



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

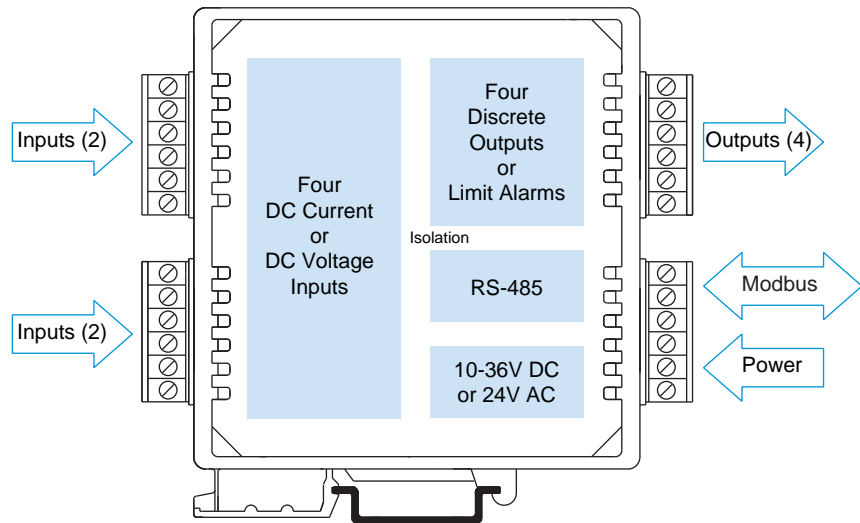
Power Requirement

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)

5020-350

AC current sensor for 913MB. One for each channel

TBK-B02

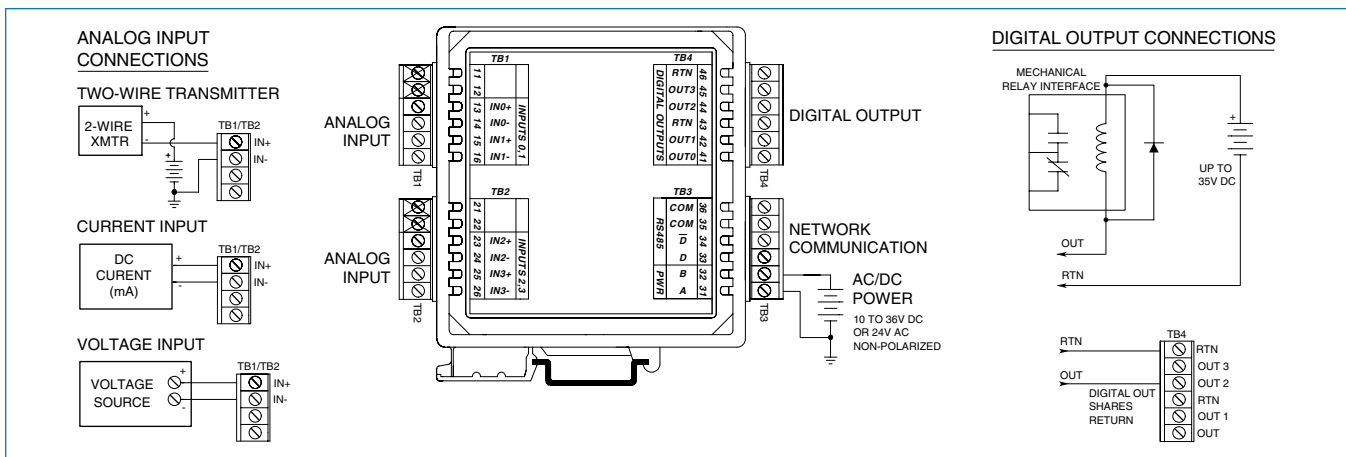
Optional terminal block kit, barrier strip style, 4 pcs.

TBK-S02

Optional terminal block kit, spring clamp style, 4 pcs.

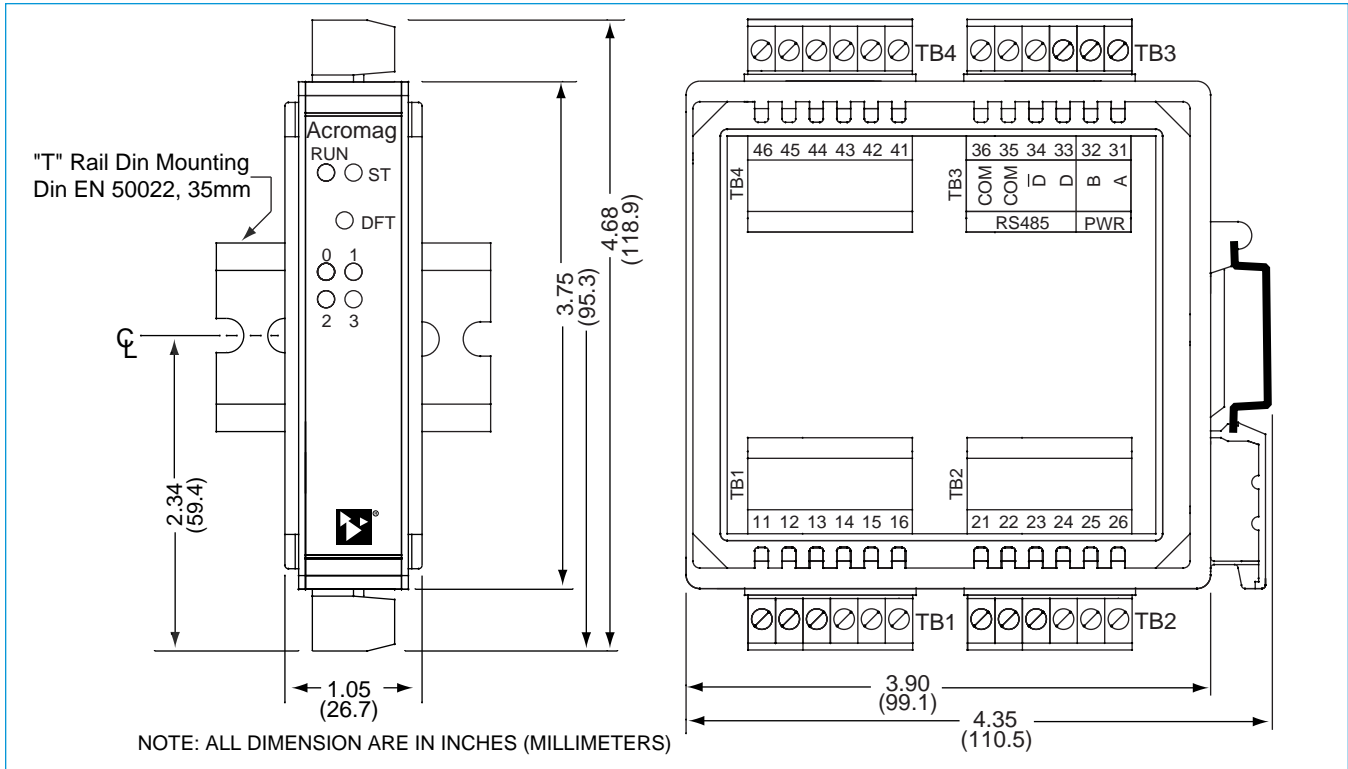
PS5R-VB24

Power supply (24V DC, 2.1A)





900MB Series Technical Diagrams



BusWorks® Modbus I/O

