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Schema di certificazione

CESI-ATEX

[1] **EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment or Protective System intended for use
in potentially explosive atmospheres
Directive 2014/34/EU**

[3] EU-Type Examination Certificate number:

CESI 22 ATEX 012X

[4] Product: Three-phase synchronous reluctance motors
series 7KSRT 80-90-100-112-132-160

[5] Manufacturer: **KONCAR – MES d.o.o.**

[6] Address: Fallerovo Setaliste 22, HR – 10000 ZAGREB - Croatia

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] CESI, notified body n. 0722 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and Council of 26 February 2014, certifies that this Product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Product intended for use in potentially explosive atmospheres given in Annex II to the Directive.

[9] The examination and test results are recorded in confidential report n. EX C2006103
Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018 - EN 60079-1:2014 - EN IEC 60079-7 :2015+A1:2018 - EN 60079-31:2014

except in respect of those requirements listed at item 18 of the Schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the Product 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 Product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this Product. These are not covered by this certificate.

[12] The marking of the Product shall include the following:

I M2 Ex db I Mb *or* I M2 Ex db eb I Mb
II 2G Ex db IIB T3 Gb *or* II 2G Ex db eb IIB T3 Gb
II 2G Ex db IIC T3, T4, T5, T6 Gb *or* II 2G Ex db eb IIC T3, T4, T5, T6 Gb

II 2D Ex tb IIIC T160°C, T130°C, T 100°C Db

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Date 09/05/2022 - Translation issued the 09/05/2022

Prepared
Sergio Mezzetti

Verified
Mirko Balaz

Approved
Roberto Piccin

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Schedule

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

[15] **Description of equipment**

The three-phase synchronous reluctance motors series 7KSRT 80-90-100-112-132-160 with four poles, in cast iron frame. They are manufactured by different constructive typologies in combination with terminal boxes. Synchronous reluctance motors need frequency converter for operation. Motor has always $2p=4$ for both stator winding and the rotor. They are supplied by frequency converter from 5 to 133 Hz. and can be self-ventilated or with forced ventilation.

The motors are manufactured with two separate compartments: motor (Ex db) and terminal box (Ex db or Ex eb) for supply and auxiliary circuits connection or can be provided with permanently connected cable.

Only for groups II and III, the motors series 7KSRT 80 ÷ 160 can be assembled with two “Ex db” terminal boxes (connected by sealing bushing + 3-piece fitting or by barrier cable glands and cable) or with two “Ex eb” terminal boxes (connected by piece fitting or by cable glands and cable).

The motors can be equipped with auxiliary devices such as heaters, thermal detectors, brake or/and encoder.

The three-phase synchronous reluctance motors series 7KSRT 80 ÷ 160, can be manufactured for efficiency Class IE4 (premium efficiency) or for efficiency class IE5 (ultra-premium efficiency) according to EN 60034-30-2 standard. The motor efficiency class level is identified by proper code.

The motors insulating system is made in thermal class F, (thermal class H for motors group IIB with ambient temperature $T_a = + 80^\circ\text{C}$) and are designed with temperature limit of the insulation class B (120°C).

The motors series 7KSRT 80 ÷ 160, for gas group IIC, can be protected from corrosion with a top layer of conductive paint or alternatively with a layer of non-conductive dry film having thickness > 0.2 mm, in this last case, the following label shall be applied: “Warning – potential electrostatic charging hazard. Clean with damp cloth”.

