

Modicon TM5

PCI Modules

Hardware Guide

09/2020



The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in death** or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in death** or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This manual describes the hardware implementation of the Modicon TM5 PCI modules. It provides parts descriptions, specifications, wiring diagrams, installation and setup for Modicon TM5 PCI modules.

Validity Note

This document has been updated for the release of EcoStruxure™ Machine Expert V1.2.5.

The technical characteristics of the devices described in the present document also appear online.

To access the information online, go to the Schneider Electric home page

<https://www.se.com/ww/en/download/>.

The characteristics that are described in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Modicon TM5 Expansion Modules Configuration Programming Guide	EIO000003179 (Eng) EIO000003180 (Fre) EIO000003181 (Ger) EIO000003182 (Spa) EIO000003183 (Ita) EIO000003184 (Chs)
Modicon Flexible TM5 / TM7 System - System Planning and Installation Guide	EIO000003161 (Eng) EIO000003162 (Fre) EIO000003163 (Ger) EIO000003164 (Spa) EIO000003165 (Ita) EIO000003166 (Chs)
Modicon TM5 PCI Modules Instruction Sheet	BBV56042

You can download these technical publications and other technical information from our website at <https://www.se.com/ww/en/download/> .

Product Related Information

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

DANGER

POTENTIAL FOR EXPLOSION

- Only use this equipment in non-hazardous locations, or in locations that comply with Class I, Division 2, Groups A, B, C and D.
- Do not substitute components which would impair compliance to Class I, Division 2.
- Do not connect or disconnect equipment unless power has been removed or the location is known to be non-hazardous.
- Do not use the USB port(s), if so equipped, unless the location is known to be non-hazardous.

Failure to follow these instructions will result in death or serious injury.

WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.¹
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

¹ For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this manual, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety*, *safety function*, *safe state*, *fault*, *fault reset*, *malfunction*, *failure*, *error*, *error message*, *dangerous*, etc.

Among others, these standards include:

Standard	Description
IEC 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2015	Safety of machinery: Safety related parts of control systems. General principles for design.
EN 61496-1:2013	Safety of machinery: Electro-sensitive protective equipment. Part 1: General requirements and tests.
ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
ISO 13850:2015	Safety of machinery - Emergency stop - Principles for design
IEC 62061:2015	Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems
IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements.
IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems.
IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements.
IEC 61784-3:2016	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions.
2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2014/35/EU	Low Voltage Directive

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

Standard	Description
IEC 60034 series	Rotating electrical machines
IEC 61800 series	Adjustable speed electrical power drive systems
IEC 61158 series	Digital data communications for measurement and control – Fieldbus for use in industrial control systems

Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive (2006/42/EC)* and *ISO 12100:2010*.

NOTE: The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.

Chapter 1

TM5 System General Rules for Implementing

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Installation and Maintenance Requirements	14
Wiring Rules and Recommendations	17
Environmental Characteristics	18
PCI Modules Installation	20

Installation and Maintenance Requirements

Before Starting

Read and understand this chapter before beginning the installation of your TM5 System.

The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, you must also consider any applicable local, regional or national standards and/or regulations.

Pay particular attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your machine or process in the use of this equipment.

NOTICE

ELECTROSTATIC DISCHARGE

- Store all components in their protective packaging until immediately before assembly.
- Never touch exposed conductive parts such as contacts or terminals.

Failure to follow these instructions can result in equipment damage.

Disconnecting Power

All options and modules should be assembled and installed before installing the control system on a mounting rail, onto a mounting plate or in a panel. Remove the control system from its mounting rail, mounting plate or panel before disassembling the equipment.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

Programming Considerations

WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Operating Environment

WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate this equipment according to the conditions described in the Environmental Characteristics.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: Individual I/O modules may differ in terms of operating temperature de-ratings or other important environmental characteristics. For the specific information, refer to the hardware guide for your particular module.

Installation Considerations

WARNING

UNINTENDED EQUIPMENT OPERATION

- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in an enclosure appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.
- Use the sensor and actuator power supplies only for supplying power to the sensors or actuators connected to the module.
- Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not use this equipment in safety-critical machine functions unless the equipment is otherwise designated as functional safety equipment and conforming to applicable regulations and standards.
- Do not disassemble, repair, or modify this equipment.
- Do not connect any wiring to reserved, unused connections, or to connections designated as No Connection (N.C.).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: JDYX2 or JDYX8 fuse types are UL-recognized and CSA approved.

