ISR-A

Intrinsically Safe Relay

User Manual

Version: 4, JULY 2024

Designed and manufactured in Australia by Ampcontrol Pty Ltd

AMPCONTROL®

WARNING!

The **warning** symbol highlights a potential risk of **injury or death**.

Please share these warnings with other operators.

CAUTION!

The **caution** symbol highlights a potential risk of **damage to equipment**.

Please share these cautions with other operators.

NOTE

The **note** symbol highlights **key information**.

Please share these notes with other operators.

ENVIRO

The **enviro** (environmental) symbol highlights areas which may have an impact on the surrounding **fauna and/or flora**.

Copyright Notice

Disclaimer

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Before You Begin

Thank you for purchasing the Ampcontrol I.S. Relay.

WARNING!

In the interests of **safety and correct equipment operation**, please take the time to read and understand the content in this manual.

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1 SAFETY AND OTHER WARNINGS

For safety reasons, the I.S. Relay must be installed, operated and serviced only by competent personnel. Please read and understand this instruction manual completely before installing, operating or servicing this equipment. Failure to install or operate this instrument in accordance with the instructions contained in this manual may create hazardous operating conditions.

1.1 Safe Use of Equipment

The equipment supplied has been designed and manufactured to ensure safe operation. The equipment must only be used within the design parameters.

The instructions within this manual must be observed as an aid towards achieving the safest possible installation.

Persons responsible for installation, maintenance, or operation, must observe the following instructions:

1.1.1 Changes to Equipment

Changes in the design and modifications to the equipment are not permitted. Unauthorised changes made to the hardware will void the manufacturer's warranty, and may compromise the integrity of the system into which it is installed and other connected equipment.

1.1.2 Equipment Knowledge

Experience with, or understanding of, this equipment is essential for the safe installation and removal of the equipment. Therefore, please read and understand this manual prior to use. Competency based training courses are recommended and are available on request.

1.1.3 Manual Handling

Precautions have been taken to ensure all equipment is safe to handle and free from sharp edges. However care should always be taken when handling enclosures and gloves should be worn.

1.1.4 Installation

Correct operation and safety depend on the I.S. Relay and associated equipment being installed correctly. Mechanical and or electrical installation and maintenance of plant and equipment must only be carried out by appropriately qualified personnel and must be tested thoroughly prior to operation.

1.1.5 Operation

As safety depends on the I.S. Relay functioning correctly it is highly recommended that all safety functions of the I.S. Relay be periodically tested to ensure correct operation.

2 RECEIVING AND STORAGE

2.1 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 loading. If there is evidence of physical damage, notify Ampcontrol immediately.

Notify Ampcontrol immediately in the case of any discrepancies to the packing list. Keep a record of any 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, retain and store any approval documentation for your safety file as applicable prior to wrapping being discarded.

2.2 Inspection

Equipment that is found to be damaged or has been modified away from its published specification must not be used. Please contact Ampcontrol if the equipment is suspected to be different than that ordered or if it does not match the published specifications.

2.3 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 between 0-40 ˚C, preferably on shelves and protected from moisture and sunlight.

2.4 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**.

ENVIRO

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.

3 INTRINSICALLY SAFE RELAY OVERVIEW

Ampcontrol's I.S. Relay (ISRA) is designed for use in Intrinsically Safe switching and indication applications. The Relay provides two Intrinsically Safe relay outputs with normally open and normally closed outputs. These outputs may pass into hazardous area through appropriately rated glands.

Three variants of the I.S. Relay are available. These support 12 VDC, 24 VDC and 110 VAC supplies. The input terminals of the 12 VDC version are certified intrinsically safe.

The ISR-A must be installed in an enclosure rated no less than IP54 as per IEC60529.

Key Features

- Intrinsically Safe [Ex ia Ma] I
- Designed and tested to AS/NZS 60079.11
- 2 relay outputs
- Standard DIN rail mounting
- Compact design

CAUTION!

Modules used in non-I.S. systems shall not be reused in I.S. systems (as the integrity of internal components upon which intrinsic safety depends may have been compromised).

WARNING!

I.S. parameters must be observed. Refer to the Conditions of Certification Section for more information.

