



Issue Date: 31 October 2018
Expiry Date: 31 October 2021



IA Certificate Number: **MASC M/11-420X**
Our ref: 11-420 S5

IA – CERTIFICATE

(Supplement Five: Supplemented for ARP Review)

(IN TERMS OF REGULATION 21.17.2 OF THE MINERALS ACT (INCORPORATION THE MINE HEALTH AND SAFETY ACT) AND REGULATION 9 (1) OF THE ELECTRICAL MACHINERY REGULATIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT)

TX9165.01.i Sentro 8 Sensor Station with TX6350 eModules and TX9160 rModules

This document is based on and must be read in conjunction with IECEx ITA 13.0023X certificate.

Further to your request, we have evaluated the supplied documentation.

The following is applicable:

Description	Detail
Requested By :	Troxel Ltd. 10 Newby Road, Hazel Grove, Stockport, Cheshire, SK7 5DY, UK
Equipment :	Sensor Station
Manufacturer :	Troxel Ltd. 10 Newby Road, Hazel Grove, Stockport, Cheshire, SK7 5DY, UK
Model(s) / Type(s) :	TX9165.01.i Sentro 8 Sensor Station with TX6350 eModules and TX9160 rModules
Rating :	Ex ia I Ma
Certification body :	TUV Rheinland Australia Pty. Ltd (TUV)
Type Certificate No :	IECEx ITA 13.0023X
Variations/Issue/Amendment :	Issue 2
Assessment Report No :	AU/ITA/ExTR13.0029/00 GB/SIR/ExTR08.0123/00 GB/SIR/ExTR10.0223/00 GB/SIR/ExTR11.0250/00 AU/ITA/ExTR15.0026/00 GB/SIR/ExTR10.0062/01 GB/SIR/ExTR10.0321/00 GB/SIR/ExTR12.0094/00 AU/ITA/ExTR16.0009/00 GB/SIR/ExTR10.0180/00 GB/SIR/ExTR11.0057/00
Quality Assurance report (QAR) / Notification (QAN) :	GB/SIR/QAR07.0017/07

Standards:	- IEC 60079-0 (2011) "General requirements"
	- IEC 60079-11 (2011) "Equipment protection by intrinsic safety 'i'"

/ The evaluation...

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The evaluation was conducted according to the requirements of:

- **SANS (IEC) 60079-0 : 2012 “Explosive atmospheres – Part 0: Equipment — General requirements”**
- **SANS (IEC) 60079-11 : 2012 “Explosive atmospheres – Part 11: Equipment protection by intrinsic safety ‘i’”**

COMPLIANCE:

The equipment as described below is hereby certified “Explosion Protected” “Ex ia I Ma” and is suitable for use in hazardous locations as stated below and as tested, assessed and inspected in accordance with the relevant requirements of SANS / IEC Standards:

Location	Zone 0, 1, 2	Mining / Underground
Hazard Frequency	---	Continuous as could occur under normal operating conditions in hazardous area
Environment	Group I	Methane / Coal dust
Surface Temperature	150°C	
Service/Ambient Temperature	(-20°C ≤ Ta ≤ +40°C)	

DESCRIPTION OF EQUIPMENT (According to TUV Certificate):

The TX9165.01.i Sentro 8 Sensor Station is designed to monitor up to eight sensors, these are fully integrated into the Sensor Station to give direct monitoring of the toxic and flammable gas concentrations, ambient air temperature, atmospheric pressure and humidity, alternatively, the monitoring channels may be connected to remote sensors to measure airflow, pressure, vibration, etc. The Sentro 8 can be programmed to control a number of output relays and give various audio and visual alarms.

The TX9165.01i Sentro 8 Sensor Station comprises a sub-assembly of several printed circuit boards (PCB), within an inner plastic enclosure. The sub-assembly is made from the Main PCB, Power PCB, Control PCB, Upper Interface PCB and Lower Interface PCB. An LCD display is mounted on the Control PCB. The inner enclosure is housed inside an external enclosure that is made from polycarbonate/ABS with anti-static properties and has a polycarbonate window for the LCD display. The enclosure provides a degree of ingress protection to at least IP54. External circuit connections are made in the terminal chamber. Cable access into the terminal chamber is through the eight gland entries at the bottom of the housing.

