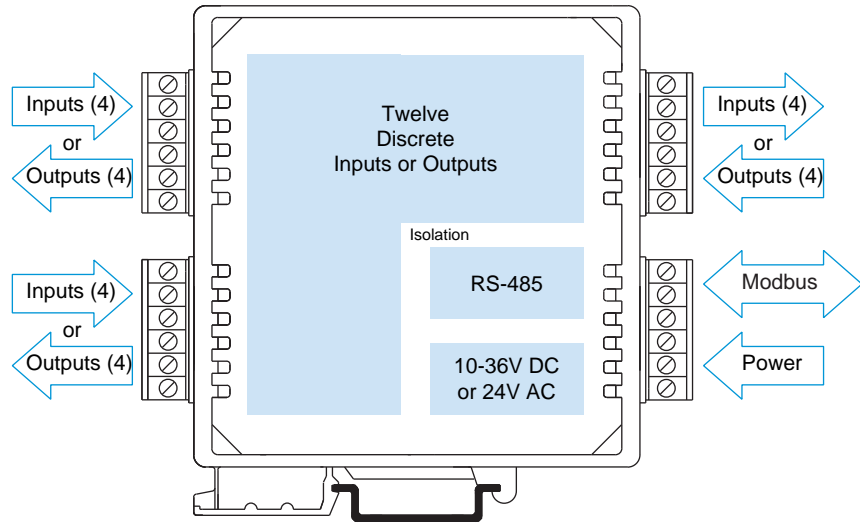




## Modbus/RS-485



## High-Density Discrete I/O Module



## 901/902/903MB Multi-Channel Discrete I/O Modules

### Active-Low Inputs Sinking Outputs (Low-Side Switching)

#### Models

- 901MB: 12 input channels
- 902MB: 12 output channels
- 903MB: 12 input/output channels

#### Input

Twelve input channels (901, 903 models only)  
0 to 35V DC

#### Output

Twelve output channels (902, 903 models only)  
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.

### Description

These modules provide twelve discrete input and/or output channels. Isolation separates the I/O, power, and network circuits. Network communication adheres to the industry-standard RS-485 Modbus RTU protocol. Both AC and DC power sources are supported with wide range, nonpolarized, diode-coupled terminals.

The open-drain outputs are intended for current-sinking or low-side switching applications. The buffered inputs are active-low. These models are the complement of the 904, 905, and 906 units which have open-source, high-side output switches and active-high inputs. Socketed pull-up resistors are easily removed or exchanged to satisfy your application requirements.

The 903MB model has twelve input/output points that may be used as inputs or outputs on a bit-by-bit basis. Outputs may be read back to verify output settings.

Combining flexible I/O types, wide I/O ranges, 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)
- Twelve I/O channels in a single inch-wide unit reduces system costs and saves panel space
- High-voltage, high-current, open-drain outputs enable direct (low-side) control of external devices
- High-voltage buffered inputs monitor discrete levels from a variety of industrial devices
- Tandem input/output circuitry (903 models only) connects input buffers with open-drain outputs for convenient loopback monitoring of the output state
- Outputs have built-in over-temperature and over-current shut-down protection, plus active clamping circuits for switching inductive loads
- 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, I/O, and network circuitry
- Self-diagnostics monitor microcontroller activity to detect operational failures (lock-up) and execute a reset to restore communication



## Performance

### Discrete Inputs (901 & 903 models only)

#### Input Type

12 active-low, buffered inputs, with a common connection. Inputs include transient suppression devices and series connected 100K ohm resistors, plus diode over-voltage clamps to the internal +5V supply.

#### Input Signal Voltage Range

0 to 35V DC, maximum.

#### Input Current

293µA, typical at 35V DC.

#### Input Signal Threshold

TTL compatible with 100mV of hysteresis, typical. Low-to-High threshold is 1.7VDC, High-to-Low is 1.6VDC, typical. Limited to TTL levels of 0.8VDC (max. LOW level) and 2.0VDC (min. HIGH level).

#### Input Resistance

100K ohms, typical.

#### Input Hysteresis

100mV DC, typical.

### Discrete Outputs (902 & 903 models only)

#### Output Type

12 independent, open-drain, DMOS MOSFET switches with a common source connection that operate as low-side switches.

#### Output Voltage Range

0 to 35V DC max. (0 to 500mA/channel continuous). External voltage source required.

#### Output ON Resistance

0.28 ohms maximum.

#### Output Response Time

Force Single Coil: Output updates within 250µs of receipt of a command.

