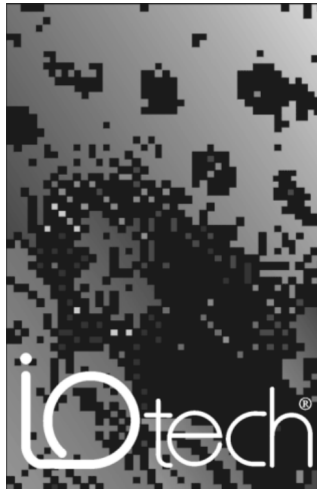


PointScan/200 Series

User's Manual

RS485 Distributed I/O



the smart approach to instrumentation™

IOtech, Inc.

25971 Cannon Road
Cleveland, OH 44146-1833
Phone: (440) 439-4091
Fax: (440) 439-4093

E-mail (sales): sales@iotech.com

E-mail (post-sales): productsupport@iotech.com

Internet: www.iotech.com

PointScan/200 Series

User's Manual

RS 485 Distributed I/O

p/n 1085-0902 Rev. 1.0

Warranty Information

Your IOtech warranty is as stated on the *product warranty card*. You may contact IOtech by phone, fax machine, or e-mail in regard to warranty-related issues.

Phone: (440) 439-4091, fax: (440) 439-4093, e-mail: sales@iotech.com

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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.



This ESD caution symbol urges proper handling of equipment or components sensitive to damage from electrostatic discharge. Proper handling guidelines include the use of grounded anti-static mats and wrist straps, ESD-protective bags and cartons, and related procedures.

Specifications and Calibration

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.

Quality Notice



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.

INSTALLATION AND HAZARDOUS AREA WARNINGS

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, IOtech 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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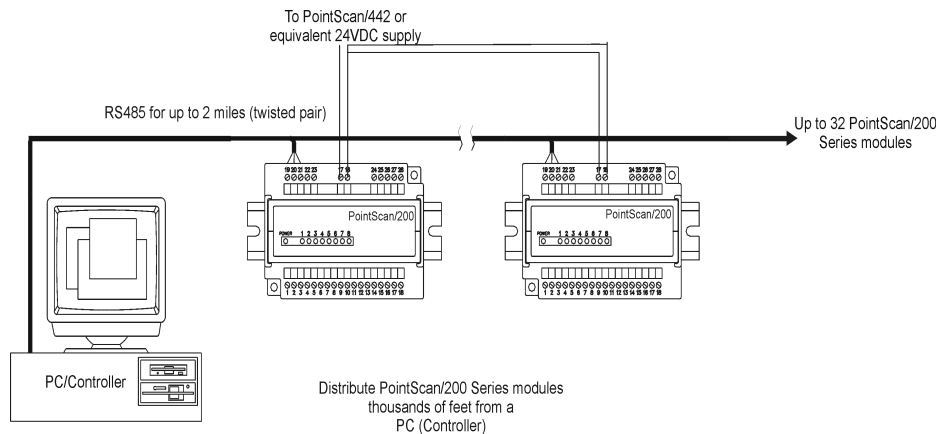
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Appendix A – Table of PointScan I/O Modules and Accessories



Overview

This manual will help you install and maintain PointScan/200. In summary, wiring for power, communications and I/O is connected to each module's base. Then, setup choices are entered using the IO Toolkit and the system is ready to run.



General Specifications

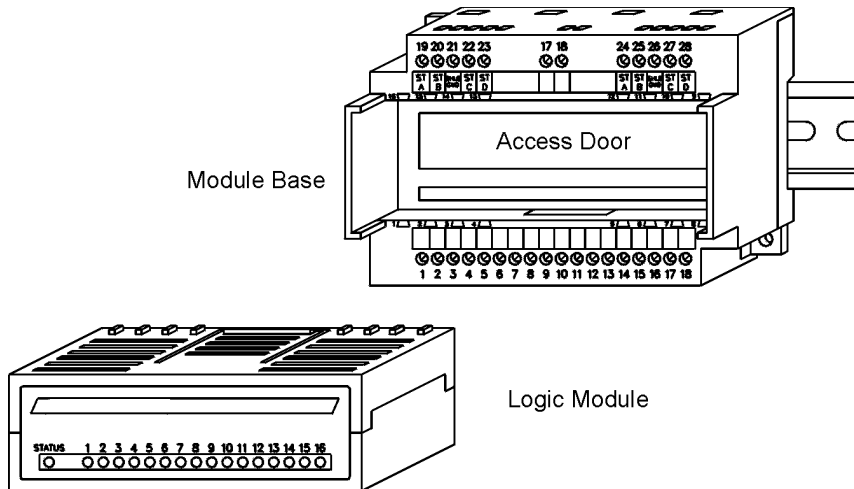
These general specifications apply to all PointScan/200 modules.

Supply Voltage	9 - 30 VDC, 0.5 Watt typical per module (25 mA @ 24 VDC – varies by module and load).
Modules per RS485 bus	32 (use a PointScan/441 to drive a total of 128 modules)
RS485 Isolation	1200 Volts RMS (for 1 minute)
Operating Temperature	-30 to 70 °C
Storage Temperature	-40 to 85 °C
Humidity	5 to 95% (non-condensing)

I/O Module Components

A PointScan/200 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/201, /202, /204, and /231) the hinged door provides access to jumpers and/or 100 ohm replaceable shunts.

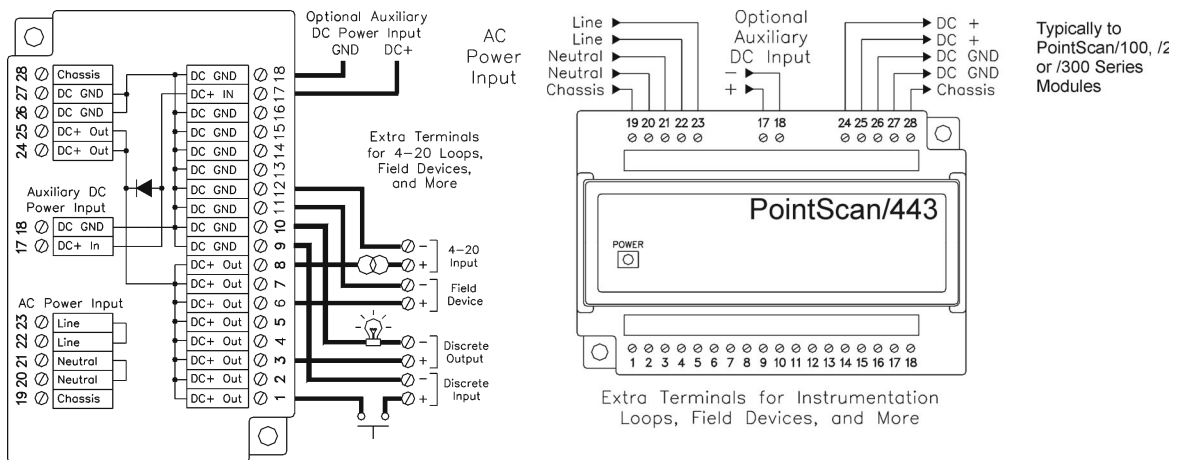
A logic module may be removed by lightly squeezing the top and bottom locking tabs and pulling the logic module straight out. To reinstall, insert the logic module into the base and press firmly until it snaps into place. The logic module is fully seated when the innermost row of ventilation slots are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



