

Modicon M262 Distributed PAC

User Guide

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As part of a group of responsible, inclusive companies, we are updating our communications that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

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Safety Information

Important Information

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.

Qualification of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product.

The qualified person must be able to detect possible hazards that may arise from parameterization, modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified person must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

Intended Use

The products described or affected by this document, together with software, accessories, and options, are programmable logic controllers (referred to herein as "logic controllers"), intended for industrial use according to the instructions, directions, examples, and safety information contained in the present document and other supporting documentation.

The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements, and the technical data.

Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety-related measures must be implemented.

Since the product is used as a component in an overall machine or process, you must ensure the safety of persons by means of the design of this overall system.

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts.

Any use other than the use explicitly permitted is prohibited and can result in unanticipated hazards.

About the Book

Document Scope

Use this document to:

- Install and operate your M262 distributed PAC (Programmable Automation Controller).
- Connect the M262 distributed PAC to a programming device equipped with EcoStruxure Automation Expert software.
- Interface the M262 distributed PAC with I/O expansion modules, HMI and other devices.
- Familiarize yourself with the M262 distributed PAC features.

NOTE: Read and understand this document and all related documents before installing, operating, or maintaining your controller.

Validity Note

This document has been updated for the release of EcoStruxure™ Automation Expert V22.1.

The characteristics that are described in the present document, as well as those described in the documents included in the Related Documents section below, can be found online. To access the information online, go to the Schneider Electric home page 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.

For product compliance and environmental information (RoHS, REACH, PEP, EOL, etc.), go to www.se.com/ww/en/work/support/green-premium/.

Related Documents

Title of Documentation	Reference Number
Modicon TM3 Digital I/O Modules - Hardware Guide	EIO0000003125 (ENG) EIO0000003126 (FRE) EIO0000003127 (GER) EIO0000003128 (SPA) EIO0000003129 (ITA) EIO0000003130 (CHS) EIO0000003425 (TUR) EIO0000003424 (POR)
Modicon TM3 Analog I/O Modules - Hardware Guide	EIO0000003131 (ENG) EIO0000003132 (FRE) EIO0000003133 (GER) EIO0000003134 (SPA) EIO0000003135 (ITA) EIO0000003136 (CHS) EIO0000003427 (TUR) EIO0000003426 (POR)
Modicon TM3 Expert I/O Modules - Hardware Guide	EIO0000003137 (ENG) EIO0000003138 (FRE) EIO0000003139 (GER) EIO0000003140 (SPA) EIO0000003141 (ITA) EIO0000003142 (CHS) EIO0000003429 (TUR) EIO0000003428 (POR)
Modicon TM3 Transmitter and Receiver Modules - Hardware Guide	EIO0000003143 (ENG) EIO0000003144 (FRE) EIO0000003145 (GER) EIO0000003146 (SPA) EIO0000003147 (ITA) EIO0000003148 (CHS) EIO0000003431 (TUR) EIO0000003430 (POR)
Modicon TM3 Safety Modules - Hardware Guide	EIO0000003353 (ENG) EIO0000003354 (FRE) EIO0000003355 (GER) EIO0000003356 (SPA) EIO0000003357 (ITA) EIO0000003358 (CHS) EIO0000003360 (TUR) EIO0000003359 (POR)
TM262L01MDESE8T - Instruction Sheet	GEX7596701

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.

M262 Distributed PAC General Hardware Overview

Overview

This chapter provides general information about the M262 distributed PAC system architecture and its components.

M262 Distributed PAC Description

Overview

The M262 distributed PAC is a dual-channel controller that supports Ethernet communication. It is expandable with TM3 I/O modules. The M262 distributed PAC is configured and programmed with the EcoStruxure Automation Expert software.

The related library for M262 distributed PAC in EcoStruxure Automation Expert is **SE.DPAC**.

Power Supply

The power supply of the M262 distributed PAC is 24 Vdc, page 51.

Real Time Clock

The M262 distributed PAC includes a Real Time Clock (RTC) system, page 31.

The system time is maintained by capacitors when the power is off. The time is maintained for 1 000 hours when the controller is not supplied.

Run/Stop

The M262 distributed PAC can be operated externally by the following:

- A hardware Run/Stop switch, page 31.
- An EcoStruxure Automation Expert software command.

Memory

This table describes the different types of memory:

Memory Type	Size	Use
RAM	256 Mbytes	For the execution of the application and the firmware.
Flash	1 Gbyte	Non-volatile memory dedicated to the retention of the program and data in case of a power interruption.
Non-volatile RAM	512 Kbytes	Non-volatile memory dedicated to the retention of the retain-persistent variables, and the diagnostic files and associated information.

Removable Storage

The M262 distributed PAC includes an integrated SD card slot, page 69.

The main uses of the SD card are:

- Resetting the user data and security settings
- Retrieving logs

Embedded Communication Features

The following types of communication ports are available:

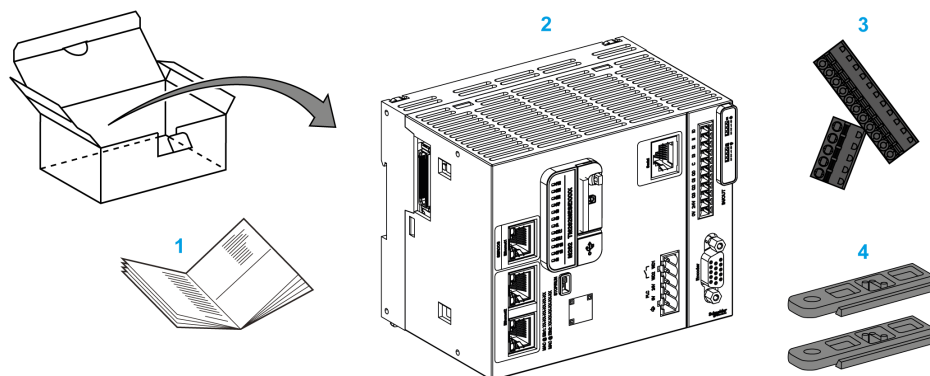
- Ethernet, page 62
- Serial Line, page 64

M262 Distributed PAC

Reference	Power supply	Communication Ports	Terminal Type
TM262L01MDESE8T	24 Vdc	1 Ethernet port 1 dual port Ethernet switch 1 serial line port	Removable spring

Delivery Content

The following figure presents the content of the delivery for the M262 distributed PAC:

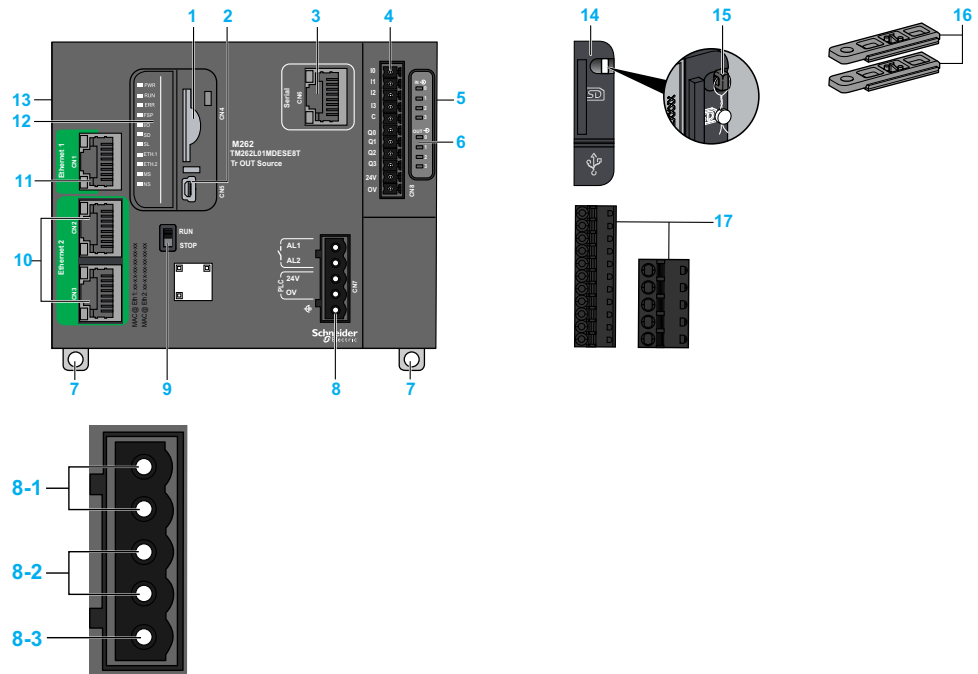


- 1 M262 distributed PAC Instruction Sheet
- 2 M262 distributed PAC
- 3 Removable spring terminal blocks
- 4 Attachment parts

TM262L01MDESE8T Presentation

Description

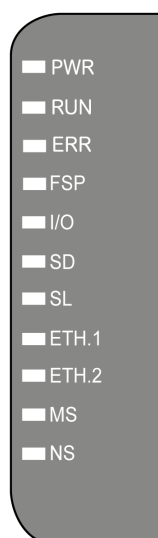
The following figure shows the different components of the TM262L01MDESE8T logic controller:



N°	Description	Refer to
1	SD card slot	SD Card, page 69
2	USB mini-B programming port	Not used.
3	Serial line port / type RJ45 (RS-232 or RS-485)	Serial Line, page 64
4	Inputs/outputs terminal connector	Not used.
5	TM3 bus connector	TM3 Expansion Modules, page 20
6	I/O status LEDs	Not used.
7	Clip-on lock for 35 mm (1.38 in.) top hat section rail (DIN rail)	Installing and Removing the Controller with Expansions, page 44
8	Power supply	8-1, 8-2 and 8-3
8-1	Alarm relay terminal connector	Alarm Relay, page 32
8-2	24 Vdc power supply	DC Power supply Characteristics and Wiring, page 51
8-3	Functional Earth (FE) grounding connection	Grounding the M262 Distributed PAC System, page 53
9	Run/Stop switch	Run/Stop, page 31
10	Dual port Ethernet switch	Ethernet 2 port, page 62
11	Ethernet 1 port	Ethernet 1 port, page 62
12	Status LEDs	See below.
13	TMS bus connector	Not used.
14	Protective cover (for SD card slot and USB mini-B programming port)	-
15	Locking hook (optional lock not included)	-
16	Attachment parts	-
17	Removable spring terminal blocks	-

Status LEDs

This figure shows the status LEDs:

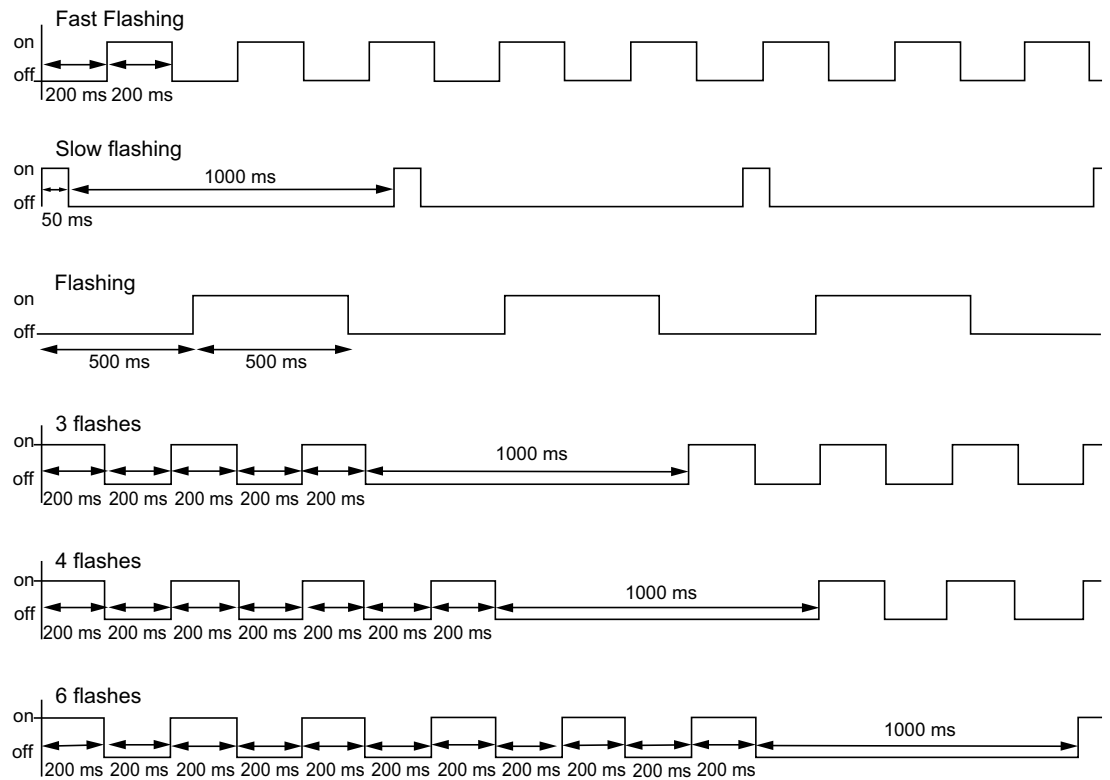


The following table describes the system status LEDs:

Label	Function Type	Color	Status	Description
PWR	Power	Green/Red	OFF	Indicates that power is removed.
			Green ON	Indicates that power is applied, normal operation.
			Green ON / 1 red flash	Elevated internal operating temperature detected (over 80 °C / 176 °F). Take appropriate measures to reduce the temperature.
			Green ON / 2 red flashes	Detected error on TM3 power.
			Green ON / 4 red flashes	Detected error on serial line power.
RUN	Machine status	Green	ON	Indicates that the controller is running a valid application.
			Fast flashing	Indicates that the controller is running a valid application that is stopped.
			Slow flashing	Indicates that the controller has no application.
			OFF	Cyber security configuration required. The default password must be changed.
ERR	Internal Error	Red	ON	Indicates that an application error has been detected. See Fetch Log Files > Log Files in the EcoStruxure Automation Expert software.
			Fast flashing	<ul style="list-style-type: none"> If RUN LED is ON: A system error has been detected. If RUN LED is OFF: A firmware error has been detected. See Fetch Log Files > Log Files in the EcoStruxure Automation Expert software.
FSP	Forced stop	Red	ON	Indicates that the Run/Stop switch or Run/Stop input has been activated to force the controller to the STOPPED state.
			Flashing	Indicates that at least one application variable is being forced.
I/O	I/O error	Red	ON	Indicates that I/O or expansion module errors have been detected.

