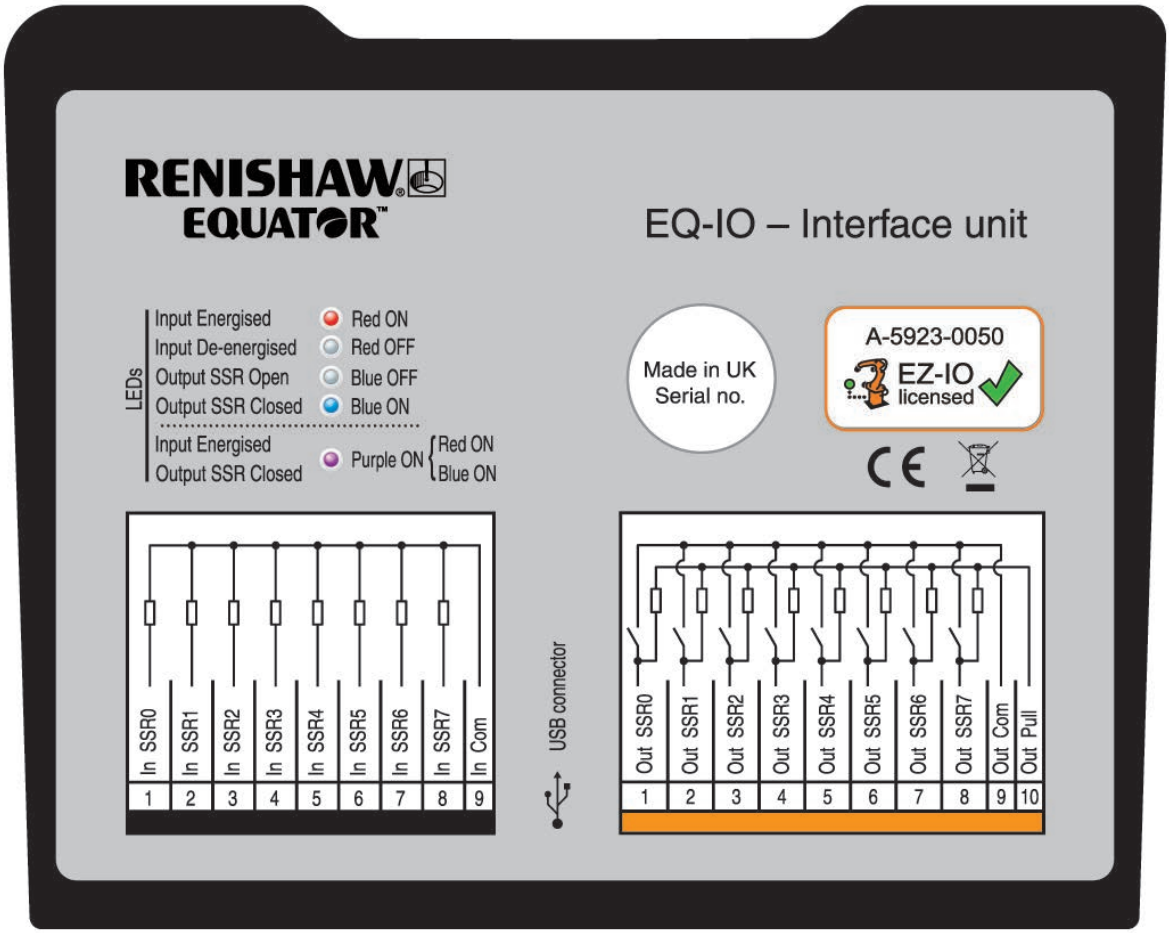
RENISHAW
apply innovation™

EQ-IO – Interface unit



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Safety information

- Essential safety measures required whilst using Equator 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 Equator, its EQ-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 EQ-IO interface unit (A-5923-0100, A-5923-0110) must never be used for Stop circuitry.

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

- The EQ-IO interface unit must be unpowered during installation/cabling.
- Reasonable protection must be given against ESD (ElectroStatic Discharge).
- 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 Equator, EQ-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 Equator motion in the undriven state.

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.

