



IECEX Ex TEST REPORT COVER



ExTR Reference Number..... : GB/BAS/ExTR10.0134/00
 ExTR Free Reference Number..... : 09/0519
 Complied by + signature (ExTL).... : R. Powney
 Reviewed by + signature (ExTL) ... : M. Powney
 Approved by + signature (ExCB).... : R. Sinclair
 Date of issue..... : 7 June 2010

Ex Certification Body (ExCB)..... : Baseefa
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Ex Testing Laboratory (ExTL)..... : Baseefa
 Address : Rockhead Business Park, Staden Lane, Buxton, Derbyshire, UK, SK17 9RZ

Applicant's name : Emerson Process Management - Rosemount Analytical
 Address : 2400 Barranca Parkway, Irvine, California 92606, USA

Standards : IEC 60079-0:2007 Edition 5, IEC 60079-11:2006 Edition 5
 Test procedure..... : IECEx Scheme
 Test Report Form No. : ExTR Cover_1
 TRF Originator :
 Master TRF..... : Dated 2006-08

Instructions for Intended Use of Cover Sheet:

This document is to be compiled and reviewed by the ExTL, with the ExCB giving the final approval, or compiled by the ExCB without the involvement of the ExTL. It is to serve as the sole cover for an ExTR package, which may be comprised of a single ExTR document or multiple ExTR documents. This ExTR Cover is to be completed and attached to the completed ExTR package.

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Test item description..... :
 Trademark :
 Model/type reference : Xmt

Manufacturer : Emerson Process Management - Rosemount Analytical
 Address : 2400 Barranca Parkway, Irvine, California 92606, USA

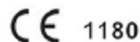
Code (e.g. Ex __ II__ T__)..... : Ex ia IIC T4 Ga

Rating.....: Various

Copy of Marking Plate

Rosemount® Analytical

IRVINE, CA
MODEL XMT-T-FF-73



II 1 G

IECEX BAS 09.0150X
Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +50°C)

Baseefa04ATEX0215X
EEx ia IIC T4
Tamb = 0°C TO +50°C

SUPPLY

Ui = 30 VDC
Ii = 300mA
Pi = 1.3 W
Ci = 0.4 nF
Li = 0 μH

9241584-00/C

XMT-T-FF label used as an example.

Particulars: test item vs. test requirements

Classification of installation and use..... : portable / stationary / hand-held

Ingress protection : IP20 min

Rated ambient temperature range (°C) : -20°C to +50°C

General remarks:

General product information:

The Xmt is designed to convert an electrical signal from a remote sensor, or integral toroidal sensor (Xmt-T only) into a 4-20mA HART compatible signal. The apparatus consists of a printed circuit board, terminal facilities and a liquid crystal display and keypad, all housed in a plastic enclosure.

The apparatus may be designated Xmt-A, Xmt-P, Xmt-C and Xmt-T.
The Xmt-A and Xmt-P differ only in software.

The suffixes -HT, -FF & -FI designate the following protocol compatibilities:

HT HART
FF Fieldbus
FI FISCO

Manufacturer's Documents

Document No.	Sheets	Document Title	Issue	Date
33633-00	1 & 2	Enclosure, Front Pipe Mount	J	09-27-05
33634-00/01	1 & 2	Enclosure, Rear Pipe Mount	L	09-10-04
33635-00	1 of 1	Cover, Panel Mount Enclosure	H	03-28-08
33636-00	1 & 2	Enclosure, Panel Mount	M	03-25-08
33670-01	1 – 4	Overlay, XMT	D	01-10-07
33788-00	1 of 1	PCB, SoluComp XMT-A/P	E	08-23-05
33831-02	1 of 1	Cover, PCB SoluComp XMT-T	E	08-24-06
33831-00	1 of 1	Cover, PCB SoluComp XMT-A	G	08-24-06
33870-00	1 of 1	PCB SoluComp XMT-C-HT	B	08-23-05
33884-00	1 of 1	PCB, SoluComp XMT-T-HT	B	08-23-06
33943-00	1 of 1	PCB, SoluComp, XMT-A/P-FF-FI	A	06-02-05
33944-00	1 of 1	PCB, SoluComp XMT-C-FF-FI	A	06-02-05
33945-00	1 of 1	PCB, SoluComp XMT-T-FF-FI	B	03-14-06
33948-00	1 of 1	PCB, SoluComp XMT-A/P-HT, CPU	C	12-09-05
33949-00	1 of 1	PCB, SoluComp XMT-C-HT	B	12-09-05
33950-00	1 of 1	PCB, SoluComp XMT-T-HT	A	12-09-05
70025-00	1 of 1	PCB, Fieldbus Square Card	C	07-13-07
1700430	1 – 5	Certified Product Schematic, PCB, SoluComp XMT-A/P-HT	A	01-05-04
1700456	1 – 3	Certified Product Toroidal Snsr Mod 245	B	09-22-04

Document No.	Sheets	Document Title	Issue	Date
1700459	1 of 1	Certified Product DWG Toroidal Sensor Model 225/226/228	B	04-10-03
1700460	1 of 1	Certified Product DWG Toroidal Sensor Model 222	B	02-02-04
1700461	1 – 3	Certified Product DWG Toroidal Sensor Model 242	D	04-10-03
1700465	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-A/P-HT	A	01-22-04
1700496	1 of 1	Certified Product Schematic, PCB, SoluComp XMT-C-HT	A	01-05-04
1700513	1 of 1	Certified Product MOD XMT-A-HT-10 Xmtr IS (BAS)	A	01-22-04
1700514	1 of 1	Certified Product MOD XMT-A-FF-10 Xmtr IS (BAS)	A	10-06-04
1700515	1 of 1	Certified Product MOD XMT-A-HT-11 Xmtr IS (BAS)	B	01-22-04
1700516	1 of 1	Certified Product MOD XMT-A-FF-11 Xmtr IS (BAS)	B	10-06-04
1700517	1 of 1	Certified Product MOD XMT-P-HT-10 Xmtr IS (BAS)	A	01-22-04
1700518	1 of 1	Certified Product MOD XMT-P-FF-10 Xmtr IS (BAS)	A	10-06-04
1700519	1 of 1	Certified Product MOD XMT-P-HT-11 Xmtr IS (BAS)	B	01-22-04
1700520	1 of 1	Certified Product MOD XMT-P-FF-11 Xmtr IS (BAS)	B	10-06-04
1700522	1 of 1	Certified Product MOD XMT-C-FF-10 Xmtr IS (BAS)	A	10-06-04
1700523	1 of 1	Certified Product MOD XMT-C-HT-11 Xmtr IS (BAS)	B	01-22-04
1700524	1 of 1	Certified Product MOD XMT-C-FF-11 Xmtr IS (BAS)	B	10-06-04
1700525	1 of 1	Certified Product MOD XMT-T-HT-10 Xmtr IS (BAS)	A	01-22-04
1700526	1 of 1	Certified Product MOD XMT-T-FF-10 Xmtr IS (BAS)	A	10-06-04
1700527	1 of 1	Certified Product MOD XMT-T-HT-11 Xmtr IS (BAS)	B	01-22-04
1700528	1 of 1	Certified Product MOD XMT-T-FF-11 Xmtr IS (BAS)	B	10-06-04
1700529	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-C-HT	A	01-20-04
1700530	1 – 5	Certified Product Schematic, PCB, SoluComp XMT-T-HT	A	01-05-04
1700531	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-T-HT	A	01-20-04
1700573	1 of 1	Certified Product MOD XMT-A-FI-10 Xmtr IS (BAS)	A	10-06-04
1700574	1 of 1	Certified Product MOD XMT-A-FI-11 Xmtr IS (BAS)	B	10-06-04
1700575	1 of 1	Certified Product MOD XMT-P-FI-10 Xmtr IS (BAS)	A	10-06-04
1700576	1 of 1	Certified Product MOD XMT-P-FI-11 Xmtr IS (BAS)	B	10-06-04
1700577	1 of 1	Certified Product MOD XMT-C-FI-10 Xmtr IS (BAS)	A	10-06-04
1700578	1 of 1	Certified Product MOD XMT-C-FI-11 Xmtr IS (BAS)	B	10-06-04
1700579	1 of 1	Certified Product MOD XMT-T-FI-10 Xmtr IS (BAS)	A	10-06-04
1700580	1 of 1	Certified Product MOD XMT-T-FI-11 Xmtr IS (BAS)	B	10-06-04
1700590	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-A/P-FF	B	09-13-07
1700591	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-A/P-FI	B	09-13-07
1700592	1 – 5	Certified Product Schematic, PCB, SoluComp XMT-A/P-FF-FI	A	10-06-04
1700593	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-C-FF	A	11-01-05
1700594	1 of 1	Certified Product Assembly, PCb, SoluComp XMT-C-FI	A	11-01-05
1700595	1 – 5	Certified Product Schematic, PCB, SoluComp XMT-C-FF-FI	A	10-06-04
1700596	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-T-FF	B	03-01-06
1700597	1 of 1	Certified Product Assembly, PCB, SoluComp XMT-T-FI	B	03-01-06
1700598	1 – 5	Certified Product Schematic, PCB, SoluComp XMT-T-FF-FI	B	11-06-06
9241577-00	1 of 1	Label, IS Baseefa XMT-A-HT	C	02-19-10
9241578-00	1 of 1	Label, IS Baseefa XMT-A-FF	C	02-19-10
9241579-00	1 of 1	Label, IS Baseefa XMT-P-HT	C	02-19-10
9241580-00	1 of 1	Label, IS Baseefa XMT-P-FF	C	02-19-10
9241581-00	1 of 1	Label, IS Baseefa XMT-C-HT	C	02-19-10
9241582-00	1 of 1	Label, IS Baseefa XMT-C-FF	C	02-19-10

