ControlNet PCI Communication Interface Card

Catalog Number 1784-PCIC and 1784-PCICS

The 1784-PCIC and -PCICS cards are peripheral component interconnect (PCI) open-bus interface cards. The cards enable PCI local bus compatible computers to communicate directly with other ControlNet™ products.

The 1784-PCIC communication interface card is a messaging only card that provides ControlNet monitoring and configuration capabilities. The 1784-PCICS communication interface card provides ControlNet I/O bridging as well as monitoring and configuration capabilities.

This document describes how to install the 1784-PCIC/PCICS ControlNet communication interface cards.

If you connect the card directly to a ControlNet coax network, you may also need to use:

- ControlNet Coax Tap Installation Instructions, publication 1786-5.7

- ControlNet Coax Media Planning and Installation Guide, publication CNET-IN002.

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.

Reproduction of the contents of this copyrighted publication, in whole or part, without written permission of Rockwell Automation, is prohibited.

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.

ATTENTION

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.

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.

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.

ATTENTION

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:

- 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.

The following statements apply to the 1784-PCIC card only:

| **IMPORTANT** | This equipment is not resistant to sunlight or other sources of UV radiation. |

| **IMPORTANT** | The secondary of a current transformer shall not be open-circuited when applied in Class I, Zone 2 environments. |

| **IMPORTANT** | Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments. |

| **IMPORTANT** | This equipment shall be used within its specified ratings defined by Allen-Bradley. |

| **IMPORTANT** | Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments. |

European Zone 2 Certification

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive. The examination and test results are recorded in confidential report No. 28 682 010.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021 (1999).

Rockwell Automation Support

Rockwell Automation offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and 260 authorized systems integrators located throughout the United States alone, plus Rockwell Automation representatives in every major country around the world. Contact your local Rockwell Automation representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements

Obtain Pre-Sales Product Support

If you need to contact Rockwell Automation for pre-sales product support, contact your local Rockwell Automation representative.

Obtain Technical Product Support

If you need to contact Rockwell Automation for technical assistance, try one of the following methods:

- Call your local Rockwell Automation representative
- Post-Sales Technical Support, 1.440.646.5800
- Fax Back system, 1.440.646.5436 (requires a touch-tone telephone)
- Web Links http://www.ab.com — as a registered member, open to http://www.ab.com/mem/technotes/techmain.html

About the Application Software

The Rockwell Automation standard application programming interface (API) is RSLinx^{TM} software from Rockwell Software Inc. Contact your local Rockwell Automation sales representative or distributor for further information.

Install the Card Inside the Computer

Before you install the card, be certain that you:

- know how to install hardware in your computer
- consult your computer's documentation for hardware installation instructions

| **TIP** | Installation instructions for both the 1784-PCIC and 1784-PCICS cards are exactly the same. In most illustrations, the 1784-PCIC card is shown. |

To install the card, you need to:

- access to the computer's expansion slots
- possess either a Phillip-head or a flat-head screwdriver
- insert the card into the computer

| **IMPORTANT** | The card's dimensions are shown below. |

6.5 in.
16.5 cm

4.2 in.
10.7 cm
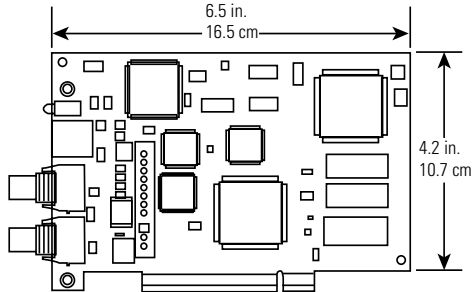
Access the Computer's PCI Local Bus Expansion Slots

To install the card, you must access the computer's PCI local bus expansion slots. Follow these general steps, or refer to your computer's user guide for instructions on how to:

