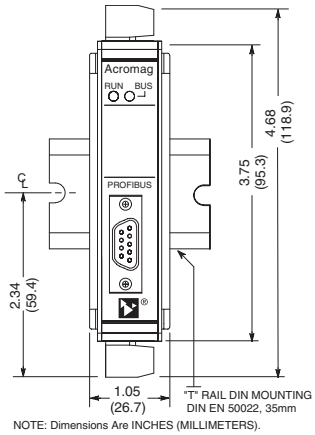
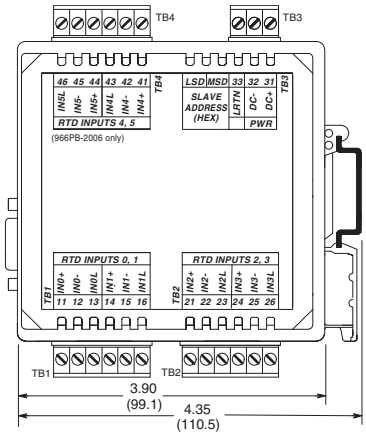
Profibus-DP / RS485



NOTE: Dimensions Are INCHES (MILLIMETERS).



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.

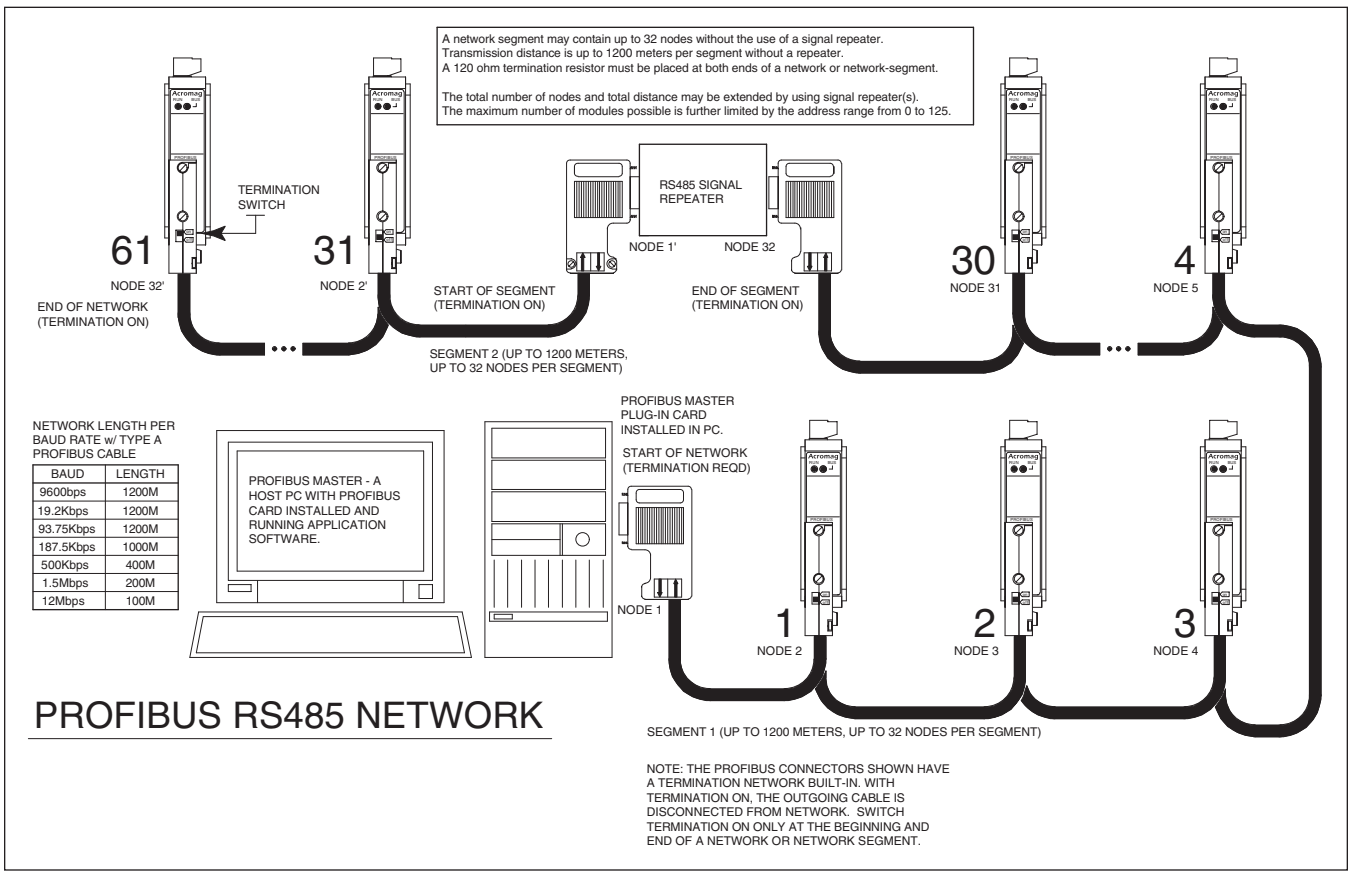
Radiated Field Immunity (RFI)
Per EN61000-4-3 and ENV50204.