Wiring Rules and Recommendations

Introduction

There are several rules that must be followed when wiring PCI module.

Wiring Rules



HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

The following rules must be applied when wiring the PCI module:

Use twisted-pair, shielded cables for networks and field bus.

Refer to the section Grounding the TM5 System (*see Modicon TM5 / TM7 Flexible System, System Planning and Installation Guide*) to ground the shielded cables.

Environmental Characteristics

Enclosure Requirements

TM5 components are designed as Zone B, Class A industrial equipment according to IEC/CISPR Publication 11. If they are used in environments other than those described in the standard, or in environments that do not meet the specifications in this manual, your ability to meet electromagnetic compatibility requirements in the presence of conducted and/or radiated interference may be reduced.

The TM5 components meet European Community (CE) requirements for open equipment as defined by EN61131-2. You must install them in an enclosure designed for the specific environmental conditions and to minimize the possibility of unintended contact with hazardous voltages. Your enclosure should be constructed of metal to improve the electromagnetic immunity of your TM5 System. Your enclosure should have a keyed locking mechanism to minimize unauthorized access.

Environmental Characteristics

This equipment meets UL, CSA, GOST-R and c-Tick certifications and CE requirements as indicated in the table below. This equipment is intended for use in a Pollution Degree 2 industrial environment.

The table below provides the general environmental characteristics:

Characteristic	Specification	
This product is compliant with Europe RoHS recommendations and China RoHS regulations.		
Standard	IEC61131-2 ed. 3 2007	
Agencies	UL 508 ● CSA 22.2 No. 142-M1987 ● CSA 22.2 No. 213-M1987	
Ambient operating temperature	Horizontal installation	0...55 °C (32...131 °F) ¹
	Vertical installation	0...50 °C (32...122 °F)
Storage temperature	-25...70 °C (-13...158 °F)	
Relative humidity	5...95% (non-condensing)	
Degree of pollution	IEC60664	2
Degree of protection	IEC61131-2	IP20
Corrosion immunity	No	
Operating altitude	0...2000 m (0...6.560 ft.)	
Storage altitude	0...3000 m (0...9.842 ft.)	

Characteristic	Specification	
Vibration resistance	Mounted on a DIN rail	3.5 mm (0.138 in.) fixed amplitude from 5...8.4 Hz 9.8 m/s ² (1 g _n) fixed acceleration from 8.4...150 Hz
Mechanical shock resistance		147 m/s ² (15 g _n) for a duration of 11 ms
Connection type		Removable spring terminal block
Connector insertion/removal cycles		50
Note: 1 Some devices have extended temperature operating ranges subject to derating and possibly other restrictions. See the specific characteristics for your electronic module.		

Electromagnetic Susceptibility

The table below provides the TM5 System electromagnetic susceptibility specifications:

Characteristic	Specification	Range
Electrostatic discharge	IEC/EN 61000-4-2	8 kV (air discharge) 4 kV (contact discharge)
Electromagnetic fields	IEC/EN 61000-4-3	10 V/m (80 MHz...2 GHz) 1 V/m (2...2.7 GHz)
Fast transients burst	IEC/EN 61000-4-4	Power lines: 2 kV I/O: 1 kV Shielded cable: 1 kV Repetition rate: 5 and 100 KHz
Surge immunity 24 Vdc circuit	IEC/EN 61000-4-5	1 kV in common mode 0.5 kV in differential mode
Surge immunity 230 Vac circuit		2 kV in common mode 1 kV in differential mode
Induced electromagnetic field	IEC/EN 61000-4-6	10 V _{eff} (0.15...80 MHz)
Conducted emission	EN 55011 (IEC/CISPR11)	150...500 kHz, quasi peak 79 dB μ V
		500 kHz...30 MHz, quasi peak 73 dB μ V
Radiated emission	EN 55011 (IEC/CISPR11)	30...230 MHz, 10 m@40 dB μ V/m
		230 MHz...1 GHz, 10 m@47 dB μ V/m

PCI Modules Installation

Installation Considerations

For mounting positions and minimum clearances, the PCI modules are mounted according to the rules defined for the controllers. Refer to the site requirements for the installation of the system (see *Modicon TM5 / TM7 Flexible System, System Planning and Installation Guide*).