Trade marks

RENISHAW and the probe symbol used in the RENISHAW logo are registered trade marks of Renishaw plc in the United Kingdom and other countries. apply innovation and names and designations of other Renishaw products and technologies are trade marks of Renishaw plc or its subsidiaries.

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.

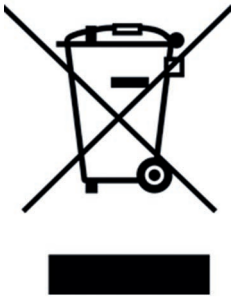
Unless otherwise specifically agreed in writing between you and Renishaw, if you purchased the equipment from a Renishaw company the warranty provisions contained in Renishaw's CONDITIONS OF SALE apply. You should consult these conditions in order to find out the details of your warranty but in summary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



EU declaration of conformity

Renishaw plc hereby declares that the, EQ-IO Equator Interface Unit is in compliance with the essential requirements and other relevant provisions of the applicable EU directives.

Contact Renishaw plc or visit www.renishaw.com/equatorproductguides for the full EU declaration of conformity.

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

The United States of America (USA)

Information to user (FCC 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 installation 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 you will be required to correct the interference at your expense.

Information to user (FCC 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.

Introduction

The Equator™ automation kit consists of EQ-IO interface units and the EZ-IO software which runs on the Equator Controller.

The kit is designed to provide an interface between the Equator 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 Equator 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.

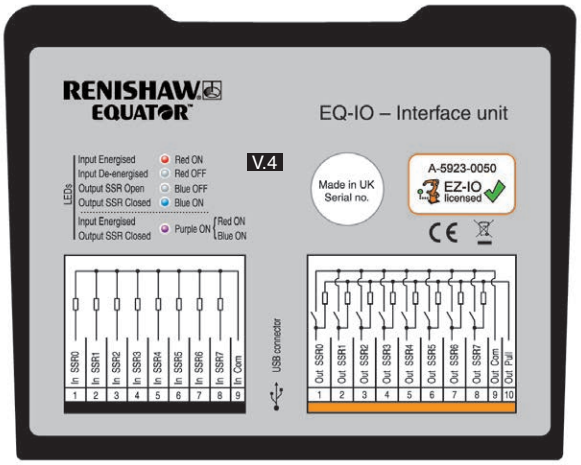
If required, a PLC may be programmed to handle manual selection of operations. In this case, a button console would be used to send signals to the Equator to start the measurement cycle. As an alternative, a button console could be connected to the Equator to control component loading/unloading.

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.

EQ-IO Interface Unit

- The hardware consists of the EQ-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, see detailed information in the 'Using two EQ-IO interface units' section.



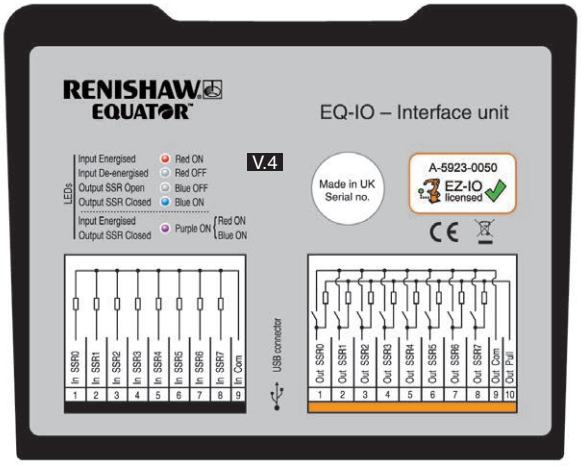
- A 3 m USB type A to USB type B cable is supplied to connect the EQ-IO interface unit to the Equator Controller. Maximum length of the USB cable, as defined by the USB 2.0 specification, is 5 m.

