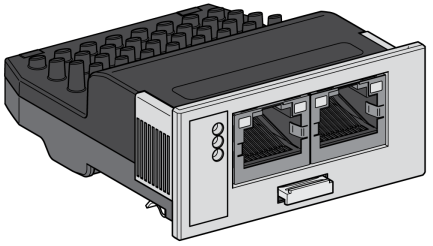
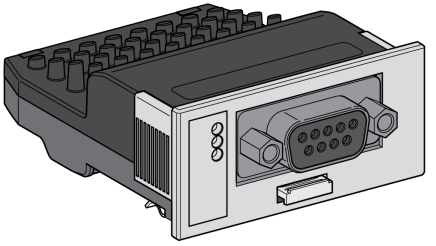
Modicon LMC078

Ethernet and PROFIBUS DP Communication Modules Hardware Guide

09/2014





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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.

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.

Table of Contents

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, 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

The purpose of this document is to describe the communication modules and their association to the Modicon LMC078 Motion Controller by:

- demonstrating how to install and operate your LMC Ethernet and PROFIBUS DP communication modules,
- demonstrating how to interface the LMC Ethernet and PROFIBUS DP communication modules with a Modicon LMC078 Motion Controller,
- helping you become familiar with the LMC Ethernet and PROFIBUS DP communication modules features.

NOTE: Read and understand this document and all related documents *(see Modicon LMC078, Motion Controller, Hardware Guide)* before installing, operating, or maintaining your LMC Ethernet and PROFIBUS DP communication modules.

Users should read through the entire document to understand all of its features.

Validity Note

This document has been updated with the release of SoMachine V4.1 LMC078 add-on.

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the model number/product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in this manual 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 manual and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Modicon LMC078 Motion Controller Programming Guide	EIO0000001909 (ENG) EIO0000001910 (FRE) EIO0000001911 (GER) EIO0000001912 (SPA) EIO0000001913 (ITA) EIO0000001914 (CHS) EIO0000001915 (POR) EIO0000001916 (TUR)
Modicon LMC078 Motion Controller Hardware Guide	EIO0000001933 (ENG) EIO0000001934 (FRE) EIO0000001935 (GER) EIO0000001936 (SPA) EIO0000001937 (ITA) EIO0000001938 (CHS) EIO0000001939 (TUR)

You can download these technical publications and other technical information from our website at www.schneider-electric.com.

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

Install and use this equipment in non-hazardous locations only.

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.

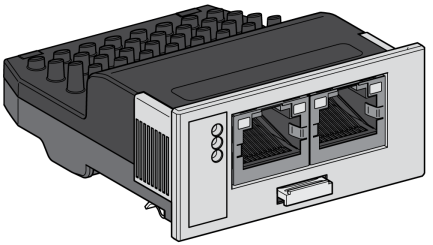
Chapter 1
General Overview

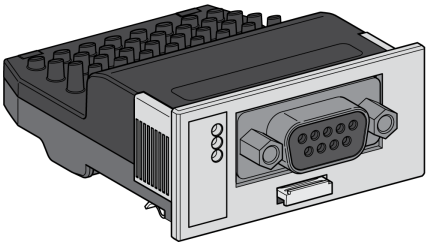
General Overview

Introduction

The LMC Ethernet and PROFIBUS DP communication modules are designed to be inserted in the Modicon LMC078 Motion Controller *(see Modicon LMC078, Motion Controller, Hardware Guide)*.

NOTE: The LMC Ethernet and PROFIBUS DP communication modules are also compatible with LMC1••C••••••• and LMC2••C••••••• Motion Controllers, which are outside the scope of the present document.





Although the communication modules have the same dimensions, their connectors and features are different. It is possible to switch between the different fieldbus systems by changing the communication module.

Programming is done at the controller level *(see Modicon LMC078, Motion Controller, Programming Guide)*.

