CPS – A, Compact Power Supply

User Manual

Designed and Manufactured in Australia by Ampcontrol CSM Pty Limited ABN 35 000 770 141

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Ampcontrol User Manual Part No: 142628

AMPCONTROL®

Manual Revision Record:

Version	Notes	Author	Checked	Approved	Date
R1–CRN 7886	First Issued	B. Pascoe			

Safety and other Warnings

WARNING! 	**This safety alert symbol identifies important safety messages in this manual and indicates a potential risk of injury or even death to the personnel. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.**

CAUTION! 	**This safety alert symbol identifies important information to be read in order to ensure the correct sequence of work and to avoid damage or even destruction of the equipment, and reduce any potential risk of injury or death to the personnel.**

	Supplementary information not directly affecting safety or damage to equipment. Carefully read the message that follows, and inform other relevant personnel.

	**Information concerning possible impact on the environment and actions required for prevention and proper response.**

Copyright Notice

Disclaimer

Ampcontrol CSM Pty Ltd will make no warranties as to the contents of this documentation and specifically disclaims any implied warranties or fitness for any particular purpose.

Ampcontrol further reserves the right to alter the specification of the system and/or manual without obligation to notify any person or organisation of these changes.

Before You Begin

We would like to take a moment to thank you for purchasing the Compact Power Supply.

WARNING! 	**To become completely familiar with this equipment and to ensure correct installation and operation, we strongly recommend that you take the time to read and understand this user manual thoroughly.**

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1 Receiving and Storage

1.1 Receiving

All possible precautions are taken to protect the equipment against damage or losses during shipment, however before accepting delivery, check all items against the packing list or Bill of Lading. If there are shortages or evidence of physical damage, notify Ampcontrol immediately.

Notify Ampcontrol within 7 days (maximum) in case of shortages or discrepancies, according to the packing list. This action will help ensure a speedy resolution to any perceived problems. Keep a record of all claims and correspondence. Photographs are recommended.

Where practicable do not remove protective covers prior to installation unless there are indications of damage. Boxes opened for inspection and inventory should be carefully repacked to ensure protection of the contents or else the parts should be packaged and stored in a safe place. Examine all packing boxes, wrappings and covers for items attached to them, especially if the wrappings are to be discarded.

1.2 Storage after Delivery

When the equipment is not to be installed immediately, proper storage is important to ensure protection of equipment and validity of warranty.

All equipment should be stored indoors, preferably on shelves (where practicable), and protected from the elements. If storing on the ground use wooden blocks to elevate the equipment above the ground and ensure that the storage area is not an area where water will collect. The storage location must not be in direct sunlight and must stay within the temperature range of -10 to +60°C.

1.3 Unpacking of Equipment

The method of packing used will depend on the size and quantity of the equipment. The following cautions should be interpreted as appropriate.

CAUTION! 	**Take care when unpacking crates as the contents may have shifted during transport.** **Make sure that cable drums are securely attached to their shipping pallets before attempting to move them.**

 *ENVIRONMENTAL ALERT*	The disposal of packaging materials, replaced parts, or components must comply with environmental restrictions without polluting the soil, air or water. Ensure that any timber and cardboard used as packaging is disposed of in a safe and environmentally responsible manner. Where possible, dispose of all waste products i.e. oils, metals, plastic and rubber products by using an approved recycling service centre.

2 General safety

2.1 Personnel Safety Warnings

2.1.1 Relevant Personnel

All personnel directly responsible for the installation, operation and maintenance of the equipment should ensure that they are aware of, before start-up, any instructions in safety, as well as attend any scheduled facility safety meetings.

Site meetings should address and record such health and safety issues as:

- Risk assessment and a subsequent work method statement.
- Evacuation and rescue plans.
- Identification of Safety Officers.
- Identification of medical facilities.
- Any special site requirements

Each person who is concerned with the installation, start-up, operation, maintenance, repair work, or with any possible disassembly or reassembly of the equipment, must observe any instructions issued at site meetings.

2.1.2 Safety Communication

All safety instructions should be passed on to other users. As well as the instructions given in this manual, the Safety Instructions and Rules for the Prevention of Accidents generally applicable to this type of work have to be followed, as well as any Site Safety Rules or Regulations. The responsibilities applicable to those persons who work with the equipment must be clearly laid down.