1. Turn off the power to the host computer with the power switch.

2. Remove the computer's cover.

3. Select a vacant PCI local bus expansion slot.

4. Loosen the screw on the back (rear bracket) of the computer.

5. Remove the slot's expansion cover.

6. Insert the card.

To insert the card inside the computer:

1. Follow the card handling instructions on page 6.

2. Insert the card into the edge connector and tighten the expansion slot screw.

3. Turn on the computer to be certain that it comes up correctly.

If the computer:	then:
powers up	go to step 4
hangs up	• you probably have a memory or I/O conflict • you should remove all other cards and try again If you continue to experience difficulty, contact your local Rockwell Automation sales representative or distributor, or call Rockwell Automation Technical Support at 440.646.5800.

4. When the computer boots up correctly, replace the computer's cover.

Connect the Card

After you have installed the card, you can connect it:

- directly to a ControlNet network, which requires a tap (page 10)
- to a device already connected to the ControlNet network (page 11)

See Figure 1 on page 9 for the connectors and indicators.

Figure 1 1784-PCIC or -PCICS card (1784-PCIC card shown)

Diagnostic status indicators

Network Access Port (NAP)
RJ-45 connector for connecting programming terminals to devices on a ControlNet network

Channel A
BNC connectors for connecting directly to ControlNet network

Redundant media BNC connectors

Channel B

Do not connect more than one ControlNet network to this card.

Allen-Bradley
1784-PCIC
ControlNet
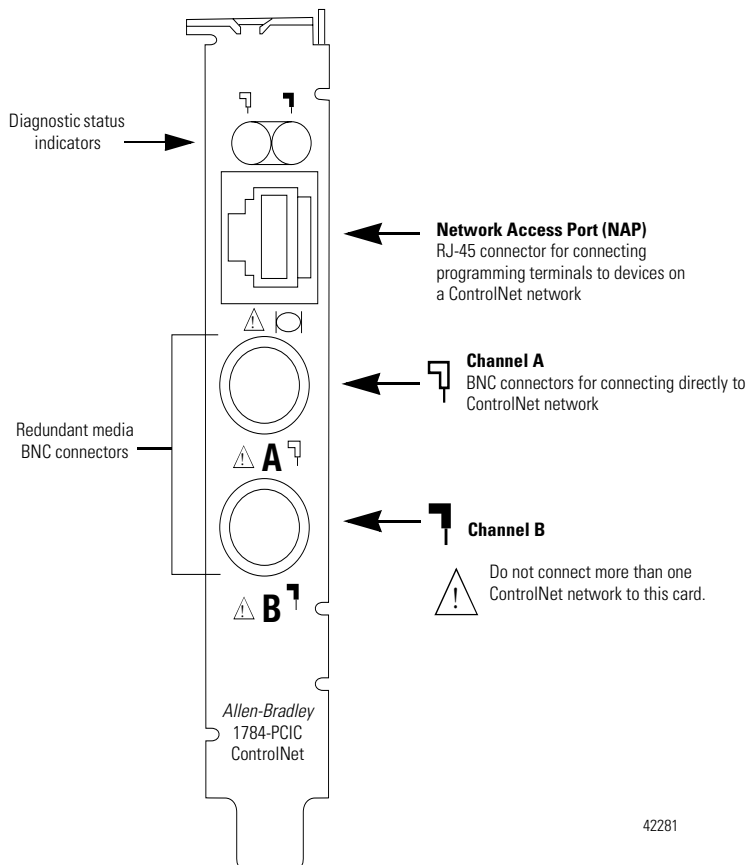
42281

ATTENTION	Do not connect more than one ControlNet network to this card. If you attempt to connect a second network to this card, your communication system will operate erratically.

WARNING ⚠	If you connect or disconnect the ControlNet 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. |

Connect the Card Directly to the ControlNet Network

To connect the card directly to a ControlNet network as shown in Figure 2, follow the instructions in these publications:

- ControlNet Coax Tap Installation Instructions, publication 1786-5.7
- ControlNet Coax Media Planning and Installation Manual, publication CNET-IN002.

