








### IECEX TEST REPORT COVER

ExTR Reference Number.....:	US/FMG/ExTR19.0040/00	
ExTR Free Reference Number .....	PR455360	
Compiled by + signature (ExTL) .....	Kevin M. Costa	<i>Kevin M. Costa</i>
Reviewed by + signature (ExTL).....:	Cheryl A. Gagliardi	<i>Cheryl A. Gagliardi</i>
Approved by + signature (ExCB) ...:	J. E. Marquedant	<i>J.E. Marquedant</i>
Date of issue .....	11 May 2020	
Ex Testing Laboratory (ExTL).....:	FM Approvals	
Address .....	1151 Boston-Providence Turnpike, Norwood, MA 02062 USA	
Ex Certification Body (ExCB).....:	FM Approvals	
Address .....	1151 Boston-Providence Turnpike, Norwood, MA 02062 USA	
Applicant's name.....:	Mettler-Toledo GmbH	
Address .....	Im Langacher 44 8606 Greifensee, Switzerland	
Standards associated with this ExTR package .....	IEC 60079-0: Edition 7; IEC 60079-7: Edition 5; IEC 60079-15: Edition 4	
Clauses considered .....	All clauses considered	
Test Report Form Number .....	ExTR Cover_7 (released 2018-02)	
Related Amendments, Corrigenda or ISHs .....	IEC 60079-0: Edition 7; ISH1: 2019, ISH2: 2019, COR1: 2020 IEC 60079-7: Edition 5; ISH1:2016, AMD1 :2017 IEC 60079-15: Edition 4; ISH1:2016	
Test item description.....:	Weight Transmitter	
Model/type reference .....	ACT100xx	
Code (e.g. Ex __ II__ T__ ).....:	Ex nA IIC T4 Gc Ta = -10° to +40°C Ex ec IIC T4 Gc Ta = -10° to +40°C	
Rating.....:	12-30Vdc input	

<b>ExTR Package Contents</b>
Assembled ExTR documents and Additional reference material:
IECEX Test Report Cover
IECEX Test Report: IEC 60079-0, Edition 7
IECEX Test Report: IEC 60079-7, Edition 5
IECEX Test Report: IEC 60079-15, Edition 4

Manufacturer's name .....:	Mettler-Toledo GmbH
Address .....:	Im Langacher 44 8606 Greifensee, Switzerland
Trademark .....:	<b>METTLER TOLEDO</b>
Certificate No. (optional) .....:	IECEx FMG 19.0043X/00
QAR Reference No. (optional) .....:	NL/DEK/QAR11.0008/07
<b>Particulars: Test item vs. Test requirements</b>	
Classification of installation and use ..... :	Stationary
Ingress protection .....:	N/A
Rated ambient temperature range (°C).....:	-10°C to +40°C
<b>General remarks:</b>	
The test results presented in this ExTR package relate only to the item or product tested.	
<ul style="list-style-type: none"> <li>▪ "(See Attachment #)" refers to additional information appended to the ExTR package.</li> <li>▪ "(See appended table)" refers to a table appended to the ExTR package.</li> <li>▪ Throughout this ExTR package, a point is used as the decimal separator.</li> <li>▪ <i>Where the term "N/A" appears in any part of an ExTR package, it indicates that the associated issue was considered "Not applicable" to the involved evaluation.</i></li> <li>▪ <i>In accordance with IECEx 02, a Receiving ExCB may request a sample of the Ex equipment and copies of the documentation referred to in an ExTR Cover.</i></li> </ul>	
The technical content of this ExTR package shall not be reproduced except in full without the written approval of the Issuing ExCB and ExTL.	
<b>General product information:</b>	
The ACT100xx transmitter is a weighing product that transfers weight data to a customer control system (PLC/DCS) via analog signal (current or voltage) normally 4-20mA or 0-10Vdc.	
It has an RJ45 port which is only used for Configuration/Service and for manufacturing purposes only. No external device will be connected to the ACT100xx via this port during normal operation. In addition, it provides a digital I/O interface with three discrete inputs and two discrete outputs.	
<u>Electrical Supply:</u>	
12-30Vdc, Agency approved Zone 2 Power supply or	
12-30Vdc, Class 2 or Limited Power source (LPS) Type, SELV power supply	
The ACT100xx transmitter is intended to be used according to the following environmental conditions:	
The transmitter can be operated at temperatures ranging from □10° to 40° C (14° to 104° F) at 10% to 85% relative humidity non-condensing.	
<b>Details of change (applicable only when revising an existing ExTR package):</b>	
N/A	
<b>Copy of Marking Plate:</b>	

<p style="text-align: center; font-weight: bold; font-size: 1.2em;">METTLER TOLEDO</p> <p>Associated NFW Apparatus Suitable For Class I, II, III; Division 2; Groups A, B, C, D, F, G OR Zone 2, IIC Zone 22, IIB -10°C ≤T<sub>a</sub> ≤+40°C SEE CONTROL DRAWING 30565571 VOIR LE PLAN DE CONTRÔLE 30565571</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">               II 3 G              II 3 G         </div> <div style="text-align: center;">             Ex nA IIC T4 Gc              Ex ec IIC T4 Gc              -10°C ≤T<sub>a</sub> ≤+40°C         </div> <div style="text-align: center;">               APPROVED              FM18USC223X              FM19CA0118X              FM18ATEX0213X              IECEx_FMG_19.0043X         </div> </div> <p>SEE INSTALLATION DRAWING 30562232 VOIR LE PLAN DE INSTALLATION 30562232</p> <p><b>WARNING: TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING. INSTALLATION MUST BE IN ACCORDANCE WITH METTLER TOLEDO CONTROL DRAWING 30565571 AND INSTALLATION DRAWING 30562232. FAILURE TO DO SO MAY RESULT IN BODILY INJURY OR PROPERTY DAMAGE.</b>  <b>AVERTISSEMENT: POUR ÉVITER L'INFLAMMATION D'ATMOSPHERES INFLAMMABLES OU COMBUSTIBLES, COUPER LE COURANT AVANT L'ENTRETIEN. INSTALLATION DOIT ÊTRE EN CONFORMITÉ AVEC LE PLAN CONTRÔLE 30565571 et INSTALLATION 30562232 DE METTLER TOLEDO. LE DÉFAUT DE LE FAIRE PEUT ENTRAÎNER DES BLESSURES OU DES DOMMAGES MATÉRIELS BODITY.</b></p> <p style="font-size: 0.8em;">Mettler-Toledo GmbH, Im Langacher 44, CH-8608 Greifensee, Switzerland</p>	<p style="text-align: center; font-weight: bold; font-size: 1.2em;">METTLER TOLEDO</p> <p>MODEL: XXXXXX VERSION: XXXXXXXXXXXXXXXX XXX XXXX P/N: XXXXXXX XXX</p> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <p>24VDC 0.5A -10°C ~+40°C</p> <p>MAC: xx-xx-xx-xx-xx-xx    Default IP: 192.168.0.2</p> </div> <div style="text-align: center;">               S/N: XXXXXXX XXX         </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;">               E495941              Mettler-Toledo GmbH              Im Langacher 44              CH-8606 Greifensee, Switzerland  <a href="http://www.mt.com/ind-act100-downloads">www.mt.com/ind-act100-downloads</a> </div> <div style="text-align: center;"> <p>CAN-ICES-3(B) /NMB(B)</p>               Made in China         </div> </div>
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**Details regarding 'trade agent' / 'local assembler' application in accordance with OD 203:**

