RENISHAW
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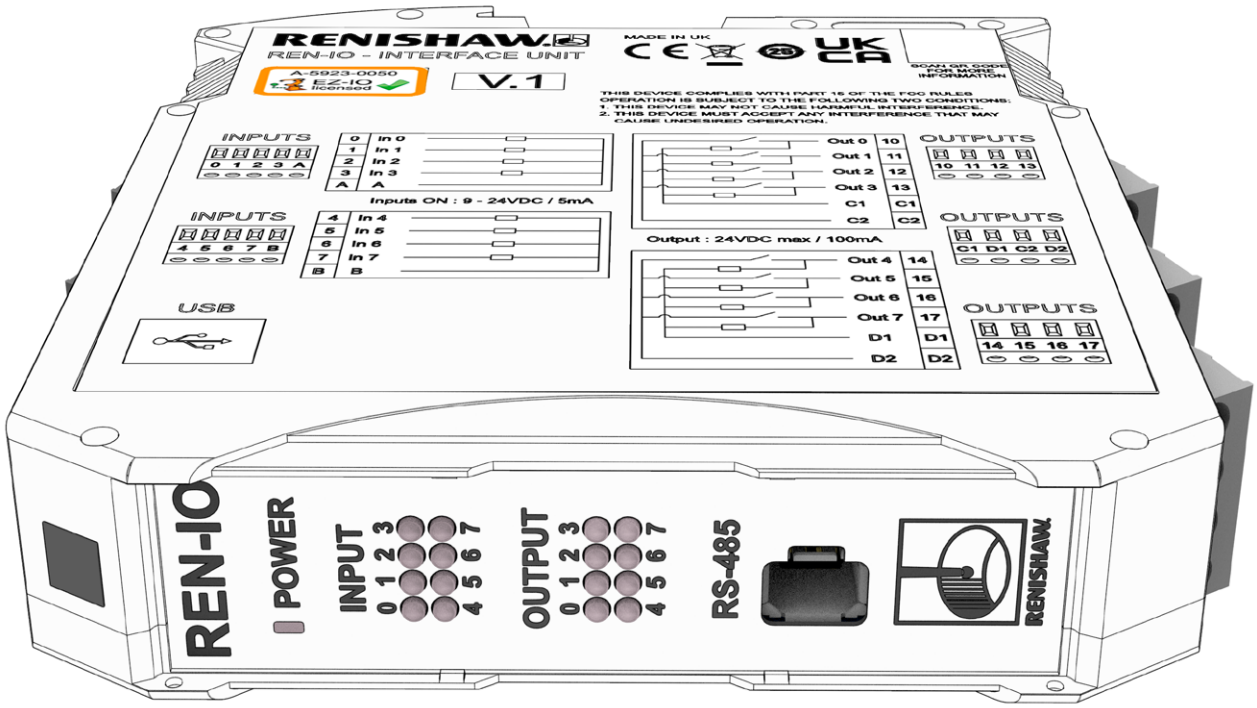
REN-IO – Interface unit



Contents

Safety information

- Essential safety measures required whilst using this equipment in an automated work cell are outlined in this section. It is the responsibility of the customer to ensure that all relevant safety precautions are in place before taking this equipment into service.
- It is the responsibility of the customer to arrange for training of the operator of a robot system to recognise and respond to known hazards associated with the automated system and to be aware of the recommended operating procedures for the particular application.
- Persons responsible for installing the system (including the measuring system, its REN-IO interface unit and any external devices wired into it) must be competent and familiar with the recommended programming procedures for the application and the robot installation. Programming and control of external equipment is entirely the responsibility of the customer. Good engineering practices and local, appropriate regulations/standards should be adhered to.

WARNING: The REN-IO interface unit (A-5923-0100, A-5923-0110) must never be used for Stop circuitry.

WARNING: The system must always be the cell slave, accepting commands from the master. Renishaw will not accept responsibility for incorrect use of the system and REN-IO interface unit.