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.



Accessories

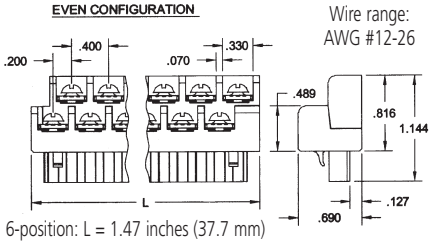
Terminal Blocks

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

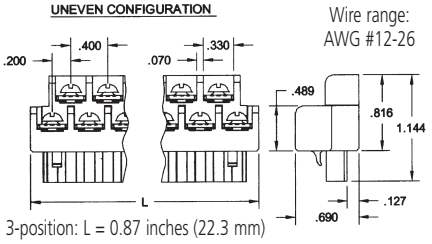
Ordering Information

See individual I/O modules for compatibility.

Barrier Strip Terminal Blocks



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



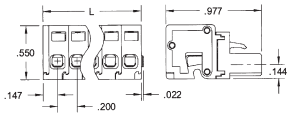
3-position: L = 0.87 inches (22.3 mm)

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

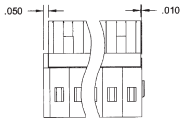
TBK-B02
Terminal block kit,
four 6-position pieces

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

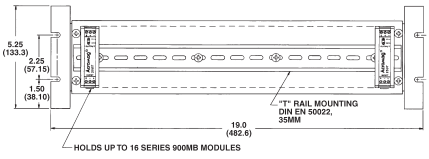
DIN-Rail Mounting

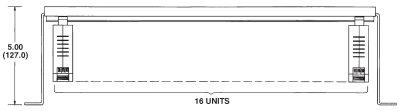
For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.

Ordering Information

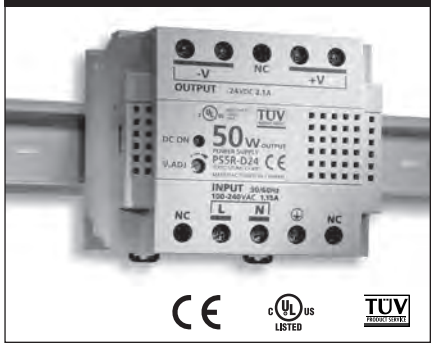
20RM-16-DIN
19" rack-mount kit with DIN rail.

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

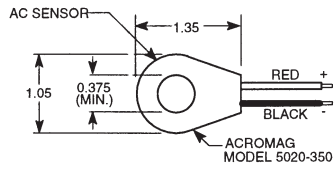
Output
24V DC, 2.1A (50W)

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)

ProfiBus-DP / RS485

900PB Series ProfiBus-DP I/O Modules

The 900PB series is a high-performance line of networked I/O modules. These units feature universal input/output ranges and an intelligent microcontroller to provide extreme flexibility and powerful monitoring and control capabilities. Select from a variety of analog and discrete I/O models to meet your application requirements.

