Modbus/RS-485

917/918MB Multi-Channel Analog Output Modules

DC Current or DC Voltage Outputs

Discrete Outputs

Models
917MB: 4 current output channels
918MB: 4 voltage output channels

Analog Output
917MB: 0 to 20mA, 4 to 20mA, 0 to 1mA DC
918MB: 0 to 10V, 0 to 5V, 0 to 1V DC

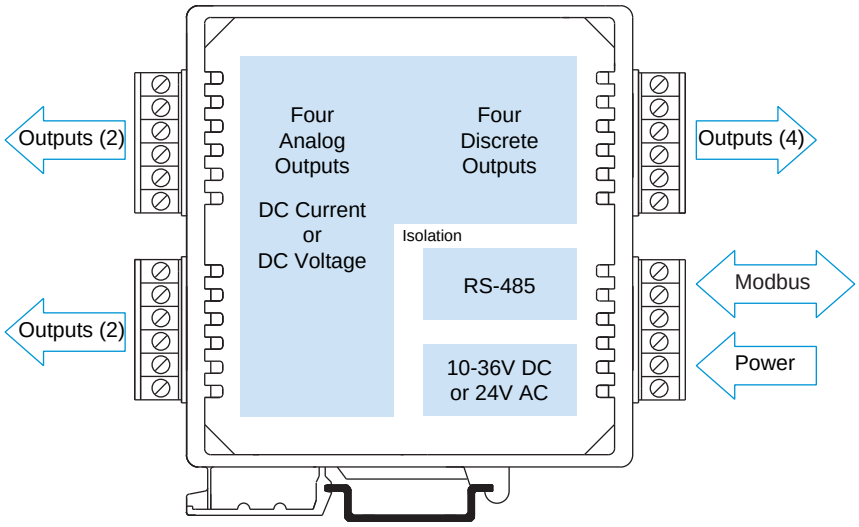
Discrete Output
Four output channels:
Open-drain MOSFETs (1A DC loads)
0 to 35V DC

Network Communication
Modbus-RTU high-speed RS-485

Power Requirement
12 to 36V DC (917MB), 10 to 36V DC (918MB), 24V AC

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

Analog Output Module



Description

These modules drive four analog output channels and also feature four discrete outputs for on/off control. Isolation separates the 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 analog outputs generate a signal based on communication from the host. They accommodate wide DC voltage or current ranges.

Discrete outputs provide simple on/off switching capability (open-drain) for external devices.

Combining analog outputs, on/off controllers, 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 make it reliable for both control room and distributed field I/O use in a broad range of temperature control 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)
- 12-bit D/A yields 0.1% of span resolution and accuracy
- Four analog outputs in an inch-wide module reduces system costs and saves panel space
- Four discrete outputs enable 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
- Three-way isolation eliminates potential ground loops between power, output, and network circuitry
- Self-diagnostics monitor microcontroller activity to detect operational failures (lock-up) and execute a reset to restore communication

Performance

General Analog Output

Resolution
See current/voltage output specifications for more information.

Ambient Temperature Effect
Better than ±0.001% of output span per °C, or ±1.0uV/°C, whichever is greater.

Ambient Temperature
Operation (917MB): -25°C to 60°C* (-13°F to 140°F*).
Operation (918MB): -25°C to 70°C (-13°F to 158°F).
Storage: -40°C to +85°C (-40°F to +185°F).

* Limit 917MB maximum ambient to 50°C (122°F) when using supply voltages less than 15V DC.

Current Output (917MB)

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

Output Range	Resolution	Accuracy (% span)
0 to 1mA	0.554%	±2.0% (±0.002mA)
0 to 20mA	0.028%	±0.1% (±0.02mA)
4 to 20mA	0.035%	±0.1% (±0.02mA)

Maximum Output Current
22.5mA DC typical.

Integral Non-Linearity
±0.1% of span or ±2 LSB typical, whichever is larger, for spans equal to or greater than 16mA.

Output Compliance
12V minimum, 12.7V typical.

Output Load Resistance Range
0 to 630 ohms typical.

Response Time
11ms typical into 500 ohms, for measurement to reach 98% of the final value in response to a step command. Actual response time will vary with load.

Voltage Output (918MB)

DC Voltage Output Ranges
Range user-configured. Selection applies to all channels.

Output Range	Resolution	Accuracy (% span)
0 to 1V	0.274%	±0.6% (±6mV)
0 to 5V	0.055%	±0.1% (±5mV)
0 to 10V	0.027%	±0.1% (±10mV)

Maximum Output Voltage
11.255V DC typical.