Figure 2 Connect the card directly to the ControlNet network
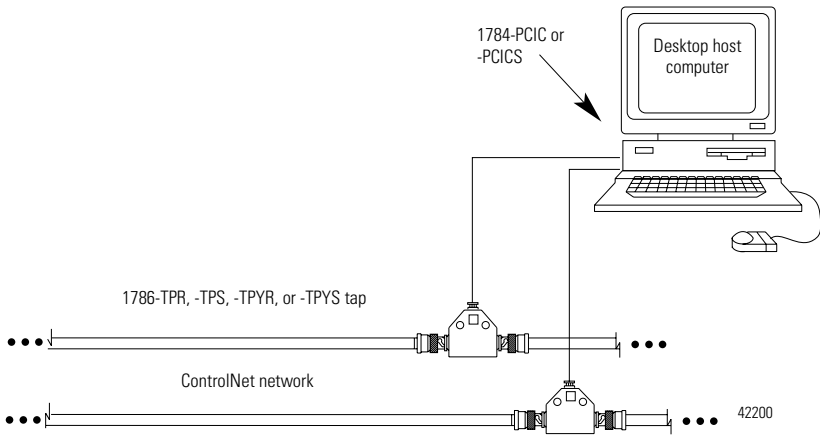
ATTENTION ⚠	If you connect the product to a cable system that does not support redundant media, connect the tap dropline to the BNC connector labeled channel A. Channel B is left open.

If the cable system is redundant, connect the product so that all devices on the network use the same cable for the same channel. That is, all channel A connectors connect to one cable; all channel B connectors connect to the other. |

See page 15 for information about status indicators.

TIP ▶	If you use a non-redundant cable system, all ControlNet devices must be on the same channel, channel A.

Connect to a Device on the ControlNet Network

The 1786-CP cable (Figure 3) connects a host computer to another ControlNet device. It has two RJ-45 8-pin connectors.

Figure 3 1786-CP cable

RJ-45 8-pin connectors

Connector 1

Connector 2
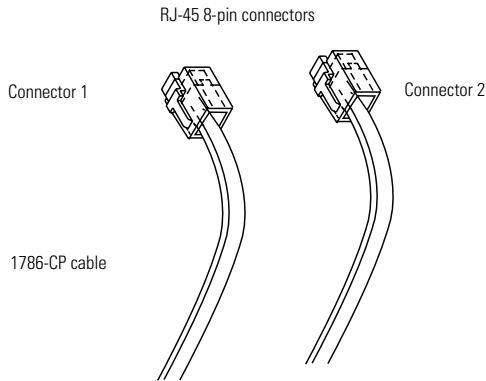
1786-CP cable

30124-m

ATTENTION ⚠	Use only the **1786-CP** cable when you connect a programming terminal to the network through the network access port (NAP). If you use a different cable, it could result in possible network failures or product damage.

See Tables A and B for the wiring for the 1786-CP cable.

Table A Wiring for 1786-CP connector cable

Connector 1		
Wire Number	**Signal Mnemonic**	**Signal Name**
1	ISO-GND	Isolated Ground
2	N.C.	No Connection
3	PTTX-H	Transmit Data High
4	PTTX-L	Transmit Data Low
5	PTRX-L	Receive Data Low
6	PTRX-H	Receive Data High
7	N.C.	No Connection
8	ISO-GND	Isolated Ground

Table B   Wiring for 1786-CP connector cable

Connector 2		
Wire Number	**Signal Mnemonic**	**Signal Name**
1	ISO-GND	Isolated Ground
2	N.C.	No Connection
3	PTRX-H	Receive Data High
4	PTRX-L	Receive Data Low
5	PTTX-L	Transmit Data Low
6	PTTX-H	Transmit Data High
7	N.C.	No Connection
8	ISO-GND	Isolated Ground

When you use the RJ-45 connector, you can connect the card to a ControlNet network without a tap through the Network Access Port (or NAP) of a programmable controller, I/O adapter, or other ControlNet compliant devices (Figure 4 and Figure 5).