2.2 Safe Use of Equipment

The equipment supplied has been manufactured according to the state of the art, and designed to ensure a safe operation. The equipment may only be used within the design parameters.

In general, the following instructions must be observed in order to help achieve maximum safety during operation.

The owner/user is responsible for observing the following instructions:

2.2.1 Live Conductors

No work shall be carried out on live conductors (except intrinsically safe) energized by any voltage where equipment is operating in, or connected by cabling to, any hazardous zone. This does not preclude the use of IS test instruments provided their use is as detailed in HB13-2007 Section 11 (Standards Australia Handbook-Electrical equipment for hazardous areas).

2.2.2 Equipment Knowledge

Experience with, or understanding of, this equipment is essential for the safe installation and removal of the equipment. Therefore, in case of a question on how to safely proceed, contact Ampcontrol immediately.

Mechanical and or Electrical installation, and maintenance of plant and equipment, must only be carried out by appropriately qualified personnel.

3 Overview of Equipment

3.1 Description

The Ampcontrol CPS-A Intrinsically Safe Compact Power supply forms part of the Gasguard Range of Group I certified Gas Detection and Alarm Systems and is also suitable for use with other applications.

The CPS series of IS power supplies convert 110Vac mains power to intrinsically safe low voltage DC power.

The DIN rail mount enclosure is made of robust black polycarbonate. Top and bottom enclosure walls have ventilation slots for natural convection cooling. The side walls are solid and allow other components to be mounted adjacent to it on the DIN rail. Top and bottom ventilation slots must be kept free for air circulation. Screw terminals are located on the front for connecting the AC mains cable and the output load circuits. The output has two terminals for each of the positive and negative DC supply.

WARNING! 	**The power supply must be mounted in a safe area or in a suitable enclosure with a minimum IP 54 rating.**

Typical use of this power supply is for voice communication systems, gas detection systems and other electronic equipment requiring intrinsically safe power in a Group I application.

The CPS-A Power supply is an IP 20 plastic enclosure DIN rail mounting Intrinsically Safe power supply designed for Group I applications. Several power output versions of the Power Supply are available with a range of voltage and current limits.

Mounting is by a moulded clip assembly onto a standard TS32 top hat DIN rail.

Connections are made to enclosed screw clamp type terminals on the front facia of the enclosure.

3.2 Specification

Supply Voltage: 110Vac ± 20%, 50/60Hz
Operating Temperature: 0-50ºC for 12.6V/2.4A
0-60ºC all other models
Dimensions: 125 W x 102 H x 122 D mm
Weight: 1kg
Input Parameter: Um = 132V
Output Parameters: Refer Table 3.2 (following)

Table 3.2: Output parameters

Uo	Io	Co	Lo	L/R
12.6V	2.4A	10uF	74uH	30uH/Ω
12.6V	2.4A	20uF	40uH	8uH/Ω
12.6V	2.0A	20uF	95uH	40uH/Ω
15.1V	1.5A	1uF	190uH	30uH/Ω
15.1V	0.469A	2uF	450uH	70uH/Ω
15.1V	0.51A	2uF	450uH	65uH/Ω

4 Installation

Install the CPS-A power supply on a TS 32 type DIN rail in a cool, dry, dust and vibration free area.

CAUTION! 	**The unit should be installed with the ventilation slots on the top and lower faces to ensure proper ventilation.** **Take care not to allow swarf and other metallic items to penetrate the enclosure during installation of adjacent equipment.** **Ensure adequate space above and below the unit to allow free air movement through the slots.**

WARNING! 	**The input mains terminals and output DC terminals have minimum separation distance of 50mm. This separation must be maintained by using insulated wires & lugs.** **Wiring to the CPS-A must comply with local wiring codes and Intrinsically Safe standards as applicable to the application.**

