

PointScan/300 Series

User's Manual

PT Bus distributed I/O



the smart approach to instrumentation™

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Many IOtech products carry the CE marker indicating they comply with the safety and emissions standards of the European Community. As applicable, we ship these products with a Declaration of Conformity stating which specifications and operating conditions apply.

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Refer all service to qualified personnel. This caution symbol warns of possible personal injury or equipment damage under noted conditions. Follow all safety standards of professional practice and the recommendations in this manual. Using this equipment in ways other than described in this manual can present serious safety hazards or cause equipment damage.



This warning symbol is used in this manual or on the equipment to warn of possible injury or death from electrical shock under noted conditions.



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Specifications are subject to change without notice. Significant changes will be addressed in an addendum or revision to the manual. As applicable, IOtech calibrates its hardware to published specifications. Periodic hardware calibration is not covered under the warranty and must be performed by qualified personnel as specified in this manual. Improper calibration procedures may void the warranty.

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IOtech has maintained ISO 9001 certification since 1996. Prior to shipment, we thoroughly test our products and review our documentation to assure the highest quality in all aspects. In a spirit of continuous improvement, IOtech welcomes your suggestions.

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These products should not be used to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of consequential equipment or personnel safety. In particular, SIXNET disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in any application.

All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.

WARNING – EXPLOSION HAZARD – WHEN IN HAZARDOUS LOCATIONS, DISCONNECT POWER BEFORE REPLACING OR WIRING MODULES.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

<p>Note: Refer to the IO Toolkit software's online help for detailed product specifications and configuration settings.</p>
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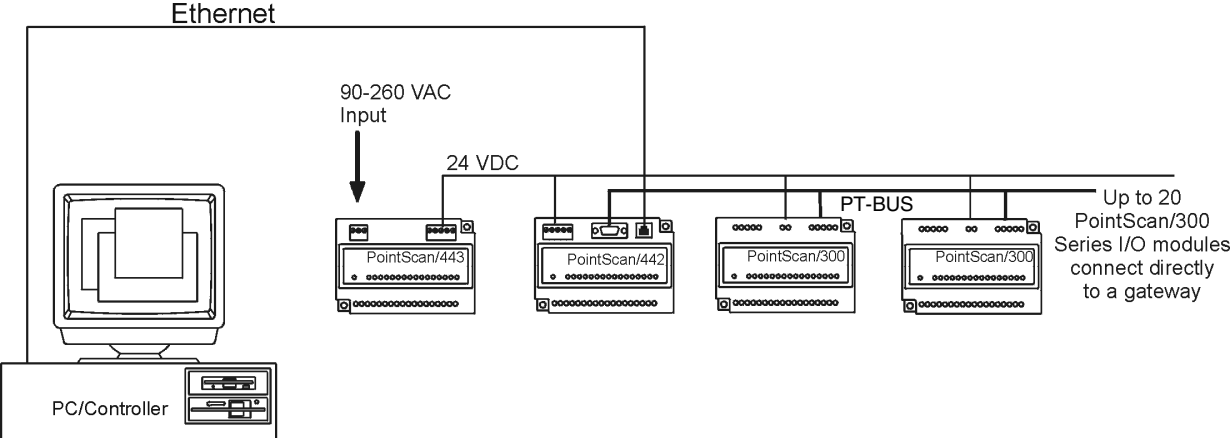
Appendix A – Table of PointScan I/O Modules and Accessories



Overview

The PointScan/300 Series DIN rail mounted I/O that provides direct field wiring connections to a wide variety of industry devices. The PointScan/300 Series I/O and Windows software form a high performance, flexible I/O system.

A typical PointScan/300 Series station consists of a DC power supply, a communication gateway, and I/O modules. The gateway connects to the I/O modules through a daisy-chained "PT-Bus" cable. (See Section 3.)

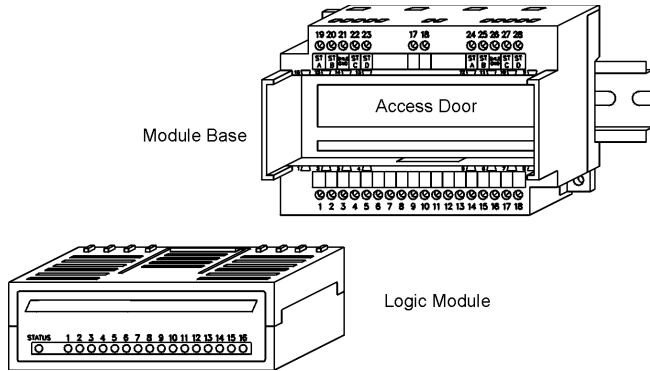


Typical PointScan/300 System Configuration

I/O Module Components

A PointScan/300 Series I/O module consists of a base assembly and a removable logic module. All base assemblies have a hinged door that is accessible when the logic module is removed. In 4-20 mA analog input modules (PointScan/301, /302, and /304) the hinged door provides access to jumpers and/or 100 ohm replaceable shunts.

A logic module may be removed by lightly squeezing the top and bottom locking tabs and pulling the logic module straight out. To reinstall, insert the logic module into the base and press firmly until it snaps into place. The logic module is fully seated when the innermost row of ventilation slots are just covered by the top surface of the base cover.



I/O Module Assembly

Status LED Indication

The “Status” LED on each module may be observed in one of five states:

ON - The module is configured properly and communicating with the gateway.

OFF - There is no power to the module, or the status LED is being turned off intentionally by the I/O Tool Kit during the module linking operation

LONG BLINK (.75 sec. ON, .25 sec. OFF) - Long blinking indicates one of two conditions. Either the module has lost communication with the gateway for more than 10 seconds, or the module has not received configuration data from the gateway. Upon initial system startup (no configuration in the gateway) this should be the observed LED state on each module.

SHORT BLINK (.25 sec. ON, .75 sec. OFF) - Short blinking indicates a failure of the module self test upon powerup.

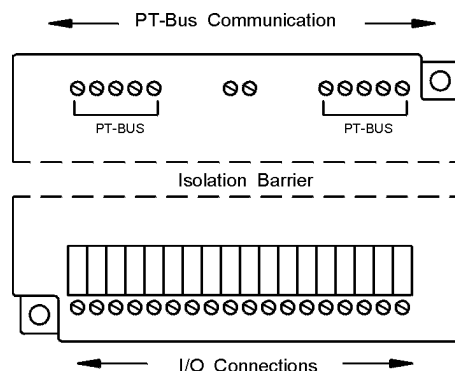
WINKING (10 blinks/ sec.) - A status LED may be winked by the I/O Tool Kit utility to bring attention to the module. This winking occurs during module linking procedure. Refer to the online help in the I/O Tool Kit for more information.

Status LED Wink Feature

The “Status” LED may be intentionally winked (10 blinks/second) by the IO Toolkit program to visually identify the module when other modules are present.

Isolation

Every PointScan/300 Series I/O module is isolated from ground (1200Vrms @ 1 minute) and additional isolation is available on select modules (e.g. PointScan/323, 500V channel to channel isolation) for fault-free operation. Additional levels of isolation are provided with some modules. Refer to the product specifications in the Remote IO Toolkit online help system for more information.



Local Diagnostics

Local diagnostics can be performed through any available port while the gateway is responding to messages from the other port. Diagnostic software, such as IO Toolkit, can be used to display the status of the I/O registers.

Hot Swap Feature

I/O modules may be unplugged from their bases, even in live systems. PointScan/300 Series I/O modules automatically self-configure from system memory. Analog I/O logic modules will automatically upload and self-adjust to user calibration settings (if any are present) from the module base.

Gateway Memory

All PointScan/442 gateways have nonvolatile (battery-free) memory for storing configuration data from the I/O Toolkit utility.

Programmable gateways have battery-backed memory for storage of program variables and logged data. The battery is a rechargeable lithium cell that is kept fresh by the power circuitry in the gateway. The memory retention period for an unpowered gateway is at least one year at room temperature. The retention time will be shorter at higher temperatures. The life expectancy of the lithium battery is approximately 10 years.

Calibration

All PointScan/300 Series analog I/O logic modules are factory calibrated over all supported ranges using a regularly maintained set of standards. Factory calibration data is stored in permanent memory in the logic module, and cannot be altered. User recalibration may be performed, but is necessary only if inaccuracy in your field device is observed, or if any of the 100 ohm input shunts are replaced with low tolerance resistors.

Each analog channel has span and offset calibration settings. Span is the "range" or "gain" of the channel. Offset is the "zero" setting. Each reported analog I/O value is the product of the factory calibration value times the user calibration value. The user calibration value is defined as:

$(\text{user span value} * \text{raw value}) + \text{user offset}$

The user span is a unity value (1) by default. The user offset is zero by default.

Note: All factory and user calibrations are performed in software. There are no adjustment potentiometers inside the logic modules.

User calibrations are performed using the IO Toolkit utility. Refer to the IO Toolkit on-line help system for information on calibrating PointScan/300 Series analog I/O.

Getting Started With PointScan/300 Series Hardware

Following these steps will make installation and start-up easier.

① Mount the Hardware

If you purchased individual PointScan/300 Series components, refer to [Section 2 for information on installation instructions](#).

② Install PT-BUS Wiring Between Modules

Make PT-BUS wiring connections between the PointScan/300 Series modules. Refer to [Section 3 for PT-BUS wiring guidelines](#).

③ Connect Power and I/O Wiring to the Modules

Connect AC power to the PointScan/300 Series power supply. Make DC power connections from the power supply to the gateway and I/O modules (as needed.) Make field wiring connections to the PointScan/300 Series I/O modules and any peripheral equipment. Refer to the individual module sections in this manual for connection details.