Depending on of type of protection, the motor series 7KSRT, for groups I can be marked as follows:

 **I M2 Ex db I Mb**
I M2 Ex db eb I Mb

Depending on of type of protection and ambient temperature, the motor series 7KSRT for Group II and III with efficiency classes IE4 and IE5 can be marked as follows:

 **II 2G Ex db IIC T3, T4, T5, T6 Gb** Ambient Temperature: $- 20^\circ\text{C} / +40^\circ\text{C}$
II 2G Ex db eb IIC T3, T4, T5, T6 Gb
II 2D Ex tb IIC T160°C, T130°C, T100°C Db

 **II 2G Ex db IIC T3, T4, Gb** Ambient Temperature: $-20^\circ\text{C}/+40^\circ\text{C}/+50^\circ\text{C}/+60^\circ\text{C}$
II 2G Ex db eb IIC T3, T4, Gb
II 2D Ex tb IIC T160°C, T130°C Db

 **II 2G Ex db IIB T3 Gb** Ambient Temperature: $- 20^\circ\text{C} / +80^\circ\text{C}$
II 2G Ex db eb IIB T3 Gb
II 2D Ex tb IIC T160°C Db

Only the motors with efficiency class IE4 can be marked as follows:

 **II 2G Ex db IIC T5, Gb** Ambient Temperature $-20^\circ\text{C}/+40^\circ\text{C}/+50^\circ\text{C}/+60^\circ$
II 2G Ex db eb IIC T5 Gb

 **II 2G Ex db IIC T6, Gb** Ambient Temperature $-20^\circ\text{C}/+40^\circ\text{C}/+50^\circ\text{C}$
II 2G Ex db eb IIC T6 Gb

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Schedule

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

[15] **Description of equipment** (follows)

Equipment identification

The motors of series 7KSRT..., are identified by a code with the following meaning:

A B C D E F G H I J K

A = Efficiency class:

P = premium efficiency class IE4

UP = Ultra-premium efficiency class IE5

B = Motor series: 7- motors with cast iron frame

C = Type of motor:

KSRT = basic design of single speed motor

KSR= KONCAR MES Synchro Reluctance

T = flameproof

KSRBT = single speed marine motor

KSR= KONCAR MES Synchro Reluctance

B = tropicalized for marine applications

T = flameproof

D = Additional code (single or in combination)

A = motor with special mounting dimension

E = motor with special electric design

K = motor with electromagnetic brake

E = Motor frame size (80-90-100-112-132-160)

F = Frame length: S = Short, M = Medium, L = Long and X for longer frame (SX, MX, LX)

G = Power designation, power according to stator and rotor lamination length: A, B, C . or

RA, RB ...; (R= for reduced power in bigger frame)

H = Number of poles

I = Type of protection and means of external connection

D = Ex db IIC (B) – both motor and terminal box in type of protection “db”

E = Ex db eb IIC (B) - motor in type of protection “db” and terminal box in type of protection “eb”

K = Ex db IIC (B) – motor in type of protection “db” with permanently connected cables

R1 = Ex db eb I (design for mines) - motor in type of protection “db” and terminal box in type of protection “eb” with certified cable plugs

R2 = Ex db I (design for mines) – both motor and terminal box in protection “db” with certified cable plugs, or with direct cable entry (barrier cable glands)

P = Ex tb IIIC- motor in dust protection type “tb”

J = Code of additionally mounted equipment (single or in combination)

A = motor with space heaters

G = motor with encoder mounted on

T = motor with thermal protection

V = motor with forced ventilation unit in which a certified driving motor is used

K = Temperature Class for gas: T3; T4; T5; T6.

Max. Surface Temperature for dust: T160°C; T130°C; T100°C.

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Schedule

[14] EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X

[15] **Description of equipment** (follows)

Electrical characteristics

Maximum rated voltage:	750 V
Maximum rated current:	40 A
Rated frequency:	50 Hz
Synchronous speed	1500 rpm
Number of poles:	4
Insulation class:	F – H (with limit Δt B)
Duty:	S1 – S10
Rated power at to S1 duty:	up to 18,5 kW
Degree of protection:	IP 55 (standard) or IP 54, IP 56 or IP 65 or IP 66 or IP 67 (only for “Ex db” and direct cable entry)
Peak voltage:	≤ 1060 V (with KONCAR high strength insulation system) ≤ 1800 V (with KONCAR special insulation type “ELLOK” and direct entry of cable)
Frequency range:	5 ÷ 133 Hz
Maximum speed:	4000 rpm

The three-phase synchronous reluctance motors are equipped with thermal detectors (PTC thermistors or TP thermal switches); these thermal detectors shall connect to suitable protection devices of the supply system.

