## Profibus-DP / RS485

PNO Certified

2 YEAR WARRANTY

c(UL)us LISTED



NOTE: Dimensions Are INCHES (MILLIMETERS).

RTD INPUTS 4, 5 (966PB-2006 only)

SLAVE ADDRESS (HEX)

RTD INPUTS 0, 1

RTD INPUTS 2, 3
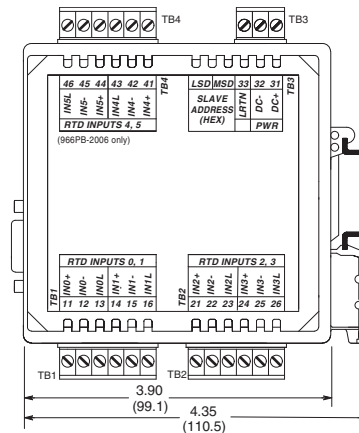
# 966PB
# Analog Input:

## 4 or 6-Channel Input: RTD or Resistance Signals

## ■ Description

These modules provide an isolated Profibus-DP network interface for up to six input channels. Multi-range inputs accept signals from a variety of sensors and devices. High-resolution, low noise, A/D converters deliver high accuracy and reliability. 3-way isolation further improves the system performance.

### Input Ranges
RTD (user-selectable type)
*2-wire and 3-wire RTDs are supported.*
Platinum 100 ohm (alpha = 1.3850 or 1.3911)
Nickel 120 ohm
Copper 10 ohm

Resistance
0 to 500 ohms

### Network Communication
Profibus-DP, RS-485 network up to 12Mbaud

### Power Requirement
12 to 36V DC supply required

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

## ■ Special Features

■ Standard Profibus-DP network communication with industry-standard ASIC (Siemens SPC3)

■ 6-input stand-alone module has much lower start-up cost than multi-piece block I/O systems

■ Versatile RTD or ohmic inputs support a wide variety of industrial sensors and devices

■ RTD break detection (upscale or downscale) identifies sensor wiring failures

■ High-resolution 16-bit Σ–Δ A/D converters ensure precise, high accuracy measurements

■ Compact packaging with pluggable terminals saves space and simplifies wiring

■ Wide operational temperature range permits installation in extreme environments

## ■ Performance

### ■ General Specifications
See Page 47 for communication and other specs.

### ■ Input
Configuration
Input ranges are selectable for a 3-channel group.

Accuracy

| Input Type | Input Range | Accuracy (typical) |
|---|---|---|
| Pt 100 ohm | -200 to 850°C | ±0.25°C |
| Ni 120 ohm | -80 to 320°C | ±0.25°C |
| Cu 10 ohm | -200 to 260°C | ±1.25°C |
| Resistance | 0 to 500 ohms | ±0.05 ohms |

RTD Break Detection
Upscale or downscale selection applies to all channels.

Analog to Digital Converter (A/D)
16-bit Σ–Δ converter.

### Noise Rejection
Normal Mode: Better than 40dB @ 60Hz.
Common Mode: Better than 130dB @ 60Hz.

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

### Excitation Current
1mA DC typical, all RTD types.

## ■ Environmental

### Ambient Temperature
Operating: -25 to 70°C (-13 to 158°F).
Storage: -40 to 85°C (-40 to 185°F).

### Relative Humidity
5 to 95%, non-condensing.

### Isolation
1500V AC for 60 seconds or 250V AC continuous. 3-way isolation between I/O, network, and power. Inputs share a common.

## ■ Ordering Info

### Models
966PB-2004
4-channel RTD/resistance input module

966PB-2006
6-channel RTD/resistance input module

NOTE: Modules include GSD files on CD-ROM.

### Accessories (see Page 48)
PS5R-VD24
Power supply (24V DC, 2.1A).
See Power Supplies on Page 199.

TBK-B03
Optional terminal block kit, barrier strip style, 4 pcs.

TBK-S03
Optional terminal block kit, spring clamp style, 4 pcs.

# General Operation and Performance Specifications

*The following specifications are common to all 900PB Series I/O modules.*

## ■ Communication

**Interface Standard**
Isolated, 3-wire RS-485 multi-drop, half-duplex, asynchronous.

**Command/Response Protocol**
Standard ProfiBus DP (Master/Slave) protocol per European Norm EN50170.

**Baud Rate**
Supports rates of 9600, 19.2K, 44.45K, 93.75K, 187.5K, 500K, 1.5M, and 12M bits per second, auto-detected.

**Communication Distance**
Up to 1200 meters without a repeater using Type A wire (<30pF/m).

1200m @ 115Kbps or less
1000m @ 187.5Kbps
400m @ 500Kbps
200m @ 1.5Mbps
100m @ 12Mbps

**Address**
Set via two rotary hexadecimal switches or via the Set Slave Address command. Valid setting is 0-125. Address 126 (7EH) is factory default address.

**Maximum Message Size**
Up to 32 bytes recommended, extendable up to 244 bytes of data/node/message, plus 11 bytes of overhead (data frame).