Document No.	Sheets	Document Title	Issue	Date
9241583-00	1 of 1	Label, IS Baseefa XMT-T-HT	C	02-19-10
9241584-00	1 of 1	Label, IS Baseefa XMT-T-FF	C	02-19-10

IECEX TEST REPORT
Section 1
To be completed by ExCB



IECEX TEST REPORT
IEC 60079
Electrical equipment for explosive gas atmospheres
Part 0: General requirements

ExTR Reference Number..... : GB/BAS/ExTR10.0134/00
 ExTR Free Reference Number..... : 09/0519
 Complied by + signature (ExTL).... : R. Powney
 Reviewed by + signature (ExTL) ... : M. Powney
 Date of issue : 7 June 2010

Ex Testing Laboratory (ExTL) : Baseefa
 Address..... : Rockhead Business Park, Staden Lane, Buxton, SK17 9RZ, UK

Applicant's name : Emerson Process Management - Rosemount Analytical
 Address..... : 2400 Barranca Parkway, Irvine, California 92606, USA

Standard..... : IEC 60079-0:2007 Edition 5
 Test procedure : IECEx Scheme
 Test Report Form No. : ExTR60079-0:2007-Baseefa
 TRF Originator..... :
 Master TRF : dated 2008-03

Instructions for Intended Use of Ex Test Report:

This ExTR blank document is to be compiled and reviewed by the ExTL. The ExTR package in which this ExTR is incorporated (comprised of a single ExTR document or multiple ExTR documents) is to be accompanied by a single ExTR Cover Sheet, which is to be approved by the ExCB. ExTR Addendum(s) and/or ExTR Report of National Differences may also supplement this ExTR.

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Possible test case verdicts:

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

General remarks:

The tests results presented in this report relate only to the object tested.
 This report shall not be reproduced except in full without the written approval of the testing laboratory.

"(see Attachment #)" refers to additional information appended to the report.
 "(see appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

IECEX TEST REPORT
Section 1
To be completed by ExCB

ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
1	SCOPE	The Xmt is within the scope of IEC 60079-0:2007 and IEC 60079-11:2006.	Pass
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
4	EQUIPMENT GROUPING		
4.1	Group I	Not applicable.	N/A
4.2	Group II	The Xmt is intended for use in a Group IIC atmosphere.	Pass
4.3	Group III	Not in scope.	N/A
4.4	Equipment for a particular explosive atmosphere	See clause 4.2.	N/A
5	TEMPERATURES		
5.1	Environmental influences		
5.1.1	Ambient temperatures	The Xmt has a Temperature Classification of T4 and an ambient temperature range of -20°C to +50°C. This is clearly marked on the certification label.	Pass
5.1.2	External source of heating or cooling	See clause 5.1.1	Pass
5.2	Service temperature	Not applicable.	N/A
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	The maximum surface temperature does not exceed the limit for T4 in a +50°C ambient.	Pass
5.3.2	Limitation of maximum surface temperature		
5.3.2.1	Group I electrical equipment	Not applicable.	N/A
5.3.2.2	Group II electrical equipment	The maximum surface temperatures do not exceed the maximum permitted limits.	Pass
5.3.2.3	Group III electrical equipment		
5.3.2.3.1	Maximum surface temperature determined without a dust layer	Not in scope.	N/A
5.3.2.3.2	Maximum surface temperature with respect to dust layers	Not in scope.	N/A

IECEX TEST REPORT
Section 1
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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
5.3.3	Small component temperature for Group I or Group II electrical equipment	See clause 5.3.2.2.	Pass
6	REQUIREMENTS FOR ALL ELECTRICAL EQUIPMENT		
6.1	General	The Xmt complies with the requirements of IEC 60079-0:2007 and IEC 60079-11:2006.	Pass
6.2	Mechanical strength of equipment	Excluded by IEC 60079-11:2006.	N/A
6.3	Opening times	Excluded by IEC 60079-11:2006.	N/A
6.4	Circulating current	Excluded by IEC 60079-11:2006.	N/A
6.5	Gasket retention	Excluded by IEC 60079-11:2006.	N/A
6.6	Electromagnetic and ultrasonic energy radiating equipment		
6.6.1	Radio frequency sources	Not applicable.	N/A
6.6.2	Lasers or other continuous wave sources	Not applicable.	N/A
6.6.3	Ultrasonic sources	Not applicable.	N/A
7	NON-METALLIC ENCLOSURES AND NON-METALLIC PARTS OF ENCLOSURES		
7.1	General		
7.1.1	Applicability	The enclosure meets the requirements of the Standards.	Pass
7.1.2	Specification of materials	Excluded by IEC 60079-11:2006.	N/A
7.1.3	Plastic materials	Excluded by IEC 60079-11:2006.	N/A
7.1.4	Elastomeric materials	Excluded by IEC 60079-11:2006.	N/A
7.2	Thermal endurance		
7.2.1	Tests for thermal endurance	Excluded by IEC 60079-11:2006.	N/A
7.2.2	Material selection	Excluded by IEC 60079-11:2006.	N/A
7.3	Resistance to light	Excluded by IEC 60079-11:2006.	N/A
7.4	Electrostatic charges on external non-metallic materials		
7.4.1	Applicability	See clause 7.4.2.	Pass

IECEX TEST REPORT
Section 1
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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
7.4.2	Avoidance of a build-up of electrostatic charge on Group I or Group II electrical equipment	The enclosure is fabricated from Lexan and is assessed to have a surface resistance in excess of 1GΩ. The front panel (liquid crystal display window and keypad) has a ground plane ≤0.2mm from the front and back – the transparent section, provided for the display, is of laminate construction with the central plane being conductive and is electrically connected to the rest of the internal ground plane.	Pass
7.4.3	Avoidance of a build-up of electrostatic charge on equipment for Group III	Not in scope.	N/A
7.5	Threaded holes	Excluded by IEC 60079-11:2006.	N/A
8	METALLIC ENCLOSURES AND METALLIC PARTS OF ENCLOSURES		
8.1	Material Composition		
8.1.1	Group I	Not applicable.	N/A
8.1.2	Group II	Not applicable. See clause 7.4.2.	N/A
8.1.3	Group III	Not in scope.	N/A
8.2	Threaded Holes	Excluded by IEC 60079-11:2006.	N/A
9	FASTENERS		
9.1	General	Excluded by IEC 60079-11:2006.	N/A
9.2	Special fasteners	Excluded by IEC 60079-11:2006.	N/A
9.3	Holes for special fasteners	Excluded by IEC 60079-11:2006.	N/A
9.3.1	Thread engagement	Excluded by IEC 60079-11:2006.	N/A
9.3.2	Tolerance and clearance	Excluded by IEC 60079-11:2006.	N/A
9.3.3	Hexagon socket set screw	Excluded by IEC 60079-11:2006.	N/A
10	Interlocking devices	Excluded by IEC 60079-11:2006.	N/A
11	Bushings	Excluded by IEC 60079-11:2006.	N/A
12	Materials used for cementing	Excluded by IEC 60079-11:2006.	N/A
13	EX COMPONENTS		