Each module provides a direct network interface for your I/O signals. Unlike "block I/O" devices that combine a large and expensive processor block with snap-on I/O terminal blocks, 900PB modules handle the network interface and I/O processing in a single, compact multi-channel module. This space-saving approach is very cost-effective for systems that need to add some I/O channels at an existing control site or network new, remote sites.

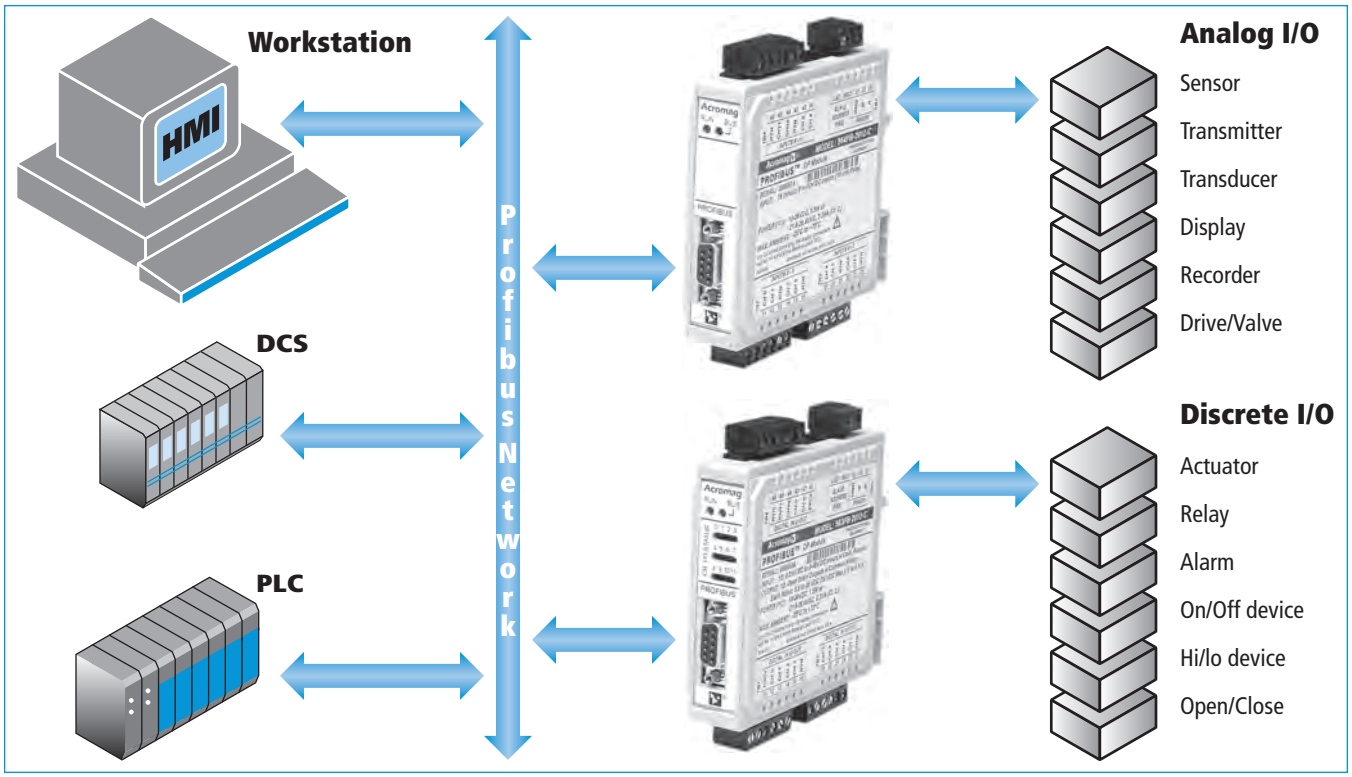
To ensure unsurpassed performance, these I/O modules employ advanced microcontroller technology. Isolated input, output, power, and network circuits increase noise/transient immunity and prevent ground loops. Status LEDs provide diagnostic feedback.

