



## Modbus/RS-485



## 913/914MB Multi-Channel Analog Input Modules

### DC Current, DC Voltage or AC Current Input

### Limit Alarms or Discrete Outputs

#### Models

913MB: 4 current input channels  
914MB: 4 voltage input channels

#### Input Ranges

0 to 20mA DC,  
±10V DC,  
0 to 20A AC (with 5020-350 sensor)

#### Output

Four output channels:  
Open-drain MOSFETs (1A DC loads)  
0 to 35V DC

#### Network Communication

Modbus-RTU high-speed RS-485

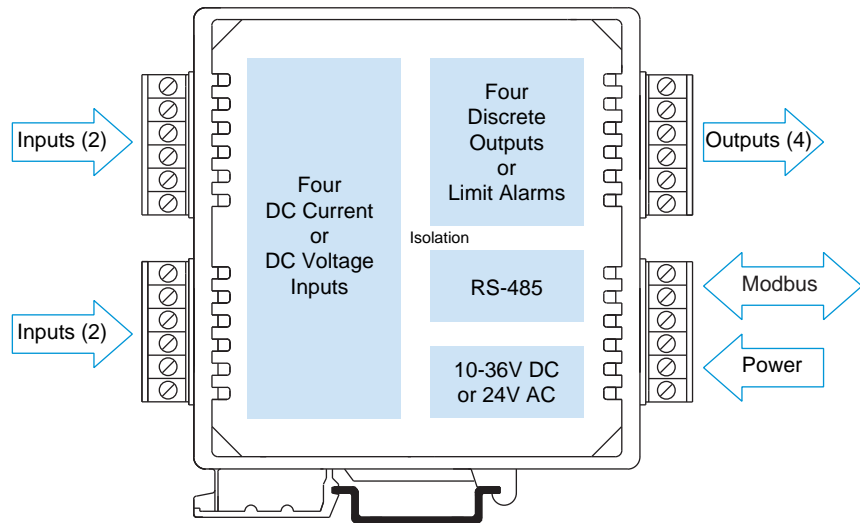
#### Power Requirement

10 to 36V DC,  
24V AC

#### Approvals

CE marked. UL, cUL listed  
Class I; Division 2; Groups A, B, C, D.

## DC Current/Voltage Input Module



### Description

This signal conditioner is a four-channel analog input module with four discrete outputs. It provides isolation between input, output, power, and network circuits. Network communication adheres to the industry-standard RS-485 Modbus RTU protocol. AC and DC power sources are supported with nonpolarized, diode-coupled terminals.

The inputs accommodate wide DC voltage or current ranges. Flexible discrete outputs operate as alarms or on/off controllers. As limit alarms, each discrete output can be configured with high and/or low setpoints exclusively tied to an analog input channel. Alarm trips function without host communication enabling low-cost stand-alone alarms, as well as local backup for the primary control system. Otherwise, on/off control is based on commands issued by the host system.

Combining flexible transmitter functions, mixed signal I/O, alarm support, and a network interface in a single package, makes this instrument extremely powerful. Multi-channel design adds cost-efficiency and allows high-density mounting. Plus, safe, rugged construction makes these modules reliable for use in both control room and distributed field I/O applications. Custom module configurations are also possible (consult factory for details).

### Special Features

- Standard Modbus RTU protocol with high-speed RS-485 communication (up to 115K bps)
- 16-bit sigma-delta A/D yields 0.1% of range resolution and accuracy
- Four inputs in a single inch-wide module reduces system costs and saves panel space
- Four discrete outputs enable local limit alarms or host-controlled on/off switching
- Heavy-duty 1A solid-state relays provide dependable on/off control of industrial devices
- Self-calibration lowers maintenance costs by reducing periodic manual calibration checks
- Watchdog timers provide a configurable failsafe output state for use when host I/O communication is lost
- Four-way isolation eliminates potential ground loops between power, input, output, and network circuitry
- Self-diagnostics monitor microcontroller activity to detect operational failures (lock-up) and execute a reset to restore communication

#### AC Current Sensor Model 5020-350



For 913MB. Order separately (one per channel).