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Section 1
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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
13.1	General	The Fieldbus Communications Board (-FF / -FI versions only) is component certified under BAS01ATEX1385U and meets the requirements of Annex B.	Pass
13.2	Mounting	The Fieldbus Communications Board (-FF / -FI versions only) is securely mounted on the PCB within the enclosure.	Pass
13.3	Internal mounting	Not applicable. See clause 13.1.	N/A
13.4	External mounting	Not applicable. See clause 13.2.	N/A
14	CONNECTION FACILITIES AND TERMINAL COMPARTMENTS		
14.1	General	Excluded by IEC 60079-11:2006.	N/A
14.2	Termination compartment	Excluded by IEC 60079-11:2006.	N/A
14.3	Type of protection	Excluded by IEC 60079-11:2006.	N/A
14.4	Creepage and clearance	Excluded by IEC 60079-11:2006.	N/A
15	CONNECTION FACILITIES FOR EARTHING OR BONDING CONDUCTORS		
15.1	Equipment requiring earthing	Excluded by IEC 60079-11:2006.	N/A
15.1.1	Internal	Excluded by IEC 60079-11:2006.	N/A
15.1.2	External	Excluded by IEC 60079-11:2006.	N/A
15.2	Equipment not requiring earthing	Excluded by IEC 60079-11:2006.	N/A
15.3	Size of conductor connection	Excluded by IEC 60079-11:2006.	N/A
15.4	Protection against corrosion	Excluded by IEC 60079-11:2006.	N/A
15.5	Secureness of electrical connection	Excluded by IEC 60079-11:2006.	N/A
16	ENTRIES INTO ENCLOSURES		
16.1	General	Excluded by IEC 60079-11:2006.	N/A
16.2	Identification of entries	Excluded by IEC 60079-11:2006.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
16.3	Cable glands	Excluded by IEC 60079-11:2006.	N/A
16.4	Blanking elements	Excluded by IEC 60079-11:2006.	N/A
16.5	Temperature at branching point and entry point	Excluded by IEC 60079-11:2006.	N/A
16.6	Electrostatic charges of cable sheaths	Excluded by IEC 60079-11:2006.	N/A
17	SUPPLEMENTARY REQUIREMENTS FOR ROTATING ELECTRICAL MACHINES		
17.1	Fans and fan hoods	Excluded by IEC 60079-11:2006.	N/A
17.2	Ventilation openings for external fans	Excluded by IEC 60079-11:2006.	N/A
17.3	Construction and mounting of the ventilation systems	Excluded by IEC 60079-11:2006.	N/A
17.4	Clearances for the ventilating system	Excluded by IEC 60079-11:2006.	N/A
17.5	Materials for external fans and fan hoods	Excluded by IEC 60079-11:2006.	N/A
17.6	Equipotential bonding conductors	Excluded by IEC 60079-11:2006.	N/A
18	SUPPLEMENTARY REQUIREMENTS FOR SWITCHGEAR		
18.1	Flammable dielectric	Excluded by IEC 60079-11:2006.	N/A
18.2	Disconnectors	Excluded by IEC 60079-11:2006.	N/A
18.3	Group I – Provisions for locking	Excluded by IEC 60079-11:2006.	N/A
18.4	Doors and covers	Excluded by IEC 60079-11:2006.	N/A
19	Supplementary requirements for fuses	Excluded by IEC 60079-11:2006.	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
20	SUPPLEMENTARY REQUIREMENTS FOR PLUGS, SOCKET OUTLETS AND CONNECTORS		
20.1	Interlocking	Excluded by IEC 60079-11:2006.	N/A
20.1.1	Explosive gas atmospheres	Excluded by IEC 60079-11:2006.	N/A
20.1.2	Explosive dust atmospheres	Excluded by IEC 60079-11:2006.	N/A
20.2	Energized plugs	Excluded by IEC 60079-11:2006.	N/A
21	SUPPLEMENTARY REQUIREMENTS FOR LUMINAIRES		
21.1	General	Excluded by IEC 60079-11:2006.	N/A
21.2	Covers for luminaires of EPL Gb or EPL Db	Excluded by IEC 60079-11:2006.	N/A
21.3	Covers for luminaires of EPL Gc or EPL Dc	Excluded by IEC 60079-11:2006.	N/A
21.4	Special lamps	Excluded by IEC 60079-11:2006.	N/A
22	SUPPLEMENTARY REQUIREMENTS FOR CAPLIGHTS AND HANDLIGHTS		
22.1	Group I caplights	Excluded by IEC 60079-11:2006.	N/A
22.2	Group II and Group III caplights and handlights	Excluded by IEC 60079-11:2006.	N/A
23	APPARATUS INCORPORATING CELLS AND BATTERIES		
23.1	General	Not applicable.	N/A
23.2	Batteries	Excluded by IEC 60079-11:2006.	N/A
23.3	Cell types	Not applicable.	N/A
23.4	Cells in a battery	Not applicable.	N/A
23.5	Ratings of batteries	Not applicable.	N/A
23.6	Interchangeability	Not applicable.	N/A
23.7	Charging of primary batteries	Not applicable.	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
23.8	Leakage	Not applicable.	N/A
23.9	Connections	Not applicable.	N/A
23.10	Orientation	Not applicable.	N/A
23.11	Replacement of cells or batteries	Not applicable.	N/A
23.12	Replaceable battery pack	Not applicable.	N/A
24	Documentation	See list of manufacturer's documents.	Pass
25	Compliance of prototype or sample with documents	Not applicable.	N/A
26	TYPE TESTS		
26.1	General	Testing was deemed not necessary.	N/A
26.2	Test configuration	Not applicable.	N/A
26.3	Tests in explosive test mixtures	Not applicable.	N/A
26.4	Tests of Enclosures		
26.4.1	Order of tests		
26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass of parts of enclosures	Excluded by IEC 60079-11:2006.	N/A
26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures	Excluded by IEC 60079-11:2006.	N/A
26.4.1.2.1	Group I electrical apparatus	Excluded by IEC 60079-11:2006.	N/A
26.4.1.2.2	Group II and Group III electrical apparatus	Excluded by IEC 60079-11:2006.	N/A
26.4.2	Resistance to impact	Excluded by IEC 60079-11:2006.	N/A
26.4.3	Drop test	Not applicable.	N/A
26.4.4	Acceptance criteria	Excluded by IEC 60079-11:2006.	N/A
26.4.5	Degree of protection (IP) by enclosures		
26.4.5.1	Test procedure	Excluded by IEC 60079-11:2006.	N/A
26.4.5.2	Acceptance criteria	Excluded by IEC 60079-11:2006.	N/A
26.5	Thermal tests		