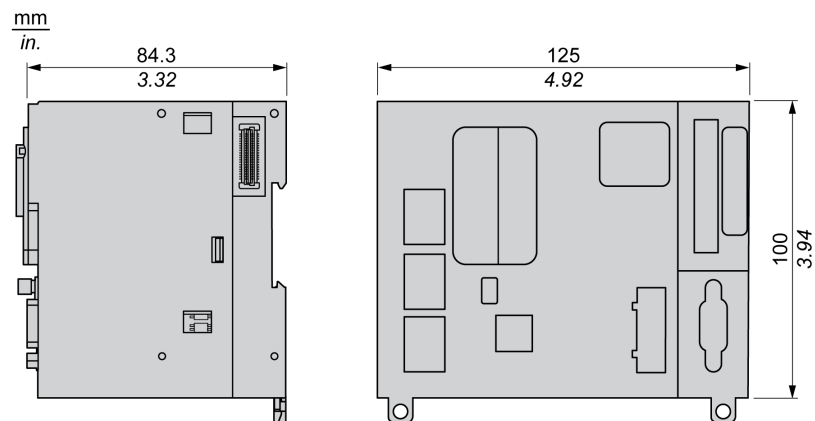
Label	Function Type	Color	Status	Description
SD	SD card access	Green	ON	Indicates that a script execution is completed.
		Green	Flashing	Indicates that a script execution is in progress.
		Yellow	ON	Indicates that a script execution is unsuccessful. NOTE: If the script file is not executed, a log file is generated. The log file location in the controller is <code>/usr/Syslog/FWLog.txt</code> .
		Yellow	Flashing	Indicates that the SD card is being accessed (script execution in progress).
		-	OFF	No SD card activity.
SL	Serial line	Yellow	Flashing	Indicates communication on the serial line.
			OFF	Indicates no serial communication.
ETH.1 ETH.2	Ethernet port status	Green	ON	Indicates that the Ethernet port is connected and the IP address is defined.
			3 flashes	Indicates that the Ethernet port is not connected.
			4 flashes	Address conflict detected. Indicates that the configured IP address is already in use.
			6 flashes	Indicates that the configured IP address is not valid. The default IP address is being used.
			OFF	Indicates that the Ethernet port is not configured.
MS	EtherNet/IP controller interface status	Red	ON	Indicates that an unrecoverable error has been detected.
			Flashing	Indicates that a recoverable error has been detected.
		Green	ON	Indicates that the controller interface is functioning normally.
			Flashing	Indicates that the configuration is missing, incomplete, or incorrect.
		Red/Green	Flashing	Indicates that an error has been detected.
NS	EtherNet/IP network status	Red	ON	Indicates that one or more connections timed out, or that an error is preventing network communications (duplicate IP address, or bus powered off).
			Flashing	Indicates that a recoverable error has been detected, for example, one or more connections timed out.
		Green	ON	Indicates that the controller interface is functioning normally and network connections are established.
			Flashing	Indicates that the controller interface is operating normally, but network connections have not been established, or the network configuration is missing, incomplete, or incorrect.
		Red/Green	Flashing	Indicates that an error has been detected.
		-	OFF	Indicates that the controller is powered off.
		-	OFF	Indicates that the controller is powered off.

This figure shows the types of flashing of the status LEDs:



Dimensions

The following figure shows the external dimensions of the TM262L01MDESE8T logic controller:



Weight

655 g

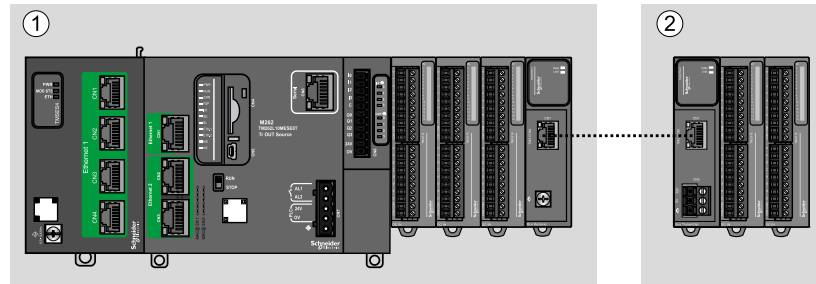
Maximum Hardware Configuration

Introduction

The M262 distributed PAC is a control system that offers a scalable solution for logic applications, with optimized configurations and an open, expandable architecture.

Local and Remote Configuration Principle

The following figure defines the local and remote configurations:



(1) Local configuration

(2) Remote configuration

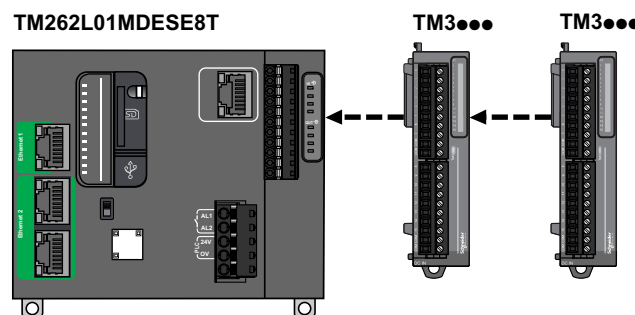
M262 Distributed PAC Local Configuration Architecture

Optimized local configuration and flexibility are provided by the association of:

- M262 distributed PAC
- TM3 expansion modules (7 maximum)

Application requirements determine the architecture of your M262 distributed PAC configuration.

The following figure represents the components of a local configuration:



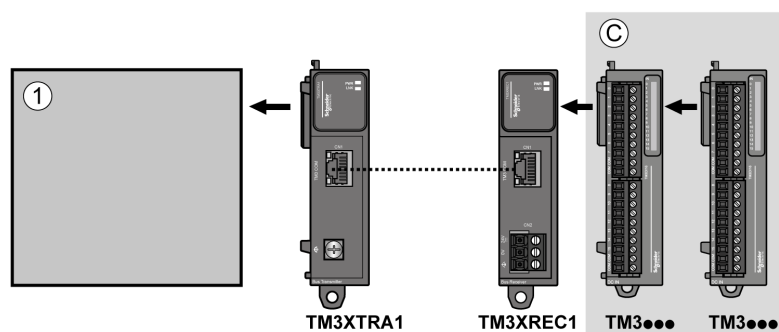
M262 Distributed PAC Remote Configuration Architecture

Optimized remote configuration and flexibility are provided by the association of:

- M262 distributed PAC
- TM3 expansion modules
- TM3 transmitter and receiver modules

Application requirements determine the architecture of your M262 distributed PAC configuration.

The following figure represents the components of a remote configuration:



(1) Logic controller and modules

(C) TM3 expansion modules (7 maximum)

Maximum Number of Modules

The following table shows the maximum configuration supported:

References	Maximum	Type of Configuration
TM262L01MDESE8T	7 TM3 expansion modules	Local
TM3XREC1	7 TM3 expansion modules	Remote
NOTE: TM3 transmitter and receiver modules are not included in a count of the maximum number of expansion modules.		

NOTE: The configuration with its TM3 expansion modules is validated by EcoStruxure Automation Expert software in the **Configuration** window.

NOTE: In some environments, the maximum configuration populated by high power consumption modules, coupled with the maximum distance allowable between the TM3 transmitter and receiver modules, may present bus communication issues although the EcoStruxure Automation Expert software allowed for the configuration. In such a case you will need to analyze the power consumption of the modules chosen for your configuration, as well as the minimum cable distance required by your application, and possibly seek to optimize your choices.

TM3 Expansion Modules

Introduction

The range of TM3 expansion modules includes:

- Digital modules, classified as follows:
 - Input modules, page 20
 - Output modules, page 21
 - Mixed input/output modules, page 22
- Analog modules, classified as follows:
 - Input modules, page 23
 - Output modules, page 24
 - Mixed input/output modules, page 25
- Expert modules, page 26
- Transmitter and receiver modules, page 26
- Safety modules, page 27

For more information, refer to the following documents:

- TM3 Digital I/O Modules Hardware Guide
- TM3 Analog I/O Modules Hardware Guide
- TM3 Expert Modules Hardware Guide
- TM3 Transmitter and Receiver Modules Hardware Guide
- TM3 Safety Modules Hardware Guide

TM3 Digital Input Modules

The following table shows the TM3 digital input expansion modules, with corresponding channel type, nominal voltage/current, and terminal type:

Reference	Channels	Channel Type	Voltage Current	Terminal Type / Pitch
TM3DI8A	8	Regular inputs	120 Vac 7.5 mA	Removable screw terminal block / 5.08 mm
TM3DI8	8	Regular inputs	24 Vdc 7 mA	Removable screw terminal block / 5.08 mm
TM3DI8G	8	Regular inputs	24 Vdc 7 mA	Removable spring terminal block / 5.08 mm
TM3DI16	16	Regular inputs	24 Vdc 7 mA	Removable screw terminal blocks / 3.81 mm
TM3DI16G	16	Regular inputs	24 Vdc 7 mA	Removable spring terminal blocks / 3.81 mm
TM3DI16K	16	Regular inputs	24 Vdc 5 mA	HE10 (MIL 20) connector
TM3DI32K	32	Regular inputs	24 Vdc 5 mA	HE10 (MIL 20) connector

TM3 Digital Output Modules

The following table shows the TM3 digital output expansion modules, with corresponding channel type, nominal voltage/current, and terminal type:

Reference	Channels	Channel Type	Voltage Current	Terminal Type / Pitch
TM3DQ8R	8	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line/2 A maximum per output	Removable screw terminal block / 5.08 mm
TM3DQ8RG	8	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line/2 A maximum per output	Removable spring terminal block / 5.08 mm
TM3DQ8T	8	Regular transistor outputs (source)	24 Vdc 4 A maximum per common line/0.5 A maximum per output	Removable screw terminal block / 5.08 mm
TM3DQ8TG	8	Regular transistor outputs (source)	24 Vdc 4 A maximum per common line/0.5 A maximum per output	Removable spring terminal block / 5.08 mm
TM3DQ8U	8	Regular transistor outputs (sink)	24 Vdc 4 A maximum per common line/0.5 A maximum per output	Removable screw terminal block / 5.08 mm
TM3DQ8UG	8	Regular transistor outputs (sink)	24 Vdc 4 A maximum per common line/0.5 A maximum per output	Removable spring terminal block / 5.08 mm
TM3DQ16R	16	Relay outputs	24 Vdc / 240 Vac 8 A maximum per common line / 2 A maximum per output	Removable screw terminal blocks / 3.81 mm
TM3DQ16RG	16	Relay outputs	24 Vdc / 240 Vac 8 A maximum per common line / 2 A maximum per output	Removable spring terminal blocks / 3.81 mm
TM3DQ16T	16	Regular transistor outputs (source)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable screw terminal blocks / 3.81 mm
TM3DQ16TG	16	Regular transistor outputs (source)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable spring terminal blocks / 3.81 mm
TM3DQ16TK	16	Regular transistor outputs (source)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connector
TM3DQ16U	16	Regular transistor outputs (sink)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable screw terminal blocks / 3.81 mm

Reference	Channels	Channel Type	Voltage Current	Terminal Type / Pitch
TM3DQ16UG	16	Regular transistor outputs (sink)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable spring terminal blocks / 3.81 mm
TM3DQ16UK	16	Regular transistor outputs (sink)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connector
TM3DQ32TK	32	Regular transistor outputs (source)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connectors
TM3DQ32UK	32	Regular transistor outputs (sink)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connectors

TM3 Digital Mixed Input/Output Modules

This following table shows the TM3 mixed I/O modules, with corresponding channel type, nominal voltage/current, and terminal type:

Reference	Channels	Channel Type	Voltage Current	Terminal Type / Pitch
TM3DM8R	4	Regular inputs	24 Vdc 7 mA	Removable screw terminal blocks / 5.08 mm
	4	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line / 2 A maximum per output	
TM3DM8RG	4	Regular inputs	24 Vdc 7 mA	Removable spring terminal blocks / 5.08 mm
	4	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line / 2 A maximum per output	
TM3DM24R	16	Regular inputs	24 Vdc 7 mA	Removable screw terminal blocks / 3.81 mm
	8	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line / 2 A maximum per output	
TM3DM24RG	16	Regular inputs	24 Vdc 7 mA	Removable spring terminal blocks / 3.81 mm
	8	Relay outputs	24 Vdc / 240 Vac 7 A maximum per common line / 2 A maximum per output	

TM3 Analog Input Modules

The following table shows the TM3 analog input expansion modules, with corresponding resolution, channel type, nominal voltage/current, and terminal type:

Reference	Resolution	Channels	Channel Type	Mode	Terminal Type / Pitch
TM3AI2H	16 bit, or 15 bit + sign	2	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable screw terminal block / 5.08 mm
TM3AI2HG	16 bit, or 15 bit + sign	2	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable spring terminal block / 5.08 mm
TM3AI4	12 bit, or 11 bit + sign	4	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable screw terminal block / 3.81 mm
TM3AI4G	12 bit, or 11 bit + sign	4	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable spring terminal blocks / 3.81 mm
TM3AI8	12 bit, or 11 bit + sign	8	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA 0...20 mA extended 4...20 mA extended	Removable screw terminal block / 3.81 mm
TM3AI8G	12 bit, or 11 bit + sign	8	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA 0...20 mA extended 4...20 mA extended	Removable spring terminal blocks / 3.81 mm
TM3TI4	16 bit, or 15 bit + sign	4	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA Thermocouple PT100/1000 NI100/1000	Removable screw terminal block / 3.81 mm

Reference	Resolution	Channels	Channel Type	Mode	Terminal Type / Pitch
TM3TI4G	16 bit, or 15 bit + sign	4	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA Thermocouple PT100/1000 NI100/1000	Removable spring terminal blocks / 3.81 mm
TM3TI4D	16 bit, or 15 bit + sign	4	inputs	Thermocouple	Removable screw terminal block / 3.81 mm
TM3TI4DG	16 bit, or 15 bit + sign	4	inputs	Thermocouple	Removable spring terminal blocks / 3.81 mm
TM3TI8T	16 bit, or 15 bit + sign	8	inputs	Thermocouple NTC/PTC Ohmmeter	Removable screw terminal block / 3.81 mm
TM3TI8TG	16 bit, or 15 bit + sign	8	inputs	Thermocouple NTC/PTC Ohmmeter	Removable spring terminal blocks / 3.81 mm

TM3 Analog Output Modules

The following table shows the TM3 analog output modules, with corresponding resolution, channel type, nominal voltage/current, and terminal type:

Reference	Resolution	Channels	Channel Type	Mode	Terminal Type / Pitch
TM3AQ2	12 bit, or 11 bit + sign	2	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable screw terminal block / 5.08 mm
TM3AQ2G	12 bit, or 11 bit + sign	2	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable spring terminal block / 5.08 mm
TM3AQ4	12 bit, or 11 bit + sign	4	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable screw terminal block / 5.08 mm
TM3AQ4G	12 bit, or 11 bit + sign	4	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	Removable spring terminal block / 5.08 mm

TM3 Analog Mixed Input/Output Modules

This following table shows the TM3 analog mixed I/O modules, with corresponding resolution, channel type, nominal voltage/current, and terminal type:

Reference	Resolution	Channels	Channel Type	Mode	Terminal Type / Pitch
TM3AM6	12 bit, or 11 bit + sign	4	inputs	0...10 Vdc	Removable screw terminal block / 3.81 mm
		2	outputs	-10...+10 Vdc 0...20 mA 4...20 mA	
TM3AM6G	12 bit, or 11 bit + sign	4	inputs	0...10 Vdc	Removable spring terminal block / 3.81 mm
		2	outputs	-10...+10 Vdc 0...20 mA 4...20 mA	
TM3TM3	16 bit, or 15 bit + sign	2	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA Thermocouple PT100/1000 NI100/1000	Removable screw terminal block / 5.08 mm
	12 bit, or 11 bit + sign	1	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	
TM3TM3G	16 bit, or 15 bit + sign	2	inputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA Thermocouple PT100/1000 NI100/1000	Removable spring terminal block / 5.08 mm
	12 bit, or 11 bit + sign	1	outputs	0...10 Vdc -10...+10 Vdc 0...20 mA 4...20 mA	

TM3 Expert Modules

The following table shows the TM3 expert modules.

Reference	Channels	I/O Types	Voltage	Terminal Type / Pitch
TM3XTYS4	4	3 regular inputs (sink) per channel	24 Vdc Type 1 (IEC/ EN 61131-2)	4 front connectors RJ-45
		2 regular transistor outputs (source) per channel	24 Vdc / 0.3 A	
TM3XHSC202	-	10 inputs	24 Vdc / 7.5 mA	Removable screw terminal block / 3.81 mm
		8 outputs	24 Vdc / 0.3 A	
TM3XHSC202G	-	10 inputs	24 Vdc / 7.5 mA	Removable spring terminal block / 3.81 mm
		8 outputs	24 Vdc / 0.3 A	

TM3 Transmitter and Receiver Modules

The following table shows the TM3 transmitter and receiver expansion modules, with corresponding terminal type. For information on configuration of these modules, refer to the TM3 Transmitter and Receiver I/O Modules Configuration section.