N/A

**Testing not fully performed by ExTL staff at the above ExTL address:**

N/A

**National differences considered as part of this evaluation:**

N/A

**"Specific Conditions of Use" / "Schedule of Limitations":**

1. The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1
2. The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with IEC 60079-0 and IEC 60079-15
3. Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment

**Routine tests:**

N/A

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<b>Technical Documents</b>			
Title:	Drawing No.:	Rev. Level:	Date:
Weighing Transmission ACT100xx DIN	30529621	B	05-Nov-2019
ACT100 Mainboard BOM	30488897	F	23.3.2020
AD1 BOM	30490215	D	23.3.2020
PCB ACT100 Mainboard assembly	30488897	F	19.3.2020
PCB ACT100 AD&Power	30490215	D	20.03.2020

assembly			
PNL, Mult, ACT100 AD&Power	30490202	B	14.11.2018
ACT100 Mainboard Schematic	30488897	F	14.2.2019
ACT100 AD&Power Schematic	30490215	D	20.3.2020
Installation Drawing ACT100xx	30562232	A	2020/02/11
Control Drawing ACT100xx	30565571	A	2019/12/4
Ex Label, ATEX&IECEX, ACT100xx	30566602	A	2019-08-02

Note: An \* is included before the title of documents that are new or revised.



**IECEx TEST REPORT**  
**IEC 60079-0**  
**Explosive atmospheres – Part 0: Equipment – General requirements**

ExTR Reference Number.....:	US/FMG/ExTR19.0040/00	
ExTR Free Reference Number .....	PR455360	
Compiled by + signature (ExTL) .....	Kevin M. Costa	<i>Kevin M. Costa</i>
Reviewed by + signature (ExTL).....:	Cheryl A. Gagliardi	<i>Cheryl A. Gagliardi</i>
Date of issue .....	2020-05-07	
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Applicant's name.....:	Mettler-Toledo GmbH	
Address .....	Im Langacher 44 8606 Greifensee, Switzerland	
Standard.....:	IEC 60079-0:2017, Edition 7.0	
Test procedure .....	IECEx System	
Test Report Form Number .....	ExTR60079-0_7B_DS (released 2018-01)	
Related Amendments, Corrigenda or ISHs .....	ISH1:2019, ISH2:2019	

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**Possible test case verdicts:**

- test case does not apply to the test item .....:N / A
- test item does meet the requirement .....:Pass

**General remarks:**

The test results presented in this Ex Test Report relate only to the item or product tested.

- "(see Attachment #)" refers to additional information appended to this document.
- "(see appended table)" refers to a table appended to this document.
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IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
2	Normative references		
3	Terms and definitions		
4	Equipment grouping		
4.1	General	Equipment assessed for group IIC explosive atmosphere	PASS
4.2	Group I	Not Group I equipment	NA
4.3	Group II	The equipment meets the requirements of this clause as shown below	PASS
4.4	Group III	Not Group III equipment	NA
4.5	Equipment for a particular explosive gas atmosphere	Equipment is not for use in a particular explosive atmosphere	NA
5 See also <a href="#">DS 2015/011A</a>	Temperatures		
5.1	Environmental influences		
5.1.1	Ambient temperature	The equipment has an ambient temperature range of -10°C to +40°C	PASS
5.1.2	External source of heating or cooling	The equipment does not contain external sources of heating or cooling	NA
5.2	Service temperature	The equipment was tested in accordance with Clause 26.5.1. The maximum service temperature will not exceed the T4 temperature class it has been assigned.  See Measurement Section for test details and results	PASS
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	The maximum surface temperature was determined, by test, to be well below the 135°C limit for a T4 temperature class per the requirements of this Clause and also Clause 26.5.1  See Measurement Section for test details and results	PASS
5.3.2	Limitation of maximum surface temperature		
5.3.2.1	Group I electrical equipment	Not Group I equipment	NA

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
5.3.2.2	Group II electrical equipment	The maximum surface temperature will not exceed 135°C for the T4 temperature class assigned. This was verified by temperature testing.  See Measurement Section for test details and results	PASS
5.3.2.3	Group III electrical equipment	Not Group III equipment	NA
5.3.2.3.1	Maximum surface temperature for EPL Da	Equipment not assessed for level of protection Da	NA
5.3.2.3.2	Maximum surface temperature for EPL Db	Equipment not assessed for level of protection Db	NA
5.3.2.3.3	Maximum surface temperature determined without a layer of dust for EPL Dc	Equipment not assessed for level of protection Dc	NA
5.3.3	Small component temperature for Group I or Group II electrical equipment	All components <20mm <sup>2</sup> displayed temperatures that were measured to be <275°C in a 40°C ambient temperature and all components ≥20mm <sup>2</sup> ≤1000mm <sup>2</sup> displayed temperatures that were measured to be <200°C in a 40°C ambient temperature. All components >1000mm <sup>2</sup> had a maximum temperature rise of 30K and would never exceed the T4 temperature limit of 135°C in a maximum ambient of 40°C  See Measurement Section for test details and results	PASS
5.3.4	Component temperature of smooth surfaces for Group I or Group II electrical equipment	The safety margin called out by this Clause is not necessary as the component temperature fall well below the 135°C maximum temperature for a T4 temperature class  See Measurement Section for test details and results	PASS
6	Requirements for all electrical equipment		
6.1	General	The equipment meets the requirements of this standard and also IEC 60079-7 and IEC 60079-15. The equipment was found to be constructed in accordance with the applicable safety standards	PASS
6.2	Mechanical strength of equipment	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
6.3	Opening times	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
6.4	Circulating currents in enclosures (e.g. of large electric machines)	Equipment does not contain circulating currents	NA

