IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

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Certificate No.:	**IECEx CML 15.0034X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 4	Issue 3 (2021-10-05) Issue 2 (2017-10-20) Issue 1 (2016-01-13) Issue 0 (2015-07-23)
Date of Issue:	2023-10-18		

Applicant: **Controlled Systems Limited**
Ryder Close
Swadlincote
Derbyshire.
DE11 9EU
United Kingdom

Equipment: **949X-PS XXX-IS Power Supply Module**

Optional accessory:

Type of Protection: **Intrinsic safety and/or Type n**

Marking: [Ex ia Ma] I, [Ex ib Mb] I, [Ex ia Ga] II*, [Ex ib Gb] IIB, [Ex ia Da] IIIC, [Ex ib Db] IIIC

Ex nA II* T4 Gc

* = IIA or IIB or IIC depending on model

(-40°C < Ta < +70°C)

Approved for issue on behalf of the IECEx Certification Body: **L A Brisk**

Position: **Assistant Certification Manager**

Signature: 
(for printed version)

Date: 18 Oct 2023
(for printed version)

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Certificate issued by:

Eurofins E&E CML Limited
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United Kingdom

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Manufacturer: **Controlled Systems Limited**
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Manufacturing locations: **Controlled Systems Limited**
Ryder Close
Swadlincote
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DE11 9EU
United Kingdom

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

IEC 60079-15:2010 Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
Edition:4

This Certificate **does not** indicate compliance with 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 Reports:

GB/CML/ExTR15.0047/00 GB/CML/ExTR17.0175/00 GB/CML/ExTR21.0229/00

Quality Assessment Report:

GB/CML/QAR22.0013/01

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The 949X-PS-XXXX IS Power Supply Module series is an intrinsically safe power supply intended to power equipment in the hazardous area.

See Annex for full description and Conditions of Manufacture

SPECIFIC CONDITIONS OF USE: YES as shown below:
See Annex for Specific Conditions of Use.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Issue 1

This issue introduces the following change:

1. To correct certificate code and ambient range.

Issue 2

This issue introduces the following changes:

1. To rename the printed circuit board from the 9491-PS-PLUS (rev 6) to the 9492-PS-PLUS (Rev 7).
2. To permit the use of an alternative opto-isolator Type CN65Exi, in place of the original OPI1264C. Changes to the PCB have been made to accommodate the new opto-isolator.
3. To permit the use of an alternative version of IC4 and IC5 (LTC4252), together with changes in value of R16; R18 and R9; R24. Resistors R17 and R23 have been removed as they are no longer required.
4. To provide additional placement of up to ten resistor slots (R37 to R41 and R63 to R67) for the creation of the Ex ia circuit. This arrangement allows the flexibility of creating the correct value of current limiting resistance, whilst allowing for the failure of two resistors.
5. To permit the value of decoupling capacitors C52 and C53 to be increased to 10nF.
6. To permit gate resistors R29 and R31 to be duplicated to R29; R17 and R31; R23. In addition, the values of R30 and R32 have been increased.
7. Removal of standard IEC 60079-26:2014 as there is no longer a requirement to meet this for the equipment considered.

Issue 3

This issue introduces the following change:

1. Update of IEC 60079-0 to the latest Edition

Issue 4

This issue introduces the following change:

1. Update to QAR Reference

Annex:

IECEx CML 15.0034X Iss. 4 Annex.pdf

Annexe to:	IECEx CML 15.0034X, Issue 4
Apparatus:	Controlled Systems Limited
Applicant:	949X-PS-XXXX IS Power Supply Module

Description

The 949X-PS-XXXX IS Power Supply Module series is an intrinsically safe power supply intended to power equipment in the hazardous area. It consists of a printed circuit board assembly mounted in a plastic enclosure. There can be two separate intrinsically safe outputs, one 'ia' and one 'ib'. It restricts the transfer of energy from unspecified safe-area apparatus to an intrinsically safe circuit by the limitation of voltage and current. A transformer provides galvanic isolation between the hazardous and non-hazardous area.

The power supply is intended to be either DIN rail mounted or backplane mounted.

External I.S. connections are made via 'plug-in' terminals at the top of the enclosure, one for each of the two separate I.S. circuits (if fitted).