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

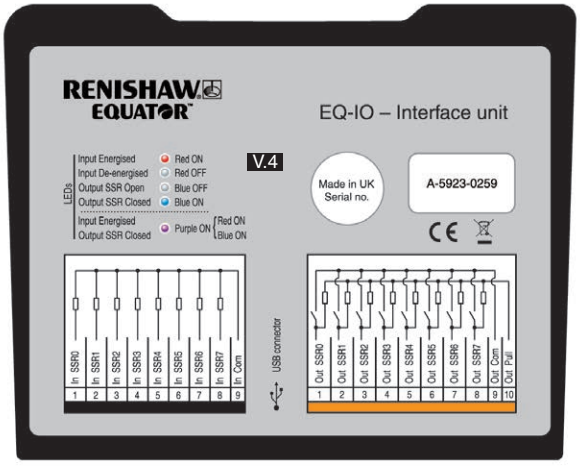
CAUTION: The EQ-IO – Interface unit requires one of the following versions of the Equator Software Suite:
Equator Software Suite version 1.5.6 with 1.5.6.3 patch applied
Equator Software Suite version 1.5.7 or later

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

A-5923-0110 (EZ-IO licensed)



A-5923-0100 (Unlicensed)



Specifications

Operating parameters

Absolute Maximum Ratings	Min	Max	Unit
Input Control Voltage	8	26	V
Output Current (20 °C)		100	mA

Physical characteristics	
Dimensions (W × D × H)	134 mm × 107.6 mm × 34.6 mm (5.28 in × 4.24 in × 1.36 in)
Mounting	DIN rail
Termination type	Terminal block
Wire size	Output connector: 12AWG max. 30AWG min Input connector: 14AWG max. 30AWG min
Controller connection	USB 2.0
Max length cable (USB)	5 m (16.4 ft)
Number of inputs	8
Number of outputs	8
Voltage on state input	9-24 v
Number of input grounds	2
Number of output grounds	2

Environment 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

LED colour - Inputs	State
Green	Input on
No light	Input off

LED colour - Inputs	State
Green	Output connected to OUTCOM
No light	Output pulled to OUTPULL via 10k resistor

