

TM2

Analog I/O Modules Hardware Guide

05/2009



EIO0000000034.01

www.schneider-electric.com

Schneider
Electric

Schneider Electric assumes no responsibility for any errors that may appear in this document. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without express written permission of Schneider Electric.

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

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

© 2009 Schneider Electric. All rights reserved.

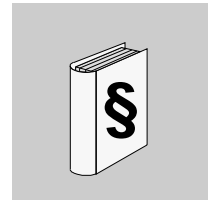
Table of Contents



	Safety Information	5
	About the Book	7
Part I	TM2 Analog I/O Modules	11
Chapter 1	General Overview and Rules for Implementing	13
1.1	General Overview	14
	General Description	15
	Physical description	17
	Accessories	18
1.2	General Rules for Implementing	20
	Installation Guidelines	21
	Mounting Positions and Minimum Clearances	24
	Assembling a Module to a Controller	25
	Disassembling a Module from a Controller	27
	How to Install and Remove the Controller with its Expansions from a Mounting Rail	28
	How to Directly Mount a Module on a Panel Surface	31
	Wiring Rules and Recommendations	33
	Grounding of Modules	35
Chapter 2	Environmental Specifications of TM2 I/O Modules	37
	Environmental Specifications of TM2 I/O Modules	37
Chapter 3	TM2AMI2HT Analog Input Module	39
	Presentation of the TM2AMI2HT Module	40
	Characteristics of the TM2AMI2HT Module	41
	Connecting the TM2AMI2HT Module	45
Chapter 4	TM2AMI2LT Analog Input Module	47
	Presentation of the TM2AMI2LT Module	48
	Characteristics of the TM2AMI2LT Module	49
	Connecting the TM2AMI2LT Module	53
Chapter 5	TM2AMI4LT Analog Input Module	55
	Presentation of the TM2AMI4LT Module	56
	Characteristics of the TM2AMI4LT Module	57
	Connecting the TM2AMI4LT Module	61

Chapter 6	TM2AMI8HT Analog Input Module	63
	Presentation of the TM2AMI8HT Module	64
	Characteristics of the TM2AMI8HT Module	65
	Connecting the TM2AMI8HT Module	69
Chapter 7	TM2ARI8HT Analog Input Module	71
	Presentation of the TM2ARI8HT Module	72
	Characteristics of the TM2ARI8HT Module	73
	Connecting the TM2ARI8HT Module	77
Chapter 8	TM2ARI8LRJ Analog Input Module	79
	Presentation of the TM2ARI8LRJ Module	80
	Characteristics of the TM2ARI8LRJ Module	81
	Connecting the TM2ARI8LRJ Module	85
Chapter 9	TM2ARI8LT Analog Input Module	87
	Presentation of the TM2ARI8LT Module	88
	Characteristics of the TM2ARI8LT Module	89
	Connecting the TM2ARI8LT Module	93
Chapter 10	TM2AMO1HT Analog Output Module	95
	Presentation of the TM2AMO1HT Module	96
	Characteristics of the TM2AMO1HT Module	97
	Connecting the TM2AMO1HT Module	101
Chapter 11	TM2AVO2HT Analog Output Module	103
	Presentation of the TM2AVO2HT Module	104
	Characteristics of the TM2AVO2HT Module	105
	Connecting the TM2AVO2HT Module	108
Chapter 12	TM2AMM3HT Analog Mixed I/O Module	109
	Presentation of the TM2AMM3HT Module	110
	Characteristics of the TM2AMM3HT Module	111
	Connecting the TM2AMM3HT Module	116
Chapter 13	TM2AMM6HT Analog Mixed I/O Module	117
	Presentation of the TM2AMM6HT Module	118
	Characteristics of the TM2AMM6HT Module	119
	Connecting the TM2AMM6HT Module	124
Chapter 14	TM2ALM3LT Analog Mixed I/O Module	127
	Presentation of the TM2ALM3LT Module	128
	Characteristics of the TM2ALM3LT Module	129
	Connecting the TM2ALM3LT Module	134
Chapter 15	Agency Compliance	137
	Agency Requirements	137
Glossary	139
Index	141

Safety Information



Important Information

NOTICE

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



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



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

DANGER

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

WARNING

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

 **CAUTION**

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

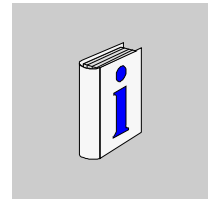
CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

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.