Figure 1: ISR-A Models

4 INSTALLATION

4.1 General Warnings

These instructions have been designed to assist users of the I.S. Relay with installation.

Before the I.S. Relay can be installed, there are a number of things that need to be considered and understood to prevent incorrect or unsafe operation of the I.S. Relay or the system into which it is installed.

Along with relevant competence, and an understanding of the target application, the following points should be considered:

4.1.1 Ensure that the information provided in this user manual is fully understood.

It is extremely important that the limitations and functionality of the I.S. Relay are understood to prevent incorrect installation and use from creating a potentially dangerous risk. If in doubt as to the nature of the limitations or their implication, consult a competent authority such as a supervisor or Ampcontrol technical representative.

4.1.2 Ensure that the application into which the I.S. Relay is being installed has been properly defined, designed and approved.

Any system intended to mitigate the risk of injury needs to be properly designed and implemented. Such a system must be the result of structured risk analysis with the outcomes used to define the system requirements. These requirements, in turn, will guide the choice of instrumentation, logic solvers and actuators needed to implement the system. Understanding the needs of the system will ensure proper selection of equipment.

4.1.3 Ensure that the I.S. Relay will properly perform the required functions within the system design.

It is important to understand how the I.S. Relay is intended to interact with other equipment within a system. For safe and reliable use, it is crucial that neither the I.S. Relay's logical operation nor its signalling be compromised by incompatibilities with connected equipment.

4.1.4 Modifications of any form to the I.S. Relay are prohibited.

The I.S. Relay as supplied has been designed and manufactured to comply with the requirements of protection standards. If modifications of any form are made to the I.S. Relay, the equipment may no longer be fit for use. If any modifications or damage to the I.S. Relay is evident, do not use the equipment and contact Ampcontrol for advice.

4.2 Mandatory Installation Practices

The following information must be adhered to when installing the I.S. Relay. Failure to adhere to this information may give rise to unsafe operation.

Using the I.S. Relay in a manner that exceeds its electrical, functional or physical specifications, or in a way that is contrary to its operating restrictions, may create risks to personnel and/or equipment resulting in injury or death.

- The I.S. Relay must be powered within the specified voltage range
- The installation of the I.S. Relay must be carried out by suitably trained and qualified personnel
- Identification labels fixed to the I.S. Relay must not be damaged, removed or covered before, during or after installation
- The installation is to be in accordance with the relevant installation Standards/Codes of Practice.
- Modifications must not be made to any part of the I.S. Relay. As supplied, the unit is built to, and complies with the relevant standards. Modifications to its construction will render the unit non-compliant
- Complete and accurate records of the installation must be kept as part of the site installation

4.3 Conditions of Certification

The ISR-A will be manufactured in three versions: 12 VDC, 24 VDC and 110 VAC. The following information is common to all variants unless otherwise specified, in which case the information is only applicable to the referenced version.

NOTE

Refer to the IECEx website for the latest controlled documentation.

4.3.1 ISR-A Properties

a) Electrical parameters for the entity

The following parameters shall be taken into account during interconnection in a system:

Supply Terminals

Pin 1 with respect to Pins 2 and 3

ISRA-12

U_i = 16.5 VDC

Li = Negligible

Ci = Negligible

ISRA-24

Um = 132 VAC

ISRA-110

Um = 127.6 VAC

I.S. Switching Contacts

Pins 4, 5 and 6

Description	Ui	Ii	Ci	Li
Contacts 1 [1] Pins 4, 5 and 6	32.5 V	3 A	Negligible	Negligible
Contacts 2 [1] Pins 7, 8 and 9	32.5 V	3 A	Negligible	Negligible

[1]Note that I.S. Contacts 1 and I.S. Contacts 2 are separate galvanically isolated IS circuits.

Refer to Section 4.5 or APPENDIX A for electrical connection diagrams.

b) Special conditions for protection

The equipment shall be installed in an enclosure that provides a degree of protection not less than IP54 as per IEC 60529.