- The REN-IO interface unit must be unpowered during installation/cabling.
- Reasonable protection must be given against ESD (ElectroStatic Discharge).
- The REN-IO interface unit is not IP rated, it is intended to be used in conjunction with an electrical cabinet. It is the customer/integrators responsibility to ensure adequate protection for the equipment to minimise practical and/or liquid ingress. Failure to do so may result in unpredictable operation or product damage.
- Ensure mating connectors are plugged into their respective sockets, to prevent damage to connected equipment.
- Before running the system in automatic mode, the ‘Send Outputs/Receive Inputs’ function in EZ-IO should be used to test individual I/O lines, preventing any wiring mistakes to cause unwanted motion.
- Electrical connections and mappings of input and output signals must be designed to ensure that no motion occurs in the event of cable damage.
- During installation and at regular intervals, visual checks of the measuring system, REN-IO interface unit, cell master and cables must be completed prior to operation.

WARNING: Outputs should be wired so that there is no external/system motion in the open state. Inputs should be wired so that there is no system motion in the undriven state.

- Renishaw recommends that the REN-IO is located outside of the cell or in a safe zone.

- If the system is running in automatic mode, all interlocks must be activated before the Initialise button is selected.
- Use interlocks on all entry points to prevent operation of hazardous equipment, whilst operator may be present in the cell.
- System test runs should be carried out with both the system and the master running at reduced speed. On the Equator gauging system, this is achieved using the speed override function on the MCUlite-2 joystick.
- Ensure that all personnel are clear of the area before running the system.

Regulatory information

Disclaimer

RENISHAW HAS MADE CONSIDERABLE EFFORTS TO ENSURE THE CONTENT OF THIS DOCUMENT IS CORRECT AT THE DATE OF PUBLICATION BUT MAKES NO WARRANTIES OR REPRESENTATIONS REGARDING THE CONTENT. RENISHAW EXCLUDES LIABILITY, HOWSOEVER ARISING, FOR ANY INACCURACIES IN THIS DOCUMENT.

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All other brand names and product names used in this document are trade names, trade marks, or registered trade marks of their respective owners.

Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier.

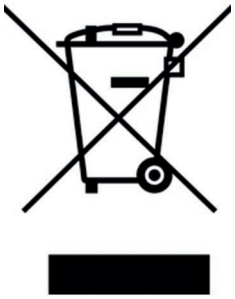
Unless otherwise specifically agreed in writing between you and Renishaw, if you purchased the equipment from a Renishaw company the warranty provisions contained in Renishaw's CONDITIONS OF SALE apply. You should consult these conditions in order to find out the details of your warranty but in summary the main exclusions from the warranty are if the equipment has been:

- neglected, mishandled or inappropriately used; or
- modified or altered in any way except with the prior written agreement of Renishaw.

If you purchased the equipment from any other supplier, you should contact them to find out what repairs are covered by their warranty.

Disposal of waste electrical and electronic equipment

The use of this symbol on Renishaw products and/or accompanying documentation indicates that the product should not be mixed with general household waste upon disposal. It is the responsibility of the end user to dispose of this product at a designated collection point for waste electrical and electronic equipment (WEEE) to enable reuse or recycling. Correct disposal of this product will help to save valuable resources and prevent potential negative effects on the environment. For more information, please contact your local waste disposal service or Renishaw distributor.



Declaration of Conformity

Renishaw plc hereby declares that the REN-IO interface unit is in compliance with the essential requirements and other relevant provisions of:

- the applicable EU directives
- the relevant statutory instruments under UK law

The full text of the declaration of conformity is available at:
www.renishaw.com/equatorproductguides

REACH regulation

Information required by Article 33(1) of Regulation (EC) No. 1907/2006 ("REACH") relating to products containing substances of very high concern (SVHCs) is available at: www.renishaw.com/REACH

China RoHS

For more information on China RoHS, visit: www.renishaw.com/ChinaRoHSGAUGING

FCC

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information Unique Identifier:(REN-IO interface unit)

Responsible Party – U.S. Contact Information Renishaw Inc.

1001 Wesemann Drive
West Dundee
Illinois
IL 60118
United States
Telephone number: +1 847 286 9953

Email: usa@renishaw.com

47 CFR Section 15.19

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and

2. This device must accept any interference received, including interference that may cause undesired operation.

47 CFR Section 15.21

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc or authorised representative could void the user's authority to operate the equipment.

47 CFR Section 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme ICES-001 du Canada.

Introduction

The automation kit consists of REN-IO interface units and the EZ-IO software which runs on the system Controller.

The kit is designed to provide an interface between the system and external equipment e.g. PLC's (Programmable Logic Controllers), machine tools, robots, loading systems, etc.