NOTE: The PCI module is designed to operate within the same temperature range as the controllers, including the controller de-rating for extended temperature operation, and temperature restrictions associated with the mounting positions.

NOTICE

ELECTROSTATIC DISCHARGE

- Verify that empty PCI slots have their covers in place before applying power to the controller.
- Do not touch an exposed PCI connector.

Failure to follow these instructions can result in equipment damage.

NOTICE

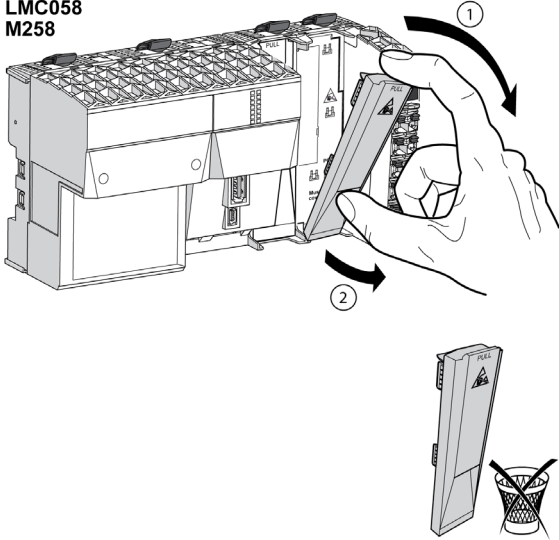
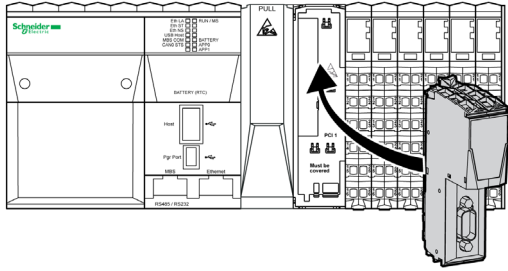
ELECTROSTATIC DISCHARGE

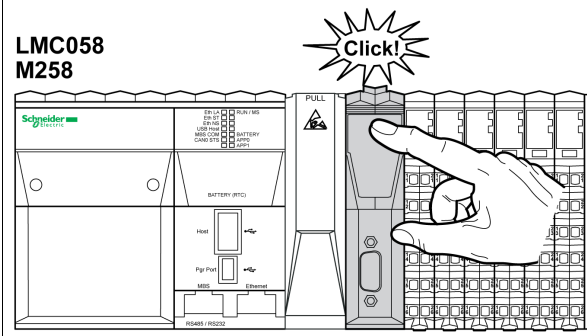
- Store electronic components in their protective packaging until immediately before assembly.
- Only touch modules on the housing.
- Take the necessary protective measures against electrostatic discharges.

Failure to follow these instructions can result in equipment damage.

Installation

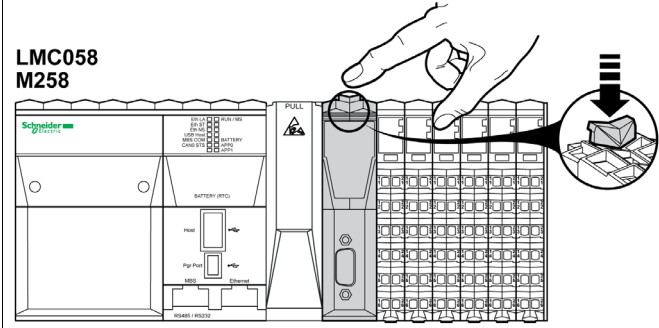
The following table describes the different steps to install PCI modules on the controller.

