EU Type Examination Certificate CML 15ATEX2071X Issue 1

1 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

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

3 Manufacturer **Controlled Systems Limited**

4 Address **Ryder Close,**
Swadlincote,
Derbyshire,
DE11 9EU
UK

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 Certification Management Limited, Unit 1 Newport Business Park, New Port Road, Ellesmere Port CH65 4LZ, UK, Notified Body Number 2503, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to conditions of safe use (affecting correct installation or safe use). These are specified in Section 14.

8 This EU Type Examination certificate relates only to the design and construction of the specified equipment or component. Further requirements of Directive 2014/34/EU Article 13 apply to the manufacture of the equipment or component and are separately certified.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN 60079-0:2012 EN 60079-11:2012

10 The equipment shall be marked with the following:

I (M1), (M2)	II (1), (2) G	II (1), (2) D
[Ex ia Ma] I	[Ex ia Ga] II*	[Ex ia Da] IIIC
[Ex ib Mb] I	[Ex ib Gb] IIB	[Ex ib Db] IIIC
Ta = -40°C to +70°C	Ta = -40°C to +70°C	Ta = -40°C to +70°C

II* = IIA or IIB or IIC, depending on model

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11 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

Part Number	Group	LOP	Nominal O/P Voltage	Uo (OVP)	Io	Po
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

Type	Group	Co	Lo/Ro
		(uF)	(uH/Ω)
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	Lo
		(µF)	(µH)
9491-PS	IIB	0.5	100
9492-PLUS	IIB	1.0	100

Variation 1

This variation introduces the following modifications to the 949X-PS-XXX IS Power Supply Module:

i. To rename the printed circuit board from the 9491-PS-PLUS (rev 6) to the 9492-PS-PLUS (Rev 7)

ii. 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

iii. 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.

iv. 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.

v. To permit the value of decoupling capacitors C52 and C53 to be increased to 10nF.

vi. 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.

vii. Removal of standard EN 60079-26:2015 as there is no longer a requirement to meet this for the equipment considered.

viii. To update the certificate reference to the 2014/34/EU Directive.

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	23 July 2015	R521A/00	Issue of prime certificate
1	20 Oct 2017	R11295B/00	Introduction of Variation 1

Note: Drawings that describe the equipment or component are listed in the Annex.

13 Conditions of manufacture

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

13.1 Where the product incorporates certified parts or safety critical components, the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.

13.2 The equipment shall be designed in accordance with general electrical safety standards, e.g. IEC 60950 or IEC 61010-1.

13.3 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

13.4 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

13.5 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.

13.6 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).

14 Special Conditions for Safe Use (Conditions of Certification)

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

14.1 This certificate does not consider category 3 (Zone 2) installations. Refer to Certificate CML 15ATEX4072X.

Certificate Annex

Certificate Number	**CML15ATEX2071X**
Equipment	**949X-PS-XXX IS Power Supply Module**
Manufacturer	**Controlled Systems Limited**

The following documents describe the equipment or component defined in this certificate:

Issue 0

Drawing No	Sheets	Rev	Approved date	Title
9491-9492-9493-PSU ASSY	1 & 2	4	23 July 2015	9491/9492/9493 IS Power Supply Assembly Drawing
949X-PS-XXX-LABEL	1	1	23 July 2015	949X-PS-XXX ATEX/IECEx Label Drawing
9491-PS-PLUS	1	6C	23 July 2015	IS Power Supply Circuit Diagram
9491-PS-PLUS PCB	1	6	23 July 2015	IS Power Supply PCB Artworks
TFR305	1 & 2	2	23 July 2015	Planar Transformer – Type TFR305

Issue 1

Drawing No	Sheets	Rev	Approved date	Title
9491/9492/9493-ASSY	1 to 2	6	20 Oct 2017	9491/9492/9493 IS Power Supply Assembly Drawing
9492-PS-PLUS*	1 of 1	7	20 Oct 2017	IS Power Supply Circuit Diagram
9492-PS-PLUS PCB**	1 of 1	7	20 Oct 2017	9492-PS-PLUS Artworks

* This was previously drawing 9491-PS-PLUS
** This was previously drawing 9491-PS-PLUS PCB