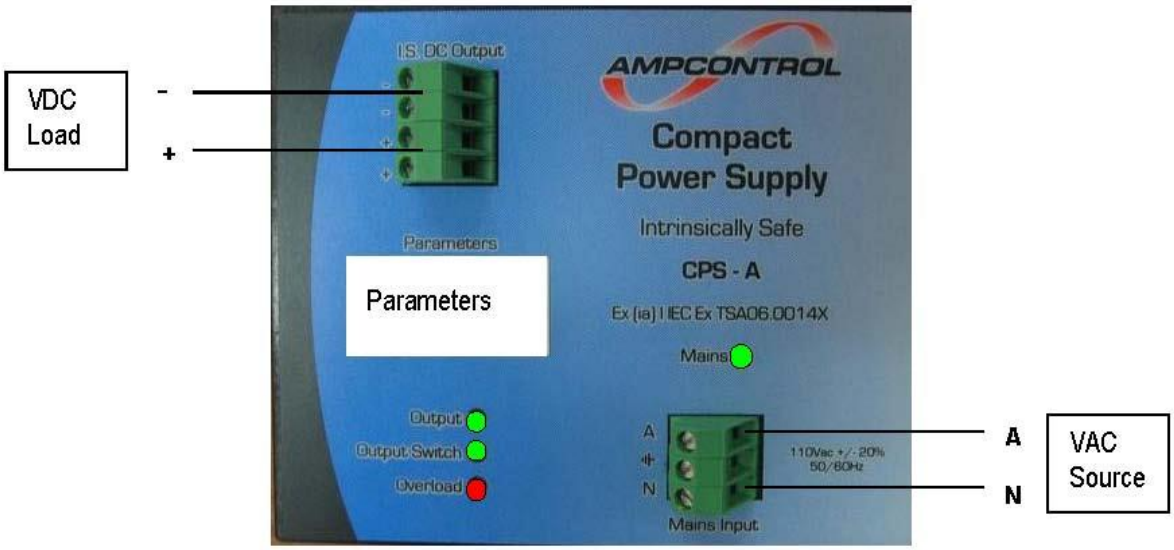

Illustration showing Facia Panel and Cable Connections

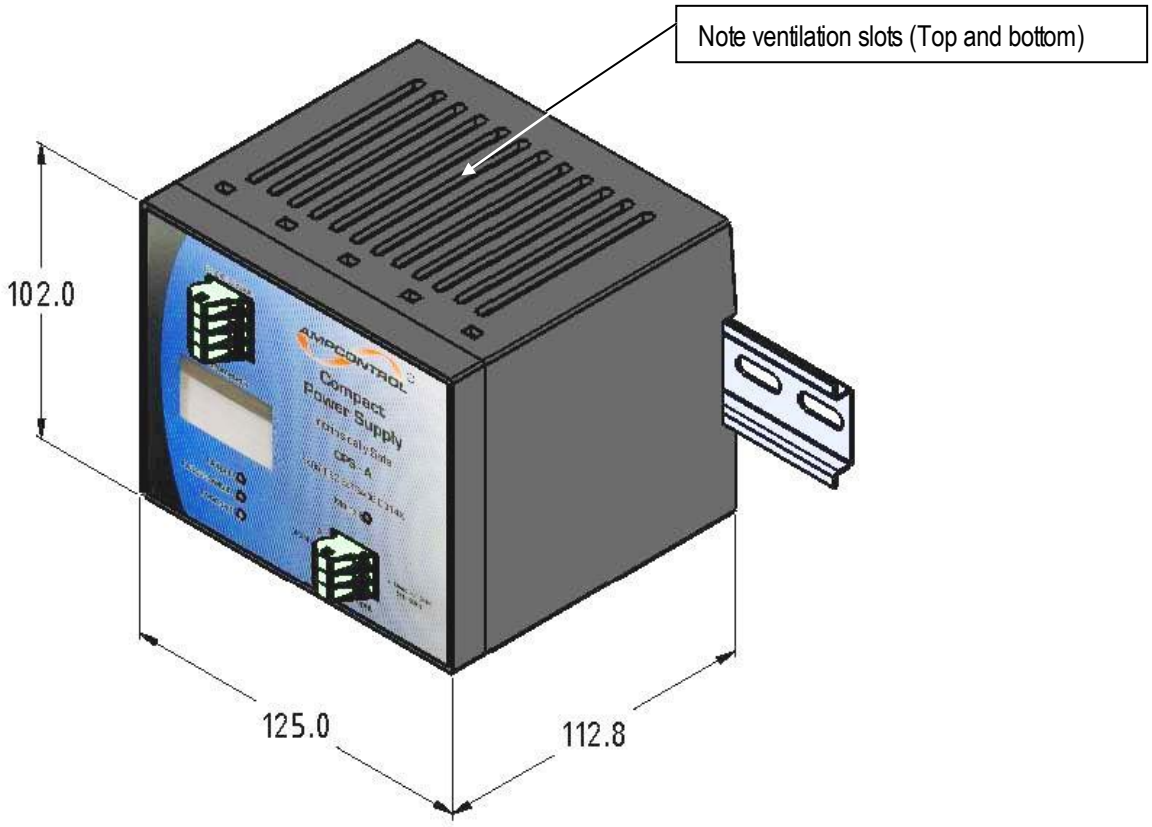

Illustration showing External dimensions and DIN Rail mounting

5 Operation

WARNING! 	**The CPS-A has no user serviceable parts. All repairs must be carried out by Ampcontrol personnel only. If a fault develops return the CPS-A to Ampcontrol for repair. It is essential that no attempt be made to repair the CPS-A as any attempt to dismantle or repair the CPS-A can seriously compromise the safety of the unit and the consequence can be fatal.**

The power supply is of an active type and exhibits very low output impedance. The output voltage is reduced by only 0.3V at full load. Precise active current limiting provides maximum available current up to the Io parameter. The power supply output acts as a current limited voltage source. The load impedance can vary down to short circuit while the maximum output current is maintained. The red overload LED on the facia lights up when operating in current limit.

The OUTPUT LED is driven directly by the output voltage. If the Power Supply is in current limit mode the OUTPUT LED reduces in intensity with the lower output voltage. The OUTPUT SWITCH LED confirms that the internal control circuit is healthy and the output is active. The OUTPUT SWITCH LED turns off when mains power is removed or if a fault occurs.

CAUTION! 	**If mains power is healthy but the OUTPUT SWITCH indicator is OFF, this indicates a fault has developed. Return the power supply to Ampcontrol for repair.**

6 Warnings for the Use of the CPS-A

WARNING! 	**This equipment is not designed to receive standard single-phase 220-250Vac from normal power supply so there is a need to be careful about its use. To allow for full serviceable life of the product & not to void the warranty, be sure to comply with the following:**

1. The input Voltage Range must be correct and connected to the designated input terminals
2. The load must be connected to the designated output DC terminals.
3. Do not allow any ingress of any form of foreign objects into the equipment.
