

# EU-TYPE EXAMINATION CERTIFICATE

## Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

- EU-Type Examination Certificate Number:** ITS17ATEX201833X      **Issue 01**
- Product:** Models MS35XXE, MS35XXL, MS36XXE, MS36XXL, MS50XXE, MS50XXL, MS55XXE and MS55XXL corrosion monitors. Model MS5040 and MS5540 repeaters.
- Manufacturer:** Metal Samples Company  
(a Division of Alabama Specialty Products, inc.)
- Address:** 152 Metal Samples Rd, Munford, AL 36268, USA
- This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- Intertek Testing and Certification Limited, Notified Body number 0359 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council dated 26 February 2014, certifies that the product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II of the Directive.
- Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-0:2012 + A11:2013 and EN 60079-11: 2012 except in respect of those requirements referred to within item 14 of the Schedule.
- If the sign "X" is placed after the certificate number, it indicates that the product is subject to the special conditions of use specified in the Schedule to this certificate.
- This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
- The marking of the product shall include the following:

II 1 (1) G Ex ia [ia] IIC T4 Ga



-40°C ≤ Tamb ≤ +70°C (for use with Tadiran TL5930 cells)

-40°C ≤ Tamb ≤ +50°C (for use with Xeno Energy XL-205F cells)

**Certification Officer:**  \_\_\_\_\_ **Date:** 20 June 2019  
Kevin J. Wolf

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### 11. Description of Equipment or Protective System

The MS35XXE/L, MS36XXE/L and MS50XXE/L are remote monitoring equipment which measures the corrosion rate of metallic pipe through resistive probe. Equipment models share the same internal circuitry, with the exception of model specific optional boards. The MS35XXE/L and MS50XXE/L utilizes a either a rectangular cuboidal stainless steel enclosure with approximate dimensions 23cm x 20cm x 11cm or a variable non-metallic enclosure with minimum dimensions 25cm x 20cm x 10cm. Both enclosures form a base and hinged lid assembly and are retained with bolt secured metallic tabs.

The MS36XXE/L and MS50XXE/L variants utilize the same cylindrical enclosure with approximate diameter of 12cm, and length 20cm. The central section of the enclosure is metallic and has two screw on non-metallic or aluminum end caps which form three compartments. The front end cap includes a transparent window which shows an LCD display, whilst the rear houses is fully opaque and holds the equipment battery. Connection is made to the equipment through three connectors, two on the side of the central housing and the third on a conduit which is welded to the bottom surface of the central housing at a normal angle.

A USB port is provided on each enclosure variant for downloading data in the hazardous area. This port has been assessed for connection to the ET1650 USB stick manufactured by Alabama Specialty Products. The USB stick has been assessed for connection to a maximum Um of 6V. No other USB stick shall be used with the equipment whilst the equipment is in a hazardous area.

Whilst in the non-hazardous area the USB port may be used with a generic USB stick providing the part does not contain a source of power (e.g. a battery).

The ambient temperature range in which the equipment may be installed is dependent upon the cells used.

Ambient Temperature Range	Cells	Battery Pack Reference
$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +70^{\circ}\text{C}$	Tadiran TL5930	ET1664 / ET2250
$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +50^{\circ}\text{C}$	Xeno Energy XL-205F	ET1857 / ET2257

Battery packs contain integral current limiting devices and have been subjected to the applicable tests to be changed in the hazardous area. The battery pack must be removed from the hazardous area, or the area confirmed to be non-hazardous prior to changing individual cells.

All equipment has the facilities for connection to an external corrosion measurement probe and when fitted with board EXCDB\_000030 the equipment has the facilities for an additional barrier input (J2) and an intrinsically safe output. The following entity parameters have been assessed for use with the equipment and are marked on the equipment labels as applicable.

#### Parameters of probe connection on EXCDB-000023 – Single Channel ER Measurement Board

Uo:	4.94V
Io:	0.332A
Po:	0.41W
Co:	1.9 $\mu$ F
Lo:	60 $\mu$ H

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### Parameters of probe connection on EXCDB-000033 – Four Channel ER Measurement Board

Parameters are defined per probe.

Uo: 4.94V  
Io: 0.848A  
Po: 1.047W  
Co: 0.1 $\mu$ F  
Lo: 20 $\mu$ H

### Parameters of probe connection on EXCDB-000036 – Single Channel LPR Measurement Board

Uo: 8.61V  
Io: 0.305A  
Po: 0.377W  
Co: 0.1 $\mu$ F  
Lo: 60 $\mu$ H

### Parameters of probe connection on EXCDB-000039 – Four Channel LPR Measurement Board

Parameters are defined per probe.