Associated Sub assemblies

TX6350 eModule	–	Flammable
TX6350 eModule	–	Infrared
TX6350 eModule	–	Toxic
TX9160 eModule	–	Climate
TX9160 rModule	–	4..20mA
TX9160 rModule	–	0.4..2V
TX9160 rModule	–	PT100
TX9160 rModule	–	Namur

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TX6350 eModule – Flammable

The TX6350 eModule - Flammable is designed to measure concentration of flammable gas by means of a pellistor type sensing head and to electronically convert the measured value into an output signal that can be monitored by monitoring equipment, into which the sensor is plugged. The Flammable Gas Sensor contains a sub-assembly comprising a Sensing Board, Baseboard and a Connector Board. The sub-assembly fits inside a plastic enclosure with one face of the Connector Board exposed to connect with an external circuit.

TX6350 eModule – Infrared

The TX6350 - Infrared Gas Sensing eModule is designed to measure gas concentration by means of a Dynament Type MSHia *** or Type MSHia-P *** Gas Sensor (code Ex d+ia I Ma). The microcontroller inside the module communicates digitally with the Gas Sensor to obtain the current gas reading. This reading is provided as an output signal which is monitored by the TX9165.01.i Sentro 8 Sensor Station into which the module is plugged.

The Infrared Gas Sensing eModule contains a sub-assembly comprising a CPU board (alternatively CPU OSC Board), baseboard and a connector board. The CPU board makes use of a pressure sensor which is used to monitor normal atmospheric pressure. The sub- assembly fits inside a plastic enclosure with one face of the connector board exposed to connect with an external circuit.

TX6350 eModule – Toxic

The TX6350 Toxic Gas Sensor is designed to measure toxic gas concentration by means of an electrochemical cell and to electronically convert the measured value into an output signal that can be monitored by the sensor station into which the sensor is plugged.

The TX6350 Toxic Gas Sensor contains a sub-assembly comprising a CPU Board, Connector Board and either a Toxic Baseboard or an Oxygen Baseboard. The sub-assembly fits inside a plastic enclosure with one face of the Connector Board exposed to connect to external circuit.

TX9160 eModule – Climate

The TX 9160 Climate Sensing Module is designed to measure temperature humidity and pressure by means of two sensors with digital interfaces. The Information from the sensors is processed and sent electronically to monitoring equipment which the climate sensor is plugged into.

The sensing module contains a sub-assembly comprising a sensor board, baseboard and connector board. The sub-assembly fits inside a plastic enclosure with one face of the connector board exposed to connect with an external circuit.

TX9160 – Series rModule

The TX9160 Series rModules Sensors are designed to interface to remotely connected sensors, provide power and where necessary provide signal conditioning, power limitation and digital interface to the base unit.

The sensor contains a sub-assembly comprising a Signal Conditioning CPU board and one of three Signal Conditioning Baseboards i.e.

0.4-2V/4-20mA Input Module Baseboard

PT100 Input Module Baseboard

Single Namur/Monitoring Switch Baseboard

The sub-assembly fits inside a plastic enclosure.

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MARKING:

TUV marking remains applicable and the marking for the relevant models will be as above. The following MASC Certificate number (IA number) must be additionally applied to the equipment.

IA No: MASC M/11-420X

CONDITIONS OF MANUFACTURE:

- None

SPECIAL CONDITIONS OF USE (X):

- Any replacement cable glands shall be suitable for the application and shall provide an ingress protection of at least IP54.
- The following parameters shall be taken into account during connection into a system:
TX9165.01.i Sentro 8 Sensor Station

Function	Terminals	Uo	Io	Po	Co	Lo	Ui	Ci	Li
Incoming Power	14 & 15						14.4V	0	0
RS485	Terminal A - 17 wrt 15/16 (0V)	5.88V	66mA	97mW	1000uF	26mH	6.88V	0	0
	Terminal B - 18 wrt 15/16 (0V)	5.88V	66mA	97mW	1000uF	26mH	6.88V	0	0
Output Relays	1,2,3; 4,5,6; 7,8,9; 10,11,12	0V					30V	0	0
Module connectors A to H	Pin1 wrt 2	14.4V	Io of supply conneced at the power terminal 14 & 15						
	Pin 3 & 4 wrt 2	6.51V	460mA	1.383W	1000uF	2.06mH			
	Pin 5 wrt 2	5.88V	27mA	40mW	1000uF	Lo/Ro = 565.5mH			
	Pin 6 wrt 2	5.88V	27mA	40mW	1000uF	Lo/Ro = 565.5mH			

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When a TX9160 rModule is fitted, the external sensors connected to terminals 1m, 2m and 3m have the following parameters, dependent on the sensor type fitted:

Sensor Type		rModule Terminal	Parameters				
			Uo	Io	Po	Ci	Li
TX9160.01i.301 and TX9160.01i.303	0.4-2V / 4-20 mA Input	1m wrt 3m	Uo = Uo of external power supply connected to base unit where maximum Uo = 14.4.V Io = Io of external power supply connected to base unit. Po = Po of external power supply connected to base unit. Ci = Ci of external power supply connected to base unit. Li = Li of external power supply connected to base unit.				
		2m wrt 3m	14.4V	5mA	17mW	0	0
TX9160.01i.321 and TX9160.01i.323	0.4-2V /4-20 mA Differential Input	1m	Not Connected				
		2m to 3m	14.4V	5mA	17mW	0	0
TX9160.01i.306	PT100 Input	1m wrt 3m	14.4V	28mA	100mW	120nF	0
		2m wrt 3m	14.4V	5mA	17mW	0	0
TX9160.01i.501 and TX9160.01i.502	Namur/ Monitored Input	1m wrt 2m	14.4V	42mA	151mW	0.77uF	0
		3m not used					
Function: Incoming Power – Terminals 14&15 When a number of TX9160 rModule are fitted:			Ui = 14.4V	Ci = 0.38uF multiplied by the number of TX9160 rModule, plus total Ci of all external sensors connected to TX9160 rModules.		Li = Total Li of all external sensors connected to rModules.	

- Where an external sensor is used with either a type TX9160.01i.301 (4-20mA), TX9160.01i.303 (0.4-2V), TX9160.01i.321 (4-20mA Differential) or TX9160.01i.323 (0.4- 2V Differential) rModule and it is powered from a separate intrinsically safe power supply, the following conditions shall be met –
 - o No connection shall be made to rModule terminal 1m (power).
 - o The 0V of the external sensor power supply shall be connected to the 0V input of the equipment.
 - o The Ui presented by an externally powered sensor to any rModule, terminals 2m or 3m, shall not exceed the 14.4 V.

CONDITIONS OF CERTIFICATION:

1. This IA Certificate covers all units sold from the date of this document to 31 October 2021.
2. As per ARP 0108 a three yearly review is required on this IA Certificate.
3. The apparatus must be additionally marked with the MASC marking details above.
4. This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date.
5. The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by TUV and in this approval.
6. The TUV certification must remain valid.
7. The extent of the requirements in the ARP 0108 (or regulations) and SANS 10108 on the certification of the equipment must remain unchanged.
8. The Ex quality assurance notification/report for the equipment must remain valid.

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The use of apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:

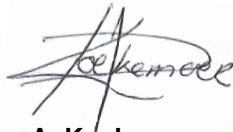
- i. SANS 10086 requirements;
- ii. Any conditions mentioned in the above document;
- iii. Codes of Practice enforced in terms of Regulations 21.17.2 of Minerals Act, by Chief Inspector of Mines;
- iv. Any restrictions and conditions enforced by Chief Inspectors of Mines, Principal Inspector (Group I equipment) of Chief Inspector of Factories (Group II equipment);
- v. Any relevant requirements of the MHS Act or the OHS Act.

CONCLUSION:

From the above and the selective examination of the documentation, nothing contrary to the requirements of the applicable standards was found, provided that the equipment / component is used as described in the above document / certificate and according to the MASC conditions below. A MASC IA certificate is issued based on the work done by TUV.

The routine tests for production units according to the TUV Certificate must be complied with (if applicable).

Yours faithfully



A. Koekemoer
TECHNICAL SPECIALIST

Mining And Surface Certification

This document is issued based on Mining And Surface Certification's Standard Contract terms and conditions available on request.

While every endeavour is made to ensure that a test / assessment is representative and accurately performed, and that a report is accurate in the quoted results and conclusions drawn from the test / assessment, MASC or its members/employees shall in no way be liable for any error made in carrying out the test / assessment or for any erroneous statement, whether in fact or in opinion, contained in a report issued pursuant to a test / assessment.

MASC takes no responsibility for any non-conformances, exclusions or any results / assessments not in compliance with the standards. By marking the equipment in accordance with the documentation / standard, the manufacturer attests on his own responsibility that the equipment has been constructed in accordance with the applicable requirements of the relevant standards and that the routine verifications and routine tests have been successfully completed and the product complies with the documentation and standard(s).

This document is only for use and application in South Africa. It is issued based on National interpretations and accepted practises.

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