④ Install Communication Cabling

If you did not purchase a factory communication cable (CA-22), install a RS232 cable between your computer and serial port on the PointScan/300 Series gateway.

Fabricate and install RS232, RS422 and RS485 cables as needed. If you are using Ethernet gateways, (PointScan/442) install the correct cabling and peripherals. Refer to the documentation for your Ethernet communication devices for details.

⑤ Apply Power

Power up the PointScan/300 Series I/O and related peripherals. Observe the status LED on each module. The normal conditions are as follows:

<u>Module Type</u>	<u>LED, Normal Indication</u>
Gateway (PointScan/442)	Power and Status LEDs On
I/O modules PointScan/300 Series in user enclosure	Status LEDs Blinking
PointScan/443	Power LED on

⑥ Configure Using IO Toolkit

Refer the steps outlined in the online help for each PointScan/300 Series module.

⑦ Test the System

Use the Test I/O window in the IO Toolkit program to verify proper I/O operation in all PointScan/300 Series module.

⑧ Configure Your Computer

Refer to the on-line help in the IO Toolkit for more information.

⑨ Run the (Citec) Software

Refer to the on-line help in the Citec software for more information.

⑩ If You Have Difficulty

If you experience startup trouble, contact IOtech at productsupport@iotech.com.

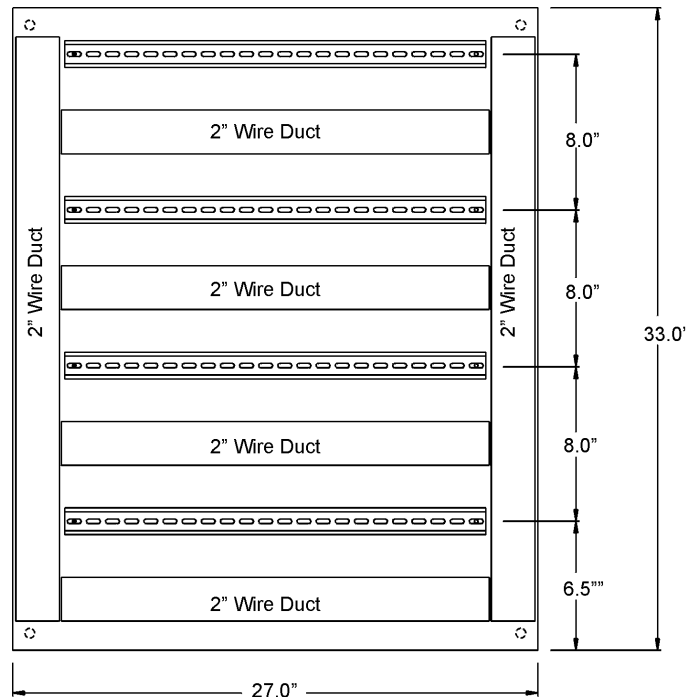


PointScan/300 Series Panel Assembly

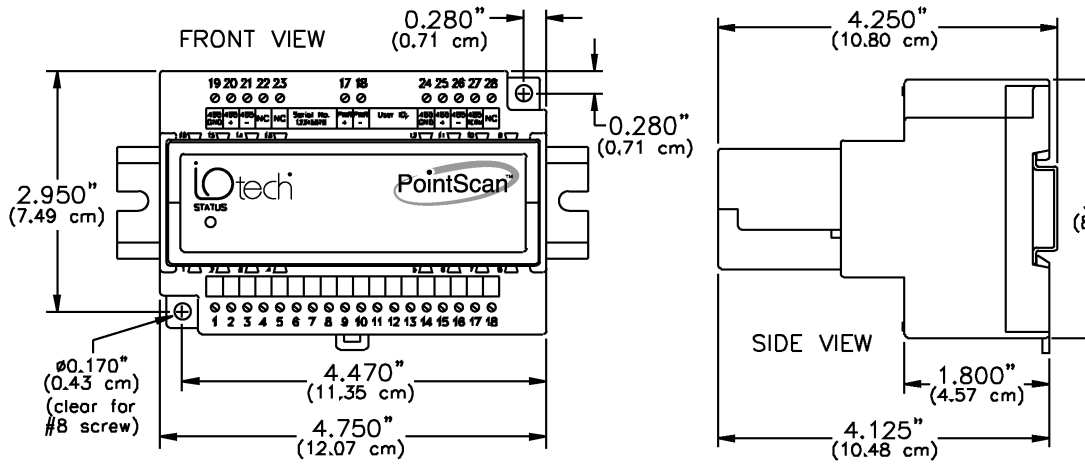
PointScan/300 Series I/O snaps onto DIN rail strips fastened to the subpanel. Figure 2-4 shows a sample panel with DIN rail strips and wire duct attached. Recommended DIN rail spacing is 8 inches. This spacing allows room for wire duct to be installed without obstructing field wiring installation.

The PointScan/300 Series modules are typically installed against one another, but space may be left between modules to accommodate other DIN rail mounted components such as terminal blocks and fuse holders. End clamps are recommended to restrict side-to-side movement. Figures 2-5 through 2-7 show the physical dimensions of the PointScan/300 Series components.

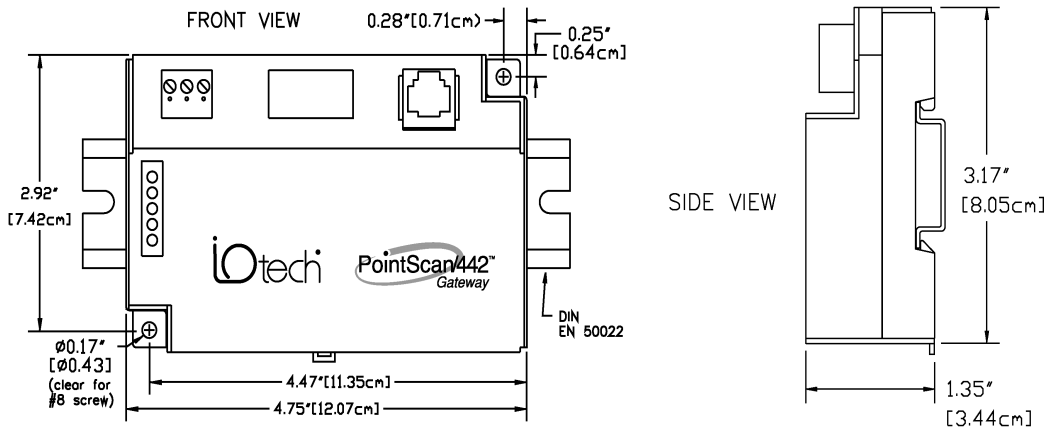
PointScan/300 Series modules may be installed in any orientation and order on your panel. The modules are electrically interconnected using PT-Bus wiring, beginning with the gateway. Refer to Section 3 for more information on PT-Bus wiring.



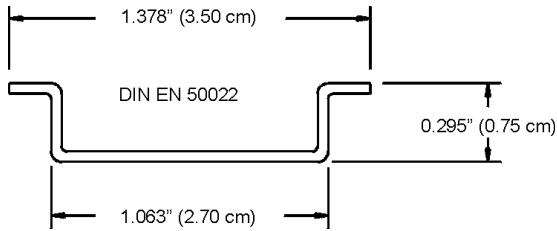
Sample Layout For a 36" x 30" Enclosure



I/O Module and I/O Expander Dimensions



Gateway Dimensions



DIN EN 50022 Suppliers

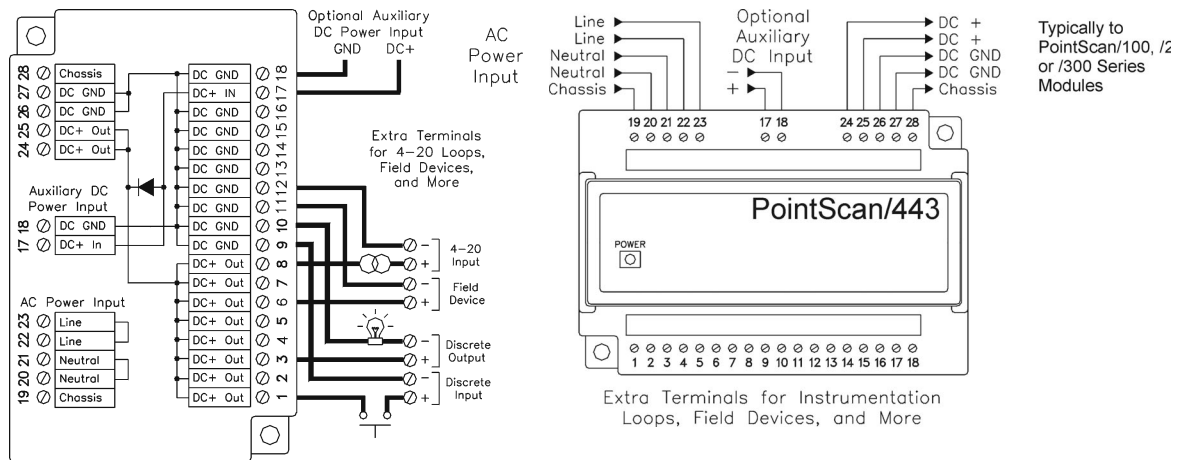
<u>Manufacturer</u>	<u>Type</u>
Altech	PR30
Entelec	TS35
Phoenix	NS35/7.5
Wago	TS35
Weco	H-35
Weidmuller	TS35
Wieland	TS35

DIN Rail Dimensions
Figure 2-7

DC Power Overview

PointScan/300 modules can be powered from the same DC source that is used to power your I/O devices. No separate power supply is required. Typically, 10 to 30 VDC power is applied to terminals 24 and 25 on the base of each module.