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
6.5	Gasket retention	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
6.6	Electromagnetic and ultrasonic energy radiating equipment		
6.6.1	General	Equipment is not a source of electromagnetic or ultrasonic energy	NA
7	Non-metallic enclosures and non-metallic parts of enclosures		
7.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
8	Metallic enclosures and metallic parts of enclosures	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
9	Fasteners		
9.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
10	Interlocking devices	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
11	Bushings	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54. Field wiring connections not assessed as part of scope of the Project	NA
12	(Reserved for future use)		
13 See also <a href="#">DS 2014/001</a>	Ex Components		
13.1	General	Equipment does not contain Ex components	NA
14	Connection facilities		
14.1	General	The equipment contains four (4) terminal blocks which are housed within the enclosure which allow connections to external wiring	PASS
14.2	Type of protection	The connectors comply with the level of protection 'ec' requirements per IEC 60079-7	PASS



IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
14.3	Creepage and clearance	The equipment complies with the specific creepage and clearance requirements per IEC 60079-7 and IEC 60079-15	PASS
15	Connection facilities for earthing or bonding conductors	Equipment intended to be installed within a secondary enclosure. The secondary enclosure contains an earth ground on the exterior.	NA
16	Entries into enclosures		
16.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
17	Supplementary requirements for electric machines		
17.1	General	Equipment is not considered an electrical machine	NA
18	Supplementary requirements for switchgear	Equipment is not switchgear	NA
19	Reserved for future use		
20	Supplementary requirements for external plugs, socket outlets and connectors for field wiring connection		
20.1	General	Equipment is intended for installation within a secondary enclosure with a minimum ingress protection rating of IP54. The enclosure is not part of the scope of the assessment	NA
21	Supplementary requirements for luminaires		
21.1	General	Equipment is not a luminaire	NA
22	Supplementary requirements for caplights and handlights	Equipment is not a caplight or a handlight	NA
23	Equipment incorporating cells and batteries		
23.1	General	Equipment does not contain cells or batteries	NA
24	Documentation	Documents submitted by the manufacturer give a full and correct specification of the explosion safety aspects of the electrical equipment	PASS

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
25	Compliance of prototype or sample with documents	The samples submitted and examined complied with the manufacturer's documentation	PASS
26	Type tests		
26.1	General	Type testing meets the requirements as described below	PASS
26.2	Test configuration	Type testing for temperature conducted under the most onerous conditions	PASS
26.3	Tests in explosive test mixtures	The spark-ignition assessment was conducted using the spark-ignition tables/curves from IEC60079-11. No testing in explosive mixtures was required	NA
26.4	Tests of enclosures		
26.4.1	Order of tests		
26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass parts of enclosures	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures		
26.4.1.2.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.4.5	Degree of protection (IP) by enclosures		
See also <a href="#">DS 2012/003</a>			
26.4.5.1	Test procedure	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.5	Thermal tests		
26.5.1	Temperature measurement		
26.5.1.1	General	The ACT100xx Weight Transmitter was tested in accordance with this Clause	PASS
26.5.1.2	Service temperature	The maximum service temperature determined via test will not exceed the T4 temperature class that has been assigned.  See Measurement Section for test details and results	PASS
26.5.1.3	Maximum surface temperature	The maximum surface temperature determined via test will not exceed the T4 temperature class that has been assigned.  See Measurement Section for test details and results	PASS
26.5.2	Thermal shock test	Equipment does not contain glass windows	NA
26.5.3	Small component ignition test (Group I and Group II)		
26.5.3.1	General	See Clause 5.3.3	PASS
26.6	Torque test for bushings	Equipment does not contain bushings	NA
26.7	Non-metallic enclosures or non-metallic parts of enclosures		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.7.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.8	Thermal endurance to heat	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.9	Thermal endurance to cold	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.10	Resistance to UV light		
26.10.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54. Equipment will not be exposed to UV light	NA
26.11	Resistance to chemical agents for Group I equipment	Equipment is not Group I equipment	NA
26.12	Earth continuity	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.13	Surface resistance test of parts of enclosures of non-metallic materials	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.14	Measurement of capacitance		
26.14.1	General	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.15	Verification of ratings of ventilating fans	Equipment does not contain ventilating fans	NA
26.16	Alternative qualification of elastomeric sealing O-rings	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
26.17	Transferred charge test	Equipment intended to be installed within a secondary enclosure with an Ingress Protection rating of IP54	NA
27	Routine tests	No routine tests need to be performed	NA
28	Manufacturer's responsibility		
28.1	Conformity with the documentation	The manufacturer has complied with the assessment and testing of their equipment to the applicable clauses	PASS
28.2	Certificate	An IECEx certificate will be generated by FM Approvals upon successful completion of this Project	PASS

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
28.3	Responsibility for marking	By marking the electrical apparatus in accordance with Clause 29, it is the manufacturer's responsibility that the electrical apparatus has been constructed in accordance with the applicable requirements of the relevant standards in safety matters. And that the product complies with the documentation	PASS
29 Marking			
29.1	Applicability	The apparatus is marked with the applicable standards for the types of protections listed in Clause 1	PASS
29.2	Location	The manufacturer has submitted label drawings which detail the correct marking of the equipment	PASS
29.3	General	The manufacturer submitted label contains the required information	PASS
29.4	Ex marking for explosive gas atmospheres	The equipment will be marked as follows: Ex nA IIC T4 Gc Ex ec IIC T4 Gc	PASS
29.5	Ex marking for explosive dust atmospheres	Equipment not assessed for dust atmosphere	NA
29.6	Combined types (or levels) of protection	Equipment does not contain parts which have a different type of protection	NA
29.7	Multiple types of protection	The equipment has been marked for 'nA' and 'ec' type protection	PASS
29.8	Ga equipment using two independent Gb types (or levels) of protection	Not applicable to assessment	NA
29.9	Boundary wall	Equipment will not be installed across a boundary wall	NA
29.10	Ex Components	The equipment is not an Ex component	NA
29.11	Small Ex Equipment and small Ex Components	Equipment is not considered small equipment or small Ex component	NA
29.12	Extremely small Ex Equipment and extremely small Ex Components	Equipment is not considered extremely small equipment or extremely small Ex component	NA
29.13	Warning markings	The following warning marking will appear on the equipment: <b>WARNING: Do not open when energized</b> <b>WARNING: Do not open when an explosive atmosphere is present</b>	PASS