IECEX TEST REPORT
Section 1
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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
26.5.1	Temperature measurement		
26.5.1.1	General	Not applicable.	N/A
26.5.1.2	Service temperature	Not applicable.	N/A
26.5.1.3	Maximum surface temperature	Not applicable.	N/A
26.5.2	Thermal shock test	Excluded by IEC 60079-11:2006.	N/A
26.5.3	Small component ignition test (Group I and Group II)		
26.5.3.1	General	Not applicable.	N/A
26.5.3.2	Procedure	Not applicable.	N/A
26.5.3.3	Acceptance criteria	Not applicable.	N/A
26.6	Torque test for bushings		
26.6.1	Test procedure	Excluded by IEC 60079-11:2006.	N/A
26.6.2	Acceptance criteria	Excluded by IEC 60079-11:2006.	N/A
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.7.1	General	Excluded by IEC 60079-11:2006.	N/A
26.7.2	Test temperatures	Excluded by IEC 60079-11:2006.	N/A
26.8	Thermal endurance to heat	Excluded by IEC 60079-11:2006.	N/A
26.9	Thermal endurance to cold	Excluded by IEC 60079-11:2006.	N/A
26.10	Resistance to light		
26.10.1	Test procedure	Excluded by IEC 60079-11:2006.	N/A
26.10.2	Acceptance criteria	Excluded by IEC 60079-11:2006.	N/A
26.11	Resistance to chemical agents for Group I electrical equipment	Excluded by IEC 60079-11:2006.	N/A
26.12	Earth Continuity	Excluded by IEC 60079-11:2006.	N/A
26.13	Surface resistance test of parts of enclosures of non-metallic materials	Not applicable.	N/A
26.14	Charging test		
26.14.1	Introduction	Not applicable.	N/A
26.14.2	Principle of the test	Not applicable.	N/A
26.14.3	Samples and test apparatus	Not applicable.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
26.14.4	Ambient conditions	Not applicable.	N/A
26.14.5	Conditioning	Not applicable.	N/A
26.14.6	Determination of the most efficient charging method	Not applicable.	N/A
26.14.6.1	Method A: Rubbing with a pure polyamide cloth (figure 6)	Not applicable.	N/A
26.14.6.2	Method B: Rubbing with a cotton cloth (figure 6)	Not applicable.	N/A
26.14.6.3	Method C: Charging by influence with a d.c. high-voltage power supply (figure 8)	Not applicable.	N/A
26.14.7	Assessment of discharge	Not applicable.	N/A
26.15	Measurement of capacitance	Not applicable.	N/A
26.15.1	Test procedure	Not applicable.	N/A
26.15.2	Acceptance criteria	Not applicable.	N/A
27	Routine tests	Not applicable.	N/A
28	MANUFACTURER'S RESPONSIBILITY		
28.1	Conformity with the documentation	Not applicable.	N/A
28.2	Certificate	Manufacturer's responsibility.	N/A
28.3	Responsibility for marking	Manufacturer's responsibility.	N/A
29	MARKING		
29.1	Location	The certification label is legible and located on the exterior of the enclosure.	Pass
29.2	General	The marking meets the requirements of IEC 60079-0:2007 and IEC 60079-11:2006.	Pass
29.3	Ex marking for explosive gas atmospheres	See clause 29.2.	Pass
29.4	Ex marking for explosive dust atmospheres	Not applicable. See clause 4.2 and 4.3.	N/A
29.5	Combined types of protection	Not applicable.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
29.6	Multiple types of protection	Not applicable.	N/A
29.7	Ga using two independent Gb types of protection	Not applicable.	N/A
29.8	Ex components	Not applicable.	N/A
29.9	Small equipment and small Ex components	Not applicable.	N/A
29.10	Extremely small equipment and small Ex components	Not applicable.	N/A
29.11	Warning markings	The Xmt carries a warning that the plastic enclosure, excluding the front panel, must only be cleaned with a damp cloth.	Pass
29.12	Alternate marking of equipment protection levels		
29.12.1	Alternate marking of type of protection for explosive gas atmospheres	Not applicable.	N/A
29.12.2	Alternate marking of type of protection for explosive dust atmospheres	Not applicable.	N/A
29.13	Cells and batteries	Not applicable.	N/A
29.14	Examples of marking	Not applicable.	N/A
30	INSTRUCTIONS		
30.1	General	A copy of the instructions, which meets the requirements of IEC 60079-0:2007, is kept on file.	Pass
30.2	Cells and batteries	Not applicable.	N/A
Annex A	SUPPLEMENTARY REQUIREMENTS FOR CABLE GLANDS		
A.1	General	Excluded by IEC 60079-11:2006.	N/A
A.2	Constructional requirements		
A.2.1	Cable sealing	Excluded by IEC 60079-11:2006.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
A.2.2	Filling compounds	Excluded by IEC 60079-11:2006.	N/A
A.2.3	Clamping		
A.2.3.1	General	Excluded by IEC 60079-11:2006.	N/A
A.2.3.2	Group II or III cable glands	Excluded by IEC 60079-11:2006.	N/A
A.2.4	Lead-in of cable		
A.2.4.1	Sharp edges	Excluded by IEC 60079-11:2006.	N/A
A.2.4.2	Point of entry	Excluded by IEC 60079-11:2006.	N/A
A.2.5	Released by a tool	Excluded by IEC 60079-11:2006.	N/A
A.2.6	Fixing	Excluded by IEC 60079-11:2006.	N/A
A.2.7	Degree of protection	Excluded by IEC 60079-11:2006.	N/A
A.3	Type Tests		
A.3.1	Tests of clamping of non-armoured and braided cables	Excluded by IEC 60079-11:2006.	N/A
A.3.1.1	Cable glands with clamping by the sealing ring	Excluded by IEC 60079-11:2006.	N/A
A.3.1.2	Cable glands with clamping by the filling compound	Excluded by IEC 60079-11:2006.	N/A
A.3.1.3	Cable glands with clamping by means of a clamping device	Excluded by IEC 60079-11:2006.	N/A
A.3.1.4	Tensile test	Excluded by IEC 60079-11:2006.	N/A
A.3.1.5	Mechanical strength	Excluded by IEC 60079-11:2006.	N/A
A.3.2	Tests of clamping of armoured cables		
A.3.2.1	Tests of clamping where the armourings are clamped by a device within the gland	Excluded by IEC 60079-11:2006.	N/A
A.3.2.1.1	Tensile test	Excluded by IEC 60079-11:2006.	N/A
A.3.2.1.2	Mechanical strength	Excluded by IEC 60079-11:2006.	N/A
A.3.2.2	Tests of clamping where the armourings are not clamped by a device within the gland	Excluded by IEC 60079-11:2006.	N/A
A.3.3	Type test for resistance to impact		
A.3.4	Test for degree of protection (IP) of cable entries	Excluded by IEC 60079-11:2006.	N/A
A.4	Marking		

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-0:2007 Edition 5	
Clause	Requirement – Test	Result – Remark	Verdict
A.4.1	Marking of cable glands	Excluded by IEC 60079-11:2006.	N/A
A.4.2	Marking of cable sealing rings	Excluded by IEC 60079-11:2006.	N/A
Annex B	Requirements for Ex components	The Fieldbus Communications Board (-FF / -FI versions only) meets the requirements of Annex B.	Pass
Annex C	Example of Rig for resistance to impact test	Not applicable.	N/A
Annex D	Introduction of an alternative risk assessment method	Not applicable.	N/A
Annex E	Motors supplied by converters	Not applicable.	N/A

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IECEX TEST REPORT
IEC 60079
Explosive atmospheres – Part 11:
Equipment protection by intrinsic safety "i"

ExTR Reference Number..... : GB/BAS/ExTR10.0134/00
 ExTR Free Reference Number..... : 09/0519
 Complied by + signature (ExTL).... : R. Powney
 Reviewed by + signature (ExTL) ... : M Powney
 Date of issue : 7 June 2010

Ex Testing Laboratory (ExTL) : Baseefa
 Address..... : Rockhead Business Park, Staden Lane, Buxton, SK17 9RZ, UK

Applicant's name : Emerson Process Management - Rosemount Analytical
 Address..... : 2400 Barranca Parkway, Irvine, California 92606, USA

Standard..... : IEC 60079-11:2006, Fifth edition
 Test procedure : IECEX Scheme
 Test Report Form No. : ExTR60079-11_Version1A
 TRF Originator..... :
 Master TRF : dated 2006-09

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 This ExTR blank document is to be compiled and reviewed by the ExTL. The ExTR package in which this ExTR is incorporated (comprised of a single ExTR document or multiple ExTR documents) is to be accompanied by a single ExTR Cover Sheet, which is to be approved by the ExCB. ExTR Addendum(s) and/or ExTR Report of National Differences may also supplement this ExTR.

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

General remarks:
 The tests results presented in this report relate only to the object tested.
 This report shall not be reproduced except in full without the written approval of the testing laboratory.
 "(see Attachment #)" refers to additional information appended to the report.
 "(see appended table)" refers to a table appended to the report.
 Throughout this report a point is used as the decimal separator.