The equipment shall be installed in a separately certified Ex protected enclosure suitable for Group I as described by IEC 60079-0 or be installed in the non-hazardous area.

c) Conformity with 6.3.13

This module conforms with IEC 60079-11, 6.3.13 – Dielectric strength requirement

d) The environmental conditions intended for operation

Ambient temperature is within the range of -20 °C to 60 °C.

e) The application of Annex F

U_m is overvoltage category III (ISRA-110, ISRA-24)

Each I.S. circuit is overvoltage category I

4.4 Mechanical Installation Information

The ISR-A is to be installed in an enclosure rated to minimum IP54.

4.4.1 Enclosure Dimensions

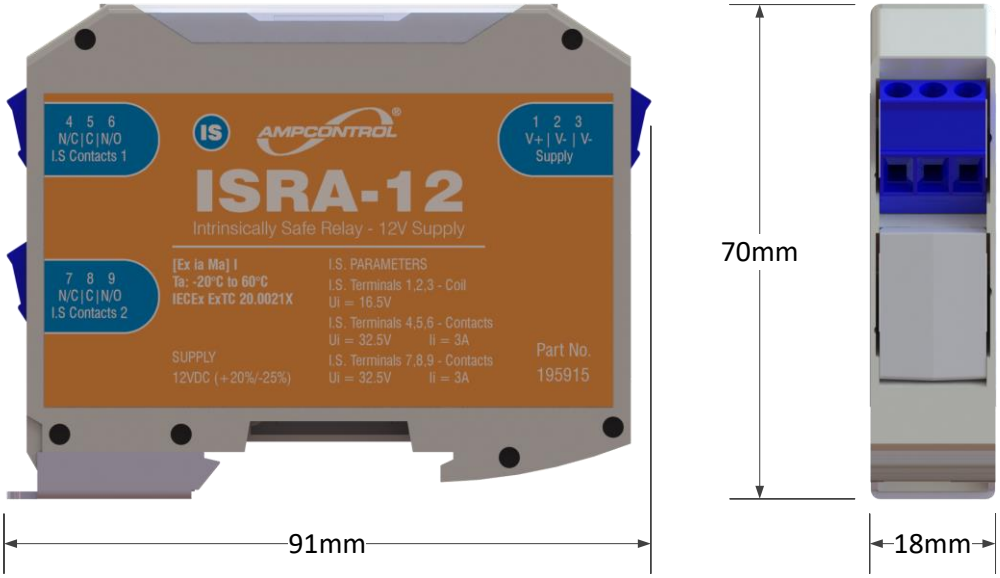

Figure 2: I.S. Relay Dimensions

NOTE

Enclosure dimensions are the same for all I.S. Relay models.

NOTE

Ensure there is adequate room around the I.S. Relay for cable termination and access to the DIN rail release tab.

4.4.2 Mounting Arrangement

The I.S. Relay is DIN rail mounted and can be mounted in any orientation; however, it should ideally be orientated as shown in the left of Figure 3. The DIN rail release tab is located on the bottom of the relay at the rear of the unit.

Figure 3: Mounting Arrangement

4.4.3 Terminal Layout

Figure 4: ISRA-12 Terminal Layout

Table 1: ISRA-12 Terminal Overview

Number	Description
4	Normally Closed
5	Common
6	Normally Open

Number	Description
1	V+
2	V-
3	V-

7	Normally Closed
8	Common
9	Normally Open

NOTE

It is not necessary to connect both V- terminals on the ISRA-12.

Figure 5: ISRA-24 Terminal Layout

Table 2: ISRA-24 Terminal Overview

Number	Description
4	Normally Closed
5	Common
6	Normally Open

Number	Description
1	V+
2	V-
3	V-

7	Normally Closed
8	Common
9	Normally Open

NOTE

It is not necessary to connect both V- terminals on the ISRA-24.

Figure 6: ISRA-110 Terminal Layout

Table 3: ISRA-110 Terminal Overview

Number	Description
4	Normally Closed
5	Common
6	Normally Open

Number	Description
1	Active
2	Neutral
3	Neutral

7	Normally Closed
8	Common
9	Normally Open

NOTE

It is not necessary to connect both Neutral terminals on the ISRA-110.