About the Book



At a Glance

Document Scope

This manual describes the hardware implementation of TM2 Analog I/O Modules. It provides parts descriptions, specifications, wiring diagrams, installation, and setup for TM2 Analog I/O modules.

Validity Note

The information in this manual is applicable **only** for TM2 products.

Related Documents

Title of Documentation	Reference Number
Twido Programmable Controllers Modular and Compact bases Hardware guide	35011387
Advantys OTB Modbus Remote I/O User guide	1606383
Advantys OTB CANopen Remote I/O User guide	1606384
Advantys OTB Ethernet Remote I/O User guide	1606385
M238 Controller Hardware guide	EIO0000000016 (ENG); EIO0000000017 (FRE); EIO0000000018 (GER); EIO0000000019 (SPA); EIO0000000020 (ITA); EIO0000000021 (CS)
TM2 Analog I/O Modules Instruction Sheet	AAV81778 00

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

Product Related Information

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove ALL power from the ALL devices before removing any covers or doors of the system, and prior to installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Disconnect the power at the controller and at the power source.
- Remove the terminal block before installing/removing the module from the rail, rack or enclosure. Terminal blocks must be connected or disconnected with sensor and pre-actuator voltage switched off.
- 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 your TM2 and associated products.

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

WARNING

EXPLOSION HAZARD

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.
- Substitution of components may impair suitability for Class I Division 2 compliance.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

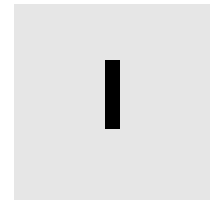
- Only use software that Schneider Electric has approved for use with your controller. This device has not been tested for proper operation with other software packages.
- Update your application program every time you change the hardware configuration of the expansion bus.

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

User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

TM2 Analog I/O Modules



Introduction

This part of the guide provides parts descriptions, specifications, wiring diagrams and installation about TM2 Analog I/O modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
1	General Overview and Rules for Implementing	13
2	Environmental Specifications of TM2 I/O Modules	37
3	TM2AMI2HT Analog Input Module	39
4	TM2AMI2LT Analog Input Module	47
5	TM2AMI4LT Analog Input Module	55
6	TM2AMI8HT Analog Input Module	63
7	TM2ARI8HT Analog Input Module	71
8	TM2ARI8LRJ Analog Input Module	79
9	TM2ARI8LT Analog Input Module	87
10	TM2AMO1HT Analog Output Module	95
11	TM2AVO2HT Analog Output Module	103
12	TM2AMM3HT Analog Mixed I/O Module	109
13	TM2AMM6HT Analog Mixed I/O Module	117
14	TM2ALM3LT Analog Mixed I/O Module	127
15	Agency Compliance	137

General Overview and Rules for Implementing

1

Introduction

This chapter gives a general introduction and the rules for implementing the modules.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
1.1	General Overview	14
1.2	General Rules for Implementing	20

1.1 General Overview

Introduction

This section gives a general introduction to the modules.

What's in this Section?

This section contains the following topics:

Topic	Page
General Description	15
Physical description	17
Accessories	18

General Description

Introduction

The range of TM2 analog I/O modules includes:

- Input modules,
- Output modules,
- Mixed Input/Output modules.

The TM2 analog I/O modules are equipped with either screw terminal blocks, or RJ11 connectors (only for TM2ARI8LRJ).

