

## 965PB Analog Input:

### 4 or 6-Channel Input: Thermocouple or Millivolt Signals

#### Description

These modules provide an isolated Profibus-DP network interface for up to six input channels. Differential inputs eliminate ground noise and each terminal block includes a cold junction compensation (CJC) sensor for more precise temperature measurements. Multi-range inputs accept signals from a variety of sensors and devices. High-resolution, low noise, A/D converters deliver high accuracy and reliability.

#### Input Ranges

Thermocouple (user-selectable type)  
 Type J, K, T, R, S, E, B, or N

DC Millivolts (user-selectable range)  
 ±100mV or ±1V 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)
- 6-input stand-alone module is very economical
- Universal inputs support a variety of sensors
- Built-in CJC sensor on each terminal block produces more precise temperature measurements
- Thermocouple break detection (upscale or downscale) identifies sensor wiring failures
- High-resolution 16-bit  $\Sigma$ - $\Delta$  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.

Input	Input Range	Accuracy (typical)
Type J	-210 to 760°C	±0.5°C
Type K	-200 to 1372°C	±0.5°C
Type T	-260 to 400°C	±0.5°C
Type R	-50 to 1768°C	±1.0°C
Type S	-50 to 1768°C	±1.0°C
Type E	-200 to 1000°C	±0.5°C
Type B	260 to 1820°C	±1.0°C
Type N	-230 to -170°C	±1.0°C
Type N	-170 to 1300°C	±0.5°C
Voltage	±100mV or ±1V DC	±0.1% of span

Cold Junction Compensation (CJC) Accuracy  
 ±0.5°C.

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

Analog to Digital Converter (A/D)  
 16-bit  $\Sigma$ - $\Delta$  converter.

Noise Rejection  
 Normal Mode: Better than 40dB @ 60Hz.  
 Common Mode: Better than 140dB @ 60Hz.

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

#### 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.

#### Ordering Info

##### Models

965PB-2004  
 4-channel thermocouple/millivolt input module  
 965PB-2006  
 6-channel thermocouple/millivolt input module  
 NOTE: Modules include GSD files on CD-ROM.

##### Accessories (see Page 48)

P55R-D24  
 Power supply (24V DC, 2.1A).  
 See Power Supplies on Page 199.



## 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 (<math>\leq 30\text{pF/m}</math>).

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 EN550204.

#### 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

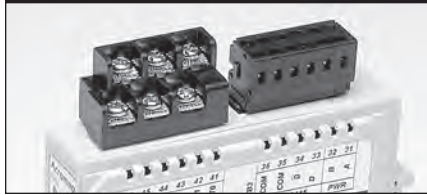
Per EN55022 Class B.





## Accessories

### Terminal Blocks

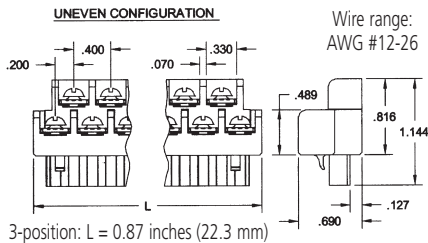
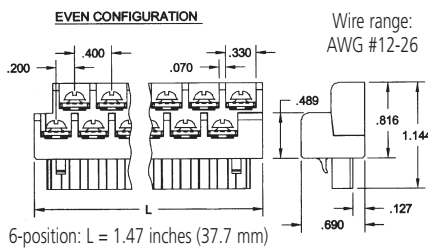


Barrier strip (left) and spring clamp (right).

#### Ordering Information

See individual I/O modules for compatibility.

#### Barrier Strip Terminal Blocks

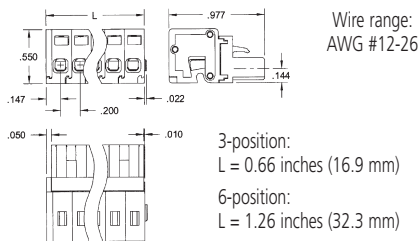


**TBK-B01**  
Terminal block kit,  
two 6-position pieces

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

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

#### Spring Clamp Terminal Blocks



**TBK-S01**  
Terminal block kit,  
two 6-position pieces

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

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

### Mounting Hardware



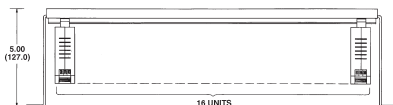
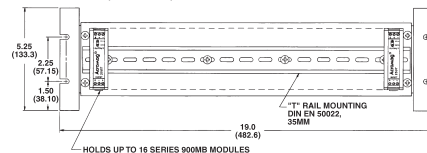
#### DIN-Rail Mounting

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.

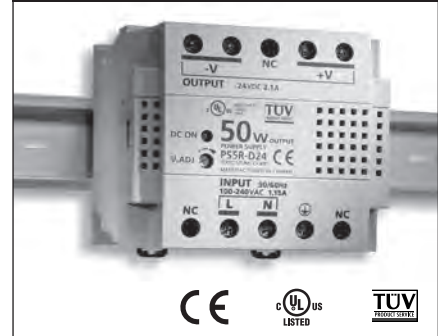
#### Ordering Information

**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

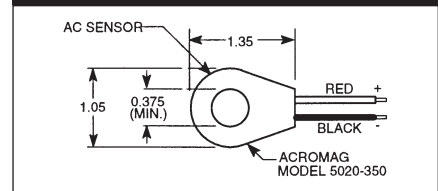
**Output**  
24V DC, 2.1A (50W)

#### Ordering Information

**P55R-D24**  
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)