



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEx CML 17.0019X

Issue No: 1

Certificate history:

Issue No. 1 (2018-11-14)

Issue No. 0 (2017-03-09)

Status: **Current**

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Date of Issue: **2018-11-14**

Applicant: **CEMP S.r.l**  
Via Piemonte, 16  
20030 Senago (MI)  
**Italy**

Equipment: **Three-phase asynchronous motors and terminal boxes**

*Optional accessory:*

Type of Protection: **Ex d, Ex de, Ex tb/tc**

Marking:

Ex db I Mb; or Ex db eb I Mb; and/or

Ex db IIB/IIC T3/T4/T5/T6 Gb ; or

Ex db eb IIB/IIC T3/T4/T5/T6 Gb ;

and/or

Ex tb/tc IIIB/ III C T150°C/T135°C/T125°C/T100°C/T85°C Db/Dc

*Approved for issue on behalf of the IECEx  
Certification Body:*

D R Stubbings MIET

*Position:*

Technical Director

*Signature:  
(for printed version)*

*Date:*

2018-11-14

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

**Certification Management Limited**  
Unit 1, Newport Business Park  
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Ellesmere Port, CH65 4LZ  
United Kingdom





# IECEX Certificate of Conformity

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Date of Issue: 2018-11-14 Page 2 of 4  
Manufacturer: **CEMP S.r.l**  
Via Piemonte, 16, 20030 Senago (MI) - ITALY  
**Italy**

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended.

## STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

<b>IEC 60079-0 : 2011</b> Edition:6.0	Explosive atmospheres - Part 0: General requirements
<b>IEC 60079-1 : 2014-06</b> Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
<b>IEC 60079-31 : 2013</b> Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
<b>IEC 60079-7 : 2015</b> Edition:5.0	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

## TEST & ASSESSMENT REPORTS:

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

Test Report:

[GB/CML/ExTR17.0032/00](#)      [GB/CML/ExTR18.0235/00](#)

Quality Assessment Report:

[IT/CES/QAR07.0002/12](#)



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## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

Three-phase asynchronous motors and terminal boxes types: E3AC\*\*\*\*\*, E3AB\*\*\*\*\*, E3AM\*\*\*\*\*, E4AC\*\*\*\*\*, E4AB\*\*\*\*\*, E4AM\*\*\*\*\* with frame sizes 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315 mm.

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 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 terminal box can be Ex-dB or Ex-eB type of protection. The motor and terminal box enclosures satisfies also the Ex-tB type of protection, mechanical protection degree IP65

### SPECIFIC CONDITIONS OF USE: YES as shown below:

Refer to certificate Annex for Conditions of Certification



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

### Variation 1

This variation introduces the following modifications:

To permit three additional de-rated motor ratings for temperature class T6.

Motor size 160mm, 4 poles IIB/IIC

Motor size 250mm, 4 poles IIB/IIC

Motor size 315mm, 4 poles IIB/IIC

To permit the identification of mining codes.

To permit the maximum rated power typo change 230kW to 240kW.

### **Annex:**

[IECEX CML 18.0019X Issue 1 Certificate Annex IECEx.pdf](#)

**Annexe to:** IECEx CML 17.0019X Issue 1  
**Applicant:** CEMP S.r.l  
**Apparatus:** Three-phase asynchronous motors and terminal boxes



## Description

Three-phase asynchronous motors and terminal boxes types Types: E3AC\*\*\*\*; E3AB\*\*\*\*; E3AM\*\*\*\*; E4AC\*\*\*\*; E4AB\*\*\*\*; E4AM\*\*\*\* with frame sizes 80, 90, 100, 112 132, 160, 180, 200, 225, 250, 280, 315 mm.

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 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 terminal box can be Ex-db or Ex-eb type of protection. The motor and terminal box enclosures satisfies also the Ex-tb type of protection, mechanical protection degree IP65.