The PointScan/443 is used to power up to seven PointScan modules of any type, instrumentation loops, and other devices. It operates on 85-264 VAC (47-63 Hz) or 120-370 VDC and outputs 24 VDC at up to 1 A. Refer to the figure below for the proper power connections.



DC Power Wiring PointScan/443

PointScan/442 gateways, and user instrumentation loops may be powered from the PointScan/443 power supply. The PointScan/443 supplies 24 volts DC at a maximum of two amps.

DC Power Wiring (User DC Source)

PointScan/442 gateways, and user instrumentation loops may be powered from a single DC source. The user DC power source must be between 18 to 30 volts.

Current Requirements

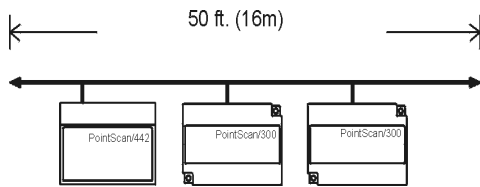
To calculate the current requirements, add the wattage required for the I/O modules in use, then divide the total wattage by the DC power source voltage. Then add any current needed for user instrumentation loops.

PT-Bus Wiring Guidelines

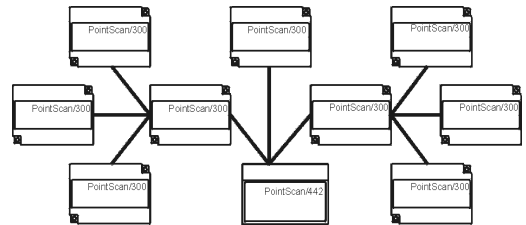
PT-Bus wiring connects the PointScan/300 Series I/O modules and expanders to the gateway. Follow the guidelines for reliable performance.

PT-Bus Capability

Max. modules controlled by one gateway	128
Max. modules connected directly to gateway	20 (any mix)
Required cable type	Any with 2 individually shielded pairs, 22AWG min.
Recommended cables	Alpha 2466C, Belden 8723, Carol C1352
Max. cabling off each gateway or expander	50 ft. (16M)



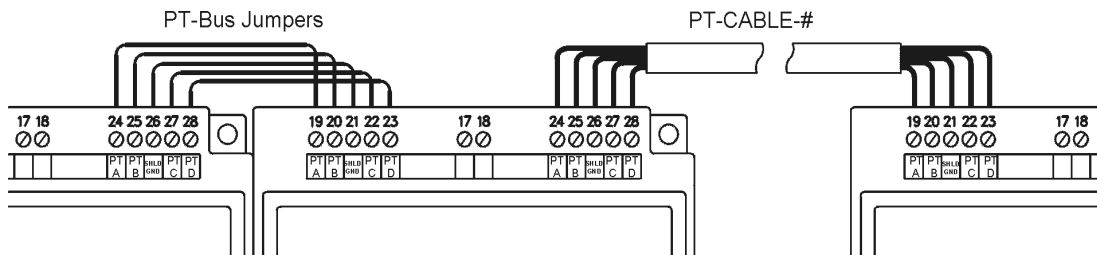
Connect up to 20 I/O modules directly to the gateway with a maximum total cabling of 50 feet (16m).



PT-Bus connections may form star configurations without restrictions.



PT-Bus wiring may be extended into additional cabinets as long as the total length of wire connected to the gateway or expander stays within the 50 foot limit (16m).



Use the supplied PT-Bus jumpers between adjacent PointScan components. Otherwise, use the recommended cable.

This section documents the following modules:

PointScan/321	PointScan/322	PointScan/323	PointScan/324
	PointScan/325	PointScan/326	PointScan/327

8 Channel Input Modules

PointScan/300 eight channel discrete input modules incorporate one of two module base styles. These base styles and other features are detailed below.

Standard Base

With the standard base, one terminal from each channel is connected to an internal common bus. A single user power connection to the module allows up to eight input devices to be connected in sourcing or sinking configurations using two wires each.

Optional Universal Wiring Base

With the optional Universal Wiring base, each discrete input has two independent screw terminals to provide point to point isolation.

Input Isolation

All discrete inputs are optically isolated from the PointScan/300 series circuitry, regardless of the module base style. If the optional Universal base is used, the discrete inputs will be channel to channel isolated as well.

Sinking or Sourcing Wiring

AC inputs should be wired in a sourcing configuration as shown on the next page. All DC input modules (except the PointScan/325) will read either DC sinking or sourcing wiring. Just reverse the power input wires (terminals 17 and 18) to configure sinking or sourcing DC wiring.

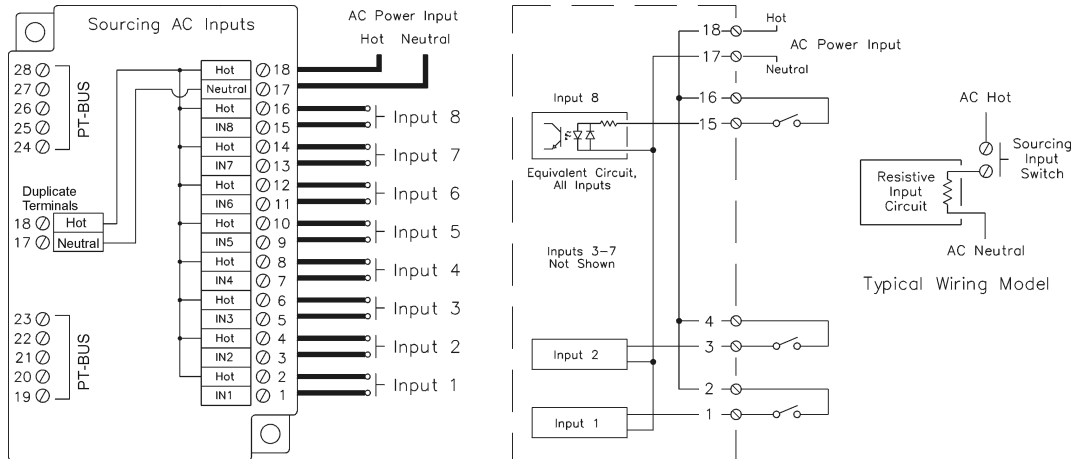
Counter Feature

All eight channel discrete input modules have an input count accumulator feature. If this feature is enabled (in the Remote IO Toolkit program), an analog input register will report a unipolar (unsigned) 16-bit count value that increments on each OFF to ON transition of the corresponding input. The maximum count input rate is 100 Hz (6000 pulses/min). These accumulations initialize at zero each time power is cycled. They cannot be reset under software control.

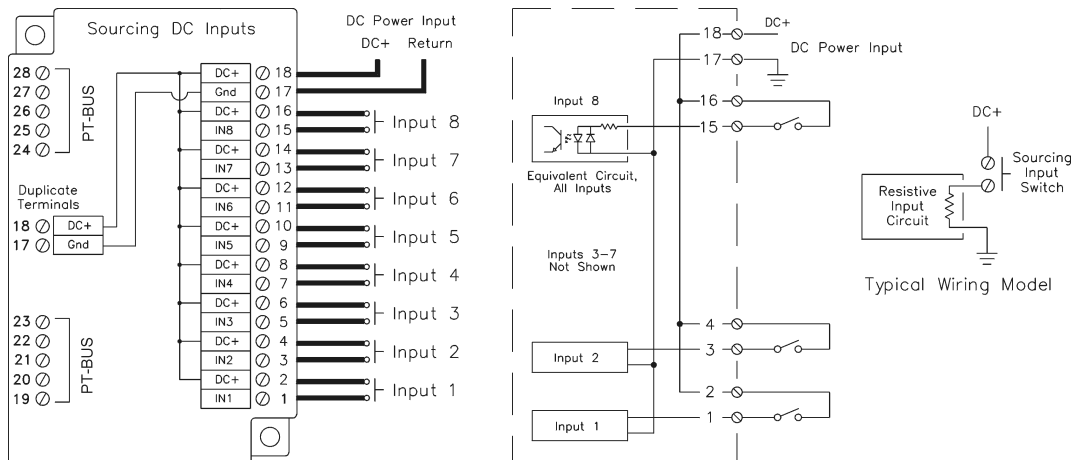
Discrete Input Connections Using the Standard Base

Each Standard Base reduces or eliminates the need for extra screw terminals by internally connecting the instrumentation power or return wire to each input channel.

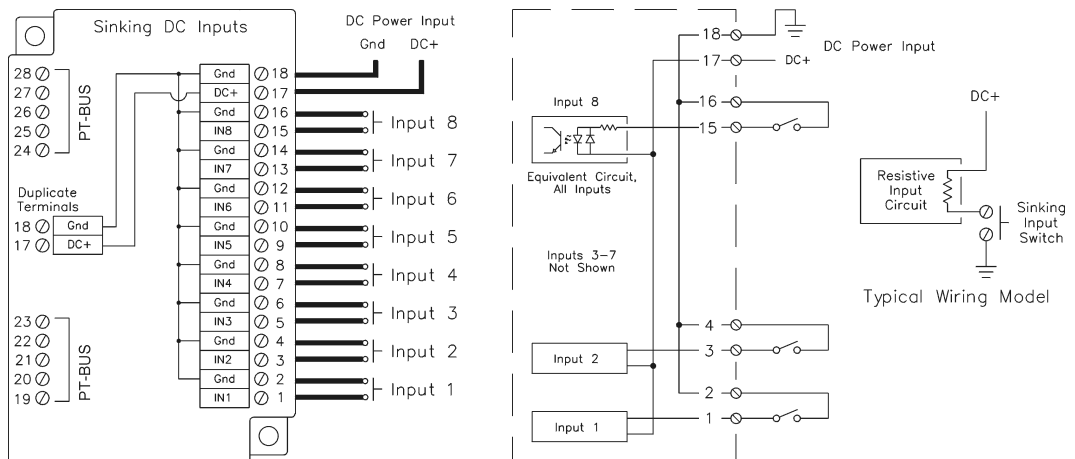
For AC applications with inputs on a single AC service:



For most DC applications:



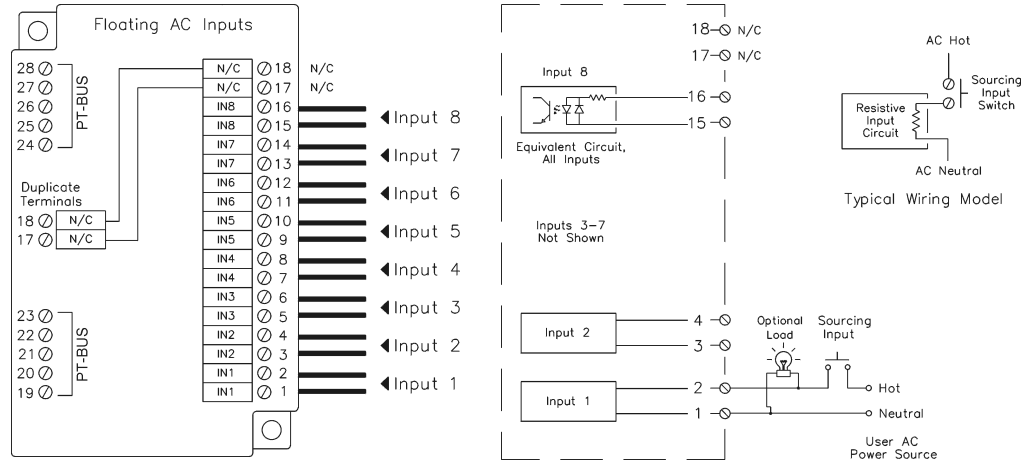
For special inputs from grounded switch closures: (except PointScan/325)



Discrete Input Connections Using The (Optional) Universal Wiring Base

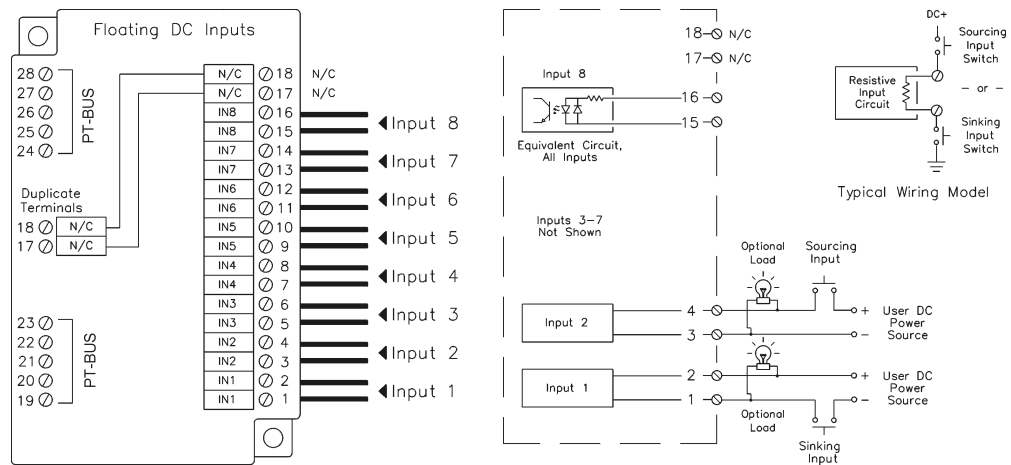
Each (optional) Universal Wiring Base provides channel to channel isolation by supplying two screw terminals for each input channel. This allows input signals from different power sources to be wired to the same base.

For AC applications with inputs from different AC sources:



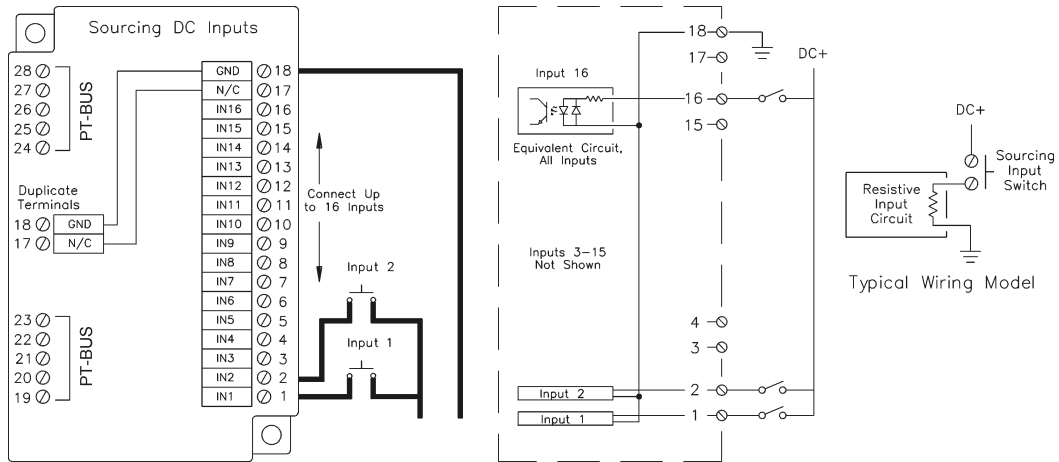
Note: In AC applications, each input may be wired to independent AC sources or line phases.

For DC applications with inputs from different DC sources:



PointScan/322 High density Input Module

This high density discrete input module has 16 channels that accept inputs from 10 to 32 volts DC. Connect your input signals to terminals 1 through 16. Connect the return from your DC power source to terminal 18. You will need to externally distribute the (+) DC power to your field devices.

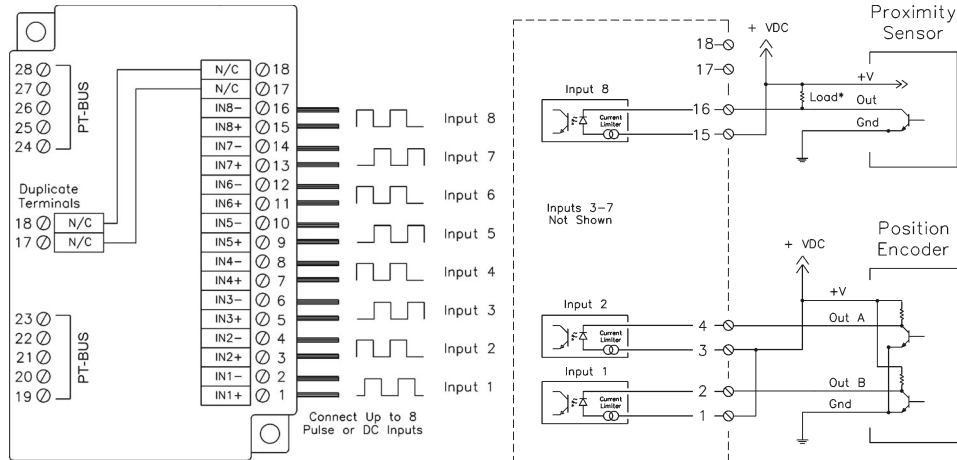


PointScan/327 High-Speed Counter Module

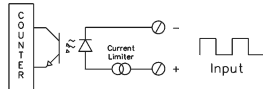
This high-speed counter module has eight isolated circuits that accept pulse inputs from a variety of sources, including quadrature and incremental encoders. Count values are reported in 16 bit analog input registers, with 32 bit results available by cascading two adjacent I/O channels to report total counts. The states of the counter inputs are also reported as discrete inputs. Pulse rates up to 50 kHz are supported. The counters may be reset by toggling discrete output bits. Counter modes are selected using the Remote IO Toolkit program. Refer to the Remote IO Toolkit online help system for more information.

Input Wiring

Screw terminal assignments, compatible only with the universal wiring base, are shown below. For best noise immunity, connect input signals using twisted wire pairs. To maintain the best differential noise rejection, do not connect (-) screw terminals together at the I/O base.



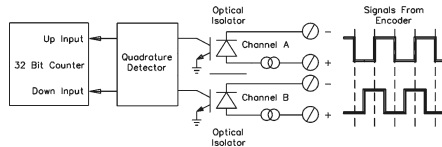
Typical Count/Rate Input Circuit



* Populate the appropriate load resistor, unless your sensor does not require one.

Typical Wiring Models

Typical Position Input Circuit





This section documents the following modules:

PointScan/336 **PointScan/337** **PointScan/339**
PointScan/340 **PointScan/341**

8 Channel Output Modules

PointScan/300 Series eight channel discrete output modules incorporate one of two module base styles. These base styles and other features are detailed below.

Standard Base

With the standard base, one terminal from each channel is connected to an internal common bus. A single user power connection to the module allows up to eight output devices to be connected in sourcing or sinking configurations using two wires apiece. This is the most common wiring configuration. Refer to the next page for sample wiring connections.

(Optional) Universal Wiring Base (-w)

With the (optional) Universal Wiring base, each discrete output has two independent screw terminals to provide point to point isolation. Sample wiring is shown on the next page.

Output Isolation

All discrete outputs are optically isolated from the PointScan/300 Series circuitry, regardless of the module base style. If the (optional) Universal base is used, the discrete outputs will be channel to channel isolated as well.

