Mining And Surface Certification (Pty) Ltd

2015/021934/07

THIS CERTIFICATE IS ISSUED AS AN I.A. CERTIFICATE IN TERMS OF THE MINE HEALTH AND SAFETY ACT, ACT NO 29 OF 1996 (AND REGULATIONS), THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND REGULATION 17 OF THE ELECTRICAL MACHINERY REGULATIONS

IA CERTIFICATE	MASC MS/23-9019X	**Issue**	0	
Issue Date	21 November 2023	**Expiry Date**	21 November 2026	
**** Based on Certificate No**	IECEx MSC 19.0001X	**Issue / Variations / Amendment**	1	
Requested by	**Nautitech Mining Systems Pty Ltd** Unit 3, 9 Packard Avenue, Castle Hill, NSW 2154, Australia			
Manufacturer	**Solexy Srl** Via Enrico Fermi, 2, I-25015 Desenzano del Garda (BS), Italy			
Description	The Antenna Coupler RX, SX and UX Series are designed to be installed and threaded onto an enclosure and acts as a coupling between an RF transmitter, that is installed in a certified enclosure, and a passive antenna installed outside the enclosure in a hazardous location. The Antenna Coupler M Series is designed to be installed and threaded onto an enclosure located in the safe area an acts as a coupling between an RF transmitter that is installed inside the enclosure and a passive antenna installed outside the enclosure in a hazardous location. Refer to Annex B below for a full description.			
Equipment	Antenna Couplers	**Type**	RX, SX, UX and M Series	
MARKING: **Original marking as per certificate ** remains applicable.** **IA number must be added.**	**Type:** **Ex Marking:**	Antenna Couplers RX, SX, UX and M Series Ex db mb [ia Ma] I Mb Ex db mb [ia Ga] IIA/IIB/IIC T6….T5 Gb Ex mb tb [ia Da] IIIC T80°….T100°C Db markings apply for M series only: [Ex ia Ma] I [Ex ia Ga] IIA/IIB/IIC [Ex ia Da] IIIC Um = 250Vdc or 250 Vac 50 – 60 Hz		
	IA Number:	MASC MS/23-9019X (To be additionally marked on equipment)		
	Warnings:	See Base Certificate ** (original marking must be applied)		
Quality Assurance report (QAR) / Notification (QAN) Expiry date:		GB/ITS/QAR17.0007/05		

Compliance:

The equipment as described above has been allocated the rating Explosion Protected 'as above' utilizing the SANS/IEC Standards:

- SANS (IEC) 60079-0: 2019 (2017) Explosive atmospheres - Part 0: Equipment - General requirements
- SANS (IEC) 60079-1: 2015 (2014) Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
- SANS (IEC) 60079-11: 2012 (2011) Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
- SANS (IEC) 60079-18: 2022 (2017) Explosive atmospheres - Part 18: Protection by encapsulation "m"
- SANS (IEC) 60079-31: 2023 (2022) Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"

Note: This certificate covers only the listed standards and does not imply compliance to any other standard, related or inferred. It is up to the manufacturer to ensure that the product complies to all relevant standards for the application.

Special conditions of safe use "X":

- Refer to Annex A below for more details.

Conditions of manufacture:

- Refer to Annex A below for more details.

Terine Orsmond
PROJECT MANAGER

Regardt Zeelie
TECHNICAL SPECIALIST

This certificate covers all units sold as long as the QAR/QAN remains valid.
According to the relevant requirements of the MHS Act and the OHS Act, production units of explosion protected equipment are required to comply with third party quality assurance (an approved mark scheme or batch testing by an accredited test laboratory).

Apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:
SANS 10086 requirements;
Any conditions mentioned in the above certificate;
Any relevant requirements of the MHS Act;
Any restrictions and conditions enforced by the chief inspector of mines, principal inspector (Group I equipment) or chief inspector of factories (Group II equipment).

