut off the supply at:

- Max. 120°C for temperature class T4/T125°C/T135°C
- Max. 130°C for temperature class T3/T150°C and for group I

The intervention of the thermal detector shall guarantee the disconnection of the supply; the resetting of the supply shall not be automatic.

The motor marked for temperature class T5 and T6 are not intended for supply by inverter (see exception inside "Special Condition for Use")

According to EN 60034-6 standard, the cooling is achieved by one of the following methods:

- Self-cooled motor by fan fitted on shaft, IC411;
- Fan directly coupled; IC418;
- Totally enclosed not ventilated, IC410;
- Forced ventilation by means of auxiliary motor, IC416

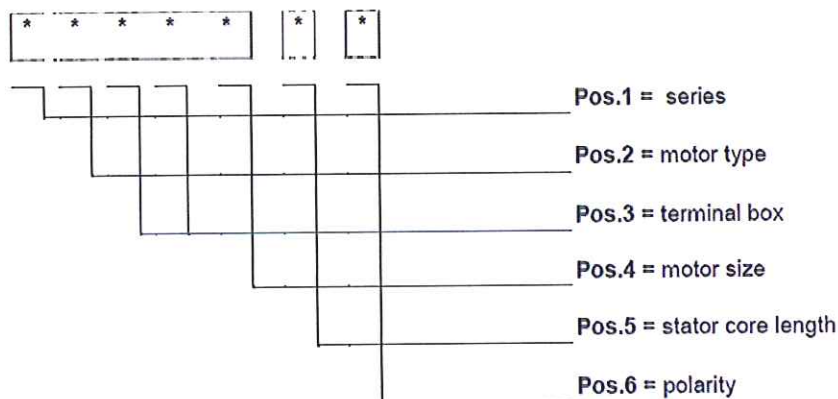
The operation of the primary motor shall be interlocked to the correct operation of the forced ventilation.

External fan can be made of plastic material (Polyethylene), aluminium, brass or steel.

The motor with type of protection Ex-db or Ex-tb can be equipped with separately certified draining devices, see equipment list below.

The accessories used for cable entry and for the unused holes shall be separately certified according to the applicable type of protection and shall guarantee the minimum degree of protection as indicated on motor nameplate.

Identification code:



Note:

Nameplate data always includes "IC" code to clarify type of cooling (IC410 - IC411 - IC416 - IC418)

Pos. 1: Motor series

E3AC	Flame proof electric motors for gas group IIC and for dust group IIIC/IIIB
E4AC	E3* Efficiency IE3 Class; E4* Efficiency IE4 Class
E3AB	Flame proof electric motors for gas group IIB and for dust group IIIC/IIIB
E4AB	E3* Efficiency IE3 Class; E4* Efficiency IE4 Class
E3AM	Flame proof electric motors for Mining – M2
E4AM	E3* Efficiency IE3 Class; E4* Efficiency IE4 Class

Pos. 2: Motor type (electrical features)

1	...	5	Three phase motor for hoist
2	...	6	...
3	Three phase motor one polarity	7	Three phase motor suitable for frequency converter
4	...	8	Three phase motor with enlarged Ex eb terminal box

Pos. 3: Terminal box

0	With standard terminal box	3	Plate and cable gland version
2	With bigger terminal box (jus for frame 80-112)	5	Terminal box in Ex-eb version

Pos. 4: Size

80	Motor size 80	180	Motor size 180
90	Motor size 90	200	Motor size 200
100	Motor size 100	225	Motor size 225

112	Motor size 112	250	Motor size 250
132	Motor size 132	280	Motor size 280
160	Motor size 160	315	Motor size 315

Pos. 5: Stator core length

	As per attachment A		
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Pos. 6: Polarity number

2	2 poles	10	10 poles
4	4 poles	12	12 poles
6	6 poles	16	16 poles
8	8 poles		

Code example: **E3AC30 132 MB 4** = Three phase motor flameproof Ex db IIC T4 Gb – Ex tb IIIC T135°C Db, frame size 132, medium iron core, 4 poles.

Ratings:

Main supply:

- Maximum rated voltage: 1000 V
- Maximum rated power: 240 kW
- Maximum current: 380 A
- Rated frequency: 50 / 60 Hz
- Insulation class: F (with ΔT class B)
- Duty: S1, S2, S3, S4, S6, S9
- Max. rated speed: 3600 r.p.m

Inverter supply:

- Maximum rated voltage: 1000 V
- Maximum peak voltage: 2300 V
- Maximum current: 380 A
- Max. rated speed: 3960 r.p.m
- Duty: S9

Allowable ambient temperature range:

- 60°C to +60°C
- 60 to +80°C (only for IIB)

The minimum ambient temperature is in function of the motor constructional characteristics as indicated in the manufacturer's documentation.