4.5 Electrical Installation Information

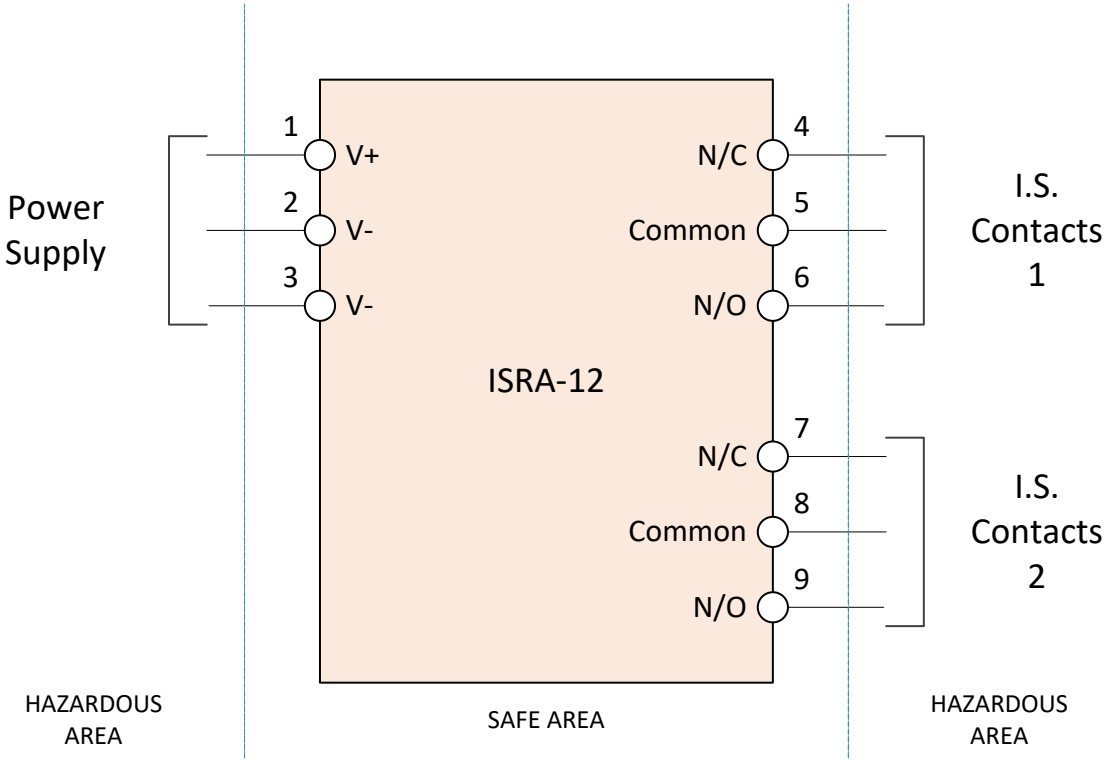

Figure 7: Electrical Connections - ISRA-12

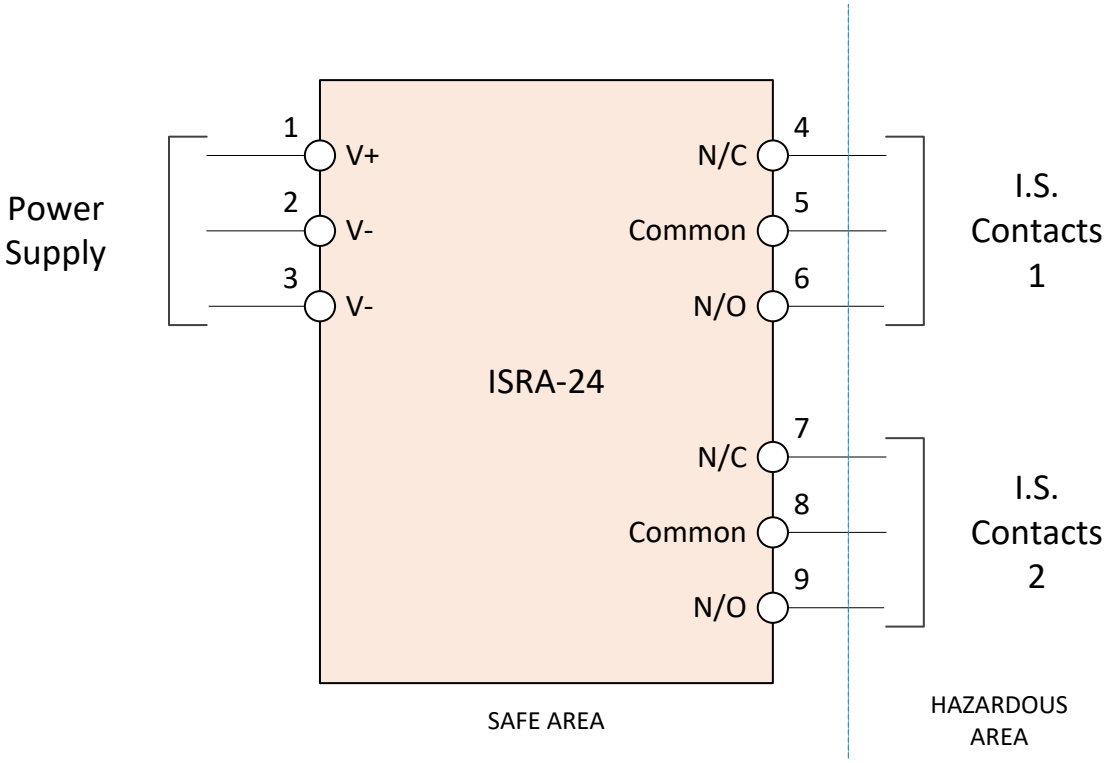

Figure 8: Electrical Connections - ISRA-24

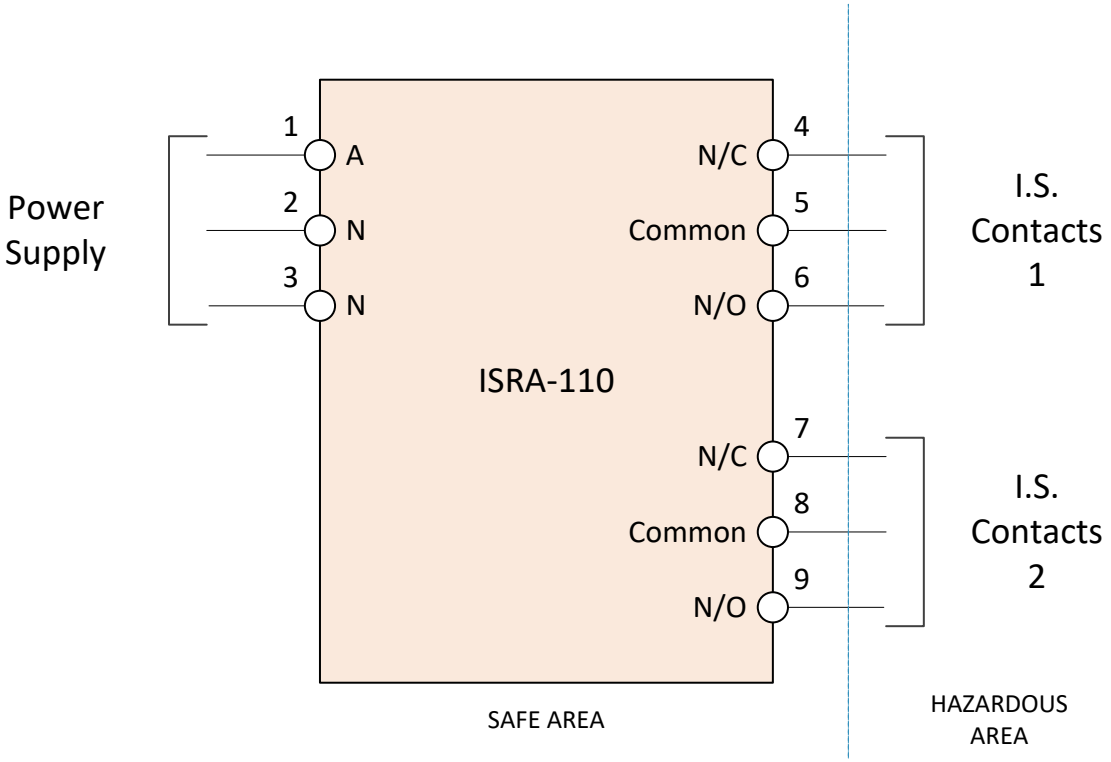

Figure 9: Electrical Connections - ISRA-110

6 SERVICE, MAINTENANCE & DISPOSAL

6.1 Equipment Service

A number of external system based checks should be completed on a regular basis. These 'routine inspections' must be carried out by suitably trained people with knowledge of the I.S. Relay and the systems into which it is fitted. Routine inspections may take the form of either visual-only checks, or visual and 'hands-on' checks.