Mining And Surface Certification (Pty) Ltd
Unit 5 Lelyta Park, 45 Jurg Avenue, Hennopspark, Ext 87
Centurion 0157

ANNEX A

This document is based on and must be read in conjunction with certificate IECEx MSC 19.0001X	
Description (According to Base Certificate) ** "Refer to description in Base Certificate ** (and any applicable schedules/issues/variations)."	
Refer to Annex B below for further details.	
Standard compliance	See Base Certificate ******
Special conditions of safe use ("X")	1. Solexy RX, SX, UX and M series antenna couplers must be connected to an RF source with a minimum internal impedance of 50 Ω 2. It is considered inappropriate to provide conventional IS parameters for this equipment. For connection to external antenna, refer to the Instruction and Operating Manual for clarification of the antenna requirements and calculation of the RF power 3. Solexy RX, SX, UX and M series antenna coupler does not provide any RF power limitation. The threshold power must be limited by the user in order to achieve the levels defined in IEC/EN 60079-0 Table 5 4. RX and SX Series equipment marked with an ambient temperature of -40°C to +70°C/+85°C is limited to a max RF input of 2 W. 5. Since Annex F is applied to the UX and M Series antenna couplers, they shall only be supplied with equipment rated with a maximum overvoltage category II. 6. The M series antenna coupler is only intended to be installed in a non-hazardous location. refer to manufacturer instructions for further details.
Conditions of manufacture	1. Each piece of "m" equipment shall be subjected to a visual inspection. No damage shall be evident, such as cracks in the compound, exposure of the encapsulated parts, flaking, inadmissible shrinkage, swelling, decomposition, failure of adhesion (separation of any adhered parts) or softening. 2. 100% of the assembled UX and M series printed circuit boards shall be subject to the routine dielectric strength at a test voltage of 2U + 1000V, where U = 250Vac between the input and output of the device for at least 60 seconds. No breakdown of the insulation shall occur.
Conditions of Certification	• This IA Certificate covers all units sold from the date of this document to the expiry date of this certificate. • As per ARP 0108 a maximum three yearly review is required on this IA Certificate (expiry is determined as per the QAR/QAN/QMS expiry date). • The apparatus must be additionally marked with the MASC marking details above. • 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. • The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by the certificate on which this IA Certificate is based and any other conditions in this IA Certificate. • The certification on which this IA Certificate is based must remain valid. • The extent of the requirements in the ARP 0108 (or regulations), SANS 10108 and any other applicable regulations on the certification of the equipment must remain unchanged. • The Ex quality assurance notification/report for the equipment must remain valid.
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 as per the Base Certificate ******. • The routine tests for production units according to the Base Certificate ** must be complied with (if applicable).

ANNEX B

Description:

The Antenna Coupler RX, SX and UX Series are designed to be installed and threaded onto an enclosure and acts as a coupling between an RF transmitter, that is installed in a certified enclosure, and a passive antenna installed outside the enclosure in a hazardous location. The Antenna Coupler M Series is designed to be installed and threaded onto an enclosure located in the safe area an acts as a coupling between an RF transmitter that is installed inside the enclosure and a passive antenna installed outside the enclosure in a hazardous location.

The antenna coupler RX, SX, UX and M series function is to block DC signals and provide very high impedance to low frequency AC signals but also acts a flameproof bushing that is threaded onto a flameproof enclosure.

The Antenna coupler output provides an intrinsically safe output for the connected passive antenna and blocks any unsafe energy from reaching the antenna under fault conditions. The circuitry that provides the intrinsically safe output is encapsulated and provides “Ex m” type of protection and all of that is enclosed in an ‘Ex db’/’Ex tb’ stainless steel body enclosure.

The antenna coupler is also available in a UX and M series. The UX series antenna coupler is provided with the same metallic enclosure and potting compound as the RX and SX series, but is provided with an updated layout that improves RF performance and allows the equipment to operate up to 10GHz. The M series antenna coupler incorporates the updated layout as well but is only intended to be installed in a non-hazardous area. This M series antenna coupler can be manufactured with either metallic or non-metallic enclosure and with various encapsulation compound options.

The standard RX, SX, UX and M series antenna coupler are available in 5 different options. These options vary only in the way the input and output connections are assembled and have no impact on the Ex parameters that contribute to the explosion safety of the equipment.

Model #	**RF Connection Type**							
	N	**N w/ isolated GND**	**TNC**	**TNC w/ isolated GND**	**BNC**	**BNC w/ isolated GND**	**RP-SMA**	**SMA**
RX	X	X	X	X	X	X	X	X
SX	X	-	X	-	X	-	X	X
UX	X	-	X	-	X	-	X	X
M	X	X	X	X	X	X	X	X

Technical data:

Maximum input voltage	250 Vdc / 250 Vac 50-60Hz
Maximum input frequency (RX and SX)	6 Ghz
Maximum input frequency (UX and M)	10 Ghz
Minimum Internal Impedance of RF transmitter	50 Ω

