



# UNITRONICS EX-RC1 Remote Input or Output Adapter User Guide

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# Unitronics

UNITRONICS EX-RC1 Remote Input or Output Adapter



## EX-RC1 User Guide

The EX-RC1 is a remote I/O adapter that enables communication between Unitronics Vision OPLCs and remote I/O Expansion Modules in your system. This adapter is connected to a PLC via CANbus and can be connected to up to 8 I/O Expansion Modules. The network can include up to 60 nodes, including both PLCs and adapters, communicating via UniCAN – Unitronics' proprietary CANbus protocol.

### Component Identification

The EX-RC1 may either be snap-mounted on a DIN rail or screw-mounted onto a mounting plate. The component identification is:

1. Status indicators
2. PC to EX-RC1 connection port
3. Power supply connection points
4. EX-RC1

#### to expansion module connection port

5. CANbus port
6. DIP Switches – Network ID, CANbus

### Product Usage Instructions

- Before using the EX-RC1, it is important to read and understand the user manual and accompanying documentation. This product is intended for use by trained and competent personnel who are familiar with local and national electrical standards.
- When installing the device, it is important to ensure that it is not installed in areas with excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks, or excessive

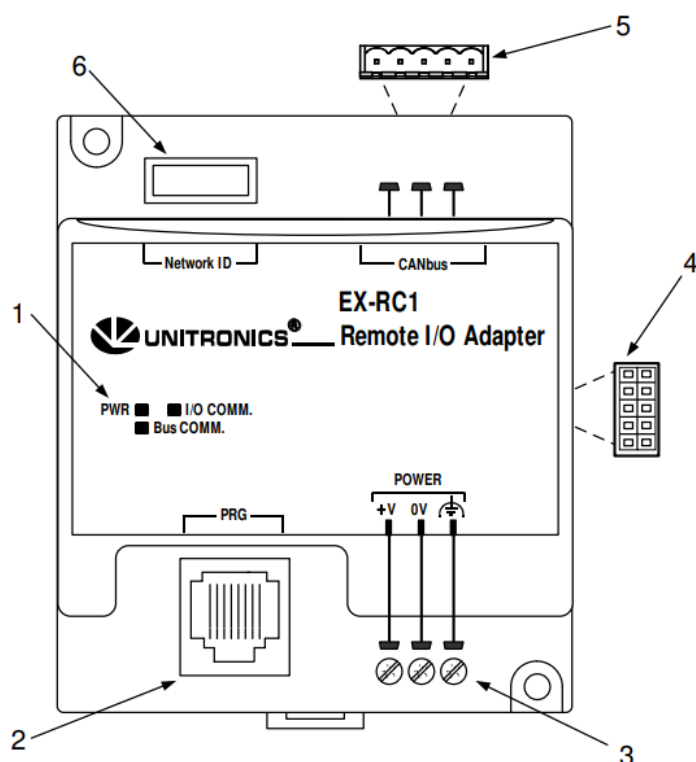
vibration. Once installed, the following guidelines should be followed:

- Check the user program before running it
- Do not attempt to use this device with parameters that exceed permissible levels
- Install an external circuit breaker and take appropriate safety measures against short-circuiting in external wiring
- To avoid damaging the system, do not connect/disconnect the device when the power is on
- The EX-RC1 is run by a factory-installed application and can auto-detect digital I/O Expansion Modules. However, if the system includes analog modules, the application must be edited. For more information, refer to the Remote I/O topics in the VisiLogic Help system.
- Overall, the EX-RC1 is an essential component for communicating between Unitronics Vision OPLCs and remote I/O Expansion Modules, and when used correctly, can help ensure the safe and efficient operation of your system

## ABOUT PRODUCT

- The EX-RC1 interfaces between Unitronics Vision OPLCs and remote I/O Expansion Modules distributed throughout your system.
- The adapter is connected to a PLC via CANbus. Each adapter may be connected to up to 8 I/O Expansion Modules. The network may comprise up to 60 nodes, including both PLCs and adapters; note that the PLC must comprise a CANbus port. Communication is via UniCAN, Unitronics' proprietary CANbus protocol.
- The EX-RC1 is run by a factory-installed application. The adapter can auto-detect digital I/O Expansion Modules. If the system includes analog modules, the application must be edited. For more information refer to the Remote I/O topics in the VisiLogic Help system.
- The EX-RC1 may either be snap-mounted on a DIN rail, or screw-mounted onto a mounting plate.

