

# Scadaflex RIO

## Packaged Remote I/O Modules Wireless or Wired

Scadaflex Remote I/O (RIO) Modules extend the I/O capacity of Scadaflex II SCADA controllers. They are offered in three versions that differ in the type of communications interface: license-free mesh radio, traditional spread spectrum radio, or a hardwired RS-485 network. The spread spectrum radio and RS-485 versions may also be used with third party equipment since they support standard Modbus RTU communications. The mesh radio version must be used with either Scadaflex II or Modulus SCADA controllers from Industrial Control Links.

RIO modules are prepackaged in NEMA 4X enclosures, ready to be installed. Up to 254 modules can reside on a single network.

RIO modules are designed for ease of installation. Other than setting a network address, there are no hardware field setup requirements. Any operation adjustments are made via register communications from a Master (Host) controller. If a module must be exchanged in the field, all field device wiring terminates to removable terminal plugs.



SCADAFLEX RIO Remote I/O Module  
10DI, 1PI, 10DO, 4AI  
29-1010 RS-485 Interface  
29-1011 1/4W 900MHz Mesh Radio  
29-1012 1/4W 900MHz Spread Spectrum Radio  
  
AC Power option  
29-9001 110/220 Vac Power

### Scadaflex RIO Packaged Remote I/O Modules

- 10 DISCRETE INPUTS
- 1 HIGH-SPEED PULSE INPUT (WITH RATE AND TOTALIZER)
- 10 DISCRETE OUTPUTS (RELAY)
- 4 ANALOG INPUTS (mA, V, Resistance, Thermistors)
- 1 COMMUNICATIONS INTERFACE:  
MESH RADIO, OR  
SPREAD SPECTRUM RADIO, OR  
RS-485 SERIAL PORT

#### MESH RADIO COMMUNICATIONS OPTION

RIO modules are available with a built-in mesh radio that is compatible with LPR battery powered I/O modules as well as Scadaflex II and Modulus SCADA controllers. Mesh radios form a wide-area mesh network that covers a large area with minimum power consumption. Each module in the network automatically serves as a repeater for any other modules that cannot get through directly. Meshing systems are “self healing”; if a node drops out, others take over message repeater functions. Even though RIO modules do not need to go to sleep like the ultra low power LPR modules, they do support the network protocol and can act as self healing repeaters to extend the total network coverage. Meshing radios have a range of up to about two miles with the supplied antenna, or much farther with elevated higher gain antennas. With their mesh repeating capability, their effective coverage range is many square miles.

#### SPREAD SPECTRUM RADIO COMMUNICATIONS OPTION

RIO modules are available with a traditional spread spectrum radio wireless interface as an alternative to the mesh radio option. The main advantage of this radio is improved point-to-point range when no mesh or repeater functionality is required (the spread spectrum radio has approximately 9dB improved sensitivity over its mesh counterparts).

#### RS-485 COMMUNICATIONS OPTION

RIO modules are also available with an RS-485 hardwired interface which is the lowest cost solution for shorter communications distances. The RS-485 hardware interface utilizes a bused pair RJ-45 (Ethernet) connectors so that low cost Ethernet cables can be used to quickly plug the modules together into a network with a Scadaflex II controller. Twisted pair wire up to several thousand feet may also be used.

#### AC POWER OPTION

RIO modules are typically powered from 12 volt or 24 volt DC power. Alternatively, they are available with a built-in 24Vdc power supply that accepts 120Vac or 240Vac power in. The internal supply option has extra capacity, providing 1/4A to power sensors.

# Scadaflex RIO Remote I/O Modules Specifications

## FIELD I/O

<b>Digital Inputs:</b>	10	Optically Isolated (AC/DC, not polarity sensitive)
Input Range:		0 to 30Vdc (ON= >9V, OFF < 6V), <b>60Vdc absolute maximum</b>
Input Current:		Approximately 1 mA @ 12Vdc, 2.2mA at 24Vdc
<b>High-speed Pulse Input:</b>	1	Non-isolated DC or contact closure, DC to 20KHz maximum—16-bit rate and 32-bit totalizer registers
Input Range:		Contact closure or open collector driver to ground, or 0 to 30Vdc (ON=<1.5V, OFF > 2.5V), <b>60Vdc absolute maximum</b>
Input Current:		0.5mA (internal current source)
<b>Digital Outputs:</b>	10	Relay contacts, Form A (normally open)
Contact Output Rating:		240/277 Vac, 30Vdc, 3A maximum per output (resistive load). <b>Do not exceed 8A total of all outputs</b>
<b>Analog Inputs:</b>	4	16-bit, Delta Sigma, individually selectable input ranges
Input Ranges:		20mA 5V +/- 250mV 65,000 ohms 35Vdc on any range
Maximum signal level		