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
29.14	Cells and batteries	Equipment does not contain cells or batteries	NA
29.15	Electric machines operated with a converter	Equipment is not an electrical machine	NA
29.16	Examples of marking	Examples only; No requirements	NA
30	Instructions		
30.1	General	The instructions include: <ul style="list-style-type: none"> <li>• Recapitulation of the marking</li> <li>• Instructions for safe                             <ul style="list-style-type: none"> <li>• Putting into service</li> <li>• Use</li> <li>• Assembling and dismantling</li> <li>• Maintenance</li> <li>• Installation</li> <li>• Adjustment</li> </ul> </li> <li>• Where necessary, training instructions</li> <li>• Information necessary to determine the safe use under specific operating instructions</li> <li>• Electrical parameters, maximum surface temperatures and other limit values</li> <li>• Where necessary, special conditions of use, including guidance on potential misuse</li> <li>• Certificate will contain a list of the standards, including the issue date, with which the equipment is declared to comply</li> </ul>	PASS
30.2	Cells and batteries	Equipment does not contain cells or batteries	NA
30.3	Electrical machines	Equipment is not an electrical machine	NA
30.4	Ventilating fans	Equipment does not contain ventilating fans	NA
30.5	Cable glands	Cable glands not part of the equipment assessment	NA
Annex A (Normative)	Supplementary requirements for cable glands		
A.1	General	Cable glands not part of the equipment assessment	NA
Annex B (Normative)	Requirements for Ex Components		
Table B.1	Applicability of clauses to Ex Components	Equipment is not an Ex component	NA
Annex C (Informative)	Example of rig for resistance to impact test		
Annex D (Informative)	Electric machines connected to converters		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
Annex E (Informative)	Temperature evaluation of electric machines		
Annex F (Informative)	Guideline flowchart for tests of non-metallic enclosures or non-metallic parts of enclosures (26.4)		
Annex G (Informative)	Guidance flowchart for tests of cable glands		
Annex H (Informative)	Shaft voltages resulting in motor bearing or shaft brush sparking Discharge energy calculation		

**Measurement Section, including Additional Narrative Remarks (as deemed applicable)**

**Temperature testing applicable to Clauses 5.2, 5.3.1, 5.3.2.2, 5.3.3, 5.3.4, 26.5.1.2 and 26.5.1.3**

Test voltage (V):30Vdc (including 'worst case' setup)  
 Ambient temperature for test: 21°C

Part Designation	Highest Temperature Measured + Ambient (21°C)	Conform to requirements for applicable Clauses for T4 Temperature Class?
DC-DC IE0517KS-3W (Denoted as PS1)	52°C	YES
Regulator, LDO, 5V, 30V, 0.25A, SOT223, SMD (denoted as U12)	46°C	YES
Microcontroller, M3, LPC1837, 180MHz, BGA (denoted as U1)	43°C	YES
Suppressor, AC, IND, 250V, 700µHx2, 5A, THD (denoted as FL1)	36°C	YES
ACT100xx Enclosure Surface	32°C	YES*
Internal Air Temperature	37°C	YES

\*Enclosure surface temperature per limits (85°C for plastics) from Table 19 of ANSI/ISA 61010-1



**IECEX TEST REPORT**  
**IEC 60079-7**  
**Explosive atmospheres - Part 7:**  
**Equipment protection by increased safety "e"**

ExTR Reference Number .....	: US/FMG/ExTR19.0040/00
ExTR Free Reference Number.....	: PR455630
Compiled by + signature (ExTL)....	: Kevin M. Costa <i>Kevin M. Costa</i>
Reviewed by + signature (ExTL) ...	: Cheryl A. Gagliardi <i>Cheryl A. Gagliardi</i>
Date of issue.....	: 2020-05-07
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Standard .....	: IEC 60079-7:2017, Edition 5.1
Test Report Form Number .....	: ExTR60079-7_5B_DS (released 2017-09)
Related Amendments, Corrigenda or ISHs.....	: ISH1: 2016, AMD1: 2017

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- test case does not apply to the test item..... : N/A
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**General remarks:**

The test results presented in this Ex Test Report relate only to the item or product tested.

- "(see Attachment #)" refers to additional information appended to this document.
- "(see appended table)" refers to a table appended to this document.
- Throughout this document, a point "." is used as the decimal separator.

The technical content of this Ex Test Report shall not be reproduced except in full without the written approval of the Issuing ExCB and ExTL.

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
2 See also <a href="#">DS2010/006A</a>	Normative references		
3 See also <a href="#">DS 2008/005A</a>	Terms and definitions		
4	Constructional requirements		
4.1	Level of Protection	The equipment is being assessed as level of protection 'ec'	PASS
4.2	Electrical connections		
4.2.1	General	Equipment is intended to be installed within a secondary enclosure with a minimum ingress protection rating of IP54. The enclosure is not part of the scope of assessment.	NA
4.2.3	Factory connections		
4.2.3.1	General	The equipment is provided with factory connections which are fixed in a specific location and meet the requirements of Annex H	PASS
4.2.3.2	Twist-on connectors for Level of Protection "ec"	Equipment does not utilize twist-on connectors	NA
4.2.3.3	Permanent connections	The equipment satisfies the requirements of this clause by e) "In level of protection 'ec', PCB mounted components, including surface mount and through-hole components, without additional support"	PASS
4.2.3.4 See also <a href="#">DS 2015/012</a>	Pluggable connections for Level of Protection "eb"	Equipment not assessed to level of protection 'eb'	NA
4.2.3.5 See also <a href="#">DS 2015/012</a>	Pluggable connections for Level of Protection "ec"	The equipment contains four (4) internal, pluggable connections (See assembly diagram 30529621) which passed the 15N pull force test which satisfies the requirements of this Clause  J1 (AD1 Board) – 39N J6 (ACT100 Mainboard) – 47N J3 (AD1 Board) – 24N J3 (ACT100 Mainboard) -- 36N	PASS



IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
4.2.3.6	Pluggable terminal bridging connections	The equipment does not contain bridging connections	NA
4.2.4	External plug and socket connections for field wiring connection	The equipment is intended for installation within a secondary enclosure with a minimum ingress protection rating of IP54. The enclosure is not part of the scope of the assessment	NA
4.3 See also <a href="#">DS 2016/001</a>	Clearances	The equipment conforms to the requirements of Annex H.	NA
4.4	Creepage distances		
4.4.1	General	The equipment conforms to the requirements of Annex H. See Annex H for details	NA
4.4.2	Creepage between differing voltages	The equipment conforms to the requirements of Annex H. See Annex H for details	NA
4.4.3	Determining creepage distances	The equipment conforms to the requirements of Annex H. See Annex H for details	NA
4.5	Printed wiring boards with conformal coating, Level of Protection “ec”	A reduction in creepage and clearance distances per Table 2 is not required as the equipment meets the requirements of Annex H	NA
4.6	Solid electrical insulating materials		
4.6.1	Specification	The equipment does not utilize encapsulant or potting compound as part of the design	NA
4.6.2	Long-term thermal stability	See 4.6.1	NA
4.7	Windings		
4.7.1	General	Clauses 4.7.2 thru 4.7.5 are applicable to Level of Protection ‘eb’ only. Since the assessment of the equipment is for ‘ec’, the Clauses will not be applicable	NA
4.7.2	Insulated conductors	See 4.7.1	NA
4.7.3	Winding impregnation	See 4.7.1	NA
4.7.4	Conductor dimensions	See 4.7.1	NA
4.7.5	Sensing elements	See 4.7.1	NA
4.8	Temperature limitations		
4.8.1	General	The equipment does not contain encapsulant or potting	NA

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
4.8.2	Conductors	Temperature testing in accordance with IEC 60079-0 verified that temperatures of the components would not impact the mechanical strength of the conductors, nor would the temperatures achieved damage any neighbouring electrical parts.	PASS
4.8.3	Insulated windings	Inductors L1 (CDRH125NP-220MC) and FL1 (7448225007) have an operating temperature of 155°C. Temperature testing per the requirements of IEC 60079-0 showed a temperature rise of the surface of inductors L1 and FL1 to be < 20K. It can be deduced that the internal winding temperature, in a maximum 40°C ambient, would be much less than the maximum temperature of 150°C per Table 4. Therefore testing was waived.	PASS
4.9	Wiring internal to equipment	The equipment does not contain any internal wiring	NA
4.10	Degrees of protection provided by enclosures	Equipment is intended to be installed within a secondary enclosure providing an ingress protection level of IP54. The certificate will contain an 'X' suffix, denoting that a "Specific Condition of Use" is being used	NA
4.11	Fasteners	Equipment is not for Group I	NA
5	Supplementary requirements for specific electrical equipment		
5.1	General	Informative	NA
5.2	Electrical machines		
5.2.1	General	Equipment not considered an electrical machine	NA
5.3	Luminaires, hand lights, or caplights		
5.3.1	General	Equipment is not a luminaire, handlight or caplight	NA
5.4	Analog measuring instruments and instrument transformers		
5.4.1	General	The equipment is being assessed for level of protection 'ec', therefore Clauses 5.4.1 thru 5.4.6 are not applicable	NA
5.4.2	Limiting temperature	See 5.4.1	NA
5.4.3	Short-circuit currents	See 5.4.1	NA
5.4.4	Short time thermal current	See 5.4.1	NA

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
5.4.5	Measuring instruments supplied by current transformers	See 5.4.1	NA
5.4.6	Moving coils	See 5.4.1	NA
5.4.7	External secondary circuits	The equipment does not contain a current transformer	NA
5.5	Transformers other than instrument transformers	The equipment does not contain transformers of any kind	NA
5.6	Supplementary requirements for equipment incorporating cells and batteries		
5.6.1	Type of cells and batteries		
5.6.1.1	General	Equipment does not contain cells or batteries	NA
5.7	General purpose connection and junction boxes	The equipment does not incorporate connection boxes or junction boxes	NA
5.8	Resistance heating equipment (other than trace heating systems)		
5.8.1	General	Equipment is not Resistance heating equipment	NA
5.9	Supplementary requirements for fuses		
5.9.1	General	The equipment contains three (3), non-renewable fuses. Two (2) on the Mainboard (denoted as F1 and F2- Littelfuse;1206L016, 30V, 0.6W, 160mA ) and one (1) on the AD1 board (denoted as F1 – Littelfuse; 2920L075/60, 60V, 1.5W, 750mA). The fuses are not considered to open during normal operation	PASS
5.9.2	Temperature class of equipment	The maximum surface temperatures of the fuses are well below the maximum allowable temperature for a T4 temperature rating (135°C)	PASS
5.9.3	Fuse mounting	All fuses are soldered into place on their respective PCBs	PASS
5.9.4	Fuse enclosures	Fuses are soldered to the boards and cannot be readily replaced	PASS
5.9.5	Replacement fuse identification	Fuses are of non-interchangeable type, therefore, marking is not necessary adjacent to the fuse	PASS
5.10	Other electrical equipment	Applicable equipment falls under the requirements of Clauses 5.2 through 5.9 and is not considered "new technology" per Note 1	NA
6	Type verifications and type tests		