## Component identification





1	Status indicators
2	PC to EX-RC1 connection port
3	Power supply connection points
4	EX-RC1 to expansion module connection port
5	CANbus port
6	DIP Switches

- Before using this product, it is the responsibility of the user to read and understand this document and any accompanying documentation.
- All examples and diagrams shown herein are intended to aid understanding, and do not guarantee operation. Unitronics accepts no responsibility for actual use of this product based on these examples.
- Please dispose of this product in accordance with local and national standards and regulations.
- Only qualified service personnel should open this device or carry out repairs.

## User safety and equipment protection guidelines

- This document is intended to aid trained and competent personnel in the installation of this equipment as defined by the European directives for machinery, low voltage, and EMC. Only a technician or engineer trained in the local and national electrical standards should perform tasks associated with the device's electrical wiring.
- Symbols are used to highlight information relating to the user's personal safety and equipment protection throughout this document.
- When these symbols appear, the associated information must be read carefully and understood fully.

Symbol	Meaning	Description
	Danger	The identified danger causes physical and property damage.
	Warning	The identified danger can cause physical and property damage.
<i>Caution</i>	Caution	Use caution.

- Failure to comply with appropriate safety guidelines can result in severe personal injury or property damage. Always exercise proper caution when working with electrical equipment.
- Check the user program before running it.
- Do not attempt to use this device with parameters that exceed permissible levels.
- Install an external circuit breaker and take appropriate safety measures against short-circuiting in external wiring.
- To avoid damaging the system, do not connect / disconnect the device when the power is on.

## Environmental Considerations

- Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain,

excessive heat, regular impact shocks or excessive vibration.

- Leave a minimum of 10mm space for ventilation between the top and bottom edges of the device and the enclosure walls.
- Do not place in water or let water leak onto the unit.
- Do not allow debris to fall inside the unit during installation.

## UL Compliance

- The following section is relevant to Unitronics' products that are listed with the UL.
- The following models: IO-AI4-AO2, IO-AO6X, IO-ATC8, IO-DI16, IO-DI16-L, IO-DI8-RO4, IO-DI8-RO4-L, IO-DI8-TO8, IO-DI8-TO8-L, IO-RO16, IO-RO16-L, IO-RO8, IO-RO8L, IO-TO16, EX-A2X are UL listed for Hazardous Locations.
- The following models: EX-D16A3-RO8, EX-D16A3-RO8L, EX-D16A3-TO16, EX-D16A3-TO16L, IO-AI1X-AO3X, IOAI4-AO2, IO-AI4-AO2-B, IO-AI8, IO-AI8Y, IO-AO6X, IO-ATC8, IO-D16A3-RO16, IO-D16A3-RO16L, IO-D16A3-TO16, IO-D16A3-TO16L, IO-DI16, IO-DI16-L, IO-DI8-RO4, IO-DI8-RO4-L, IO-DI8-RO8, IO-DI8-RO8-L, IO-DI8-TO8, IO-DI8-TO8-L, IO-DI8ACH, IO-LC1, IO-LC3, IO-PT4, IOPT400, IO-PT4K, IO-RO16, IO-RO16-L, IO-RO8, IO-RO8L, IO-TO16, EX-A2X, EX-RC1 are UL listed for Ordinary Location.

## UL Ratings, Programmable Controllers for Use in Hazardous Locations, Class I, Division 2, Groups A, B, C and D

These Release Notes relate to all Unitronics products that bear the UL symbols used to mark products that have been approved for use in hazardous locations, Class I, Division 2, Groups A, B, C and D.

### Caution

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, or Nonhazardous locations only.
- Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.
- **WARNING—Explosion Hazard**—substitution of components may impair suitability for Class I, Division 2.
- **WARNING – EXPLOSION HAZARD** – Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- **WARNING** – Exposure to some chemicals may degrade the sealing properties of material used in Relays.
- This equipment must be installed using wiring methods as required for Class I, Division 2 as per the NEC and/or CEC.