## Ratings:

### Allowable ambient temperature range:

$-60^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$  (all sizes)

$-60^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$  (only for IIB)

### 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  $\Delta T$  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

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## Conditions of Manufacture

- i. The manufacturer must perform the required routine tests which includes an overpressure test made as per first method (static) described for the type tests in 15.2.3.2 of IEC 60079-1:2014 Ed.7 on each Ex-db motor and/or junction box enclosure (if applicable), by applying pressure as per the below table:

Item	Material	Ambient temperature T.amb (min.) $\geq$ -20°C	Ambient temperature $-60^{\circ}\text{C} \leq \text{T.amb (min.)} < -20^{\circ}\text{C}$	
Motor 80 mm	Cast iron EN-GJL-200 (UNI EN 1561)	N / A <sup>(1)</sup>	N / A <sup>(1)</sup>	
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 <sup>(1)</sup>	N / A <sup>(2)</sup>	
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 <sup>(2)</sup>	40.4 bar	
Junction box Motor sizes 80 – 112 Standard			N / A <sup>(1)</sup>	N / A <sup>(1)</sup>
Junction box Motor sizes 80 – 112 Oversize			N / A <sup>(1)</sup>	N / A <sup>(1)</sup>
Junction box Motor sizes 132 – 160 Standard			N / A <sup>(1)</sup>	N / A <sup>(1)</sup>
Junction box Motor sizes 180 – 250 Standard		N / A <sup>(1)</sup>	N / A <sup>(1)</sup>	
Junction box Motor sizes 280 – 315 Standard		N / A <sup>(1)</sup>	N / A <sup>(1)</sup>	
Junction box Motor sizes 280 – 315 Small		N / A <sup>(1)</sup>	N / A <sup>(1)</sup>	

**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 IEC 60079-1)

ii. 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 IEC 60079-7:2015 Ed. 5, with voltage (2Un+1000) V in period of at least 60 s or 1.2x(2Un+1000) V at least 100 ms.

iii. Shaft power must be de-rated in accordance with manufactures instructions NT/MG/0831E3/C-B/IEC, table 1.

- All frames standard constructions and HIGHER OUTPUT power  
ambient temperature from -20 °C to + 60°C (+80°C for IIB marking)  
In these cases, it is necessary to de-rate power of motor in proportion to the ambient temperature.

Table 1 De-rating according to ambient temperature

Ambient temperature [°C]	40	45	50	55	60	65	70	75	80	
Δ T limit [°K] (Insulation class B)	80	75	70	65	60	53	45	38	30	
Shaft power reduction	0%	5%	10%	15%	20%	30%	35%	52%	50%	
Temperature Class	T3 – T4 (T150°C - T135°C – T125°C)					T3 (T150°C)				

Note

The manufacturer performs the heating test to verify the temperature rise so that limits of temperature class are respected.

The minimum ambient temperature is in function of the motor constructional characteristics as indicated in the Cemp technical note No. NT/MG/0831E3/C-B/IEC. The motors with the ambient temperature above +40°C up to +80°C are made in compliance with the power de-rating as per the table in the manufacturer documentation.

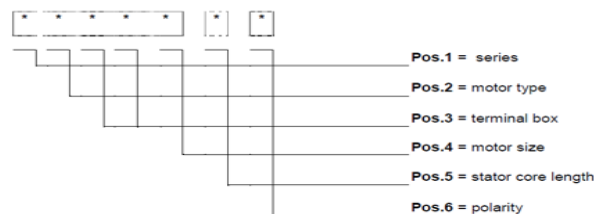
iv. **Certified component/equipment:** The following Ex equipment and Ex components have been assessed into the motor certificate:

Component	Material or Type	Applicable standard and/or certificate
Auxiliary terminal board	BARTEC Type 07-9702 / 03	PTB 99 ATEX 3117U IECEX PTB 07.0007U
Auxiliary terminal board	CABUR	CABUR CESI 03 ATEX 164U IECEX CES 11.0008U
Rubber bushing	rubber EPDM / VMQ	TUV IT 12 ATEX052U IECEX LCI 09.0003U
Line bushing	BARTEC Type 07-91...-.../G	EPS 13 ATEX 1619U IECEX EPS 13.0045U
Motor for IC146	CEMP motor 63 – 71 – 80	TUV IT 14 ATEX 065X TUV IT 14 ATEX 050X IECEX EXA 16.0006X
Elfit drain valve	ECD-2*	CESI 01 ATEX 081U IECEX CES 14.0016U
CMP drain valve	781 D	SIRA 10 ATEX 1307U IECEX SIR 10.0149U
Encoder	SCANCON Incremental	ITS 09 ATEX 16847X IECEX ITS 10.0015X
Encoder	SCANCON Absolute	ITS 09 ATEX 16867X IECEX ITS 10.0016X
Cable Gland	RCN Type: RAD / BAD / RN	INERIS 06 ATEX 0014X IECEX INE 10.0010X
Barrier cable gland	KOPEX	CESI 14 ATEX 032X IECEX CES 14.0013X
Anti-condensation heaters	Standard – not certified	Included inside the Ex-db motor enclosure.