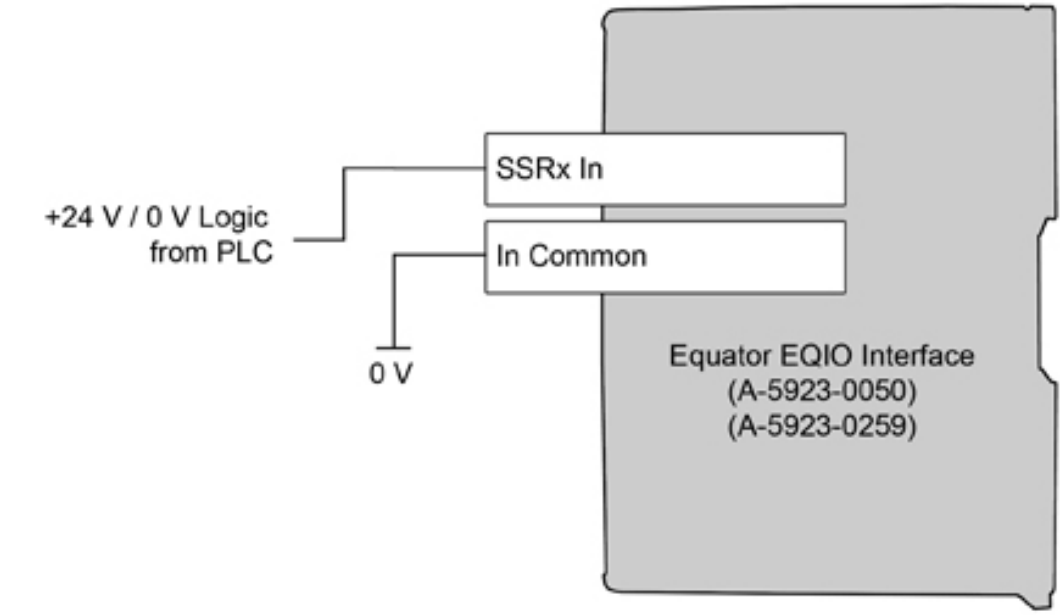
Input stage

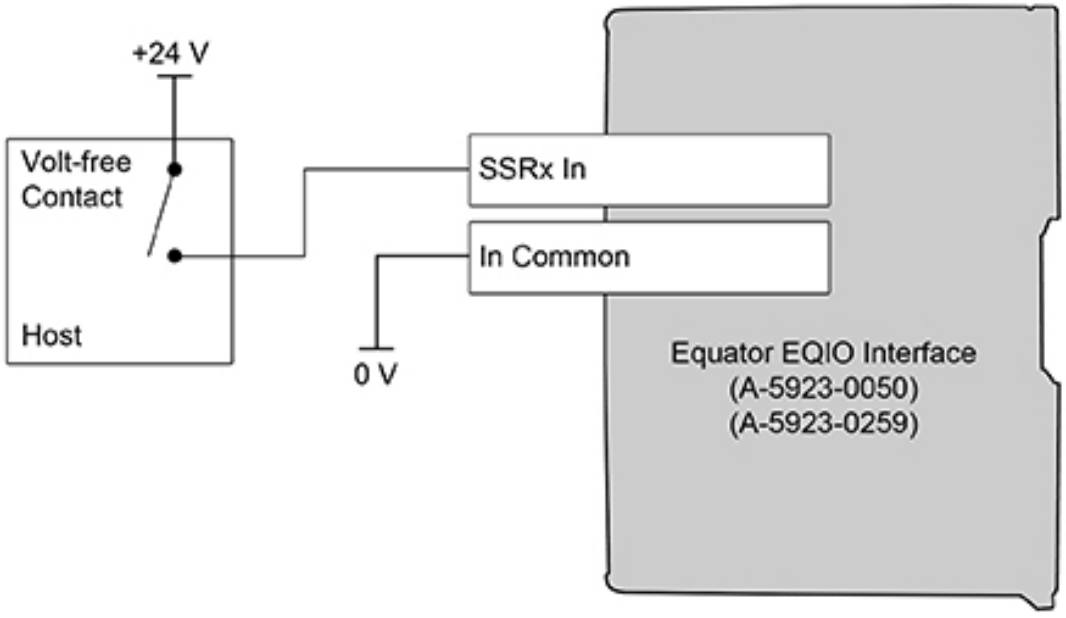
- The EQ-IO input stage accepts 8-24 V logic signals, typically from a PLC or other control logic.

Input Characteristics	Min	Typical	Max	Unit
Input absolute maximum voltage (after which damage will occur)	-	-	30	V
Input voltage to activate	8	-	9	V
Input voltage to deactivate	-	-	6	V
Input current	-	-	10	mA

- If a 24 V output stage is used by the host, the 0 V (ground) signals should be wired directly to the host interface as shown.

- If a relay, switch, or other volt-free contact is used by the host, it will be necessary to wire the input as shown.