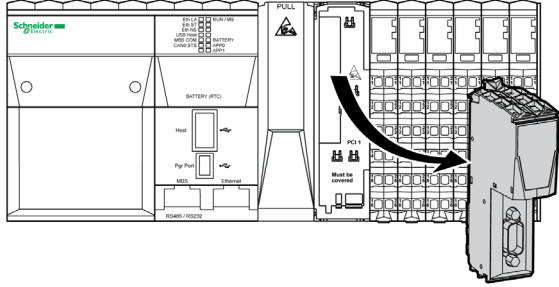
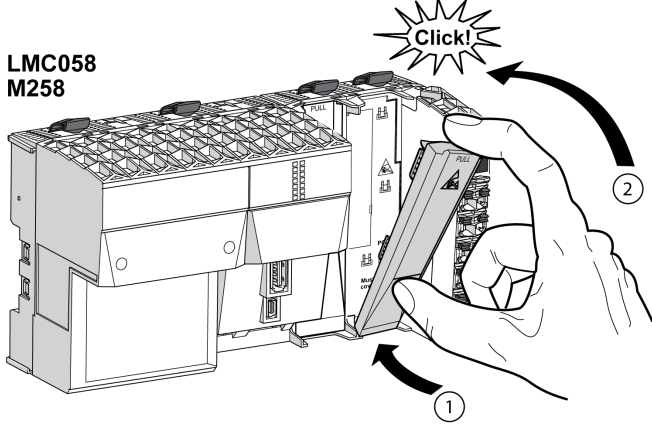
Step	Action
1	Disconnect all power from all equipment prior to removing any covers or installing a PCI module.
2	Remove the PCI module from the packaging.
3	<p>Remove the cover of the slot on the controller.</p> <p>NOTE: Keep the cover to reuse it for the deinstallation.</p> <p>LMC058 M258</p> 
4	<p>Place the PCI module on the slot of the controller.</p> <p>LMC058 M258</p> 

Step	Action
5	<p>Push the PCI module into the controller until it clicks.</p> <p>LMC058 M258</p> 

De-installation

The following table describes the different steps to de-install PCI modules from the controller.

Step	Action
1	<p>Disconnect all power from all equipment, including connected devices, prior to removing a PCI module.</p>
2	<p>Press the locking clip on the PCI module.</p> <p>LMC058 M258</p> 

Step	Action
3	<p>Pull the PCI module out from its mounting slot.</p> <p>LMC058 M258</p> 
4	<p>Put the cover on the slot of the controller.</p> <p>LMC058 M258</p> 

Chapter 2

TM5 System PCI General Overview

General Description

Introduction

The communication electronic modules are designed to be connected to the Modicon M258 Logic Controller and Modicon LMC058 Motion Controller ranges.

Communication Electronic Module Features

The following table shows the communication electronic module features:

Reference	Description
TM5PCRS2 <i>(see page 28)</i>	TM5 interface electronic module, 1 RS232, electrically isolated
TM5PCRS4 <i>(see page 34)</i>	TM5 interface electronic module, 1 RS485, electrically isolated
TM5PCDPS <i>(see page 39)</i>	TM5 interface electronic module, Profibus DP slave

NOTE:

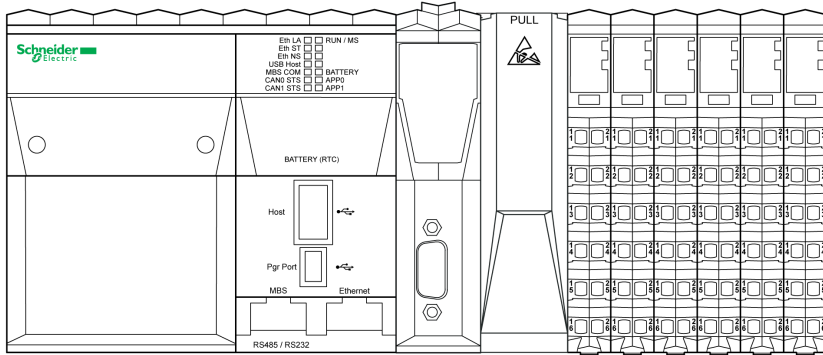
For information on compatibility rules between PCI communication electronic modules and controllers, refer to:

- Modicon M258 Logic Controller Hardware Guide *(see Modicon M258, Logic Controller, Hardware Guide)*,
- Modicon LMC058 Motion Controller Hardware Guide *(see Modicon LMC058, Motion Controller, Hardware Guide)*.

PCI slots

The figure below shows a controller with the PCI slots:

**LMC058
M258**



NOTE: For more information on the compatibility of the PCI electronic modules with the specific Controller references and other considerations, please see the specific Hardware Guide for your Controller.

NOTICE

ELECTROSTATIC DISCHARGE

- Verify that empty PCI slots have their covers in place before applying power to the controller.
- Do not touch an exposed PCI connector.