Reference	Description	Terminal Type / Pitch
TM3XTRA1	Data transmitter module for remote I/O	1 front connector RJ-45 1 screw for functional ground connection
TM3XREC1	Data receiver module for remote I/O	1 front connector RJ-45 1 removable power supply connector / 5.08 mm

TM3 Safety Modules

This table contains the TM3 safety modules, with the corresponding channel type, nominal voltage/current, and terminal type:

Reference	Function Category	Channels	Channel type	Voltage Current	Terminal type
TM3SAC5R	1 function, up to category 3	1 or 2 ⁽¹⁾	Safety input	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable screw terminal block
		Start ⁽²⁾	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAC5RG	1 function, up to category 3	1 or 2 ⁽¹⁾	Safety input	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable spring terminal block
		Start ⁽²⁾	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAF5R	1 function, up to category 4	2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable screw terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAF5RG	1 function, up to category 4	2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable spring terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAFL5R	2 functions, up to category 3	2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable screw terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAFL5RG	2 functions, up to category 3	2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable spring terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAK6R	3 functions, up to category 4	1 or 2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable screw terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
TM3SAK6RG	3 functions, up to category 4	1 or 2 ⁽¹⁾	Safety inputs	24 Vdc	3.81 mm (0.15 in.) and 5.08 mm (0.20 in.), removable spring terminal block
		Start	Input	100 mA maximum	
		3 in parallel	Relay outputs Normally open	24 Vdc / 230 Vac 6 A maximum per output	
⁽¹⁾ Depending on external wiring					
⁽²⁾ Non-monitored start					

Accessories

Overview

This section describes the accessories and cables.

Accessories

Reference	Description	Use	Quantity
TMASD1	SD Card	Use to update the controller firmware, initialize a controller with a new application or clone a controller, apply post configuration file to the controller, store recipe files, and receive data logging files.	1
TMA262SET8G	Removable 11-pt spring terminal block (pitch 3.81 mm): <ul style="list-style-type: none"> 3 terminals for 24 Vdc I/O 4 terminals for inputs 4 terminals for outputs 	Connects 24 Vdc power supply, and embedded I/Os.	1
	Removable 5-pt spring terminal block (pitch 5.08 mm): <ul style="list-style-type: none"> 3 terminals for 24 Vdc I/O 2 terminals for relay output 	Connects 24 Vdc power supply and relay output.	1
TMA262SET8S	Removable 11-pt screw terminal block (pitch 3.81 mm): <ul style="list-style-type: none"> 3 terminals for 24 Vdc I/O 4 terminals for inputs 4 terminals for outputs 	Connects 24 Vdc power supply and embedded I/Os.	1
	Removable 5-pt screw terminal block (pitch 5.08 mm): <ul style="list-style-type: none"> 3 terminals for 24 Vdc I/O 2 terminals for relay output 	Connects 24 Vdc power supply and relay output.	1
NSYTRAAB35	End brackets	Helps secure the controller or receiver module and their expansion modules on a top hat section rail (DIN rail).	1
TM2XMTGB	Grounding Bar	Connects the cable shield and the module to the functional ground.	1
TM200RSRCMC	Shielding take-up clip	Mounts and connects the ground to the cable shielding.	25 pack
TMAM3	2 attachment parts	Mounts the controller directly to a flat, vertical panel.	1

Cables

Reference	Description	Details	Length
TCSMCN3M4F3C2	RS-232 serial link cordset 1 RJ45 connector and 1 SUB-D 9 connector	For DTE terminal (printer).	3 m (9.84 ft)
490NTW000••	Ethernet shielded cable for DTE connections	Standard cable, equipped with RJ45 connectors at each end for DTE. CE compliant.	2, 5, 12, 40, or 80 m (6.56, 16.4, 39.37, 131.23 or 262.47 ft)
490NTW000••U		Standard cable, equipped with RJ45 connectors at each end for DTE. UL compliant.	2, 5, 12, 40, or 80 m (6.56, 16.4, 39.37, 131.23, or 262.47 ft)
TCSECE3M3M••S4		Cable for harsh environment, equipped with RJ45 connectors at each end. CE compliant.	1, 2, 3, 5, or 10 m (3.28, 6.56, 9.84, 16.4, 32.81 ft)
TCSECU3M3M••S4		Cable for harsh environment, equipped with RJ45 connectors at each end. UL compliant.	1, 2, 3, 5, or 10 m (3.28, 6.56, 9.84, 16.4, 32.81 ft)
VW3A8306R••	2 RJ45 connectors	Cable equipped with RJ45 connectors at each end for Modbus serial link.	0.3, 1, or 3 m (0.98, 3.28, or 9.84 ft)

M262 Distributed PAC Features

Overview

This chapter describes the M262 distributed PAC features.

Related Library

The related library for M262 distributed PAC in EcoStruxure Automation Expert is **SE.DPAC**.

M262 Distributed PAC States and Behaviors

Processor Load Management

Processor Load	Duration	Behavior
More than 95%	> 2 s	The controller goes to HALTED state.
More than 98%	> 2 s	The controller is rebooted automatically and goes to CLEANED state. The TM3 expansion modules outputs are forced to 0. The ERR LED flashes fast.

The controller goes to HALTED state if the TM3 Watchdog time exceeds 1.5 seconds or if there is an EcoStruxure Automation Expert timeout.

Log information is stored in log files for use by the Schneider Electric Technical Support. See **Fetch Log Files > Log Files** in the EcoStruxure Automation Expert software.

Match Physical TM3 Configuration with Application

The controller goes to HALTED state if the physical TM3 bus configuration does not match the application configuration.

Refer to [Optional I/O Expansion Modules](#), page 78 to mark TM3 I/O expansion modules as optional. This feature provides a more flexible configuration.

Real Time Clock (RTC)

Overview

The M262 distributed PAC includes a real-time clock (RTC) to provide system date and time information and to support related functions requiring a real-time clock.

Provided the controller has been powered on for at least 2 hours, the system date and time are maintained for 1000 hours at 25 °C (77 °F) even when the controller is powered off.

This table shows how RTC drift is managed:

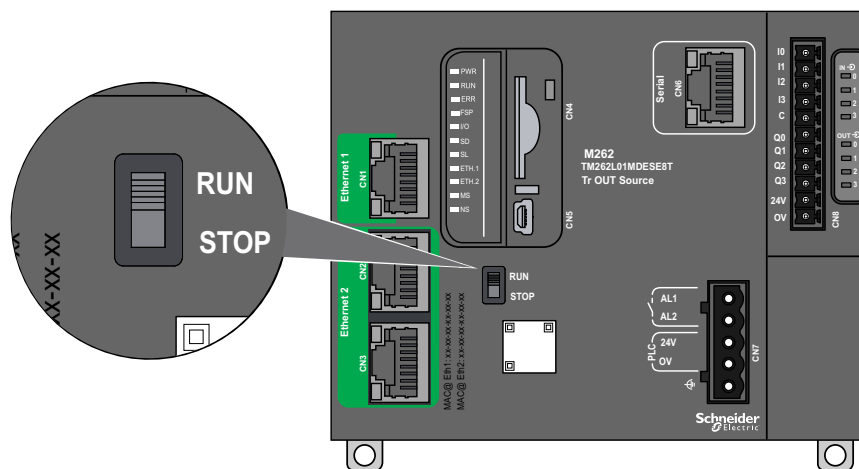
RTC Characteristics	Description
RTC drift	Less than 15 seconds per month at 25 °C (77 °F)

In EcoStruxure Automation Expert, the **NTP Server Configuration** allows you to activate the RTC time automatic adjustment.

Run/Stop Switch

Overview

The M262 distributed PAC has a RUN/STOP switch:



When the RUN/STOP switch is set to STOP:

- the controller goes to STOPPED state
- the transition to RUN is only possible one time after restart of the Runtime

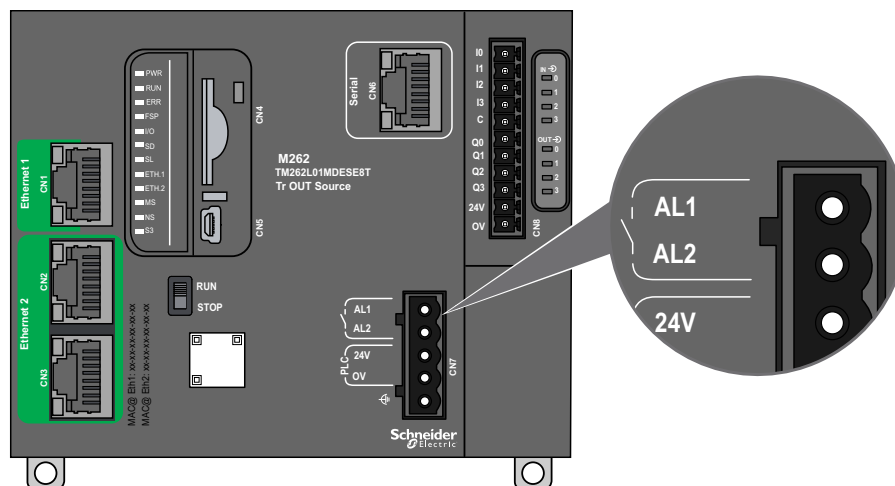
When the RUN/STOP switch is set to RUN:

- the controller will apply the Runtime configuration settings at boot

Alarm Relay

Introduction

The M262 distributed PAC has integrated relay connections that can be wired to an external alarm:



For wiring details, refer to Alarm Relay Wiring, page 60.

Characteristics

This table shows the characteristics of the alarm relay:

Characteristic	Value
Wiring type	2 terminals on removable spring terminal block
Output type	Relay
Contact type	Normally Open (NO)
Nominal input voltage	24 Vdc
Maximum input voltage	28.8 Vdc
Input voltage type	PELV
Contact resistance	300 mΩ maximum
Minimum switching load	5 V at 100 mA
Maximum current	700 mA
Overload protection	Yes, resettable fuse, maximum 3.2 A
Reverse polarity protection	Not necessary

Operation

When the controller is energized, the alarm relay is activated and its contact is closed.

The relay contact is opened by one of the following conditions:

- Appearance of an internal hardware error.
- Interruption of the controller power supply.

Perform a power cycle of the controller to recover from a hardware watchdog event and reset the relay output contact to the closed state.

When the controller is de-energized, the alarm relay is deactivated and its contact is opened.

M262 Distributed PAC Installation

Overview

This chapter provides installation safety guidelines, device dimensions, mounting instructions, and environmental specifications.

M262 Distributed PAC General Rules for Implementing

Environmental Characteristics

Enclosure Requirements

M262 distributed PAC system 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, the ability to meet electromagnetic compatibility requirements in the presence of conducted and/or radiated interference may be reduced.

All M262 distributed PAC system components meet European Community (CE) requirements for open equipment as defined by IEC/EN 61131-2. You must install them in an enclosure designed for the specific environmental conditions and to minimize the possibility of unintended contact with hazardous voltages. Use metal enclosures to improve the electromagnetic immunity of your M262 distributed PAC system. Use enclosures with a keyed locking mechanism to minimize unauthorized access.

Environmental Characteristics

All the M262 distributed PAC module components are electrically isolated between the internal electronic circuit and the input/output channels within the limits set forth and described by these environmental characteristics. For more information on electrical isolation, see the technical specifications of your particular controller found later in the current document. This equipment meets CE requirements as indicated in the table below. This equipment is intended for use in a Pollution Degree 2 industrial environment.

⚠ 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.

The following table shows the general environmental characteristics:

Characteristic	Minimum Specification	Tested Range	
Standard compliance	IEC/EN 61131-2 UL/CSA 61010-1, -2-201	–	
Ambient operating temperature	–	Horizontal installation	–20...60 °C (–4...140 °F)
	–	Vertical installation	–20...50 °C (–4...122 °F)
	–	Flat installation	–20...45 °C (–4...113 °F)
Transport/storage temperature	–	–40...85 °C (–40...185 °F)	
Relative humidity	–	Transport and storage	5...95 % (non-condensing)
	–	Operation	5...95 % (non-condensing)
Degree of pollution	IEC/EN 60664-1	2	
Degree of protection	IEC/EN 61131-2	IP20 with protective covers in place	
Corrosion immunity	–	Atmosphere free from corrosive gases	
Operating altitude	–	0...2000 m (0...6560 ft)	
Storage altitude	–	0...3000 m (0...9843 ft)	
Vibration resistance	IEC/EN 61131-2	Panel mounting or mounted on a top hat section rail (DIN rail)	3.5 mm (0.13 in) fixed amplitude from 2...8.4 Hz 9.8 m/s² (32.15 ft/s²) (1 g _n) fixed acceleration from 8.4...200 Hz
Mechanical shock resistance	–	147 m/s² (482.28 ft/s²) (15 g _n) for a duration of 11 ms	
NOTE: The tested ranges may indicate values beyond that of the IEC Standard. However, our internal standards define what is necessary for industrial environments. In all cases, we uphold the minimum specification if indicated.			

Electromagnetic Susceptibility

The M262 distributed PAC system meets electromagnetic susceptibility specifications as indicated in the following table:

Characteristic	Minimum Specification	Tested Range		
Electrostatic discharge	IEC/EN 61000-4-2 IEC/EN 61131-2	8 kV (air discharge) 4 kV (contact discharge)		
Radiated electromagnetic field	IEC/EN 61000-4-3 IEC/EN 61131-2	10 V/m (80...1000 MHz) 3 V/m (1.4...2 GHz) 1 V/m (2...3 GHz)		
Fast transients burst	IEC/EN 61000-4-4 IEC/EN 61131-2	24 Vdc main power lines	2 kV (CM ¹ and DM ²)	
		24 Vdc I/Os	2 kV (clamp)	
		Relay output	1 kV (clamp)	
		Digital I/Os	1 kV (clamp)	
		Communication line	1 kV (clamp)	
Surge immunity	IEC/EN 61000-4-5 IEC/EN 61131-2	–	CM ¹	DM ²
		DC Power lines	0.5 kV	0.5 kV
		Relay Outputs	–	–
		24 Vdc I/Os	–	–
		Shielded cable (between shield and ground)	1 kV	–
Induced electromagnetic field	IEC/EN 61000-4-6 IEC/EN 61131-2	10 Vrms (0.15...80 MHz)		
Conducted emission	IEC 61000-6-4 IEC/EN 61131-2	<ul style="list-style-type: none">10...150 kHz: 120...69 dBµV/m QP150...1500 kHz: 79...63 dBµV/m QP1.5...30 MHz: 63 dBµV/m QP		
Radiated emission	IEC 61000-6-4 IEC/EN 61131-2	30...230 MHz: 40 dBµV/m QP 230...1000 MHz: 47 dBµV/m QP		
1 Common Mode				
2 Differential Mode				
NOTE: The tested ranges may indicate values beyond that of the IEC Standard. However, our internal standards define what is necessary for industrial environments. In all cases, we uphold the minimum specification if indicated.				

Certifications and Standards

Introduction

For information on certifications and conformance to standards, go to www.se.com.

For product compliance and environmental information (RoHS, REACH, PEP, EOL, etc.), go to www.se.com/green-premium.

M262 Distributed PAC Installation

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

In addition to the **Environmental Characteristics**, refer to **Product Related Information** in the beginning of the present document for important information regarding installation in hazardous locations for this specific equipment.


 **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 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.

M262 Distributed PAC Mounting Positions and Clearances

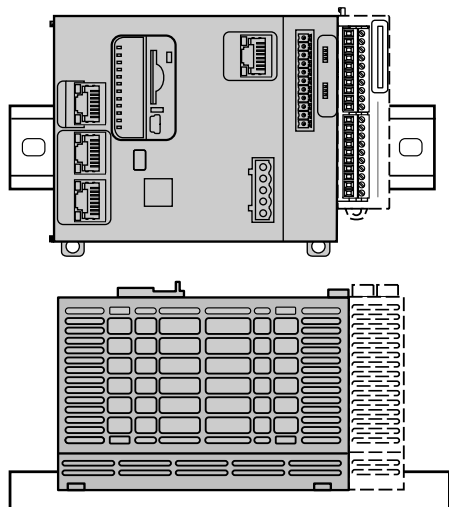
Introduction

This section describes the correct mounting positions for the M262 distributed PAC.

