



# **EOTec 2C31 Installation Guide**

*ControlNet Single Ring Modules*

*For the EOTec 2000 Series*

**November 2008**

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## Limited Warranty

For Standard Terms and Conditions of Sale, including Limited Warranty, refer to the Weed Instrument web-site at the following URL:

[http://www.weedinstrument.com/info\\_central/Conditions\\_of\\_Sale.pdf](http://www.weedinstrument.com/info_central/Conditions_of_Sale.pdf)

## Trademarks

Trademarks found in this document are the property of their respective companies.

## Standards and Warnings

The *EOTec 2C31 – Self Healing Ring Modules for ControlNet* has been designed by Weed Instrument to meet the following standards.



EMC immunity – IEC61326-1:1998 Equipment for Measurement, Control and Laboratory Use



FM Approved for:  
Class I, Division 2, Groups A, B, C & D, T4  
(0°C To +60°C)



When used in Hazardous Locations:

Class I, Division 2, Groups A, B, C & D, T4.

Substitution of components may impair suitability for Class I, Division 2. Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction. Do not connect/disconnect equipment unless area is known to be non-hazardous and power is switched off. Certified components for use in a suitable enclosure. The maximum ambient temperature is 60°C.



Installations shall comply with the relevant requirements of the National Electrical Code<sup>®</sup> (ANSI/NFPA 70), the Canadian Electrical Code<sup>®</sup> (CEC, CAN/CSA-C22.1) and any local electrical codes, where applicable.



The *Fiber Optic portion* of the ControlNet Specification is somewhat limited in scope and Weed Instrument Fiber Optic Products have a more varied set of specifications based on field requirements and proven applications. The fiber portion of this series is not designed to be compatible with the fiber portion of the ControlNet Specification and, therefore, interconnection *by fiber* to any other manufacturer's products is neither expressed nor implied.



Lightning Danger: Do not work on equipment during periods of lightning activity.

Refer to the [Technical Specifications](#) section, at the end of this manual, for complete specifications on agency approvals.

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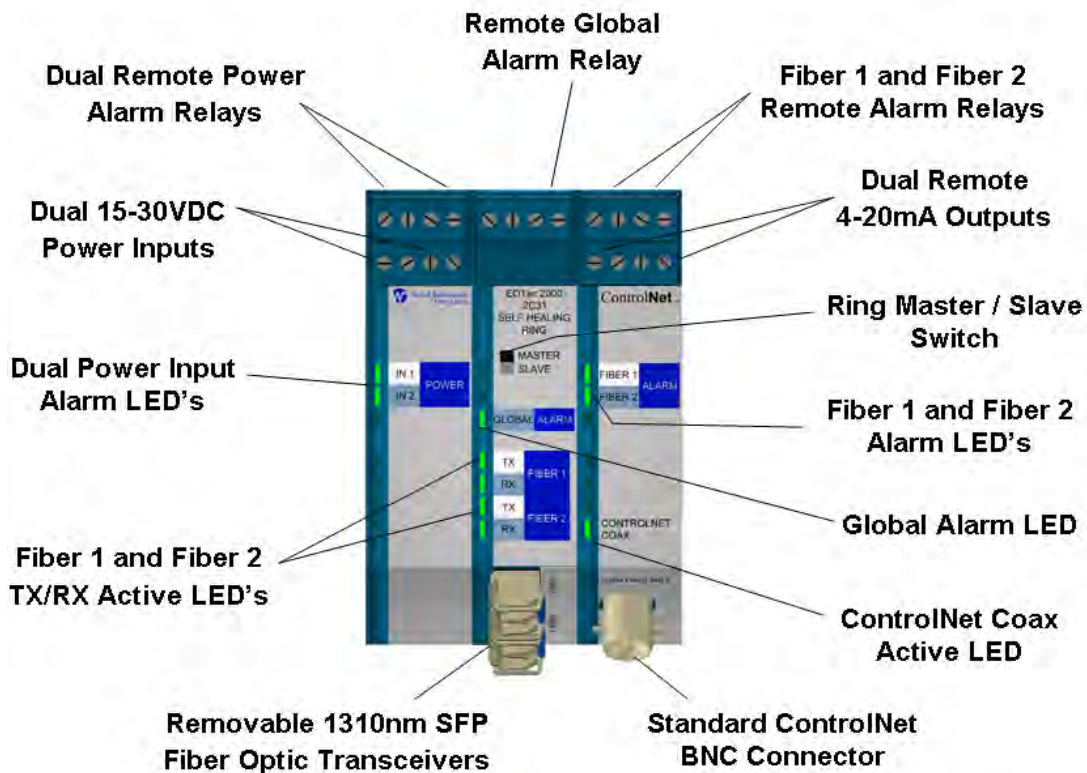
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Refer to the *EOTec 2000 ControlNet Ring Communications Manual* for detailed information about the features, capabilities and operation of the units, including information on settings that need to be made in the PLC control software.