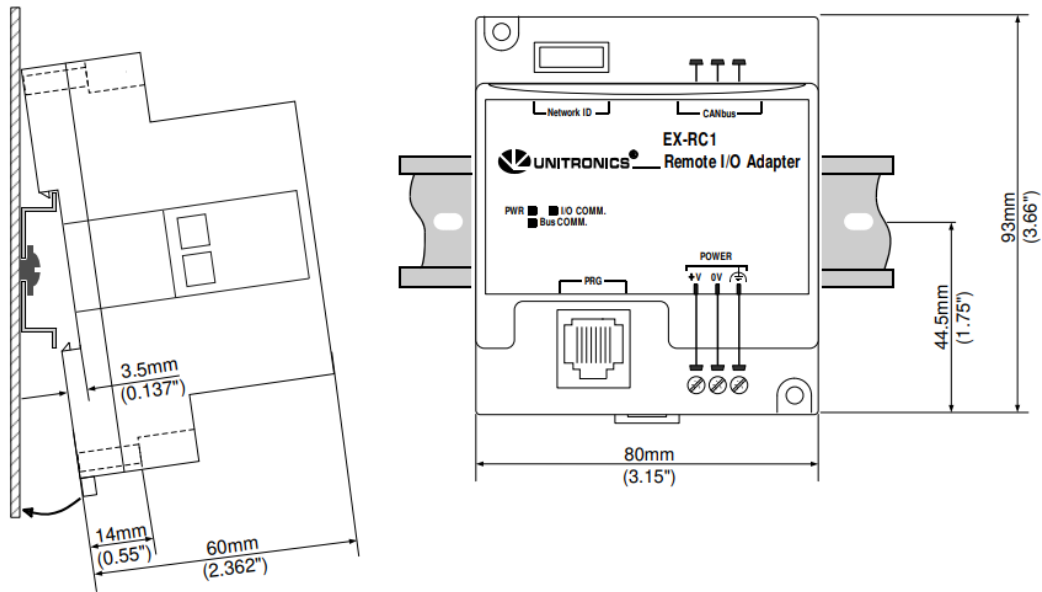
## Relay Output Resistance Ratings

- The products listed below contain relay outputs:
- Input/Output expansion modules, Models: IO-DI8-RO4, IO-DI8-RO4-L, IO-RO8, IO-RO8L
- When these specific products are used in hazardous locations, they are rated at 3A res, when these specific products are used in non-hazardous environmental conditions, they are rated at 5A res, as given in the product's specifications.

## Mounting the Module

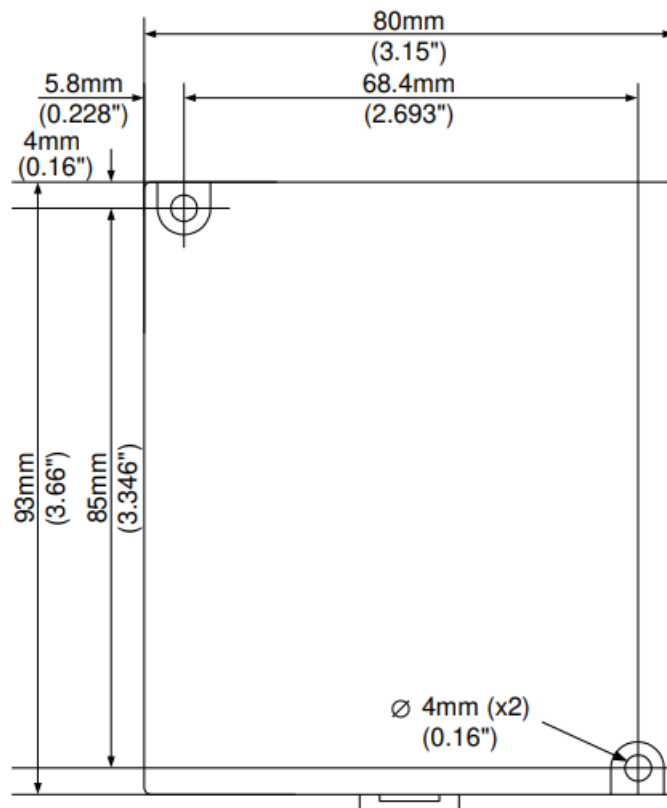
### DIN-rail mounting

Snap the device onto the DIN rail as shown below; the module will be squarely situated on the DIN rail.



