Profibus-DP / RS485

PNO Certified

BusWorks® Profibus I/O

NOTE: Dimensions Are INCHES (MILLIMETERS).

"T" RAIL DIN MOUNTING DIN EN 50022, 35mm

981/982/983PB Discrete I/O:

12-Channel I/O: Active-Low Inputs, Sinking Outputs (Low-Side Switching)

Models
981PB: 12 input channels
982PB: 12 output channels
983PB: 12 input/output channels

■ Description

These modules provide an isolated Profibus-DP network interface for twelve discrete input and/or output channels. The outputs provide direct on/off, high/low, or open/close control of industrial devices. The inputs sense the status of motors, pumps, valves and other equipment. The 983PB model with tandem I/O provides output level control and status verification in one unit.

Input Range
0 to 35V DC

Output Range
0 to 35V DC

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)

■ 12-channel stand-alone module has far lower start-up cost than multi-piece block I/O systems

■ 0-35V DC solid-state logic interface can monitor or control a wide variety of devices

■ Bidirectional I/O models facilitate loopback monitoring of the output state

■ Socketed SIP resistors provide input and output 5.6K ohm pull-ups to the excitation supply

■ Three selectable failsafe modes (off, last-state, or pre-defined) help prevent unsafe conditions

■ Compact packaging with pluggable terminals saves space and simplifies wiring

■ Wide operational temperature range permits installation in extreme environments

■ Performance

■ General Specifications
See Page 17 for communication and other specs.

■ Input (981 & 983 models)
Input Type
Twelve active-low, buffered inputs, with a common connection. Built-in 5.6K ohm pullups to excitation terminal socketed for 4-channel groups.

Input Signal Voltage Range
0 to 35V DC, maximum.

Input Impedance
100K ohms, typical.

Input Signal Threshold
TTL compatible with 100mV of hysteresis, typical.

■ Output (982 & 983 models)
Output Type
12 independent, open-drain, DMOS MOSFET switches.

Output Voltage Range
0 to 35V DC max. (0 to 500mA/channel continuous).

Output ON Resistance
0.28 ohms maximum.

■ Environmental
Ambient Temperature
Operating: -25 to 70°C (-13 to 158F).
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.

■ Ordering Information

Models
981PB-2012
Discrete input module, 12 channels

982PB-2012
Discrete output module, 12 channels

983PB-2012
Discrete input/output module, 12 channels

NOTE: Modules include GSD files on CD-ROM.

Accessories (see Page 18)
PS5R-D24
Power supply (24V DC, 2.1A).
See Power Supplies on page 183.

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

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

BusWorks®

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.

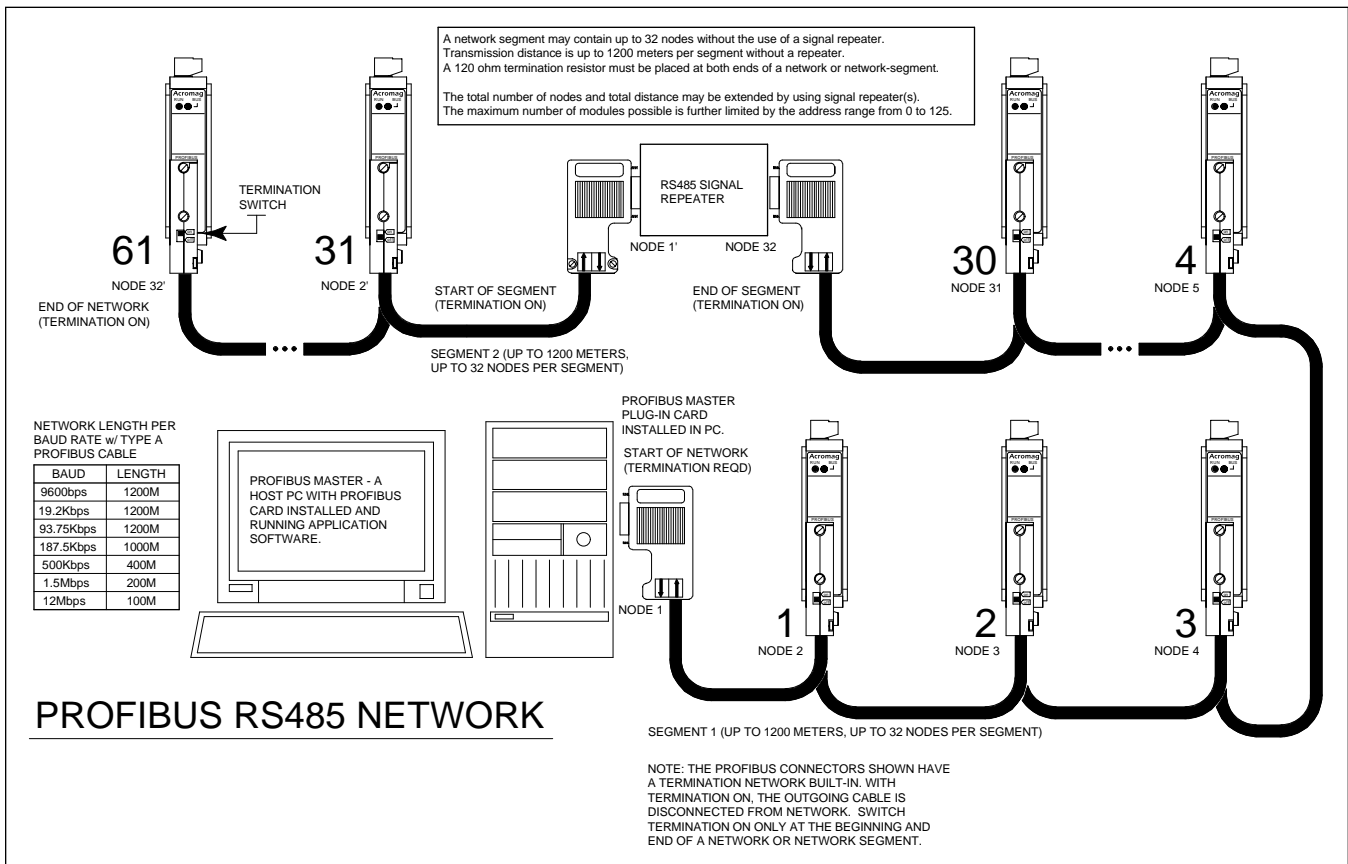### Electrostatic Discharge (ESD) Immunity
Per EN61000-4-2.