The flexibility of a digital I/O connection allows the system to be commissioned on a variety of different types of automated work-cells. Common applications include part loading and unloading performed by a robot.

In these applications, a pneumatic or electrically driven fixture is often used to ensure that the part being loaded is placed in the correct position and orientation in order to achieve highly repeatable measurements. Once the part has been measured, the EZ-IO software signals whether the part is inside or outside the specified tolerances. Based on this information, the robot can take different actions.

If required, a PLC may be programmed to handle manual selection of operations. In this case, a button console would be used to send signals to the system to start the measurement cycle. As an alternative, a button console could be connected to the system to control component loading/unloading.

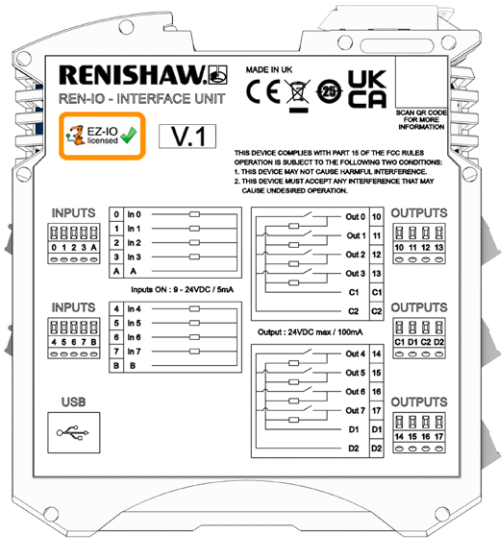
EZ-IO's built in custom signal facility allows for customisation of digital I/O to allow inputs and outputs to be directly controlled from the DMIS program. This could be for switching outputs such as status lights, audible alarms etc. or inputs such as start buttons or to other devices such as PLCs or Machine Tool Controllers.

Input and output signals interpreted by MODUS only, are not subject to the same signal checks that are within EZ-IO.

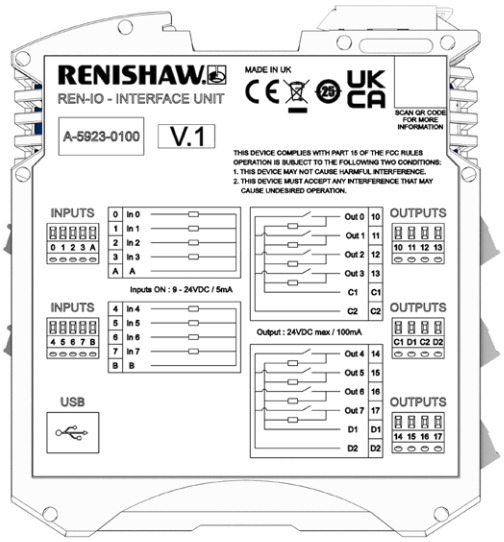
REN-IO Interface unit

- The hardware consists of the REN-IO interface unit (A-5923-0110, A-5923-0100).
- A-5923-0110 is EZ-IO licensed and A-5923-0100 is unlicensed. The secondary, unlicensed unit is used to extend the number of lines available.
- Each REN-IO interface unit must be connected to an individual USB port on the system controller.

A-5923-0110 (EZ-IO licensed)



A-5923-0100 (Unlicensed)



- A 5 m USB type A to USB type B cable is supplied to connect the REN-IO interface unit to the controller. Maximum length of the USB cable, as defined by the USB 2.0 specification, is 5 m.

NOTE: Power supplied by USB 2.0 (5 V, 500 mA). Only to be connected via USB to the controller.

NOTE: It is strongly advised that USB signal repeaters are avoided, as they can suffer from interference.

CAUTION: The REN-IO – Interface unit requires one of the following versions of the Equator Software Suite:

Equator Software Suite version 1.5.6 with 1.5.6.3 patch applied
Equator Software Suite version 1.5.7 or later

NOTE: For Equator Software Suite versions pre 1.5.6, please contact your local Renishaw representative

Specifications

Physical specifications	
Dimensions (W×D×H)	25 mm × 105 mm × 115 mm (1 in × 4 in × 4.5 in)
Mounting	DIN rail
Termination type	Terminal block
Wire size IO cable	Output: 12AWG max. 30AWG min Input: 14AWG max. 30AWG min
Max length IO cable	3 m (9.8 ft)
Controller connection*	USB 2.0 (5 V, 500 mA)
Max length USB cable	5 m (16.4 ft)
Number of inputs	8
Number of outputs	8
Input ON Voltage	9-24 V

* The REN-IO – Interface unit is not currently compatible with Equator Controller version 05 or older.

