



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Ex COMPONENT CERTIFICATE

Certificate No.: **IECEx CES 13.0015U**

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Certificate history:

Status: **Current**

Issue No: 3

Issue 2 (2022-02-28)

Issue 1 (2016-06-09)

Issue 0 (2013-07-29)

Date of Issue: **2024-09-25**

Applicant: **F.T.M. S.r.l. – Fabbrica Trasformatori di Misura**
Via Po, 3
I - 20073 Opera (MI)
Italy

Ex Component: **Ring-core Current Transformers, Series AOC Ex**

This component is NOT intended to be used alone and requires additional consideration when incorporated into other equipment or systems for use in explosive atmospheres (refer to IEC 60079-0).

Type of Protection: **Increased safety 'e'**

Marking: **Ex eb IIC Gb**

PAD C4013067 (3081187) - USO AZIENDALE

Approved for issue on behalf of the IECEx
Certification Body:

Alessandro Fedato

Position:

Head of IECEx CB

Signature:
(for printed version)

Date:
(for printed version)

2024.09.25

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Certificate issued by:

CESI
Centro Elettrotecnico
Sperimentale Italiano S.p.A.
Via Rubattino 54
20134 Milano
Italy

CESI



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Manufacturer: **F.T.M. S.r.l. – Fabbrica Trasformatori di Misura**
Via Po, 3
I - 20073 Opera (MI)
Italy

Manufacturing locations: **F.T.M. S.r.l. – Fabbrica Trasformatori di Misura**
Via Po, 3
I - 20073 Opera (MI)
Italy

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 component 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

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition: 7.0

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition: 5.1

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

TEST & ASSESSMENT REPORTS:

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

Test Reports:

IT/CES/ExTR13.0013/00
IT/CES/ExTR13.0013/03

IT/CES/ExTR13.0013/01

IT/CES/ExTR13.0013/02

Quality Assessment Report:

IT/CES/QAR10.0005/13



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Ex Component(s) covered by this certificate is described below:

The current transformers (CT), series AOC Ex, subject of this certificate, are toroidal transformers for measurement (accuracy class from 0.2% to 3%) or protection (accuracy class 5P + 10P and PX).

The component, in subject, constitutes the secondary circuit of the current transformer and consists of an enamelled copper winding wound on a toroidal magnetic core, the whole embedded in polyurethane resin; the primary circuit, on which the current measurement has to be done, is realized with a cable or bar crossing the toroid.

The sizing and installation of the primary circuit (cable or bar) is under the responsibility of the user, in accordance with the standard IEC 60079-7.

The current transformers, series AOC Ex, are components designed to be installed inside electrical equipment that must ensure suitable IP protection (not less than IP54). The ambient temperature (at the point of installation of the CT, inside the protective enclosure) must not exceed 70°C.

The current transformers, series AOC Ex, are identified by a code consisting of the following elements:

AOC Ex nnn

Where:

- ☐ AOC Ex identifies the series of current transformers;
- ☐ nnn identifies the inner diameter of the transformer (in mm) through which the primary circuit passes: 45+110;

The Ring-core Current Transformers series AOC Ex characteristics are further described in the Annexe of this certificate.

SCHEDULE OF LIMITATIONS:

- The ring-core CT shall be installed into enclosure having a minimum degree of protection IP54 and the max ambient temperature around the CT must not exceed 70 °C. Installation shall be made in compliance with IEC 60079-0 and IEC 60079-7.
- The ambient temperature at the installation point of the current transformers, inside the protective enclosure, must remain within the range: $-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +70^{\circ}\text{C}$.
- Adequate precautions shall be taken to ensure that the CT's secondary circuit have a burden connected at all times.
- For the CT with rated secondary current (I_{sn}) = 1 A the maximum temperature rise of CT's secondary winding is $\leq 20\text{K}$ considering the heating in continuous service at 1.2 I_{pn} , and $\leq 30\text{K}$ with heating due to short-time thermal current limit ($I_{\text{th}} \times 1\text{s}$) of the CT.
- For the CT type AOC Ex80 with ratio 50/5 A/A the maximum temperature rise of CT's secondary winding is $\leq 10\text{K}$ considering the heating in continuous service at 1.2 I_{pn} , and $\leq 65\text{K}$ with heating due to short-time thermal current limit ($I_{\text{th}} \times 1\text{s}$) of the CT.
- For the CT type AOC Ex80 with ratio 350/5 A/A the maximum temperature rise of CT's secondary winding is $\leq 10\text{K}$ considering the heating in continuous service at 1.2 I_{pn} , and $\leq 30\text{K}$ with heating due to short-time thermal current limit ($I_{\text{th}} \times 1\text{s}$) of the CT.
- For the CT type AOC Ex80 with ratio 500/5 A/A the maximum temperature rise of CT's secondary winding is $\leq 15\text{K}$ considering the heating in continuous service at 1.2 I_{pn} , and $\leq 15\text{K}$ with heating due to short-time thermal current limit ($I_{\text{th}} \times 1\text{s}$) of the CT.
- For the CT type AOC Ex105 with ratio 600/5 A/A the maximum temperature rise of CT's secondary winding is $\leq 20\text{K}$ considering the heating in continuous service at 1.2 I_{pn} , and $\leq 10\text{K}$ with heating due to short-time thermal current limit ($I_{\text{th}} \times 1\text{s}$) of the CT.
- The CT's primary conductor must guarantee the respect of the temperature class in service considering the maximum ambient temperature, heating in continuous service and heating with short-time thermal current (I_{th}) provided for the user equipment ($\leq I_{\text{th}}$ limit of the CT).



