



1. **EC-TYPE EXAMINATION CERTIFICATE**

2. **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

3. **EC-Type Examination Certificate Number:** ITS14ATEX28092X Issue 3

4. **Equipment or Protective System:** MS2700E High Resolution ER RS-485 Transmitter
MS2800E Ultra Resolution ER RS-485 Transmitter
MS2701E High Resolution ER RS-485 Transmitter
MS2801E Ultra Resolution ER RS-485 Transmitter

5. **Manufacturer:** Metal Samples Company (a Division of Alabama Specialty Products Inc)

6. **Address:** 152 Metal Samples Road, Munford, AL 36268, USA

7. This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8. Intertek Testing and Certification Limited, notified body number 0359 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Intertek Report Ref: G102139087 dated October 2015, Intertek Report Ref G101693610-1 dated March 2015 and Intertek Report Ref G101693610 dated December 2014.

9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN 60079-0:2012 and EN 60079-11:2012 except in respect of those requirements referred to at item 16 of the Schedule.

10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11. This EC Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

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Registered No 3272281 Registered Office: Academy Place, 1-9 Brook Street, Brentwood, Essex, CM14 5NQ.



A T Austin
Certification Officer
14 October 2015

This certificate may only be reproduced in its entirety and without any change, schedule included and is subject to Intertek Testing and Certification's Conditions for Granting Certification.



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12. The marking of the equipment or protective system shall include the following:-

	MS2700E/ MS2800E (Single) II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIC T130°C Da -20°C ≤ Ta ≤ + 70°C	MS2700E/ MS2800E (Multi-drop) II 1 G Ex ia IIB T4 Ga II 1 D Ex ia IIIB T130°C Da -20°C ≤ Ta ≤ + 70°C
	MS2701E/ MS2801E (Single) II 1/2 G Ex ia d IIC T4 Gb II 1/2 D Ex ia d IIIC T130°C Da -20°C ≤ Ta ≤ + 70°C	MS2701E/ MS2801E (Multi-drop) II 1/2 G Ex ia d IIB T4 Gb II 1/2 D Ex ia d IIIB T130°C Da -20°C ≤ Ta ≤ + 70°C

13. **Description of Equipment or Protective System**

The ER RS-485 Transmitter is a field mounted microprocessor based corrosion transmitter capable of measuring and transmitting data from all types of electrical resistance (ER) corrosion probes. The High Resolution ER RS485 Transmitter comprises a digital board, an analog board and a transformer board all housed within a stainless steel enclosure. The printed circuit boards (pcbs) contain fixed resistors, capacitors, inductor in the form of a transformer, semiconductor devices, connectors for printed circuit board interconnections, terminal block and connectors for external connections. The ER RS485 Transmitter is of four models which are MS2700E/MS2701E High Resolution ER RS-485 Transmitters and MS2800E/MS2801 Ultra Resolution ER RS-485 Transmitters. All models are electronically the same. The difference between the MS27XXE series and MS28XXE series is only in the firmware that processes the acquired data. Enclosures for all models maintain the degree of protection of at least IP66. The enclosure for MS2700E and MS2800E transmitters is made of stainless steel while the enclosure for MS2701E and MS2801E transmitters is pre-certified flameproof enclosure made with aluminium alloys.

The maximum intrinsically safe input and output parameters at the external connections are as follows:

Input supply terminal: Ui = 23 Vdc, Ii = 88.2 mA Pi = 0.52 W Ci = 0 Li = 0	RS-485 channel at each line: Ui = 3.7 Vdc Ii = 225 mA Pi = 0.206 W Uo = 5 V Io = 51 mA Po = 64 mW	Terminal connector J1 (probe connections): Uo = 5 V Io = 503 mA Po = 0.7 W
RS-485 channel and Terminal connector J1 (Combined) Ci = 68uF Li = 0 Co = 32uF Lo = 0.14 mH		