Uo: 8.61V  
Io: 0.848A  
Po: 1.047W  
Co: 0.1 $\mu$ F  
Lo: 20 $\mu$ H

### Barrier Input J3 on board EXCDB-000030 – Remote Datalogger Communication Board

Ui 28V  
Ii 93mA  
Pi 0.75W  
Ci (@28V) 0.054 $\mu$ F  
Ci: (@4.94V) 5.59 $\mu$ F  
Li: 0H

### Parameters on Junction J2 of EXCDB-000030 – Remote Datalogger Communication Board

Output connects to external intrinsically safe circuitry. The following maximum parameters have been provided for maximum flexibility, however the simultaneous combination of these parameters has not been assessed for spark safety. A reduced set of parameters has been tested for spark safety to permit the connection of simple intrinsically safe apparatus and is summarized within the Special Conditions for Safe Use.

Uo: 4.94V  
Io: 2mA  
Po: 2.47mW  
Ci: 0 $\mu$ F  
Li: 0 $\mu$ H  
Co: 100 $\mu$ F

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Lo: 880 $\mu$ H

### 12. Report Number

Intertek Report: 103520011DAL-004-CR Dated: June 2019.

### 13. Special Conditions of Certification

#### (a). Special Conditions of Use

- Inductance and capacitance values specified for connection to port J2 of board EXCDB\_000030 have not been assessed for simultaneous combination. Care shall be taken to ensure that the combination of resistive, inductive and capacitive energies cannot result in an incendive spark. To aid in the connection of simple apparatus the following values have been subjected to spark ignition testing and have been shown to be safe

Uo:	4.94V
Io:	2mA
Pi:	2.47mW
Ci:	0 $\mu$ F
Li:	0 $\mu$ H
Co:	50 $\mu$ F
Lo:	30 $\mu$ H

- External non-metallic materials pose a potential electrostatic charging hazard. Refer to the manufacturer's instruction manual for details on the mitigation of electrostatic charging.
- The models MS36XX and MS50XX may be fitted with metallic end-caps which are produced from aluminum and may pose a potential impact spark ignition hazard when used in EPL Ga installations. When the equipment is to be mounted in an EPL Ga environment the end user shall conduct a risk assessment prior to installation and shall only use the equipment where the risk of impact has been determined to be negligible.

#### (b). Conditions of Manufacture - Routine Tests

- N/A, no routine tests applicable to this product.

### 14. Essential Health and Safety Requirements (EHSRs)

The relevant Essential Health and Safety Requirements (EHSRs) have been identified and assessed in Intertek Report: 103520011DAL-004-CR Dated: June 2019.

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### 15. Drawings and Documents

Title:	Drawing No.:	Rev. Level:	Date:
Circuit Diagram - Remote Data Logger Host Board	EXCDB-000017	A	04/10/2019
Circuit Diagram - Battery Pack protection Module	EXCDB-000018	0	03/16/17
Circuit Diagram - Battery Protection Circuit for wireless devices	EXCDB-000044	0	03/14/2019
Circuit Diagram - Remote Data Logger Bluetooth Module	EXCDB-000019	0	03/17/17
Circuit Diagram ER Measurement Board Typell	EXCDB-000023	0	03/08/17
Circuit Diagram - Remote Data Logger Display Board	EXCDB-000029	A	'04/03/19
Circuit Diagram - Remote Data Logger RS232 & current loop Module	EXCDB-000030	0	06/23/2017
Circuit Diagram - ER Measurement Board - Multi Channel	EXCDB-000033	0	03/07/2019
Circuit Diagram - LPR Measurement Board with Controller	EXCDB-000036	0	05/17/2019
Circuit Diagram - LPR Measurement Board - Multi Channel	EXCDB-000039	0	05/23/2019
Circuit Diagram - ISA Wireless Board	EXCDB-000024	A	03/16/16
Circuit Diagram -HART Wireless Board	EXCDB-000025	0	03/07/2019
PCB Fabrication Drawing Remote Data Logger Host Board	EXPCB-000017	A	04/10/2019
PCB Fabrication Drawing - Battery Pack protection Module	EXPCB-000018	0	03/16/17
PCB Fabrication Drawing Battery Protection Circuit for wireless devices	EXPCB-000044	0	03/14/2019
PCB Fabrication Drawing - Remote Data Logger Bluetooth Module	EXPCB-000019	0	03/17/17
PCB Fabrication Drawing - ER Measurement Board Type-II	EXPCB-000023	A	05/03/18
PCB Fabrication Drawing Remote Data Logger Display Board	EXPCB-000029	A	04/03/2019
PCB Fabrication Drawing - Remote Data Logger RS232 & Current Loop Board	EXPCB-000030	0	06/23/2017
PCB Fabrication Drawing ER Measurement Board -Multi Channel	EXPCB-000033	0	03/07/2019
PCB Fabrication Drawing LPR Measurement Board with controller	EXPCB-000036	0	05/17/2019
PCB Fabrication Drawing LPR Measurement Board -Multi Channel	EXPCB-000039	0	05/23/2019
PCB Fabrication Drawing - ISA Wireless board	EXPCB-000024	A	03/16/16
PCB Fabrication Drawing HART Wireless board	EXPCB-000025	0	03/07/2019
Assembly Drawing - Remote Data Logger Host Board	EXET2096	A	04/10/2019