DC Power Overview

PointScan/200 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 17 and 18 on the base of each module. Some PointScan/200 Series modules distribute power or return connections to I/O terminals for your convenience in making field-wiring connections. Refer to the wiring diagram for each module for more information.

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 PointScan/200 Series modules in use, then divide the total wattage by the DC power source voltage. Then add any current needed for user instrumentation loops.

PointScan/200 LEDs

Every PointScan/200 module has a number of LEDs. These LEDs can be useful for system diagnostics. These LEDs can be observed in the following states:

I/O Module Status LED

On, with a quick “OFF” BLINK [Long Blink](1.9 seconds ON, .1 seconds OFF) - The module is configured and fully operational, but has not received a valid request from the host for a time longer than the specified time out period. A communication time out has occurred.

Full ON [On] - The module is configured, fully operational, and has received communication from the host device before the timeout period expired. **This is the desired LED indication during system operation.**

HALF BLINK [Long Blink] (1 second ON, 1 second OFF) - The module is not adequately configured and requires a download from the IO Toolkit program.

Full OFF [Off] - There is no power to the module, or the status LED is being turned off intentionally by the IO Toolkit during the module loading operation.

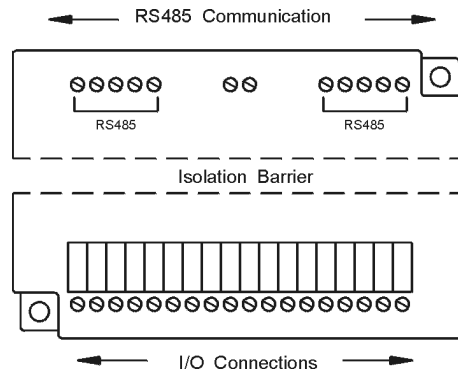
Off, with a quick “ON” BLINK [Short Blink] (1.9 seconds OFF, .1 seconds ON) - The module failed self-test at initialization. It will not attempt communication and should be replaced.

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/200 Series I/O module is isolated from ground (1200 Vrms 1 minute) and additional modules for fault-free operation. Additional levels of isolation (e.g. 500V channel to channel isolation) are provided with some modules. Refer to the product specifications in the 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/100 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.

Getting Started

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

① Mount the Hardware

Refer to [Section 2 for installation instructions](#) for PointScan series I/O and optional accessories

② Install Ethernet/ RS485 Wiring Between Modules

Make PT-Bus (PointScan/300) or RS485 (PointScan/200) wiring connections the modules.

Refer to [Section 2 for wiring guidelines](#).

③ Connect Power and I/O Wiring to the Modules

Connect AC power to the PointScan/442 power supply. Make DC power connections from the power supply to the I/O modules and optional accessories (as needed.) Make field wiring connections to the PointScan/100 Series I/O modules and any peripheral equipment.

Refer to the individual module sections in this manual for connection details.

④ Install Communication Cabling

For PointScan/100 Series modules connect the Ethernet Cable (RJ45) to the resident connector.

For PointScan/200 Series modules connect the Twisted Pair (RS485) cabling.

Refer to [Chapter 2 for wiring details](#).

⑤ Apply Power

Power up the PointScan/100 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>
PointScan/442 Power Supply	Power LED On
PointScan/200 Series	Status LEDs Blinking

⑥ Configure Using IO Toolkit

Refer to the steps outlined in the online help for each PointScan/200 Series module.

⑦ Test the System

Refer to [chapter 3, IO Toolkit](#) and use the Test I/O window in the IO Toolkit program to verify proper I/O operation in all PointScan/200 Series module.

⑧ Configure Your Computer

Refer to the on-line help in the IO Tool Kit 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.

RS485 Wiring Guidelines

PointScan/200 modules communicate with a master controller (PC) using a two wire RS485 party-line. It is recommended that in addition to the two signal wires, a shield or ground wire be connected to reference all stations to a common return. The RS485 port on all PointScan/200 modules is isolated from its internal circuitry, local power source, and I/O wiring to improve communications reliability. It is recommended that only 32 PointScan/200 modules be connected on an unbuffered RS485 party-line, and that the termination jumper be installed on the last module on the end of a network segment. Limiting the cabling to two network arms (segments) radiating from the master controller will yield best signal results.

PointScan/441 RS232 to RS485 Four Port Converter

Overview

This interface provides a convenient way to connect RS485 PointScan/200 bussed Series I/O modules to a RS232 port on a master controller (DC). Designed specifically for driving modules this converter is fully automatic, requiring no user settings. Four RS485 ports are provided to allow up to 128 I/O modules to be connected in a star configuration (multiple network arms). Electrical isolation is provided between the RS232 and RS485 ports for increased reliability.

This RS232 to RS485 converter is recommended when:

1. I/O modules need to be connected to an RS232 port on the master controller
2. More than 32 modules and/or other RS485 devices are to be addressed.
3. A “star” wiring configuration (more than two network wiring segments) is needed.
4. Electrical isolation between the RS485 party-line and the RS232 port on the master controller will increase reliability.