14. **Report Number**

Intertek Report Ref: G102139087 dated October 2015
 Intertek Report Ref: G101693610-1 dated March 2015
 Intertek Report Ref: G101693610 dated December 2014

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15. Conditions of Certification

(a). Special Conditions for safe use

- The Corrosion Probe is not capable of withstanding the 500 V r.m.s electric strength test as required by clause 6.3.13 of EN 60079-11:2012. This must be taken into account when installing the Probe.
- Only the ER RS-485 Transmitter can be installed in explosive dust atmosphere. The ER probe cannot be installed in the explosion dust atmosphere (Group III).
- The equipment shall be classified as Group IIB/IIIB when networked in daisy chain arrangement.
- Maximum of 32 transmitters are allowed in the daisy arrangement.
- Only cable glands and blanking plugs certified for protection types 'd', 'tb', and have an IP66 rating may used in the Ex d enclosure.
- The equipment must be supplied via an Ex-certified intrinsically safe barrier with the specified entity parameters irrespective of the flameproof enclosure utilized.

(b). Conditions of Manufacture

- None

16. Essential Health and Safety Requirements (EHSR's)

The relevant EHSR's have been identified and assessed in Intertek Report Ref G101693610 dated December 2014

17. Drawings and Documents

Title	Drawing No.:	Rev. Level:	Date:
Assembly Drawing - MS2700E / MS2800E High Resolution ER RS485 Transmitter	EXMDB-010361	0	3/27/2014
Transmitter Enclosure (2 Sheets)	EXET1410	E	9/23/2014
Lid Shell Weldment - Transmitter Enclosure	EXET1422	0	9/23/2014
Lid Shell Top Plate Lid Shell weldment	EXET1422-A	0	9/23/2014
Lid Shell Body plate Lid Shell Weldment	EXET1422-B	0	9/23/2014
IS Label Drawing - MS2700E High Resolution ER RS485 Transmitter	EXET1456	D	2/2/2015
IS Label Drawing - MS2800E High Resolution ER RS485 Transmitter	EXET1457	D	2/2/2015

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Title	Drawing No.:	Rev. Level:	Date:
Circuit Diagram - High Resolution ER RS485 Transmitter Digital Board	EXCDB-000004	0	6/10/2014
Bill of Materials - High Resolution ER RS485 Transmitter Digital Board	EXBOM-000004	E	12/4/2014
Assembly Drawing - High Resolution ER RS485 Transmitter Digital Board (2 Sheets)	EXET1427	0	6/10/2014
PCB Fabrication Drawing - High Resolution ER RS485 Transmitter Digital Board (11 Sheets)	EXMDB-010360	0	6/10/2014
Circuit Diagram - High Resolution ER Transmitter Analog Board	EXCDB-000002	0	1/8/2014
Bill of Materials - High Resolution ER Transmitter Analog Board	EXBOM-000002	A	6/9/2014
Assembly Drawing - High Resolution ER Transmitter Analog Board (2 Sheets)	EXET1408	A	5/28/2014
PCB Fabrication Drawing - High Resolution ER Transmitter Analog Board (10 Sheets)	EXMDB-010332	A	5/28/2014
Circuit Diagram - High Resolution ER Transmitter Transformer Board	EXCDB-000003	A	7/16/2014
Bill of Materials - High Resolution ER Transmitter Transformer Board	EXBOM-000003	C	7/21/2014
Assembly Drawing - High Resolution ER Transmitter Transformer Board (2 Sheets)	EXET1409	B	7/16/2014
PCB Fabrication Drawing - High Resolution ER Transmitter Transformer Board (10 Sheets)	EXMDB-010333	B	7/16/2014
Assembly Drawing - Low Level Transformer and case	EXMDB010359	0	3/4/2014
Control Drawing - MS2700E / MS2800E High Resolution ER RS485 Transmitter	EXWDB-000077	B	9/24/2014

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18. Revisions

Variation One: Intertek Project Ref G101693610-1, ITS14ATEX28092X Issue 2 dated April 09, 2015

To permit the following:-

1. MS2701E and MS2801E models added as part of this certification.
2. Allow the equipment to be networked in daisy chain arrangement.
3. Changes to appropriate documents to reflect the above changes.