Integral Non-Linearity
±0.1% of span or ±2 LSB typical, whichever is larger, for spans equal to or greater than 5V.

Output Current
0 to 10mA DC maximum.

Output Impedance
1 ohm.

Output Short Circuit Protection
Included.

Response Time
110µs rise time typical, 150µs fall time typical, unloaded, for output to reach 98% of the final value in response to a step command. Time varies with load.

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 (up to 1A/channel continuous). External voltage source required.

Output ON Resistance
0.15 ohms maximum.

Operation
Digital outputs are set to their OFF state following a software or power-on reset. Outputs may 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.

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

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 (918MB), 12 to 36V DC (917MB)
22 to 26V AC.

Supply Current

Supply	Current Draw (917)	Current Draw (918)
10V DC	Not Recommended	100mA maximum
12V DC	275mA maximum	85mA maximum
24V DC	120mA maximum	45mA maximum
24V AC	210mA rms max.	85mA rms max.

Isolation
1500V AC for 60 seconds or 250V AC continuous. 3-way isolation between outputs, network, and power circuits.

Ordering Information

Models

917MB-0900
918MB-0900
DC current (917MB) or voltage (918MB) output module

Accessories

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

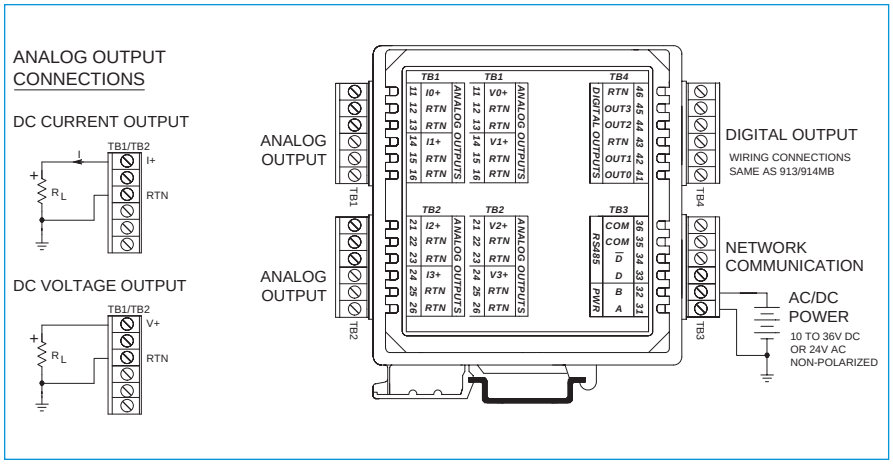
4001-095
USB-to-RS232 adapter. See page 70 for more info.

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

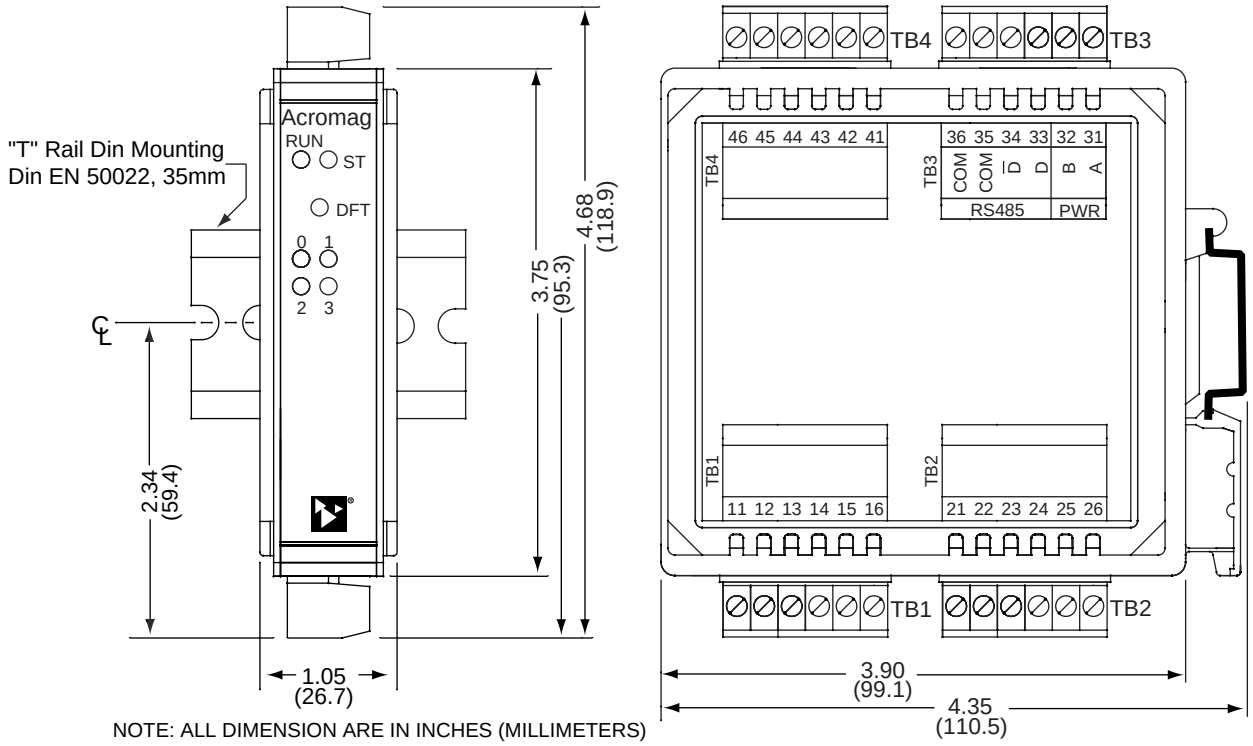
TBK-S02
Optional terminal block kit, spring clamp style, 4 pcs.