Force Multiple Coils: First coil updates in 250µs, followed successively by additional coils every 180µs.

## General

### I/O Pull-ups and Socket

5.6K ohm pull-up resistor SIPs are installed in sockets at each port (four-channels per port).

### Excitation (per port)

External excitation voltage for each four-channel port is limited to 35V or less.

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

### LED Indicators

LEDs indicate power, status, and discrete level.

### Power Requirements

10 to 36V DC,  
22 to 26V AC.

### Supply Current

Supply	Current Draw
10V DC	130mA maximum
24V DC	54mA maximum
24V AC	95mA maximum

### Isolation

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

## Ordering Information

### Models

901MB-0900  
Discrete input module

902MB-0900  
Discrete output module

903MB-0900  
Discrete input/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.

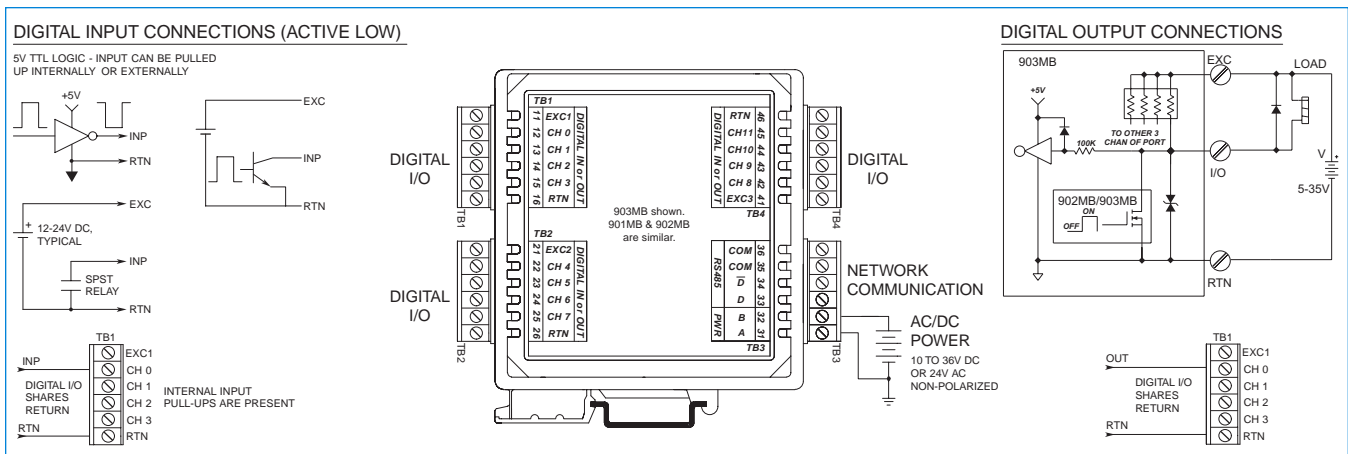
#### P55R-D24

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.