Drawings

Title:	Drawing No.:	Rev. Level:	Date:
MS2700E ER Transmitter Hazardous Area Label	EXET1456	F	3/23/15
MS2701E ER Transmitter Hazardous Area Label	EXET1474	C	3/23/15
MS2800E ER Transmitter Hazardous Area Label	EXET1457	F	3/23/15
MS2801E ER Transmitter Hazardous Area Label	EXET1475	C	3/23/15
Control drawing MS2701E/MS2801E RS-485 Transmitter (Multi Drop)	EXWDB-000094	A	03/25/15
Control drawing MS2700E/MS2800E RS-485 Transmitter (Stand Alone)	EXWDB-000077	C	01/13/15
Control drawing MS2700E/MS2800E RS-485 Transmitter (Multi Drop)	EXWDB-000092	A	03/20/15
Control drawing MS2701E/MS2801E RS-485 Transmitter (Stand Alone)	EXWDB-000093	Ø	01/13/15

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Revisions Contd.

Variation two: Intertek Project Ref G102139087, ITS14ATEX28092X Issue 3 dated October 14, 2015

To permit the following:-

1. Entity parameters at the input supply terminal for the Group IIB ER RS485 Transmitters (used in daisy chain arrangement) changed from $U_i = 23 \text{ Vdc}$, $I_i = 88.2 \text{ mA}$, $P_i = 0.52 \text{ W}$ to $U_i = 23.6 \text{ Vdc}$, $I_i = 352.8 \text{ mA}$, $P_i = 2.3 \text{ W}$.
2. Entity parameters at the probe output connection for the Group IIB ER RS485 Transmitters (used in daisy chain arrangement) changed from $U_o = 5 \text{ V}$, $I_o = 503 \text{ mA}$, $P_o = 0.7 \text{ W}$ to $U_o = 5 \text{ V}$, $I_o = 352.8 \text{ mA}$, $P_o = 0.44 \text{ W}$.
3. Value of current limiting resistor R1 changed from $180 \Omega \pm 1\% 3\text{W}$, changed to $300 \Omega \pm 1\% 3\text{W}$.
4. Changes to appropriate documents to reflect the above changes.

Drawings

Title:	Drawing No.:	Rev. Level:	Date:
High Resolution ER RS485 Transmitter Digital Board.	EXCDB0000004	A	05/18/2015
Control Drawing MS2700E/MS2800E ER RS-485 Transmitter (Multi Drop)	EXWDB-000092	B	05/19/15
Control Drawing MS2701E/MS2801E ER RS-485 Transmitter (Multi Drop)	EXWDB-000094	B	07/30/15
BILL OF MATERIALS - HIGH RESOLUTION ER RS485 TRANSMITTER DIGITAL BOARD	EXBOM-000004	F	3/30/2015

The new entity parameters for the Group IIB ER RS485 Transmitters are:

Input supply terminal:

$U_i = 23.6 \text{ Vdc}$,
 $I_i = 352.8 \text{ mA}$
 $P_i = 2.3 \text{ W}$
 $C_i = 0$
 $L_i = 0$

Input supply terminal:

$U_i = 23.6 \text{ Vdc}$,
 $I_i = 352.8 \text{ mA}$
 $P_i = 2.3 \text{ W}$
 $C_i = 0$
 $L_i = 0$

Terminal connector J1 (probe connections):

$U_o = 5 \text{ V}$
 $I_o = 352.8 \text{ mA}$
 $P_o = 0.44 \text{ W}$

RS-485 channel and Terminal connector J1 (Combined)

$C_i = 68\mu\text{F}$
 $L_i = 0$
 $C_o = 32\mu\text{F}$
 $L_o = 1.2 \text{ mH}$

This Certificate is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek.

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