IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

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

Certificate No.:	IECEx ICS 16.0006X	Issue No: 0	Certificate history:
Status:	**Current**	Page 1 of 3	Issue No. 0 (2017-04-26)
Date of Issue:	**2017-04-26**		

Applicant: **Metermatic**
1 Angus Crescent,
Longmeadow Business Estate East,
Modderfontein, Johannesburg
South Africa

Equipment: **EM6**

Optional accessory:

Type of Protection: **Ex d, Ex ia, Ex ib**

Marking:

Ex d ia [ia Ga] [ib Gb] IIA T4 Gb

-20°C to 60°C

Approved for issue on behalf of the IECEx Certification Body: Roelof Viljoen

Position: Certification Authority

Signature:
(for printed version)

Date: 2017-04-26

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

South Africa Mining and Surface Certification (MASC)
45 Jurg Street
Lelyta Park Unit 5,
Hennopspark Ext 87, Centurion, 0157, Gauteng
South Africa

IECEx Certificate of Conformity

Certificate No:	IECEx ICS 16.0006X	Issue No: 0
Date of Issue:	**2017-04-26**	Page 2 of 3
Manufacturer:	**Metermatic** 1 Angus Crescent, Longmeadow Business Estate East, Modderfontein, Johannesburg **South Africa**	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2007-04 Edition:6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

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

TEST & ASSESSMENT REPORTS:

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

Test Report:

ZA/ICS/ExTR15.0003/00	ZA/ICS/ExTR16.0006/00	ZA/ICS/ExTR16.0007/00
ZA/ICS/ExTR16.0008/00	ZA/ICS/ExTR17.0004/00	ZA/ICS/ExTR17.0005/00

Quality Assessment Report:

ZA/ICS/QAR15.0009/01

IECEx Certificate of Conformity

Certificate No:	IECEx ICS 16.0006X	Issue No: 0
Date of Issue:	**2017-04-26**	Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The EM6 is installed on a vehicle that enters the hazardous area, or a Gantry which is a hazardous area.

The EM6 has an aluminium enclosure with approximate dimensions of 347mm x 226mm x 91mm. It has an external cover and an internal flameproof (FLP-101) cover. Therefore, the enclosure comprises two chambers / enclosures.

A GSM Module may be fitted only when the DPM-100 power module is fitted. Output to an antenna is facilitated via a flameproof certified B-ANT-EXD bushing in the side of the flameproof enclosure.

Please refer to the Annex of the Cerificate for a full description.

SPECIFIC CONDITIONS OF USE: YES as shown below:

Please refer to the Annex of the certificate for the Specific Conditions of use.

Annex:

Annex to Certificate IECEx ICS 16.0006X.pdf

IECEx Certificate of Conformity – Annex

Certificate No.:	IECEx ICS 16.0006X	**Issue:**	0	**Date:**	2017-04-26
Electrical Apparatus:	EM6				

1. EQUIPMENT

The EM6 is installed on a vehicle that enters the hazardous area, or a Gantry which is a hazardous area.
Two different power supply modules are used for the different voltage levels:

- The power supply module type is marked on the module at the end user termination / connection facilities inside the flameproof enclosure to facilitate correct selection of Um values.
- Power supply module APM-100 fitted: Um 250Vac.
- Power supply module DPM-100 fitted: Um 35Vdc.

The EM6 has an aluminium enclosure with approximate dimensions of 347mm x 226mm x 91mm. It has an external cover and an internal flameproof (FLP-101) cover. Therefore, the enclosure comprises two chambers / enclosures.

- The flameproof (FLP-101) chamber with the flameproof cover and cable entries into this chamber are part of the flameproof concept. The cover has a separate label (FLP-101) to make clear that it is a flameproof enclosure. The flameproof enclosure (chamber) contains electronics including the associated apparatus circuits for the external intrinsic safety circuits. The associated apparatus connects to the electronics in the non-flameproof chamber, as well as external intrinsic safety equipment, e.g. sensors.
- The following cable entries are provided for in the enclosure:
  - Four threaded entries (M20 x 1.5 – 6H) are provided on the one side in the external wall of the flameproof (FLP-101) enclosure, as well as three threaded entries (M20 x 1.5) into the intrinsically safe chamber.
  - In the opposite external wall an optional M16 x 1.5 – 6H threaded entry is provided in the flameproof (FLP-101) enclosure. The B-ANT-EXD bushing with hard wired ANT-GSM antenna is located in this entry.
  - An M16 x 1.5 – 6H threaded entry is provided in an extrusion of the internal cast flameproof (FLP-101) cover.
- Some intrinsically safe circuits exit the flameproof enclosure via internal tracks in a PCB, which is sandwiched in the flange flamepath of the flameproof (FLP-101) enclosure, between the base and the cover. The PCB has copper layers forming the flange flamepath on both sides of the PCB. The cover is secured with sixteen M6 x 1.0 x 25mm – grade 12.9 SHCS (socket head cap screw). Washers are fitted to the fastener up to 3.1mm thick..
- The external cover(s) protects all the internal electronics (outside the flameproof compartment), as well as the flameproof (FLP-101) cover.
  - The electronics outside the flameproof enclosure is powered from the associated apparatus circuits in the flameproof enclosure and allows for connection to external intrinsic safety equipment, e.g. sensors.
  - Two types of external covers exist:
    - Type EM6: The external cover can be fitted with an optional i-button reader (with o-ring), an o-ring, two polycarbonate windows with gaskets and a keypad with a gasket in the cover. Two LCD displays are visible through the two windows.
    - Type EM6-X: The cover comprises a blank cover with o-ring.
  - The external cover(s) is secured with four M6 fastener.