## **Module Layout**

The *patent pending* 2C31 provides two 15-30VDC redundant power inputs to insure that each module remains powered at all times. There are two removable Small Form-factor Pluggable (SFP) transceivers provided to connect fiber optic cable to create a ring network and a standard ControlNet BNC connector for connecting into any ControlNet coax trunk line.

Diagnostic features include ten local diagnostic LEDs that illuminate either green or red to inform the user of the status of each ring module. Each 2C31 has two power remote alarm relays to set an alarm when either input is outside the specified voltage, two fiber remote alarm relays to set an alarm when data is not present at either receive port, and a global alarm that is set when any of the other four remote alarms is set. The global alarm is unique in that it is communicated between all modules in the ring so that a control room only needs to connect to one module to be able to understand when a fault has occurred anywhere within the ring.

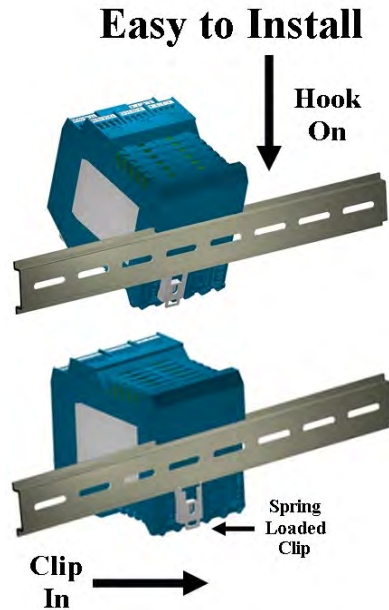


**Figure 1**

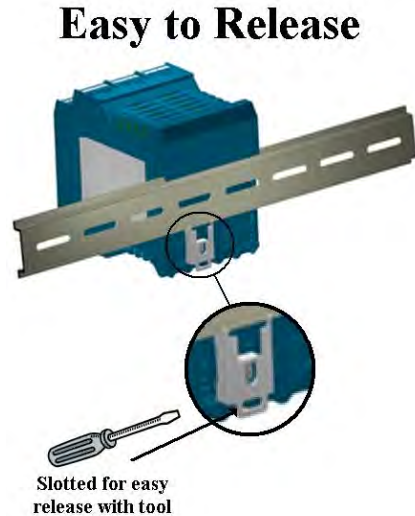
Also, standard on every 2C31 are two 4-20mA outputs that monitor the signal strength of both fiber ports real-time. This can be used to set a trip point to alert users of deteriorating fiber cables and also works as a handy troubleshooting tool when installing a ring network.

## ***Installation***

Fasten the module onto a standard DIN rail, as shown below. Hook the module on top of the rail and push down to clip it on to the rail at the bottom. Make sure to leave enough room to route any cabling.



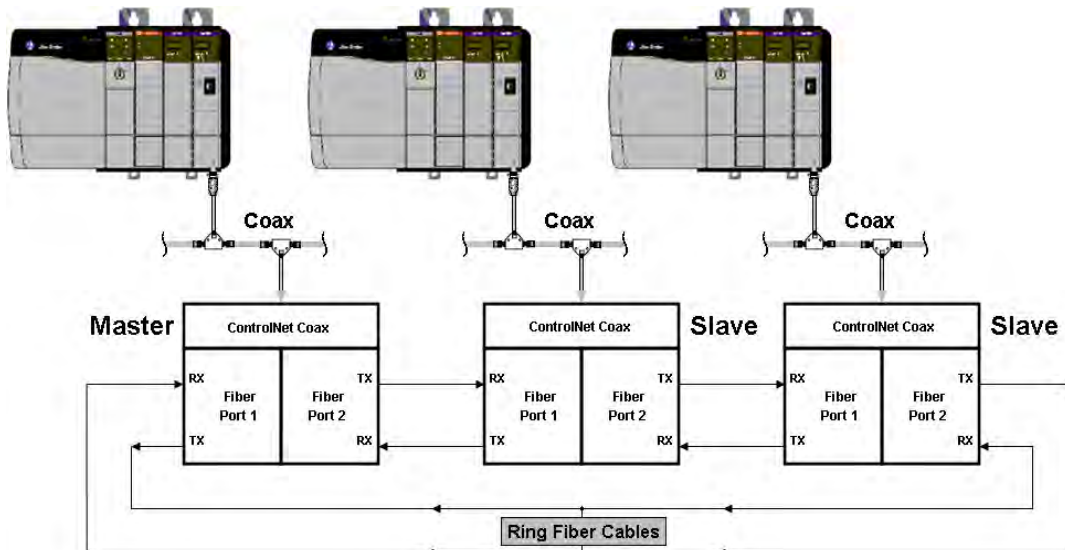
To remove the module from the DIN rail, open the spring-loaded clip as shown above by inserting a screwdriver into the bottom slot on the clip and pulling up on the screwdriver's handle (pivoting down at the tip) to disengage the clip from the DIN rail.