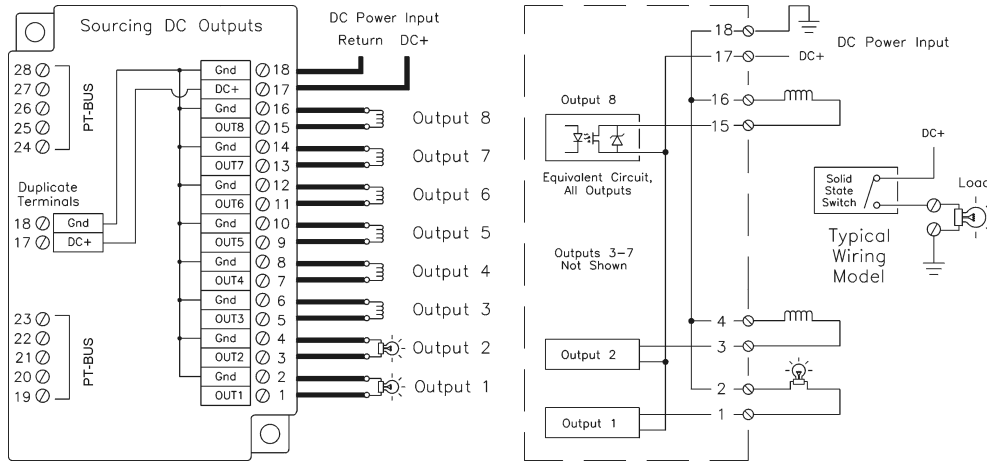
Watchdog Output Feature

The first DC output channel may be configured (in software) as a watchdog output. If this feature is selected, the output will be on when there is good command activity from the gateway. The output will no longer be controlled as a discrete output. The corresponding register will be unused.

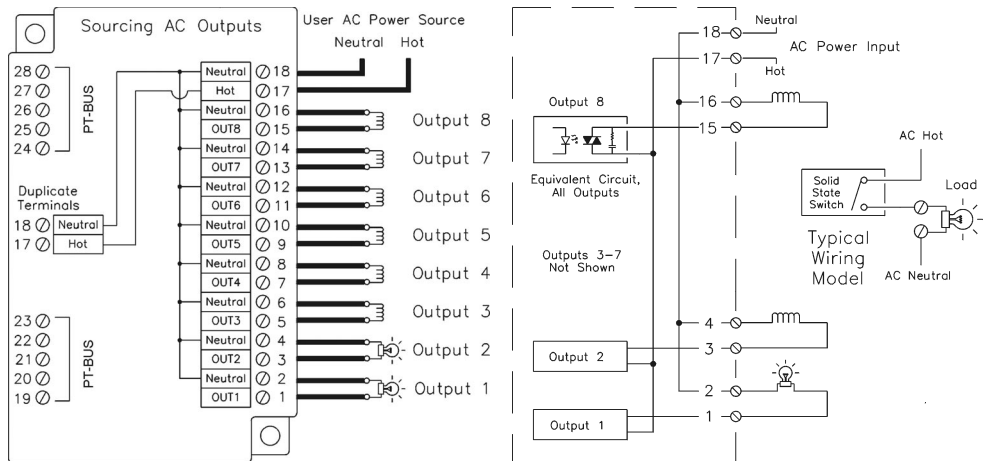
Discrete Output Connections Using The Standard Base

Each Standard Base reduces or eliminates the need for extra screw terminals by internally connecting the instrumentation power or return wire to each output channel.

Sourcing DC outputs:



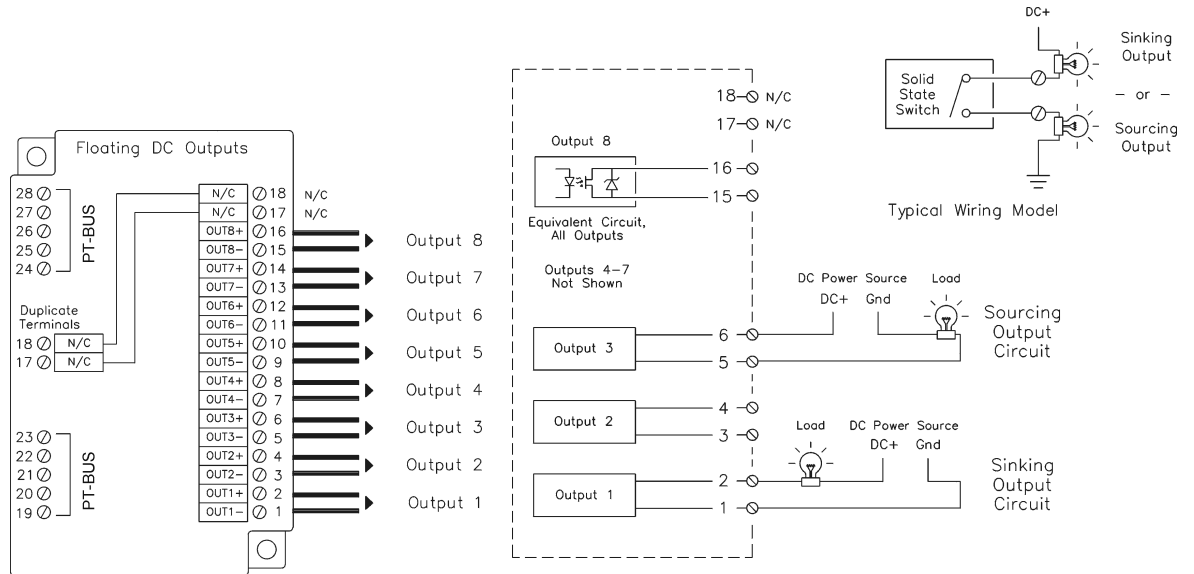
Sourcing AC outputs:



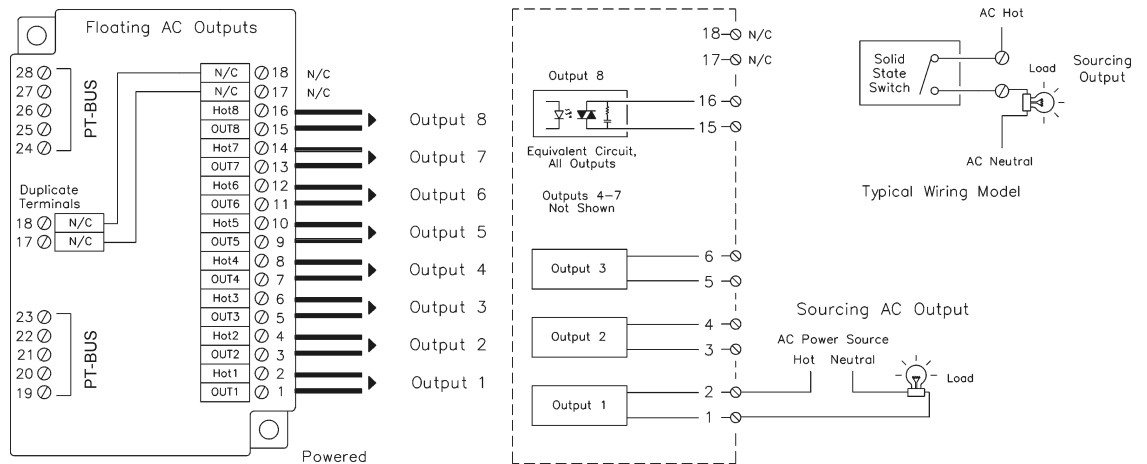
Discrete Output Connections Using The (optional) Universal Wiring Base

Each (optional) Universal Wiring Base provides channel to channel isolation by supplying two screw terminals for each output channel. This allows outputs on the same module to be switching different AC or DC power sources.

For DC applications:



For AC applications:



PointScan/341 High density Output Module

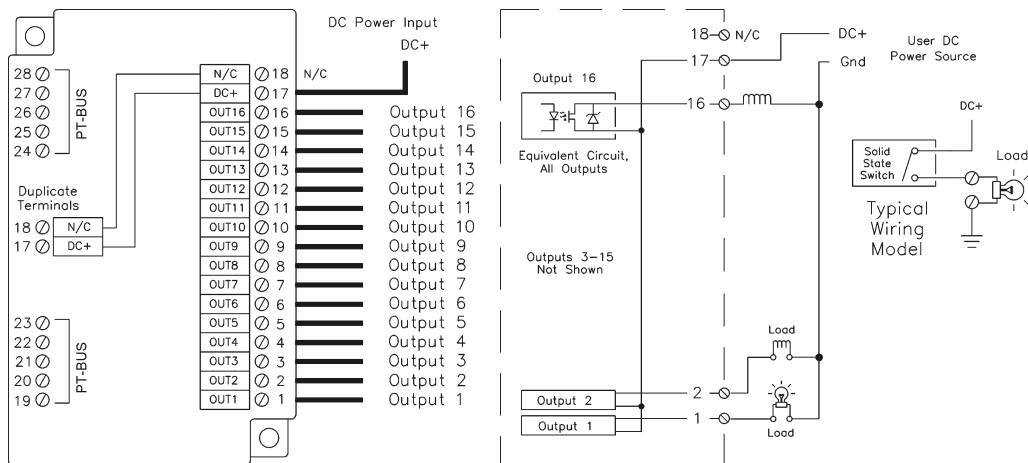
This high density discrete output module has 16 channels that source 10 to 32 volts DC to the field devices. The current rating for each output channel is 1 mA to 500 mA (0.5A). One screw terminal is provided for the (+) user DC power source.

High Density Wiring Base

With the standard base, one screw terminal is provided for the output wire to each of the sixteen field devices. One screw terminal is provided for the user DC power (+). Refer to the figure below for sample wiring connections. Connect your output wires to terminals 1 through 16. Connect your DC (+) to terminal 18. You will need to externally distribute the DC power return to your field devices.

Watchdog Output Feature

The first DC output channel may be configured (using the Remote IO Toolkit program) as a watchdog output. If this feature is selected, the output will be on when there is good command activity from the gateway.