Associated Ambient Temperature Range		
Gas	Dust	Tamb
T5	100°C	-40°C to +80°C (When max RF input = 6W) – see note 1 -40°C to +85°C (When max RF input = 2W) – see note 1 -40°C to +85°C – see note 2
T6	80°C	-40°C to +65°C (When max RF input = 6W) – see note 1 -40°C to +70°C (When max RF input = 2W) – see note 1 -40°C to +75°C – see note 2
Note 1: the following ambient temperature ranges are related to the RX and SX series models only. *Note 2: the following ambient temperature ranges are related to the UX series models only.*		

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Equipment Group	Threshold Power Pth (W)	Threshold Power Pth (dBm)
Group I / IIA / III	6	37.8
Group IIB	3.5	35.4
Group IIC	2	33.0

Maximum RF input power		
Power	**Associated Tamb**	**Model Series**
7W (38.4 dBm)	when ta = - 40°C to +85°C when ta = - 40°C to +75°C	UX
	when ta = - 40°C to +85°C	M
6W (37.8 dBm)	when ta= - 40°C to +80°C when ta= - 40°C to +65°C	RX and SX
2W (33 dBm)	when ta= - 40°C to +85°C when ta= - 40°C to +70°C	RX and SX

RX	X	X	X	XX	XX	X	XX	-	XXXX X
	1	**2**	**3**	**4**	**5**	**6**	**7**		**8**

1	Series	F	RP-SMA
		S	SMA Female
		N	N Female
		B	BNC Female
		T	TNC Female
		1	N Female Isolated Ground
		2	TNC Female Isolated Ground
		3	BNC Female Isolated Ground
2	Thread	M	M25x1.5
		3	3/4” NPT-m
3	Material	S	AISI 303
		C	AISI 316
		L	AISI 316L
4	Coaxial cable type / Radio Connector	XX	2 digit for coax connector and cable type
5	Cable length	XX	2 digits for coax cable length (inches) 00 for double connector execution (no cable)
6	Version	X	1 digit for version
7	Standard Reference	XX	2 digits for certification marking – see Note 1
		X0	European - IECEx
		N0	North American (USA & CANADA)
		XN	European IECEx - North America (double marking)
8	Special Execution	XXXXX	Up to 5 digits for special execution in terms of marking, labelling, instruction, packaging, etc.
Note 1: further coding will be defined in case of different approvals.			

SX & UX	X	X	X	XX	XX	X	XX	-	XXXX X
	1	**2**	**3**	**4**	**5**	**6**	**7**		**8**

1	Series	F	RP-SMA
		S	SMA Female
		N	N Female
		B	BNC Female
		T	TNC Female
2	Thread	M	M25x1.5

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		3	3/4" NPT-m
3	Material	S	AISI 303
		C	AISI 316
		L	AISI 316L
4	Coaxial cable type / Radio Connector	XX	2 digit for coax connector and cable type
5	Cable length	XX	2 digits for coax cable length (inches) 00 for double connector execution (no cable)
6	Version	X	1 digit for version
7	Standard Reference	XX	2 digits for certification marking – see Note 1
		X0	European - IECEx
		N0	North American (USA & CANADA)
		XN	European IECEx - North America (double marking)
8	Special Execution	XXXXX	Up to 5 digits for special execution in terms of marking, labelling, instruction, packaging, etc.
Note 1: further coding will be defined in case of different approvals.			

M	**X**	**X**	**X**	**XX**	**XX**	**X**	**XX**	**-**	**XXXXX**
	1	**2**	**3**	**4**	**5**	**6**	**7**		**8**

1	Number of Channel	x	1 digit for number of channel
2	Series	F	RP-SMA
		S	SMA Female
		N	N Female
		B	BNC Female
		T	TNC Female
		1	N Female Isolated Ground
		2	TNC Female Isolated Ground
		3	BNC Female Isolated Ground
3	Material	P	Plastic
		A	Aluminium
		S	AISI 303
		C	AISI 316
		L	AISI 316L
4	Coaxial cable type / Radio Connector	XX	2 digit for coax connector and cable type
5	Cable length	XX	2 digits for coax cable length (inches) 00 for double connector execution (no cable)
6	Version	X	1 digit for version
7	Standard Reference	XX	2 digits for certification marking – see Note 1
		X0	European - IECEx
		N0	North American (USA & CANADA)
		XN	European IECEx - North America (double marking)
8	Special Execution	XXXXX	Up to 5 digits for special execution in terms of marking, labelling, instruction, packaging, etc.
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