Figure 4 Connect a programming terminal to a ControlNet network through another ControlNet device
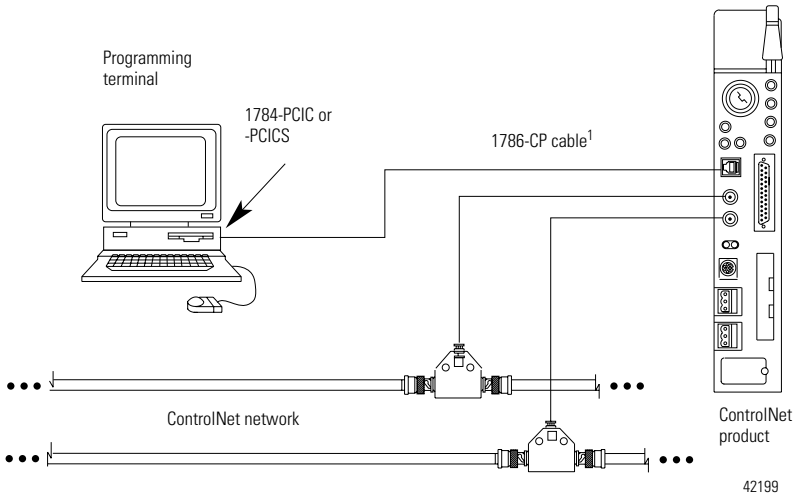
1   The 1786-CP cable can be plugged into any ControlNet product's NAP to provide programming capability on the ControlNet network. When you connect a programming terminal through this cable, it is counted as a node and must have a unique address.

ATTENTION	If a SoftLogix5800 processor is running on the computer containing the 1784-PCIC or -PCICS card, you should not use the 1786-CP cable to connect the card to the ControlNet network. Instead, connect the card directly to the ControlNet network as shown in Figure 4.

Figure 5 Connect a portable host computer to the ControlNet network through the 1784-PCIC or -PCICS card
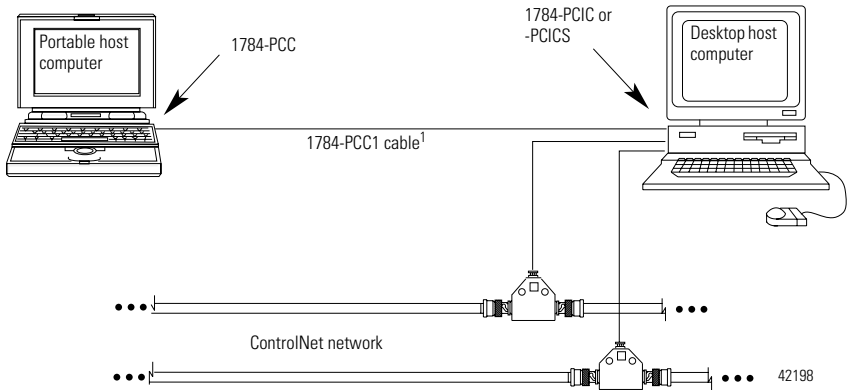
[1] The 1784-PCC1 cable ships with the 1784-PCC communication card.

1784-PCIC and -PCICS Drivers

The drivers for the 1784-PCIC and -PCICS cards are included with Rockwell Software's RSLinx 2.3 (2.30.01 Build 48) or later.

Rockwell Software's RSNetWorx for ControlNet 3.0 SP1 (3.00.01 Build 11) or later is required to configure a ControlNet network containing the 1784-PCICS card.

Visit the Rockwell Automation support web page at http://support.rockwellautomation.com to download updates for RSLinx and RSNetWorx.