Self-diagnostics and sophisticated watchdog timers simplify maintenance and troubleshooting. The watchdog timer invokes a failsafe condition if host communication is lost. For further security, a second watchdog monitors the microcontroller for failed operations or a "lock-up" condition and automatically resets the unit.

24 HOUR STOCK ITEM Ready to ship within 24-hours from stock. Backed by a 2-year warranty.

Special Features

- **Direct Network Interface:** Each module has a built-in microcontroller for communication. No bus coupler required.
- **RS485/ProfiBus Network Communication:** Highly immune to noise and operates over long distances
- **Industry Standard ASIC:** Siemens SPC3 intelligent ASIC to talk ProfiBus
- **High-Speed Data Rates:** Half-duplex RS485 with rates up to 12M baud
- **Auto-Baud Rate Detection:** Baud rate is set automatically
- **Fully Isolated:** I/O, network, and power circuits isolated from each other for safety and noise immunity
- **Nonvolatile Reprogrammable Memory:** Allows the functionality of this device to be reliably reprogrammed thousands of times
- **Self-Diagnostics & Watchdog Timers:** Self-test simplifies maintenance. Profibus has defined failsafe mode for lost communication.



Discrete I/O

These modules monitor discrete levels of various devices and/or provide on/off control capabilities depending on the model selected. Each module has up to twelve channels to save space and minimize costs. Models are available with input- or output-only, or bidirectional I/O configurations.

Inputs
- Active-low inputs, 0 to 35V DC

Outputs
- Sinking outputs, 0 to 35V DC, up to 500mA

Functions
- Monitor discrete state or level
- Control on/off, high/low, open/close switching
- Activate audible or visual alarms

Analog Input

These units monitor a wide variety of industrial machinery and equipment. They accept direct sensor inputs or DC process control signals from transducers, transmitters, and other instruments.

Inputs
- DC current
- DC voltage
- DC millivolts
- Thermocouple
- RTD/resistance
- AC current

Functions
- Measure process variables
- Monitor machinery and industrial devices
- Acquire data from non-networked instruments

Analog Output

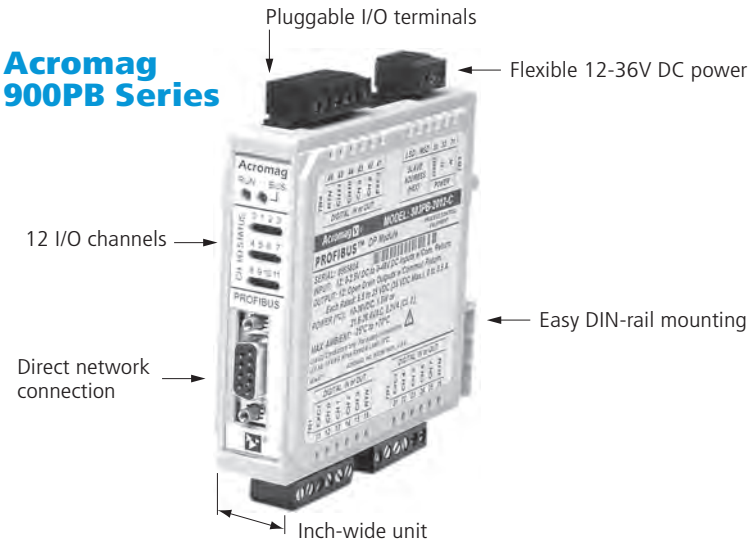
Analog output modules are ideal for controlling a wide variety of industrial equipment. The host defines the output of voltage or current signals to control speed, flow, temperature, frequency, level, force, torque, intensity, and many other physical properties.