### Screw-Mounting





- The figure below is not drawn to scale. It may be used as a guide for screw-mounting the module.
- Mounting screw type: either M3 or NC6-32.



### Setting the Unit ID Number

- The ID number range is from 1 to 60.

- The DIP switch settings represent the ID number as a binary value as shown in the following figures.

Unit ID	1 (Default)	2	59	60
Settings				

## Connecting Expansion Modules

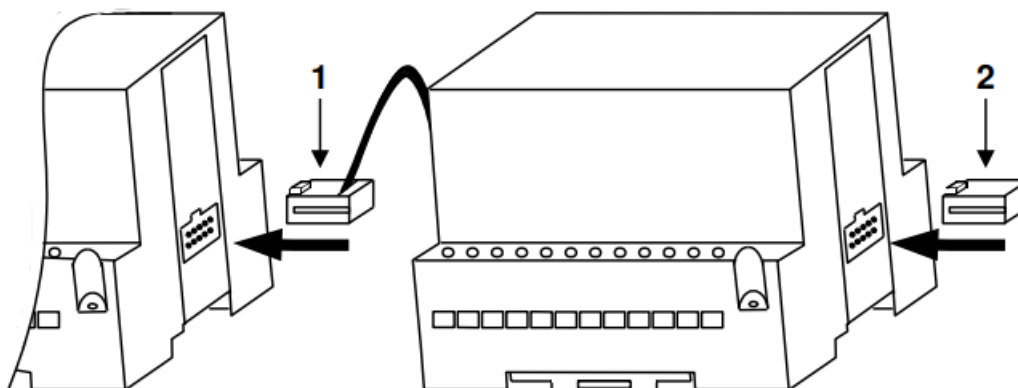
An adapter provides the interface between the OPLC and an expansion module. To connect the I/O module to the adapter or to another module:

1. Push the module-to-module connector into the port located on the right side of the device.

**Note** that there is a protective cap provided with the adapter. This cap covers the port of the final I/O module in the system.

To avoid damaging the system, do not connect or disconnect the device when the power is on.

## Component identification



1	Module-to-module connector
2	Protective cap

## Wiring

- Do not touch live wires.
- Unused pins should not be connected. Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.
- Do not connect the 'Neutral' or 'Line' signal of the 110/220VAC to the device's 0V pin.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- Double-check all the wiring before turning on the power supply.

## Wiring Procedures

- Use crimp terminals for wiring; use 26-14 AWG wire (0.13 mm<sup>2</sup>–3.31 mm<sup>2</sup>) for all wiring purposes.
  1. Strip the wire to a length of 7±0.5mm (0.250–0.208 inches).
  2. Unscrew the terminal to its widest position before inserting a wire.
  3. Insert the wire completely into the terminal to ensure that a proper connection can be made.
  4. Tighten enough to keep the wire from pulling free.
- To avoid damaging the wire, do not exceed a maximum torque of 0.5 N·m (5 kgf·cm).
- Do not use tin, solder, or any other substance on stripped wire that might cause the wire strand to break.
- Install at maximum distance from high-voltage cables and power equipment.

## Wiring Power Supply

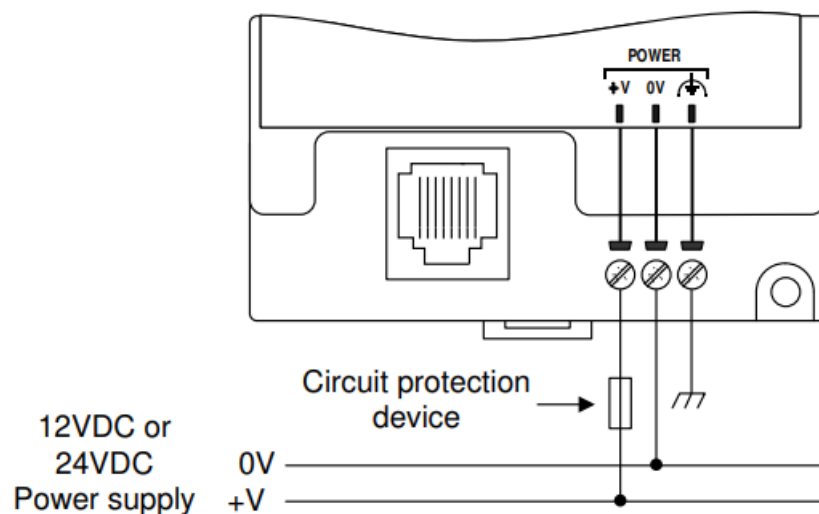
Connect the “positive” cable to the “+V” terminal, and the “negative” to the “0V” terminal.

