



Installation Instructions

PROFIBUS DP Analog, RTD and Thermocouple Base Terminal Block CompactBlock LDX I/O

(Cat. Nos. 1790P-TN4C0, -TN0C2, -T4R0, -T4T0)

What This Document Describes

This document describes how to install your PROFIBUS DP CompactBlock LDX I/O.

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GSD File Requirements

Current functionality of PROFIBUS DP CompactBlock LDX I/O blocks requires GSD files.

These files are easy to install and are available online at:
www.ab.com/networks/gsd/

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard

WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

ATTENTION

- Touch a grounded object to discharge potential static.
 - Wear an approved grounding wriststrap.
 - Do not touch connectors or pins on component boards.
 - Do not touch circuit components inside the equipment.
 - If available, use a static-safe workstation.
 - When not in use, store the equipment in appropriate static-safe packaging.
-

Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

ATTENTION



This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications. NOTE: See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 (“Industrial Automation Wiring and Grounding Guidelines”), for additional installation requirements pertaining to this equipment.

Installing CompactBlock LDX I/O

Follow these steps to install the base block:

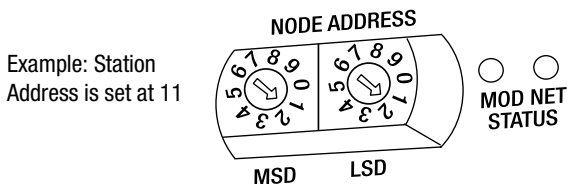
1. Set the station address on the base block.
2. Mount the base block.
3. Mount the optional expansion blocks.
4. Wire the terminal blocks.
5. Connect field wiring.
6. Wire and connect the PROFIBUS connector.
7. Connect power to the block.

These steps are explained in detail in the following procedures.

Set the Station Address on the Base Block

To set the station address, adjust the switches on the front of the base block. The two switches are most significant digit (MSD) and least significant digit (LSD). The switches can be set between 00 and 99.

The base block reads the rotary switches at power-up only.



Mount the Base Block

You can mount the base block to a panel or DIN rail. We recommend that you ground the panel or DIN rail before mounting the base block.

WARNING

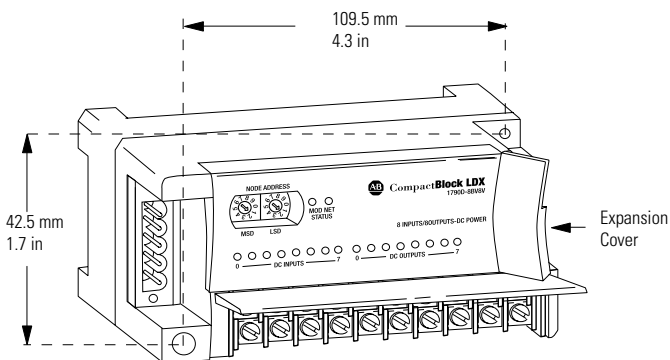


When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with the proper wiring method that complies with the governing electrical codes.

Panel Mounting

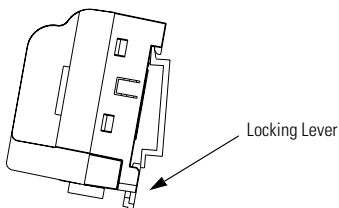
1. Place the base block against the panel where you want to mount it.
2. Gently pull and position the expansion cover to the left.
3. Place a center punch, nail or similar device through the mounting holes in the base block and make two marks on the panel (lower left and upper right corners of the base block).
4. Remove the base block and drill two holes in the panel to accommodate each of the mounting screws.

- Replace the base block on the panel and place a screw through each of the two mounting holes. Tighten the screws until the base block is firmly in place.



DIN Rail Mounting

- Hook the top slot of the base block over the DIN Rail.
- Pull down on the locking lever while pressing the base block against the rail.



- When the base block is flush against the rail, push up on the locking lever to secure the base block to the rail.

Mount the Optional Expansion Blocks

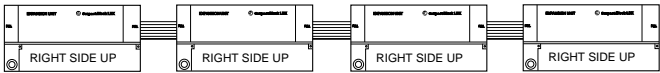
IMPORTANT

The analog base blocks can accommodate a maximum of two discrete expansion blocks. The RTD and thermocouple base blocks do not support any expansion blocks.