## Setup/Configuration

Setup of the EOTec 2C31 is made easy using the following instructions.

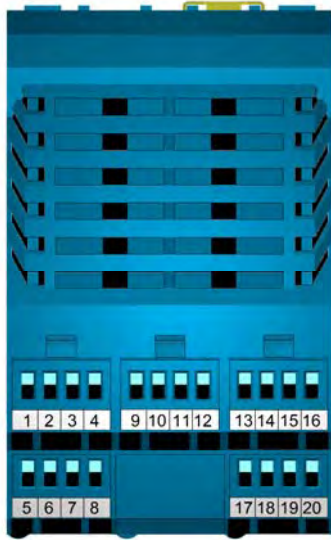
Setup / Configuration Summary	
Master Switch	A fiber ring must have one ‘Master’ (only 1) module to manage the fiber break/heal process (see <a href="#">figure 1</a> for switch location). All other switches must be set as slaves as shown in <a href="#">figure 2</a> (Master/Slave).
ControlNet Ports	1 – ControlNet BNC style connector located on the front slope of the 2C31 module, this connection is made to a ControlNet tap and attached to a ControlNet trunk line. See <a href="#">figure 2</a> (Coax).
Fiber Connections	2 – LC style connectors located on the front slope of the 2C31 module, these connections are made to an adjacent 2C31 module. See <a href="#">figure 2</a> (Fiber Port 1; 2)
Alarm/Diagnostic Connections	4-pin terminal block plug connectors located at the top of the 2C31 module. See <a href="#">Table 1</a> for wiring list and consult the operator manual for tips and suggestions.
Power Source Connections	2 - 15-30Vdc power inputs are located at the top of the 2C31 module. See <a href="#">Table 1</a> for wiring list and consult the operator manual for tips and suggestions.



**Figure 2**

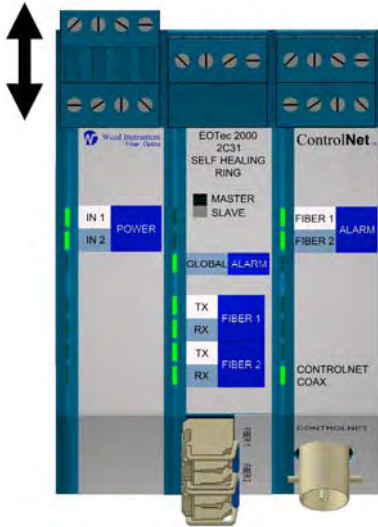
## Wiring Guidelines

The Weed EOTec 2C31 modules can be connected per Table 1.



**Top View**

**Removable  
Terminal Block Plugs**



Function	Terminal #	Signal
Power	1	Relay contact 1
Alarm 1	2	Relay contact 2
Power	3	Relay contact 1
Alarm 2	4	Relay contact 2
Power 1	5	15 - 30VDC
Input	6	Return (-)
Power 2	7	Return (-)
Input	8	15 - 30VDC
Unused	9	
	10	
Global Alarm	11	Relay contact 1
	12	Relay contact 2
Fiber 1 Alarm	13	Relay contact 1
	14	Relay contact 2
Fiber 2 Alarm	15	Relay contact 1
	16	Relay contact 2
Fiber 1 4-20mA	17	Positive (+)
	18	Return (-)
Fiber 2 4-20mA	19	Positive (+)
	20	Return (-)

All relays are closed on alarm

**Table 1**

To assist in making wire connections to the modules, the terminal block plugs are easily removed.