Failure to follow these instructions can result in equipment damage.

For more details about addition of one more module, refer to Inserting the electronic Modules (see *Modicon TM5 / TM7 Flexible System, System Planning and Installation Guide*).

Chapter 3

TM5PCRS2 PCI Communication Electronic Module

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
TM5PCRS2 Presentation	28
TM5PCRS2 Characteristics	30
TM5PCRS2 Wiring Diagram	31

TM5PCRS2 Presentation

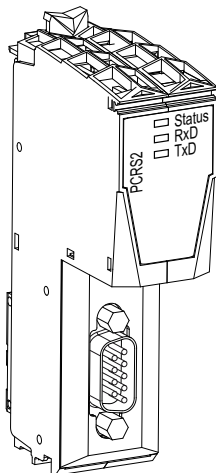
Main Characteristics

The table below describes the main characteristics of the serial line TM5PCRS2 communication electronic module:

Main Characteristics	
Interface type	RS232
Connector type	D-Sub 9, male
Transfer rate	115.2 kbit/s max.

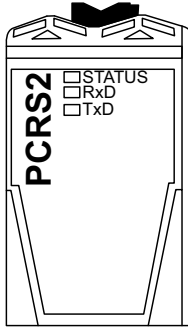
Ordering Information

The figure below presents the TM5PCRS2:



Status LEDs

The figure below shows the TM5PCRS2 status LEDs:



The table below shows the description of the TM5PCRS2 status LEDs:

LED	Color	Status	Description
Status	Green	On	Module configured and operational.
	Red	On	The module is waiting for configuration.
RxD	Yellow	On	The module is receiving data via the RS232 interface.
TxD	Yellow	On	The module is transmitting data via the RS232 interface.

TM5PCRS2 Characteristics

Introduction

These are the general characteristics for the TM5PCRS2 communication electronic module. See also the Environmental Characteristics (*see page 18*).

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION
Do not exceed any of the rated values specified in the environmental and electrical characteristics tables.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

General Characteristics

The table below describes the general characteristics of the TM5PCRS2 communication electronic module:

General characteristics	
Power dissipation	0.33 W max.
Weight	50 g (1.8 oz)

Characteristics

The table below describes the characteristics of the TM5PCRS2 communication electronic module:

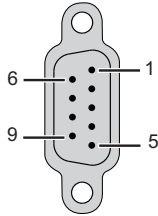
Characteristics		
Isolation	Between serial line and internal electronics	See note ¹
Data formats	Please refer to <i>Modicon TM5, PCI Modules Configuration, Programming Guide</i> .	
Handshake lines	RTS, CTS	

¹ The two power circuits reference the same functional ground (FE) through specific components designed to reduce effects of electromagnetic interference. These components are rated at 30 or 60 Vdc.

TM5PCRS2 Wiring Diagram

RS232 Interface

The following diagram shows the male RS232 interface for TM5PCRS2:



The following table describes the different pins of the male RS232:

Pin	RS232	Description
1	Reserved	-
2	RxD	Receives data
3	TxD	Transmits data
4	Reserved	-
5	0 V	-
6	Reserved	-
7	RTS	Ready To Send
8	CTS	Clear To Send
9	Reserved	-

Chapter 4

TM5PCRS4 PCI Communication Electronic Module

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
TM5PCRS4 Presentation	34
TM5PCRS4 Characteristics	36
TM5PCRS4 Wiring Diagram	37

TM5PCRS4 Presentation

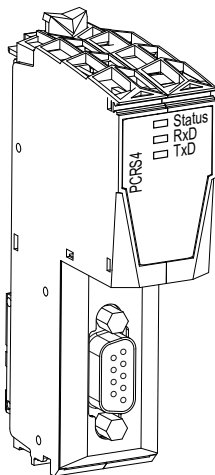
Main Characteristics

The table below describes the main characteristics of the serial line TM5PCRS4 communication electronic module:

Main Characteristics	
Interface type	RS485
Connector type	D-Sub 9, female
Transfer rate	115.2 kbit/s max.