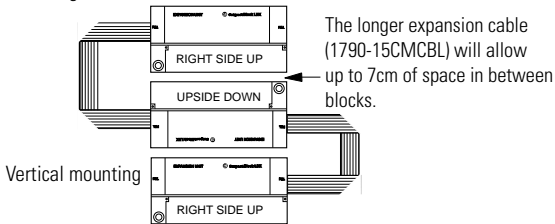
Mount the expansion block by connecting it to a previously-installed CompactBlock LDX I/O base or expansion block.

Beginning with the base block, you can mount your expansion blocks either horizontally or vertically:

- horizontally (left to right) - add expansion blocks in an end-to-end configuration
- vertically (up or down) - add expansion blocks either up or down in a back-to-back configuration. In this configuration, you must use the optional 15cm ribbon cable (1790-15CMCBL) and alternately position the blocks in a right-side up, upside-down fashion.



Horizontal mounting



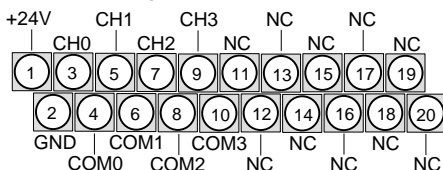
Vertical mounting

You can mount your blocks on a panel or DIN rail as described in the previous section.

Wire the Terminal Block

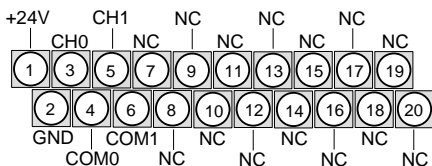
The following figures show the wiring information for the terminal blocks.

1790P-TN4C0 Current Analog Input Module Terminal Block Wiring



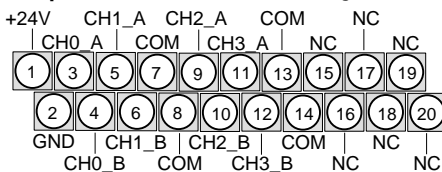
- Wire pin 1 to Field Power (+) 24Vdc
Wire pin 2 to Field Power (-) GND

1790P-TN0C2 Current Analog Output Module Terminal Block Wiring



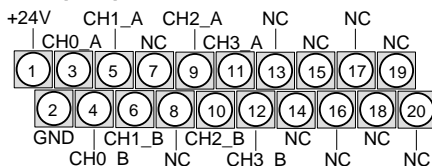
- Wire pin 1 to Field Power (+) 24Vdc
Wire pin 2 to Field Power (-) GND

1790P-T4R0 RTD Input Module Terminal Block Wiring



- Wire pin 1 to Field Power (+) 24Vdc
Wire pin 2 to Field Power (-) GND

1790P-T4T0 Thermocouple Input Module Terminal Block Wiring



- Wire pin 1 to Field Power (+) 24Vdc
Wire pin 2 to Field Power (-) GND

Connect Field Wiring

System Wiring Guidelines

Follow these guidelines when wiring your system:

- Use shielded, twisted pair wire to ensure proper operation and high immunity to electrical noise.
- To limit noise, locate RTD and resistance device signal wires as far away as possible from power lines, load lines and other sources of electrical noise, such as hard-contact switches, relays and AC motor drives.
- Under normal conditions, connect the drain wire and shield junction to earth ground, via a panel or DIN rail mounting screw at the block end.
- Keep shield connection to ground as short as possible.
- To ensure optimum accuracy, limit overall cable impedance by keeping the cable as short as possible. Locate the I/O system as close to your field devices as your application will permit.

RTD Wiring Guidelines

Since the operating principle of the RTD module is based on the measurement of resistance, give special consideration when selecting the input cable. For 2-wire or 3-wire configurations, select a cable that has consistent impedance throughout its entire length.

IMPORTANT

The RTD block requires three wires to compensate for lead resistance error. We recommend that you do not use 2-wire RTDs if long cable runs are required, as it reduces the accuracy of the system. However, if a 2-wire configuration is required, reduce the effect of the lead wire resistance by using a lower-gauge wire for the cable (for example, use AWG #16 instead of AWG #24). The block's terminal strip accepts AWG #14 gauge wire.