## Performance Specifications

### General Input

**Resolution**  
0.005% or 1 part in 20,000.

**Noise Rejection**  
Normal mode: 40dB @ 60Hz, typical.  
Common mode: 140dB @ 60Hz, typical.

**Input Filter Bandwidth**  
-3dB at 3Hz, typical.

**Input Conversion Rate**  
180ms per channel.

### Current Input (913MB)

**DC Current Input Ranges**  
Range user-configured. Range selected applies to all channels.

0 to 1mA, 0 to 20mA, 4 to 20mA,  
0 to 11.17mA (for use with 5020-350 AC sensor).

**DC Current Input Resistance**  
49.9 ohms.

**DC Current Input Accuracy**  
±0.1% of input range.

### Voltage Input (914MB)

**DC Voltage Input Ranges**  
Range user-configured. Range selected applies to all channels.

±10V, ±5V, ±2.5V, ±1.25V,  
±625mV, ±313mV, ±156mV, ±78mV

**Input Impedance**  
110.5K ohms.

**DC Voltage Input Accuracy**  
±0.1% of input range.

### Discrete Output

**Output Type**  
Four independent open drain MOSFET switches with a common return that operate as low-side switches.

**Output Voltage Range**  
0 to 35V DC.  
External voltage source required.

**Output Current Range**  
0 to 1A DC continuous for each output.

**Output OFF Leakage Current**  
50µA maximum.

**Output ON Resistance**  
0.15 ohms maximum.

**Output Response Time**  
4.1ms typical, from receipt of command to gate transition of the output MOSFET.

**Operation**  
Digital outputs are set to their OFF state following a software or power-on reset. Outputs can optionally be set to user-defined states following a watchdog timeout. Watchdog timeout output control takes precedence over limit alarm control. Alarm control takes precedence over host control.

### Communication

**Supported Modbus Commands**  
The command/response protocol for communicating with this module adheres to the Modbus/RTU standard for the following Modbus Functions.

- Read Coil (Output) Status
- Read Holding Registers
- Read Input Registers
- Force Single Coil (Output)
- Preset Single Register
- Force Multiple Coils (Output)
- Preset Multiple Registers
- Report Slave ID
- Reset Slave

### LED Indicators

LEDs indicate power, status, and discrete level/alarm.

### Power and Isolation

**Power Requirements**  
10 to 36V DC or 22 to 26V AC.

**Supply Current**

Supply	Current Draw
10V DC	125mA maximum
24V DC	50mA maximum
24V AC	100mA rms maximum

**Isolation**  
1500V AC for 60 seconds or 250V AC continuous.  
4-way isolation between input, network, power, and discrete I/O circuits. Inputs are isolated channel-to-channel for common mode voltage to ±4V DC.

### Ordering Information

#### Models

913MB-0900  
914MB-0900  
DC current (913MB) or voltage (914MB) input module

#### Accessories

900C-SIP  
Configuration Software Interface Package (includes software CD-ROM for Windows, RS-232/485 converter, and RS-485/three-wire cable)

5034-225  
USB-to-RS232 adapter. See page 68 for more info.