4. Do not allow any alteration to this product that might violate the Intrinsic Safety as the consequences could be fatal. No alteration shall be made without written permission from Ampcontrol Pty Ltd.
5. Do not allow the equipment to operate beyond the specification. This will compromise the service life & result in premature failure.

7 Product List

There are five models of CPS-A power supply each with a unique rating to facilitate a specific load requirement. These are listed below:

1. 121307 CPS-A – 15.1V/0.469A Output
2. 141207 CPS-A – 15.1V/0.51A Output
3. 121152 CPS-A – 15.1V/1.5A Output
4. 121155 CPS-A – 12.6V/2.0A Output
5. 121149 CPS-A – 12.6V/2.4A Output

See Table 3.2, Specification for output parameters.

8 Approval Documents

Guidance on the use of the IECEx Internet based "On-Line" Certificate of Conformity System (taken from IECExOD 011-1).

The nature of the IECEx CoC (Certificate of Conformity) "On-Line" System is that once an ExCB (Certification Body) issues an IECEx CoC or an IECEx Conformity Mark License, the website version acts as the original document and is controlled via strict password protocols. While industry and the public may view and print a copy of the CoC or License from the website, they cannot alter the version that sits on the Website.

When printing a CoC all page margins must be set to minimum to ensure that the CoC is printed correctly.

The IECEx CoC "On-Line" System Website is located on the IEC Server which is backed up by the IEC Central Office, in accordance with hteir internal procedures, in the same manner as those for the backing up of all IEC Central Office information, including IEC Standards.

The IECEx Equipment CoC Number assigned to each CoC comprises the following:

IECEx YYY ZZ.0000

Where:

IECEx = Identifies that the CoC has been issued in accordance with the IECEx Rules and Procedures.

YYY = The ExCB code.

ZZ = The last two digits of the year of issue.

0000 = The consecutive number of CoC for that year.

IECEx CoC System URL http://www.iecex.com/certificates.

Follow the links for Certified Equipment to locate the CoC Number: **IECEx TSA 06.0014X.**

A copy is included hereafter for reference.