## COMMUNICATIONS

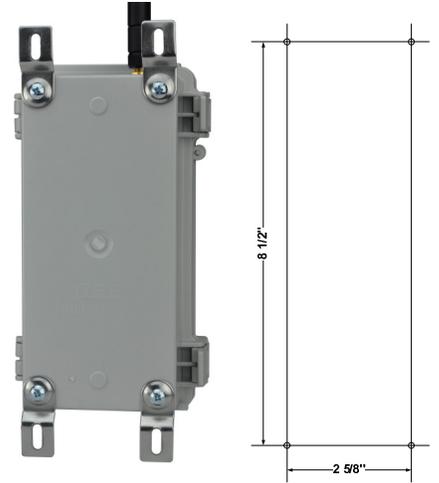
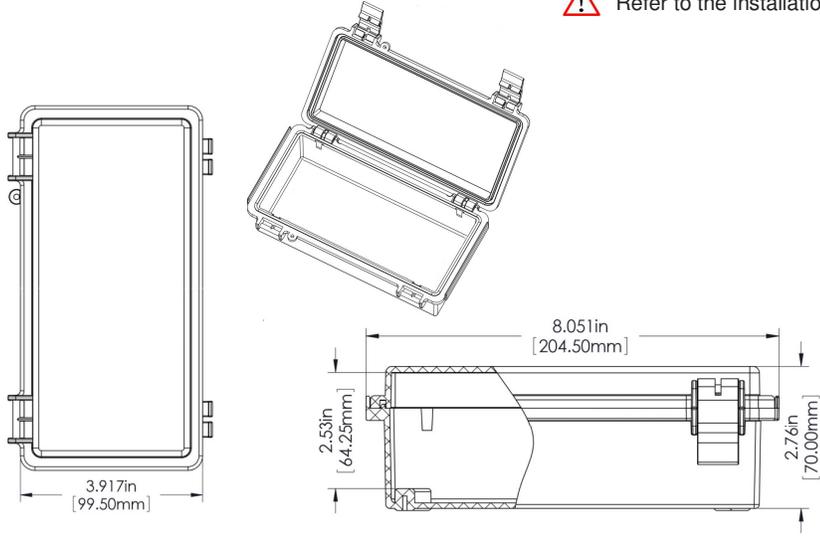
<b>Serial Interface Option:</b>	1	<b>[29-1010]</b> RS-485
Baud Rates (all ports)		115K, 38.4K, 19.2K, 9600, 4800, 2400, 1200 baud
Protocols		Modbus RTU (slave)
<b>Radio Interface Options:</b>	1	<b>[29-1011]</b> 900MHz 1/4W (24dBm) Meshing radio, -101 dBm sensitivity @ 200kbps Proprietary ultra low-power protocol (optimized power-down/sleep), or
		<b>[29-1012]</b> 900MHz 1/4W (24dBm) Frequency Hopping Spread Spectrum radio, -110 dBm sensitivity @ 10kbps, Modbus RTU (slave)