Place the tip of a screwdriver under the front of the plug and lift.

**Local and Remote Alarms**

<b>Local Alarms (LED Indicators)</b>		
<b>LED Function</b>	<b>Fault Indicator</b>	<b>Color</b>
ControlNet Coax	Normal	Solid Green
	ControlNet Initialization	Flash Green
	Frequent errors	Flash Red
	Jabber	Solid Red
	No Data / No Connection	Off
Fiber Data (1; 2)	Normal RX	Solid Green
	RX error	Flash Red
	No RX	Solid Red
	Normal TX	Solid Green
	No TX	Off
Power In (1; 2)	Power In (1; 2) on	Solid Green
	Power In (1; 2) < 15Vdc	Solid Red
	Power In (1; 2) > 30Vdc	Solid Red
	Power off	Off
Fiber Alarm (1; 2)	No Fiber Break	Solid Green
	Fiber Break	Solid Red
Global Alarm	No alarm condition in single ring	Solid Green
	Alarm condition in single ring	Solid Red

<b>Remote Alarms</b>		
<b>Alarm Function</b>	<b>Alarm Indicator</b>	<b>Result</b>
4-20ma Output Fiber (1; 2)	Output of RX light intensity measurement.	Best = 20ma Fail ≤ 4ma
Power In (1; 2)	PwrIn (1; 2) = 15 – 30Vdc	Relay open
	PwrIn (1; 2) < 15Vdc or > 30Vdc	Relay closed
Fiber Alarm (1; 2)	No fiber break	Relay open
	Fiber break	Relay closed
Global Alarm	No alarm condition in single ring	Relay open
	Alarm condition in single ring	Relay closed

<b>Global Alarm Faults</b>		
<b>Alarm Function</b>	<b>Faults that cause a Global Alarm</b>	<b>Result</b>
Global Alarm	Power In (1; 2) Fiber Alarm (1; 2) Fiber – RX error	LED = Red Relay closed

**Technical Specifications**

<b>General Specifications</b>	
Maximum nodes	99 nodes supported
Maximum taps per segment	48 (using coax cable length of 250m maximum)
Maximum coax cable length	1000m (when connected to only 2 taps)
Trunk connection	Anywhere on the trunk via ControlNet Tap with 1m drop cable required
Coax cable connection	BNC
Data rate	5M baud
Propagation delay	1 $\mu$ s maximum per link pair
Coax propagation delay	4.17 $\mu$ s/km 1.27 $\mu$ s/1000ft
Fiber propagation delay	5.01 $\mu$ s/km 1.53 $\mu$ s/1000ft
Mounting	35mm DIN Rail
Input Voltage	15-30Vdc; Nominal 24Vdc @ 333mA Quiescent (8W)
Inrush current, maximum	1A @ 24Vdc
Alarm Output Contacts Rating Maximum	DPDT (Form-C) relay 220Vdc, 250Vac 1A Switching Current 1A Carrying Current
Diagnostic Output Loop Resistance	4 to 20mA loop signal 1000 $\Omega$ @ 24Vdc; Adjust $\pm$ 50 $\Omega$ / Volt Change
Transient Spike Protection	1500 W 25 $^{\circ}$ C (10 X 1000 $\mu$ s)
Mean time between failure (MTBF)	521,108 Operating Hours MIL-HDBK-217F (25 $^{\circ}$ C)
Operating temperature range	0 to +60 $^{\circ}$ C
Storage temperature range	-40 to +85 $^{\circ}$ C
Humidity (non-condensing)	5 to 95% RH
EMC Requirements	IEC61326-1:1998
Hazardous locations	FM Approved: Class I, Division 2, Groups A, B, C, & D, T4 CSA C22.2 No 142 and C22.2 No 213
Optical Wavelength	1310nm
Communication Data Range	Up to 155 Mbps
Optical Port Connection	Duplex LC connector - other connectors options available, see datasheet for accessories
Optical Dynamic Range	See <a href="#">Optical Interface Table</a> below.
Packaging (polyamide)	UL 94V-0
Dimensions	See <a href="#">Dimensions</a> section in this manual.