RS232 Wiring

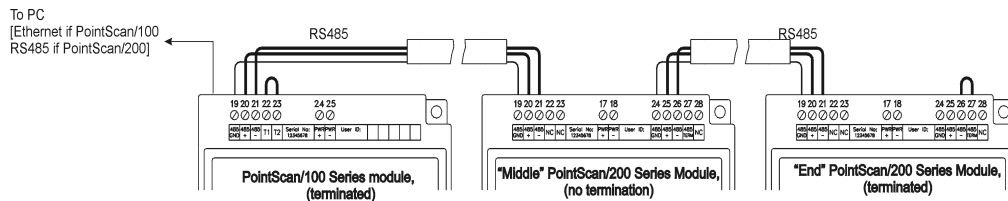
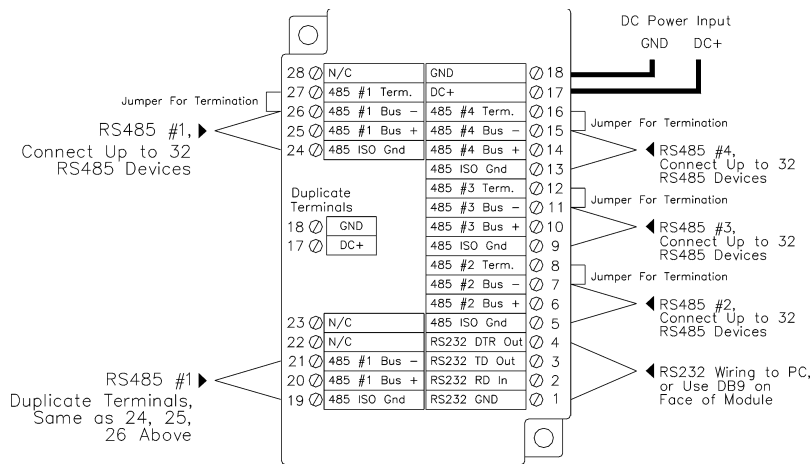
Only the transmit (TD), receive (RD) and common return (GND) signals need be connected in the RS232 cable. A standard suitable null modem cable may be connected to the DB9 connector in the face of the module. Alternatively, signals may be connected to the wiring base as shown in the upcoming diagram. The PointScan/441 module detects message direction and automatically generates a transmitter enable (keying) signal. The DTR signal is always high (asserted) to provide a pull up for any lines in the master controller that may need to be tied off.

RS485 Wiring

All four RS485 ports are interchangeable and may each drive up to 32 PointScan/200 modules. In addition to the two wire signal pair, it is recommended that a shield or third ground conductor be connected to the RS485 ground terminal to reference all stations together. All four RS485 ports are referenced to the same internal signal common (ground), which is electrically isolated from the RS232 port and DC power input terminals. It is recommended that a jumper wire be connected between the “RS485(-)” terminal and “Term” terminal if this device is on the end of a network arm (i.e. it is the last station on the RS485 bus).

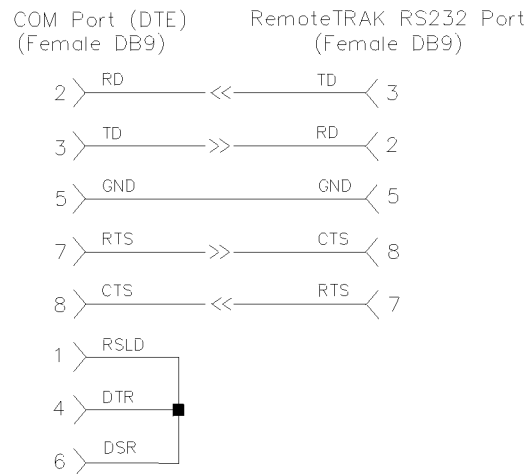
Screw Torque

All the screw terminals on the base should be tightened to a maximum of 3.48 in-lbs.



CA-22

Cable for PC COM Port to PointScan/440 or PointScan/441 RS232 Port

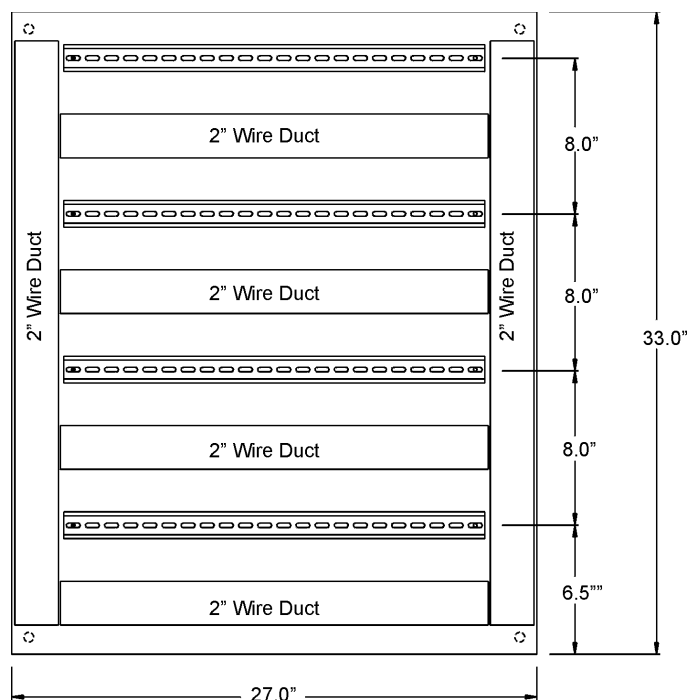


PointScan/200 Series Panel Assembly

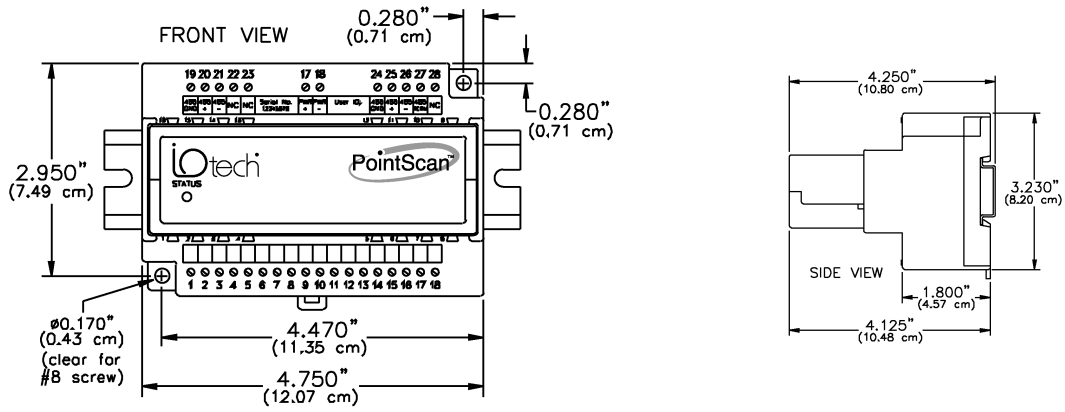
PointScan/200 Series I/O snaps onto DIN rail strips fastened to the subpanel. The following figure shows a sample panel with DIN rail strips and wire duct attached. Recommended DIN rail spacing is 8 inches. This spacing allows room for wire duct to be installed without obstructing field wiring installation.