Communication Modules Features

The following table describes the communication modules features:

Communication module	Reference	Description
Ethernet	VW3E704100000	Communication module that provides EtherNet/IP adapter interface.
PROFIBUS DP	VW3E704000000	Communication module that provides a PROFIBUS Slave interface.

Chapter 2
Ethernet and PROFIBUS DP Communication Modules Installation

What Is in This Chapter?

This chapter contains the following topics:

Installation and Maintenance Requirements

Before Starting

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

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

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

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

⚠ 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.

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.
- 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.
- 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.

Environmental Characteristics

Environmental Characteristics

Procedure	Characteristic	Description	Reference standard
Operation	**Class 3K3**		**IEC/EN 60721-3-3**
	Degree of protection	IP 20	
	Pollution degree	2, according to IEC 61131-2, UL508	
	Ambient temperature	+5...+55° C *(+41...+131 °F)*	
	Condensation	Prohibited	
	Icing	Prohibited	
	Relative humidity	5...95% (non-condensing)	
	Installation altitude without derating	0...2000 m *(0...6561 ft)*	
	Installation high altitude derating, 2000...3000 m *(6561...9842 ft)*	40 °C *(104 °F)* maximum ambient temperature	
	Class 3M4		
	Shock	100 m/s²	
	Vibration	10 m/s²	
Transport	**Class 2K3**		**IEC/EN 60721-3-2**
	Ambient temperature	-25...+70 °C *(-13...+158 °F)*	
	Condensation	Prohibited	
	Icing	Prohibited	
	Relative humidity	5...95% (non-condensing)	
	Maximum altitude of transport	10000 m *(32808 ft)*	
	Class 2M2		
	Shock	300 m/s²	
	Vibration	15 m/s²	
Storage in transport packaging	**Class 1K4**		**IEC/EN 60721-3-1**
	Ambient temperature	-25...+55 °C *(-13...+131 °F)*	
	Condensation	Prohibited	
	Icing	Prohibited	
	Relative humidity	5...95% (non-condensing)	

Communication Modules Installation and Removal

Installation

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE

- Keep equipment in the protective conductive packaging with protective shield in place until you are ready to install the equipment.
- Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling this equipment.
- Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment.

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

NOTICE

INTERRUPTED COMMUNICATION

Do not touch the contacts when unpacking or installing the optional communication module.

Failure to follow these instructions can result in equipment damage.

NOTICE

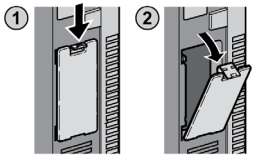
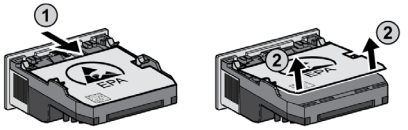
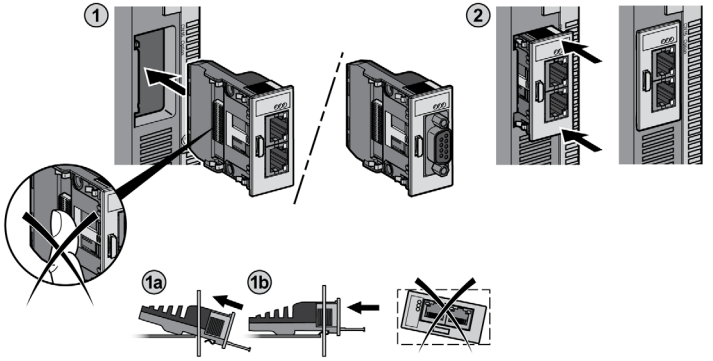
INOPERABLE COMMUNICATION MODULE

- Remove all power from the controller before attempting to install the optional communication module.
- Ensure that the springs at the bottom side of the communication module are located at the printed circuit board side when you insert the communication module into the slot.

Failure to follow these instructions can result in equipment damage.

This table describes how to mount the LMC communication modules into the controller.