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict
1	SCOPE		
2	NORMATIVE REFERENCES		
3	DEFINITIONS		
4	GROUPING AND CLASSIFICATION		
5	LEVELS OF PROTECTION AND IGNITION COMPLIANCE		
5.1	General	The Xmt, coded Ex ia, meets the requirements of the applicable clauses of IEC 60079-11:2006.	Pass
5.2, 5.3, 5.4	Level of protection	Refer to Appendix A.1 for details.	Pass
5.5	Spark ignition compliance	Refer to Appendix A.2 for details.	Pass
5.6	Thermal ignition compliance		
5.6.1	General	Refer to Appendix A.3 for details.	Pass
5.6.2	Temperature for small components	Refer to Appendix A.3.1 for details.	Pass
5.6.3	Wiring within apparatus	Refer to Appendix A.3.2 for details.	Pass
5.6.4	Tracks on printed circuit boards	Refer to Appendix A.3.3 for details.	Pass
5.7	Simple apparatus	Not applicable.	N/A
6	APPARATUS CONSTRUCTION		
6.1	Enclosures	See clause 6.1.1.	Pass
6.1.1	Apparatus complying with Table 5	The enclosure provides the electronics within with a degree of protection of at least IP20.	Pass
6.1.2	Apparatus complying with Annex F	Not applicable.	N/A
6.2	Facilities for connection of external circuits		

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict

6.2.1	Terminals	A three-way terminal block is provided to allow connection to the loop and a suitable earth (which also grounds the front panel). Connections to the sensors are made via a twelve-way terminal block which is in excess of 90mm from the loop terminals.	Pass
6.2.2	Plugs and sockets	Not applicable.	N/A
6.2.3	Determination of maximum external inductance to resistance ratio (Lo/Ro) for resistance limited power source	See Appendix A.1. for details.	Pass
6.2.4	Permanently connected cable	Not applicable.	N/A

6.3	Separation distances		
6.3.1	Separation of conductive parts		
6.3.1.1	Distances according to Table 5	All creepage, clearance and separation distances, where required, are in excess of the requirements of Table 5 of IEC 60079-11:2006. Additionally, the PCB is conformally coated with Humiseal or CTG TC-3285 both of which have a CTI in excess of the 100 required by IEC 60079-11:2006 for a peak voltage of 30V.	Pass
6.3.1.2	Distances according to Annex F	Not applicable.	N/A
6.3.2	Voltage between conductive parts	Not applicable.	N/A
6.3.3	Clearance	See clause 6.3.1.1.	Pass
6.3.4	Separation distances through casting compound	Not applicable.	N/A
6.3.5	Separation distances through solid insulation	Not applicable.	N/A
6.3.6	Composite separations	Not applicable.	N/A
6.3.7	Creepage distance	See clause 6.3.1.1.	Pass
6.3.8	Distance under coating	See clause 6.3.1.1.	Pass
6.3.9	Requirements for assembled printed circuit boards	See clause 6.3.1.1.	Pass
6.3.10	Separation by earth screens	Not applicable.	N/A
6.3.11	Internal wiring	Not applicable.	N/A
6.3.12	Dielectric strength requirement	It is assessed that the apparatus will withstand the 500Vrms test as described by clause 10.3 of IEC 60079-11:2006 due to the enclosure being plastic and therefore an insulator.	Pass
6.3.13	Relays	Not applicable.	N/A

6.4	Protection Against Polarity Reversal	A single diode provides protection against polarity reversal. Additionally, the loop terminals are clearly marked.	Pass
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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict
6.5	Earth conductors, connections and terminals	The earth terminal in the loop connection terminal block is considered suitable for purpose.	Pass
6.6	Encapsulation	Not applicable.	N/A
7	COMPONENTS ON WHICH INTRINSIC SAFETY DEPENDS		
7.1	Rating of components	Refer to Appendix A.4 for details.	
7.2	Connectors for internal connections, plug-in cards and components	The internal connections are all factory made and are considered impossible to interchange with other connections. The Fieldbus Communications Board is mechanically secured to the main PCB by screws.	Pass
7.3	Fuses	Not applicable.	N/A
7.4	Primary and secondary cells and batteries		
7.4.1	General	The Xmt does not contain any cells or batteries	N/A
7.4.2	Electrolyte leakage and ventilation	Not applicable. See clause 7.4.1.	N/A
7.4.3	Cell voltages	Not applicable. See clause 7.4.1.	N/A
7.4.4	Internal resistance of cell or battery	Not applicable. See clause 7.4.1.	N/A
7.4.5	Batteries in apparatus protected by other means of protection	Not applicable. See clause 7.4.1.	N/A
7.4.6	Batteries used and replaced in explosive gas atmospheres	Not applicable. See clause 7.4.1.	N/A
7.4.7	Batteries used but not replaced in explosive gas atmospheres	Not applicable. See clause 7.4.1.	N/A
7.4.8	External contacts for charging batteries	Not applicable. See clause 7.4.1.	N/A
7.4.9	Battery construction	Not applicable. See clause 7.4.1.	N/A
7.5	Semiconductors		
7.5.1	Transient effects	Not applicable. The Xmt is supplied from an intrinsically safe supply.	N/A
7.5.2	Shunt voltage limiters	Zener diodes are used throughout the circuitry to limit maximum voltages and are adequately rated.	Pass
7.5.3	Series current limiters	Not applicable.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict
7.6	Failure of components, connections and separations	Refer to Appendix A.4.	Pass
7.7	Piezo-electric devices	Not applicable.	N/A
7.8	Electrochemical cells for the detection of gases	Not applicable.	N/A
8	INFALLIBLE COMPONENTS, INFALLIBLE ASSEMBLIES OF COMPONENTS AND INFALLIBLE CONNECTIONS ON WHICH INTRINSIC SAFETY DEPENDS		
8.1	Mains transformers		
8.1.1	Protective measures	Not applicable.	N/A
8.1.2	Transformer construction	Not applicable.	N/A
8.1.3	Transformer type tests	Not applicable.	N/A
8.1.4	Routine test of mains transformers	Not applicable.	N/A
8.2	Transformers other than mains transformers	The transformer meets the requirements of the 500V isolation test between primary and secondary windings. Additionally, the manufacturer specifies the following routine tests: - 1500Vac, primary – secondary (+ screen) - 1500Vac, primary (+ screen) – secondary	Pass
8.3	Infallible windings	Not applicable.	N/A
8.3.1	Damping windings	Not applicable.	N/A
8.3.2	Inductors made by insulated conductors	Not applicable.	N/A
8.4	Current-limiting resistors	Current limiting resistors are of metal film or wire-wound construction.	Pass
8.5	Blocking capacitors	Not applicable.	N/A
8.6	Shunt safety assemblies		
8.6.1	General	Pairs of zener diodes (which may be 4.3V, 4.7V, 6.2V or 12V nominal) are mounted on 2mm tracking to create infallible shunt voltage limitation assemblies.	Pass
8.6.2	Safety shunts	See clause 8.6.1.	Pass
8.6.3	Shunt voltage limiters	See clause 8.6.1.	Pass

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict

8.7	Wiring, printed circuit board tracks, and connections	See clause 8.6.1.	Pass
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8.8	Galvanically separating components		
8.8.1	General	A transformer and opto-isolators are used to galvanically separate the loop area side of the circuitry from the sensor side of the circuitry.	Pass
8.8.2	Isolating components between intrinsically safe and non-intrinsically safe circuits	Not applicable.	N/A
8.8.3	Isolating components between separate intrinsically safe circuits	The isolating components are used in accordance with clause 7.1. Additionally, the circuits on both sides of the galvanic isolation components cannot invalidate the infallible separation of the devices.	Pass

9	DIODE SAFETY BARRIERS		
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9.1	General	Not applicable.	N/A
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9.2	Construction	Not applicable.	N/A
9.2.1	Mounting	Not applicable.	N/A
9.2.2	Facilities for connection to earth	Not applicable.	N/A
9.2.3	Protection of components	Not applicable.	N/A