The PointScan/200 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. The next figures show the physical dimensions of the PointScan/200 Series components.

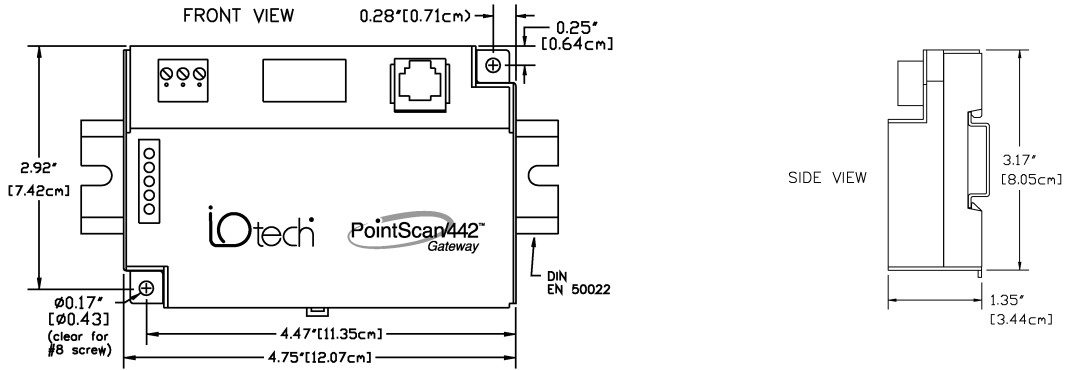
PointScan/200 Series modules may be installed in any orientation and order on your panel. The modules are electrically interconnected using RS485 wiring, beginning with the gateway.



Sample Layout For a 36" x 30" Enclosure



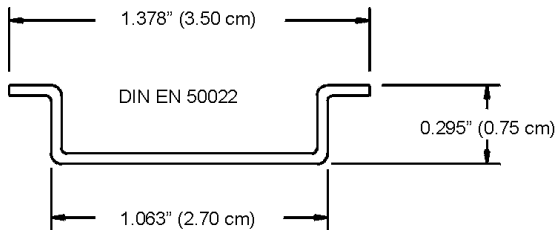
PointScan/100, PointScan/200, PointScan/300 Series I/O modules, PointScan/441 (RS-232/RS-485 Converter), and PointScan/443 (Power Supply) Dimensions



Gateway Dimensions

DIN EN 50022 Suppliers

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



DIN Rail Dimensions

PointScan/440 Portable Remote I/O Field Configuration Tool

Operation

This setup tool is the most convenient way to configure a PointScan/200 module. Unplug any module and insert this setup tool in its place. Commands from the IO Toolkit in your Windows-based PC store the configuration information into permanent memory in the module's base. This module automatically reads the unique serial number stored in the base, making it unnecessary for you to enter the serial number into the software manually. Upon reinsertion, the I/O module finds this configuration information, instantly configures itself and begins to scan I/O. It is permissible to configure PointScan/200 modules in live systems using this setup tool.

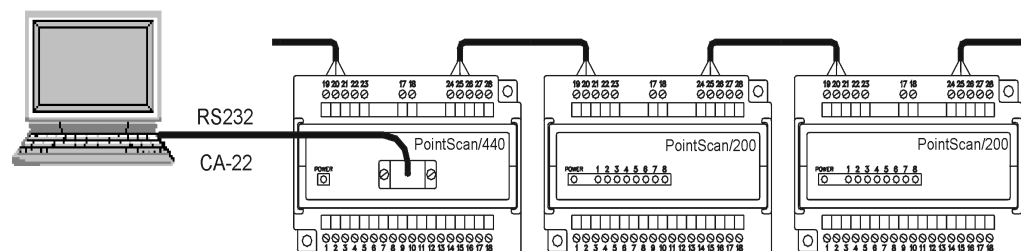
Note: PointScan/200 "smart bases" allow hot swap of live modules -- an exclusive IOtech feature.

Wiring

Connect this module to your Windows PC using a standard Serial (RS232) cable. Only the transmit (TD), receive (RD) and common return (GND) signals are actively used. The RS232 port on this configuration tool is electrically isolated to protect your computer in the event of field wiring errors. This module requires DC supply power on terminals 17 and 18 on the wiring base it is plugged into. No other connections are required. (I/O wiring will be left undisturbed.)

RS232 Mode

This module always communicates to the host PC at 9600 baud, with no parity and eight data bits. Be sure to set the communications port on your computer to these default settings.



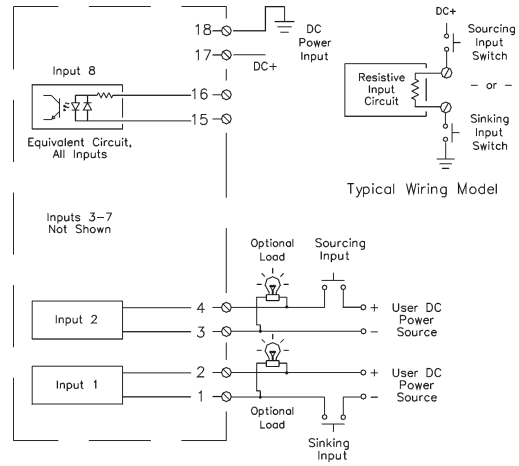
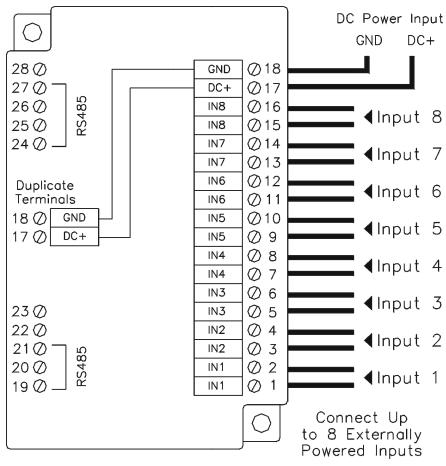
Alternative Setup Method

PointScan/200 modules may also be configured by connecting the RS485 party-line to an RS485 port or RS232 port (through a converter) on your PC. It will be necessary to enter the serial number found on each module's base in the IO Toolkit to enable this setup software to initially talk to each module. In most situations, setup through the RS485 port can only be done with the system off-line. Use a PointScan/440 module for on-line setup changes. (See above.)