When using a 3-wire configuration, the block compensates for resistance error due to lead wire length. For example, in a 3-wire configuration, the block reads the resistance due to the length of the wires and assumes that the resistance of the other lead wire is equal. If the resistance of the individual lead wires are much different, an error may exist. The closer the resistance values are to each other, the greater the amount of error is eliminated.

IMPORTANT

To ensure temperature or resistance value accuracy, the resistance difference of the cable lead wires must be equal to or less than 0.01 ohm.

To ensure that the lead values match as closely as possible:

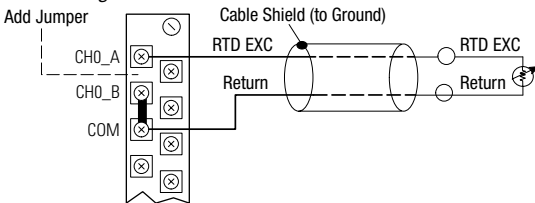
- Keep lead resistance as small as possible and less than 25 ohms.
- Use quality cable that has a small tolerance impedance rating.
- Use a heavy-gauge lead wire which has less resistance per foot.

RTD Wiring Configurations

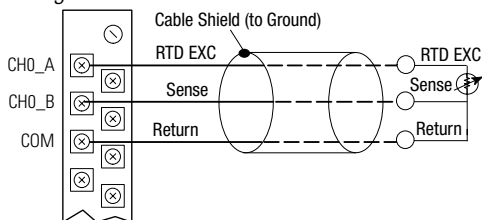
Three configurations of RTDs can be connected to the blocks:

- 2-wire RTD, which is composed of an RTD EXC (excitation) lead wire and a RTN (return) wire.
- 3-wire RTD, which is composed of a Sense and 2 RTD lead wires (RTD EXC and RTN).
- 4-wire RTD, which is composed of a Sense and 2 RTD lead wires (RTD EXC and RTN). The second sense wire of a 4-wire RTD is left open.

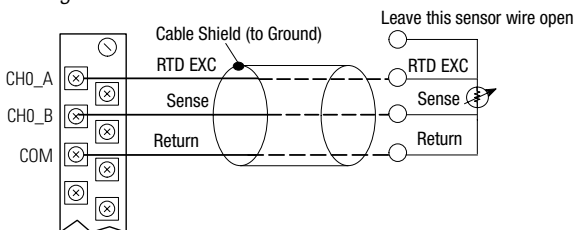
2-Wire RTD Configuration



3-Wire RTD Configuration



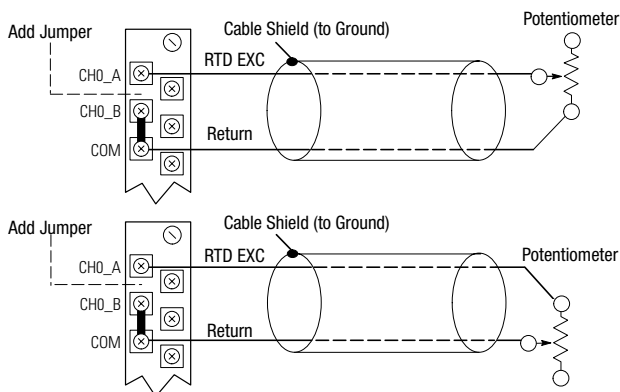
4-Wire RTD Configuration



Wiring Resistance Devices (Potentiometers)

Potentiometer wiring requires the same type of cable as that for the RTD. Potentiometers can be connected to the module as a 2-wire or 3-wire connection as shown in the following figures:

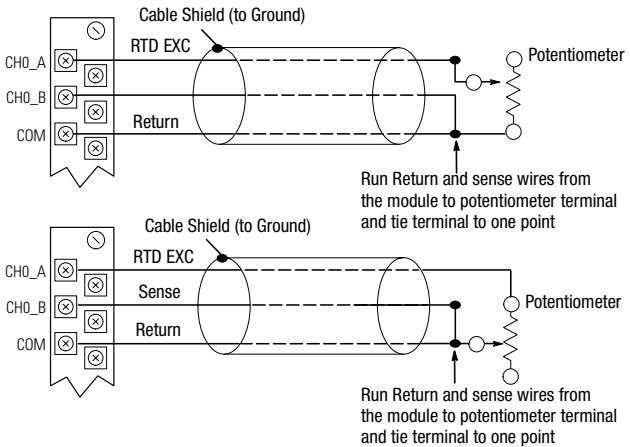
2-Wire Potentiometer Interconnection



TIP

The potentiometer wiper arm can be connected to either the EXC or return terminal, depending on whether you want increasing or decreasing resistance.

3-Wire Potentiometer Interconnection



Connect the PROFIBUS DP Terminal Connector

Follow these procedures when connecting the PROFIBUS DP terminal connector to the base block.

WARNING



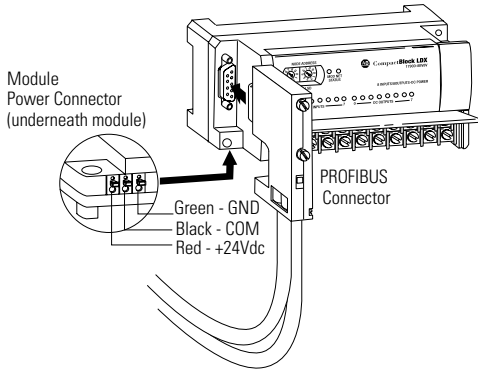
If you connect or disconnect the PROFIBUS cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

The required PROFIBUS female 9-pin D-sub connector is not supplied with the base block; you must purchase it separately.

Before you connect the female 9-pin D-sub connector to the base block, make sure it is wired correctly, as shown in the following table.

Pin Number:	Name:	Description:
1	shield	Shield, Protective Ground
2	M24V	Minus 24V Output Voltage
3	RxD/TxD-P	Receive/Transmit-Data-P
4	CNTR-P	Control-p
5	DGND	Data Ground
6	VP	Voltage-Plus
7	P24V	Plus 24V Output Voltage
8	RxD/TxD-N	Receive/Transmit-Data-N
9	CNTR-N	Control-N

Once you have properly wired the connector, attach it to the base block as shown below. Use the locking screws on the connector to fasten it to the base block.



Connect Power to the Block

To apply power to the block, refer to the above illustration.

I/O Memory Mapping

1790P-TN4C0 Analog Input Module Input Data File

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Not Used				Analog Input Data Channel 0											
1	Not Used				Analog Input Data Channel 1											
2	Not Used				Analog Input Data Channel 2											
3	Not Used				Analog Input Data Channel 3											
4	Not Used												S3	S2	S1	S0

Word/Bit Descriptions for 1790P-TN4C0 Analog Input Module

Word	Decimal Bit	Description
Read Word 0	Bits 00-11	Channel 0 input data
	Bits 12-15	Not used: Set to 0
Read Word 1	Bits 00-11	Channel 1 input data
	Bits 12-15	Not used: Set to 0
Read Word 2	Bits 00-11	Channel 2 input data
	Bits 12-15	Not used: Set to 0
Read Word 3	Bits 00-11	Channel 3 input data
	Bits 12-15	Not used: Set to 0
Read Word 4	Bits 00-03	Status bits for individual channels - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1 and so on. When set (1) indicates: <ul style="list-style-type: none"> • No field power • Open wire (4-20mA current input only) • Under range (4-20mA current input only) • Recoverable module fault (whole channel to be set) • Unrecoverable module fault (whole channel to be set)
	Bits 04-15	Not used: Set to 0

1790P-TN0C2 Analog Output Module Output Data File

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Not Used				Analog Output Data Channel 0											
1	Not Used				Analog Output Data Channel 1											

Word/Bit Descriptions for 1790P-TNOC2 Analog Output Module

Word	Decimal Bit	Description
Write Word 0	Bits 00-11	Channel 0 output data
	Bits 12-15	Not used: Set to 0
Write Word 1	Bits 00-11	Channel 1 output data
	Bits 12-15	Not used: Set to 0