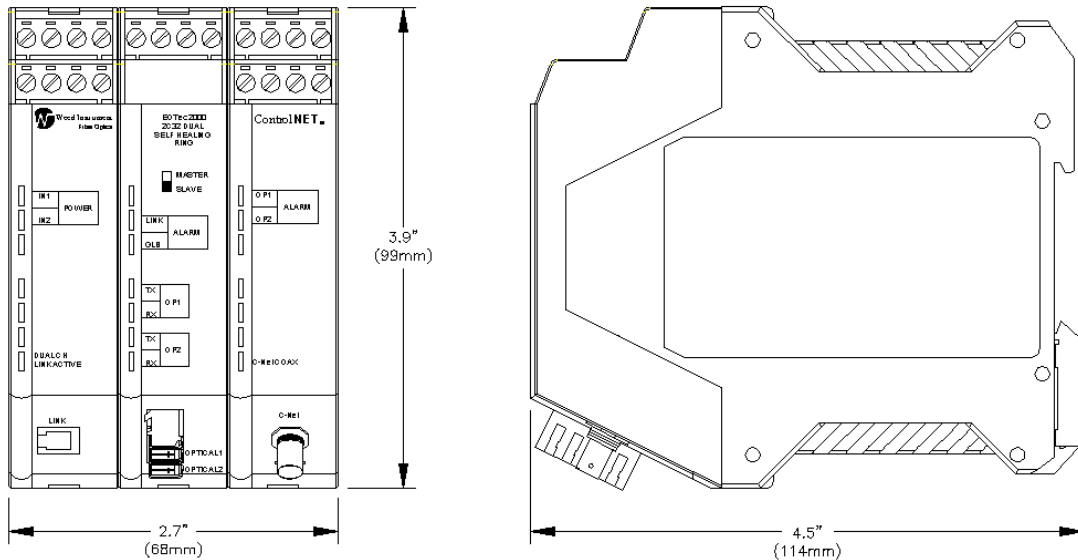
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Optical Transceiver Specifications			
Model	Fiber Type	Max Optical Dynamic Range, Fiber Size	Typical Max* Distance (mi/km)
2C31-LC-MM/MM	Multi-mode	11 dB into 62.5/125µm fiber 7.5 dB into 50/125µm fiber	2.5mi/4km 1.9mi/3km
2C31-LC-SM/SM	Single mode	19 dB into 9/125µm fiber	12.4mi/20km
2C32-LC-MM/MM	Multi-mode	11 dB into 62.5/125µm fiber 7.5 dB into 50.5/125µm fiber	2.5mi/4km 1.9mi/3km
2C32-LC-SM/SM	Single mode	19 dB into 9/125µm fiber	12.4mi/20km

\* See EOTec 2000 ControlNet Ring Communications Manual for assistance in selecting the transceivers that best meet your needs.

## Dimensions

The following diagram shows the module's dimensions. This package outline is the same for all EOTec 2C31 and 2C32 ring series modules.



Inches  
(mm)

## ***Technical Support and Service***

For technical support, please follow this link:

[www.weedinstrument.com/contact\\_us/technical.html](http://www.weedinstrument.com/contact_us/technical.html)

### **Installation and Operation**

Our professionals can guide you through the installation and operation of your new product so that it is efficiently operational in the minimum amount of time. Weed Instrument also helps you install options and upgrades to ensure that your product is successfully enhanced with greater performance and new capabilities.

### **Troubleshooting**

Should you have a question regarding the operation of your instrument or perceive a malfunction, the technical support experts will help you determine the issue and offer you the best possible solution.

Go to [www.weedinstrument.com/contact\\_us/tech\\_support/troubleshooting.html](http://www.weedinstrument.com/contact_us/tech_support/troubleshooting.html) and determine if any of the troubleshooting tips solve your problem.

### **Service, Repairs and Returns**

If you need to return units for whatever reason, please follow this link:

[www.weedinstrument.com/contact\\_us/tech\\_support/service.html](http://www.weedinstrument.com/contact_us/tech_support/service.html)

1. Click the link for the RETURN MATERIAL AUTHORIZATION FORM (RMA). This form must be filled out completely in order to obtain an RMA number from Weed Instrument.
2. To ensure prompt service the RMA number must be marked on the outside of your shipping container.
3. You are responsible for fully decontaminating your unit prior to shipment. If we receive a contaminated product we reserve the right to have it removed and destroyed by a HAZ MAT team at the owner's expense.
4. Once the form is complete, please send it to Weed Instrument by clicking on the **Submit** button. You will be given an RMA number within 24 hours. If you need the RMA number immediately, please call us after submitting the RMA form and a Service Administrator will give you the number verbally.