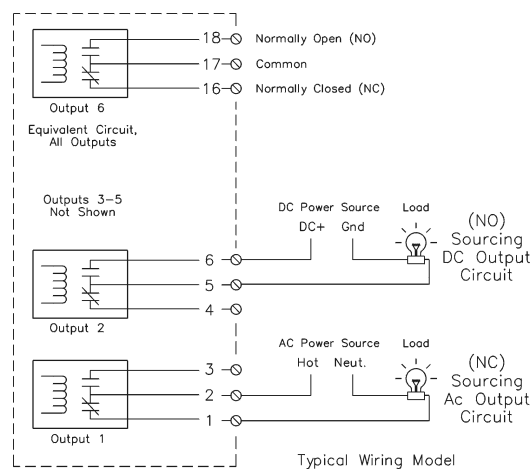
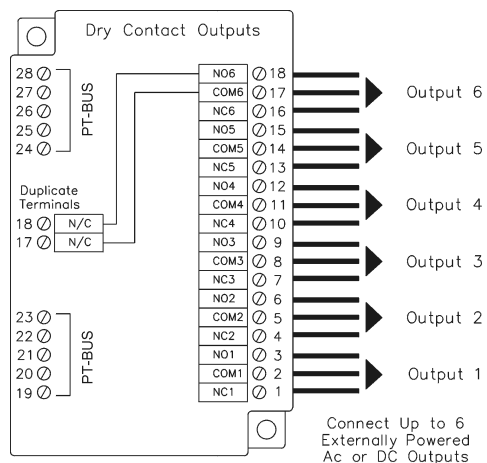


PointScan/336 Dry Contact Relay Module

This discrete output module has six Form C relay output channels that switch DC or AC power to the field devices. The current rating for each output channel is 0.1 mA to 2 amps DC, or 0.1 mA to 500 mA (0.5A) AC. Screw terminals, compatible only with the universal wiring base, are provided for the normally closed and normally open outputs.

Watchdog Output Feature

The first DC output channel may be configured (using the Remote IO Toolkit program) as a watchdog output. If this feature is selected, the output will be on when there is good command activity from the gateway.





This section documents the following modules:
PointScan/301 PointScan/302 PointScan/303
PointScan/304 PointScan/305 PointScan/306

Power Requirements

The internal analog input circuitry is powered by the gateway through the PT-Bus wiring. External power is required only for 4-20 mA loop signals coming from an unpowered source.

Analog Isolation

The PT-Bus wiring between PointScan/300 Series modules is isolated to a rating of 1,200 volts. Therefore, all PointScan/300 Series modules are isolated from one another. In addition, the PointScan/304 module provides 50 volt channel to channel isolation.

4-20 mA Input Circuit Jumpers

The PointScan/304 module has jumpers for connecting or disconnecting 100 ohm current shunts from each input circuit. The PointScan/301 module has jumpers for providing 24 VDC loop power or instrumentation ground to each field device. The jumpers are located behind the access door inside the module base. To gain access to them, unplug the logic module from the base and open the access door. Refer to the upcoming pages for more information on these jumpers.

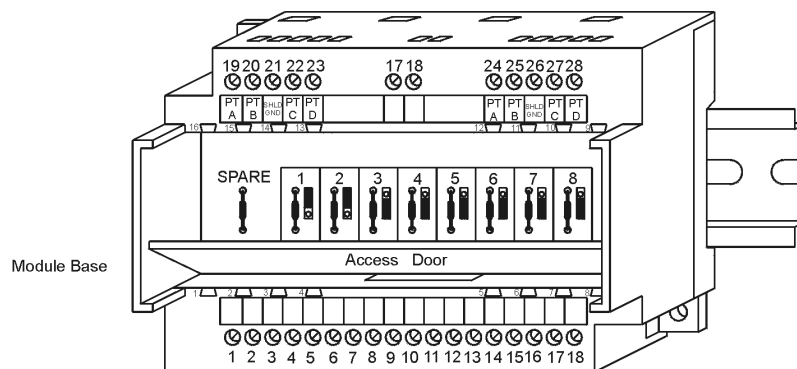
These jumpers must be set to match the corresponding input signal type, regardless of software range selection. Improper jumper selection could result in damage to the input circuitry.

Replaceable Current Shunts

PointScan/300 Series modules that support 4-20 mA inputs have a 100 ohm replaceable shunt for each channel. These shunts are enabled by jumper settings, and are replaceable if damaged by an equipment failure or wiring error.

These high precision shunts are located behind the access door inside the analog input module's base. A spare shunt is provided in the base assembly for your convenience. These shunts are illustrated within the diagrams of the applicable analog input modules.

If factory supplied shunts are used for replacements, recalibration of the input channels will not be necessary.



PointScan/304 Instrumentation Input Module

This instrumentation analog input module has eight isolated input channels that accept signals from a wide variety of field devices. Two screw terminals are provided for each input signal. Note: Compatible only with the Universal Wiring Base.

Thermocouple Burnout Detection

This module has upscale or downscale burnout detection, which is enabled from within the IO Toolkit program. If the thermocouple resistance exceeds approximately 10 kilohms, the channel reading will be reported as plus or minus full high temperature or low temperature, depending on whether upscale or downscale burnout is selected.

Autopolarity Feature (4-20 mA)

If the polarity on a 4-20 mA input is reversed, the value will still be reported properly.

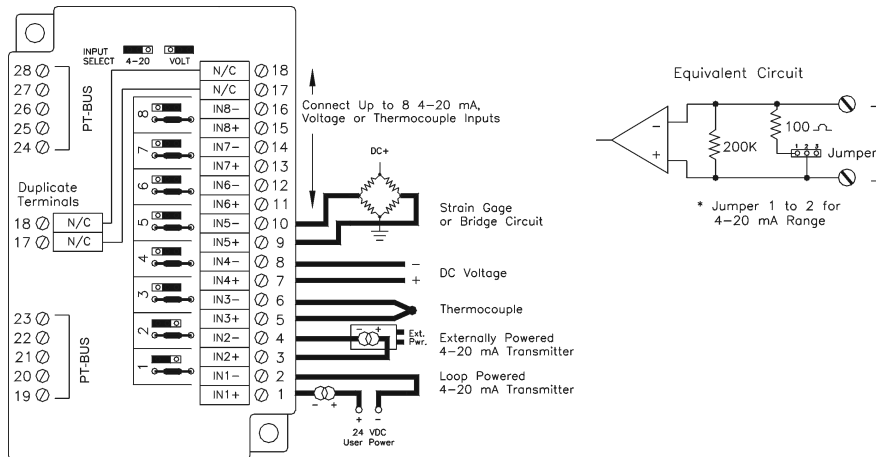
4-20 mA Input Enable Jumpers

This module has a 4-20 mA input enable jumper for each channel. Set each jumper to match the desired input as shown in the diagram below. The jumper setting must match the range selection in the Remote IO Toolkit program.

Note: Access these jumpers by removing the plug-in logic module and opening the access door in the base.

Analog Input Scaling

Thermocouple inputs are automatically linearized and cold junction compensated. Values are reported as degrees F, degrees C or 0.1 degrees C. Other types of inputs are reported as unscaled values from -32768 to 32767. Refer to the IO Toolkit online help system for more information.



PointScan/301 4-20 mA Input Module

This 4-20 mA analog input module has eight channels that accept 4-20 mA signals from self powered or loop powered devices. Two screw terminals are provided for each input channel. The return screw terminals are tied through movable jumpers to +24 volts DC or to instrumentation ground.

Open Loop Detection Feature

The Remote IO Toolkit configuration program provides a selection that allows inputs below 4 mA to be reported as zero, or be reported as negative values to detect loop failure.

Replaceable Current Shunts

This module base has replaceable 100 ohm current shunts, should a faulty field device or wiring error cause the original shunt to overheat. To access these shunts, unplug the logic module from the base and open the access door. A spare shunt is provided.

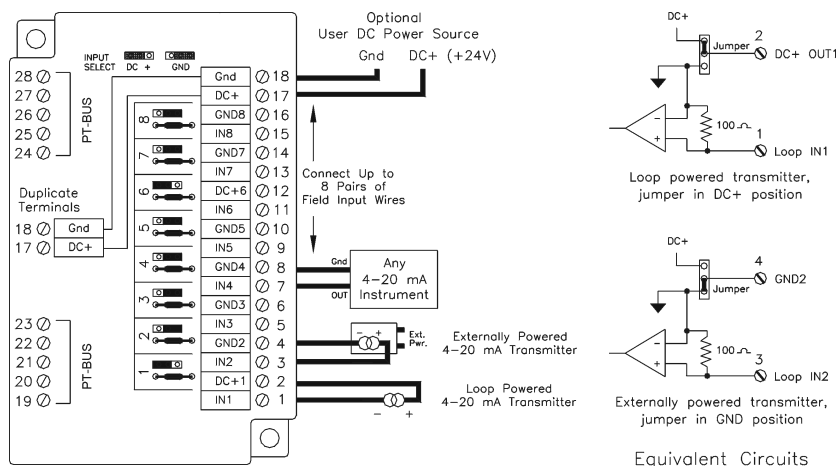
4-20 mA Input Scaling

Current inputs are reported as unscaled values from 0 to 32767. Refer to the Remote IO Toolkit online help system for more information.

Loop Power Jumpers

If any of your 4-20 mA transmitters require loop power, connect 24 VDC to terminals 17 and 18 of the module base as shown below. (The 24 VDC may come from an external DC power source, or from the power supply.) Then set the loop power jumper for each unpowered loop input channel to the DC+ position. For all self-powered 4-20 mA input field devices, set the loop power jumper to the GND position to provide a ground reference for the input channel.

The loop power jumpers are located inside the module base, and may be accessed by removing the plug-in logic module and opening the access door.