1790P-T4R0 RTD Module Input Data File

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	RTD Input Data Channel 0															
1	RTD Input Data Channel 1															
2	RTD Input Data Channel 2															
3	RTD Input Data Channel 3															
4	Not Used				S11	S10	S9	S8	Not Used				S3	S2	S1	S0

Word/Bit Descriptions for 1790P-T4R0 RTD Module

Word	Decimal Bit	Description
Read Word 0	Bits 00-15	Channel 0 input data
Read Word 1	Bits 00-15	Channel 1 input data
Read Word 2	Bits 00-15	Channel 2 input data
Read Word 3	Bits 00-15	Channel 3 input data
Read Word 4	Bits 00-03	Underrange for individual channels - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1 and so on. When set (1) the input signal is below the input channel's minimum range.
	Bits 04-07	Not used: Set to 0
	Bits 08-11	Overrange for individual channels - Bit 08 corresponds to input channel 0, bit 09 corresponds to input channel 1 and so on. When set (1) the input signal is above the input channel's maximum range, or open RTD is detected.
	Bits 12-15	Not used: Set to 0

1790P-T4T0 Thermocouple Module Input Data File

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Thermocouple Input Data Channel 0															
1	Thermocouple Input Data Channel 1															
2	Thermocouple Input Data Channel 2															
3	Thermocouple Input Data Channel 3															
4	Not Used				S11	S10	S9	S8	Not Used				S3	S2	S1	S0

Word/Bit Descriptions for 1790P-T4T0 Thermocouple Module

Word	Decimal Bit	Description
Read Word 0	Bits 00-15	Channel 0 input data
Read Word 1	Bits 00-15	Channel 1 input data
Read Word 2	Bits 00-15	Channel 2 input data
Read Word 3	Bits 00-15	Channel 3 input data
Read Word 4	Bits 00-03	Underrange for individual channels - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1 and so on. When set (1) the input signal is below the input channel's minimum range.
	Bits 04-07	Not used: Set to 0
	Bits 08-11	Overrange for individual channels - Bit 08 corresponds to input channel 0, bit 09 corresponds to input channel 1 and so on. When set (1) the input signal is above the input channel's maximum range, or open thermocouple is detected.
	Bits 12-15	Not used: Set to 0

Troubleshoot with the Indicators

The base block has the following indicators:

- module status
- network status
- I/O status

Mod/Net Status Indicator		
LED Indicator:	Status:	Description:
Module Status	Solid Red	Unrecoverable fault in base block
	Flashing Red	Unrecoverable fault in expansion unit
	Solid Green	Normal operation - OK
	Off	No power
LED Indicator:	Status:	Description:
Network Status	Solid Red	Unrecoverable communication fault
	Flashing Red	Recoverable communication fault
	Solid Green	Communication path complete - OK
	Flashing Green	Communication path incomplete

I/O Status Indicators			
Function:	LED Color:	Module Illumination:	Condition:
Outputs	Each output: Green	None Green	Output not energized Output energized
Inputs	Each Input: Green	None Green	No valid input Valid input

RTD and Thermocouple Blocks - I/O Channel LED Status Indicator	
Status:	Description:
Flashing Green/Red	Power up
Off	Off line
Red	On line and no field power
Red	PROFIBUS connection and no field power
Flashing Red	Field power and open wire
Green	Field power and valid input
Flashing Red	Input over range
Flashing Red	Input under range
Flashing Red	Recoverable fault

I/O Channel LED Status Indicator			
1790D-TN4C0		1790D-TN0C2	
Status:	Description:	Status:	Description:
Flashing Green/Red	Power up	Flashing Green/Red	Power up
Off	Off line	Off	Off line
Red	On line and no field power	Off	On line and no field power
Red	PROFIBUS connection and no field power	Green	PROFIBUS connection and no field power
Flashing Red ¹	Field power and open wire (4-20mA range only) ²	Green	Field power and open wire
Green	Field power and valid input	Green	Field power and valid output
Green	Input over range	Flashing Red	Field power and output out of range
Flashing Red ¹	Input under range <3mA (4-20ma range only) ²	Flashing Green	Output idle
Flashing Red	Recoverable fault	Flashing Red	Recoverable fault

¹ Green for 0-20mA range.