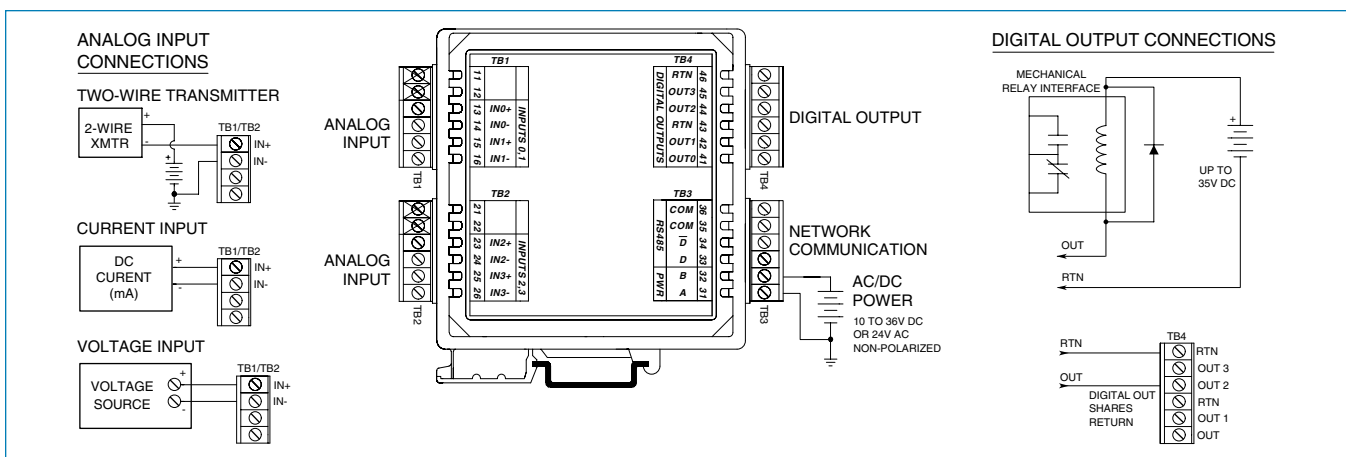
5020-350  
AC current sensor for 913MB. One for each channel. (See page 205)

TBK-B02  
Optional terminal block kit, barrier strip style, 4 pcs.

TBK-S02  
Optional terminal block kit, spring clamp style, 4 pcs.

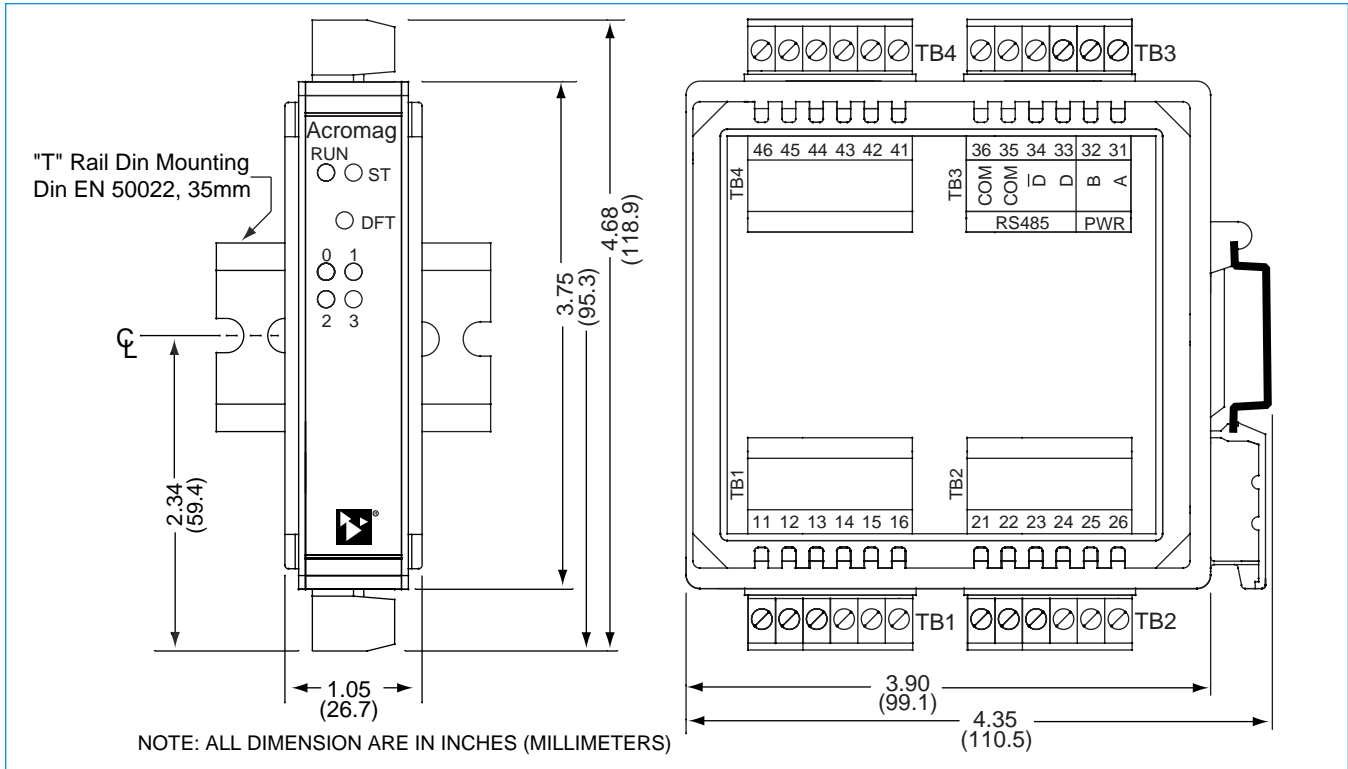
PS5R-D24  
Power supply (24V DC, 2.1A).  
See Power Supplies on Page 199.