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

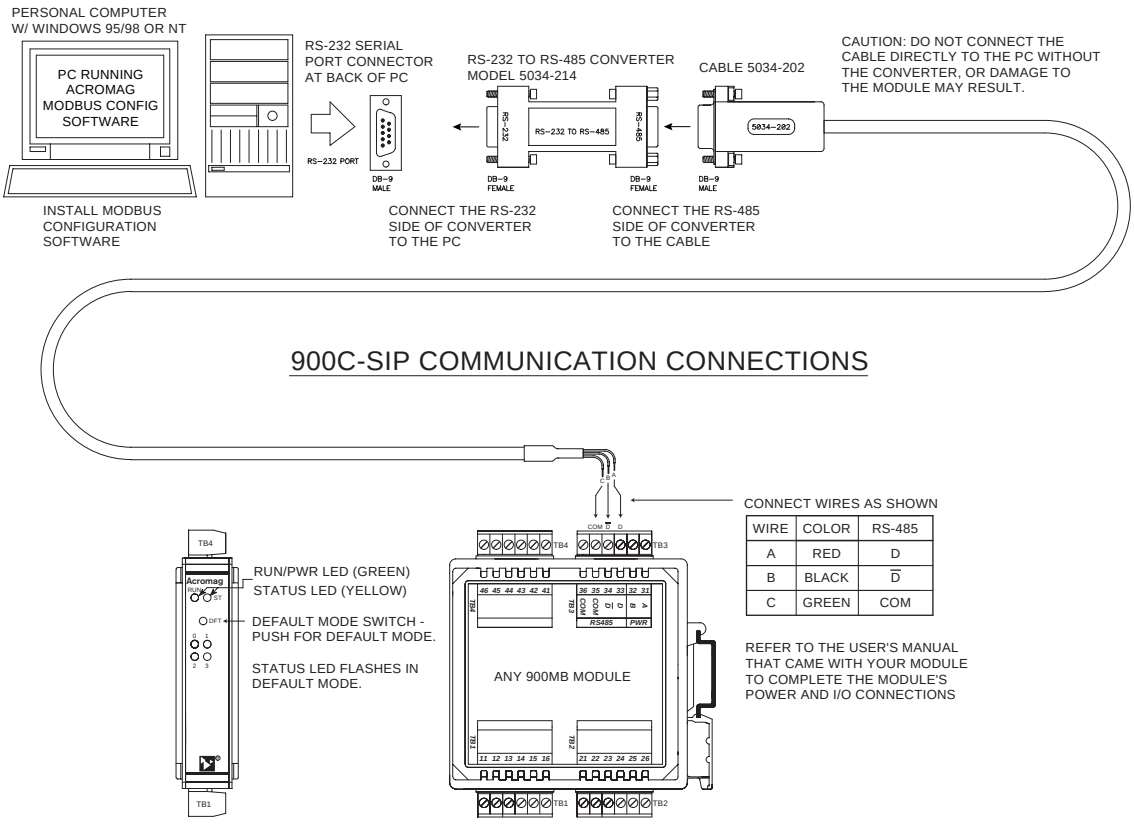
For more information on software, network hardware, and mounting accessories, please see Pages 69-71.