10	TYPE VERIFICATIONS AND TYPE TESTS		
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10.1	Spark ignition test	Not applicable.	N/A
10.1.1	General	Refer to Appendix A.2 for details.	
10.1.2	Spark test apparatus	Not applicable.	N/A
10.1.3, 10.1.3.1, 10.1.3.2	Test gas mixtures and spark test apparatus calibration current	Not applicable.	N/A
10.1.4, 10.1.4.1, 10.1.4.2	Tests with the spark test apparatus – circuit test, safety factors	Not applicable.	N/A
10.1.5	Testing considerations		
10.1.5.1	General	Not applicable.	N/A
10.1.5.2	Circuits with both inductance and capacitance	Refer to Appendix A.2.4 for details.	
10.1.5.3	Circuits using shunt short-circuit (crowbar) protection	Refer to Appendix A.2.5 for details.	
10.1.5.4	Results of spark test	Not applicable.	N/A

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict
10.2	Temperature tests	Not applicable.	N/A
10.3	Dielectric strength tests	See clause 6.3.12.	N/A
10.4	Determination of parameters of loosely specified components	Not applicable.	N/A
10.5	Tests for cells and batteries		
10.5.1	General	Not applicable.	N/A
10.5.2	Electrolyte leakage test for cells and batteries	Not applicable.	N/A
10.5.3	Spark ignition and surface temperature of cells and batteries	Not applicable.	N/A
10.5.4	Battery container pressure tests	Not applicable.	N/A
10.6	Mechanical tests		
10.6.1	Casting compound	Not applicable.	N/A
10.6.2	Sealing of components before encapsulation	Not applicable.	N/A
10.6.3	Partitions	Not applicable.	N/A
10.7	Tests for apparatus containing piezoelectric devices	Not applicable.	N/A
10.8	Type tests for diode safety barriers and safety shunts	Not applicable.	N/A
10.9	Cable pull test	Not applicable.	N/A
10.10	Transformer tests	Not applicable.	N/A
11	ROUTINE VERIFICATIONS AND TESTS		
11.1	Routine tests for diode safety barriers	Not applicable.	N/A
11.1.1	Completed barriers	Not applicable.	N/A
11.1.2	Diodes for 2-diode “ia” barriers	Not applicable.	N/A
11.2	Routine tests for infallible transformers	Not applicable.	N/A
12	MARKING		

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ExTR: GB/BAS/ExTR10.0134/00		IEC 60079-11:2006 5 Edition	
Clause	Requirement – Test	Result – Remark	Verdict

12.1	General	The Xmt is marked in accordance with the requirements of IEC 60079-0:2007 and IEC 60079-11:2006.	Pass
12.2	Marking of connection facilities	The connection facilities are clearly marked.	Pass
12.3	Warning markings	The Xmt carries a warning that the plastic enclosure, excluding the front panel, must only be cleaned with a damp cloth.	Pass
12.4	Examples of marking	Not applicable.	N/A

13	DOCUMENTATION	The documentation meets the requirements of IEC 60079-0:2007 and IEC 60079-11:2006.	Pass
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ANNEX A	ASSESSMENT OF INTRINSICALLY SAFE CIRCUITS (NORMATIVE)
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ANNEX B	SPARK TEST APPARATUS FOR INTRINSICALLY SAFE CIRCUITS (NORMATIVE)
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ANNEX C	MEASUREMENT OF CREEPAGE DISTANCE, CLEARANCES AND SEPARATION DISTANCES THROUGH CASTING COMPOUND AND THROUGH SOLID INSULATION (INFORMATIVE)
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ANNEX D	ENCAPSULATION (INFORMATIVE)
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ANNEX E	ENCAPSULATION (INFORMATIVE)
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ANNEX F	ALTERNATIVE SEPARATION DISTANCES FOR ASSEMBLED PRINTED CIRCUIT BOARDS AND SEPARATION OF COMPONENTS (NORMATIVE)
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F.1	General		
F.2	Control of pollution access	Not applicable.	N/A
F.3	Distances for printed circuit boards and separation of components	Not applicable.	N/A
F.3.1	Level of protection “ia” and “ib”	Not applicable.	N/A
F.3.2	Level of protection “ic”	Not applicable.	N/A

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APPENDIX A: Description of product

A.1 General overview

The Xmt is designed to convert an electrical signal from a remote sensor, or integral toroidal sensor (Xmt-T only) into a 4-20mA HART, Fieldbus or FISCO compatible signal. The apparatus consists of a printed circuit board, terminal facilities and a liquid crystal display and keypad, all housed in a plastic enclosure.

The apparatus may be designated Xmt-A, Xmt-P, Xmt-C and Xmt-T. The Xmt-A and Xmt-P differ only in software.

The suffixes -HT, -FF & -FI designate the following protocol compatibilities:

HT	HART
FF	Fieldbus
FI	FISCO

The Fieldbus & FISCO input circuitry is identical on both versions except that the FISCO version has a fuse that is not fitted to the Fieldbus version. The output circuitry is identical on all three versions.

The Xmt is certified, under Baseefa04ATEX0213X (Xmt-A/P), Baseefa04ATEX0214X (Xmt-C) and Baseefa04ATEX0215X (Xmt-T) to the requirements of EN 60079-0:2006 & EN 60079-11:2007 and supported by certification reports 04(C)0110, 04(C)0111, 04(C)0112, 05(C)0120 and 06(C)0502. With the exception of marking, which has been updated to reflect the latest requirements of IEC 60079-0:2007, there are no additional technical changes introduced by IEC 60079-0:2007.

A.2 Spark ignition consideration

A.2.1 Parameters

Input parameters

Xmt-A/P-HT, Xmt-C-HT & Xmt-T-HT

Terminal Block 2
(Terminals 1 – 3)

U_i	=	30V	C_i	=	1000pF
I_i	=	200mA	L_i	=	0
P_i	=	0.9W			

Xmt-A/P-FF, Xmt-C-FF & Xmt-T-FF

Terminal Block 2
(Terminals 1 – 3)

U_i	=	30V	C_i	=	0.4nF
I_i	=	300mA	L_i	=	0
P_i	=	1.3W			

Xmt-A/P-FI, Xmt-C-FI & Xmt-T-FI

Terminal Block 2
(Terminals 1 – 3)

U_i	=	17.5V	C_i	=	0.4nF
I_i	=	380mA	L_i	=	0
P_i	=	5.32W			

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Output parameters

Xmt-A/P-HT/-FF/-FI

Terminal Block 1
 (Terminals 1 – 12)

$$\begin{array}{ll} U_o = 12.9V & C_i = 5.5nF \\ I_o = 123mA & L_i = 0 \\ P_o = 172mW & \end{array}$$

Load parameters

The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to Terminal Block 1, terminals 1 to 12, must not exceed the following:

Group	Capacitance μF	Inductance mH	OR	L/R Ratio μH/Ω
IIC	1.02	2.46		211
IIB	6.49	10.60		822
IIA	23.19	21.09		1727

Xmt-C-HT/-FF/-FI

Terminal Block 1
 (Terminals 1 – 12)

$$\begin{array}{ll} U_o = 7.16V & C_i = 8.81\mu F \\ I_o = 221mA & L_i = 0 \\ P_o = 280mW & \end{array}$$

Load parameters

The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to Terminal Block 1, terminals 1 to 12, must not exceed the following:

Group	Capacitance μF	Inductance mH	OR	L/R Ratio μH/Ω
IIC	4.7	3.02		66
IIB	231	12.80		282
IIA	> 1000	25.67		566

Xmt-T-HT/-FF/-FI

None.

A.2.2 Resistive spark ignition

The outputs stated in clause A.2.1 all have a factor of safety of greater than 1.5.

A.2.3 Inductive spark ignition

Xmt-A/P

Transformer T1 and Inductor L1 are the only sources of inductance in the circuit. Both have been subject to a breakflash test in the assessment of the Model 5081 and have been proven to be non-ignition capable at 300mA. Both T1 and L1 are isolated from the loop and sensor terminals by R166 & R179 and the resistors connected to the terminal block. Therefore L_i (sensors) = L_i (loop) = 0.

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Xmt-C

Transformer T1 and Inductor L1 are the only sources of inductance in the circuit. Both have been subject to a breakflash test in the assessment of the Model 5081 and have been proven to be non-ignition capable at 300mA. Both T1 and L1 are isolated from the loop and sensor terminals by R166 & R179 and the resistors connected to the terminal block. Therefore L_i (sensors) = L_i (loop) = 0.