² Can be determined from the data table.

PROFIBUS DP Digital Base Terminal Block Specifications

The following table contains specifications that are common to all of the analog, RTD and Thermocouple base blocks in this document. Individual base block specifications are detailed after this table.

Environmental Specifications	
Operating Temperature	0 to 55°C (32 to 131°F) IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)
Storage Temperature	-40 to 85°C (-40 to 185°F) IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock)
Relative Humidity	5-90% non-condensing IEC 60068-2-30 (Test Db, Un-packaged Non-operating)
Operating Altitude	2000m
Vibration	12g @ 10-500Hz EC60068-2-6 (Test Fc, Operating)
Shock: Operating Non-operating	10g 30g IEC60068-2-27 (Test Ea, Unpackaged Shock)
Emissions	Group 1, Class A CISPR 11
ESD Immunity	8kV air discharges IEC 61000-4-2
Radiated RF Immunity	10V/m with 1kHz sine-wave 80%AM from 80MHz to 1000MHz 10V/m with 200Hz 50% Pulse 100%AM @ 900Mhz IEC 61000-4-3
EFT/B Immunity	±1kV @ 5kHz on power ports ±2kV @ 5kHz on signal ports ±2kV @ 5kHz on communications ports IEC 61000-4-4
Surge Transient Immunity	±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports ±2kV line-earth(CM) on shielded ports IEC 61000-4-5
Conducted RF Immunity	10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz IEC 61000-4-6
Enclosure Type Rating	None (open style)
Mounting	DIN rail or screw
Dimensions	52x118.5x42mm (2.03x4.62x1.64in)
Weight	0.3lb (0.1kg)

PROFIBUS DP Specifications							
Network Protocol	PROFIBUS-DP (EN50170) <ul style="list-style-type: none"> • Communication of the slave with a Class 1 master • Communication of the slave with a Class 2 master 						
Redundancy	Not supported						
Repeater Control Signal	RS485 signal						
Implementation Type	DPC31						
Freeze Mode	Supported						
Sync Mode	Supported						
Auto Baud Rate	Supported						
Fail Safe Mode	Supported ¹						
Station Type	Slave						
FMS Support	Not supported						
Indicators	1 red/green module status 1 red/green network status						
Number of nodes	100 maximum - rotary switch type node address setting (0-99)						
Network Length/ Communication rate	9.6Kbps @ 1000m (3280ft) 19.2Kbps @ 1000m (3280ft) 93.75Kbps @ 1000m (3280ft) 45.45Kbps @ 1000m (3280ft) 187.5Kbps @ 1000m (3280ft) 500Kbps @ 400m (1312ft) 1.5mbps @ 200m (656ft) 3mbps @ 100m (328ft) 6mbps @ 100m (328ft) 12mbps @ 100m (328ft)						
Isolation	Type test 1250Vac rms for 60 seconds between field power and PROFIBUS (I/O to logic)						
General Specifications							
Wiring Category	2 ²						
Product Certifications (when product is marked)	<table border="0"> <tr> <td>c-UL-us</td> <td>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada</td> </tr> <tr> <td>CE³</td> <td>European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity</td> </tr> <tr> <td>C-Tick³</td> <td>Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions</td> </tr> </table>	c-UL-us	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada	CE ³	European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity	C-Tick ³	Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions
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CE ³	European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity						
C-Tick ³	Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions						

¹ Dependent upon the scanner module being used. For example, the SST Scanner (cat. no. SST-PFB-SLC) does not fully support Fail Safe mode as it only resets outputs to 0. You cannot define behavior such as Hold Last State or Fault Value with the SST Scanner.

² Refer to publication 1770-4.1, *Programmable Controller Wiring and Grounding Guidelines*.

³ See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details.