Refer to online help in RSLinx for information on how to configure the driver for the 1784-PCIC/PCICS card. For more information about RSLinx, visit http://www.software.rockwell.com. See page 6 for additional technical support information.

The 1784-PCIC and -PCICS cards require one of these operating systems:

- Microsoft Windows NT 4.0 with Service Pack 3 or later
- Microsoft Windows 98
- Microsoft Windows Me
- Microsoft Windows 2000
- Microsoft Windows XP

Going Online with RSNetWorx for ControlNet

When going online with RSNetWorx for ControlNet software via the 1784-PCIC/S card, select 'Port A, ControlNet' under the card in the Virtual Chassis. Do **not** select 'AB-PCIC-1, ControlNet'.
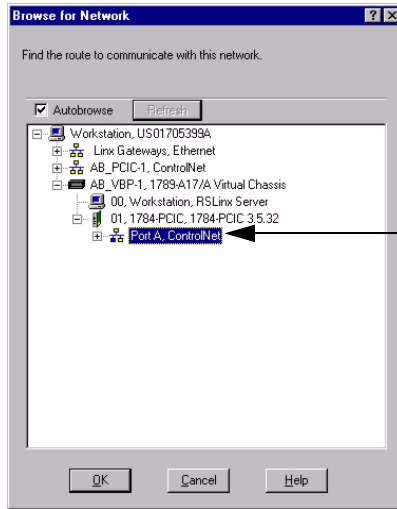
If the Virtual Backplane driver is not available, follow these steps to set up the Virtual Backplane driver in RSLinx:

1. Select **Communications** ⇒**Configure Drivers...**

2. Under Available Driver Types, select '**Virtual Backplane (SoftLogix 58xx)**'.

3. Click on **Add New**.

4. Enter a name for the driver and click on **OK**.

5. Click on **Close**. The Virtual Backplane driver is now available to use.

Interpret the Status Indicators on the 1784-PCIC and -PCICS

The status indicators on the card give you information about the card and the network when you're connected via the BNC connectors. Table C outlines the states and explains what each state means to you and the action you should take, if any, to correct that state.

ControlNet status interpretation

IMPORTANT	When you connect the module to a ControlNet network using only the network access port (NAP), the LEDs are meaningless.

- **steady** - indicator is on continuously in the defined state.
- **alternating** - the two indicators alternate between the two defined states at the same time (applies to both indicators viewed together). The two indicators are always in opposite states, out of phase.
- **flashing** - the indicator alternates between the two defined states (applies to each indicator viewed independent of the other). If both indicators flash, they must flash together, in phase.

Table C ControlNet status interpretation

⍍ A and ⍔ B	Cause:	Action:
off	• no power	• none or apply power to the PC
	• PCIC/PCICS driver not started	• start RSLinx
		• verify that the PCIC/PCICS driver has been configured properly in RSLinx
	• faulted card	• check operating system event log for details of fault (if the PC's operating system supports an event log)
		• cycle power to the PC
		• verify that you have firmly inserted the PCIC/PCICS card into a PCI local bus expansion slot and that the expansion slot screw is tightened
		• if fault persists, contact your Rockwell Automation representative or distributor
		• see page 6 for technical support information
steady red	• faulted card	• check operating system event log for details of fault (if the PC's operating system supports an event log)
		• cycle power to the PC
		• verify that you have firmly inserted the PCIC/PCICS card into a PCI local bus expansion slot and that the expansion slot screw is tightened
		• if fault persists, contact your Rockwell Automation representative or distributor
		• see page 6 for technical support information
alternating red/green	• self-test	• none