Step	Action
1	Remove power from the controller.
2	Remove the communication module from its packaging.
3	Affix the EtherNet/IP label on the Ethernet communication module. **NOTE:** The PROFIBUS DP label is already on the PROFIBUS DP communication module.

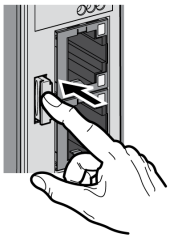
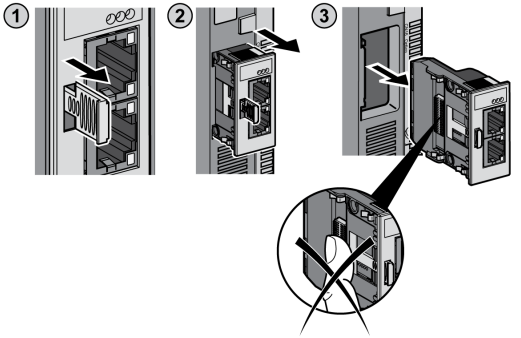
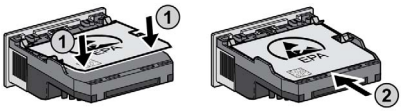
Step	Action
4	Remove manually the module slot cover from the controller:  **NOTE:** Do not use any tool. Keep the cover to replace it when unmounting the communication module.
5	Remove the EPA cover from the communication module by sliding it then lifting it:  **NOTE:** Keep the EPA cover to replace it when unmounting the communication module.
6	Insert the communication module into the controller slot: 

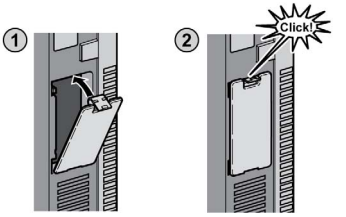
After installing, the controller detects the communication module. Configure the communication module using SoMachine software *(see Modicon LMC078, Motion Controller, Programming Guide)*.

Removal

NOTICE
INOPERABLE COMMUNICATION MODULE ● Remove all power from the controller before attempting to remove the optional communication module. **Failure to follow these instructions can result in equipment damage.**

The table below presents how to unmount the communication modules from the controller.

Step	Action
1	Remove power from the controller.
2	Press on the flap handle on the communication module: 
3	Pull the flap handle to remove the communication module from the controller slot: 
4	Re-install the EPA cover on the communication module. EPA label out facing. 
5	Place the communication module back into the original packaging.

Step	Action
6	Re-install the controller slot cover manually: 

Chapter 3
Ethernet Communication Module

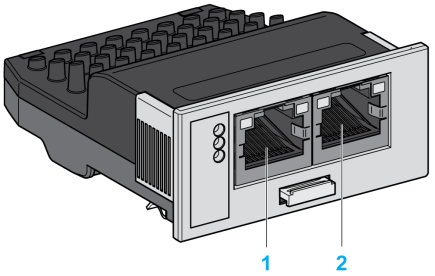
What Is in This Chapter?

This chapter contains the following topics:

Ethernet Communication Module Overview

Overview

The Ethernet communication module provides an EtherNet/IP adapter interface.

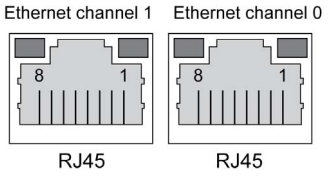


1 Ethernet channel 1
2 Ethernet channel 0

Use SoMachine to configure the communication module *(see Modicon LMC078, Motion Controller, Programming Guide)*.