NOTE: Keep adequate spacing for proper ventilation and to maintain the operating temperature specified in the *Environmental Characteristics*, page 34.

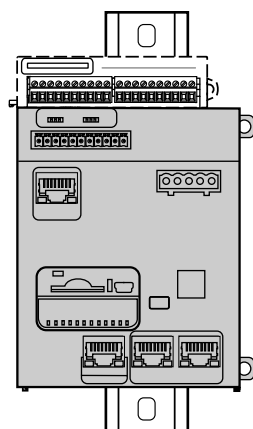
Correct Mounting Position

To obtain optimal operating characteristics, the M262 distributed PAC should be mounted as shown in the figures below:



Acceptable Mounting Positions

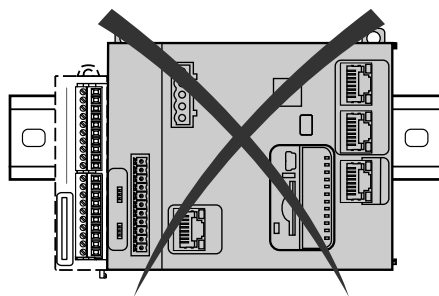
The M262 distributed PAC can also be mounted vertically on a vertical plane as shown below:

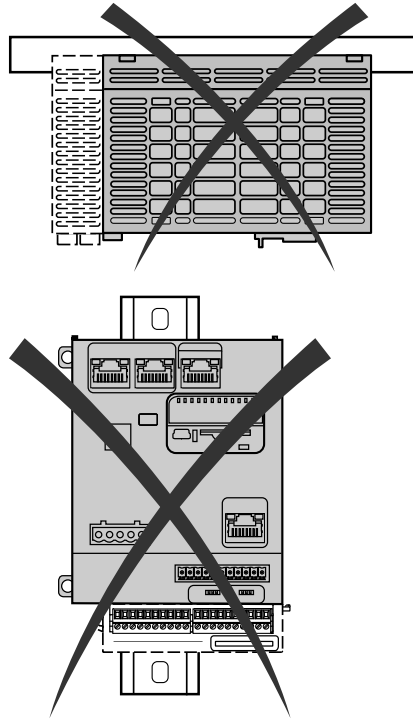


NOTE: TM3 expansion modules must be mounted above the controller.

Incorrect Mounting Positions

The M262 distributed PAC should only be positioned as shown in the [Correct Mounting Position](#), page 39 figures. The figures below show incorrect mounting positions:





Minimum Clearances

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Place devices dissipating the most heat at the top of the cabinet and ensure adequate ventilation.
- Avoid placing this equipment next to or above devices that might cause overheating.
- Install the equipment in a location providing the minimum clearances from all adjacent structures and equipment as directed in this document.
- Install all equipment in accordance with the specifications in the related documentation.

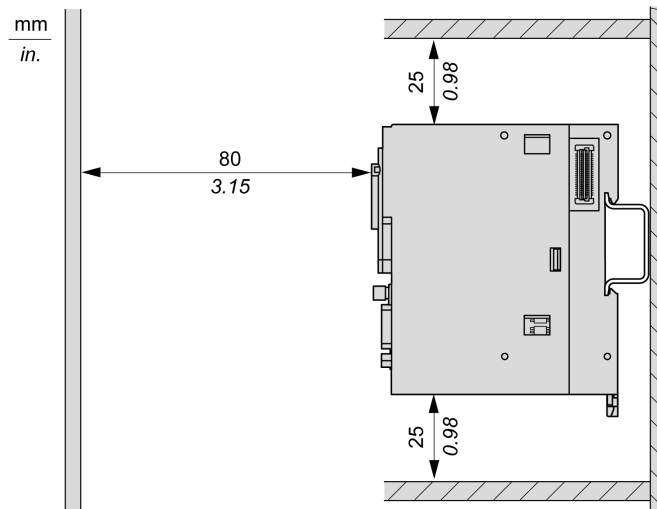
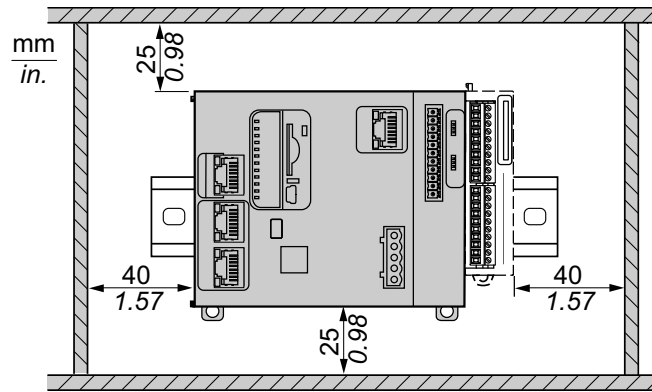
Failure to follow these instructions can result in death, serious injury, or equipment damage.

The M262 distributed PAC has been designed as an IP20 product and must be installed in an enclosure. Clearances must be respected when installing the product.

There are three types of clearances to consider:

- The M262 distributed PAC and all sides of the cabinet (including the panel door).
- The M262 distributed PAC terminal blocks and the wiring ducts to help reduce potential electromagnetic interference between the controller and the duct wiring.
- The M262 distributed PAC and other heat generating devices installed in the same cabinet.

The following figures show the minimum clearances that apply to M262 distributed PAC:



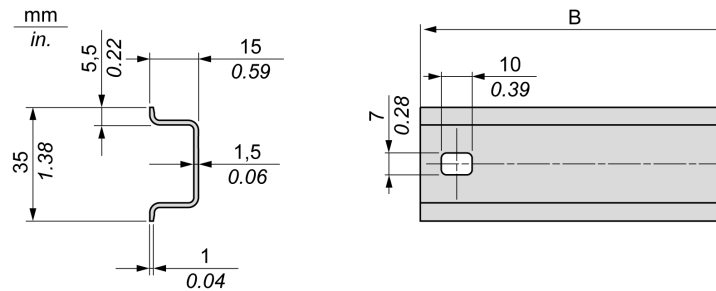
Top Hat Section Rail (DIN rail)

Dimensions of Top Hat Section Rail DIN Rail

You can mount the controller or receiver and their expansions on a 35 mm (1.38 in.) top hat section rail (DIN rail). The DIN rail can be attached to a smooth mounting surface or suspended from a EIA rack or mounted in a NEMA cabinet.

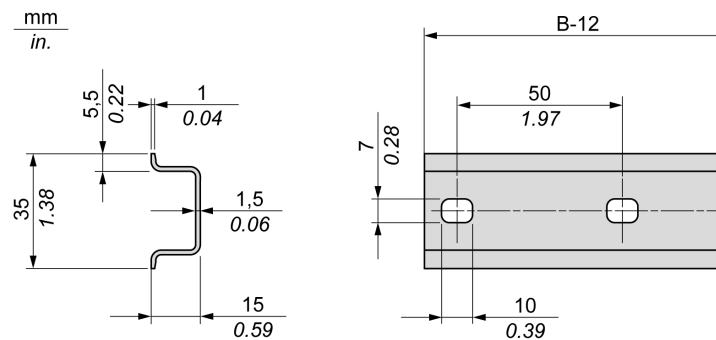
Symmetric Top Hat Section Rails (DIN Rail)

The following illustration and table indicate the references of the top hat section rails (DIN rail) for the wall-mounting range:



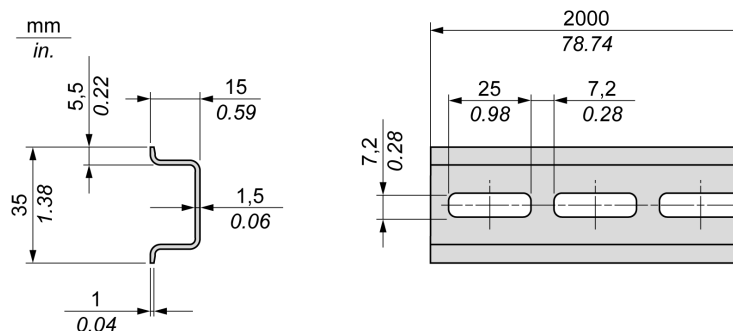
Reference	Type	Rail Length (B)
NSYSDR50A	A	450 mm (17.71 in.)
NSYSDR60A	A	550 mm (21.65 in.)
NSYSDR80A	A	750 mm (29.52 in.)
NSYSDR100A	A	950 mm (37.40 in.)

The following illustration and table indicate the references of the symmetric top hat section rails (DIN rail) for the metal enclosure range:



Reference	Type	Rail Length (B-12 mm)
NSYSDR60	A	588 mm (23.15 in.)
NSYSDR80	A	788 mm (31.02 in.)
NSYSDR100	A	988 mm (38.89 in.)
NSYSDR120	A	1188 mm (46.77 in.)

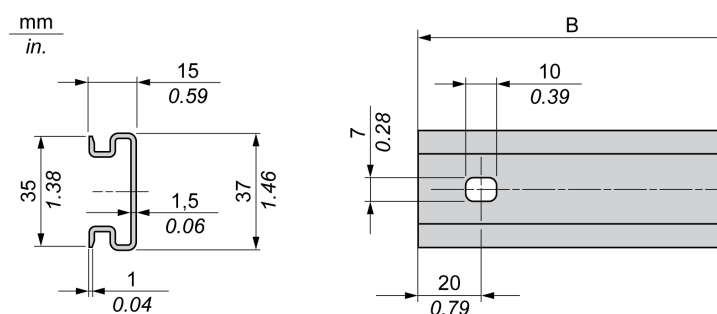
The following illustration and table indicate the references of the symmetric top hat section rails (DIN rail) of 2000 mm (78.74 in.):



Reference	Type	Rail Length
NSYSDR200 ¹	A	2000 mm (78.74 in.)
NSYSDR200D ²	A	
1 Unperforated galvanized steel		
2 Perforated galvanized steel		

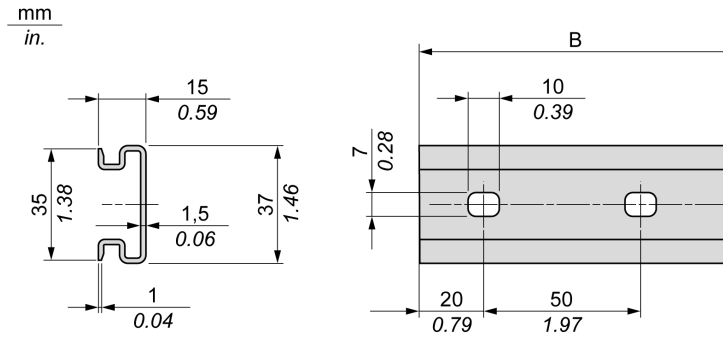
Double-Profile Top Hat Section Rails (DIN rail)

The following illustration and table indicate the references of the double-profile top hat section rails (DIN rails) for the wall-mounting range:



Reference	Type	Rail Length (B)
NSYDPR25	W	250 mm (9.84 in.)
NSYDPR35	W	350 mm (13.77 in.)
NSYDPR45	W	450 mm (17.71 in.)
NSYDPR55	W	550 mm (21.65 in.)
NSYDPR65	W	650 mm (25.60 in.)
NSYDPR75	W	750 mm (29.52 in.)

The following illustration and table indicate the references of the double-profile top hat section rails (DIN rail) for the floor-standing range:



Reference	Type	Rail Length (B)
NSYDPR60	F	588 mm (23.15 in.)
NSYDPR80	F	788 mm (31.02 in.)
NSYDPR100	F	988 mm (38.89 in.)
NSYDPR120	F	1188 mm (46.77 in.)

Installing and Removing the Controller with Expansions

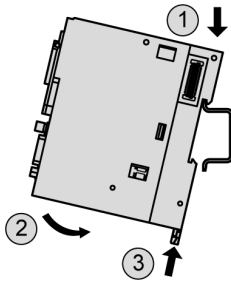

Overview

This section describes how to install and remove the controller with its expansion modules from a top hat section rail (DIN rail).

To assemble expansion modules to the controller, or to other modules, refer to the respective expansion modules hardware guide(s).

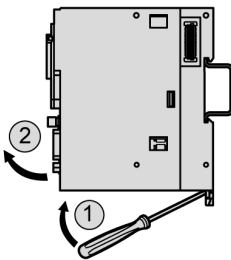
Installing a Controller with its Expansions on a DIN Rail

The following procedure describes how to install a controller with its expansion modules on a top hat section rail (DIN rail):

Step	Action
1	Fasten the top hat section rail (DIN rail) to a panel surface using screws.
2	Position the top groove of the controller and its expansion modules on the top edge of the DIN rail and press the assembly against the top hat section rail (DIN rail) until you hear the top section rail (DIN rail) click into place: 
3	Place 2 terminal block end clamps on both sides of the controller and expansion module assembly.  <p>NOTE: Type NSYTRAAB35 or equivalent terminal block end clamps help minimize sideways movement and improve the shock and vibration characteristics of the controller and expansion module assembly.</p>

Removing a Controller with its Expansions from a Top Hat Section Rail (DIN Rail)

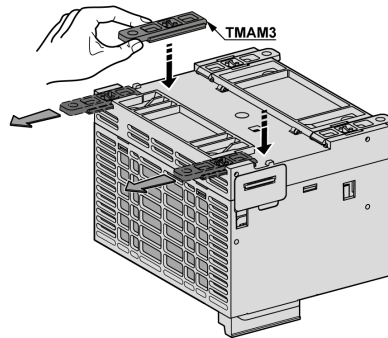
The following procedure describes how to remove a controller with its expansion modules from a top hat section rail (DIN rail):

Step	Action
1	Remove all power from your controller and expansion modules.
2	Insert a flat screwdriver into the slot of the top hat section rail (DIN rail) clip: 
3	Pull down the top hat section rail (DIN rail) clip.
4	Pull the controller and its expansion modules from the top hat section rail (DIN rail) from the bottom.

Mounting a M262 Distributed PAC on a Panel Surface

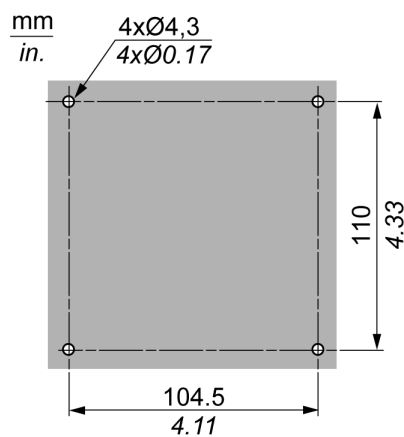
Installing the Panel Mounting Kit

Insert TMAM3 mounting strips into the slots at the top of the M262 distributed PAC:



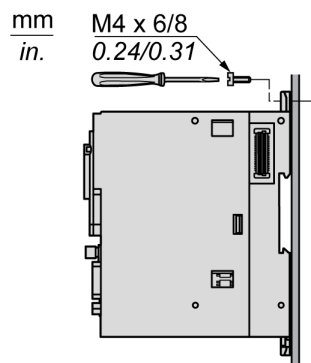
Mounting Holes

The following figure shows the mounting holes for the M262 distributed PAC:



Verify that the installation panel or cabinet surface is flat (planarity tolerance: 0.5 mm (0.019 in)), in good condition, and has no jagged edges.

Mounting the M262 Distributed PAC on a Metallic Panel



If mounting the controller on a horizontal metallic panel, use flat head screws.

M262 Distributed PAC Electrical Requirements

Wiring Best Practices

Overview

This section describes the wiring guidelines and associated best practices to be respected when using the M262 distributed PAC system.

⚠️ 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.

⚠️ 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.