## IECEx Conditions of Certification (Special Conditions for Safe Use)

- i. The flame paths are specified in the manufacturer documentation. For information regarding the dimension of the flameproof joints the manufacturer shall be contacted.
- ii. For installation in places with presence of gas group IIC, when motors are painted with a maximum thickness of paint exceeding 0.2mm, the risk of electrostatic charges shall be considered, see manufacturer instructions.
- iii. Plastic and aluminium external fan are not allowed in mining applications.
- iv. To limit the bearing current, parasitic capacitances and resonant frequencies, the end user shall limit the dV/dt maximum to 1500V/μs by using sinusfilter and taking in account the cable length and voltage between inverter and motor.
- v. The motors 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.
- vi. The Cemp anti-condensation heaters installed inside the Exd motor enclosure have a maximum power of 200W and are only allowed to be in operation when the motor is not powered, they shall be interlocked with the motor drive circuitry.
- vii. The motor in type of protection Ex-db or Ex-tb can be equipped with separately certified draining devices.
- viii. 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.
- ix.

### 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	...	4	...
2	...	5	Three phase motor for hoist
3	Three phase motor one polarity	7	Three phase motor suitable for frequency converter

#### 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.



- x. 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:
- 120°C for temperature class T4/T125°C/T135°C
  - 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.
- It's a requirement of IEC 60079-14: 2014 clause 11 for the motor and inverter combination to be tested for shutdown before the associated T Class is reached and all testing documented prior to use.
- xi. The motor market for temperature class T5 and T6 are not intended for supply by inverter.
- xii. As per the IEC 60034-6 standard, 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.
- xiii. External fan can be made of plastic material (Polyethylene), aluminium, brass or steel. Plastic and aluminium fan are not allowed on mining applications.
- xiv. 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.
- xv. When IP65 is required, a proper selection of bearing's features is required in order to limit the bearing temperature max. at 90°C;
- xvi. Motor size 315mm is manufactured without junction box for ambient temperature  $\geq 50^{\circ}\text{C}$
- xvii. All motors sizes are manufactured without terminal box for ambient temperature  $< -50^{\circ}\text{C}$
- xviii. Rubber bushing VMQ must be used into the ambient temperature range:  $-50^{\circ}\text{C} \leq T_{\text{amb.}} \leq +50^{\circ}\text{C}$
- xix. Rubber bushing EPDM must be used into the ambient temperature range:  $-20^{\circ}\text{C} \leq T_{\text{amb.}} \leq +80^{\circ}\text{C}$
- xx. Sealed line bushing BARTEC type 07-91...-.../G must be used for  $T_{\text{amb.}} < -50^{\circ}\text{C}$  or  $T_{\text{amb.}} \geq 50^{\circ}\text{C}$  for all motor sizes; and on motor 315mm for ambient temperature  $\geq 40^{\circ}\text{C}$
- xxi. Auxiliary terminal block BARTEC type 07-9702/03 is suitable for ambient temperature up to  $-55^{\circ}\text{C}$
- xxii. Auxiliary terminal block CABUR is suitable for ambient temperature up to  $-40^{\circ}\text{C}$
- xxiii. When ambient temperature is  $\geq 50^{\circ}\text{C}$ , to be energized with cables suitable for temperature  $90^{\circ}\text{C}$



- xxiv. Drain valve ELFIT ECD2\* must be used for ambient temperature up to -50°C, all motor sizes, mining excluded
- xxv. Drain valve CMP 781D\* must be used only on motor 80-100 sizes, mining excluded
- xxvi. Encoders must be used into an ambient temperature range -40 \ +70 °C, for temperature class T5 or higher
- xxvii. Barrier cable glands KOPEX are suitable up to ambient temperature +60°C