IO Toolkit

All configuration parameters are entered using the IO Toolkit Windows software, which stores all setup information into permanent memory in each module's wiring base. No field jumpers or DIP switches are required on PointScan/200 module (except wiring jumpers in the base of some 4 - 20 mA input modules).





PointScan/222 High Density Discrete Input Module

Overview

Sixteen discrete inputs accept DC sourcing signals that are all tied to a common return. More information can be found in the on-line help supplied with the IO Toolkit.

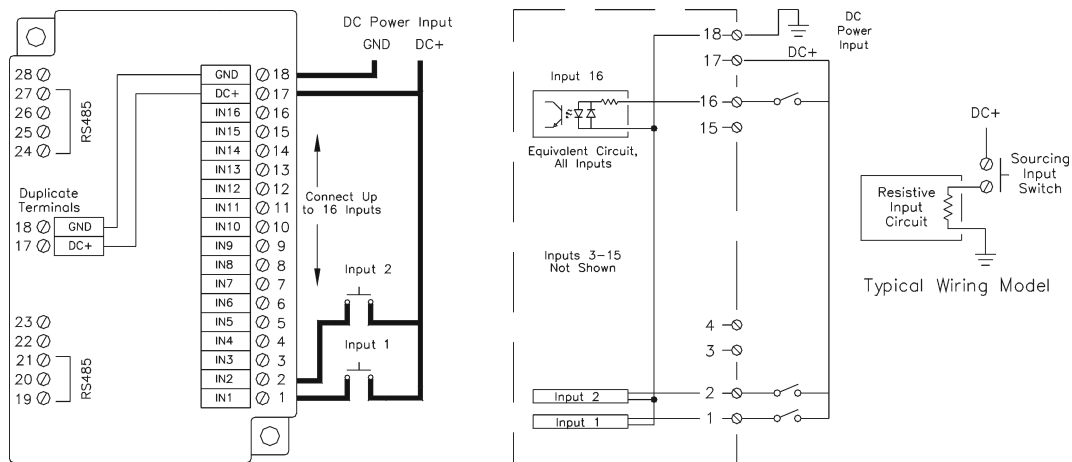
Number of Channels	16 discrete inputs (connected to a common DC source)
Input Voltage Range	10 - 30 VDC
Input Current @ 12 VDC	3.5 mA
Input Current @ 24 VDC	7.0 mA

Wiring

This high density input module provides a single terminal input for each channel. Positive DC voltage must be applied to an input to indicate an ON condition. All channels are referenced to a common return which is connected to the negative side (ground) of the DC power source.

I/O Registers

Function	Iotech Registers	Modbus Registers
Discrete Inputs	X0 - X15	10001 - 10016





PointScan/243 8 Channel High Output Current Module

Overview

Eight discrete output channels provide up to 3 Amps DC to motor contactors, valves, and other loads. Overload and thermal shutdown protection are provided. Each of the eight outputs may optionally be configured as Time Proportioned Outputs that pulse ON at a duty cycle proportional to an analog output register value. Typically these TPO outputs are controlled by a PID loop or other process algorithm in a control program. More information may be found in the on-line help supplied with the IO Toolkit.

Number of Channels	8 discrete outputs connected to a common DC source
Output Voltage Range	10 - 30 VDC
Max. Load per Output	3 Amps
Max. Load per Module	10 Amps
Max. Inrush Current	10 Amps (for 100 mS)

Wiring

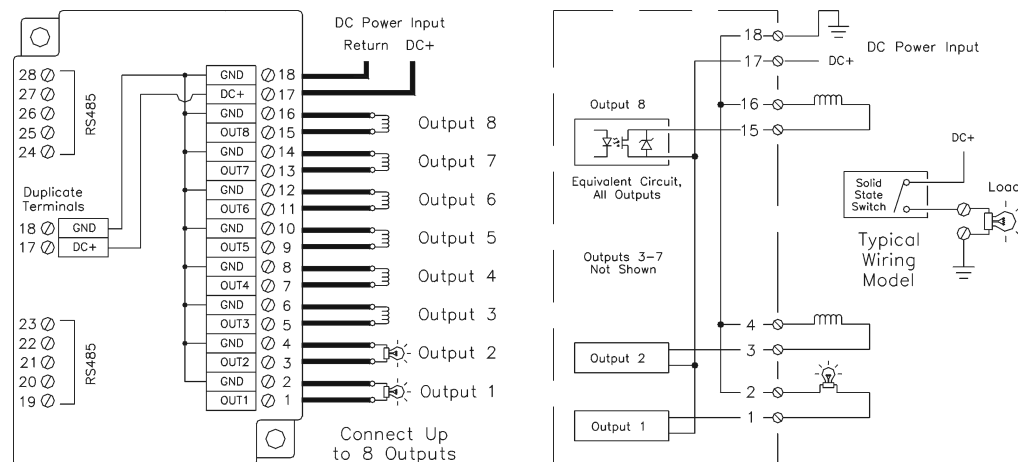
Two terminals, including a ground return, are provided for each output channel. All channels are powered by a common DC source which is connected to the DC power input terminal.

I/O Registers

<u>Function</u>	<u>IOtech Registers</u>	<u>Modbus Registers</u>
Discrete Outputs	Y0 - Y7	00001 - 00008
TPO Values	AY0 - AY7	40001 - 40008 0 to 100% ON: 0 → 32767

TPO Feature

Time proportioned outputs pulse ON and OFF with a duty cycle proportional to an analog value stored in an analog output register. TPO outputs are a low cost way to get smooth proportional control of heaters and other process variables. Typically, TPO analog output registers are assigned to the output of PID or other control program. Use the IO Toolkit to set pulse cycling as fast as 10 mS or as slow (many minutes) as your system dynamics require. Each output may be individually configured as a TPO or ordinary discrete output.



PointScan/242 High Density Discrete Output Module

Overview

Sixteen discrete outputs provide power for loads up to 1 Amp. This module does not provide over current protection or TPO capabilities. More information can be found in the on-line help supplied with the IO Toolkit.