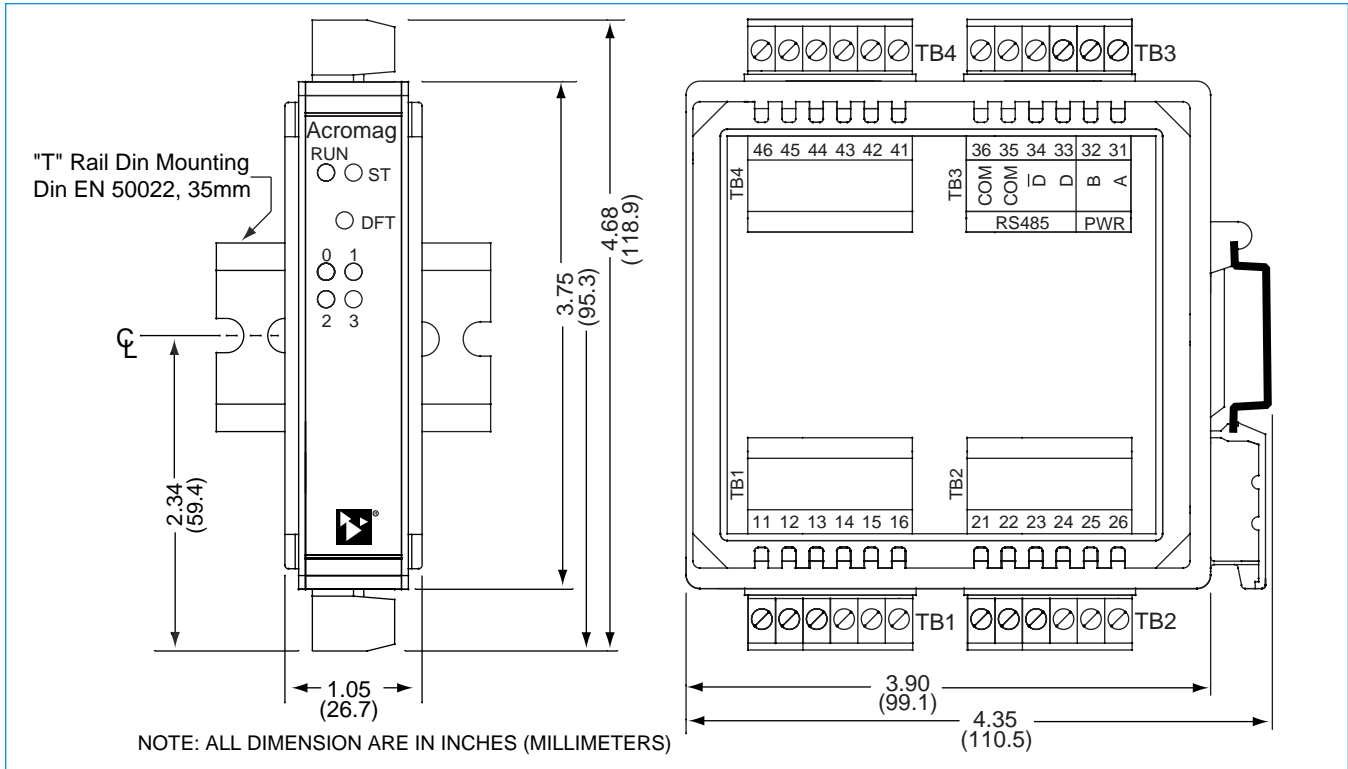


Optional terminal blocks: barrier strip (left) and spring clamp (right). Cage clamp terminal is standard.





## 900MB Series Technical Diagrams

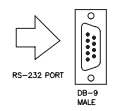


PERSONAL COMPUTER  
W/ WINDOWS 95/98 OR NT



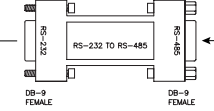
INSTALL MODBUS  
CONFIGURATION  
SOFTWARE

RS-232 SERIAL  
PORT CONNECTOR  
AT BACK OF PC



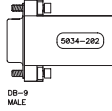
CONNECT THE RS-232  
SIDE OF CONVERTER  
TO THE PC

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



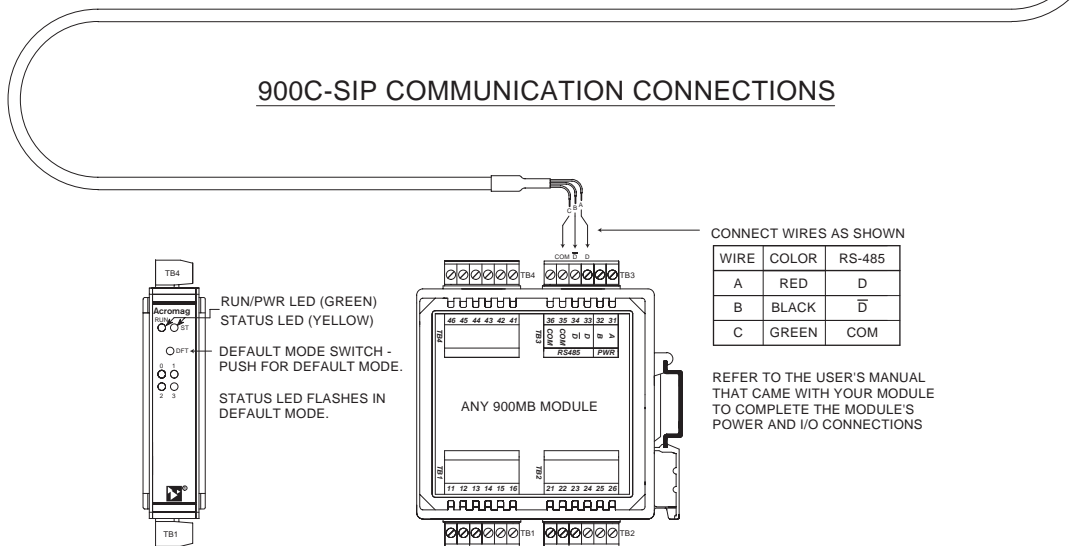
CONNECT THE RS-485  
SIDE OF CONVERTER  
TO THE CABLE

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

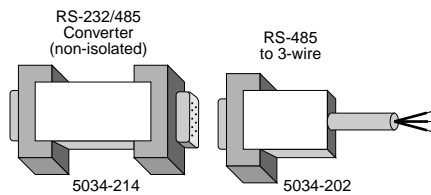
RS-485 Cable (DB-9)

RS-232 to RS-485 Converter (non-isolated)

Configuration Software for Windows

## 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

OUTPUT: 24VDC, 2.1A

50W

PS5R-D24

INPUT: 85-264VAC, 1.5A

DC ON

V.ADJ.