Xmt-T

Transformers T1, T2, the toroidal sensors and Inductor L1 are the only sources of inductance in the circuit. All have been subject to ignition testing as part of the assessment of the Model 5081T-HT/FF and proven to be non-ignition capable.

The toroidal drive transformer, T2, is the same as that used in the Model 5081T and is subject to the same tests as T1 (and as detailed on drawing 9080140). T2 is a different designed to T1 and has the following inductance values (measured at 20°C):

- Terminals 1 – 3: 280mH max.
- Terminals 4 – 5: 40 μ H max.
- Terminals 5 – 6: 6mH max.

Both T1 and L1 are isolated from the loop terminals by R166 & R179 and T2 is isolated from the loop terminals by T1, therefore L_i (loop) = 0.

Rosemount Test Report LR1901-01 of 28 July 2004 details the breakflash testing conducted on the toroidal sensors to demonstrate a factor of safety of at least 1.5. No ignition was observed and therefore no further considerations are required.

A.2.4 Capacitive spark ignition

Xmt-A/P

Resistors R166 and R179 effectively isolate all circuit capacitance on the primary side of the galvanic isolation from the loop/input terminals; transient suppressor D30 has a capacitance of 1000pF and is connected directly across the loop terminals. Therefore C_i = 1nF.

The C_i for the sensor terminals is determined from the parallel combination of all the capacitors which are connected to the sensor terminals. Therefore C_i = 5.5nF.

A breakflash test was completed on a capacitance model as detailed in Rosemount Test Report LR1796-01 and no ignition was observed.

Xmt-C

Resistors R166 and R179 effectively isolate all circuit capacitance on the primary side of the galvanic isolation from the loop/input terminals; transient suppressor D30 has a capacitance of 1000pF and is connected directly across the loop terminals. Therefore C_i = 1nF.

The C_i for the sensor terminals is determined from the parallel combination of all the capacitors which are connected to the sensor terminals. Therefore C_i = 8.81 μ F. At a voltage of 7.16V, this capacitance has a factor of safety of greater than 1.6.

A breakflash test was completed on a capacitance model as detailed in Rosemount Test Report LR1828-01 and no ignition was observed.

Xmt-T

Resistors R166 and R179 effectively isolate all circuit capacitance on the primary side of the galvanic isolation from the loop/input terminals; transient suppressor D30 has a capacitance of 1000pF and is connected directly across the loop terminals. Therefore C_i = 1nF.

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A breakflash test was completed on a capacitance model as detailed in Rosemount Test Report LR1828-01 and no ignition was observed.

A.2.5 Combination of inductive and capacitive spark ignition

See clause A.2.3.

A.2.6 Shunt short-circuit (crowbar) spark ignition

Not applicable.

A.2.7 Other spark ignition considerations

Not applicable.

A.3 Thermal ignition consideration

Xmt-A, Xmt-P, Xmt-C, Xmt-T HART (-HT) versions

From Table 2b of IEC 60079-11:2006, it can be seen that given a maximum input power of 0.9W, a Temperature Classification of T4 in a -20°C to +50°C ambient can be awarded without further consideration for components with a surface area of not less than 20mm².

The smallest ribbon cable has a cross sectional area of 0.048mm², which permits approximately 5A for a Temperature Classification of T4 in a 40°C ambient (from Table 3 of IEC 60079-11:2006). Therefore it is considered, that all ribbon cables are appropriate for a Temperature Classification of T4 in a 50°C ambient as the maximum input current is limited to 200mA which is very much less than the 5A permitted, even introducing an additional 10°C margin.

The minimum track width on the board is 0.15mm which, from Table 4 of IEC 60079-11:2006, permits a maximum current of 1.2A for a Temperature Classification of T4 in a 40°C; it is considered that, even with an additional 10°C margin, the board wiring is appropriate for a current of 200mA in an ambient temperature of 50°C.

The SOT-23 packaged components have a thermal resistance of 220°C/W so even when dissipating 0.9W in a 50°C, the surface temperature will not exceed 248°C. The Standard permits a maximum surface temperature for components less than 20mm² of 275°C, so adding a further 10°C (to account for the difference in ambient temperatures) to the 248°C obtained is still less than the permitted 275°C.

Xmt-A, Xmt-P, Xmt-C, Xmt-T Fieldbus/FISCO (-FF/-FI) versions

Fieldbus (-FF) versions

The supply is limited to 30V and the 199Ω combination of the two input resistors, the two resistors on the Fieldbus Communications Board and the barrier resistance (derived from $R = V^2/4P = 30^2/(4 \times 1.3) = 173\Omega$) limit the maximum input power to 1.13W ($P = V^2/4R$ where $V = 30V$ and $R = 199\Omega$).

FISCO (-FI) versions

The Fieldbus Communication Board, covered by BAS01ATEX1385U, is connected to connector block P1 and limits the maximum available power and voltage to 1.2W and 7.61V respectively.

The input and output parameters of this board are as follows:

Connector J1* pins 15 & 20

U_i	=	17.5V	C_i	=	0
I_i	=	380mA	L_i	=	0
P_i	=	1.5W			

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Fuse F1 (85mA, 50mA × 1.7) ensures that the maximum power cannot exceed 1.5W (17.5×0.085=1.49W).

Connector J1* pins 1 to 12

$U_o = 7.61V$ $C_o = 6.04\mu F$
 $I_o = 300mA$ $L_o = 1mH$
 $P_o = 1.2W$

*J1 is on the Comms. Board, this connector is mated to P1 on the Xmt board.

In both versions, for components greater than 20mm² in size, it is considered that a Temperature Classification of T4 in a 50°C ambient can be awarded without further consideration. For components smaller than 20mm², previous testing has shown their temperature coefficient will not exceed 180°C/W. Therefore, their maximum surface temperature will not exceed 220°C when dissipating the maximum available power of 1.2W. It is therefore considered that a Temperature Classification of T4 in a 50°C ambient can be awarded without further consideration.

A.4 Rating of components

HART (-HT) versions

Xmt-A & Xmt-P

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
LOOP SIDE – primary side of transformer T1				
R186, R187	1.05k	0.25	<0.1	<0.1
R154, R147	1.15k	0.25	0.16	0.66
R48, R66	1020Ω	0.25	0.1	0.40
R86, R96	1.15k	0.25	0.1	0.40
R83, R129, R79, R60, R55, R133, R185, R49	19k8Ω	0.125	0.04	0.32
R43, R49	1.05k	0.25	0.02	0.06
R34, R97	19k8Ω	0.125	0.01	<0.1
R40	6700Ω	0.25	0.13	0.53
R95	19k8Ω	0.125	0.04	0.32
R87, R88, R89, R98	6700Ω	0.25	0.13	0.53
R77	20Ω 2%	1	0.23	0.23
R158	49.4Ω	1	0.02	<0.1
R125	95Ω	1	0.45	0.45
R165	6.2Ω 5%	1	0.248	0.25
R184	5500Ω	0.25	0.03	0.13
R166, R179	6.2Ω 5%	1	0.26	0.26
R103, R109, R111, R113, R115, R118	6700Ω	0.25	0.13	0.53
R50, R180, R65, R67, R61, R51	6700Ω	0.25	0.12	0.48
R107	740Ω	0.25	0.12	0.48
R56	95Ω	1	0.45	0.45
D1, D2, D5, D6	6.2V 5%	0.225	0.01	<0.1
D3, D4	6.2V 5%	0.225	0.04	0.17
D7, D9, D19, D20, D22, D23	6.2V 5%	0.225	0.14	0.60
D24, D25	6.2V 5%	0.225	0.01	<0.1
D26, D27	6.2V 5%	1.5	0.8	0.53
D29, D31	12V 5%	1.5	0.8	0.53
SENSOR SIDE – secondary side of transformer T1				
R92, R99, R112, R116, R124, R126, R128, R131,	1020Ω	0.25	0.16	0.64

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R137, R151, R156				
R94, R145, R155, R192, R195, R197	1150Ω	0.25	0.15	0.60
R150, R153	19.8Ω	0.25	0.15	0.60
R85, R104, R105, R139, R152, R160	19800Ω	0.125	0.01	<0.1
R15, R16, R19, R27, R31, R32, R46, R47, R53, R54, R58, R64, R91, R130, R134, R159, R177, R178	6800Ω	0.25	0.02	<0.1
R188, R189	20Ω 1%	1	0.39	0.39
R191	200Ω 1%	1	0.16	0.16
D12 – D17	SMBJ5917 4.7V 5%	1.5	0.80	0.53
D32, D33	6.2V 5%	0.225	0.02	<0.1