A GSM Module may be fitted only when the DPM-100 power module is fitted. Output to an antenna is facilitated via a flameproof certified B-ANT-EXD bushing in the side of the flameproof enclosure.

The following safety parameters were allocated.

Power to the non-i.s. electronics in the flameproof enclosure:
Um = 250Vac (powered with APM-100)
Um = 35Vdc (powered with DPM-100)

ANT [Ex ib] (824MHz to 1990MHz) – Only used when powered with Um = 35Vdc (DPM-100)
Uo = 3.3V
Io = 2.5A
Po = 45mW
Co = 1.2uF
Lo = 45.5uH

The J8 connector may be configured to one of three different options. The CANBUS system is typically daisy chained between units, using J8. In this state, power is only supplied by a single EM6 / EM6-X unit to multiple EM6-X units, or other equipment fitting the safety description below.

J8 – CANBUS [Ex ia] (Configured as 1.6W – JP9)

Uo = 5.88V
Io = 1.800A
Po = 1.622W
Co = 980uF
Lo = 87.7uH
Lo/Ro = 107uH/Ω

J8 – CANBUS [Ex ia] (Configured as 1.2W – JP9)

Uo = 5.88V
Io = 844mA
Po = 1.194W
Co = 980uF
Lo = 399uH
Lo/Ro = 229uH/Ω

J8 – CANBUS [Ex ia] (Configured as loop powered passive connection)

Ui = 8V
Ii = 3.33A
Ci = 12.1uF
Li = 0

J9 - PROXY INTERFACE [Ex ia] (Pin 1 w.r.t. Pin 2 and Pin 3 w.r.t. Pin 4)

Uo = 7.88V
Io = 14.82mA
Po = 29.2mW
Co = 120uF
Lo = 1.29H
Lo/Ro = 9.74mH/Ω

J10 and J11 combined– TEMPERATURE INTERFACE [Ex ia]

Note: From an intrinsic safety perspective, J10 and J11 is a single i.s. circuit.
Uo = 6.88V
Io = 553mA
Po = 1.04W
Co = 400uF
Li = 930uH
Lo/Ro = 261uH/Ω

J12 and J13 individually – PULSAR INTERFACE [Ex ia] (pins 1, 2 and 3 w.r.t pin 4)

Configured as "NORMAL" – Jumper JP11-JP14 used.

Uo = 7.88V
Io = 435mA
Po = 857mW
Co = 990uF
Lo = 1.5mH
Lo/Ro = 332uH/Ω

J12 and J13 individually – PULSAR INTERFACE [Ex ia] (pins 2 and 3 respectively w.r.t pin 4– open collector)

Configured as "NORMAL" – Jumper JP11-JP14 used.

Uo = 7.88V
Io = 4.11mA
Po = 8.1mW
Co = 990uF
Lo = 16.8H
Lo/Ro = 35mH/Ω

J12 and J13 individually – PULSAR INTERFACE [Ex ia] (pin 1 w.r.t pins 2 and 3 respectively))

Configured as "NAMUR" – Jumper JP11-JP14 used.

Uo = 7.88V
Io = 6.8mA
Po = 13.5mW
Co = 990uF
Lo = 6.15H
Lo/Ro = 21mH/Ω

J14 – DALLAS TAG INTERFACE [Ex ia]

Uo = 6.88V
Io = 553mA
Po = 1.04W
Co = 100uF
Lo = 930uH
Lo/Ro = 261uH/Ω

Where safety parameters are not allocated it was not required to be limited for intrinsic safety.

The above load parameters apply where;

a. The external circuit contains no combined lumped inductance (L_i) or lumped capacitance (C_i) greater than 1% of the above values. OR
b. The external circuit contains either only lumped inductance (L_i) or lumped capacitance (C_i) in combination with a cable. OR
c. The inductance and capacitance are distributed as in a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and capacitance, up to 50% of each of the inductance and capacitance values are allowed.

Certificate No.: IECEx ICS 16.0006X **Issue:** 0 **Date:** 2017-04-26
Electrical Apparatus: EM6

2. CONDITIONS OF CERTIFICATION

Conditions of manufacture:

- A routine overpressure test is not required based on the equipment passing a 4 times overpressure test as per IEC 60079-1.

Special conditions of use:

- Earth (High Quality Earth) / circuit Ground is infallibly electrically connected/bonded to the enclosure. This must be considered for the intrinsic safe installation. (Therefore, the 500Vrms isolation is not maintained.)
- When connecting intrinsically safe equipment to the GSM barrier device where the transient current for the rating of internal components are required to be considered the principles of ExTAG DS 2006/008 (December 2006) with capacitance 100pF (±20%) for a single series capacitor and the applicable Um value must be used.
- A GSM Module and flameproof certified B-ANT-EXD bushing in the side of the flameproof enclosure may be fitted only when the DPM-100 power module is fitted.
- The intrinsic safety system approval of peripheral devices is not part of the certification.
- The bushing material may not be subjected to direct UV exposure or mechanisms of generating static electricity.
- The B-ANT-EXD shall be installed as to not be subjected to any mechanical stress on the cable.
- Only suitably certified glands / blanking elements, with additional rating of at least IP54 may be utilised on the equipment. All unused entries must be blanked.
- Some flamepaths are more restrictive than the minimum requirements in the standard. Information w.r.t. the flamepaths must be obtained from the manufacturer as required.