For more information on software, network hardware, and mounting accessories, please see Pages 69-71.

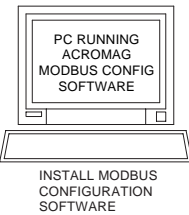




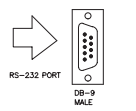
## 900MB Series Technical Diagrams



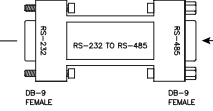
PERSONAL COMPUTER  
W/ WINDOWS 95/98 OR NT



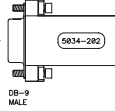
RS-232 SERIAL  
PORT CONNECTOR  
AT BACK OF PC



RS-232 TO RS-485  
CONVERTER  
MODEL 5034-214

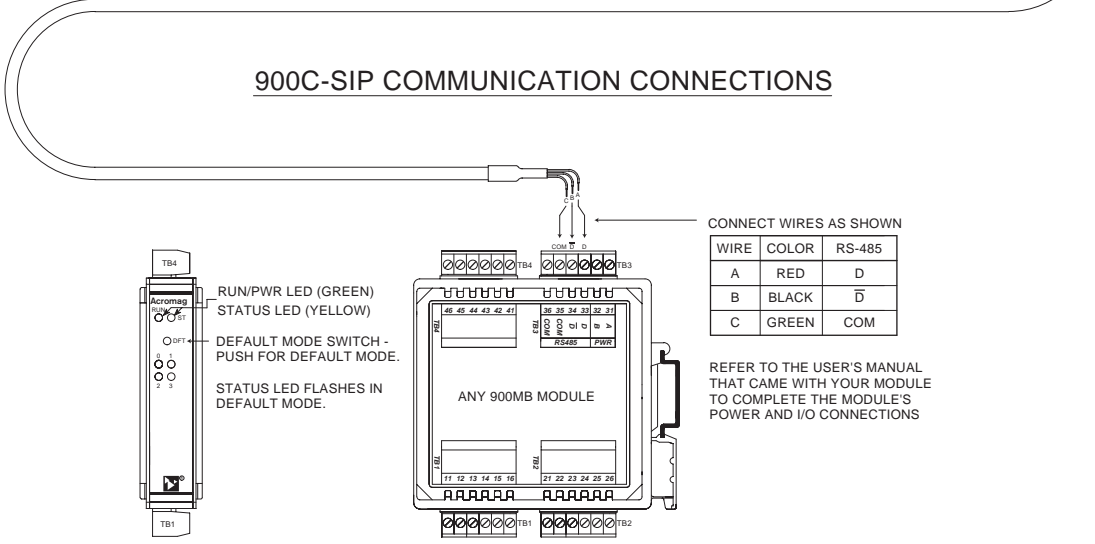


CABLE 5034-202



CAUTION: DO NOT CONNECT THE  
CABLE DIRECTLY TO THE PC WITHOUT  
THE CONVERTER, OR DAMAGE TO  
THE MODULE MAY RESULT.