Wiring Guidelines

These rules must be applied when wiring a M262 distributed PAC system:

- Communication wiring must be kept separate from the power wiring. Route these 2 types of wiring in separate cable ducting.
- Verify that the operating conditions and environment are within the specification values.
- Use proper wire sizes to meet voltage and current requirements.
- Use minimum 75 °C (167 °F) copper conductors (required).
- Use twisted pair, shielded cables for networks, and serial communication connections.

Use shielded, properly grounded cables for all communication connections. If you do not use shielded cable for these connections, electromagnetic interference can cause signal degradation. Degraded signals can cause the controller or attached modules and equipment to perform in an unintended manner.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use shielded cables for all communication signals.
- Ground cable shields for all communication signals at a single point¹.
- Route communication separately from power cables.

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

¹Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents.

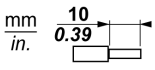





For more details, refer to [Grounding Shielded Cables](#), page 55.

NOTE: Surface temperatures may exceed 60 °C (140 °F).

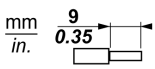




To conform to IEC 61010 standards, route primary wiring (wires connected to power mains) separately and apart from secondary wiring (extra low voltage wiring coming from intervening power sources). If that is not possible, double insulation is required such as conduit or cable gains.

Rules for TMA262SET8G Spring Terminal Blocks

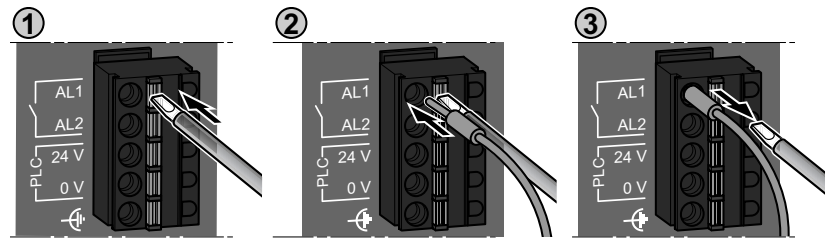
The following tables show the cable types and wire sizes for the CN7 **5.08 pitch** removable spring terminal block of the embedded 24 Vdc power supply input / alarm relay terminal connector:

					
mm ²	0,2...2,5	0,2...2,5	0,25...2,5	0,25...2,5	2 x 0,5...1
AWG	24...14	24...14	22...14	22...14	2 x 20...18

The following tables show the cable types and wire sizes for the CN8 **3.81 pitch** removable spring terminal block of the embedded I/Os connector:

				
mm ²	0,2...1,5	0,2...1,5	0,25...1,0	0,25...0,5
AWG	24...16	24...16	23...18	23...21

The following images show how to mount cables on spring connectors:



Rules for TMA262SET8S Screw Terminal Blocks

The following tables show the cable types and wire sizes for the CN7 **5.08 pitch** removable screw terminal block of the embedded 24 Vdc power supply input / alarm relay terminal connector:

mm ²	0.2...2.5	0.2...2.5	0.25...2.5	0.25...2.5	2 x 0.2...1	2 x 0.2...1.5	2 x 0.25...1	2 x 0.5...1.5
AWG	24...14	24...14	22...14	22...14	2 x 24...18	2 x 24...16	2 x 22...18	2 x 20...16

		N•m	0.49
Ø 3,5 mm (0.14 in.)		lb-in	4.34

The following tables show the cable types and wire sizes for the CN8 **3.81 pitch** removable screw terminal block of the embedded I/Os connector:

mm ²	0.14...1.5	0.14...1.5	0.25...1.5	0.25...0.5	2 x 0.14...0.5	2 x 0.14...0.75	2 x 0.25...0.34	2 x 0.5
AWG	26...16	26...16	22...16	22...20	2 x 26...20	2 x 26...20	2 x 24...22	2 x 20

		N•m	0.28
Ø 2,5 mm (0.1 in.)		lb-in	2.48

⚠⚠ DANGER

LOOSE WIRING CAUSES ELECTRIC SHOCK

Tighten connections in conformance with the torque specifications.

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

⚠ DANGER

FIRE HAZARD

Use only the correct wire sizes for the maximum current capacity of the power supplies.

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

Protecting Outputs from Inductive Load Damage

Depending on the load, a protection circuit may be needed for the outputs on the controllers and certain modules. Inductive loads using DC voltages may create voltage reflections resulting in overshoot that will damage or shorten the life of output devices.

⚠ CAUTION**OUTPUT CIRCUIT DAMAGE DUE TO INDUCTIVE LOADS**

Use an appropriate external protective circuit or device to reduce the risk of inductive direct current load damage.

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

If your controller or module contains relay outputs, these types of outputs can support up to 240 Vac. Inductive damage to these types of outputs can result in welded contacts and loss of control. Each inductive load must include a protection device such as a peak limiter, RC circuit or flyback diode. Capacitive loads are not supported by these relays.

⚠ WARNING**RELAY OUTPUTS WELDED CLOSED**

- Always protect relay outputs from inductive alternating current load damage using an appropriate external protective circuit or device.
- Do not connect relay outputs to capacitive loads.

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

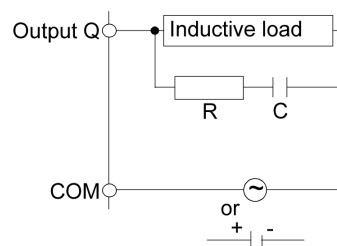
AC-driven contactor coils are, under certain circumstances, inductive loads that generate pronounced high-frequency interference and electrical transients when the contactor coil is de-energized. This interference may cause the logic controller to detect an I/O bus error.

⚠ WARNING**CONSEQUENTIAL LOSS OF CONTROL**

Install an RC surge suppressor or similar means, such as an interposing relay, on each TM3 expansion module relay output when connecting to AC-driven contactors or other forms of inductive loads.

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

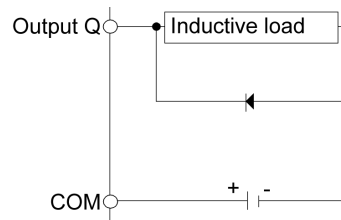
Protective circuit A: this protection circuit can be used for both AC and DC load power circuits.



C Value from 0.1 to 1 μF

R Resistor of approximately the same resistance value as the load

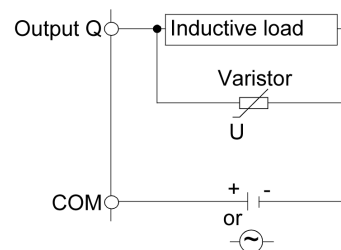
Protective circuit B: this protection circuit can be used for DC load power circuits.



Use a diode with the following ratings:

- Reverse withstand voltage: power voltage of the load circuit x 10.
- Forward current: more than the load current.

Protective circuit C: this protection circuit can be used for both AC and DC load power circuits.



In applications where the inductive load is switched on and off frequently and/or rapidly, ensure that the continuous energy rating (J) of the varistor exceeds the peak load energy by 20 % or more.

DC Power Supply Characteristics and Wiring

Overview

This section provides the characteristics and the wiring diagrams of the DC power supply.

DC Power Supply Voltage Range

If the specified voltage range is not maintained, outputs may not switch as expected. Use appropriate safety interlocks and voltage monitoring circuits.

⚠ 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.

DC Power Supply Requirements

The M262 distributed PAC requires a power supply with a nominal voltage of 24 Vdc. The 24 Vdc power supply must be rated Protective Extra Low Voltage (PELV) according to IEC 61140. This power supply is isolated between the electrical input and output circuits of the power supply.

⚠ WARNING

POTENTIAL OF OVERHEATING AND FIRE

- Do not connect the equipment directly to line voltage.
- Use only isolating PELV power supplies and circuits to supply power to the equipment¹.

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

¹ For compliance to UL (Underwriters Laboratories) requirements, the power supply must also conform to the various criteria of NEC Class 2, and be inherently current limited to a maximum power output availability of less than 100 VA (approximately 4 A at nominal voltage), or not inherently limited but with an additional protection device such as a circuit breaker or fuse meeting the requirements of clause 9.4 Limited-energy circuit of UL 61010-1. In all cases, the current limit should never exceed that of the electric characteristics and wiring diagrams for the equipment described in the present documentation. In all cases, the power supply must be grounded, and you must separate Class 2 circuits from other circuits. If the indicated rating of the electrical characteristics or wiring diagrams are greater than the specified current limit, multiple Class 2 power supplies may be used.

Controller DC Characteristics

This table shows the characteristics of the DC power supply required for the controller:

Characteristic		Value
Rated voltage		24 Vdc
Power supply voltage range		20.4...28.8 Vdc (ripple \pm 10 % Un)
Power interruption time immunity		Minimum 3 ms
Maximum inrush current		40 A
Maximum power consumption		82 W Including 25 W maximum available for TM3 expansion modules
Isolation	between DC power supply and internal logic	Not isolated
	between DC power supply and grounding	780 Vdc
Reverse polarity protection		Yes

Power Interruption

The M262 distributed PAC must be supplied by an external 24 V power supply equipment. During power interruptions, the controller, associated to the suitable power supply, is able to continue normal operation for a minimum of 10 ms as specified by IEC standards.

When planning the management of the power supplied to the controller, you must consider the power interruption duration due to the fast cycle time of the controller.

There could potentially be many scans of the logic and consequential updates to the I/O image table during the power interruption, while there is no external power supplied to the inputs, the outputs or both depending on the power system architecture and power interruption circumstances.

⚠ WARNING

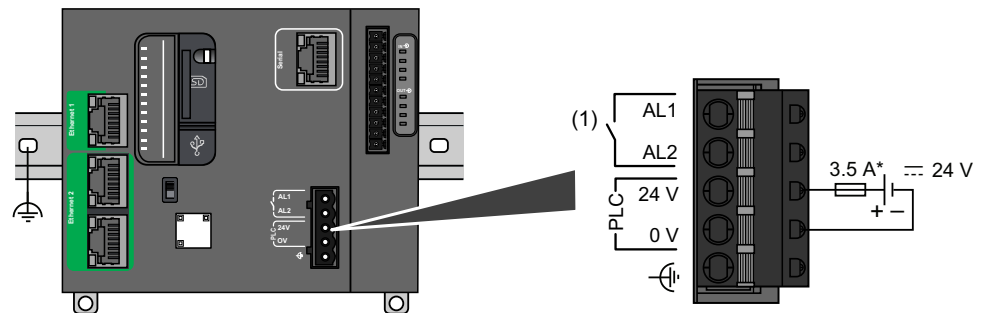
UNINTENDED EQUIPMENT OPERATION

- Individually monitor each source of power used in the controller system including input power supplies, output power supplies and the power supply to the controller to allow appropriate system shutdown during power system interruptions.
- The inputs monitoring each of the power supply sources must be unfiltered inputs.

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

Controller DC Power Supply Wiring Diagram

The following figure shows the wiring of the controller DC power supply:



(1) Alarm Relay

* Type T fuse

For more information on wiring requirements, refer to the Rules for Terminal Blocks, page 49.

Grounding the M262 Distributed PAC System

Functional Ground (FE) on the DIN Rail

The DIN rail for your M262 distributed PAC controller is common with the functional ground (FE) plane and must be mounted on a conductive backplane.

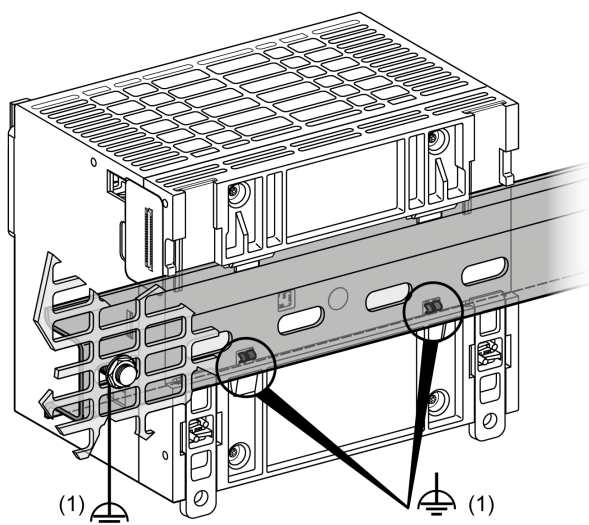
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Connect the DIN rail to the functional ground (FE) of your installation.

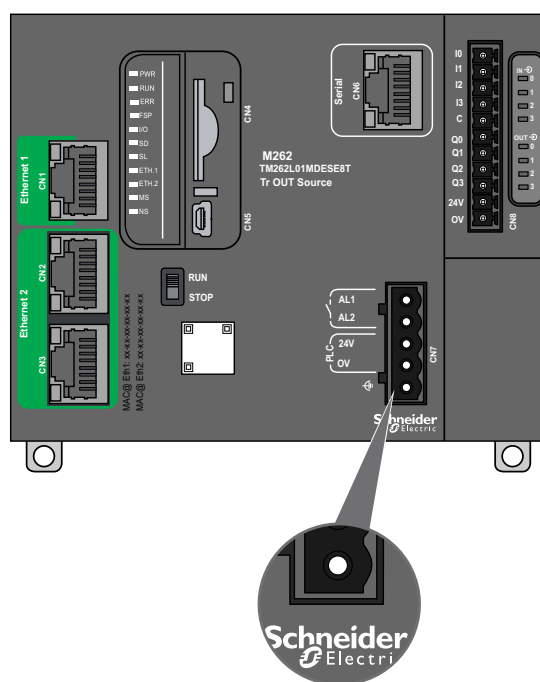
Failure to follow these instructions can result in death, serious injury, or equipment damage.

The connection between the functional ground (FE) and the M262 distributed PAC system is made by the DIN rail contacts on the back of the controller and the expansion modules.



1 Functional Ground (FE)

NOTE: When the M262 distributed PAC system is mounted on a DIN rail, the Functional Ground (FE) connector on the front face of the controller can be used to help minimize electromagnetic interference:

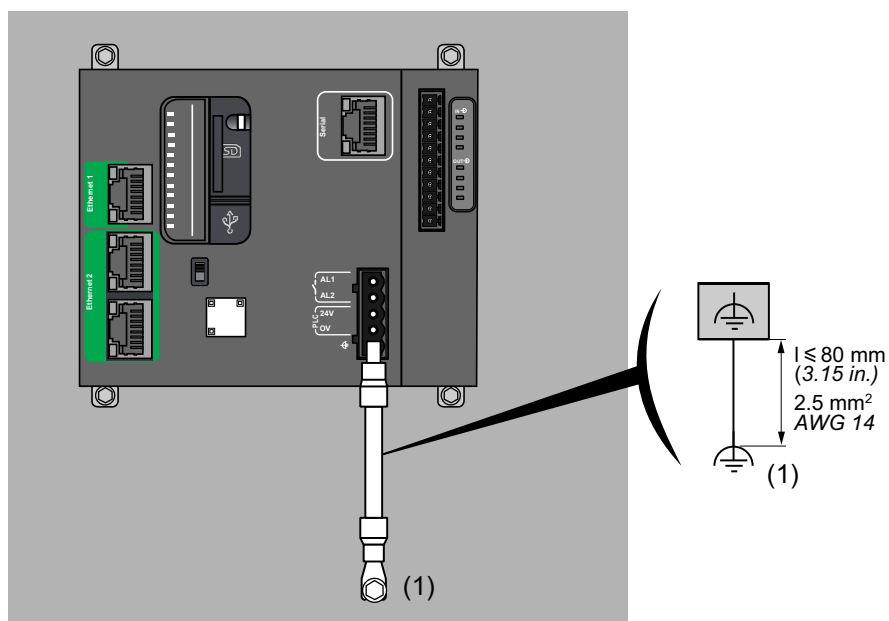


Protective Ground (PE) on the Mounting Panel

The protective ground (PE) should be connected to the conductive mounting panel by a heavy-duty wire, usually a braided copper cable with the maximum allowable cable section.

Functional Ground (FE) on the Mounting Panel

Use a functional ground cable to connect the functional ground connector to the conductive backplane:



(1) Functional ground (FE)

The functional ground cable requires a cross-section of at least 1.5 mm^2 (AWG 16) and a maximum length of 80 mm (3.15 in.).