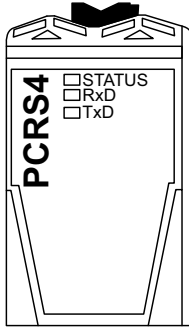
Ordering Information

The figure below presents the TM5PCRS4:



Status LEDs

This figure shows the TM5PCRS4 status LEDs :



The table below shows the description of the TM5PCRS4 status LEDs:

LEDs	Color	Status	Description
Status	Green	On	Module configured and operational.
	Red	On	The module is waiting for configuration.
RxD	Yellow	On	The module is receiving data via the RS485 interface.
TxD	Yellow	On	The module is transmitting data via the RS485 interface.

TM5PCRS4 Characteristics

Introduction

These are the general characteristics for the TM5PCRS4 communication electronic module. See also Environmental Characteristics. (*see page 18*)

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION
Do not exceed any of the rated values specified in the environmental and electrical characteristics tables.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

General Characteristics

The table below describes the general characteristics of the TM5PCRS4 communication electronic module:

General characteristics	
Power dissipation	0.40 W max.
Weight	50 g (1.8 oz)

Characteristics

The table below describes the characteristics of the TM5PCRS4 communication electronic module:

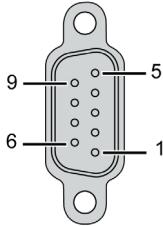
Characteristics		
Isolation	Between serial line and internal electronics	See note ¹
	Between channels	Not isolated

¹ The two power circuits reference the same functional ground (FE) through specific components designed to reduce effects of electromagnetic interference. These components are rated at 30 or 60 Vdc.

TM5PCRS4 Wiring Diagram

RS485 Interface

The following diagram shows the female RS485 interface for TM5PCRS4:



The following table describes the different pins of the female RS485:

Pin	RS485	Description
1	Reserved	-
2	Reserved	-
3	D1 (A+)	Transmit/receive data Low
4	Reserved	-
5	0 V	TTL supply
6	+5 V / 50 mA	TTL supply
7	Reserved	-
8	D0 (B-)	Transmit/receive data High
9	Reserved	-

Chapter 5

TM5PCDPS PCI Communication Electronic Module

What Is in This Chapter?

This chapter contains the following topics:

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TM5PCDPS Presentation

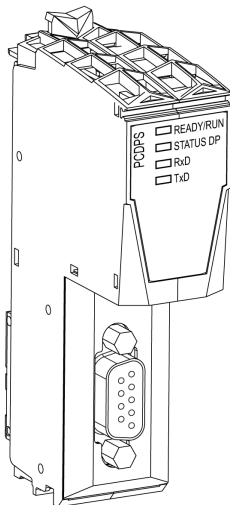
Main Characteristics

The table describes the main characteristics of the Profibus DP TM5PCDPS communication electronic module:

Main Characteristics	
Fieldbus	Profibus DP slave
Interface type	RS485
Connector type	D-Sub 9, female
Transfer rate	12 Mbit/s max.

Ordering Information

The figure presents the TM5PCDPS:



Status LEDs

This figure shows the TM5PCDPS status LEDs:



The table shows the description of the TM5PCDPS status LEDs:

LEDs	Color	Status	Description
READY/RUN	Green / red	Off	The module supply is not connected.
	Green	On	Communication is performed on the PCI bus.
	Red	Flashing	A boot error has been detected.
		On	Communication on the PCI bus has not yet been started.
STATUS DP	Green	On	The module is in RUN mode, performing cyclic communication.
	Red	On	The configuration between the slave and master is different.
		Cyclic Flashing	The module is in STOP mode, no communication is performed, a connection error has been detected.
		Acyclic Flashing	The module is not configured.
RxD	Yellow	On	The module is receiving data via the RS485 interface.
TxD	Yellow	On	The module is transmitting data via the RS485 interface.

TM5PCDPS Characteristics

Introduction

These are the general characteristics for the TM5PCDPS communication electronic module. See also Environmental Characteristics (*see page 18*).

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION
Do not exceed any of the rated values specified in the environmental and electrical characteristics tables.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

General Characteristics

The table describes the general characteristics of the TM5PCDPS communication electronic module:

General Characteristics	
Power dissipation	1.8 W
Weight	50 g (1.8 oz)

Characteristics

The table describes the characteristics of the TM5PCDPS communication electronic module:

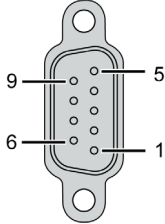
Characteristics		
Isolation	Between Profibus DP and internal electronics	See note ¹
	Between channels	Not isolated

¹ The two power circuits reference the same functional ground (FE) through specific components designed to reduce effects of electromagnetic interference. These components are rated at 30 or 60 Vdc.