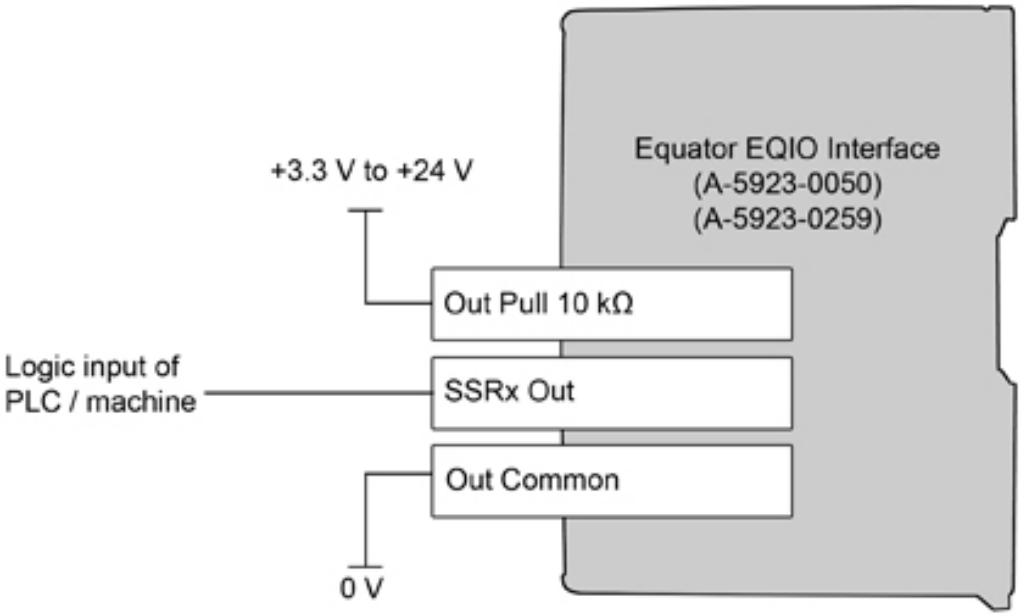
Output stage

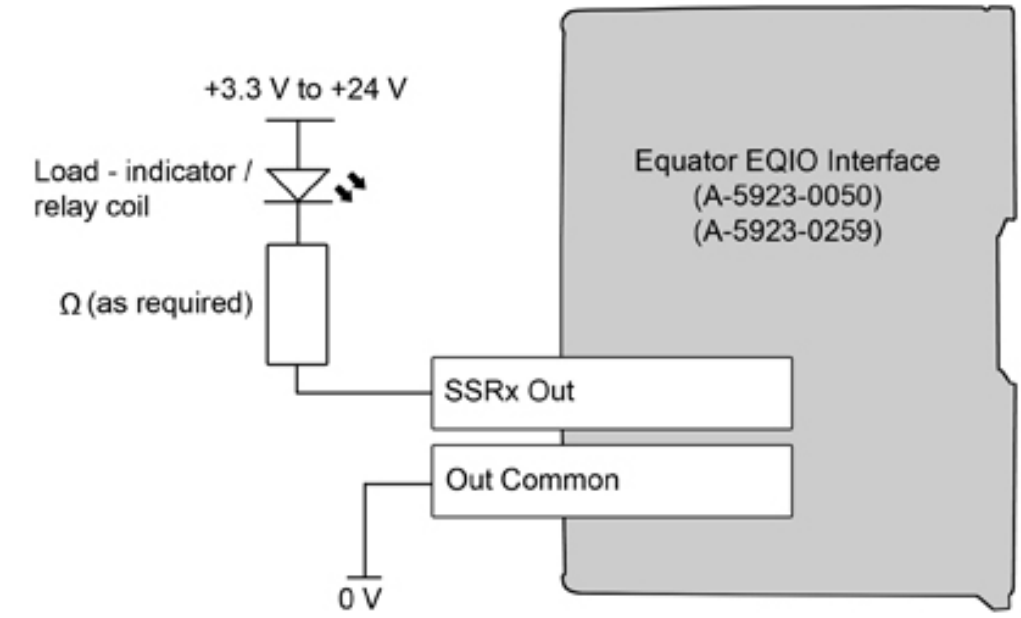
- The EQ-IO output stage has volt-free, relay style, normally open contacts with internal pull-up resistors connected to the OUTPULL pin.

Output Characteristics	Min	Typical	Max	Unit
Output absolute maximum voltage (after which damage will occur)	-	-	30	V
Maximum output current	-	-	100	mA
Internal pull resistor between OUTx and OUTPULL	-	-	10	kOhms
OUTPULL voltage*	-	-	100	mA