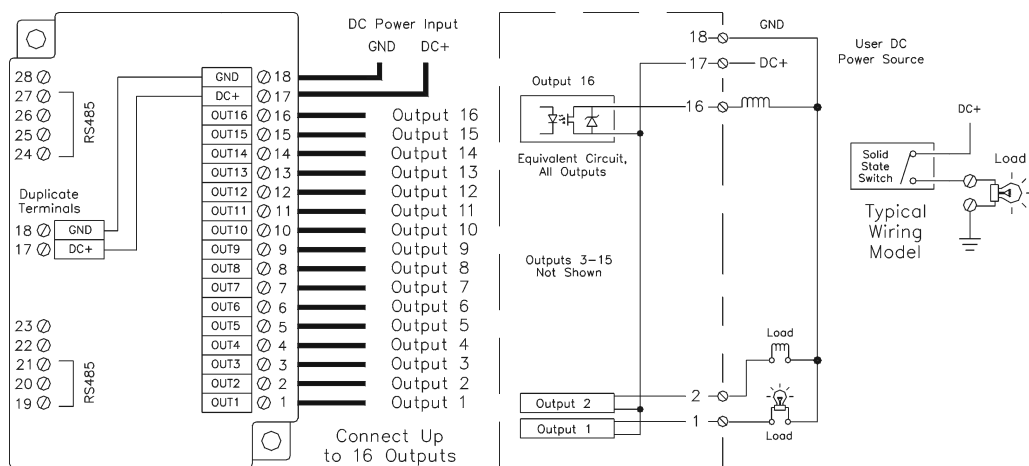
Number of Channels	16 discrete outputs connected to a common DC source
Output Voltage Range	10 - 30 VDC
Max. Load per Output	1 Amp
Max. Load per Module	10 Amps
Max. Inrush Current	5 Amps (for 100 mS)

Wiring

A single terminal is provided for each output channel. All outputs are powered from the DC power terminal. All channels are referenced to a common return which is connected to the negative side (ground) of the DC power source.

I/O Registers

Function	IOtech Registers	Modbus Registers
Discrete Outputs	Y0 - Y15	00001 - 00016



Note: It is not necessary to recalibrate analog I/O if a logic module is replaced.

Analog logic modules may be hot swapped and will not require recalibration. User calibration data is stored in system memory outside of the analog module. Factory calibration data is stored in memory in the plug-in logic module. Since all logic modules are calibrated to the same factory standards, recalibration is not necessary if logic modules are moved or replaced.

PointScan/201 8 Channel 4-20 mA Analog Inputs

Overview

Eight 4-20 mA inputs provide 16 bit high resolution analog measurements. Each input circuit in this module provides a field selectable choice of providing DC power (for loop powered transmitters) or accepting a ground return (from internally powered instruments). More information can be found in the on-line help supplied with the IO Toolkit.

Number of Channels	8 (16 bit resolution)
Input Range	4 - 20 mA
Input Impedance	100 ohms Note: input voltage drop = 2 volts at 20 mA

Wiring

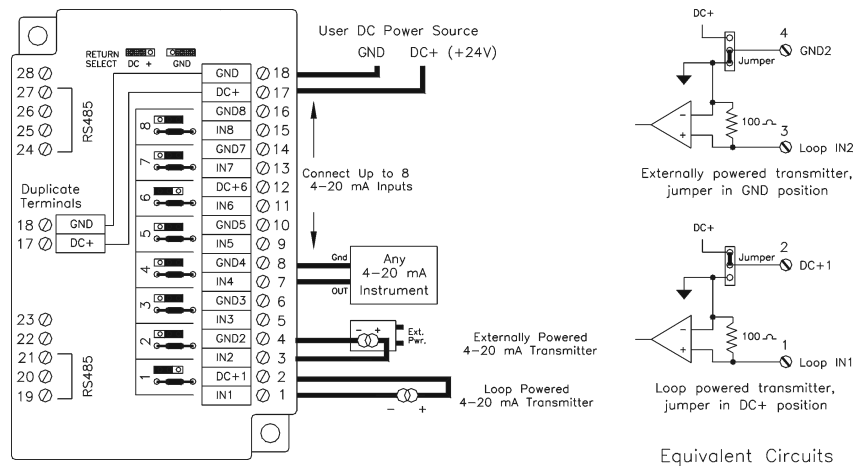
Two terminals are provided for each input channel. Either DC power or ground may be provided for each input device by setting a jumper inside the base. (Access these jumpers by unplugging the module and then opening the hinged door in the wiring base.) Refer to the diagram below. Please be sure to provide a suitable instrumentation ground to avoid measurement errors due to ground loops.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any socketed shunt that open circuits as a result of a current overload.

I/O Registers

Function	IOtech Registers	Modbus Registers
Analog Inputs	AX0 - AX7	30001 - 30008 Bipolar values: -32768 → 32767



PointScan/202 High Density 4-20 mA Analog Input Module

Overview

Sixteen 4-20 mA inputs provide 16 bit high resolution analog measurements. More information can be found in the on-line help supplied with the IO Toolkit.

Number of Channels	16 (16 bit resolution)
Input Range	4 - 20 mA
Input Impedance	100 ohms Note: input voltage drop = 2 volts at 20 mA

Wiring

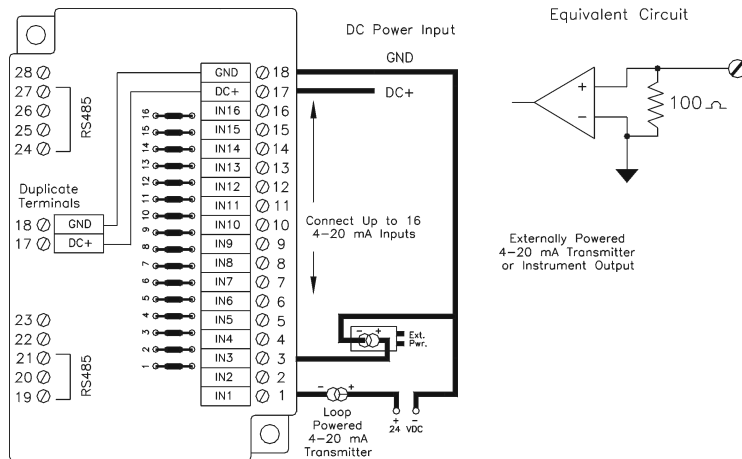
A single input terminal is provided for each measurement channel. Care must be taken to externally provide a suitable instrumentation ground for these single ended input circuits.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any socketed shunt that open circuits as a result of a current overload.