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Assembly Drawing - Host Board Wireless for MS36XX /MS50XX	EXET2251	0	04/10/2019
Assembly Drawing Host Board - for MS35XX	EXET2254	0	04/10/2019
Assembly Drawing Host board - Wireless for MS35XX / MS55XX	EXET2255	0	04/10/2019
Assembly Drawing - Battery Pack Protection Module	EXET1663	0	03/16/17
Assembly Drawing Battery Protection Circuit for wireless devices	EXET2249	0	03/14/2019
Assembly Drawing - Remote Data Logger Bluetooth Module	EXET2098	0	03/17/17
Assembly Drawing - ER Measurement Board- Type II	EXET1607	A	05/03/2018
Assembly Drawing Remote Data Logger Display Board	EXET1610	A	04/03/19
Assembly Drawing - Remote Data Logger RS232 & Current Loop Board	EXET2097	0	06/23/2017
Assembly Drawing ER Measurement Board- Multi Channel	EXET1906	0	03/07/2019
Assembly Drawing LPR Measurement Board with controller	EXET1969	0	05/17/2019
Assembly Drawing LPR Measurement Board- Multi Channel	EXET2125	0	05/23/2019
Assembly Drawing - ISA Wireless Board	EXET1605	A	03/16/16
Assembly Drawing - HART Wireless Board	EXET1803	0	03/07/2019
Bill of Materials - Host Board	EXBOM-000017	A	05/14/2019
Bill of Materials - Battery Pack protection Board	EXBOM-000018	0	5/4/2017
Bill of Materials - Battery Protection Circuit for Wireless Devices	EXBOM-000044	0	03/14/2019
Bill of Materials - MS3600E Remote Data Logger Bluetooth Board	EXBOM-000019	A	04/03/2019
Bill of Materials - Measurement Board Type-II	EXBOM-000023	A	05/29/2019
Bill of Materials - Remote Data Logger Display Board	EXBOM-000029	A	04/10/2019
Bill of Materials - MS3600E Remote Data Logger 4-20mA Board	EXBOM-000030	A	8/17/2018
Bill of Materials - ER Measurement Board - Multi channel	EXBOM-000033	0	04/23/2019
Bill of Materials - LPR Measurement Board with controller	EXBOM-000036	0	05/17/2019
Bill of Materials - LPR Measurement Board Multi channel	EXBOM-000039	0	04/23/2019
Bill of Materials - ISA Wireless Board	EXBOM-000024	A	04/23/2019
Bill of Materials - HART Wireless Board	EXBOM-000025	0	05/10/2019
REMOTE DATA LOGGERS / WIRELESS TRANSMITTERS AND REPEATERS MODEL NO: MS35XXE/L / MS55XE/L	EXMDB-011077	0	09/04/2018

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REMOTE DATA LOGGERS / WIRELESS TRANSMITTERS AND REPEATERS MODEL No: MS36X0E/L AND MS50X0E/L	EXMDB-011075	0	08/27/2018
Hazardous Area Label Battery Holder assembly- Tadiran	EXET1770	0	06/23/2017
Hazardous Area Label Battery Holder assembly- Xeno	EXET1860	0	06/23/2017
Hazardous Area Label For Battery Pack Assembly ET2250	EXET2295	0	04/10/2019
Hazardous Area Label For Battery Pack Assembly ET2257	EXET2296	0	04/10/2019
Hazardous Area Label for MS35XXE /MS55XXE Data Logger / Wireless Transmitter	EXMDB-011082	0	03/08/2019
Hazardous Area Label For MS35XXL /MS55XXL Data Logger / Wireless Transmitter	EXMDB-011084	0	03/25/2019
Hazardous Area Label MS5540 Wireless Repeater	EXMDB-011097	0	05/29/2019
Hazardous Area Label For MS36XXE /MS50XXE Data Logger / Wireless Transmitter	EXMDB-011122	0	03/25/2019
Hazardous Area Label For MS36XXL /MS50XXL Data Logger / wireless Transmitter	EXMDB-011080	0	03/25/2019
Hazardous Area Label MS5040-XXX Wireless repeater	EXMDB-011121	0	05/29/2019
Enclosure Label For MS36XXE / MS50XXE Data Logger / Wireless Transmitter	EXMDB-010858	B	03/25/2019
Enclosure Label for MS36XXL / MS50XXL Data logger / Wireless Transmitter	EXMDB-011079	0	03/25/2019
Enclosure Label MS5040-XXX Wireless Repeater	EXMDB-011095	0	03/25/2019
Control Drawing - MS36XXE Remote Data Logger	EXWDB-000097	A	05/23/2019
Control Drawing - MS35XXE Remote Data Logger	EXWDB-000109	A	05/23/2019
Control Drawing - MS35XXE MultiChannel Remote Data logger	EXWDB-000128	0	05/23/2019
Control Drawing - MS36XXL Remote Data Logger	EXWDB-000129	0	05/23/2019
Control Drawing - MS35XXL Remote Data Logger	EXWDB-000130	0	05/23/2019
Control Drawing - MS35XXL MultiChannel Remote Data logger	EXWDB-000131	0	05/23/2019
Control Drawing - MS5000E Wireless Transmitter	EXWDB-000113	A	05/24/2019
Control Drawing - MS5500E Wireless Transmitter	EXWDB-000133	0	05/24/2019
Control Drawing - MS5500E MultiChannel Wireless Transmitter	EXWDB-000134	0	05/24/2019
Control Drawing - MS5000L Wireless Transmitter	EXWDB-000135	0	05/24/2019
Control Drawing - MS5500L Wireless Transmitter	EXWDB-000136	0	05/24/2019