External non-I.S. connections are made via either 'plug-in' terminals at the side of the enclosure when the power supply is DIN rail mounted, or via a connector at the bottom of the enclosure when the equipment is backplane mounted.

The equipment must either only be installed in clean, dry, well-ventilated environments or fitted in an additional enclosure that has an IP rating suitable for the environment of use.

The power supply has the following options:

1. ia and ib outputs, which includes the 9491-PS and the 9492- PS-Plus (Group IIB, IIIC and Mining)
2. ia only outputs, which includes the 9493-PS-XXX where:
    a. 9493-PS-Mxx (Group I mining)
    b. 9493-PS-Axx (Group IIA)
    c. 9493-PS-Bxx (Group IIB)
    d. 9493-PS-Cxx (Group IIC)

The 949X-PS-XXXX IS Power Supply Module electrical parameters are:

Um = 250V

The circuit connected to the safe area terminals is designed to operate from a d.c. supply voltage of up to 30V.

Part Number	Group	LOP	Nominal O/P Voltage	Uo (OVP)	Io	Po
9491-PS	IIB	ia ib	10.0V … 12.2V	12.4V	2.61A or 505mA	8.09W or 6.27W
9492-PS-PLUS	IIB	ia ib	10.0V … 12.6V	12.8V	3.23A or 630mA	10.34W or 8.07W
9493-PS-C5	IIC	ia	4.8V … 5.2V	5.4V	4.01A	5.41W
9493-PS-B5	IIB	ia	4.8V … 5.2V	5.4V	8.26A	11.16W
9493-PS-C6	IIC	ia	5.7V … 6.7V	7.0V	3.21A	5.62W
9493-PS-C7	IIC	ia	6.6V … 7.7V	8.0V	3.11A	6.22W
9493-PS-C8	IIC	ia	7.6V … 8.7V	9.0V	3.03A	6.82W
9493-PS-C9	IIC	ia	8.4V … 9.7V	10.0V	2.81A	7.01W
9493-PS-C10	IIC	ia	9.1V … 10.7V	11.0V	2.53A	6.94W
9493-PS-C11	IIC	ia	9.9V … 11.7V	12.0V	2.25A	6.73W
9493-PS-C12	IIC	ia	10.8V … 12.7V	13.0V	1.99A	6.47W
9493-PS-C13	IIC	ia	11.3V … 13.7V	14.0V	1.14A	3.99W
9493-PS-B13	IIB	ia	11.3V … 13.7V	14.0V	2.62A	9.17W
9493-PS-A13	IIA	ia	11.3V … 13.7V	14.0V	3.21A	11.25W
9493-PS-C14	IIC	ia	12.4V … 14.7V	15.0V	0.83A	3.12W
9493-PS-B14	IIB	ia	12.4V … 14.7V	15.0V	2.10A	7.89W
9493-PS-A14	IIA	ia	12.4V … 14.7V	15.0V	2.81A	10.52W
9493-PS-M14	I	ia	12.4V … 14.7V	15.0V	3.16A	11.84W
9493-PS-C15	IIC	ia	13.2V … 15.7V	16.0V	0.67A	2.69W
9493-PS-B15	IIB	ia	13.2V … 15.7V	16.0V	1.58A	6.34W
9493-PS-A15	IIA	ia	13.2V … 15.7V	16.0V	2.24A	8.98W
9493-PS-M15	I	ia	13.2V … 15.7V	16.0V	2.99A	11.97W
9493-PS-C16	IIC	ia	14.1V … 16.7V	17.0V	0.48A	2.03W
9493-PS-B16	IIB	ia	14.1V … 16.7V	17.0V	1.26A	5.37W
9493-PS-A16	IIA	ia	14.1V … 16.7V	17.0V	1.83A	7.76W
9493-PS-M16	I	ia	14.1V … 16.7V	17.0V	2.20A	9.36W
9493-PS-C17	IIC	ia	15.0V … 17.7V	18.0V	0.41A	1.86W
9493-PS-B17	IIB	ia	15.0V … 17.7V	18.0V	1.11A	4.99W
9493-PS-A17	IIA	ia	15.0V … 17.7V	18.0V	1.47A	6.60W
9493-PS-M17	I	ia	15.0V … 17.7V	18.0V	1.93A	8.70W

The capacitance and the resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values, when used as Ex ia:

Type	Group	Co (uF)	Lo/Ro (uH/Ω)
9491-PS	IIB	7.9	17.2
	IIA	30	34.4
	I	34	56.4
9492-PLUS	IIB	6.8	13.8
	IIA	24.2	27.5
	I	30	45.1
9493-PS-C5	IIC	65	6.6
9493-PS-B5	IIB	1000	12.7
	IIA	1000	25.5
	I	1000	41.8
9493-PS-C6	IIC	15.7	6.3
	IIB	300	25.3
	IIA	1000	50.6
	I	1000	83.0
9493-PS-C7	IIC	8.4	5.7
	IIB	100	22.9
	IIA	1000	45.8
	I	1000	75.1
9493-PS-C8	IIC	4.9	5.2
	IIB	40	20.9
	IIA	500	41.7
	I	1000	68.4
9493-PS-C9	IIC	3	5.1
	IIB	20	20.3
	IIA	100	40.6
	I	180	66.5
9493-PS-C10	IIC	1.97	5.1
	IIB	13.8	20.5
	IIA	60	41
	I	67.5	67.2
9493-PS-C11	IIC	1.41	5.3
	IIB	9	21.1
	IIA	36	42.2
	I	38	69.5
9493-PS-C12	IIC	1	5.5
	IIB	6.2	22.0
	IIA	22.5	44.0
	I	28.5	72.2
9493-PS-C13	IIC	0.73	8.9
9493-PS-B13	IIB	4.6	15.5
9493-PS-A13	IIA	17	25.3
9493-PS-C14	IIC	0.58	11.4
9493-PS-B14	IIB	3.55	18.0
9493-PS-A14	IIA	14	27.0
9493-PS-M14	I	17.8	39.4
9493-PS-C15	IIC	0.46	13.2
9493-PS-B15	IIB	2.75	22.4
9493-PS-A15	IIA	11	31.7
9493-PS-M15	I	15.2	39.0
9493-PS-C16	IIC	0.375	17.5
9493-PS-B16	IIB	2.2	26.5
9493-PS-A16	IIA	9	36.6
9493-PS-M16	I	12.64	49.9
9493-PS-C17	IIC	0.309	19.1
9493-PS-B17	IIB	1.780	28.5
9493-PS-A17	IIA	7.6	43.1
9493-PS-M17	I	10	53.6

The capacitance and the inductance of the load connected to the output terminals must not exceed the following values, when used as Ex ib:

Type	Group	Co (µF)	Lo (µH)
9491-PS	IIB	0.5	100
9492-PLUS	IIB	1.0	100

Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

i. As required by Clause 11.2 of EN/IEC 60079-11:2011, a voltage of 1500Vrms shall be applied for at least 60 seconds (alternatively 1800Vrms for >1sec) between:

- The primary and secondary (1) windings
- The primary and secondary (2) windings
- The secondary (1) and secondary (2) windings

ii. The value of resistors RA, RB, RC, RD, RE, RF, RG, RH shall be chosen such that the crowbar triggering voltage associated with IC6 and IC7 occurs at a voltage less than, or equal to Uo on the table shown on drawing 9491/9492/9493-ASSY Sheet 2 for the appropriate model.

iii. The value of resistors R37, R38, R39, R40, R41, R63, R64, R65, R66 and R67 shall be fitted in accordance with the table shown on drawing 9491/9492/9493-ASSY Sheet 2 for the appropriate model.

iv. Each active current limiting switch-off circuit associated with IC4 and IC5 shall be subjected to routine tests to establish that the current switch off occurs at a load current less than, or equal to, 505mA for model 9491-PS or 630mA for model 9492-PS-PLUS. (This is not applicable for Model 9493-PS-XXX).

Specific Conditions of Use

The following conditions relate to safe installation and/or use of the equipment.

i. If the equipment is installed in a zone 2 hazardous area, it shall be housed in an enclosure that is coded Ex nA, Ex e, Ex d or Ex p, suitable for operating temperatures of -40ºC to +135ºC and providing an ingress protection of IP54 minimum. For some types of enclosure, additional certification will be required to permit the installation of the module within the enclosure. Reference should be made to the enclosure certificate. The installer shall ensure that the maximum ambient temperature of the module when installed is not exceeded.

ii. When the device is mounted in a zoned area, connection and disconnection of the modules input supply voltage while live is only permitted if the potentially explosive atmosphere is shown to be absent.