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Variation 3.1:

New AOC Ex 80 current transformers with transformation ratio 350/5 A/A and 500/5 A/A were added.

Annex:

[FTM Srl - IECEx CES 13_0015U_Issue 3 ANNEX for CT - AOC Ex.pdf](#)



Prot: C4013067

Annex to certificate:

Applicant:

Electrical Apparatus:

IECEX Certificate of Conformity



IECEX CES 13.0015U Issue No.3 of 2024-09-25

F.T.M. s.r.l. Fabbrica Trasformatori di Misura
Via Po, 3; I - 20073 Opera (MI) - Italy

Ring-core Current Transformers, Series AOC Ex

Electrical characteristics

The specific electrical characteristics of the components are shown on their plates and in the accompanying documentation, according with the industrial standards IEC 61869-1 and IEC 61869-2.

1- Electrical characteristics of the ring-core current transformers AOC Ex series with ratio nnA / 1A

- Rated primary current (I_{pn}):	from 50 A to 1000 A
- Rated secondary current (I_{sn}):	1 A
- Rated frequency:	50-60 Hz
- Rated burden:	30 VA max.
- Accuracy class:	
• for measure:	0.2% ÷ 1%
• for protection:	5P÷10P/limit factor 5÷30 or PX/Ek maximum 900 V ("Rc" and "Ie" values are reported on plate)
- Rated insulation voltage / insulation level:	0.72 / 3 kV
- Maximum continuous thermal current (Extended):	1.2 I_{pn}
- Insulation class:	A
- Thermal current limit (I_{th}):	max 280 I_{pn} x 1s, with max 35 kA x 1s
- Dynamic current limit (I_{dyn}):	max 2.84 I_{th} (kA peak), with max 99.5 kA peak
- Short-circuit current of the electrical network (I_{sc}):	0.91 I_{th}
- Ambient temperature:	-40°C ÷ +70 °C

2- Electrical characteristics of the Specific ring-core Current Transformers (with ratio nn A/ 5A)

Only type AOC Ex80 50/5 A/A and AOC Ex105 600/5 A/A

Current transformer (CT) type:	AOC Ex80 50/5 A/A	AOC Ex105 600/5 A/A
Rated primary current I_{pn} :	50 [A]	600 [A]
Rated secondary current I_{sn} :	5 [A]	5 [A]
Rated frequency:	50 – 60 [Hz]	
Rated burden:	10 [VA]	25 [VA]
Accuracy class [#]:		
• CT for Measure:	0.5 % ÷ 3%	0.2 % ÷ 3%
• CT for Protection:	10P / limit factor 5÷20 or PX/Ek max 29V (*)	5P-10P / limit factor 5÷20 or PX/Ek max 90V (*)
Rated insulation voltage / insulation level:	0.72 / 3 [kV]	
Maximum continuous thermal current (Extended):	1.2 I_{pn}	
Insulation class:	A	
Rated short-time thermal current (I_{th}):	10 [kA per 1 sec.]	35 [kA per 1 sec.]
Rated dynamic current (I_{dyn}):	28 [kA peak]	99.5 [kA peak]
Short-circuit current of the electrical network (I_{sc}):	0.91 (I_{th}) [kA]	
Ambient temperature:	- 40 ÷ +70 °C	

[#] The specific values are reported in the plate.

(*) "Rct" and "Ie" values are reported in the plate.



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Via Po, 3; I - 20073 Opera (MI) - Italy

Ring-core Current Transformers, Series AOC Ex

Only type AOC Ex80 300/5 A/A and AOC Ex80 500/5 A/A

Current transformer (CT) type:	AOC Ex80 350/5 A/A	AOC Ex80 500/5 A/A
Rated primary current I_{pn} :	350 [A]	500 [A]
Rated secondary current I_{sn} :	5 [A]	5 [A]
Rated frequency:	50 – 60 [Hz]	
Rated maximum power (burden):	30 [VA]	
Accuracy class [#]: <ul style="list-style-type: none">CT for Measure:CT for Protection:	0.2 % ÷ 3% 5P÷10P/ limit factor 5÷30 or PX/Ek max. 60 V (*)	0.2 % ÷ 3% 5P÷10P/ limit factor 5÷30 or PX/Ek max. 90 V (*)
Rated insulation voltage / insulation level:	0.72 / 3 [kV]	
Maximum continuous thermal current (Extended):	1.2 (I_{pn})	
Insulation class:	A	
Rated short-time thermal current (I_{th}):	35 [kA per 1 sec.]	
Rated dynamic current (I_{dyn}):	max. 2.84 (I_{th}) with max. 99.5 [kA peak]	
Short-circuit current of the electrical network (I_{sc}):	0.91 (I_{th}) [kA]	
Ambient temperature:	-40 ÷ +70 [°C]	

[#] The specific values are reported in the plate.

(*) "Rct" and "Ie" values are reported in the plate.