TM5PCDPS Wiring Diagram

RS485 Interface

The diagram shows the female RS485 Profibus DP interface for TM5PCDPS:



The table describes the different pins of the female D-Sub 9 RS485 interface:

Pin	Profibus DP	Description
1	Reserved	–
2	Reserved	–
3	RxD/TxD-P	Transmit/receive data High
4	CNTR-P	Transmit enable High
5	Reserved	–
6	Reserved	–
7	Reserved	–
8	RxD/TxD-N	Transmit/receive data Low
9	CNTR-N	Transmit enable Low



!

%

According to the IEC standard, % is a prefix that identifies internal memory addresses in the logic controller to store the value of program variables, constants, I/O, and so on.

C

configuration

The arrangement and interconnection of hardware components within a system and the hardware and software parameters that determine the operating characteristics of the system.

control network

A network containing logic controllers, SCADA systems, PCs, HMI, switches, ...

Two kinds of topologies are supported:

- flat: all modules and devices in this network belong to same subnet.
- 2 levels: the network is split into an operation network and an inter-controller network.

These two networks can be physically independent, but are generally linked by a routing device.

CSA

(*Canadian standards association*) The Canadian standard for industrial electronic equipment in hazardous environments.

CTS

(*clear to send*) A data transmission signal and acknowledges the RDS signal from the transmitting station.

D

derating

A reduction in an operating specification. For devices in general, it is usually a specified reduction in nominal power to facilitate operation at increased ambient conditions like higher temperatures or higher altitudes.

DIN

(*Deutsches Institut für Normung*) A German institution that sets engineering and dimensional standards.

E

electronic module

In a programmable controller system, most electronic modules directly interface to the sensors, actuators, and external devices of the machine/process. This electronic module is the component that mounts in a bus base and provides electrical connections between the controller and the field devices. Electronic modules are offered in a variety of signal levels and capacities. (Some electronic modules are not I/O interfaces, including power distribution modules and transmitter/receiver modules.)

EN

EN identifies one of many European standards maintained by CEN (*European Committee for Standardization*), CENELEC (*European Committee for Electrotechnical Standardization*), or ETSI (*European Telecommunications Standards Institute*).

equipment

A part of a machine including sub-assemblies such as conveyors, turntables, and so on.

I

I/O

(*input/output*)

IEC

(*international electrotechnical commission*) A non-profit and non-governmental international standards organization that prepares and publishes international standards for electrical, electronic, and related technologies.

IP 20

(*ingress protection*) The protection classification according to IEC 60529 offered by an enclosure, shown by the letter IP and 2 digits. The first digit indicates 2 factors: helping protect persons and for equipment. The second digit indicates helping protect against water. IP 20 devices help protect against electric contact of objects larger than 12.5 mm, but not against water.

L

LED

(*light emitting diode*) An indicator that illuminates under a low-level electrical charge.

M

ms

(*millisecond*)

N

network

A system of interconnected devices that share a common data path and protocol for communications.

P

PCI

(peripheral component interconnect) An industry-standard bus for attaching peripherals.

Profibus DP

(Profibus decentralized peripheral) An open bus system uses an electrical network based on a shielded 2-wire line or an optical network based on a fiber-optic cable. DP transmission allows for high-speed, cyclic exchange of data between the controller CPU and the distributed I/O devices.

R

RS-232

A standard type of serial communication bus, based on 3 wires (also known as EIA RS-232C or V.24).

RS-485

A standard type of serial communication bus, based on 2 wires (also known as EIA RS-485).

RTS

(request to send) A data transmission signal and CTS signal that acknowledges the RTS from the destination node.

run

A command that causes the controller to scan the application program, read the physical inputs, and write to the physical outputs according to solution of the logic of the program.

RxD

The line that receives data from one source to another.

S

STOP

A command that causes the controller to stop running an application program.

T

terminal block

(terminal block) The component that mounts in an electronic module and provides electrical connections between the controller and the field devices.

TxD

The line that sends data from one source to another.

U

UL

(underwriters laboratories) A US organization for product testing and safety certification.



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