PointScan/302 High Density Input Module

This high density 4-20 mA analog input module has 16 input channels that accept 4-20 mA signals from a wide variety of field devices. One screw terminal is provided for the instrumentation ground, and one screw terminal is provided for each input signal.

Open Loop Detection Feature

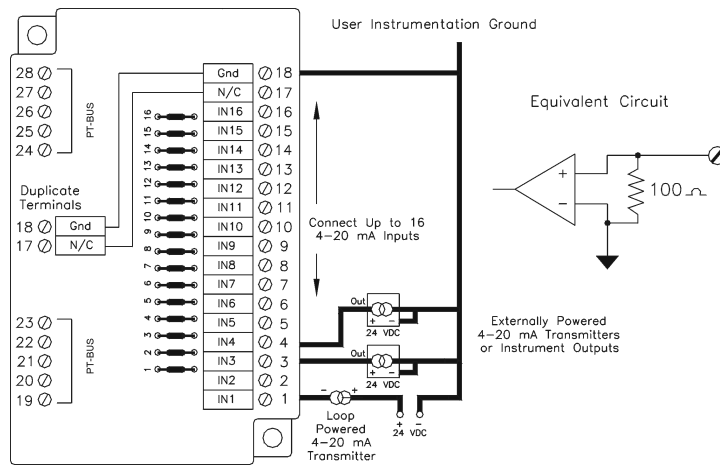
The IO Toolkit configuration program provides a selection that allows inputs below 4 mA to be reported as zero, or be reported as negative values to detect loop failure.

Replaceable Current Shunts

This module base has replaceable 100 ohm current shunts, should a faulty field device or wiring error causes the original shunt to overheat. To access these shunts, unplug the logic module from the base and open the access door. A spare shunt is provided.

4-20 mA Input Scaling

Current inputs are reported as unscaled values from 0 to 32767. Refer to the IO Toolkit online help system for more information.

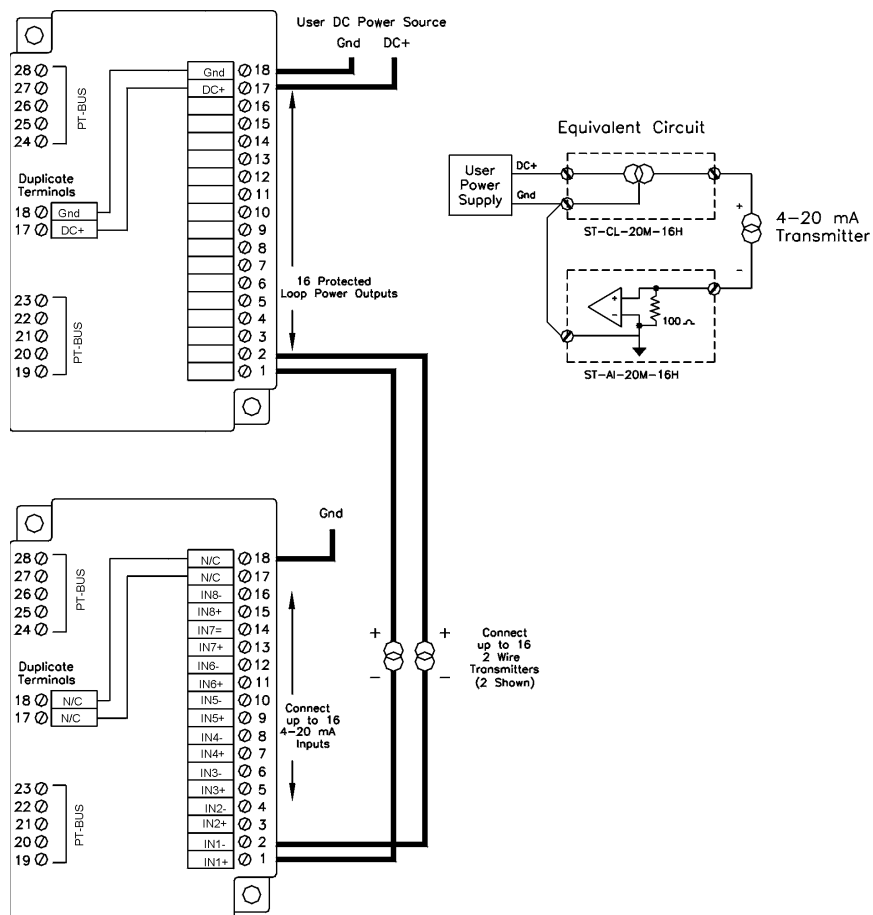


PointScan/303 4-20 mA Loop Current Limiter

This optional 4-20 mA current limiter module provides overcurrent protection when connected in series with loop powered 4-20 mA analog devices. One pair of screw terminals is provided for the loop power source, and one terminal is provided for each of the sixteen protected loops. Refer to the diagram below for sample wiring connections.

Overcurrent LEDs

A status LED will be lit if the 4-20 mA loop current for that channel exceeds 25 mA.



PointScan/305 Voltage Input Module

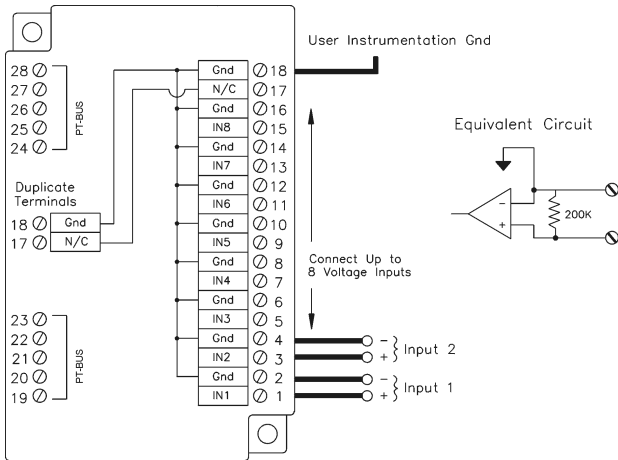
This voltage analog input module has eight channels that accept high level voltage signals from a wide variety of field devices. Two screw terminals are provided for each input channel. The return screw terminals are bussed internally.

Range Selection

This module supports voltage signals from +/- 1 volt to +/- 10 volts. Range selection is performed using the IO Toolkit configuration utility. Refer to the IO Toolkit online help system for information on selecting voltage ranges.

Voltage Input Scaling

Voltage inputs are reported as unscaled values from -32768 to 32767. Refer to the IO Toolkit online help system for more information.



PointScan/306 6 RTD Inputs (Platinum)

PointScan/307 6 RTD Inputs (Copper)

Each RTD input module has six channels that accept either 100 ohm platinum RTD inputs (PointScan/306) or 10 ohm copper RTD inputs (PointScan/307). Three screw terminals, compatible only with the universal wiring base, are provided for each input channel, to support two, three or four wire RTD connections.

Pulsed Current Feature

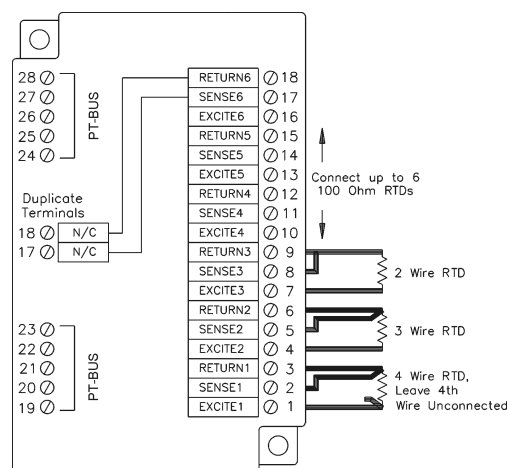
To minimize self heating of the RTD, the measurement current is pulsed on during the measurement period only.

RTD Linearization

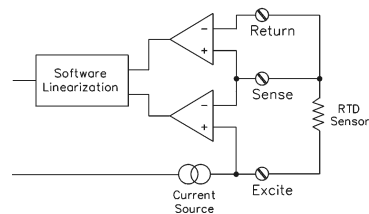
RTD linearization is performed in the gateway firmware. Both American and European linearization standards are supported, and are selectable in the IO Toolkit program.

RTD Input Scaling

All 100 ohm platinum RTD inputs are reported as unscaled values from -2000 to 8500 (-200 to 850 °C), with a resolution of 0.1 degrees C. All 10 ohm copper RTD inputs are reported as unscaled values from -2000 to 2600 (-200 to 260 °C), with a resolution of 0.1 °C.



Equivalent Circuit





This section documents the following modules:
PointScan/316 PointScan/317 PointScan/318

Analog Output Wiring

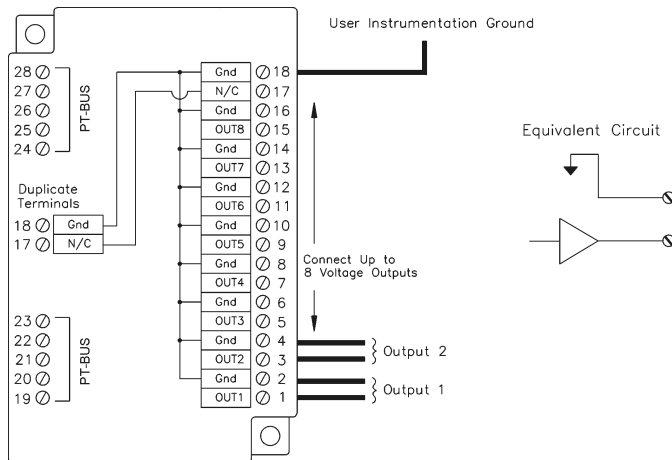
PointScan/300 Series analog output modules are supplied with the base. The return screw terminals in this base are bussed internally. A single user power connection or instrumentation ground connection to the module allows up to eight output devices to be connected using two wires apiece. Refer to the upcoming diagrams for sample wiring connections.