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
6.1	Dielectric strength	The equipment was successfully subjected to 500Vrms between the +/- input and earth connection per the requirements of this Clause for equipment with a rated voltage of <90V.	PASS
6.2	Rotating electrical machines		
6.2.1	Determination of starting current ratio $I_A/ I_N$ and the time $t_E$	Equipment is not considered an electrical machine	NA
6.3	Luminaires	Equipment is not a luminaire	NA
6.4	Measuring instruments and instrument transformers	The equipment does not contain current transformers	NA
6.5	Transformers other than instrument transformers	The equipment does not contain transformers	NA
6.6	Verification and tests for cells and batteries of Level of Protection “eb”		
6.6.1	General	Equipment does not contain cells or batteries	NA
6.7	Verification and tests for cells and batteries of Level of Protection “ec”		
6.7.1	General	Equipment does not contain cells or batteries	NA
6.8	General purpose connection and junction boxes		
6.8.1 See also <a href="#">DS 2017/004</a>	General	The equipment is not a general purpose connection box or junction box	NA
6.9	Resistance heating equipment	Equipment is not resistance heating equipment	NA
6.10	Terminal insulating material tests	This Clause is applicable to Protection level ‘eb’. The equipment is being assessed to protection level ‘ec’, therefore it is not applicable	NA
7	Routine verifications and routine tests		
7.1	Dielectric tests	The dielectric test was successfully run per the requirements of Clause 6.1	PASS
7.2	Dielectric tests for batteries	Equipment does not contain batteries	NA

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
7.3	Inter-turn overvoltage tests	The equipment does not contain current transformers	NA
8 See also <a href="#">DS 2014/001</a>	Ex Component certificates		
8.1	General	Equipment is not considered an Ex component	NA
9	Marking and instructions		
9.1	General marking	The equipment has been marked in accordance with this Clause. See manufacturer label drawing 30566602 for further details	PASS
9.2 See also <a href="#">DS 2014/001</a>	Ex Component enclosures	Enclosure not subject to this examination. Equipment has a “Specific condition of use” stating that it must be installed within a secondary enclosure with an IP54 rating	NA
9.3	Instructions for use		
9.3.1	Battery operated equipment	Equipment is not battery powered	NA
9.3.2	Terminals	The manufacturer instructions provide guidance to the end-user on recommended wire gauge size use and also conductor insulation stripping requirements.	PASS
9.3.3	Luminaires	Equipment is not a luminaire	NA
9.3.4	Machines	Equipment is not a machine	NA
9.4	Warning markings	The equivalent warning markings from Clauses 4.2.4 and 4.10.3 a) have been used as shown below: <b>WARNING: Do not open when energized</b> <b>WARNING: Do not open when an explosive atmosphere is present</b>	PASS
10	Documentation	Documents submitted by the manufacturer give a full and correct specification of the electrical equipment	PASS
Annex A (Normative)	Temperature determination of electrical machines – Methods of test and of calculation		

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
A.1	General	Equipment is not considered an electrical machine	NA
Annex B (Normative)	Type tests for specific forms of resistance heating devices or resistance heating units (other than trace heater)		
B.1	Resistance heating devices subjected to mechanical stresses	Equipment is not a resistance heating device	NA
Annex C (Informative)	Cage motors – Thermal protection in service		
Annex D (Informative)	Resistance heating devices and units – Additional electrical protection		
Annex E (Informative) See also <a href="#">DS 2017/004</a>	Combinations of terminals and conductors for general purpose connection and junction boxes		
Annex F (Normative)	Dimensions of copper conductors	Informative	NA
Annex G (Normative)	Test procedure for T5 (only 8 W), T8, T10 and T12 lamps		
G.1	Asymmetric pulse test		
G.1.1	General	Equipment does not contain lamps	NA
Annex H (Normative)	Alternative separation distances for Level of Protection “ec” equipment under controlled environments		
H.1	General	The equipment meets the requirements of H.2 thru H.5 as shown below	PASS

IEC 60079-7			
Clause	Requirement – Test	Result – Remark	Verdict
H.2	Specific Conditions of Use	<p>The equipment meets the requirements of this Clause as it is intended to be installed within a secondary enclosure with a minimum Ingress Protection rating of IP54.</p> <p>The certificates will contain an 'X' suffix, denoting that the equipment containing "Specific Conditions of Use" that will be worded as follows:</p> <p>"The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1"</p> <p>"The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with IEC 60079-0"</p> <p>"Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment"</p>	PASS
H.3	Control of pollution access	The equipment meets the requirements of this Clause as it is intended to be installed within a secondary enclosure with a minimum Ingress Protection rating of IP54.	PASS
H.4	Voltage limitation	The voltage of the equipment is limited to much less than the 275Vac or 390Vdc called out by this Clause	PASS
H.5	Control of overvoltages and transient protection	<p>Control of overvoltages and transient protection shall be made external to the equipment and denoted by a Specific Condition of Use (See Clause H.2):</p> <p>"Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment"</p>	PASS
H.6	Alternative separation distances	No minimum creepage and clearance requirements will be specified as the equipment operates at a voltage level less than 60Vac or 85Vdc	PASS
Annex I (Informative)	Application, installation, and testing considerations for Level of Protection "ec" asynchronous machines		
Annex J (informative)	Luminaires incorporating LEDs		

Measurement Section, including Additional Narrative Remarks (as deemed applicable)

As temperatures and temperature testing per IEC 60079-0 are mentioned in this report, please see Measurement Section in IEC 60079-0 ExTR for further details



	<b>IECEX TEST REPORT</b> <b>IEC 60079-15</b> <b>Explosive atmospheres – Part 15:</b> <b>Equipment protection by type of protection "n"</b>
ExTR Reference Number..... :	US/FMG/ExTR19.0040/00
ExTR Free Reference Number .....	PR455630
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Date of issue .....	2020-05-07
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Standard..... :	IEC 60079-15:2010, 4 <sup>th</sup> Edition
Test procedure .....	IECEX System
Test Report Form Number .....	ExTR60079-15_4B_DS (released 2017-09)
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<p><b>Possible test case verdicts:</b></p>
<p>- test case does not apply to the test item .....:N / A</p>
<p>- test item does meet the requirement .....:Pass</p>
<p><b>General remarks:</b></p>
<p>The test results presented in this Ex Test Report relate only to the item or product tested.</p>
<ul style="list-style-type: none"> <li>▪ "(see Attachment #)" refers to additional information appended to this document.</li> <li>▪ "(see appended table)" refers to a table appended to this document.</li> <li>▪ Throughout this document, a point "." is used as the decimal separator.</li> </ul>
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IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
2 See also <a href="#">DS</a> <a href="#">2010/006A</a>	Normative references		
3	Terms and definitions		
4	General		
4.1	Equipment grouping and temperature classification	Equipment assessed for Group IIC with an ambient temperature range of T4, Ta = -10°C to +40°C	PASS
4.2	Potential ignition sources	In normal operation, the equipment will not produce an operational arc or spark per the requirements of Clauses 16-20. The equipment has a maximum surface temperature which falls well below the limit for a T4 temperature class.	PASS
5	Temperatures		
5.1	Maximum surface temperature	The maximum surface temperature was determined, by test in accordance with IEC 60079-0, to be well below the 135°C limit for a T4 temperature class per the requirements of this Clause	PASS
5.2	Small components	In accordance with Clause 5.3.3 per IEC 60079-0:  All components <20mm <sup>2</sup> displayed temperatures that were measured to be <275°C in a 40°C ambient temperature and all components ≥20mm <sup>2</sup> ≤1000mm <sup>2</sup> displayed temperatures that were measured to be <200°C. All components >1000mm <sup>2</sup> had a maximum temperature rise of 30K and would never exceed the T4 temperature limit of 135°C in a maximum ambient of 40°C	PASS
6	Requirements for electrical equipment		
6.1	General	The equipment complies with the requirements of this standard and also complies with the General requirements of IEC60079-0	PASS
6.2	Opening times	Equipment does not incorporate 'nR' rating	NA
6.3	Minimum degree of protection		

IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
6.3.1	General	A “Specific condition of Use” will be used by the manufacturer stating that the equipment shall be installed within a secondary enclosure with an IP54 rating. The certificates will also have an ‘X’ suffix, noting there is a “Specific condition of Use” for the end user	PASS
6.3.2	Degree of protection provided by installation	A “Specific condition of Use” will be used by the manufacturer stating that the equipment shall be installed within a secondary enclosure with an IP54 rating. The certificates will also have an ‘X’ suffix, noting there is a “Specific condition of Use” for the end user	PASS
6.4			
Clearances, creepage distances and separations			
6.4.1	General	The equipment meets the exception of Clause 13 as the equipment has a rated voltage that does not exceed 60Vac or 85Vdc	NA
6.5			
Electric strength			
6.5.1	Insulation from earth or frame	The equipment was successfully tested per the requirements for equipment with a supply voltage of <90V. A 500 Vrms voltage was applied between +/- input and earth without breakdown occurring. See Measurement Section for test details and test results	PASS
6.5.2	Insulation between conductive parts	The equipment passed the routine dielectric test per the requirements of Clause 6.5.1. See Measurement Section for test details and test results	PASS
7			
Connection facilities and terminal compartments			
7.1	General	The equipment meets the requirements of this Clause as shown below in Clauses 7.2 and 7.3	PASS
7.2			
Field wiring connections			
7.2.1	General	Equipment is intended to be installed within a secondary enclosure with a minimum ingress protection rating of IP54. The enclosure is not part of the scope of assessment.	NA
7.3			
Factory connections			
7.3.1	General	The equipment meets the exception of Clause 6.4 as the equipment has a rated voltage that does not exceed 60Vac or 85Vdc. Therefore, creepage and clearance distances are not applicable to the assessment	NA
7.3.2	Field wiring connection methods used for factory connections	Equipment is intended to be installed within a secondary enclosure with a minimum ingress protection rating of IP54. The enclosure is not part of the scope of assessment.	NA
7.3.3	Other factory connections	The equipment does not utilize twist-on connecting devices	NA
7.3.4	Permanent connections	Permanent connections within equipment are soldered and not supported by the soldered connection alone	PASS

IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
7.3.5 See also <a href="#">DS 2015/012</a>	Pluggable connections	The equipment contains four (4) internal, pluggable connections (See assembly diagram 30529621) which passed the 15N pull force test which satisfies the requirements of this Clause  J1 (AD1 Board) – 39N J6 (ACT100 Mainboard) – 47N J3 (AD1 Board) – 24N J3 (ACT100 Mainboard) -- 36N	PASS
7.3.6	Terminal bridging connections	The equipment does not contain bridging connections	NA
8			
Supplementary requirements for non-sparking electrical rotating machines			
8.1	General	Equipment is not an electrical rotating machine	NA
9			
Supplementary requirements for non-sparking fuses and fuse assemblies			
9.1	Fuses	The equipment contains three (3), non-renewable fuses. Two (2) on the Mainboard (denoted as F1 and F2- Littelfuse;1206L016, 30V, 0.6W, 160mA ) and one (1) on the AD1 board (denoted as F1 – Littelfuse; 2920L075/60, 60V, 1.5W, 750mA). The fuses are not considered to open during normal operation	PASS
9.2	Temperature class of equipment	The external surface temperature of the fuses was taken into account when assessing the equipment for a T4 rating	PASS
9.3	Fuse mounting	All fuses are soldered into place on their respective PCBs	PASS
9.4	Fuse enclosures	Fuses are soldered to the boards and cannot be readily replaced	PASS
9.5	Replacement fuse identification	Fuses are of non-interchangeable type, therefore, marking adjacent to the fuse is not necessary	NA
10			
Supplementary requirements for non-sparking plugs and sockets			
10.1	Plugs and sockets for external connections	Equipment is intended to be installed within a secondary enclosure with a minimum ingress protection rating of IP54	NA
10.2 See also <a href="#">DS 2015/003</a>	Maintaining degree of protection (IP code)	Equipment is intended to be installed within a secondary enclosure with a minimum ingress protection rating of IP54	NA
10.3	Sockets that do not have plugs inserted in normal operation	The equipment contains an RJ45 socket connector on the front. This port is used for Configuration/Service and manufacturing purposes. No external device will be connected to this port during normal operation	PASS

IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
11	Supplementary requirements for non-sparking luminaires		
11.1	General	Equipment is not a luminaire	NA
12	Supplementary requirements for equipment incorporating non-sparking cells and batteries		
12.1	General	Equipment does not contain cells or batteries	NA
13 See also <a href="#">DS 2014/004</a>	Supplementary requirements for non-sparking low power equipment	The equipment meets the requirements of Clause 6.4 as the equipment has a rated voltage that does not exceed 60Vac or 85Vdc	PASS
14	Supplementary requirements for non-sparking current transformers	The equipment does not contain transformers	NA
15	Other non-sparking electrical equipment	The equipment falls within the scope which is mentioned in Clauses 8 thru 14	NA
16	General supplementary requirements for equipment producing arcs, sparks or hot surfaces	The equipment does not contain parts that produce arcs, sparks or hot surfaces during normal operation	NA
17	Supplementary requirements for enclosed-break devices and non-incendive components producing arcs, sparks or hot surfaces		
17.1	Type testing	The equipment does not contain enclosed break or non-incendive components	NA
17.2	Ratings		
17.2.1	Enclosed-break devices	The equipment does not contain enclosed-break devices	NA
17.2.2	Non-incendive components	The equipment does not incorporate non-incendive components	NA
17.3	Construction of enclosed-break devices	Equipment does not contain enclosed-break devices	NA
18	Supplementary requirements for hermetically sealed devices producing arcs, sparks or hot surfaces		
19 See also <a href="#">DS 2013/005</a>	Supplementary requirements for sealed devices producing arcs, sparks or hot surfaces	Equipment does not contain sealed devices. The equipment does incorporate two Solid State relays on the ACT100 Mainboard denoted as K1 & K2 ( Panasonic, Part # AQY212EH, SPST-A, 60V, 500mA, 5kV, 5ms, SMD)	NA
20	Supplementary requirements for restricted-breathing enclosures protecting equipment producing arcs, sparks or hot surfaces		
20.1	General	Equipment does not utilize restricted-breathing enclosures.	NA

IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
21	General information on verification and tests	Equipment is intended to be installed within a secondary enclosure with an IP54 rating. The equipment enclosure is not part of the assessment	NA
22	Type tests		
22.1	Representative samples	Equipment is intended to be installed within a secondary enclosure with an IP54 rating. The equipment enclosure is not part of the assessment	NA
22.2	Test configuration	See 22.1	NA
22.3	Tests for enclosures on which the type of protection depends		
22.3.1	Thermal endurance tests		
22.3.1.1	Thermal endurance to heat	Equipment is intended to be installed within a secondary enclosure with an IP54 rating. The equipment enclosure is not part of the assessment	NA
22.3.1.2	Drop test for hand-held equipment	See 22.3.1.1	NA
22.4	Tests for enclosed break devices and non incensive components	Equipment does not contain enclosed break devices or non-incensive components	NA
22.5 See also <a href="#">DS 2013/005</a>	Tests for sealed devices	The equipment does not contain sealed devices	NA
22.6	Type test requirements for restricted-breathing enclosures		
22.6.1	General	Equipment does not incorporate restricted-breathing enclosures	NA
22.7	Test for screw lampholders	Equipment does not contain lampholders	NA
22.8	Test for starter holders for luminaires	Equipment is not a luminaire	NA
22.9	Tests for electronic starters for tubular fluorescent lamps and for ignitors for high pressure sodium or metal halide lamps		
22.9.1	General	Equipment does not contain lamps	NA
22.10	Test for wiring of luminaires subject to high-voltage impulses from ignitors	Equipment is not a luminaire	NA
22.11	Mechanical shock test for batteries		
22.11.1	General	Equipment does not contain batteries	NA
22.12	Insulation resistance test for batteries		
22.12.1	Test conditions	Equipment does not contain batteries	NA
22.13	Additional ignition tests for large or high-voltage machines		
22.13.1	Test for cage rotor construction		
22.13.1.1	General	Equipment is not a high voltage machine	NA

IEC 60079-15			
Clause	Requirement – Test	Result – Remark	Verdict
23	Routine verifications and tests		
23.1	General	All required testing was performed per the applicable requirements from IEC60079-0 and the test of Clause 23.2	PASS
23.2	Specific routine tests		
23.2.1	Electric strength test	The equipment successfully passed the test per the requirements of Clause 6.5.1. See Measurement Section for details	PASS
23.2.2	Alternate dielectric strength test	See 23.2.1	NA
23.2.3	Routine test requirements for restricted-breathing enclosures		
23.2.3.1	General	Equipment does not incorporate restricted-breathing enclosures	NA
24	Marking		
24.1	General	The markings which appear on the manufacturer's label are in accordance with this Clause and 60079-0; Details can be found in document 30566602	PASS
24.2	Additional marking for batteries	Equipment does not contain batteries	NA
24.3	Examples of marking	Examples only; no requirements	NA
24.3.1	Warning markings	An equivalent warning to the one pointed out in Clause 20.2.7.2.2 has been placed on the manufacturer label, it reads as: <b>WARNING: To prevent ignition of flammable or combustible atmosphere, disconnect power before servicing</b>	PASS
25	Documentation	Documentation submitted by the manufacturer give a full and correct specification of the explosion safety aspects of the electrical equipment. Additionally, the documentation specifies the degree of protection provided by the installation per Clause 6.3.2	PASS
26	Instructions	The instructions provided by the manufacturer can be found on document <b>30529357</b> and satisfy the requirements per IEC 60079-0	PASS
Annex A (Informative)	Application, installation, and testing considerations for Ex "nA" asynchronous machines		

**Measurement Section, including Additional Narrative Remarks (as deemed applicable)**  
**APPENDIX B: Additional test remarks**

<b>TABLE: Dielectric strength tests</b>		
Test voltage applied between:	Test voltage (V) a.c. / <b>d.c.</b>	Breakdown Yes / No
+/- Input and earth connection at rear of equipment (DIN rail clip)	500 Vrms	No
Supplementary information		
DC voltage used as capacitors were in ground path		

<b>TABLE: Maximum temperatures</b>							
	Test voltage (V)	:30Vdc					—
	t <sub>amb1</sub> (°C)	: 21°C					—
	t <sub>amb2</sub> (°C)	:					—

Listed temperatures below are the values for the hottest components registered during temperature testing.

Maximum temperature T of part/at::	T (°C)	Allowed T <sub>max</sub> (°C)
DC-DC IE0517KS-3W (Denoted as PS1)	52°C	135°C
Regulator, LDO, 5V, 30V, 0.25A, SOT223, SMD (denoted as U12)	46°C	135°C
Microcontroller, M3, LPC1837, 180MHz, BGA (denoted as U1)	43°C	135°C
Suppressor, AC, IND, 250V, 700µHx2, 5A, THD (denoted as FL1)	36°C	135°C
ACT100xx Enclosure Surface	32°C	85°C
Internal Air Temperature	37°C	135°C