Outputs
- DC voltage
- DC current

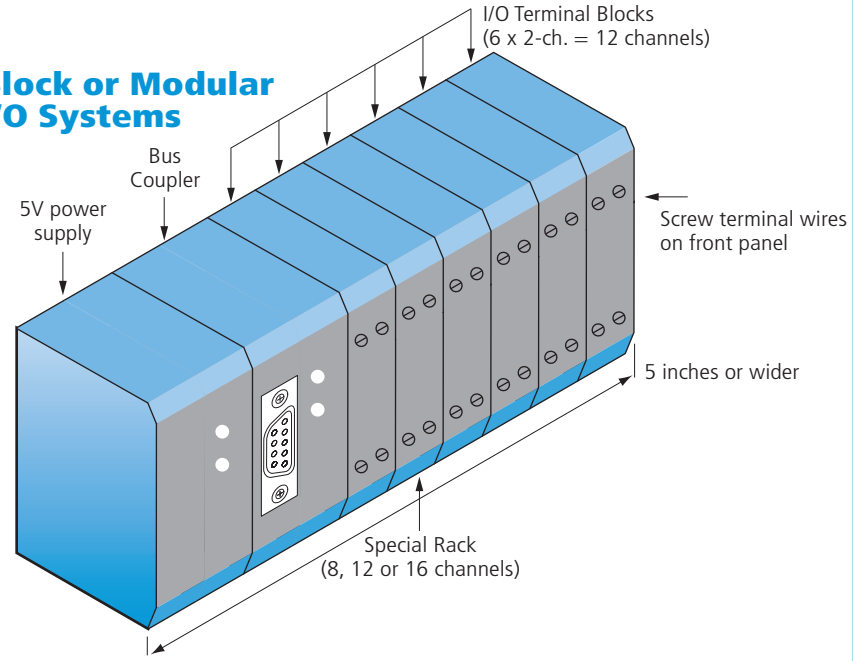
Functions
- Write data to local displays or recorders
- Control drives, valves, and positioners

Save 50% compared to "Block I/O"

Acromag 900PB Series



Block or Modular I/O Systems



Acromag 900PB Series I/O	Block and Modular I/O Systems
Stand-alone I/O modules are very economical.	*Block I/O systems have high start-up costs.*
■ Direct connection to network	■ Expensive bus coupler required
■ Up to 12 channels on one module	■ Plug-in I/O modules or terminal blocks required
■ One inch wide for twelve channels	■ Five inches wide or more for twelve channels
■ Flexible 12-36V DC power requirement	■ May require special 5V power supply
■ Pluggable terminal blocks on top and bottom	■ Fixed wiring terminals on front of unit

Easy to Use

Profibus-DP networks offer several advantages. They are proven, fast (up to 12Mbps without fiber optic cable), deterministic, and ideal for transmitting analog or discrete data. I/O devices are also easy to install and maintain. More than 1000 organizations worldwide, plus the Profibus Trade Organization (PTO), help nurture a growing user base, introduce new products, and provide technical support for this network technology.

Network devices, including Acromag's 900PB I/O modules, are easily installed and configured using network management software typically provided by the supplier of the host or master controller. The startup process is shown below.

Step 1: Set the slave address

Using two rotary switches, as shown, set the slave address between 0 and 125 (00 to 7D Hex). The factory default setting is 126 (7EH) which allows programming via the network. Once the address is set, the module may be physically connected to the network or master.

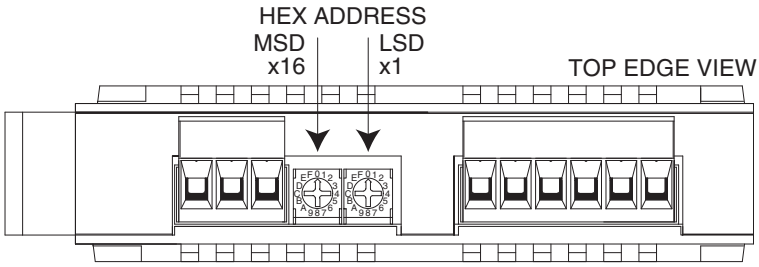
Step 2: Add the I/O module to the network database

Each I/O module, like all slave devices, is defined by a unique software file (*.gsd file). The GSD file for each module is installed (or imported) into a network database for identification by the network management software.