## Earthing the Power Supply

To maximize system performance, avoid electromagnetic interference by:

- Mounting the module on a metal panel.
- Earthing the module’s power supply: connect one end of a 14 AWG wire to the chassis signal; connect the other end to the panel.

**Note:** If possible, the wire used to earth the power supply should not exceed 10 cm in length. However, it is recommended to earth the module in all cases.



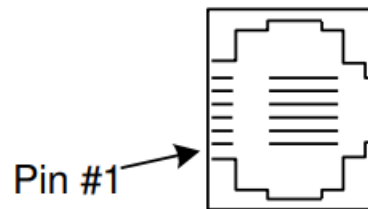
## Communication

### Connecting the EX-RC1 to a PC

Connect the PC to the adapter via the programming cable. The pinout below shows the RS232 port signals.



Pin #	Description
1	—
2	0V reference
3	TXD signal
4	RXD signal
5	0V reference
6	—

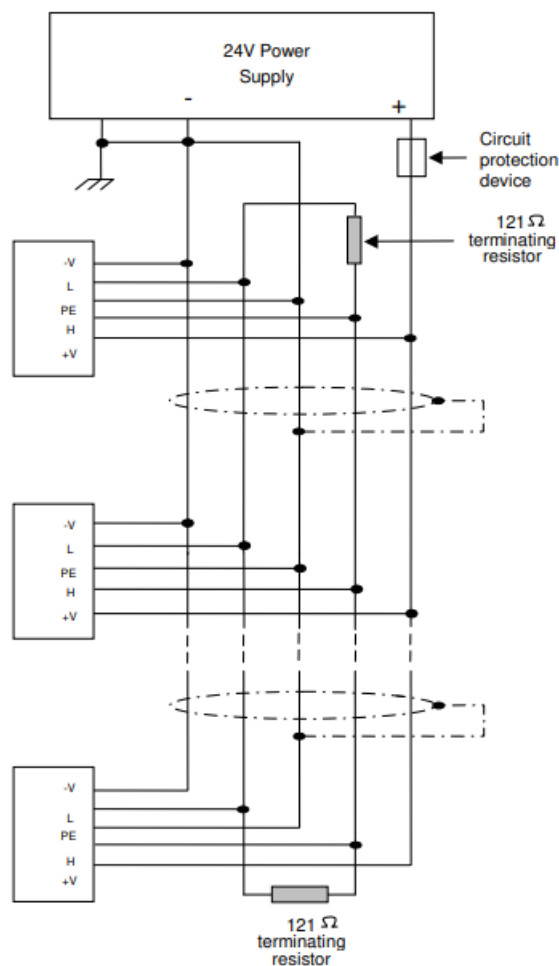


### Connecting the EX-RC1 to the CANbus network

- Connect the EX-RC1 adapter to an OPLC as shown below. The module communicates via Unitronics' proprietary UniCAN protocol. UniCAN can comprise up to 60 nodes, including PLCs and EX-RC1 remote I/O adapters.
- The CANbus port is galvanically isolated.

### CANbus Wiring

- Network terminators: Place terminators at each end of the CANbus network.
- Resistance must be set to 1%, 121Ω, 1/4W.
- Connect ground signal to the earth at only one point, near the power supply.
- The network power supply need not be at the end of the network.

