High Speed Remote I/O Module EXF-RC15

The Unitronics EXF-RC15 is a High Speed Remote I/O Module that offers three High Speed Counter inputs and four high speed outputs. Overall, the EXF-RC15 offers 9 digital inputs, 4 digital transistor outputs and 2 relay outputs. It connects to the Vision controller via CANbus and can be easily programmed via a USB port.

Component Identification

1 Status indicators

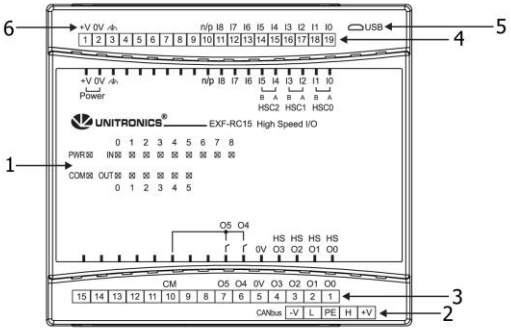
2 CANbus port

3 Output points

4 Input points

5 USB port

6 Power supply connection points



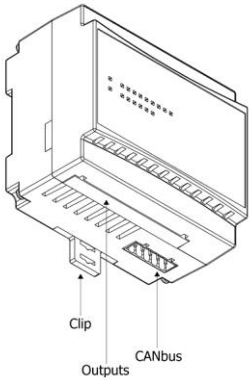
Standard Kit Contents

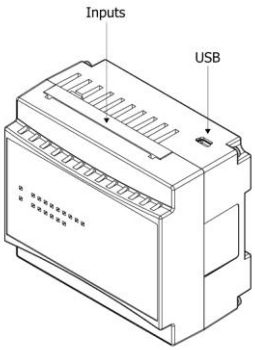
2 I/O terminal blocks

1 CANbus terminal block

1 CANbus termination resistor

High Speed Remote I/O Module Diagram





Alert Symbols and General Restrictions

This document uses the following alert symbols to highlight notices that must be observed in order to ensure personal safety and/or prevent property damages.

Symbol	Meaning	Description
⚡	Danger	The identified danger causes physical and property damage.
⚠	Warning	The identified danger could cause physical and property damage.
Caution	Caution	Use caution.

- Before using this product, the user must read and understand this document.
- All examples and diagrams 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 according to local and national standards and regulations.
- Only qualified service personnel should open this device or carry out repairs.

Failure to comply with appropriate safety guidelines can cause severe injury or property damage.

- Do not attempt to use this device with parameters that exceed permissible levels.
- Do not connect/disconnect the device when power is on.

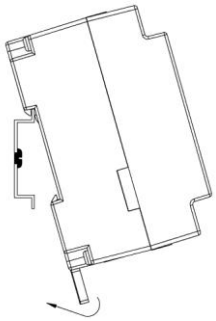
Environmental Considerations

- 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, in accordance with the standards given in the product's technical specification sheet.
- Do not place in water or let water leak onto the model.
- Do not allow debris to fall inside the model during installation.

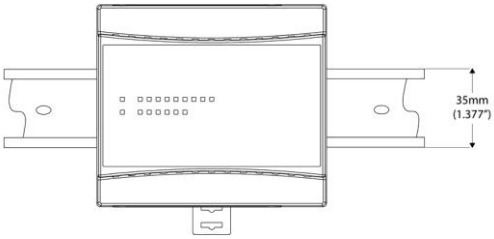
- Ventilation: 10mm space required between model's top/bottom edges & enclosure walls.
- Install at maximum distance from high-voltage cables and power equipment.

DIN-rail Mounting

1. Snap the model onto the DIN rail as shown in the figure to the right.



2. When properly mounted, the model is squarely situated on the DIN-rail as shown in the figure to the right.



Setting the Unit ID Number

The module's CANbus Unit ID is defined by a specific System Integer that is dedicated for this purpose. Please refer to the Help Manual of the Visilogic software for detailed explanation and instructions.

Wiring

- Do not touch live wires.

- Install an external circuit breaker. Guard against short-circuiting in external wiring.
- Use appropriate circuit protection devices.
- Unused pins should not be connected. Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.

Caution

- 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 substance on stripped wire that might cause the wire strand to break.
- Install at maximum distance from high-voltage cables and power equipment.

Wiring Procedure

Use crimp terminals for wiring; use 3.31 mm² –0.13 mm² wire (12-16 AWG):

1. Strip the wire to a length of 7±0.5mm (0.275±0.020“).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Insert the wire completely into the terminal to ensure a proper connection.
4. Tighten enough to keep the wire from pulling free.

- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with I/O lines used over an extended distance. Use wire that is properly sized for the load.
- The model and I/O signals must be connected to the same 0V signal.

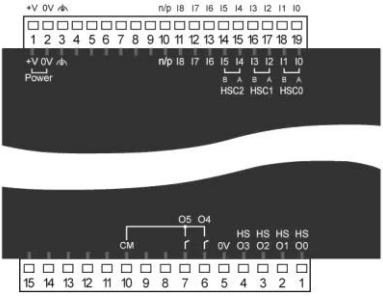
I/Os

This model comprises a total of 9 digital inputs, 2 relay outputs and 4 npn (sink) outputs. Input functionality can be adapted as follows:

1. The digital inputs may be wired, in one group, and set to either npn or pnp via wiring.
   In addition, according to appropriate wiring:
   - Inputs 0, 2, and 4 can function as high-speed counters, as part of a shaft-encoder, or as normal digital inputs.
   - Inputs 1, 3, and 5 can function as either counter reset, as part of a shaft-encoder, or as normal digital inputs.
   - If inputs 0, 2 and 4 are set as high-speed counters (without reset), inputs 1, 3 and 5 can function as normal digital inputs.

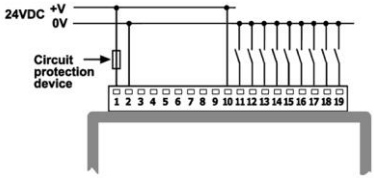
I/O Wiring

I/O Configuration

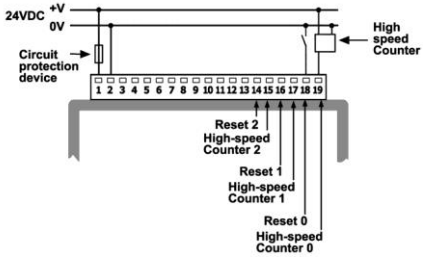


npn Input Wiring

Input wiring

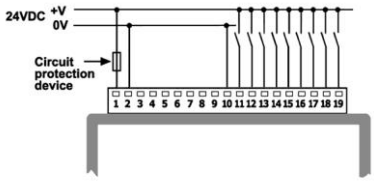


HSC input wiring

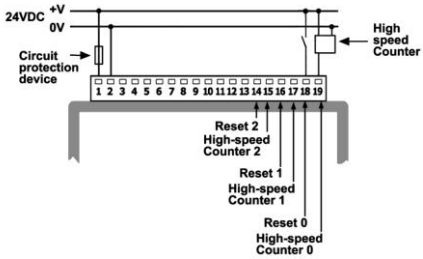


pnp Input Wiring

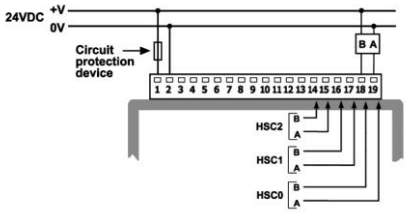
Input wiring



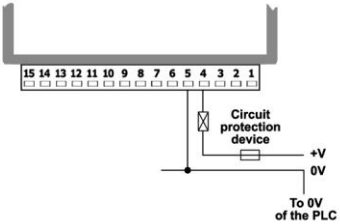
HSC input wiring



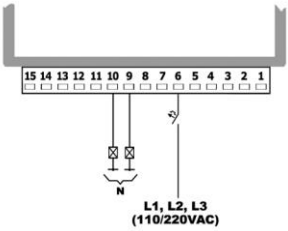
Shaft-encoder Input Wiring



npn Outputs Wiring



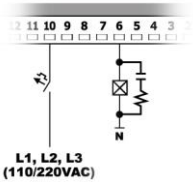
Relay Outputs

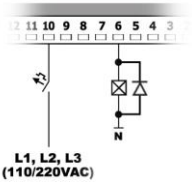


Increasing Contact Life Span

To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- A clamping diode in parallel with each inductive DC load
- An RC snubber circuit in parallel with each inductive AC load



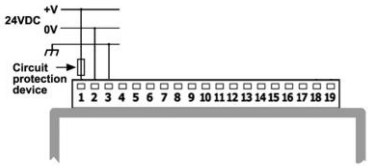


Power Supply

The model requires an external 24VDC power supply.