The motors with the ambient temperature above +40°C up to +80°C are made in compliance with the power de-rating according to the following table as indicated in the manufacturer documentation.

Ambient temperature [C°] max.	40	45	50	55	60	65	70	75	80
ΔT limit [K] - Stator Winding Class B (max. 120°C)	80	75	70	65	60	55	50	45	40
Motor size [mm]	Temperature Class (Gb) Max. Temperature (Db) (Mb)								
80	T6 85°C Mb	T6 85°C Mb	T6 85°C Mb	T5 100°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
90	T6 ^(**) / T5 100°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T5 ^(**) / T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
100	T6 85°C Mb	T6 85°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
112	T6 85°C Mb	T6 85°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
132	T6 ^(**) / T5 100°C Mb	T5 100°C Mb	T5 100°C Mb	T5 ^(**) / T4 125°C ^(*) Mb	T4 125°C Mb	T4 125°C Mb	T4 125°C Mb	T4 --- Mb	T4 --- Mb
160	T6 ^(**) / T5 100°C Mb	T6 ^(***) / T5 100°C ^(*) Mb	T6 ^(***) / T5 100°C ^(*) Mb	T6 ^(****) / T5 ^(**) / T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
180	T6 ^(**) / T5 100°C Mb	T5 100°C ^(*) Mb	T5 ^(**) / T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
200	T6 85°C Mb	T5 100°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
225	T5 100°C Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T3 --- Mb
250	T6 ^(**) / T5 100°C Mb	T5 100°C Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb

280	T6 / T5 ^(****) 85°C / 100°C ^(****) Mb	T5 100°C ^(*) Mb	T5 100°C ^(*) Mb	T5 100°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 --- Mb	T4 --- Mb
315	T6 ^(****) / T4 125°C ^(*) Mb	T6 ^(****) / T4 125°C ^(*) Mb	T6 ^(****) / T4 125°C ^(*) Mb	T6 ^(****) / T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 125°C ^(*) Mb	T4 135°C ^(*) Mb	T3 --- Mb	T3 --- Mb

(*) Additional de-rating of $\Delta T - 10K$ is required.

(**) Providing special construction related to the windings according to manufacturer's documentation at maximum rated power.

(***) with limited rated power.

(****) only types E3AB/AC-70/75 280 MB4 motors, which are rated T5/T100°C for gases/dusts, when fed by inverter within the rating data reported on the nameplates.

Warning label:

The following warnings are applied to the motor:

"restore the greasing on the joints at every opening".

"Fasteners 8.8 ISO 898-1, or better..." – for T.amb. -20 \ +80°C

"Fasteners A4-80 UNI EN ISO 3506-1" – for T.amb. -60 \ +80°C

"To be energized with cable suitable for temperature 90°C"

"Warning – potential electrostatic charging hazard – see instructions"

On the cover of the junction box:

A warning sticker is applied, which means do not open when energized

When motor anti-condensate heaters are used:

"Warning: energized heaters"

For motor supplied by inverter:

"Warning – Windings fitted with PTC thermistors".

"Warning – Winding protected by PT100 – Set operating temperature at x °C".

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1:

Special conditions for safety use.

Motor electrical ratings.

Issue 2:

New electrical rating for temperature class T6, motor sizes: 160, 250 and 315mm

Motor Identification code for Mining application E3AM^{****}, E4AM^{****}

Issue 3:

New design of main terminal box with protection type Ex db eb, available in carbon steel or stainless-steel material, for II 2G/D applications and motor sizes 180, 200, 225, 250mm.

(16) Test documents are listed in the test report No. 17 0205845-04

Routine tests:

The manufacturer must perform the required routine tests which includes an overpressure test made according to first method (static) described for the type tests in 15.2.3.2 of EN 60079-1:2014 on each Ex-db motor and/or junction box enclosure (if applicable), applying pressure according to below table:

Item	Material	Ambient temperature T.amb (min.) \geq -20°C	Ambient temperature -60°C \leq T.amb (min.) < -20°C	
Motor 80 mm	Cast iron EN-GJL-200 (UNI EN 1561)	N / A ⁽¹⁾	N / A ⁽¹⁾	
Motor 90 mm		24.3	24.3	
Motor 100 mm		24.3	24.3	
Motor 112 mm		24.8	24.8	
Motor 132 mm		25.2	25.2	
Motor 160 mm		N / A ⁽¹⁾	N / A ⁽²⁾	
Motor 180 mm		22.2	27.0	
Motor 200 mm		22.7	27.8	
Motor 225 mm		23.1	28.5	
Motor 250 mm		24.0	30.0	
Motor 280 mm		28.7	37.8	
Motor 315 mm		N / A ⁽²⁾	40.4 bar	
Junction box Motor sizes 80 – 112 Standard			N / A ⁽¹⁾	N / A ⁽¹⁾
Junction box Motor sizes 80 – 112 Oversize			N / A ⁽¹⁾	N / A ⁽¹⁾
Junction box Motor sizes 132 – 160 Standard		N / A ⁽¹⁾	N / A ⁽¹⁾	