6.1.1 Visual Only Inspections

A basic visual inspection focuses on looking at the installation for signs of physical damage, water or dust ingress and the condition of cables and labels. This type of inspection may involve opening cabinets to gain access to the I.S. Relay and other equipment. This level of inspection may also include cleaning display windows that have become obscured by dirt.

Observations would typically be:

- Check that equipment enclosures, cable trays, conduits, etc. are in good order with no physical damage.
- Check that sealed wall boxes are free from water and dust ingress internally. Door seals are in good condition.
- Check that connected cables are free from cuts, abrasions and obvious signs of damage. Cable restraints are in good order and correctly fitted.
- Check that labels on equipment, wall boxes and cables are present and in good condition (especially certification labels).
- Check that no modifications have been carried out to installed equipment.

6.1.2 Hands-On (Detailed) Inspections

A more detailed inspection would include all of the elements of a visual inspection, plus some checks that cover the integrity of connections, fixtures and fittings.

In addition to basic visual observations, more detailed integrity checks would involve:

- Verify that equipment housings, wall boxes and other mechanical fixtures are secured in place. This includes terminal box lids, tightness of cable glands, integrity of wall-box mountings, security of equipment fixing to walls/DIN rails etc
- Verify all electrical connections are secure with no loose screw terminals or DIN rail terminals not fitted to rails etc

6.2 Equipment Maintenance

WARNING!

The I.S. Relay has no user-serviceable parts.

If a fault develops, return the I.S. Relay to Ampcontrol for inspection. It is essential that **no one other than Ampcontrol attempt to repair the I.S. Relay** as any attempt to dismantle or repair the I.S. Relay can **seriously compromise the safety of the unit and voids product warranty**.

It is recommended that the electrical protection system incorporating the I.S. Relay be subject to regular functional tests at intervals determined by risk assessment or FMEA.

6.3 Disposal

ENVIRO

The electronic equipment discussed in this manual **must not be treated as general waste**. By ensuring that this product is disposed of correctly you will be helping to prevent potentially negative consequences for the environment which could otherwise be caused by incorrect waste handling of this product.

7 SPECIFICATIONS

Certification / Approvals			
Type	[Ex ia Ma] I		
Certificate Number	IECEx ExTC 20.0021X		
Power Supply (External)	**ISRA-12**	**ISRA-24**	**ISRA-110**
Coil Input Voltage	12 VDC	24 VDC	110 VAC
Must Operate Voltage	70 % max of rated	70 % max of rated	80 % max of rated
Must Release Voltage	15 % min of rated	15 % min of rated	30 % min of rated
Coil Side I.S. Circuit	Ui = 16.5 VDC	-	-
Maximum Value of Um	-	Um = 132 VAC	Um = 127.6 VAC
Rated Current	43.6 mA	21.8 mA	11 mA @ 50 Hz
Power Consumption	Approx. 530 mW	Approx. 530 mW	Approx. 0.9 VA
Relay Outputs			
Contact Rating	Each switching contact is a separate IS circuit with the following parameters: Ui = 32.5 VDC Ii = 3 A Ci = Negligible Li = Negligible		
Mechanical & Environmental			
IP Rating	ISR-A to be installed in an enclosure rated to not less than IP54		
Operating Temperature Range	-20 °C to 60 °C		
Dimensions	91 x 18 x 70 mm (H x W x D) (Refer to dimensional drawings)		
Mounting	Standard 35 mm DIN rail (Top Hat Rail – EN50022)		
Terminal Wire Gauge (Max)	2.5 mm^2 (with bootlace ferrule)		
Weight	67.5 g		
Find Out More			
For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or *customerservice@ampcontrolgroup.com* or visit the Ampcontrol website: www.ampcontrolgroup.com			