NOTE: Inputs should be wired so that there is no machine motion in an undriven state.

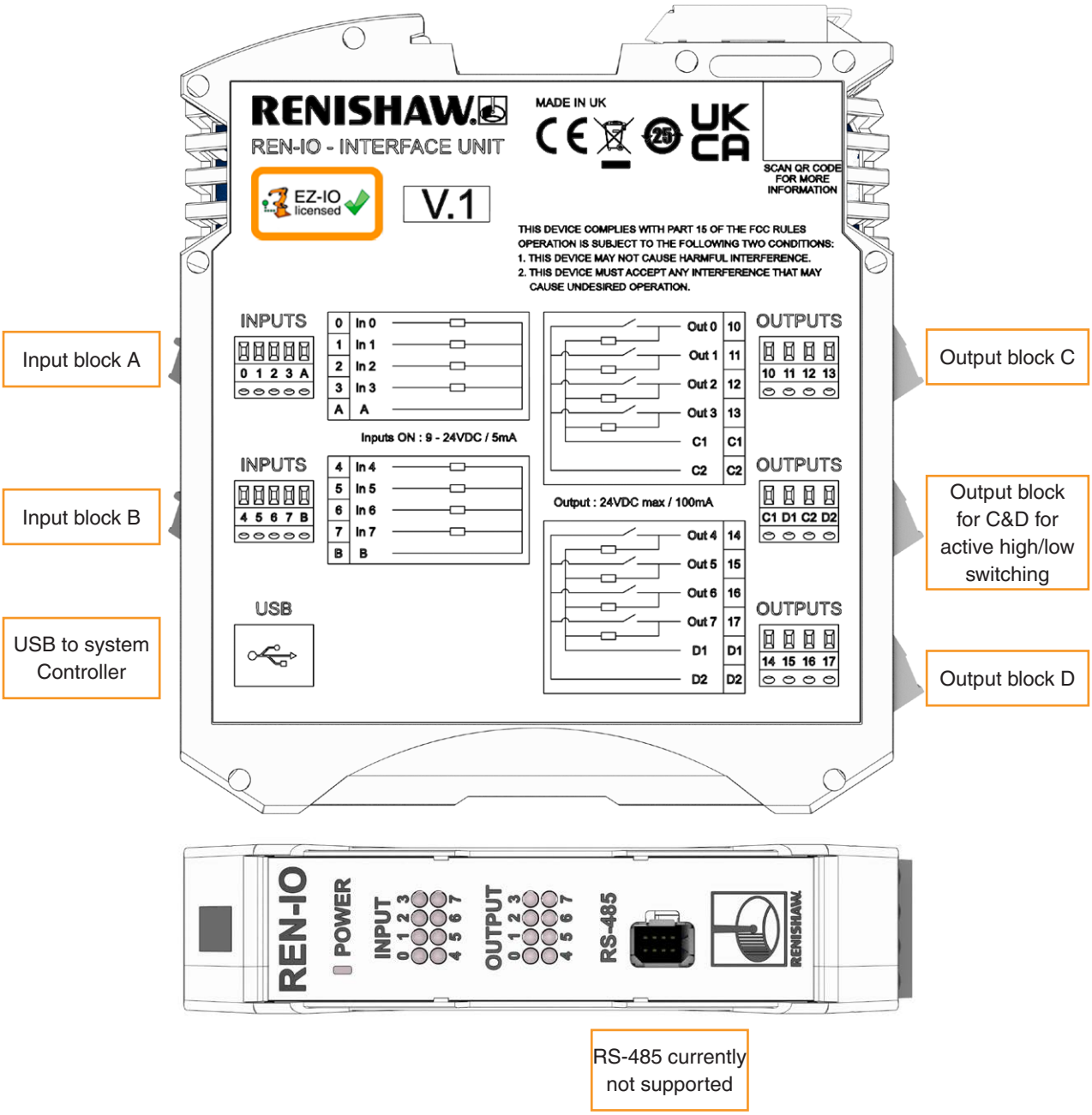
NOTE: Outputs should be wired so that there is no external/system motion in the 'OFF' state.