**Network Capacity**
Multi-drop up to 31 modules, plus a host, without a repeater.  Up to 125 modules plus a host if four repeaters are used (one for every 31 nodes).

## ■ Environmental

**Isolation**
I/O channel, power, and network circuits are isolated from each other for common-mode voltages up to 250VAC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC dielectric strength test for one minute without breakdown). Complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

## ■ Electromagnetic Compatibility (EMC)

Immunity per European Norm EN50082-1.
Emissions per European Norm EN50081-1.

**Electrostatic Discharge (ESD) Immunity**
Per EN61000-4-2.

**Radiated Field Immunity (RFI)**
Per EN61000-4-3 and ENV50204.

**Electrical Fast Transient Immunity (EFT)**
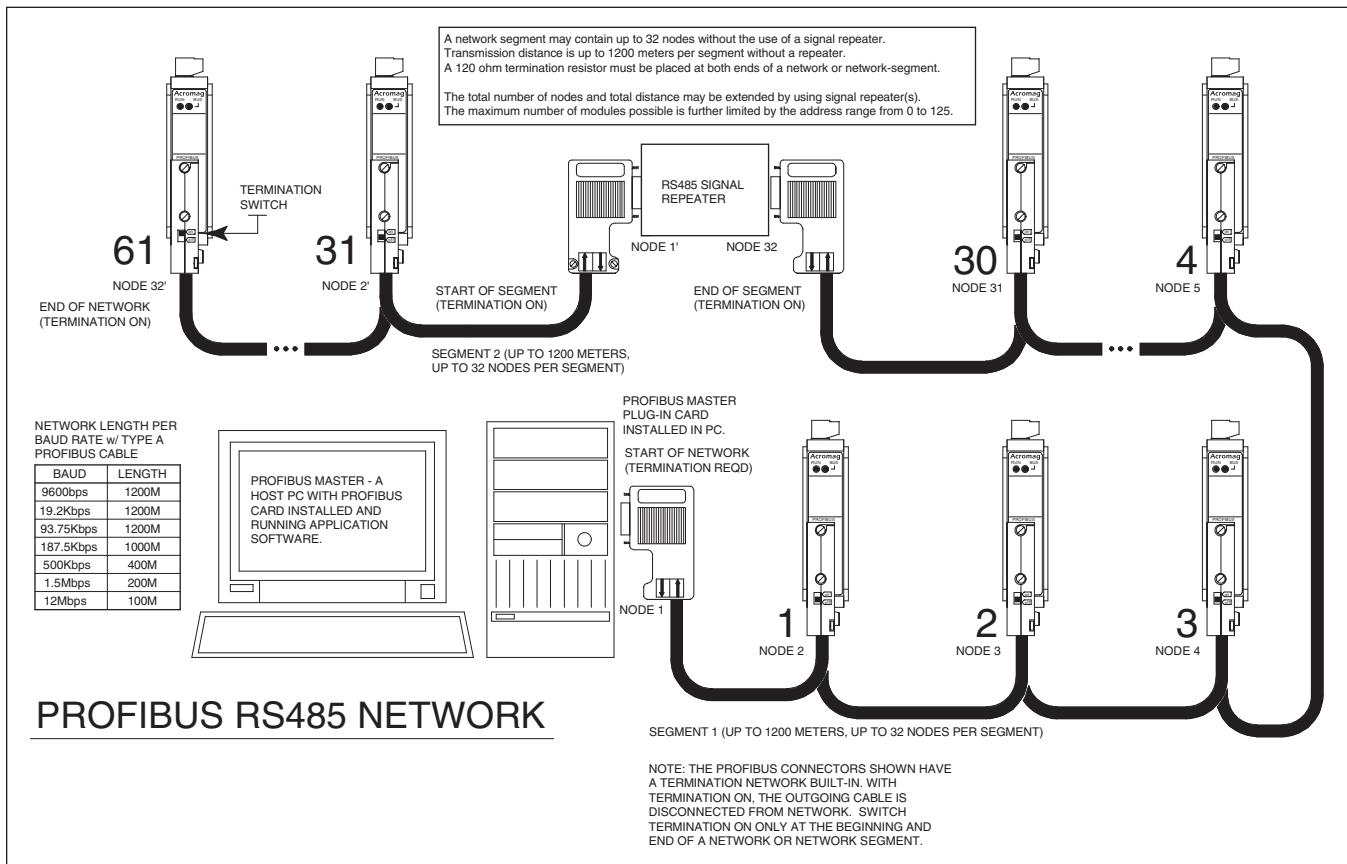Per EN61000-4-4.

**Conducted RF Immunity (CRFI)**
Per EN61000-4-6.

**Surge Immunity**
Per EN61000-4-5.

**Radiated Frequency Emissions**
Per EN55022 Class B.

A network segment may contain up to 32 nodes without the use of a signal repeater.
Transmission distance is up to 1200 meters per segment without a repeater.
A 120 ohm termination resistor must be placed at both ends of a network or network-segment.

The total number of nodes and total distance may be extended by using signal repeater(s).
The maximum number of modules possible is further limited by the address range from 0 to 125.