The operation of the thermal detector shall guarantee the disconnection of the supply at:
150 °C maximum for motors with temperature class T3
130 °C maximum both for motors with temperature class T4 and motors for group I M2 (mining).

The resetting of the supply shall not be automatic.

Ambient temperature:

- 20 ÷ + 40 °C (standard motors)
- 20 ÷ + 50 °C (motors provided with permanently connected cables)
- 20 ÷ + 60 °C (on demand)
- 20 ÷ + 80 °C (group IIB motors, with power derating for reducing the winding rise-temperature within the limit of the insulation class B (120 °C))

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Schedule

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

[15] **Description of equipment** (follows)

Motors with brake and/or encoder

Brake and/or encoder, coupled to the motor, shall be suitable for group, category, type of protection and ambient temperature range foreseen from the motor.

Motors with forced ventilation unit (only for motors 132 ÷160)

These machines are provided with a motor-driven blower mounted on the primary motor. In these case the primary motor is provided with thermal detectors for the control of internal temperature. The operation of the primary motor shall be interlocked to the correct operation of the forced ventilation.

Cable entries

The accessories used for cable entries, for unused holes and for connecting the separated terminal boxes shall be subject of separate certification according to the following standards:

Motors of Category 2G: EN IEC 60079-0 and EN 60079-1 for terminal box “Ex db”

EN IEC 60079-0 and EN IEC 60079-7 for terminal box “Ex eb”

Motors of category 2D: EN IEC 60079-0; EN 60079-1 and EN 60079-31 for terminal box “Ex db” and “Ex tb”

EN IEC 60079-0; EN IEC 60079-7 and EN 60079-31 for terminal box “Ex eb” and “Ex tb”

In all cases, the minimum degree of protection IP54, for motors of category 2G, and the minimum degree of protection IP66, for motors of category 2D, shall be guaranteed in compliance to EN 60034-5 and EN 60529 standards.

If cylindrical threads are used the coupling between the cable gland and terminal box shall be provided with block to prevent loosening.

Warning label

“Winding protected with PTC thermistors or TP thermal switches”

In case of use of anticondensation heaters:

“Warning – energized resistors”.

In case of paint with nonconductive dry film thickness > 0.2 mm

“Warning – potential electrostatic charging hazard. Clean with damp cloth”

For motors working at ambient temperature = +60°C

“Supply cables of motors shall be suitable at least for an operating temperature of 92°C”

[16] **Report n. EX C2006103**

Routine tests

“Ex db” motor enclosures

On the motor enclosures, the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of EN 60079-1 standard, at the following pressure values:

- Motor enclosure sizes 80, 90, 112:	14.5 bar
- Motor enclosure size 100:	13.5 bar
- Motor enclosure sizes 132, 160:	11.7 bar
- Motor enclosure sizes 132MX:	13.0 bar

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Schedule

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

“Ex db” terminal boxes

On the terminal boxes with type of protection “Ex db” (drw.122016/9B2), the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of EN 60079-1 standard, at the following pressure values:

- Terminal box for motors 80 ÷ 112: 12.6 bar

On the terminal boxes, with type of protection “Ex db”, (dwg. 122016/7B1) the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of EN 60079-1 standard, at the following pressure values:

- Terminal box for motors 132 ÷ 160: 13.2 bar

The terminal boxes with type of protection “Ex db” (drw. 122016/7B4) for motors sizes 132, 160 are exempted from overpressure test since they have been submitted, with positive result, to an overpressure test at corresponding to 4 times the reference pressure at the following values:

- 35.3 bar (8.8 x 4) terminal box for motor 132

- 33.2 bar (8.3 x 4) terminal box for motors 160

On the auxiliary terminal box, with type of protection “Ex db”, (dwg. A69192/2C1), used in the two boxes version, the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of EN 60079-1 standard, at the pressure value of: 12.6 bar.