Shielded Cables Connections

To help minimize the effects of electromagnetic interference, cables carrying fieldbus communication signals must be shielded.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use shielded cables for communication signals.
- Ground cable shields for communication signals at a single point ¹.
- Always comply with local wiring requirements regarding grounding of cable shields.

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

¹Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents.

The use of shielded cables requires compliance with the following wiring rules:

- For protective ground connections (PE), metal conduit or ducting can be used for part of the shielding length, provided there is no break in the continuity of the ground connections. For functional ground (FE), the shielding is intended to attenuate electromagnetic interference and the shielding must be continuous for the length of the cable. If the purpose is both functional and protective, as is often the case for communication cables, the cable must have continuous shielding.
- Wherever possible, keep cables carrying one type of signal separate from the cables carrying other types of signals or power.

The shielding must be securely connected to ground. The fieldbus communication cable shields must be connected to the protective ground (PE) with a connecting clamp secured to the conductive backplane of your installation.

The shielding of the following cables must be connected to the protective ground (PE):

- Ethernet (unless forbidden by an applicable standard)
- Serial

The embedded I/O shields can be connected to either the protective ground (PE) or the functional ground (FE).

DANGER

HAZARD OF ELECTRIC SHOCK

- The grounding terminal connection (PE) must be used to provide a protective ground at all times.
- Make sure that an appropriate, braided ground cable is attached to the PE/PG ground terminal before connecting or disconnecting the network cable to the equipment.

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

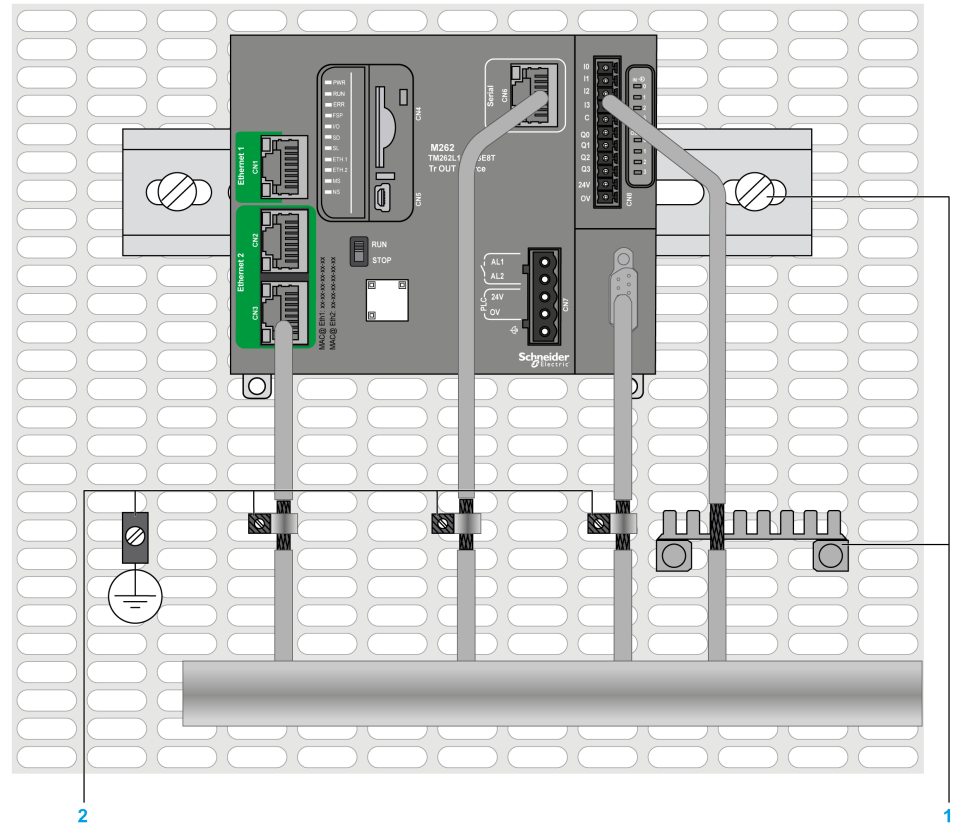
WARNING

ACCIDENTAL DISCONNECTION FROM PROTECTIVE GROUND (PE)

- Do not use the TM2XMTGB Grounding Plate to provide a protective ground (PE).
- Use the TM2XMTGB Grounding Plate only to provide a functional ground (FE).

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

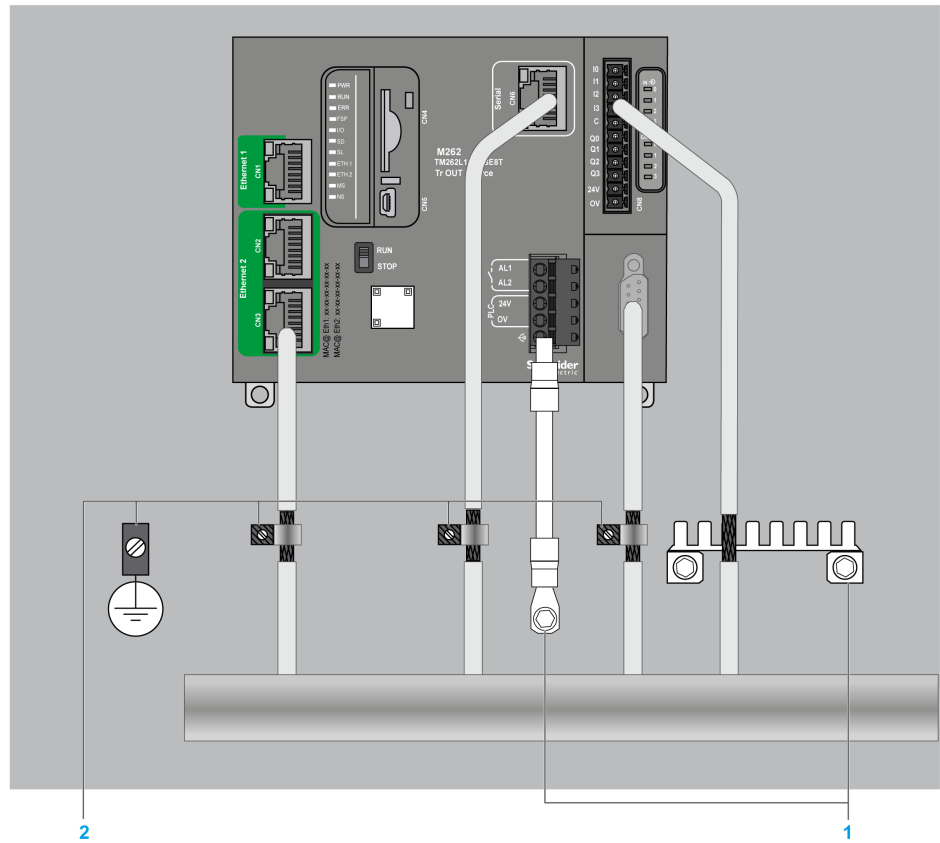
The figure below represents an M262 distributed PAC with shielded cables connected to a DIN rail:



1 Functional ground (FE)

2 Protective ground (PE)

The figure below represents an M262 distributed PAC with shielded cables connected to a mounting panel:

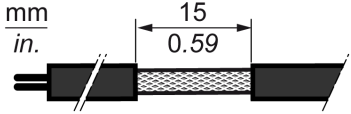
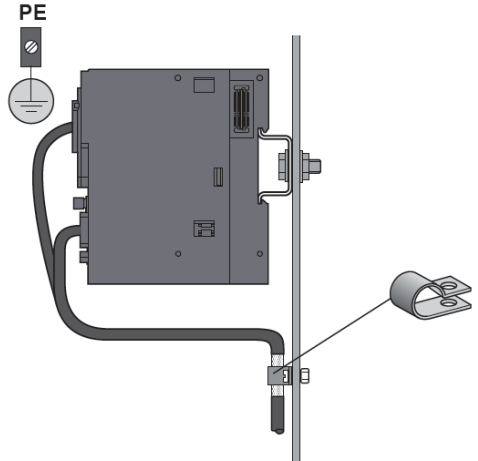


1 Functional ground (FE)

2 Protective ground (PE)

Protective Ground (PE) Cable Shielding

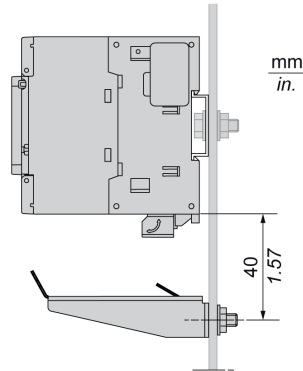
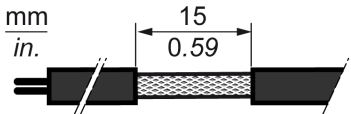
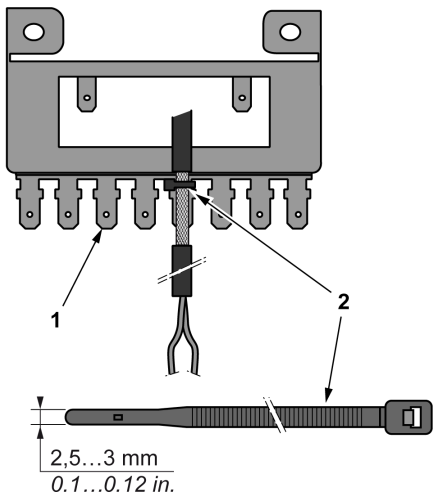
To ground the shield of a cable with a grounding clamp:

Step	Description	
1	Strip the shielding for a length of 15 mm (0.59 in.).	
2	Attach the cable to the conductive backplane plate by attaching the grounding clamp to the stripped part of the shielding as close as possible to the base of the M262 distributed PAC.	

NOTE: The shielding must be clamped securely to the conductive backplane to help ensure good contact.

Functional Ground (FE) Cable Shielding

Connect the shield of a cable with the grounding bar:

Step	Description	
1	Install the TM2XMTGB grounding bar directly on the conductive backplane below the M262 distributed PAC as illustrated.	
2	Strip the shielding for a length of 15 mm (0.59 in.).	
3	Tightly clamp on the blade connector (1) using a nylon fastener (2) (width 2.5...3 mm (0.1...0.12 in.)) and appropriate tool.	

Alarm Relay Wiring

Overview

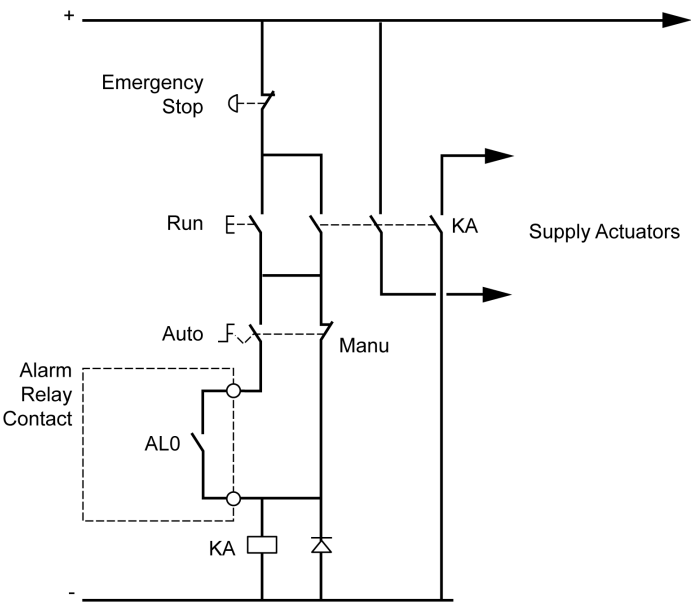
The M262 distributed PAC has integrated relay connections that can be wired to an external alarm.

Wiring Stripping and Wire Sizes

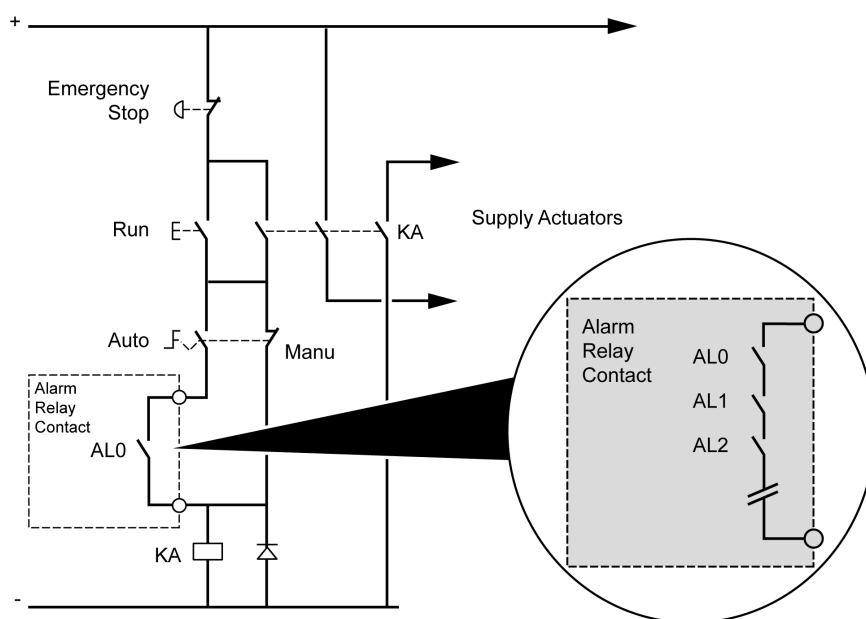
The alarm relay is wired by means of a 5.08 mm pitch removable screw terminal block on the front face of the M262 distributed PAC. For details, refer to Rules for Terminal Blocks, page 49.

Using the Alarm Relay for the Actuator Power Supply

Proceed as follows to use the alarm relay for the actuator power supply:

Step	Action
1	Switch on the power supply of the M262 distributed PAC using the main contactor.
2	<p>When the M262 distributed PAC is energized, switch on the output power supply for the actuators using the KA contactor. The following wiring diagram shows an M262 distributed PAC supplied by direct current:</p>  <p>In AUTO run mode, the KA contactor is controlled by the alarm relay from the power supply module.</p>

If your system comprises multiple M262 distributed PACs installed in multiple racks, set the alarm relay contacts in all controllers in series (AL0, AL1, AL2, and so on), as shown in the following diagram:



Integrated Communication Ports

Ethernet Ports

Overview

The M262 distributed PAC is equipped with Ethernet communications ports:

Reference	Number of Ports	Port Name
TM262L01MDESE8T	1 (100BASE-T)	Ethernet 1
	2 (dual 1000BASE-T Ethernet switch)	Ethernet 2

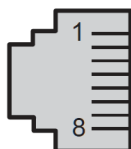
Characteristics

This table describes the different Ethernet characteristics:

Characteristic	Description	Ethernet 1	Ethernet 2
Function	Modbus TCP/IP client	Available	Available
	Modbus TCP/IP server	Available	Available
	EcoStruxure Automation Expert protocol	Available	Available
	EcoStruxure Automation Device Management protocol	Available	Available
	EtherNet/IP scanner	Available	Available
	EtherNet/IP explicit message	Available	Available
	OPC UA server	Available	Available
	NTP client	Available	Available
Connector type	RJ45		
Auto negotiation	Ethernet 1: From 10 Mbps half duplex to 100 Mbps full duplex Ethernet 2: From 100 Mbps half duplex to 1000 Mbps full duplex		
Cable type	Shielded		
Automatic cross-over detection	MDI/MDIX		

Ethernet 1 Pin Assignment

This figure shows the Ethernet 1 connector pin assignment:



This table describes the Ethernet 1 RJ45 connector pins:

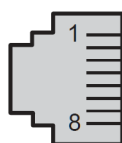
Pin N°	100BASE-T	Description
1	TD+	Transmit data +
2	TD-	Transmit Data -
3	RD+	Receive Data +
4	–	Reserved
5	–	Reserved
6	RD-	Receive Data -
7	–	Reserved
8	–	Reserved

NOTE: The controller supports the MDI/MDIX auto-crossover cable function. It is not necessary to use special Ethernet crossover cables to connect devices directly to this port (connections without an Ethernet hub or switch).