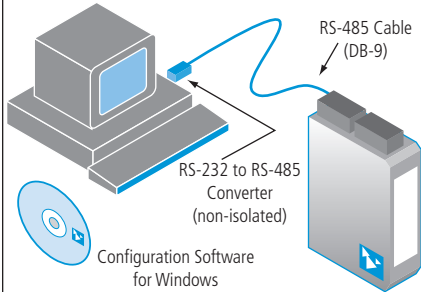
### 900C-SIP COMMUNICATION CONNECTIONS





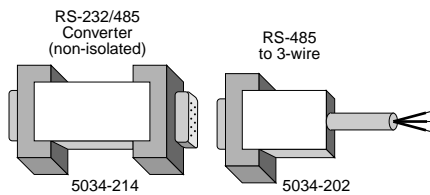
## Configuration Kit

Software Interface Package  
Model No. 900C-SIP



## Software Interface Package

This package includes Windows® Configuration Software, an RS-232-to-485 Serial Port Converter, and an RS-485 Signal Cable. These components provide everything you need to set up a Series 900 I/O module from your desktop PC before installing it on the network.



## Ordering Information

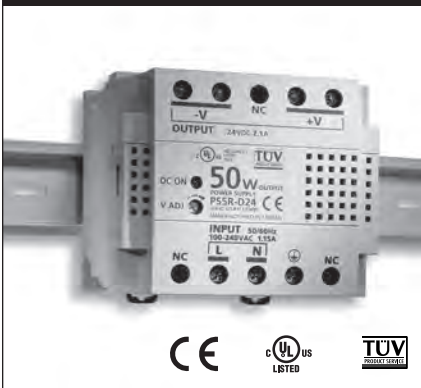
900C-SIP  
Software Interface Package.  
Includes Configuration Software (5034-186), Non-isolated RS-232 to RS-485 Serial Port Converter (5034-214), and RS-485 Cable (5034-202).  
Items can also be ordered separately below.

**5034-186**  
Configuration Software for Windows (95/98/2000/ME/NT4/XP) on CD-ROM.

**5034-214**  
Non-isolated RS-232 to RS-485 Serial Port Converter, DB-9F to DB-9F.

**5034-202**  
RS-485 to 3-wire Cable Converter, DB-9M to 3 x 12AWG RS-485 Cable, 8 ft.

## Network Power



## Universal 50W Power Supply

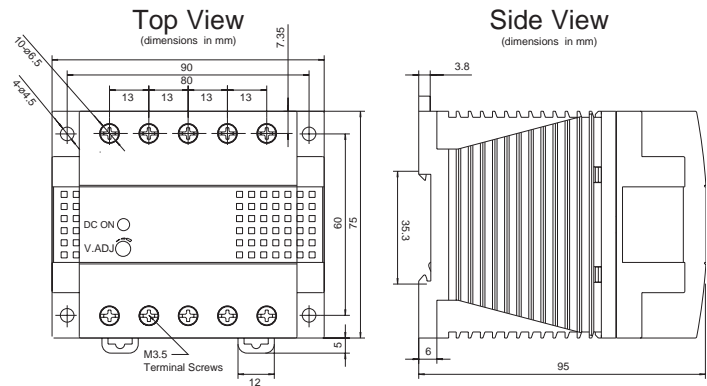
The PS5R-D24 is the ideal power source to drive your network.

**Input Power Requirement**  
Universal power  
85 to 264V AC,  
105 to 370V DC

**Output**  
24V DC, 2.1A (50W)

## Ordering Information

PS5R-D24  
Universal Power Supply



## Mounting Hardware



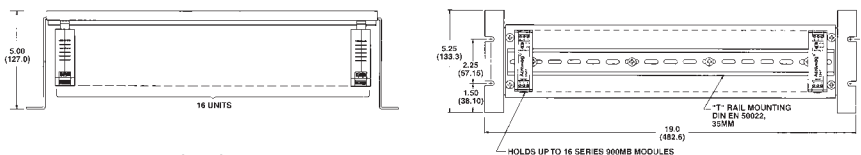
## DIN-Rail Mounting

For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.