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“Ex eb” terminal boxes

For the terminal boxes with type of protection “Ex eb”, the dielectric test with applied voltage shall be performed (according to clause 7.1 of the EN IEC 60079-7) at $2U + 1000V$ with a minimum value of 1500V ($U =$ rated voltage of the motor).

[17] **Special conditions for safe use**

- The flamepaths are specified in the manufacturer drawings. For information regarding the dimensions of the flameproof joints the manufacturer shall be contacted.
- Screws used for fastening the parts of motor enclosure, shields and terminal box shall have a yield strength equal or higher than: 800 N/mm² for motors size 80, 90, 100, 112, 132, 160.
- For motors working at max ambient temperature of + 60° Supply cables shall be suitable for an operating temperature equal or greater than 92°C;
- For motors working at max ambient temperature of + 80° Supply cables shall be suitable for an operating temperature equal or greater than 105°C;
- The motor provided with the cables permanently connected, shall have these cables protected against the risk of damage due to mechanical stresses.
- The end connections shall be made according to one of the types of protection indicated in the EN IEC 60079-0 standard according to the installation rules in force in the site of installation.
- For motors painted with non-conductive dry film having thickness > 0.2 mm, the following label shall be applied: “Warning – potential electrostatic charging hazard. Clean with damp cloth”

[18] **Essential Health and Safety Requirements**

EHSR are assured by compliance with safety conditions and by compliance with the following standards:

EN IEC 60079-0: 2018 Explosive atmospheres - Part 0 - General requirements

EN 60079-1: 2014 Explosive atmospheres - Part 1 - Equipment protection by enclosures “d”

EN IEC 60079-7:2015+A1:2018 Explosive atmospheres- - Part 7 - Equipment protection by increased safety “e”

EN 60079-31: 2014 Explosive atmospheres - Part 31 - Equipment dust ignition protection by enclosure “t”

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[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

[19] **Descriptive documents** (prot. EX C2006110)