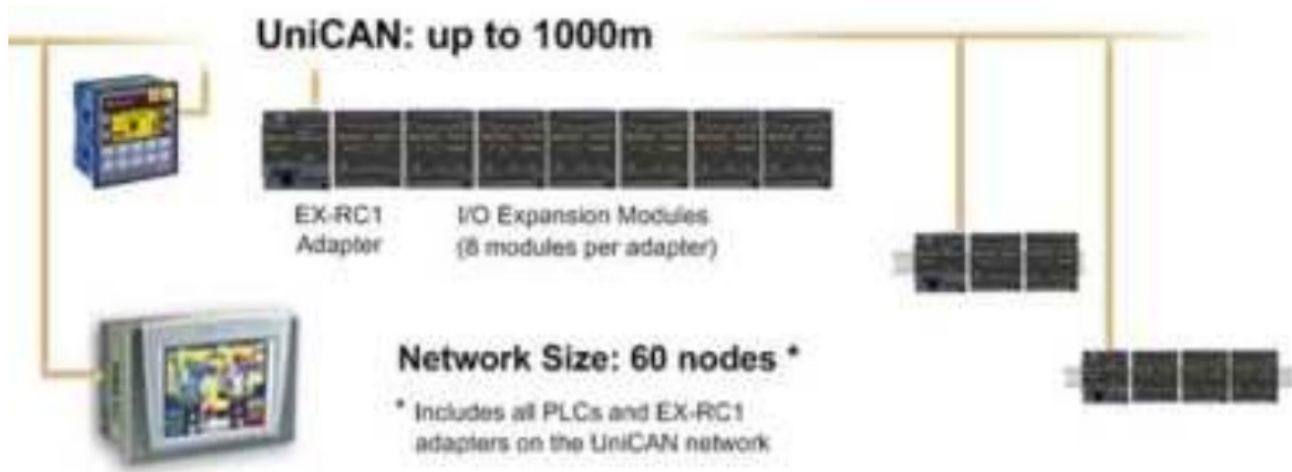


## CANbus Connector



## Network Layout

The EX-RC1 enables you to remotely locate I/Os up to 1 kilometer from a PLC. You can include both PLCs and adapters on the UniCAN network, up to a total of 60 nodes.



## EX-RC1 Technical Specifications

- **I/O module capacity:** Up to 8 I/O modules can be connected to a single adapter. The number of I/Os may vary according to module.
- **Power supply:** 12VDC or 24VDC
- **Permissible range:** 10.2 to 28.8VDC
- **Quiescent current:** 90mA@12VDC; 50mA@24VDC
- **Max. current consumption:** 650mA @ 12VDC; 350mA @ 24VDC
- **Current supply for I/O modules:** 800mA maximum from 5V. See Note 1
- **Status indicators**
  - **(PWR)** Green LED— Lit when power is supplied.
  - **(I/O COMM.)** Green LED— Lit when communication is established between the adapter to the other units. Blinks 0.5sec ON 0.5sec OFF when adapter is in Stop mode.
  - **(Bus COMM.)** Green LED— Lit when communication is established between the adapter and the OPLC.

### Notes

Example: 2 IO-DI8-TO8 units consume a maximum of 140mA of the 5VDC supplied by the adapter

## Communication

- **RS232 port:** 1
  - **Galvanic isolation:** No

- **Voltage limits:** 20V
- **Cable length:** Up to 15m (50')
- **CANbus port 1**
  - **Nodes** 60
  - **Power requirements** 24VDC ( $\pm 4\%$ ), 40mA max. per unit
  - **Galvanic isolation** Yes, between CANbus and adapter
  - **Cable type** Twisted-pair; DeviceNet® thick shielded twisted pair cable is recommended.
  - Cable length/ baud rate
    - 25 m: 1 Mbit/s
    - 100 m: 500 Mbit/s
    - 250 m: 250 Mbit/s
    - 500 m: 125 Mbit/s
    - 500 m: 100 Mbit/s
    - 1000 m: 50 Mbit/s
    - 1000 m: 20 Mbit/s

## Environmental

- **Operating temperature** 0 to 50C (32 to 122F)
- **Storage temperature** -20 to 60C (-4 to 140F)
- **Relative Humidity (RH)** 5% to 95% (non-condensing)
- **Dimensions (WxHxD)** 80mm x 93mm x 60mm (3.15" x 3.66" x 2.36")
- **Weight** 135g (4.76 oz.)
- **Mounting** Either onto a 35mm DIN-rail or screw-mounted.

## ABOUT COMPANY

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## Documents / Resources



**[UNITRONICS EX-RC1 Remote Input or Output Adapter](#)** [pdf] User Guide  
EX-RC1, Remote Input or Output Adapter, EX-RC1 Remote Input or Output Adapter, Input or Output Adapter, Output Adapter, Input Adapter, Adapter