Xmt-C

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
LOOP SIDE – primary side of transformer T1				
R186, R187	1.05k	0.25	<0.1	<0.1
R154, R147	1.15k	0.25	0.16	0.66
R66	1020Ω	0.25	0.1	0.40
R48	19k8Ω	0.125	0.01	0.09
R86, R96	1.15k	0.25	0.1	0.40
R83, R129, R79, R60, R55, R133, R185	19k8Ω	0.125	0.04	0.32
R43	6700Ω	0.25	0.033	0.13
R49	1.05k	0.25	0.016	0.06
R34, R97	19k8Ω	0.125	0.01	<0.1
R40	6700Ω	0.25	0.13	0.53
R95	19k8Ω	0.125	0.04	0.32
R87, R88, R89, R98	6700Ω	0.25	0.13	0.53
R77	20Ω 2%	1	0.23	0.23
R158	49.4Ω	1	0.02	<0.1
R125	95Ω	1	0.45	0.45
R165	6.2Ω 5%	1	0.248	0.25
R184	5500Ω	0.25	0.03	0.13
R166, R179	6.2Ω 5%	1	0.26	0.26
R103, R109, R111, R113, R115, R118	6700Ω	0.25	0.13	0.53
R50, R180, R65, R67, R61, R51	6700Ω	0.25	0.12	0.48
R107	740Ω	0.25	0.12	0.48
R56	95Ω	1	0.45	0.45
D1, D2, D5, D6	6.2V 5%	0.225	0.01	<0.1
D3, D4	6.2V 5%	0.225	0.04	0.17
D7, D9, D19, D20, D22, D23	6.2V 5%	0.225	0.14	0.60
D24, D25	6.2V 5%	0.225	0.01	<0.1
D26, D27	6.2V 5%	1.5	0.8	0.53
D29, D31	12V 5%	1.5	0.8	0.53
SENSOR SIDE – secondary side of transformer T1				
R134, R139, R152, R159	6700Ω	0.25	0.01	<0.1
R71	19k8Ω	0.125	0.01	<0.1
D12, D18	SMBJ5917	1.5	0.8	0.53

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R130	20Ω 1%	1		
R90	>680Ω	0.25	0.06	0.24
D16, D32		$I_f \geq 200\text{mA}$ $V_{fb} \geq 10\text{V}$	$I_f \leq 0.98\text{mA}$ $V_{fb} \leq 6.59\text{V}$	≤ 0.10 ≤ 0.66
R53	6700Ω	0.25	0.01	<0.1
D13, D15	SMBJ5920	1.5	0.8	0.53
R112, R114	20Ω 1%	1	0.52	0.52
R123, R124, R131,R132	6700Ω	0.25	0.01	<0.1
R108	>246Ω	0.25	0.15	0.60
R93	>494Ω	0.25	0.08	0.32
R153, R156	1.15kΩ	0.25	0.04	0.16
R99	19k8Ω	0.125	0.01	<0.1
R145, R155	1.15kΩ	0.25	0.03	0.14
R74	6700Ω	0.25	0.01	<0.1

Xmt-T

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
LOOP SIDE – primary side of transformer T1				
R186, R187	1.05k	0.25	<0.1	<0.1
R154, R147	1.15k	0.25	0.16	0.66
R48, R66	1020Ω	0.25	0.1	0.40
R86, R96	1.15k	0.25	0.1	0.40
R83, R129, R79, R60, R55, R133, R185, R40, R43, R49	19k8Ω	0.125	0.04	0.32
R34, R97, R87, R88, R89, R98, R95	19k8Ω	0.125	0.01	<0.1
R77	20Ω 2%	1	0.23	0.23
R158	49.4Ω	1	0.02	<0.1
R125	95Ω	1	0.45	0.45
R165	6.2Ω 5%	1	0.248	0.25
R184	5500Ω	0.25	0.03	0.13
R166, R179	6.2Ω 5%	1	0.26	0.26
R103, R109, R111, R113, R115, R118	6700Ω	0.25	0.13	0.53
R50, R180, R65, R67, R61, R51	6700Ω	0.25	0.12	0.48
R107	740Ω	0.25	0.12	0.48
R56	95Ω	1	0.45	0.45
D1, D2, D5, D6	6.2V 5%	0.225	0.01	<0.1
D3, D4	6.2V 5%	0.225	0.04	0.17
D7, D9, D19, D20, D22, D23	6.2V 5%	0.225	0.14	0.60
D24, D25	6.2V 5%	0.225	0.01	<0.1
D26, D27	6.2V 5%	1.5	0.8	0.53
D29, D31	12V 5%	1.5	0.8	0.53
SENSOR SIDE – secondary side of transformer T1				
R124	100Ω 1%	1	0.12	0.12
R156, R157	1150Ω	0.25	0.09	0.36
R72, R74	1150Ω	0.25	0.15	0.60
R8, R12	198Ω	0.25	0.09	0.34
R139	198Ω	1	0.09	<0.1
R126, R134, R140, R71, R120	19k8Ω	0.125	0.01	<0.1
R131	200Ω 1%	1	0.54	0.54
R112	49.9Ω 1%	1	0.21	0.21
R14, R121, R114, R82	6700Ω	0.25	0.02	<0.1

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Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
R5, R7	990Ω	0.25	0.11	0.44
R13	99Ω	0.25	0.07	0.27
D18, D35		0.225	<0.1	<0.1
D12 - D17, D33, D34		1.5	0.8	0.53
D36-D38	4.7V±5%	0.225	0.09	0.41

Fieldbus/FISCO (-FF, -FI) versions

Xmt-A/P

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
F1*	50mA			
R107	>385Ω	0.25	0.166	0.66
D22, D23	8.7V 5%	0.225	0.14	0.63
R147	>494Ω	0.25	0.129	0.52
R88, R89	>19800Ω	0.25	0.045	0.20
R86	>597Ω	0.25	0.107	0.43
R184, R185	6.2Ω 5%	1	0.5301	0.53
R87, R95, R98, R154, R186, R206	>6700Ω	0.25	0.134	0.536
D19, D20, D28, D29, D30, D35, D40, D41	6.2V 5%	0.225	0.03	0.13
D24, D25, D26, D27, D38, D39	6.2V 5%	0.225	0.01	0.04

* - not fitted on -FF version

Xmt-C

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
F1*	50mA			
R107	>385Ω	0.25	0.166	0.66
D22, D23	8.7V 5%	0.225	0.14	0.63
R147	>494Ω	0.25	0.129	0.52
R88, R89	>19800Ω	0.25	0.045	0.20
R86	>597Ω	0.25	0.107	0.43
R188, R189	6.2Ω 5%	1	0.5301	0.53
R87, R95, R98, R154, R186, R206	>6700Ω	0.25	0.134	0.536
D19, D20, D28, D29, D30, D35, D40, D41	6.2V 5%	0.225	0.03	0.13
D24, D25, D26, D27, D38, D39	6.2V 5%	0.225	0.01	0.04

* - not fitted on -FF version

Xmt-T

Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
F1*	50mA			
R107	>385Ω	0.25	0.166	0.66

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Component	Value (inc. tolerance unless given)	Mnfr rating (W) @ 70°C, W1	Fault power (W) W2	$\frac{W_2}{W_1}$
D22, D23	8.7V 5%	0.225	0.14	0.63
R147	>494Ω	0.25	0.129	0.52
R88, R89	>19800Ω	0.25	0.045	0.20
R86	>597Ω	0.25	0.107	0.43
R188, R189	6.2Ω 5%	1	0.5301	0.53
R87, R95, R98, R154, R186, R206	>6700Ω	0.25	0.134	0.536
D19, D20, D28, D29, D30, D35, D40, D41	6.2V 5%	0.225	0.03	0.13
D24, D25, D26, D27, D38, D39	6.2V 5%	0.225	0.01	0.04

* - not fitted on -FF version