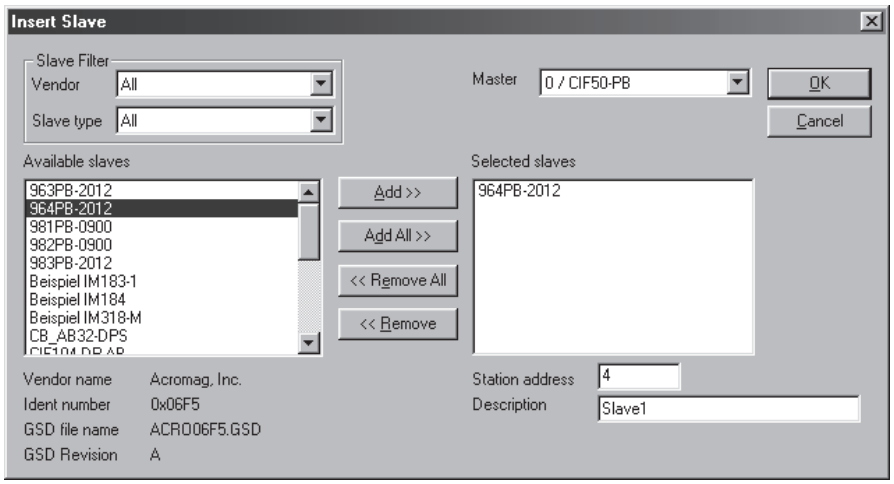
Acromag GSD files are supplied at no-charge with each module. They are also available for download on the Acromag website or from the PTO at www.profibus.com.

Step 3: Configure the module

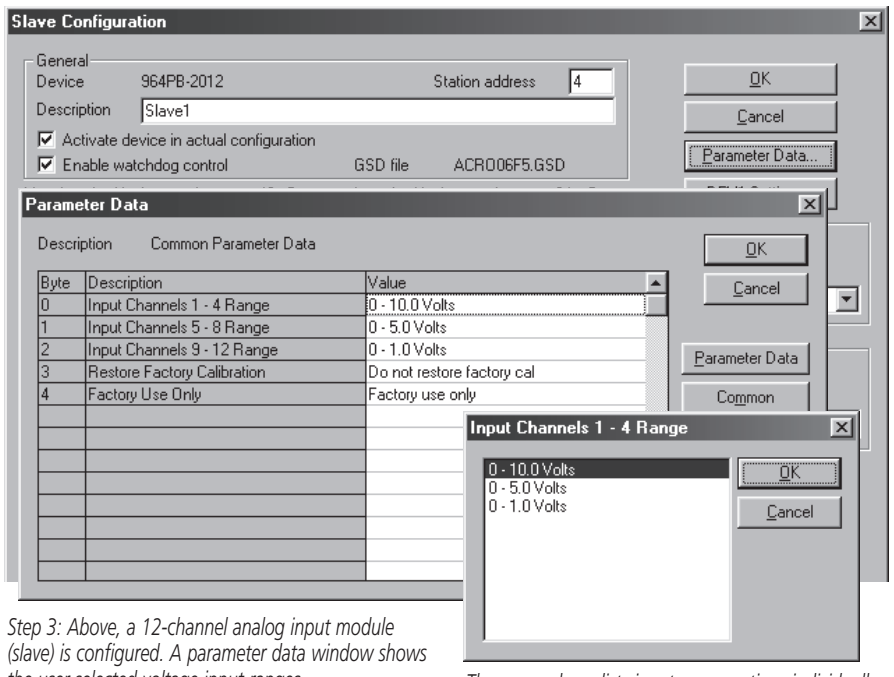
Using the network management software, you configure each device as desired (address, ranges, sensor break detection, failure modes, etc.). When finished, the software will download the configuration to the master controller for communication.



Step 1: Rotate the switches on top of each 900PB module to set the desired network address.



Step 2: The network management software (SyCon from Lantronix shown above) lists Profibus devices available for configuration after their GSD files are copied to the software's directory using Windows Explorer.



Step 3: Above, a 12-channel analog input module (slave) is configured. A parameter data window shows the user-selected voltage input ranges.

The menu above lists input range options individually selectable for each 4-channel group.