- Technical Description N° 1927213 (35 pg.)	Ed. 2	dated	20.04.2022
- Drawing n. 122016-10A2		dated	01.07.2020
- Drawing n. 122016-10A3		dated	01.07.2020
- Drawing n. 122016-10B1		dated	21.01.2021
- Drawing n. 122016-10B6 (2 sheets)		dated	01.03.2021
- Drawing n. 122016-10C5		dated	01.02.2017
- Drawing n. 122016-10I		dated	21.01.2021
- Drawing n. 122016-4F		dated	01/07/2009
- Drawing n. 122016-4H		dated	01.07.2009
- Drawing n. 122016-6A	Rev. D	dated	01.12.2020
- Drawing n. 122016-7A1		dated	20.01.2014
- Drawing n. 122016-7A2		dated	20.01.2014
- Drawing n. 122016-7A9		dated	20.01.2014
- Drawing n. 122016-7A10		dated	19.12.2014
- Drawing n. 122016-7B1 (2 sheets)	Rev. D	dated	14.12.2015
- Drawing n. 122016-7B2 (2 sheets)	Rev. D	dated	14.12.2015
- Drawing n. 122016-7B3	Rev. A	dated	30.03.2016
- Drawing n. 122016-7B4 (sheet 1/3)	Rev. B	dated	14.12.2015
- Drawing n. 122016-7B4 (sheet 2/3)	Rev. B	dated	14.12.2015
- Drawing n. 122016-7B4 (sheet 3/3)	Rev. B	dated	24.11.2015
- Drawing n. 122016-7B5 (2 sheets)	Rev. D	dated	14.12.2005
- Drawing n. 122016-7B6 (4 sheets)	Rev. C	dated	16.03.2020
- Drawing n. 122016-7B7	Rev. A	dated	16.06.2014
- Drawing n. 122016-7B8		dated	10.04.2014
- Drawing n. 122016-7C1	Rev. A	dated	20.01.2014
- Drawing n. 122016-7C2	Rev. A	dated	16.06.2014
- Drawing n. 122016-7C3	Rev. A	dated	19.12.2014
- Drawing n. 122016-7C4	Rev. A	dated	20.01.2014
- Drawing n. 122016-9A	Rev. A	dated	01.12.2020
- Drawing n. 122016-9A1		dated	30-09.2016
- Drawing n. 122016-9A2		dated	30.09.2016
- Drawing n. 122016-9A3		dated	30.09.2016
- Drawing n. 122016-9B (2 sheets)	Rev. A	dated	01.12.2020
- Drawing n. 122016-9B1 (2 sheets)		dated	30.09.2016
- Drawing n. 122016-9B2 (sheet 1/4)	Rev. A	dated	01.12.2020
- Drawing n. 122016-9B2 (sheet 2/4)	Rev. A	dated	01.12.2020
- Drawing n. 122016-9B2 (sheet 3/4)		dated	30.09.2016
- Drawing n. 122016-9B2 (sheet 4/4)	Rev. A	dated	01.12.2020
- Drawing n. 122016-9B3	Rev. A	dated	16.03.2020
- Drawing n. 122016-9D1	Rev. A	dated	01.12.2020
- Drawing n. 122016-9D2	Rev. A	dated	01.12.2020
- Drawing n. 122016-9D3	Rev. A	dated	01.12.2020
- Drawing n. 1483099	Rev. C	dated	30.03.2016
- Drawing n. 148309-A9	Rev. C	dated	30.03.2016
- Drawing n. 1488147	Rev. C	dated	30.03.2016
- Drawing n. 148814-A7	Rev. C	dated	30.03.2016
- Drawing n. 1488155	Rev. C	dated	30.03.2016
- Drawing n. 148815-A5	Rev. C	dated	30.03.2016
- Drawing n. 1608886		dated	30.01.2017

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Schedule

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 22 ATEX 012 X**

[19] Descriptive documents (prot. EX-C2006110) (follows)

- Drawing n. 1618539		dated	30.01.2017
- Drawing n. 1618563		dated	30.01.2017
- Drawing n. 1619063		dated	30.01.2017
- Drawing n. 1619306		dated	30.01.2017
- Drawing n. 1723677		dated	02.08.2018
- Drawing n. 172367-A5		dated	02.08.2018
- Drawing n. 1927213/C4 nameplate		dated	11.02.2022
- Drawing n. A07824-L	Rev. A	dated	12.05.2021
- Drawing n. A51420-11E		dated	14.12.2017
- Drawing n. A51420-8E		dated	01.05.2008
- Drawing n. A51420-9E		dated	14.12.2017
- Drawing n. A52420-A	Rev. A	dated	20.01.2014
- Drawing n. A52420-B	Rev. B	dated	16.06.2014
- Drawing n. A61903-E		dated	30.05.2014
- Drawing n. A67850	Rev. B	dated	01.05.2014
- Drawing n. A69192-5	Rev. B	dated	30.09.2016
- Drawing n. A69192-6	Rev. C	dated	30.09.2016
- Drawing n. A69192-7C1		dated	01.02.2017
- Drawing n. A69192-2C1	Rev D	dated	30.09.2016
- Appendix 1		dated	01.02.2022
- Appendix 2		dated	01.02.2022
- Appendix 3		dated	04.02.2022
- Appendix 4		dated	27.01.2022
- Appendix 5		dated	20.04.2022
- Fac-simile of EU Declaration. of Conformity Ex OB 7.3.7.29 (unit) Ed.01		dated	24/02/2021
- Operating and Manual Instruction n° 1927361 (44 pg.)		dated	--. 03.2022

One copy of all documents is kept in CESI files.

Certificate history

Issue n.	Issue Date	Summary description of variation
00	09/05/2022	- First issue of certificate CESI 22 ATEX 012X

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