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Control Drawing - MS550XL MultiChannel Wireless Transmitter	EXWDB-000137	0	05/24/2019
MS35XXE & MS36XXE Hazardous Area Certification Details	EXDOC-000012	A	05/23/2019
MS50XXE & MS55XXE Hazardous Area Certification Details	EXDOC-000013	A	05/23/2019
MS35XXL & MS36XXL Hazardous Area Certification Details	EXDOC-000017	0	05/23/2019
MS50XXL & MS55XXL Hazardous Area Certification Details	EXDOC-000018	0	05/23/2019

### 16. Details of Certificate changes Issue 1

The following PCBs have been added under this revision. The installation configuration of the boards has been summarized in the certificate description:

- EXCDB-000044 – Alternate Battery Protection Board
- EXCDB-000025 – HART Wireless Board
- EXCDB-000033 – ER Measurement Board – 4 Channel
- EXCDB-000036 – LPR Measurement Board
- EXCDB-000039 – LPR Measurement Board – 4 Channel

The following schematics have received modification under this revision

- EXCDB-000017 – Remote Datalogger Host Board
  - D2 and D3 may now optionally be fitted with a lower wattage component when used with the ET2250 battery pack. This relates to models MS352XX, MS362XX, MS50XXX and MS55XXX of the equipment.
  - R36, D5, D6 and C31 may be optionally removed.
  - The USB and SD card circuitry of this PCB may be optionally removed.
  - PCB layout has been revised to incorporate listed changes
- EXCDB-000023 – ER Measurement Board
  - Resistors R27, R28, R25, R30, R32, R32, R8, R9, R6, R12, R16, R18, R19 and R17 have been relied upon to limit the current available to the probe output.
  - The Lo permitted to be connected to the probe output has been increased from 10μH to 60μH per the manufacturer's request.
  - PCB layout has been revised to ensure separations around new safety components cannot be invalidated.
- EXCDB-000029 – Display Board – Summary and safety components
  - Resistors R15, R16 and R17 have been included to reduce the current available to protective Zener diodes.
  - Zener diodes D7, D8, D9, D10, D11 and D12 have been reduced to 1W or 2W components.
  - Zener diodes D14 and D13 have been reduced to 2W components.
  - PCB layout has been revised to incorporate listed changes

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- EXCDB-000030 – Remote Datalogger Communication Board
  - Entity parameters have been revised at J2 due to a typographical error in the previous report. The Io has been reduced from 20mA to 2mA and the Po has been reduced from 24.7mW to 2.47mW. As the resultant values are lower than previously stated this amendment does not result in a dangerous condition.

The following general modifications apply to all PCBs

- Capacitance on all boards may be reduced or omitted

The following reporting changes have been considered under this variation.

- Spark ignition assessment, thermal ignition assessment and where applicable the protective component assessment has been revised to consider the listed changes.
- An alternate non-metallic enclosure has been provided for the MS35XX and MS55XX variants of the equipment. This model is installed in a fixed installation and utilizes an IP66 enclosure and IP66 sealing devices.
- Added MS5040 and MS5540 series of repeaters.
- Alternate aluminium end-caps have been specified for the MS36XX and MS50XX models.
- Checklists have been revised to consider the listed changes.
- Standard IEC 60079-0 has been updated from Edition 6 to Edition 7.