900MB Series Technical Diagrams



NOTE: ALL DIMENSION ARE IN INCHES (MILLIMETERS)



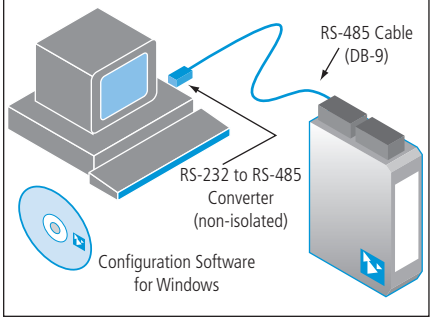
900C-SIP COMMUNICATION CONNECTIONS

WIRE	COLOR	RS-485
A	RED	D
B	BLACK	D̄
C	GREEN	COM

REFER TO THE USER'S MANUAL THAT CAME WITH YOUR MODULE TO COMPLETE THE MODULE'S POWER AND I/O CONNECTIONS

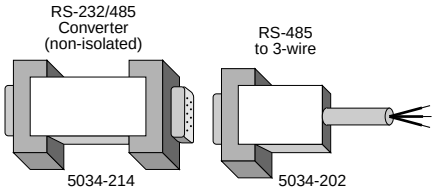
Configuration Kit

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.

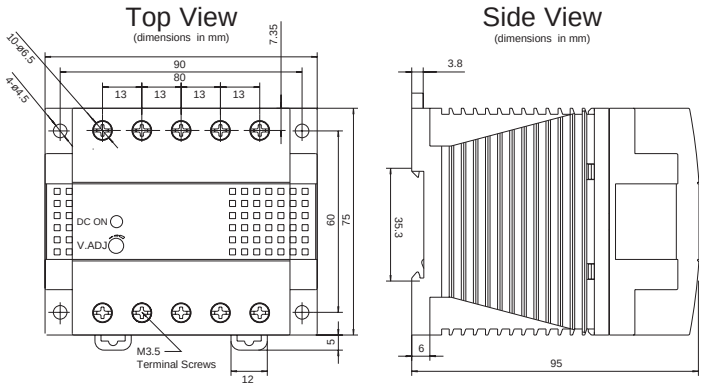
Network Power

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

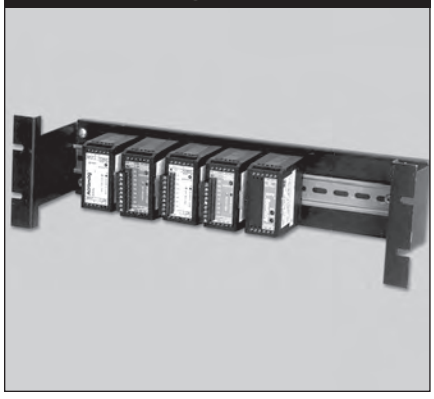
Output
24V DC, 2.1A (50W)



Ordering Information

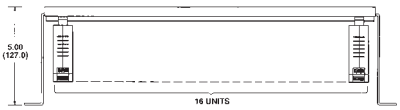
PS5R-D24
Universal Power Supply

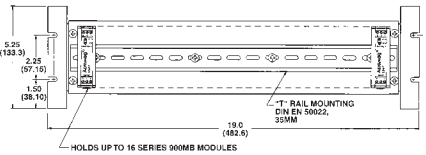
Mounting Hardware



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.





Dimensions in inches (mm).

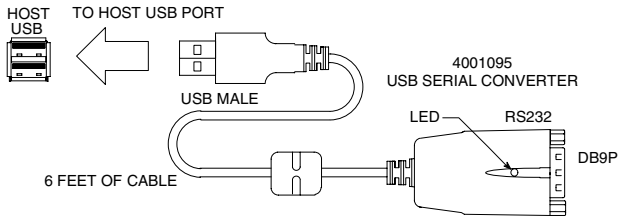
Ordering Information

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)

Accessories

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.

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.

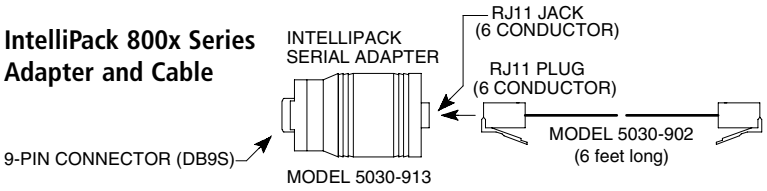
5032-287
RS-232 to 151T transmitter configuration device converter and cable, 6 ft.

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

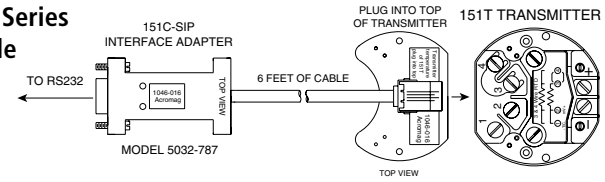
Cables

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