8 EQUIPMENT LIST

Part Number	***Description***
195915	RELAY INTRINSICALLY SAFE 12 VOLTS DC
196258	RELAY INTRINSICALLY SAFE 24 VOLTS DC
196255	RELAY INTRINSICALLY SAFE 110 VOLTS AC

APPENDIX A

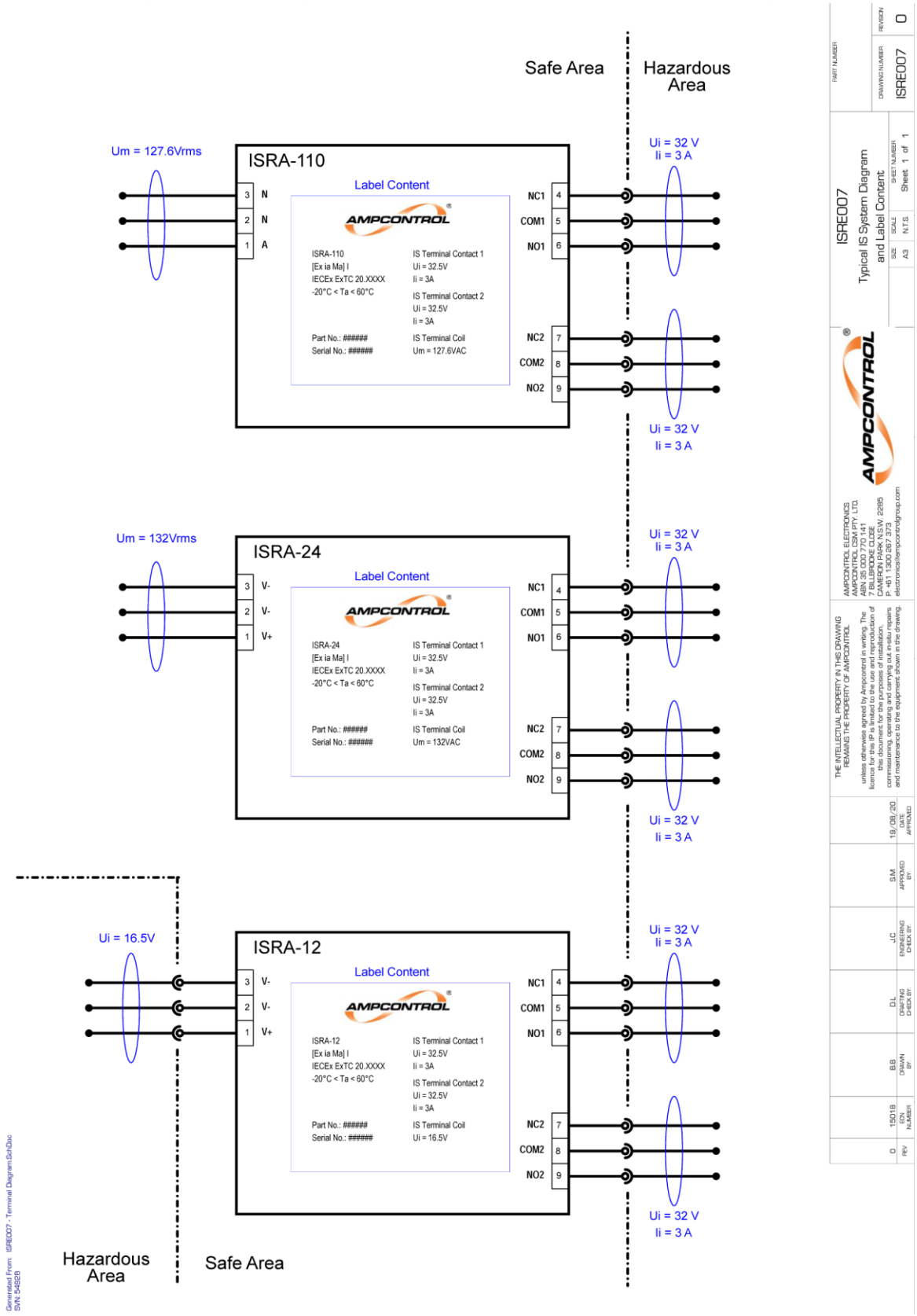

Figure 10: ISRE007 - Typical IS System Diagram and Label Content