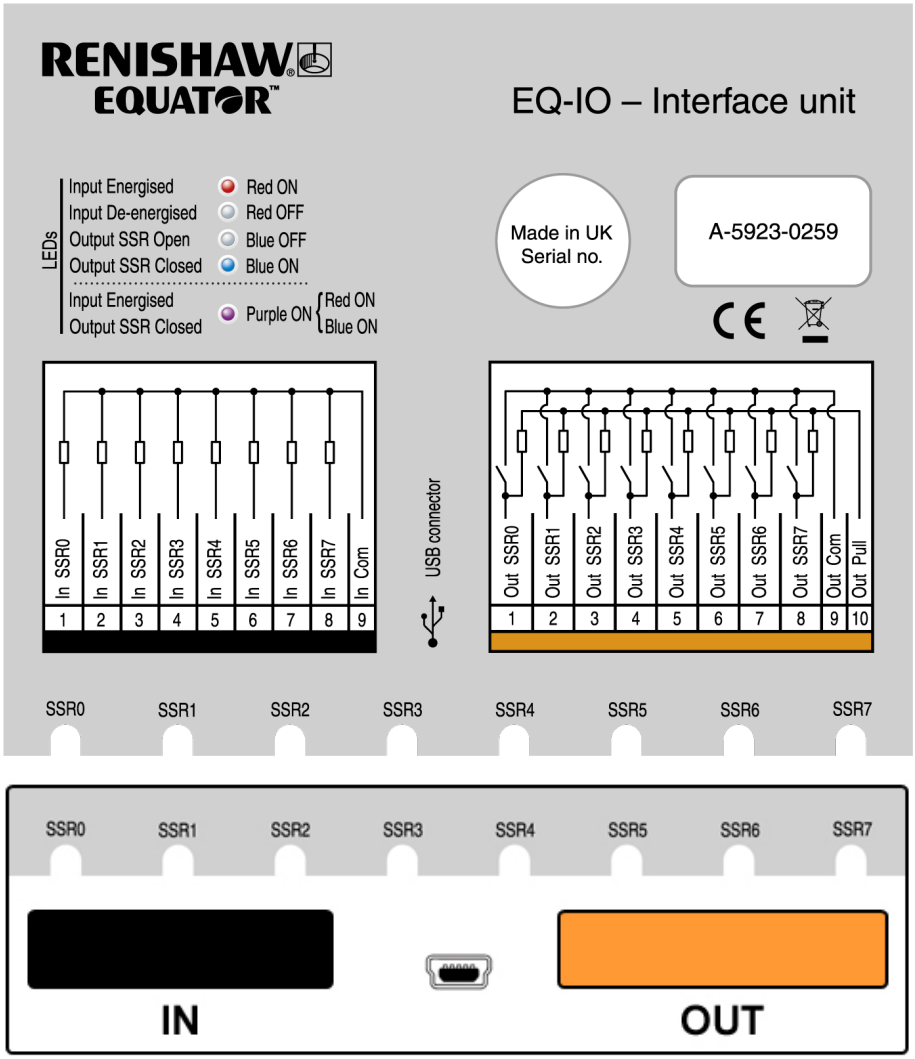
*Measured to OUTCOM.

- If a +3.3 V to +24 V logic input stage is used by the connected PLC/machine, the 0 V (ground) and signals should be wired directly to the receiving interface as shown.
- The output stage may also be used to switch loads such as relays or LED indicators as shown.