I/O Registers

Function	IOtech Registers	Modbus Registers
Analog Inputs	AX0 - AX15	30001 - 30016 Bipolar values: -32768 → 32767



PointScan/204 Instrumentation Analog Input Module

Overview

Eight isolated input channels provide 16 bit high resolution analog measurements. More information can be found in the on-line help supplied with the IO Toolkit.

Number of Channels	8 (16 bit resolution)	
Input Ranges	J, K, E, R, T,B, C, N, S Thermocouples, 62 mV to 10V,	
4 - 20 mA		
Input Impedance (4-20 mA)	100 ohms	Note: input voltage drop = 2 volts at 20 mA
Input Impedance (other ranges)	200K Ohms	

Wiring

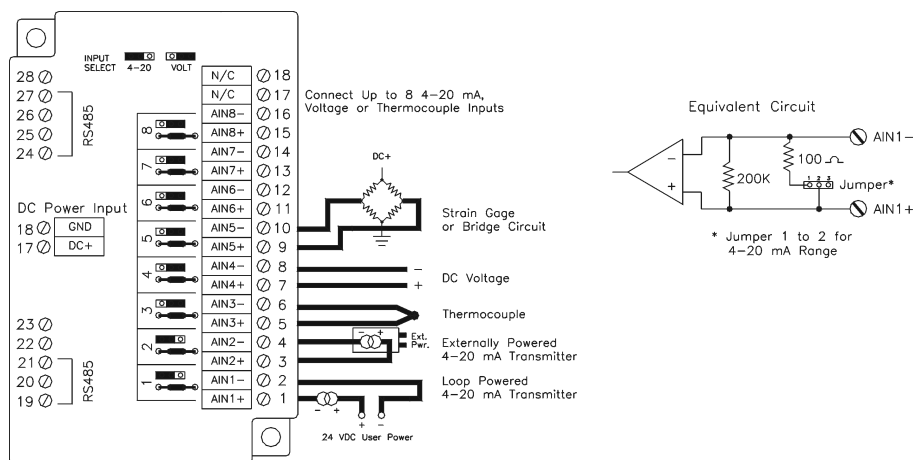
Two input terminals are provided for each measurement channel. Channel to channel isolation is provided.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any socketed shunt that open circuits as a result of a current overload.

I/O Registers

Function	IOtech Registers	Modbus Registers
Analog Inputs	AX0 – AX7	30001 – 30008 Bipolar values: -32768 → 32767





Notes

Note: It is not necessary to recalibrate analog I/O if a logic module is replaced.

Analog logic modules may be hot swapped and will not require recalibration. User calibration data is stored in system memory outside of the analog module. Factory calibration data is stored in memory in the plug-in logic module. Since all logic modules are calibrated to the same factory standards, recalibration is not necessary if logic modules are moved or replaced.

PointScan/217 **8 Channel 4-20 mA Analog Output Module**
PointScan/216 **4 Channel 4-20 mA Analog Output Module**

Overview

These analog output modules provide 4-20 mA signals as proportional control for process signals or to drive chart recorders or other measurement devices. More information may be found in the on-line help supplied with the IO Toolkit.

Number of Channels 4 or 8 (13 bit resolution -- 0.03% of full scale)
 Output Range 4 - 20 mA
 Load Resistance Range 0 - 750 ohms (at a supply voltage of 24 VDC)

Wiring

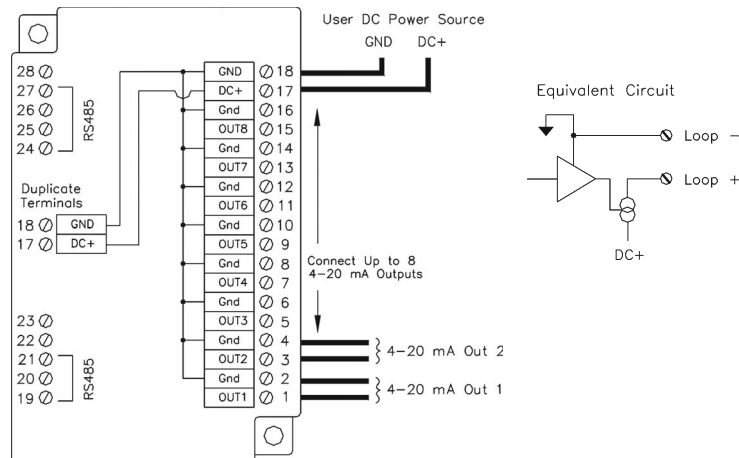
Two terminals are provided for each output channel. Outputs are directly powered from the DC power connected to this module.

Note: Both modules use a PointScan/217 wiring base. Only the first four channels are used on the PointScan/216. System capacity may be increased by plugging a PointScan/217 eight channel module into a base previously occupied by a PointScan/216 four channel module.

I/O Registers

<u>Function</u>	<u>IOtech Registers</u>	<u>Modbus Registers</u>
Analog Outputs	AY0 - AY7	40001 - 40008 Positive values: 0 → 32767

Note: Only the first four registers are used on the PointScan/216.





Note: It is not necessary to recalibrate analog I/O if a logic module is replaced.

Analog logic modules may be hot swapped and will not require recalibration. User calibration data is stored in system memory outside of the analog module. Factory calibration data is stored in memory in the plug-in logic module. Since all logic modules are calibrated to the same factory standards, recalibration is not necessary if logic modules are moved or replaced.

PointScan/228 Combined Discrete Input and Output Module

Overview

This module combines four discrete inputs and four discrete outputs. An input count feature uses analog input registers to accumulate the positive transitions of each input. Each of the four outputs may optionally be configured as Time Proportioned Outputs that pulse ON at a duty cycle proportional to an analog output register value. More information can be found in the on-line help supplied with the IO Toolkit.