NOTE: Ethernet cable disconnection is detected every second. In case of disconnection of a short duration (< 1 second), the network status may not indicate the disconnection.

Ethernet 2 Pin Assignment

This figure shows the Ethernet 2 RJ45 connector pin assignment:



This table describes the Ethernet 2 connector pin assignment:

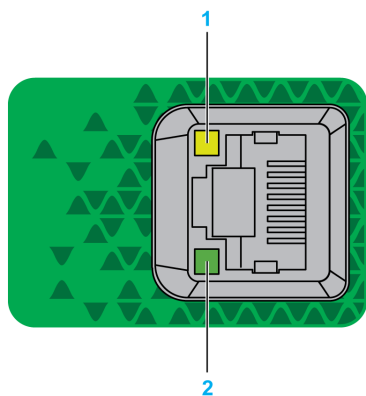
Pin N°	100BASE-T	1000BASE-T
1	TD+	DA+
2	TD-	DA-
3	RD+	DB+
4	–	DC+
5	–	DC-
6	RD-	DB-
7	–	DD+
8	–	DD-

NOTE: The controller supports the MDI/MDIX auto-crossover cable function. It is not necessary to use special Ethernet crossover cables to connect devices directly to this port (connections without an Ethernet hub or switch).

NOTE: Ethernet cable disconnection is detected every second. In case of disconnection of a short duration (< 1 second), the network status may not indicate the disconnection.

Status LEDs

This figure shows the RJ45 connectors status LEDs:



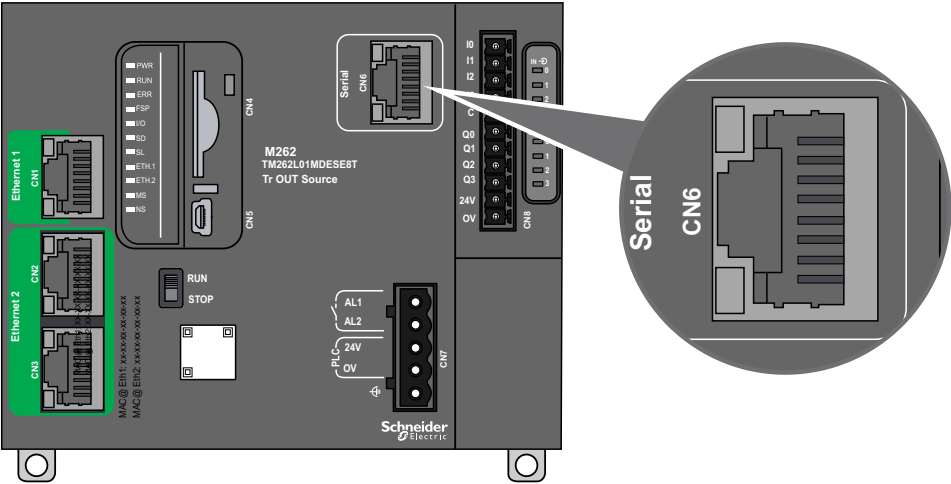
This table describes the Ethernet status LEDs:

Label	Description	LED		
		Color	Status	Description
1	Ethernet link/ speed	Green/ Yellow	Off	No link
			Solid yellow	Ethernet 1: Link at 10 Mbps Ethernet 2: Link at 100 Mbps
			Solid green	Ethernet 1: Link at 100 Mbps Ethernet 2: Link at 1000 Mbps
2	Ethernet activity	Green	Off	No activity and no link
			On	The link is detected, but there is no activity
			Flashing	Transmitting or receiving data

Serial Line Port

Overview

The serial line is used to communicate as Modbus RTU client or server.



Characteristics

Characteristic		Description
Function		RS485 or RS232 software configured
Connector type		RJ45
Isolation		550 Vac
Baud rate		<ul style="list-style-type: none"> • 1200 bps • 2400 bps • 4800 bps • 9600 bps • 19200 bps • 38400 bps • 57600 bps
Cable	Type	Shielded
	Maximum length (between the controller and an isolated junction box)	30 m (98.43 ft) for RS485 15 m (49.21 ft) for RS232
Polarization		Software configuration is used to connect when the node is configured as a master. 576 Ω resistors are optional.
5 Vdc power supply for RS485		No

NOTE: Use of communication speeds (baud rates) greater than 19200 bps may impact the performance of your controller and/or provoke communication errors.

NOTE: Some devices provide voltage on RS485 serial connections. Do not connect these voltage lines to your controller as they may damage the controller serial port electronics and render the serial port inoperable.

NOTICE

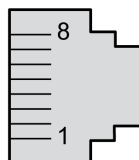
INOPERABLE EQUIPMENT

Use only the VW3A8306R** serial cable to connect RS485 devices to your controller.

Failure to follow these instructions can result in equipment damage.

Pin Assignment

The following figure shows the pins of the RJ45 connector:



This table describes the pin assignment of the RJ45 connector:

Pin	RS232	RS485
1	RxD	N.C.
2	TxD	N.C.
3	N.C.	N.C.
4	N.C.	D1
5	N.C.	D0
6	N.C.	N.C.
7	N.C.	N.C.
8	Common	Common

N.C.: No connection

RxD: Received data

TxD: Transmitted data

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Do not connect wires to unused terminals and/or terminals indicated as "No Connection (N.C.)".

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

Serial Line Configuration

The related libraries in EcoStruxure Automation Expert are **Standard.IoModbus** and **Standard.IoModbusSlave**.

This table describes the procedure to add the related library and to configure the serial line:

Step	Action
1	Right-click on the active Solution . Select References and add the library Standard.IoModbus or Standard.IoModbusSlave to the project library references.
2	Open the System tab and select the Hardware Configuration tab: the Hardware Configuration window opens.
3	In the Hardware Configuration window, right-click and select Add : the Add Bus window opens.
4	Select Standard.IoModbus.MODBUSSEIAL or Standard.IoModbusSlave.MODBUSSEIAL , click Add and Close .
5	Right-click on MODBUSSEIAL and select Properties .
6	Configure the serial line with the parameters listed in the Properties > Connect info window.

The following parameters must be identical for each serial device connected to the port:

Parameter	Default Value	Range	Description
Interframedelay	10	33...65535 for 1200 bps baud rate 17...65535 for 2400 bps baud rate 9...65535 for 4800 bps baud rate 5...65535 for 9600 bps baud rate 3...65535 for 19200 bps baud rate 2...65535 for 38400 bps baud rate 2...65535 for 57600 bps baud rate	Sets the inter frame delay for Modbus RTU communication in ms.
Port	COM1	COM1	Displays the COM port. NOTE: Changing the value has no effect.
Speed	19200	1200 2400 4800 9600 19200 38400 57600	Sets the COM port baud rate in bps. NOTE: Use of communication speeds (baud rates) greater than 19200 bps may impact the performance of your controller and/or provoke communication errors.
Databits	8	8	Displays the number of bits for data transmitting. NOTE: You can not alter this setting.
Parity	E	N E O	Used for error detection. Sets the parity: <ul style="list-style-type: none"> • N for none • E for even • O for odd
Stopbits	1	1 2	Sets the number of stop bits.
Standard	RS485	RS232 RS485	Specifies the physical medium to use.
Polarization	No	Yes No	Polarization resistors are integrated in the controller. They are switched on or off by this parameter (only for RS485): <ul style="list-style-type: none"> • Yes for ON • No for OFF

Connecting the M262 Distributed PAC to a PC

Connecting the Controller to a PC

Overview

To transfer, run, and monitor the applications, you can use an Ethernet connection to connect the controller to a computer with EcoStruxure Automation Expert installed.

NOTICE

INOPERABLE EQUIPMENT
Always connect the communication cable to the PC before connecting it to the controller.
Failure to follow these instructions can result in equipment damage.

The default IP addresses are:

- 10.10.x.x. for Ethernet_1
- 10.11.x.x. for Ethernet_2

NOTE: The two IP addresses must not be in the same IP network.

The last two fields in the default IP address are composed of the decimal equivalent of the last two hexadecimal bytes of the MAC address of the port.

The MAC address of the port can be retrieved on the label placed on the front side of the controller.

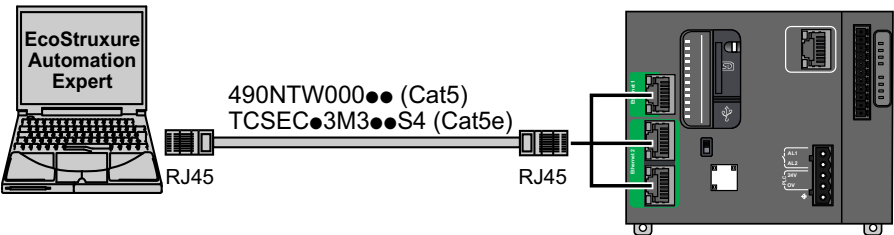
The default subnet mask is Default Class A Subnet Mask of 255.255.0.0.

NOTE: A MAC address is written in hexadecimal format and an IP address in decimal format. Convert the MAC address to decimal format.

Example: If the MAC address is 00.80.F4.01.**80.F2**, the default IP address is 10.10.**128.242**.

Ethernet Port Connection

You can connect the controller to a PC using an Ethernet cable:



To connect the controller to the PC, do the following:

Step	Action
1	Connect the Ethernet cable to the PC.
2	Connect the Ethernet cable to any of the Ethernet ports on the controller.

SD Card

SD Card Hardware Description

Overview

When handling the SD card, follow the instructions below to help prevent internal data on the SD card from being corrupted or lost or an SD card malfunction from occurring:

<i>NOTICE</i>
LOSS OF APPLICATION DATA <ul style="list-style-type: none">• Do not store the SD card where there is static electricity or probable electromagnetic fields.• Do not store the SD card in direct sunlight, near a heater, or other locations where high temperatures can occur.• Do not bend the SD card.• Do not drop or strike the SD card against another object.• Keep the SD card dry.• Do not touch the SD card connectors.• Do not disassemble or modify the SD card.• Use only SD cards formatted using FAT or FAT32. Failure to follow these instructions can result in equipment damage.

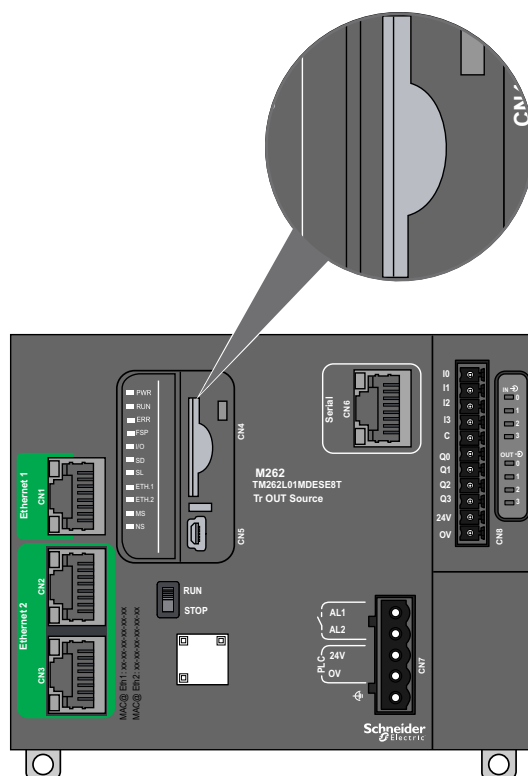
The M262 distributed PAC does not recognize NTFS formatted SD cards. Format the SD card on your computer using FAT or FAT32.

When using the M262 distributed PAC and an SD card, observe the following to avoid losing valuable data:

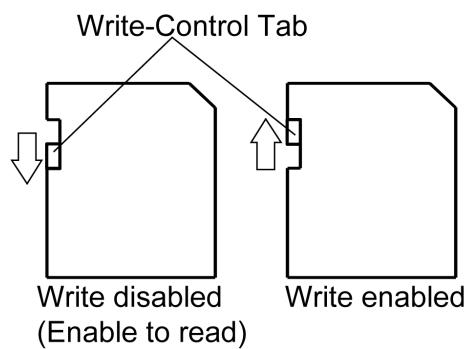
- Accidental data loss can occur at any time. Once data is lost it cannot be recovered.
- If you forcibly extract the SD card, data on the SD card may become corrupted.
- Removing an SD card that is being accessed (SD LED flashing yellow) could damage the SD card, or corrupt its data.
- If the SD card is not positioned correctly when inserted into the controller, the data on the card and the controller could become damaged.

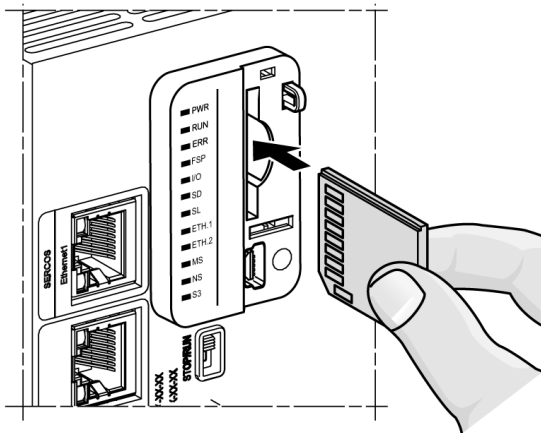
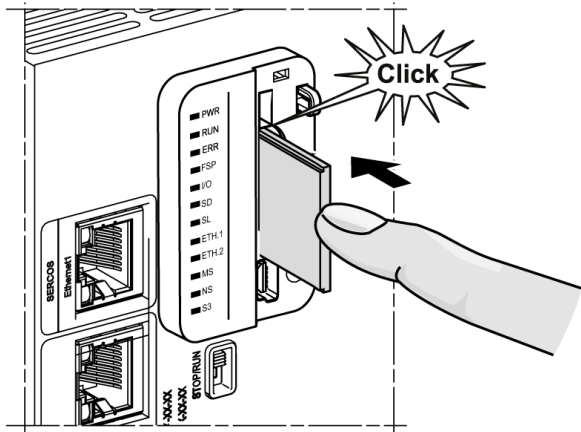
<i>NOTICE</i>
LOSS OF APPLICATION DATA <ul style="list-style-type: none">• Backup SD card data regularly.• Do not remove power or reset the controller, and do not insert or remove the SD card while it is being accessed. Failure to follow these instructions can result in equipment damage.

The following figure shows the SD card slot:



It is possible to set the Write-Control Tab to prevent write operations to the SD card. Push the tab up, as shown in the example on the right-hand side, to release the lock and enable writing to the SD card. Before using an SD card, read the manufacturer's instructions.



Step	Action
1	Insert the SD card into the SD card slot: 
2	Push until you hear it "click": 

SD Card Slot Characteristics

Topic	Characteristics	Description
Supported type	Standard Capacity	SD (SDSC)
	High Capacity	SDHC
Global memory	Size	32 GB maximum (SDHC only)

TMASD1 Characteristics

Characteristics	Description
Card removal durability	Minimum 1000 times
File retention time	10 years at 25 °C (77 °F)
Flash type	SLC NAND
Memory size	256 MB
Ambient operation temperature	-10...+85°C (14...185 °F)
Storage temperature	-25...+85°C (-13...185 °F)
Relative humidity	95% maximum non-condensing
Write/Erase cycles	3,000,000 (approximately)

Script SD Card Description

Overview

The following describes how to write script files to be executed from an SD card. Script files can be used to perform commands.

Script Syntax Guidelines

The following describes the script syntax guidelines:

- To implement a comment, the text must begin with ";".
- The maximum number of lines in a script file is 50.
- The syntax is not case-sensitive.
- If the syntax is not respected in the script file, the script file is not executed.