- The power supply must include double insulation. Outputs must be rated as SELV/PELV/Class 2/Limited Power.

- Use separate wires to connect the functional earth line (pin 3) and the 0V line (pin 2) to the system earth ground.
- Install an external circuit breaker. Guard against short-circuiting in external wiring.
- Double-check all wiring before turning on the power supply.
- Do not connect either the ‘Neutral’ or ‘Line’ signal of the 110/220VAC to 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.



Earthing the model

To maximize system performance, avoid electromagnetic interference by:

- Mounting the model on a metal panel.
- Connect each common and ground connection directly to the earth ground of your system.

For ground wiring use the shortest and thickest possible wire.

Communication Port

- **Turn off power before making communications connections.**

USB Device

Use for application download and direct PC-EXF-RC15 communication.

CANbus

Use the CANbus port for all CANbus communications including integration. The EXF-RC15 is shipped with a 5 pin CANbus terminal block.

CANbus Wiring

Use twisted-pair cable. DeviceNet® thick shielded twisted pair cable is recommended.

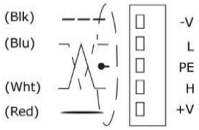
Network terminators: These are supplied with the model. Place terminators at each end of the CANbus network.

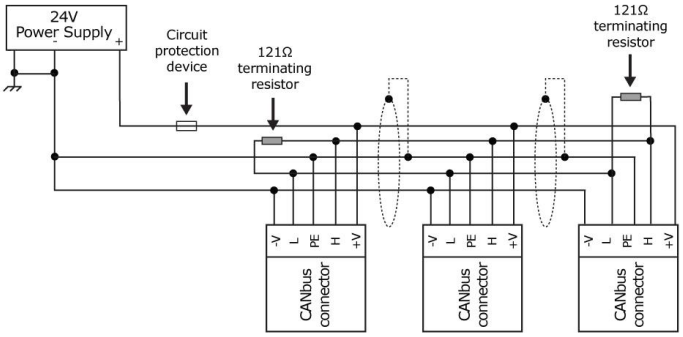
Resistance must be set to 1%, 121Ω, 1/4W.

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





High Speed Remote IO

EXF-RC15
Technical Specifications

The Unitronics EXF-RC15 is a stand-alone high-speed Remote I/O Module, no adapter required
It connects and functions as a node in a Vision UniCAN network.
Note that the module is programmed in VisiLogic and download is via USB port.
The EXF-RC15 offers:

- 9 digital inputs, including 3 high-speed counters
- 4 digital transistor outputs, may function as high-speed PWM/PTO outputs
- 2 relay outputs

You can find additional information, such as wiring diagrams, in the product's installation guide located in the Technical Library at www.unitronics.com.

Technical Specifications

Power Supply

Input voltage	24VDC
Permissible range	20.4VDC to 28.8VDC with less than 10% ripple
Max. current consumption	
npn inputs	125mA@24VDC
pnp inputs	80mA@24VDC

Digital Inputs

Number of inputs	9. See Note 1	
Galvanic isolation	None	
Nominal input voltage	24VDC	
Input voltage	Normal digital input	High Speed Input. See Note 2
pnp	0-5VDC for Logic '0' 17-28.8VDC for Logic '1'	0-3VDC for Logic '0' 20.4-28.8VDC for Logic '1'
npn	17-28.8VDC for Logic '0' 0-5VDC for Logic '1	20.4-28.8VDC for Logic '0' 0-3VDC for Logic '1
Input current	I0-I5	I6-I8
	5.4mA@24VDC	3.7mA@24VDC
Input impedance	I0-I5	I6-I8
	4.5KΩ	6.5KΩ
Response time	10mS typical, when used as normal digital input	
Input cable length		
Normal digital input	Up to 100 meters	
High Speed Input	Up to 50 meters, shielded, see Frequency table below	

High speed inputs — Specifications below apply when wired as HSC/Shaft-Encoder. See Note 1

Frequency, HSC

Driver type	pnp/npn	Push-pull
Cable length (max.)		
10m	95kHz maximum	200kHz maximum
25m	50kHz maximum	200kHz maximum
50m	25kHz maximum	200kHz maximum

Frequency, Shaft-Encoder

Driver type	pnp/npn	Push-pull
Cable length (max.)		
10m	35kHz maximum	100kHz maximum
25m	18kHz maximum	100kHz maximum
50m	10kHz maximum	100kHz maximum

Duty cycle	40-60%
Resolution	32-bit

Notes:

1. Input functionality can be adapted as follows:

   9 inputs may be used as digital inputs. They may be wired, in one group, and set to either npn or pnp via wiring.