4-Channel Analog Current Input Block Specifications

1790P-TN4C0	
Inputs per module	4 channel single-ended, non-isolated
Input Current (software configurable)	4-20mA (default) 0-20mA
Resolution	12 bits-unipolar 1/4096 maximum 3.90 μ A/bit (4-20mA) 4.88 μ A/bit (0-20mA)
Converted Data	Binary data 0000 to 0fff (max scale)
Conversion Time	10ms/channel
Overall accuracy	0.2% Full scale @0°-55°C
Calibration	None required
Input Impedance	249 Ω
Insulation Resistance	20M Ω minimum @ 250V dc (between insulated circuits)
General Specifications	
PROFIBUS Power	Supply voltage - 24V dc nominal Voltage range - 19.2-28.8V dc Power dissipation - 1.2W maximum @ 28.8V dc
Field Power	Supply Voltage - 24Vdc nominal Voltage Range - 21.6-26.4V dc (\pm 10%) Power Dissipation - 1.5W maximum @26.4V dc
Isolation	I/O to logic: photocoupler isolation Isolation voltage: Type Test 1250V ac rms for 60 seconds PROFIBUS to logic: non-isolated Field power: non-isolated
Indicators	4 red/green I/O status
Wiring	Terminal block connector screw torque: 7 inch pounds maximum
IMPORTANT: This analog base module can accommodate a maximum of two discrete expansion modules.	

2 Channel Analog Current Output Block Specifications

1790P-TNOC2	
Outputs per module	2 channel single-ended, non-isolated
Output Current	0-20mA
Resolution	12 bits 1/4096 maximum 4.88 μ A/bit
Converted Data	Binary data 0000 to 0fff (max scale)
Conversion Time	2ms/channel
Overall accuracy	0.2% Full scale @0°-55°C
Calibration	None required
Allowable external output load resistance	600 Ω maximum
Insulation Resistance	20M Ω minimum @ 250V dc (between insulated circuits)
General Specifications	
PROFIBUS Power	Supply voltage - 24V dc nominal Voltage range - 19.2-28.8V dc Power dissipation - 1.2W maximum @ 28.8V dc
Field Power	Supply Voltage - 24Vdc nominal Voltage Range - 21.6-26.4V dc (\pm 10%) Power Dissipation - 1.5W maximum @26.4V dc
Isolation	I/O to logic: photocoupler isolation Isolation voltage: Type Test 1250V ac rms for 60 seconds PROFIBUS to logic: non-isolated Field power: non-isolated
Indicators	2 red/green I/O status
Wiring	Terminal block connector screw torque: 7 inch pounds maximum
IMPORTANT: This analog base module can accommodate a maximum of two discrete expansion modules.	

4-Channel Input RTD Base Block Specifications

1790P-T4R0				
Inputs per module	4 channel, RTD/Resistance Input			
Input Range	1-625			
Sensors Supported	Sensor Type	Degree	Counts	Resolution
	Resistance 100m Ω	1 to 625 Ω	10 to 6250	100m Ω
	Resistance 10m Ω	1 to 327 Ω	100 to 32700	10m Ω
	100ohm Pt/ $\alpha = 0.00385$	-200 to +850 $^{\circ}$ C	-2000 to +8500	0.1 $^{\circ}$ C
	200ohm Pt/ $\alpha = 0.00385$	-200 to +850 $^{\circ}$ C	-2000 to +8500	0.1 $^{\circ}$ C
	500ohm Pt/ $\alpha = 0.00385$	-200 to +650 $^{\circ}$ C	-2000 to +6500	0.1 $^{\circ}$ C
	100ohm Pt/ $\alpha = 0.003916$	-200 to +640 $^{\circ}$ C	-2000 to +6400	0.1 $^{\circ}$ C
	200ohm Pt/ $\alpha = 0.003916$	-200 to +640 $^{\circ}$ C	-2000 to +6400	0.1 $^{\circ}$ C
	500ohm Pt/ $\alpha = 0.003916$	-200 to +640 $^{\circ}$ C	-2000 to +6400	0.1 $^{\circ}$ C
	100ohm Nickel	-60 to 250 $^{\circ}$ C	-600 to 2500	0.1 $^{\circ}$ C
	120ohm Nickel	-80 to 260 $^{\circ}$ C	-800 to 2600	0.1 $^{\circ}$ C
	200ohm Nickel	-60 to 250 $^{\circ}$ C	-600 to 2500	0.1 $^{\circ}$ C
	500ohm Nickel	-60 to 250 $^{\circ}$ C	-600 to 2500	0.1 $^{\circ}$ C
Resolution	16 bits across 625ohms, 0.1 $^{\circ}$ C/bit or 0.1 $^{\circ}$ F/bit (RTD Sensors) 20bit Sigma-Delta modulation converter			
Data Format	16 bit Integer (2's compliment)			
Module Scan Time	8ms/channel @ Notch Filter = 60Hz			
Overall accuracy	0.2% Full scale @0 $^{\circ}$ C-60 $^{\circ}$ C			
Settable Notch Filter	10Hz (default), 25Hz, 50Hz, 60Hz, 100Hz, 250Hz, 500Hz			
Open Wire Detection	Out of range, open wiring			
Excitation Current	1mA			
Input Impedance	5M ohm			