Environmental specifications	
Operating temperature	+5 °C to +50 °C
Storage temperature	-25 °C to +70 °C
Relative humidity (operating)	Maximum 90 %RH at 50 °C, non-condensing

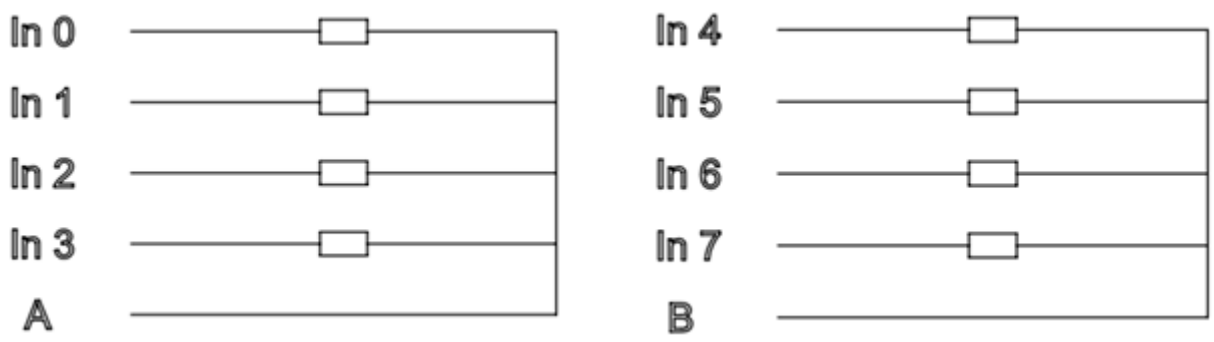
Inputs	
LED colour	**State**
Green	Input ON
No light	Input OFF

Outputs	
LED colour	**State**
Green	Output ON
No light	Output OFF

Connections configuration



Inputs

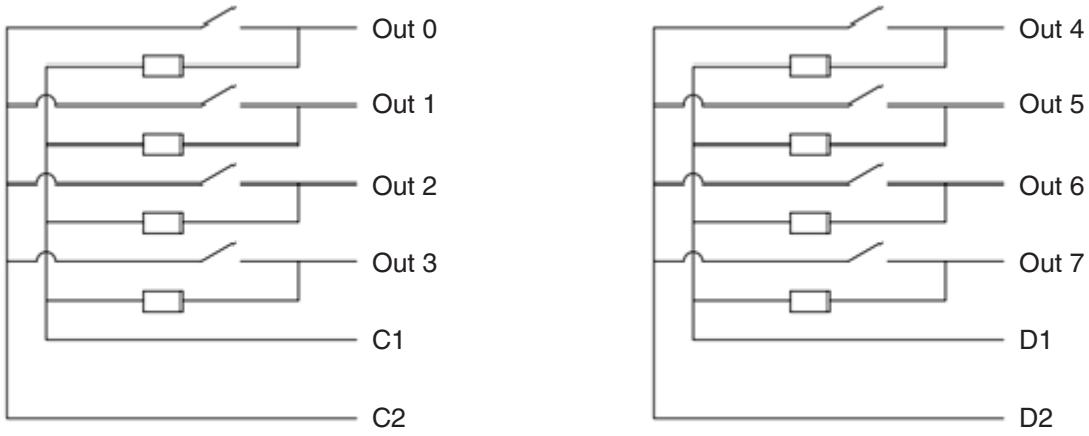


Inputs				
	Active low switching		Active high switching	
A/B	+ V (>9 V)		0 V	
Input	0 V	+ V (>9 V)	0 V	+ V (>9 V)
Input state	ON	OFF	OFF	ON

- The switching polarity can be configured as active low or active high, see table above for an example.
- In the ‘OFF’ state the input LED is off.
- In the ‘ON’ state the output LED is on.
- Connections A and B are electrically isolated from one another so the two input blocks can be configured in opposite configurations if desired.