   In addition, according to appropriate wiring:

   - Inputs 0, 2, and 4 can function as high-speed counters, as part of a Shaft-Encoder, or as normal digital inputs.
   - Inputs 1, 3, and 5 can function as either counter reset, as part of a Shaft-Encoder, or as normal digital inputs.
   - If inputs 0, 2, and 4 are set as high-speed counters (without reset), inputs 1, 3 and 5 can function as normal digital inputs.

2. If you configure an input as high-speed, you can use an end-device that comprises push-pull drive type. In this case, the high-speed input voltage ratings for npn/pnp apply.

Relay Outputs

Number of outputs	2 relay (in 1 group). See Note 3
Output type	SPST-NO (Form A)
Galvanic isolation	By relay
Type of relay	Tyco PCN-124D3MHZ or compatible
Output current (resistive load)	3A maximum per output 8A maximum total per common
Rated voltage	250VAC/30VDC
Minimum load	1mA, 5VDC
Life expectancy	100k operations at maximum load
Response time	10ms (typical)
Contact protection	External precautions required (see *Increasing Contact Life Span* in the product's Installation Guide)

Notes:

3. Outputs 4, 5 share a common signal.

Transistor Outputs

Number of outputs	4 npn (sink). See Note 4
Output type	N-MOSFET, (open drain)
Galvanic Isolation	None
Maximum output current (resistive load)	100mA per output
Rated voltage	24VDC
Maximum delay OFF to ON	1μs
Maximum delay ON to OFF	10μs
HSO freq. range with resistive load	5Hz-200kHz (at maximum load resistance of 1.5kΩ)
Maximum ON voltage drop	1VDC
Short-circuit protection	None
Voltage range	3.5V to 28.8VDC

Notes:

4. Outputs 0, 1, 2 and 3 share a common 0V signal.
   The 0V signal of the output must be connected to the controller's 0V.

LED Indications

Input LEDs	Green LED- Input state
Output LEDs	Red LED- Output state
PWR	Green LED – on when power is applied.
COM	Green LED - UniCAN communication (Linked to SB252). Controlled by user application. For details, please refer to the VisiLogic Help file.

Communication Ports

USB device

Number of ports	1
Port type	Mini-B
Specification	USB 2.0 compliant; full speed
Baud rate range	300 to 115200 bps
Isolation	None
Cable	USB 2.0 compliant; < 3 m (9.84 ft)

CANbus

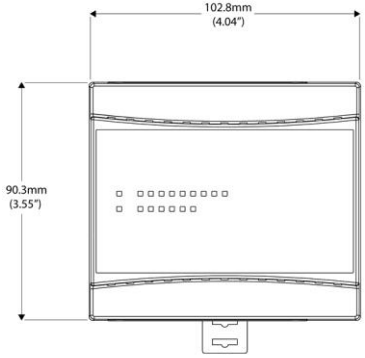
Number of ports	1		
Nodes	CANopen		Unitronics' CANbus protocols
	127		60
Cable length/baud rate	25 m	1 Mbit/s	
See note 5	100 m	500 Kbit/s	
	250 m	250 Kbit/s	
	500 m	125 Kbit/s	
	500 m	100 Kbit/s	
	1000 m*	50 Kbit/s	* If you require cable lengths over 500 meters, contact technical support.
	1000 m*	20 Kbit/s	
Isolation	Yes		

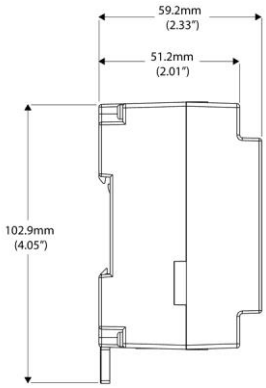
Notes:

5. Supports both 12 and 24VDC CANbus power supply, (±4%), 40mA maximum per unit.
   Note that if 12 VDC is used, the maximum cable length is 150 meters.

Dimensions

Weight	290.5g (10.24oz)
Size	Refer to the images below





Environment

Operational temperature	0 to 50ºC (32 to 122ºF)
Storage temperature	-20 to 60ºC (-4 to 140ºF)
Relative Humidity (RH)	10% to 95% (non-condensing)
Mounting method	DIN-rail mounted (IP20/NEMA1)

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