Table C ControlNet status interpretation

⊓ A and ⊓ B	Cause:	Action:
alternating red/off	• incorrect node configuration • duplicate ControlNet node address	• check PCIC/PCICS node address and other ControlNet configuration parameters
off	• channel disabled	• program network for redundant media, if required
steady green	• normal operation	• none
flashing green/off	• temporary network errors	• check media for broken cables, loose connectors, missing terminators, etc. • if condition persists, refer to the ControlNet Planning and Installation Manual, publication 1786-6.2.1
flashing red/off	• media fault	• check media for broken cables, loose connectors, missing terminators, etc. • if condition persists, refer to the ControlNet Planning and Installation Manual, publication 1786-6.2.1
	• no other nodes present on network	• add other nodes to the network
flashing red/green	• incorrect node address	• change PCIC/PCICS node address so that it is less than or equal to UMAX[1] • stop and restart the PCIC/PCICS driver in RSLinx
	• incorrect network configuration	• reconfigure the ControlNet network so that UMAX[1] is greater than or equal to the PCIC/PCICS node address

[1] UMAX is the highest node address on a ControlNet network that can transmit data.

Specifications

The operating parameters describe the environment within the card's slot. Refer to your computer documentation for environmental requirements. The card should not exceed those specifications.

General Specifications	
PCI Local Bus	Compliant to PCI Rev. 2.2
Mechanical Form Factor	PCI 5V, 32-bit short card 4.2 in. (10.7 cm) H x 6.5 in. (16.5 cm) L
Driver Compatibility	Microsoft Windows NT 4.0 with Service Pack 3 or later Microsoft Windows 98 Microsoft Windows Me Microsoft Windows 2000 Microsoft Windows XP
Power Requirements	5 V dc, 700 mA Maximum, Class 2
Conductor	Category 2 Use this conductor category information when you plan conductor routing as described in publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.
Environmental Specifications	
Ambient Operating Slot Temperature Rating	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) 0 to 50 $^\circ$C (32 to 122 $^\circ$F)
Ambient Storage Slot Temperature Rating	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) -40 to 85 $^\circ$C (-40 to 185 $^\circ$F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat) 5 to 95%, non-condensing
Vibration (Operation)	IEC60068-2-6 (Test Fc, Operating): 2g @ 10-500Hz
Shock	IEC60068-2-27 (Test Ea, Unpackaged Shock) Operating 30g Non-operating 50g
Emissions	CISPR 11 Group 1, Class A
ESD Immunity	IEC 61000-4-2 4kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3 10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz

Environmental Specifications	
EFT/B Immunity	IEC 61000-4-4 ±2kV at 5kHz on communications ports
Surge Transient Immunity	IEC 61000-4-5 ±2kV line-earth (CM) on shielded ports
Conducted RF Immunity	IEC 61000-4-6 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz
Enclosure Type Rating	None (open-style)

Certification		
(when product is marked)	UR	UL Recognized Component Industrial Control Equipment
	CSA	CSA Accepted Component for Process Control Equipment
	CSA	CSA Accepted Component for Process Control Equipment in Class I, Division 2 Group A,B,C,D Hazardous Locations
	CE[1]	European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions
	C-Tick[1]	Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions
	EEx[1]	European Union 94/9/EEC ATEX Directive, compliant with EN 50021; Potentially Explosive Atmospheres, Protection "n"
	CI	ControlNet Int'l conformance tested to ControlNet specifications.

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

Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations:

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 that has jurisdiction at the time of installation.

WARNING	**EXPLOSION HAZARD —** • 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.

Informations sur l'utilisation de cet équipement en environnements dangereux:

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.

AVERTISSEMENT	**RISQUE D'EXPLOSION —** • 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 1, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

ControlNet is a trademark of ControlNet International.

Allen-Bradley and SoftLogix are trademarks of Rockwell Automation.

RSLinx and RSNetWorx are trademarks of Rockwell Software Inc.

Windows NT, Windows 98, Windows Me, Windows 2000, and Windows XP are trademarks of the Microsoft Corporation.

PCI is a trademark of the PCI Special Interest Group.

Notes:

Notes:

Publication 1784-IN003B-EN-P - January 2003   PN 957726-10