SD Card Commands

Introduction

The M262 distributed PAC allows you to execute commands with an SD card.

When an SD card is inserted into the SD card slot of the controller, the firmware searches for and executes the script contained in the SD card (*/sys/cmd/Script.cmd*).

When the controller has executed the script, the result is logged on the SD card (*/sys/cmd/Script.log*).

Care must be taken when inserting SD cards into a controller; you must understand the consequences of executing the script command given the context of controller and its state.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- You must have operational knowledge of your machine or process before connecting this device to your controller.
- Ensure that guards are in place so that any potential unintended equipment operation will not cause injury to personnel or damage to equipment.

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

NOTE: The controller contains log file */usr/Syslog/FWLog.txt*

Upload Command

The upload command allows you to retrieve files from the controller. Power must be applied to the controller before inserting the SD card. The script must contain this command:

```
Upload "path"
```

Example script to retrieve the log files:

```
Upload "/usr/Syslog/*"
```


Upload Procedure

The upload procedure uploads files contained in a controller directory to the SD card.

Step	Action
1	Apply power to the controller.
2	Insert the prepared SD card in the source controller. Result: The operation starts automatically. During the operation, the SD LED flashes.
3	Wait until the operation is completed. Result: <ul style="list-style-type: none"> The SD LED is illuminated in green if the operation is successful. The SD LED is illuminated in yellow if an error is detected.
4	Remove the SD card from the controller and verify the SD card file <i>Script.log</i> .

ResetOrigin Command

The ResetOrigin procedure allows you to return the controller to its default settings. Power must be removed from the controller before inserting the SD card. The script must contain this command:

```
ResetOrigin
```

The effects of the ResetOrigin script command:

- Resets the default login (installer)
- Resets the default password (Inst@ller1)
- Deletes Cybersecurity configuration
- Deletes IP settings
- Deletes NTP settings
- Deletes user data

ResetOrigin Procedure

The ResetOrigin procedure returns the controller to its default settings.

Step	Action
1	Remove power from the controller.
2	Insert the prepared SD card in the source controller.
3	Restore power to the source controller. Result: The operation starts automatically. During the operation, the SD LED flashes.
4	Wait until the operation is completed. Result: <ul style="list-style-type: none"> The SD LED is illuminated in green if the operation is successful. The SD LED is illuminated in yellow if an error is detected.
5	Remove the SD card from the controller and verify the SD card file <i>Script.log</i> .
6	Apply power to the controller.

Expansion Modules Configuration

TM3 I/O Configuration General Description

Introduction

You can add TM3 digital and analog I/O expansion modules to your M262 distributed PAC.

For details on how to configure the TM3 expansion modules, refer to the EcoStruxure Automation Expert Online Help.

Related Library

The related library in EcoStruxure Automation Expert is **SE.IoTMx**.

Configuring the Latch and Filter Parameters

Introduction

You can select the type of edge for the **Latch** parameter, refer to Latch Principles, page 76:

- Rising edge
- Falling edge
- Both edge
- None

The **Filter** parameter reduces the effect of bounce on a controller digital input.

NOTE: The lower the **Filter** value, the higher the effects of electromagnetic interference.

You can configure these parameters on the following modules:

- TM3DI8_G and TM3DI16_G digital expansion modules
- TM3DI16K and TM3DI32K digital expansion modules
- TM3DM8R_G and TM3DM24R_G digital expansion modules
- TM3XHSC202_G expert expansion modules (**Filter** only)

System Requirements

To configure the **Latch** and **Filter** parameters, the following system configuration is required:

- **SE.IoTMx** library: 22.0.0.8 or greater
- TM3 digital expansion modules: SV \geq 2.0

If your TM3 digital expansion modules contain firmware SV < 2.0, you must configure the digital input channels with [Parameters, page 75](#), set to default values. Otherwise the controller goes to HALTED state after deployment.

Configuration

This table describes how to configure the **Latch** and **Filter** parameters:

Step	Action
1	In the HW Configuration tab, right-click on the expansion module and select Properties .
2	Select a channel (each channel represents an input).
3	Configure the Latch and Filter parameters.

Parameters

This table describes the **Latch** and **Filter** parameters:

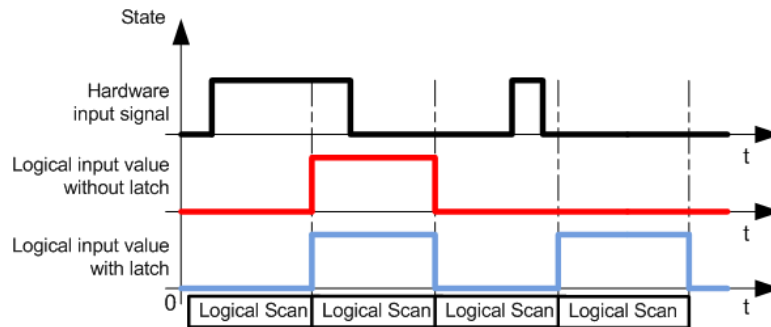
Parameter	Type	Value	Unit	Description
Latch	Enumeration of BYTE	No* Both edges Rising edge Falling edge	—	Latching allows incoming pulses with amplitude widths shorter than TM3 Bus cycle time to be captured and recorded.
Filter (digital expansion modules)	Enumeration of BYTE	0 0.3 0.5 1 2 4* 12	ms	Integrator filtering value reduces the effect of bounce on a controller input.
Filter (expert expansion modules)	Enumeration of BYTE	0.000 0.001 0.002 0.005 0.01 0.05 0.08 0.5 1 4* 12	ms	Integrator filtering value reduces the effect of bounce on a controller input.
* Parameter default value				

Latch Principles

Introduction

The **Latch** parameter allows incoming pulses with amplitude widths shorter than the controller scan time to be captured and recorded.

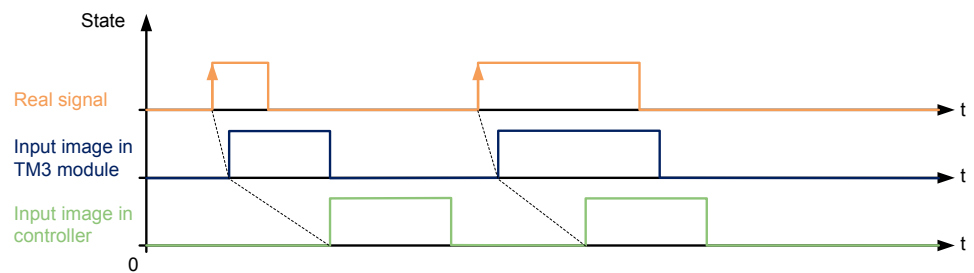
The following timing diagram illustrates the latching effects:



Several edge types can be selected for this parameter.

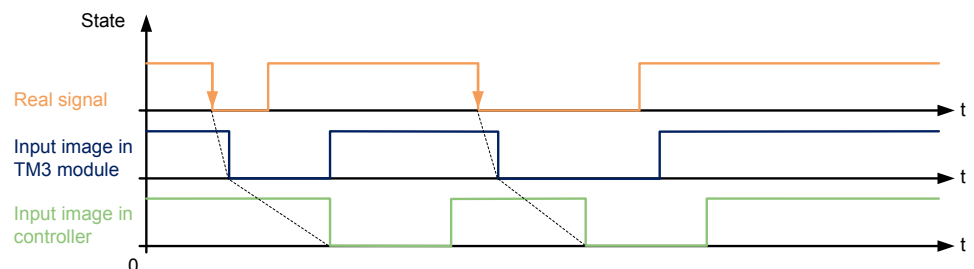
Rising edge

Latch rising edge allows the detection of a positive pulse whose width corresponds to the bounce filter value.



Falling edge

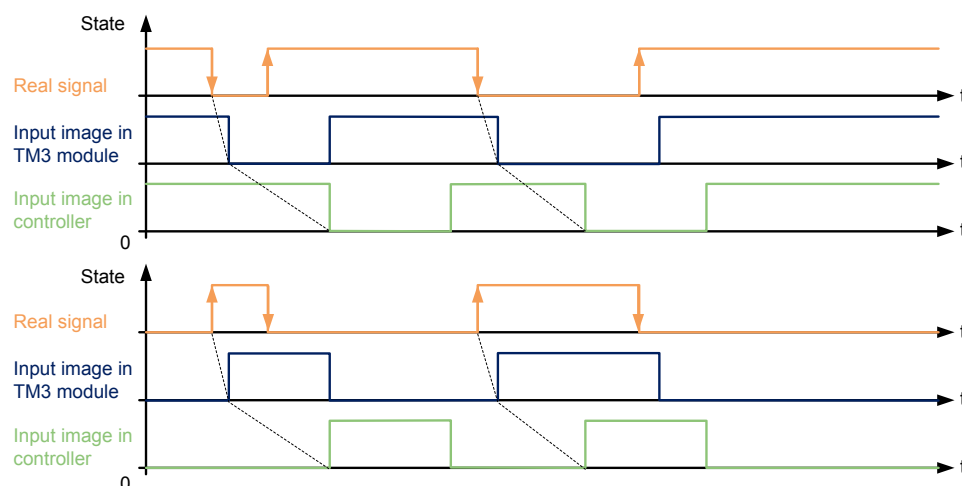
Latch falling edge allows the detection of a negative pulse whose width corresponds to the bounce filter value.



Both edge

Latch both edge allows the detection of an inverted pulse whose width corresponds to the bounce filter value.

When the I/O module is read by the controller, the level-state of the input is taken as reference to detect the next pulse.



Compatible Expansion Modules

Shared Internal ID Codes

Controllers and bus couplers identify expansion modules by an internal ID code. This ID code is not specific to each reference, but identifies the logical structure of the expansion module. Therefore, different references can share the same ID code.

Replacing a module by another module with the same internal ID code does not imply that you rework the application.

This table groups the module references sharing the same internal ID code:

Modules sharing the same internal ID code
TM3DI8, TM3DI8G
TM3DI16, TM3DI16G, TM3DI16K
TM3DQ8R, TM3DQ8RG
TM3DQ8T, TM3DQ8TG
TM3DQ8U, TM3DQ8UG
TM3DQ16R, TM3DQ16RG, TM3DQ16T, TM3DQ16TG, TM3DQ16TK, TM3DQ16U, TM3DQ16UG, TM3DQ16UK
TM3DQ32TK, TM3DQ32UK
TM3DM8R, TM3DM8RG
TM3DM24R, TM3DM24RG
TM3AI2H, TM3AI2HG
TM3AI4, TM3AI4G
TM3AI8, TM3AI8G
TM3TI4, TM3TI4G
TM3TI4D, TM3TI4DG

Modules sharing the same internal ID code
TM3TI8T, TM3TI8TG
TM3AQ2, TM3AQ2G
TM3AQ4, TM3AQ4G
TM3AM6, TM3AM6G
TM3TM3, TM3TM3G
TM3SAC5R, TM3SAC5RG
TM3SAF5R, TM3SAF5RG
TM3SAFL5R, TM3SAFL5RG
TM3SAK6R, TM3SAK6RG
TM3XHSC202, TM3XHSC202G

Optional I/O Expansion Modules

Presentation

The **Optional module** feature provides a more flexible configuration by the acceptance of the definition of modules that are not physically attached to the controller.

Therefore, a single application can support multiple physical configurations of I/O expansion modules, allowing a greater degree of scalability without the necessity of maintaining multiple application files for the same application.

Without the **Optional module** feature, when the controller starts up the I/O expansion bus (following a power cycle, application download or initialization command), it compares the configuration defined in the application with the physical I/O modules attached to the I/O bus.

Among other diagnostics made, if the controller determines that there are I/O modules defined in the configuration that are not physically present on the I/O bus, an error is detected and the controller switches to HALTED state.

With the **Optional module** feature, the controller ignores the absent I/O expansion modules that you have marked as optional, which then allows the controller to switch to RUNNING state.

The controller starts the I/O expansion bus at configuration time (following a power cycle, application download, or initialization command) even if optional expansion modules are not physically connected to the controller.

The TM3 I/O expansion modules can be marked as optional.

NOTE: TM3 Transmitter/Receiver modules (the TM3XTRA1 and the TM3XREC1) cannot be marked as optional.

You cannot have two modules with the same internal ID code marked as optional without at least one mandatory module placed between them.

You cannot have two modules with the same internal ID code with the first one marked as optional and the second one as mandatory.

You must be fully aware of the implications and impacts of marking I/O modules as optional in your application, both when those modules are physically absent and present when running your machine or process. Be sure to include this feature in your risk analysis.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Include in your risk analysis each of the variations of I/O configurations that can be realized marking I/O expansion modules as optional, and in particular the establishment of TM3 Safety modules (TM3S...) as optional I/O modules, and make a determination whether it is acceptable as it relates to your application.

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

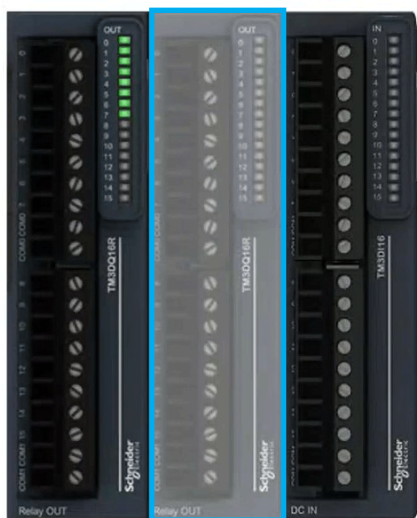
Marking an I/O Expansion Module as Optional

To add an expansion module and mark it as optional in the configuration:

Step	Action
1	Add the expansion module to the HW Configuration tab.
2	In the HW Configuration tab, right-click on the expansion module and select Properties .
3	In the Properties window, select Yes on the Optional Module line.

Optional Modules HMI Display

I/O expansion modules marked as optional and not physically present are displayed grey in the HMI overview. No actions are allowed on a grey faceplate.



Glossary

A

application:

A program including configuration data, symbols, and documentation.

B

bps:

(*bit per second*) A definition of transmission rate, also given in conjunction with multiplier kilo (kbps) and mega (mbps).

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.

controller:

Automates industrial processes (also known as programmable logic controller or programmable controller).

D

DIN:

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

E

EIA rack:

(*electronic industries alliance rack*) A standardized (EIA 310-D, IEC 60297, and DIN 41494 SC48D) system for mounting various electronic modules in a stack or rack that is 19 inches (482.6 mm) wide.

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*).

F

FE:

(*functional Earth*) A common grounding connection to enhance or otherwise allow normal operation of electrically sensitive equipment (also referred to as functional ground in North America).

In contrast to a protective Earth (protective ground), a functional earth connection serves a purpose other than shock protection, and may normally carry current. Examples of devices that use functional earth connections include surge suppressors and electromagnetic interference filters, certain antennas, and measurement instruments.

H

HE10:

Rectangular connector for electrical signals with frequencies below 3 MHz, complying with IEC 60807-2.

I

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.

I/O:

(input/output)

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

Modbus:

The protocol that allows communications between many devices connected to the same network.

N

NEMA:

(national electrical manufacturers association) The standard for the performance of various classes of electrical enclosures. The NEMA standards cover corrosion resistance, ability to help protect from rain, submersion, and so on. For IEC member countries, the IEC 60529 standard classifies the ingress protection rating for enclosures.

P

PE:

(Protective Earth) A common grounding connection to help avoid the hazard of electric shock by keeping any exposed conductive surface of a device at earth potential. To avoid possible voltage drop, no current is allowed to flow in this conductor (also referred to as *protective ground* in North America or as an equipment grounding conductor in the US national electrical code).

program:

The component of an application that consists of compiled source code capable of being installed in the memory of a logic controller.

R

RJ45:

A standard type of 8-pin connector for network cables defined for Ethernet.

RS-485:

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

RTC:

real-time clock A battery-backed time-of-day and calendar clock that operates continuously, even when the controller is not powered for the life of the battery.

RxD:

The line that receives data from one source to another.

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.

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