## GENERAL

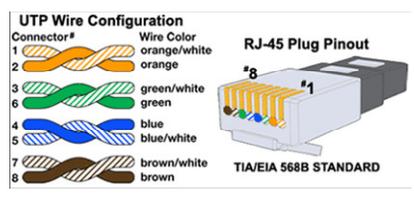
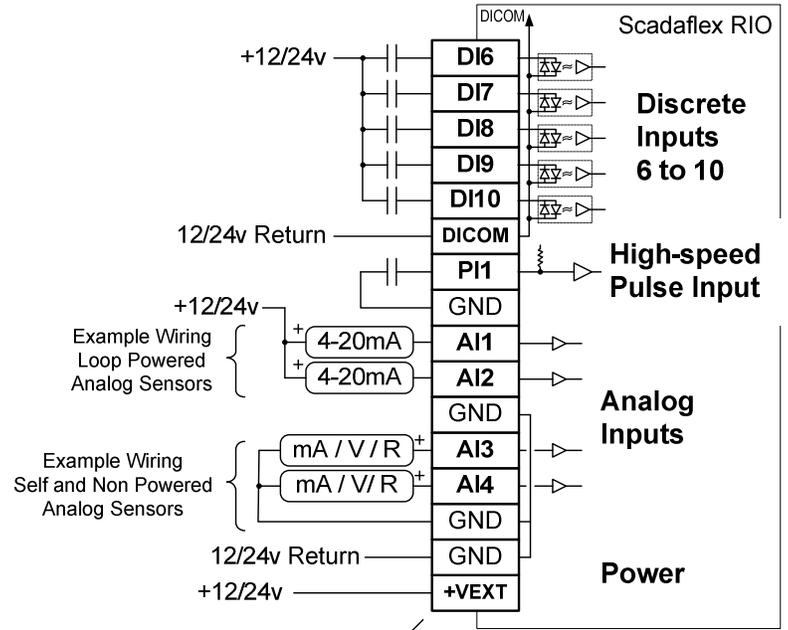
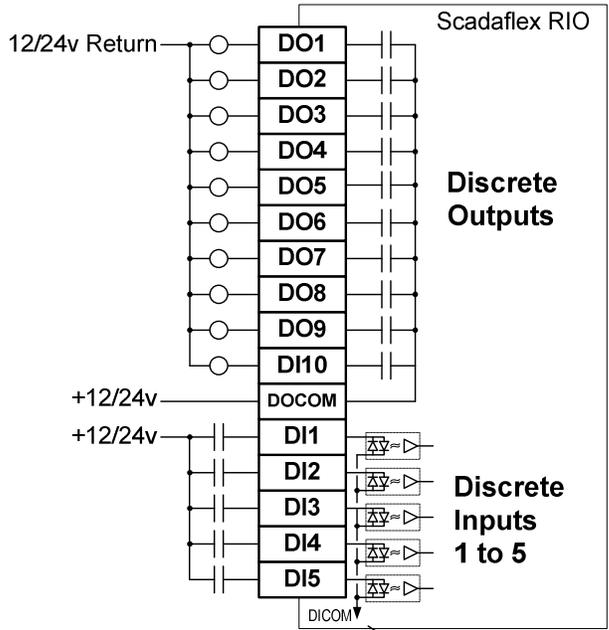
<b>Input Power:</b>	10Vdc to 30Vdc, 36Vdc absolute maximum
<b>Power Consumption</b>	15mA @ 12Vdc / 12mA @ 24Vdc (all relays OFF, RS-485 communications interface)
Add per ON relay	13mA @ 12Vdc / 7mA @ 24Vdc
Added power consumption for wireless options	
Radio Options	<b>[29-1011 and 29-1012] Idle:</b> 13mA @ 12Vdc / 6mA @ 24Vdc, <b>Transmitting (short bursts)</b> 50mA @ 12Vdc / 25mA @ 24Vdc
<b>AC Power Option:</b>	<b>[29-9001]</b> Input:100 to 277Vac, 2A maximum 50/60Hz, 13W Auxiliary Output: 24Vdc 0.25A maximum
<b>Field Wiring Termination:</b>	Screw terminal blocks, 3.5mm, 22 to 14GA wires
<b>Antenna Connector:</b>	<b>[29-02x0]:</b> RPSMA female (male pin center conductor)
<b>Temperature:</b>	-40°C to 70°C (operating), -40°C to 85°C (storage)
<b>Humidity:</b>	<95% RH (non-condensing)
<b>Enclosure:</b>	8"(H) x 4"(W) x 3"(D), NEMA 4X, Polycarbonate, wall mounting hardware provided
<b>Electrical Entrance/Exit:</b>	Pre-drilled for 3/4" conduit fitting

# Scadaflex RIO Packaged Remote I/O Modules **DIMENSIONS, MOUNTING and WIRING**

 Refer to the installation manual for additional installation details and precautions.

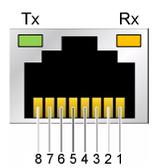
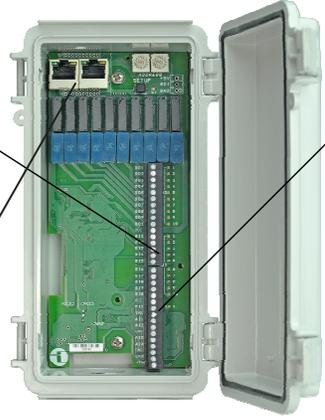


Wall or Back Plate Mounting (hardware supplied)



Serial Port Connectors (bused together)

Pin#	RS-485 Function	Wire Color
1	RS-485+	Orange/White
2	RS-485-	Orange
3		Green/White
4	Gnd	Green
5		Blue
6		Blue/White
7		Brown/White
8		Brown





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