Ethernet Communication Module Pin Assignment

Pin Assignment

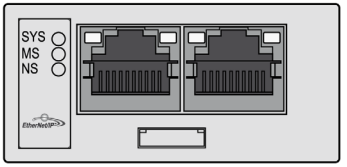


This table describes the pin assignment of the Ethernet connector:

Pin N°	Signal	Description
1	TD+	Transmit data+
2	TD-	Transmit data-
3	RD+	Receive data+
4	-	-
5	-	-
6	RD-	Receive data-
7	-	-
8	-	-

Ethernet Communication Module Status LED

Status LED



LED	Color	Status	Description
SYS	-	Off	No power available to the communication module.
	Yellow	On	Bootloader netX (roomloader) is waiting for second stage bootloader.
	Green/Yellow	Flashing	Second stage bootloader is waiting for firmware.
	Green	On	Operating system running.
		Flashing	The communication module is not configured.
	Red	On	An error that prevents the module from continued communication has been detected (alert).
		Flashing	An error that allows the module to continue to function has been detected (advisory).
MS (Module Status)	-	Off	No power available to the communication module.
	Green	On	The communication module is operating.
		Flashing	The communication module is not configured.
	Red	On	An error that prevents the module from continued communication has been detected (alert).
		Flashing	An error that allows the module to continue to function has been detected (advisory).
	Red/Green	Flashing	The communication module is performing a power up testing.

LED	Color	Status	Description
NS (Network Status)	-	Off	No power available to the communication module or it does not have an IP address.
	Green	On	The communication module has an established connection.
		Flashing	The communication module has an IP address and is ready for a connection.
	Red	On	The communication module has detected that its IP address is already in use.
		Flashing	The communication to this module has timed out.
	Red/Green	Flashing	The communication module is performing a power up testing.
LINK/RJ45 Ethernet channel 0 & 1	-	Off	The communication module is not connected to Ethernet.
	Green	On	An Ethernet connection is active.
ACT/RJ45 Ethernet channel 0 & 1	-	Off	The communication module is not connected to Ethernet.
	Yellow	Flashing	The device sends/receives Ethernet frames.

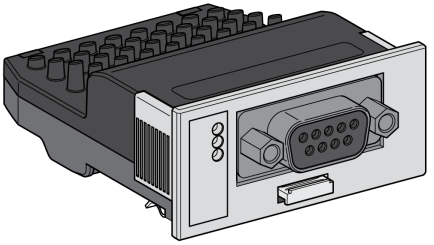
Chapter 4
PROFIBUS DP Communication Module

What Is in This Chapter?

This chapter contains the following topics:

PROFIBUS DP Communication Module Overview

Overview

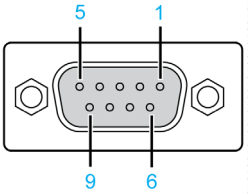


The communication module PROFIBUS DP provides a PROFIBUS interface.

After the installation, the controller detects the communication module. Use SoMachine to configure the communication module *(see Modicon LMC078, Motion Controller, Programming Guide)*.

PROFIBUS DP Communication Module Pin Assignment

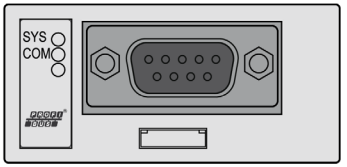
Pin Assignment



Pin	Signal	Description
1	-	Reserved
2	-	Reserved
3	RxD/TxD-P	PROFIBUS-DP-Data line B (positive)
4	RTS	Return To Send Line for line control
5	DGND	Ground for PROFIBUS-DP
6	VP	5 V power line for PROFIBUS-DP
7	-	Reserved
8	RxD/TxD-N	PROFIBUS-DP-Data line A (negative)
9	-	Reserved

PROFIBUS DP Communication Module Status LED

Status LED



LED	Color	Status	Description
SYS	-	Off	No power available to the communication module.
	Yellow	On	Bootloader netX (roomloader) is waiting for second stage bootloader.
	Green/Yellow	Flashing green/yellow	Second stage bootloader is waiting for firmware.
	Green	On	Operating system running.
COM	-	Off	No power available to the communication module.
	Green	On	Active communication.
	Red	Flashing cyclically	No active communication or connection error.
		Flashing acyclically	PROFIBUS not configured.

Glossary

I

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.

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