## Ordering Information

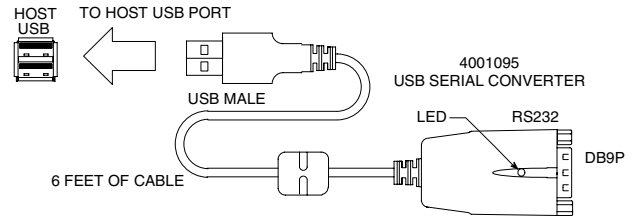
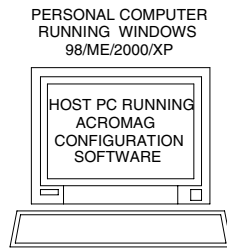
20RM-16-DIN  
19" rack-mount kit with DIN rail.

**DIN RAIL 3.0**  
**DIN RAIL 16.7**  
DIN rail strip, Type T, 3 inches (75mm) or 16.7 inches (425mm)



Dimensions in inches (mm).

## Model 4001-095 USB-to-Serial Adapter



Simplifies configuration of Acromag I/O Modules ♦ Enables configuration via USB port

### Description

This device is a USB-to-serial adapter that you can use to communicate with many Acromag I/O products for setup and re-configuration for your application.

### Key Features & Benefits

- Connects to I/O modules via USB (other adapters may be necessary)
- Complete RS232 control signals
- Conforms to USB Specification, Version 1.1
- USB-powered
- Cable length, 6 ft., UL approved

### Performance Specifications

**USB Specification**  
Version 1.1

**Data rate**  
Up to 115.2Kbps

**Environmental Standards**  
RoHS-compliant

**Basic Power Consumption**  
150mA

**PC Requirements**  
Windows® 7 (32-/64-bit) / Vista (32-/64-bit) / XP (32-/64-bit) / Server 2003 & 2008 (32-/64-bit) / 2000 / ME / 98SE / 98

### Ordering Information

NOTE: For more information visit [www.acromag.com](http://www.acromag.com).

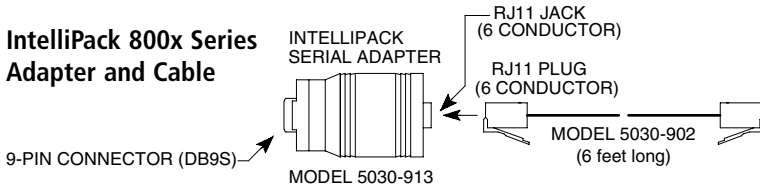
#### Adapters

- 4001-095**  
USB to serial adapter. Includes driver CD and manual.
- 5030-913**  
Serial port adapter. DB9S connector to RJ11 jack.
- 5034-202**  
RS-485 to 3-wire cable converter and cable, DB-9M to 3 x 12AWG RS-485 cable, 8 ft.
- 5032-287**  
RS-232 to 151T transmitter configuration device converter and cable, 6 ft.
- 5034-214**  
Non-isolated RS-232 to RS-485 Serial Port Converter, DB-9F to DB-9F.

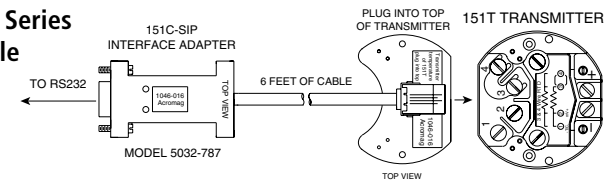
#### Cables

- 5030-902**  
Cable. 6 feet long with RJ11 plug at each end.

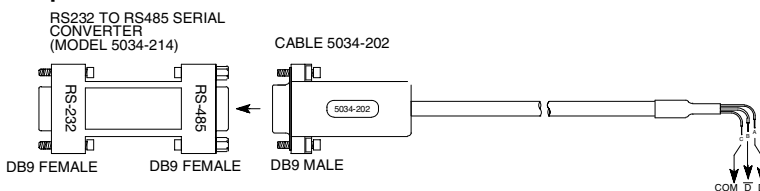
### IntelliPack 800x Series Adapter and Cable



### 151T Transmitter Series Adapter and Cable



### 900MB Modbus Series Adapter and Cable



Tel: 248-295-0880 ■ Fax: 248-624-9234 ■ [sales@acromag.com](mailto:sales@acromag.com) ■ [www.acromag.com](http://www.acromag.com) ■ 30765 S Wixom Rd, Wixom, MI 48393 USA