TERMINATION SWITCH

RS485 SIGNAL REPEATER

NODE 1'     NODE 32

61 NODE 32'     31 NODE 2'     30 NODE 31     4 NODE 5

END OF NETWORK (TERMINATION ON)

START OF SEGMENT (TERMINATION ON)     END OF SEGMENT (TERMINATION ON)

SEGMENT 2 (UP TO 1200 METERS, UP TO 32 NODES PER SEGMENT)

NETWORK LENGTH PER BAUD RATE w/ TYPE A PROFIBUS CABLE

| BAUD | LENGTH |
|---|---|
| 9600bps | 1200M |
| 19.2Kbps | 1200M |
| 93.75Kbps | 1200M |
| 187.5Kbps | 1000M |
| 500Kbps | 400M |
| 1.5Mbps | 200M |
| 12Mbps | 100M |

PROFIBUS MASTER - A HOST PC WITH PROFIBUS CARD INSTALLED AND RUNNING APPLICATION SOFTWARE.

PROFIBUS MASTER PLUG-IN CARD INSTALLED IN PC.

START OF NETWORK (TERMINATION REQD)

NODE 1

1 NODE 2     2 NODE 3     3 NODE 4

PROFIBUS RS485 NETWORK

SEGMENT 1 (UP TO 1200 METERS, UP TO 32 NODES PER SEGMENT)

NOTE: THE PROFIBUS CONNECTORS SHOWN HAVE A TERMINATION NETWORK BUILT-IN. WITH TERMINATION ON, THE OUTGOING CABLE IS DISCONNECTED FROM NETWORK.  SWITCH TERMINATION ON ONLY AT THE BEGINNING AND END OF A NETWORK OR NETWORK SEGMENT.

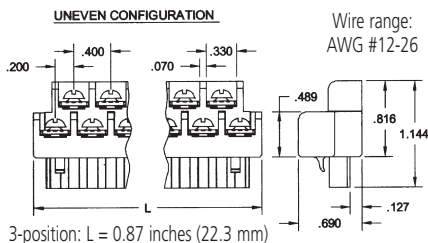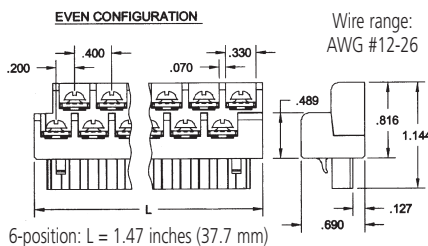# Accessories

## Terminal Blocks



Barrier strip (left) and spring clamp (right).

### ■ Ordering Information
See individual I/O modules for compatibility.

**Barrier Strip Terminal Blocks**



EVEN CONFIGURATION

Wire range: AWG #12-26

6-position: L = 1.47 inches (37.7 mm)

UNEVEN CONFIGURATION

Wire range: AWG #12-26

3-position: L = 0.87 inches (22.3 mm)

**TBK-B01**
Terminal block kit,
two 6-position pieces

**TBK-B02**
Terminal block kit,
four 6-position pieces

**TBK-B03**
Terminal block kit,
one 3-position and
three 6-position pieces

**Spring Clamp Terminal Blocks**



Wire range: AWG #12-26

3-position:
L = 0.66 inches (16.9 mm)

6-position:
L = 1.26 inches (32.3 mm)
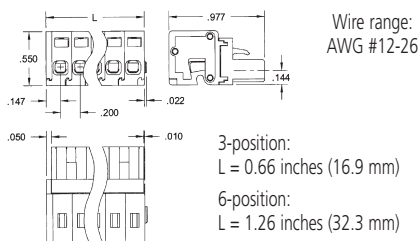
**TBK-S01**
Terminal block kit,
two 6-position pieces

**TBK-S02**
Terminal block kit,
four 6-position pieces

**TBK-S03**
Terminal block kit,
one 3-position and
three 6-position pieces

## 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.
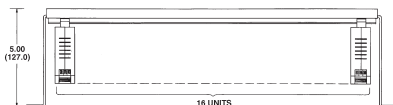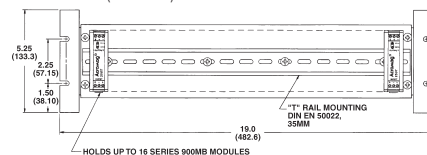
### ■ Ordering Information
**20RM-16-DIN**
19" rack-mount kit with DIN rail.

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



## Power Supplies



### 50W Supply
**Input Power Requirement**
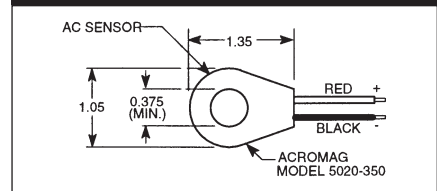85 to 264V AC or 105 to 370V DC

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

### ■ Ordering Information
**PS5R-VD24**
Universal 50W power supply

See Power Supplies on Page 199 for other models and more information.

## AC Current Sensor



### ■ Ordering Information
**5020-350**
AC current sensor (See page 205)