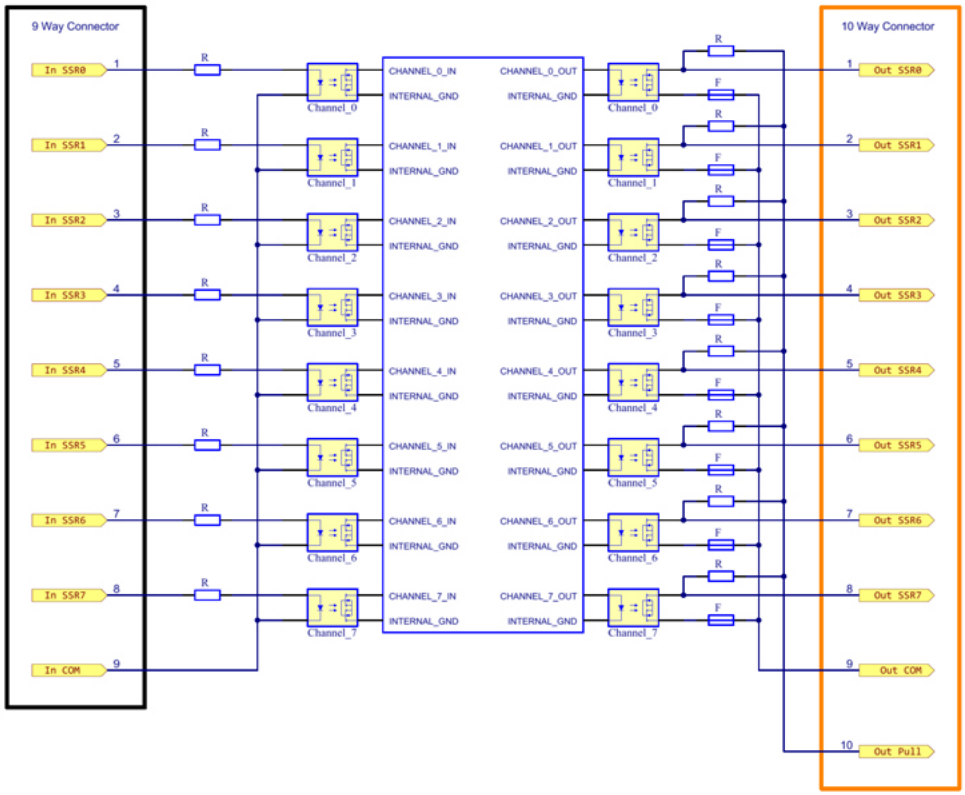
Connections configuration



Equivalent circuit

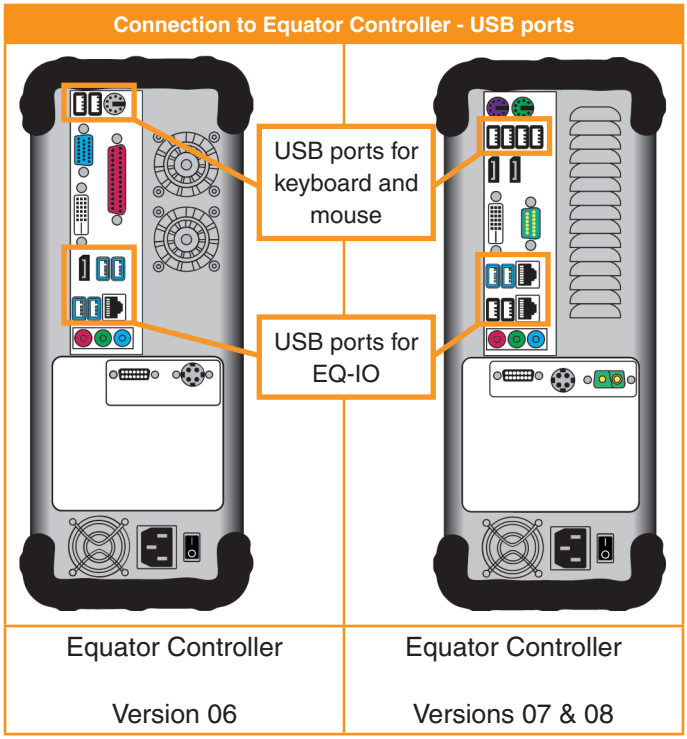
- The drawings below show the internal circuits of the input and output stages.

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.



Using two EQ-IO interface units

- A secondary, unlicensed, EQ-IO interface unit (A-5923-0100), may be used to facilitate additional lines for DMIS Part Program selection. Each EQ-IO interface unit must be connected to an individual USB port. USB ports available on the Equator Controller are shown below.



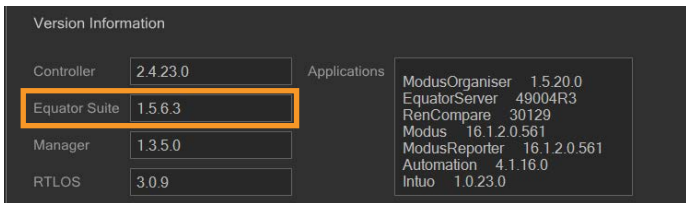
THE EQ-IO – INTERFACE UNIT (VERSION 4 OR LATER) REQUIRES ONE OF THE FOLLOWING VERSIONS OF THE EQUATOR SOFTWARE SUITE:

Equator Software Suite version 1.5.6 with 1.5.6.3 patch applied

Equator Software Suite version 1.5.7 or later

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

The Equator Software Suite version can be found in the settings screen. To open the settings screen, click on the settings button in the toolbar.



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ORIGINAL LANGUAGE
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