Junction box Motor sizes 180 – 250 Standard		N / A ⁽¹⁾	N / A ⁽¹⁾
Junction box Motor sizes 280 – 315 Standard		N / A ⁽¹⁾	N / A ⁽¹⁾
Junction box Motor sizes 280 – 315 Small		N / A ⁽¹⁾	N / A ⁽¹⁾

Remarks:

1. *not applicable, due to the positive result of the overpressure test at 4 times the reference pressure.*
2. *not applicable, due to the positive result of the overpressure test at 3 times the reference pressure. the routine overpressure testing is replaced by a batch test (according to clause 16.6 of EN 60079-1:2014).*

Motor with Ex-eb junction box:

A dielectric strength test shall be carried out on Ex-eb junction box in accordance with 6.1 of EN 60079-7:2015, with voltage $(2U_n+1000)V$ in period of at least 60 s or $1.2x(2U_n+1000)V$ at least 100 ms.

(17) Special conditions for safe use

- The flame-paths are specified in the manufacturer documentation. For information regarding the dimension of the flameproof joints the manufacturer shall be contacted.
- For installation in places with presence of gas group IIC, when motors are painted with a maximum thickness of paint exceeding 0.2mm, shall be taken into account the risk of electrostatic charges, see manufacturer instructions.
- To limit the bearing current, parasitic capacitances and resonant frequencies, the end user shall limit the dV/dt maximum to $1500V/\mu s$ by using sinus-filter and taking in account the cable length and voltage between inverter and motor. In case of use of special insulated bearing, higher dV/dt is allowed.
- The motor can be equipped with auxiliary devices: thermal detectors, encoders, anti-condensation heaters, motor-fan, etc. Auxiliary devices shall be separately certified and be suitable for the installation zone.
- The Cemp anti-condensation heaters installed inside the Ex-db motor enclosure have a maximum power of 200W and are allowed to be in operation only when motor is not powered, they shall be interlocked with the motor drive circuitry.
- The motor in type of protection Ex-db or Ex-tb can be equipped with separately certified draining devices.

- The accessories used for cable entry and for the unused holes shall be separately certified according to the applicable type of protection and shall guarantee the minimum degree of protection as indicated on motor nameplate.
- Temperature at the cable gland or branching point could exceed 70°C or 80°C respectively, suitable cable for temperature 90°C must be used.
- The motor supplied by inverter is equipped inside of stator winding with PTC or PT100 thermal detectors for temperature control. Rating data are specified on supplementary nameplate. The presence of the thermal detectors inside the motor is shown by appropriated warning label.

The thermal detectors are calibrated for cut off the supply at:

- o Max. 120°C for temperature class T4/T125°C/T135°C
- o Max. 130°C for temperature class T3/T150°C and for group I

The intervention of the thermal detector shall guarantee the disconnection of the supply; the resetting of the supply shall not be automatic.

- The motor marked for temperature class T5 and T6 are not intended for supply by inverter. For motor types E3AB/AC-70/75 280 MB4, which are rated T5/T100°C for gases/dusts, when fed by inverter, the customer shall provide a minimum voltage of 44Vac at 5 Hz, despite the voltage drop in frequency converter input up to 10%.

- According to IEC 60034-6 standard, the cooling is achieved by one of the following methods:

Self-cooled motor by fan fitted on shaft, IC411;

Fan directly coupled; IC418;

Totally enclosed not ventilated, IC410;

Forced ventilation by means of auxiliary motor, IC416.

The operation of the primary motor shall be interlocked to the correct operation of the forced ventilation.

- Plastic and aluminium fan are not allowed on mining applications.
- Special solution provides the motor without terminal box, the motor enclosure is closed by metallic plate and suitable cable glands for the stator winding cables.
- When IP65 is required, a proper selection of bearing features is required in order to limit the bearing temperature max. at 90°C.
- All terminal boxes non-metallic material components are suitable for ambient temperature $\geq -50^\circ\text{C}$.
- Schedule of limitation and the special conditions for safety use of all equipment/Ex-component used must be observed and fulfilled according to its own certificates.

(18) Essential Health and Safety Requirements

No additional ones. Assured by compliance with the standards set out in the [9].