PointScan/318 8 channel Voltage Output Module

This analog output module has eight channels that provide 5 volt or 10 volt unipolar or bipolar analog output signals. Two screw terminals are provided for each output channel. The return screw terminals to instrumentation ground are bussed internally.

Power Requirements

Voltage analog outputs are powered by the analog output module. No external power is required.



PointScan/317 8 channel 4-20 mA Outputs

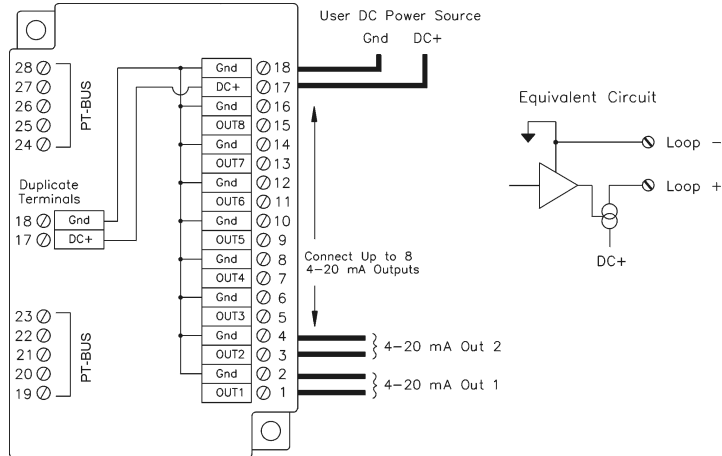
This analog output module has eight channels that provide 4-20 mA analog output signals. Two screw terminals are provided for each output channel. The return screw terminals are bussed internally.

PointScan/316 4 channel 4-20 mA Output Module

This analog output module has four channels that provide 4-20 mA analog output signals. Two screw terminals are provided for each output channel. The return screw terminals are bussed internally.

Power Requirements

External 24 VDC power is required for 4-20 mA analog outputs.



This section documents the following gateway:
PointScan/442

PointScan/442 Ethernet/RS-232 to PT-bus Gateway

Use the PointScan/442 to add either PointScan/300 series I/O or high channel count data loggers (TempScan/MultiScan/ChartScan) to an Ethernet-based system

Features

- Supports expansion of up to 20 PointScan/300 series modules on a single Ethernet port
- Links serial-based TempScan/1100, MultiScan/1200, or ChartScan/1400 data loggers to Ethernet
- Supports the Modbus/TCP open Ethernet protocol standard
- RS-232 port for diagnostics or modem connection
- DIN-rail or panel mountable

Overview

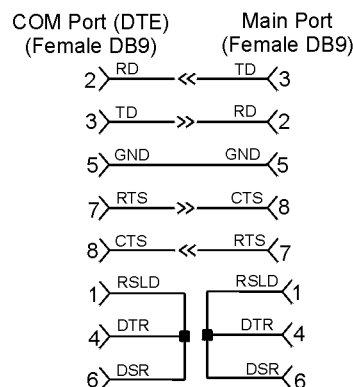
The PointScan/442 gateway is a convenient solution for linking the economical PointScan/300 series I/O or the high-channel density TempScan/MultiScan/ ChartScan data loggers to Ethernet via a single IP address. For applications with small I/O count per node, the PointScan/100 series (with built-in Ethernet) is an ideal solution, but for applications with higher I/O count per node the PointScan/442 is a practical means of adding multiple (up to 20) PointScan/300 series I/O. For applications with very high concentrations of I/O (up to 992) the TempScan/1100, MultiScan/1200, and ChartScan/1400 provide a range of low cost-per-channel options for measuring temperature (TC) and volts (V, mV).

The module's Ethernet port responds to either Modbus or PT-bus protocol, and module's RS-232 port is used for either configuration and diagnostics or as an alter-native means of accessing the I/O. The Ethernet port and the RS-232 port can be used simultaneously. The PointScan/442 polls the PointScan/300 series modules or TempScan/MultiScan/ChartScan data loggers and makes data available for display and storage.

The PointScan/442 gateway works transparently with Citect monitoring, test, and control software but is fully compatible with Modbus/TCP drivers that are part of most commercially available HMI/SCADA software.

The PointScan/442 gateway has two communication ports: a serial port, and an Ethernet port.

CA-221
Cable for PC COM Port to CA-221
RS232 Port



CA-221
Serial (RS232) Port Cable Wiring



Table PointScan I/O Modules and Accessories

A

Definition	Distributed I/O Modules			Description
	Ethernet	RS-485	PT-Bus	
Analog Inputs				
8 Analog Inputs (4 to 20 mA)	—	PointScan/201	PointScan/301	Measure analog current with 14-bit resolution
16 Analog Inputs (4 to 20 mA)	PointScan/102	PointScan/202	PointScan/302	Measure analog current with 14-bit resolution
16 Analog Inputs (Current Limiters)	—	—	PointScan/303	Provides short circuit protection for 4 to 20 mA inputs
8 Universal Analog Inputs (TC, mA, V, mV)	PointScan/104	PointScan/204	PointScan/304	Measure TCs (J, K, E, R, T, B, C, N, S), floating 4 to 20 mA, or mV, V with 16-bit resolution
8 Analog Inputs ($\pm 1, 2, 5$ 10V)	—	—	PointScan/305	Measure voltage inputs with 12-bit resolution
6 RTD Inputs (100 Ohm Platinum)	—	—	PointScan/306	Measure 100 Ohm platinum RTDs (2, 3, or 4 wire) with 16-bit resolution
6 RTD Inputs (10 Ohm Copper)	—	—	PointScan/307	Measure 10 Ohm copper RTDs (2 or 3 wire) with 16-bit resolution
Combination I/O				
8 Analog Inputs & 4 Analog Outputs (4 to 20 mA)	PointScan/108	—	—	Provides 4 to 20 mA inputs and outputs with 16-bit resolution
4 RTD Inputs & 4 Digital Outputs (100 Ohm Platinum, 12/24 VDC/VAC)	PointScan/109	—	—	Measure 100 Ohm platinum RTDs (2, 3, or 4 wire) and digital inputs
Analog Outputs				
4 Analog Outputs (4 to 20 mA)	—	PointScan/216	PointScan/316	Provides 4 to 20 mA outputs with 13-bit resolution
8 Analog Outputs (4 to 20 mA)	—	PointScan/217	PointScan/317	Provides 4 to 20 mA outputs with 13-bit resolution
8 Analog Outputs ($\pm 5V, \pm 10V, 0$ to 5V, 0 to 10V)	—	—	PointScan/318	Provides voltage outputs with 14-bit resolution
Digital Inputs				
8 Digital Inputs (12/24 VDC/VAC)	—	PointScan/221	PointScan/321	Read digital (ON/OFF) inputs
16 Digital Inputs (12/24 VDC/VAC)	PointScan/122	PointScan/222	PointScan/322	Read digital (ON/OFF) inputs
8 Digital Inputs (5 VDC)	—	—	PointScan/323	Read digital (ON/OFF) inputs
8 Digital Inputs (48 VDC/VAC)	—	—	PointScan/324	Read digital (ON/OFF) inputs
8 Digital Inputs (120 VDC/VAC)	—	—	PointScan/325	Read digital (ON/OFF) inputs
8 Digital Inputs (240 VAC)	—	—	PointScan/326	Read digital (ON/OFF) inputs
8 HS Counters with Encoders (32-bit, 4 to 30V)	PointScan/127	—	PointScan/327	Count rates up to 50-kHz plus quadrature encoder
Combination I/O				
4 Digital Inputs & Outputs (12/24 VDC)	—	PointScan/228	—	Read digital (ON/OFF) inputs, switch digital (ON/OFF) outputs
8 Digital Inputs & Outputs (12/24 VDC)	PointScan/129	—	—	Read digital (ON/OFF) inputs, switch digital (ON/OFF) outputs
8 Digital Inputs & 8 Analog Inputs (12/24 VDC/VAC, 4 to 20 mA)	PointScan/130	—	—	Read digital (ON/OFF) inputs, output 4 to 20 mA with 16-bit resolution
4 Digital Inputs & 4 Analog Inputs (12/24 VDC/VAC, 4 to 20 mA)	—	PointScan/231	—	Read digital (ON/OFF) inputs, output 4 to 20 mA with 16-bit resolution

Digital Outputs				
6 Relay Outputs (120 VDC/VAC, 2A max)	—	—	PointScan/336	Dry contact relay outputs, SPDT (FormC)
8 Digital Outputs (0 to 60 VDC, 2A max)	—	—	PointScan/337	High-current control outputs with isolation
8 Digital Outputs (60 to 150 VDC, 1A max)	—	—	PointScan/338	High-current control outputs with isolation
8 Digital Outputs (16 to 140 VAC, 2A max)	—	—	PointScan/339	High-current control outputs with isolation
8 Digital Outputs (140 to 265 VAC, 2A max)	—	—	PointScan/340	High-current control outputs with isolation
16 Digital Outputs (10 to 32 VDC, 0.5A max)	—	—	PointScan/341	Low-current outputs to drive low power devices
16 Digital Outputs (10 to 30 VDC, 1A max)	PointScan/142	PointScan/242	—	High-current control outputs with isolation
8 Digital Outputs (10 to 30 VDC, 3A max)	—	PointScan/243	—	High-current control outputs with isolation
Accessories				
Field Configuration Module				PointScan/440
RS-232/RS-485 Converter				PointScan/441
Ethernet/RS-232 to PT-bus Gateway				PointScan/442
Power Supply (24 VDC @ 1A)				PointScan/443