CE, UL LISTED, TUV

## Universal 50W Power Supply

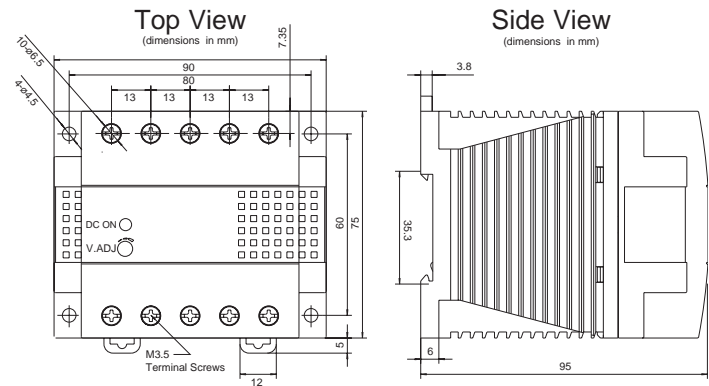
The PS5R-D24 is the ideal power source to drive your network.

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

Output  
24V DC, 2.1A (50W)

### Ordering Information

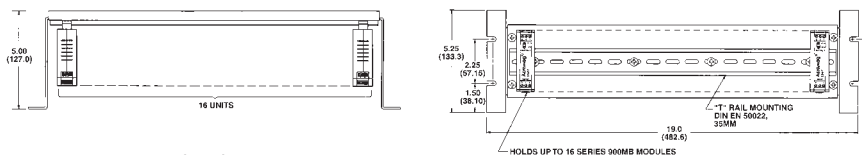
PS5R-D24  
Universal Power Supply



### Mounting Hardware

## DIN-Rail Mounting

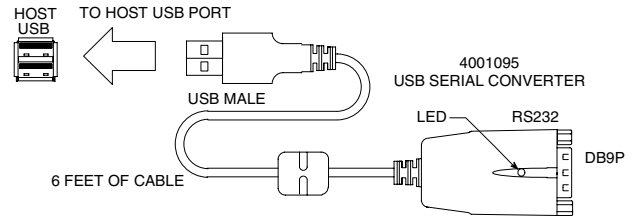
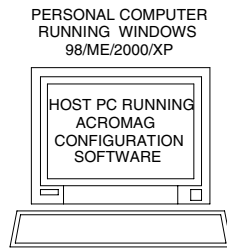
For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.



### 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)

## 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).

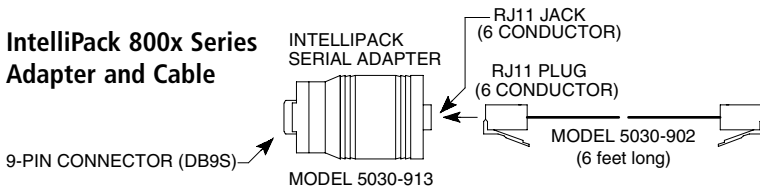
#### Adapters

- 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.

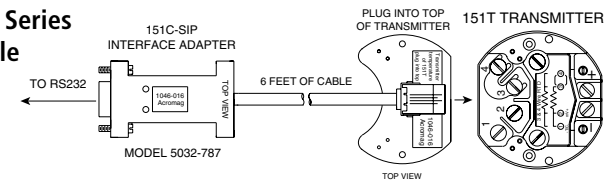
#### Cables

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

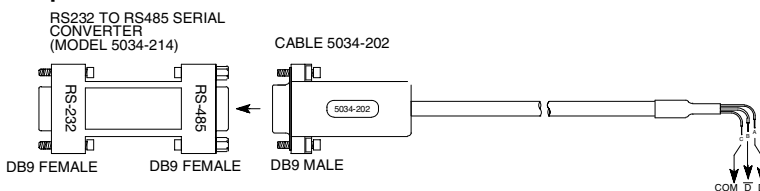
### IntelliPack 800x Series Adapter and Cable



### 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