Inputs	
A/B to IN voltage to activate	>9 V
Maximum current to activate	5 mA
A/B to IN voltage to deactivate	<6.5 V
Absolute maximum voltage	30 V

Outputs



Outputs				
	Active low switching		Active high switching	
Output state	ON	OFF	OFF	ON
C2/D2	0 V		+ V (>9 V)	
C1/D1	+ V (>9 V)		0 V	
Output X voltage	0V	+ V (>9 V)	0V	+ V (>9 V)

- Outputs are normally open.
- The switching polarity can be configured as active low or active high by wiring the C1/D1 and C2/D2 pins appropriately, see above for an example.
- In the ‘OFF’ state the output LED is off and Out X is pulled to the voltage on the C1 or D1 pin via a 10kΩ resistor.
- In the ‘ON’ state the output LED is on and Out X is connected to the voltage on the C2 or D2 pin.
- Connections C1 & D1 and C2 & D2 are electrically isolated from one another so the two output blocks can be configured in opposite configurations if desired.
- For single common applications or to replace existing EQ-IO installations like-for-like, bridge connections C1 & D1 and C2 & D2 and wire the output connections as before.

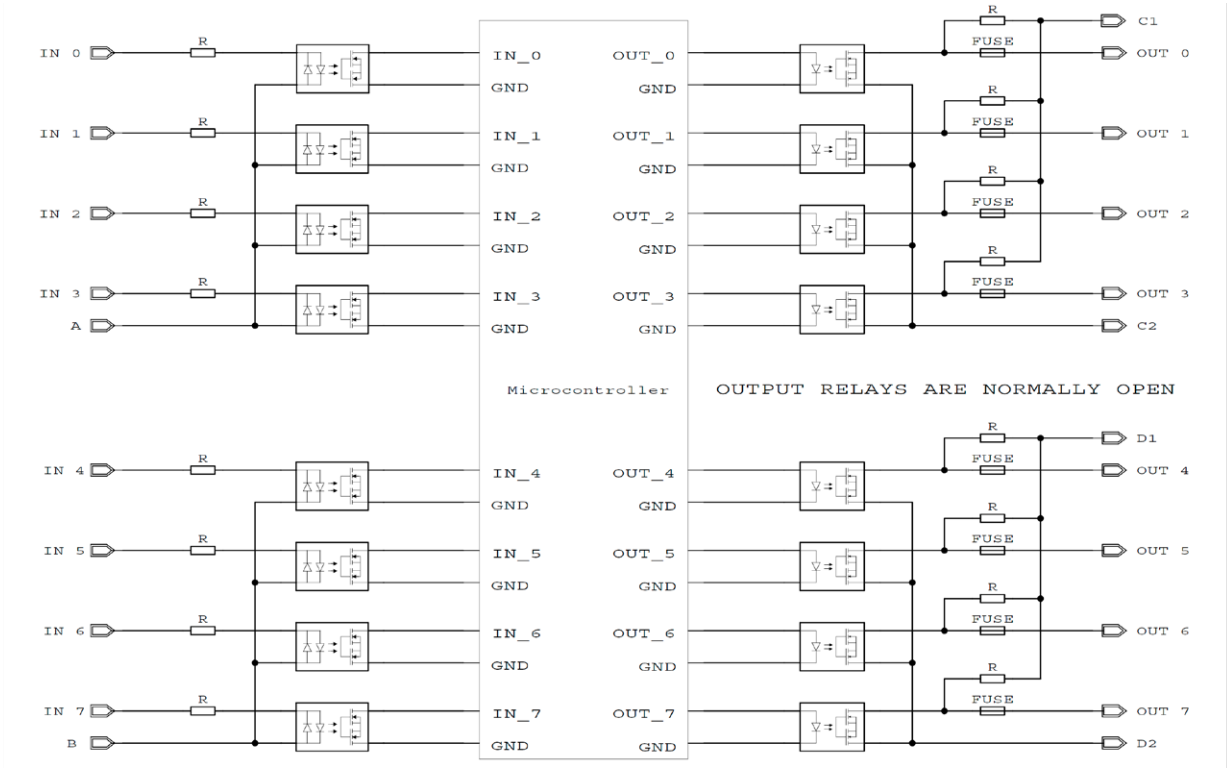
Outputs	
Absolute maximum voltage	30 V
Maximum current (20 °C)	100 mA
C1/D1 to OUT x resistor value	10k Ω (+/- 1 %)

Internal circuit diagram

- The drawings below show the internal circuits of the input and output stages.

NOTE: The output stage is fitted with 100 mA self-resettable fuse. In the event of a fault, remove power, correct problem and then reconnect. The fuse requires a couple of minutes to cool down before it resets.

Relays are normally open.



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