General Specifications

PROFIBUS Power	Supply voltage - 24V dc nominal Voltage range - 19.2-28.8V dc Power dissipation - 1.2W maximum @ 28.8V dc
Field Power	Supply Voltage - 24Vdc nominal Voltage Range - 21.6-26.4V dc ($\pm 10\%$) Power Dissipation - 1.5W maximum @26.4V dc
Isolation	I/O to logic: photocoupler isolation Isolation voltage: Type Test 1250V ac rms for 60 seconds PROFIBUS to logic: non-isolated Field power: non-isolated
Indicators	4 red/green I/O status
Wiring	Terminal block connector screw torque: 7 inch pounds maximum

IMPORTANT: This module does not support any expansion modules.

4-Channel Input Thermocouple Base Block Specifications

1790P-T4T0			
Inputs per module	4 channel, Thermocouple/mV Input		
Input Range	±76.50mV		
Sensors Supported	Sensor Type	Range	Scaling
	Voltage 10V	-76.50 to +76.50mV	-7650 to +7650
	Type B	300 to 1800°C	3000 to 18000
	Type E	-270 to 1000°C	-2700 to 10000
	Type J	-210 to 1200°C	-2100 to 12000
	Type K	-270 to 1370°C	-2700 to 13700
	Type R	-50 to 1768°C	-500 to 17680
	Type S	-50 to 1768°C	-500 to 17680
	Type T	-270 to 400°C	-2700 to 4000
	Type N	-270 to 1300°C	-2700 to 13000
Resolution	16 bits, 0.1°C/bit or 0.1°F/bit (Thermocouple Sensors) 20bit Sigma-Delta modulation converter		
Data Format	16 bit Integer (2's compliment)		
Module Scan Time	140ms/channel @ Notch Filter = 60Hz		
Overall accuracy	0.2% Full scale @0°C-60°C		
Settable Notch Filter	10Hz (default), 25Hz, 50Hz, 60Hz, 100Hz, 250Hz, 500Hz		
Open Wire Detection	Out of range, open wiring		
Cold Junction Compensation Range	0 to 70°C		
Input Impedance	5M ohm		
General Specifications			
PROFIBUS Power	Supply voltage - 24V dc nominal Voltage range - 19.2-28.8V dc Power dissipation - 1.2W maximum @ 28.8V dc		
Field Power	Supply Voltage - 24Vdc nominal Voltage Range - 21.6-26.4V dc (±10%) Power Dissipation - 1.5W maximum @26.4V dc		
Isolation	I/O to logic: photocoupler isolation Isolation voltage: Type Test 1250V ac rms for 60 seconds PROFIBUS to logic: non-isolated Field power: non-isolated		
Indicators	4 red/green I/O status		
Wiring	Terminal block connector screw torque: 7 inch pounds maximum		
IMPORTANT: This module does not support any expansion modules.			

<p>The following information applies when operating this equipment in hazardous locations:</p>	<p>Informations sur l'utilisation de cet équipement en environnements dangereux :</p>		
<p>Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>	<p>Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.</p>		
<p>WARNING</p> 	<p>EXPLOSION HAZARD</p> <ul style="list-style-type: none"> • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous. 	<p>AVERTISSEMENT</p> 	<p>RISQUE D'EXPLOSION</p> <ul style="list-style-type: none"> • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Important: Input and output wiring must be in accordance with Class 1, Division 2 wiring methods and in accordance with the authority having jurisdiction.

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