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 TSA 06.0014X**	Issue No.: **0**
Status:	**Current**	
Date of Issue:	**2006-05-22**	Page **1** of **4**

Applicant:
Ampcontrol CSM Pty Ltd
250 Macquarie Road
Warners Bay NSW 2282
Australia

Electrical Apparatus: **Intrinsically Safe Power Supply**
Optional accessory:

Type of Protection: **[Ex ia]**

Marking:
Ampcontrol
Compact Power Supply
CPS-A
[Ex ia] I
IECEx TSA 06.0014X
Ampcontrol CSM (separate label)
S/N .....

Approved for issue on behalf of the IECEx Certification Body: Ujen Singh

Position: Quality and Certification Manager

Signature:
(for printed version)

Date:

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:

TestSafe Australia
919 Londonderry Road
Londonderry NSW 2753
Australia

IECEx Certificate of Conformity

Certificate No.: **IECEx TSA 06.0014X**

Date of Issue: **2006-05-22** Issue No.: **0**

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Manufacturer: **Ampcontrol CSM Pty Ltd**
250 Macquarie Road
Warners Bay NSW 2282
Australia

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 manufacture'rs 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 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-11 : 1999 Edition: 4	Electrical apparatus for explosive gas atmospheres - Part 11: 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:

AU/TSA/ExTR06.0021/00

Quality Assessment Report:

AU/TSA/QAR06.0007/00

IECEx Certificate of Conformity

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Schedule

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

The Intrinsically Safe Power Supply CPS-A is designed for use in underground coalmines. It is supplied from 110 V ac and provides an intrinsically safe output.

The enclosure is polycarbonate and has a dimension of 125 x 105 x 120 mm.

The power supply consists of two circuit boards. The input board contains switch mode power supplies, while the output board contains over voltage and over current protection circuits.

Depending on the selection of fuse rating for the main power supply output, transformer T1, and values of resistances R5, R12, R28, R29 and R62 the power supply may be configured to provide 12 V and 15 V output. The models are distinguished by the output voltage and current marking.

CONDITIONS OF CERTIFICATION: YES as shown below:

1. It is a condition of manufacture that each infallible transformer shall be subjected to the tests of Clause 11.2 of IEC 60079.11 Standard for Routine Tests.
2. It is a condition of safe use that the following parameters shall be taken into account during installation:

Maximum supply voltage U_m	132 V a.c.					
Output models	12 V / 2.4 A		12 V / 2 A	15 V / 1.5 A	15 V / 0.5 A	15 V / 0.47 A
Maximum output voltage U_o	12.6 V		12.6 V	15.1 V	15.1 V	15.1 V
Maximum output current I_o	2.4 A		2 A	1.5 A	0.51 A	0.469 A
Maximum external capacitance C_o	10 uF	20 uF	20 uF	1 uF	2 uF	2 uF
Maximum external inductance L_o	74 uH	40 uH	95 uH	190 uH	450 uH	450 uH
Maximum external inductance and resistance ratio L_o/R_o	30 uH/Ohm	8 uH/Ohm	40 uH/Ohm	30 uH/Ohm	65 uH/Ohm	70 uH/Ohm

IECEx Certificate of Conformity

Certificate No.: **IECEx TSA 06.0014X**

Date of Issue: **2006-05-22** Issue No.: **0**

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Additional information:

The following documents were assessed in the course of preparing this certificate. The documents listed give a full and correct specification of the safety aspects of the electrical equipment.

Document No.	Document Title	Issue	Date
ISP1-Z-001	IS Power Supply - Input board	4	2005/06/30
ISP1-Z-002	IS Power Supply - Output Board	4	2005/06/30
ISP1-Z-003	IS Power Supply - Output Board	3	2005/06/30
ISP1-Z-004 3 sheets	(PCB Artwork Input Board)	1	2005/06/30
ISP1-Z-005 6 sheets	(PCB Artwork Output Board)	1	2005/06/30
ISP1-Z-006	ISP1 IS Power Supply Enclosure Assembly	0	2005/02/15
ISP1-Z-007	ISP1 Main Transformer Construction – 12V	1	2005/07/19
ISP1-Z-008	ISP1 Main Transformer Construction – 15V	1	2005/08/31
ISP1-Z-010	ISP1 Auxiliary Transformer Construction	1	2005/07/19
ISP1-Z-011	ISP1 DC-Inductor Construction	1	2005/08/29
ISP1-Z-012	ISP1 Marking (Labels)	2	2006/03/01