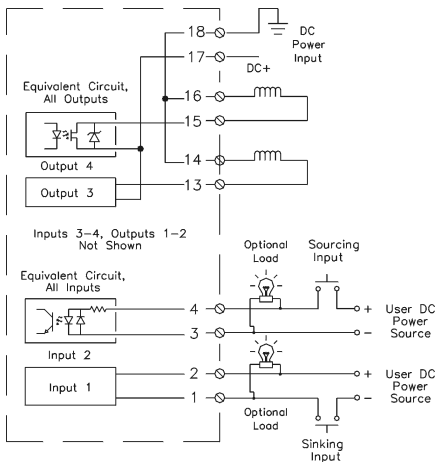
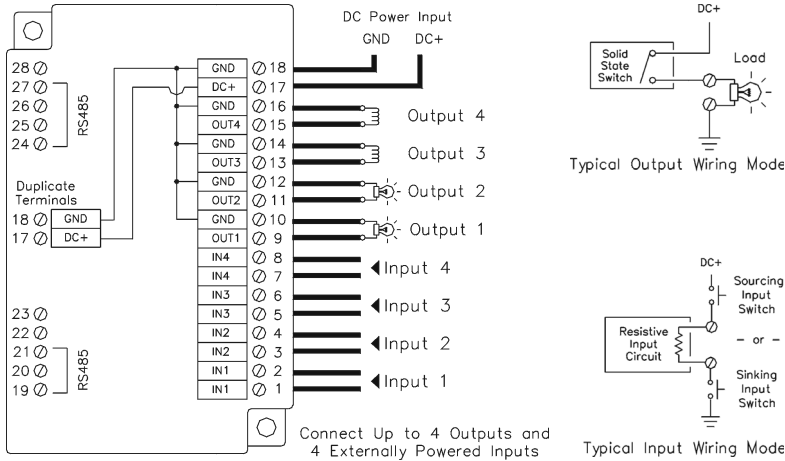
Number of Discrete Inputs	4
Input Voltage Range	10 - 30 VDC/VAC
Number of Discrete Outputs	4
Max. Load per Output	1 Amp
Max. Inrush Current	5 Amps (for 100 mS)

Wiring

A pair of floating terminals is provided for each input to provide channel-to-channel isolation and a choice of sourcing (power switching), sinking (ground switching) or AC signals on each input. The outputs all switch power from the DC power input terminal. A ground return for each output is provided for your convenience.

I/O Registers

Function	Iotech Registers	Modbus Registers
Discrete Inputs	X0 - X3	10001 – 10004
Discrete Outputs	Y0 - Y3	00001 – 00004
Counter Inputs	AX0 - AX3	30001 - 30004 Unsigned values: 0 → 65,535
TPO Values	AY0 - AY3	40001 - 40004 0 to 100% ON: 0 → 32767



PointScan/231 Combined Discrete Input and Analog Input Module

Overview

This module combines four discrete inputs and four analog inputs. A discrete input count feature uses analog input registers to accumulate the positive transitions of each input. The four analog inputs accept signals from internally powered or loop powered devices. More information can be found in the on-line help of the IO Toolkit.

Number of Discrete Inputs	4
Input Voltage Range	10 - 30 VDC
Number of Analog Inputs	4
Input Range	4 - 20 mA
Input Impedance	100 ohms Note: input voltage drop = 2 volts at 20 mA

Wiring

A pair of floating terminals is provided for each discrete input to provide channel-to-channel isolation and a choice of sourcing (power switching), sinking (ground switching) or AC signals on each input. Two terminals are provided for each analog input channel. Either DC power or ground may be provided for each input device by setting a jumper inside the base. (Access these jumpers by unplugging the module and then opening the hinged door in the wiring base.) Refer to the diagram below. Please be sure to provide a suitable instrumentation ground to avoid measurement errors due to ground loops.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity for each of the four analog input channels even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any socketed shunt that open circuits as a result of a current overload.

I/O Registers

Function	IOtech Registers	Modbus Registers
Discrete Inputs	X0 - X3	10001 - 10004
Analog Inputs	AX0 - AX3	30001 - 30004 Bipolar values: -32768 → 32767
Counter Inputs	AX4 - AX7	30005 - 30008 Unsigned values: 0 → 65,535

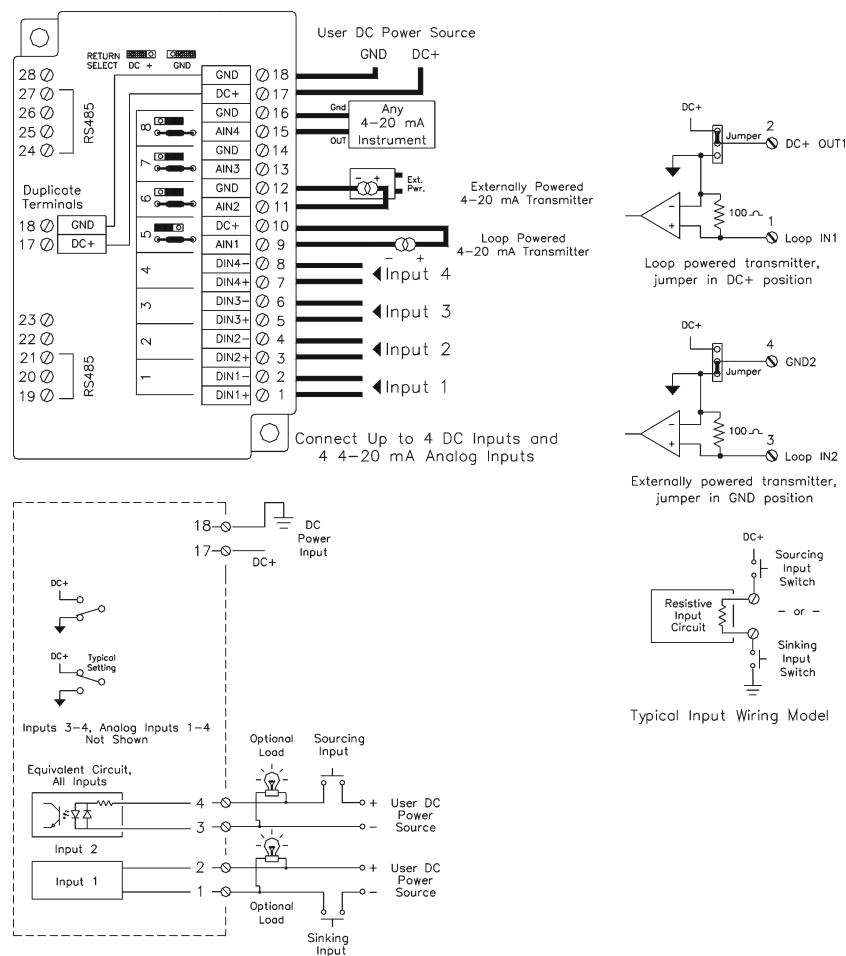




Table PointScan I/O Modules and Accessories

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