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.

BusWorks® Profibus I/O

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.

RS485 SIGNAL REPEATER

NODE 1'   NODE 32

61 — NODE 32' — END OF NETWORK (TERMINATION ON)

TERMINATION SWITCH

31 — NODE 2'

START OF SEGMENT (TERMINATION ON)

END OF SEGMENT (TERMINATION ON)

30 — NODE 31

4 — NODE 5

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.
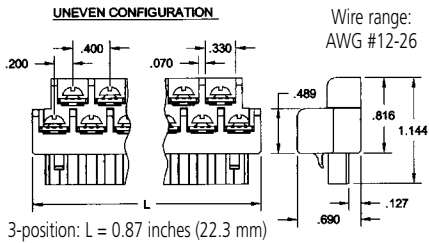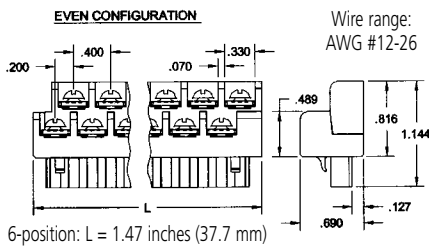
Accessories

Terminal Blocks

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

■ Ordering Information
See individual I/O modules for compatibility.
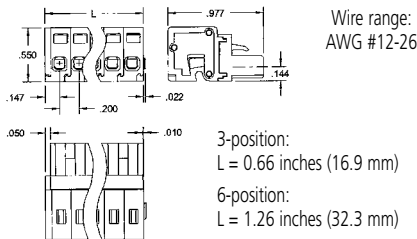
Barrier Strip Terminal Blocks

EVEN CONFIGURATION

Wire range: AWG #12-26

.200 .400 .070 .330 .489 .816 1.144 .127 .690

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

UNEVEN CONFIGURATION

Wire range: AWG #12-26

.200 .400 .070 .330 .489 .816 1.144 .127 .690

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

.977 .550 .147 .200 .022 .144 .050 .010

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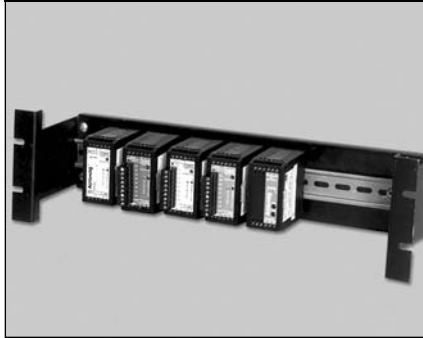
DIN-Rail Mounting
For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19″ rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.

■ 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)
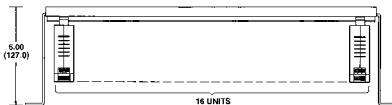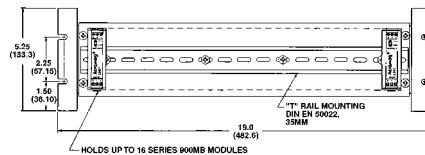
Power Supplies
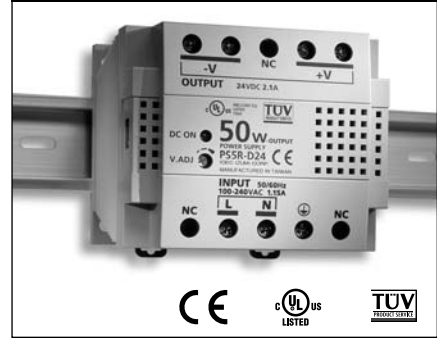
50W Supply
Input Power Requirement
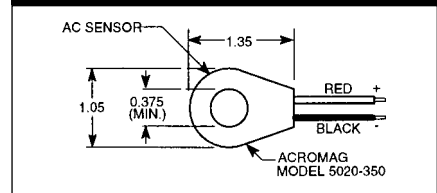85 to 264V AC or 105 to 370V DC

Output
24V DC, 2.1A (50W)

■ Ordering Information
PS5R-D24
Universal 50W power supply

See Power Supplies on page 183 for other models and more information.

AC Current Sensor

■ Ordering Information
5020-350
AC current sensor