Module Features

The following table shows the analog I/O modules features, with corresponding channel type, voltage/current and terminal type:

Reference module	Channels	Channel type	Voltage/current	Terminal Type	Reference page
Input Modules					
TM2AMI2HT	2	High-level inputs	0...10 VDC 4...20 mA	Removable screw terminal	<i>TM2AMI2HT Analog Input Module, page 39</i>
TM2AMI2LT	2	Low-level inputs	Thermocouple type J,K,T	Removable screw terminal	<i>TM2AMI2LT Analog Input Module, page 47</i>
TM2AMI4LT	4	Inputs	0...10 VDC 0...20 mA PT100/1000 Ni100/1000	Removable screw terminal	<i>TM2AMI4LT Analog Input Module, page 55</i>
TM2AMI8HT	8	Inputs	0...20 mA 0...10 VDC	Removable screw terminal	<i>TM2AMI8HT Analog Input Module, page 63</i>
TM2ARI8HT	8	Inputs	NTC / PTC	Removable screw terminal	<i>TM2ARI8HT Analog Input Module, page 71</i>
TM2ARI8LRJ	8	Inputs	PT100/1000	RJ11 connector	<i>TM2ARI8LRJ Analog Input Module, page 79</i>
TM2ARI8LT	8	Inputs	PT100/1000	Removable screw terminal	<i>TM2ARI8LT Analog Input Module, page 87</i>

Reference module	Channels	Channel type	Voltage/current	Terminal Type	Reference page
Output Modules					
TM2AMO1HT	1	Outputs	0...10 VDC 4...20 mA	Removable screw terminal	<i>TM2AMO1HT Analog Output Module, page 95</i>
TM2AVO2HT	2	Outputs	+/- 10 VDC	Removable screw terminal	<i>TM2AVO2HT Analog Output Module, page 103</i>
Mixed Modules					
TM2AMM3HT	2	Inputs	0...10 VDC 4...20 mA	Removable screw terminal	<i>TM2AMM3HT Analog Mixed I/O Module, page 109</i>
	1	Outputs	0...10 VDC 4...20 mA		
TM2AMM6HT	4	Inputs	0...10 VDC 4...20 mA	Removable screw terminal	<i>TM2AMM6HT Analog Mixed I/O Module, page 117</i>
	2	Outputs	0...10 VDC 4...20 mA		
TM2ALM3LT	2	Low-level inputs	Thermo J,K,T, PT100	Removable screw terminal	<i>TM2ALM3LT Analog Mixed I/O Module, page 127</i>
	1	Outputs	0...10 VDC 4...20 mA		

Physical description

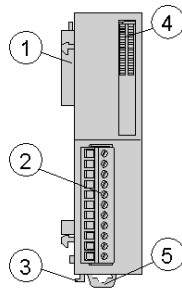
Introduction

This section describes the parts of Analog I/O modules, two with terminal block and one with 8 x RJ11 connectors. Your I/O module may differ from the illustrations but the parts will be the same.

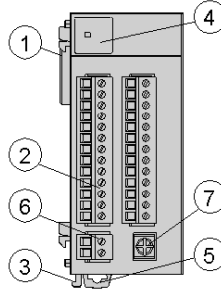
Illustration

The following pictures show the parts of Analog I/O modules:

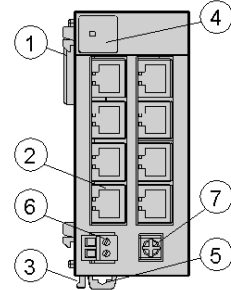
TM2ALM3LT module
with a terminal block



TM2ARI8LT module
with 2 terminal blocks



TM2ARI8LRJ module
with 8 x RJ11 connectors



Elements

The following table describes the different elements of Analog I/O modules shown above:

Label	TM2ALM3LT	TM2ARI8LT	TM2ARI8LRJ
1	Expansion connector for electrical connection (one on each side, right side not visible). It is designed to provide continuity of the electrical link between the modules connected.		
2	Terminal block (supplied with the module)	2 x Terminal block (supplied with the module)	8 x RJ11 Connectors
3	Locking device for attachment to the previous module		
4	LEDs for displaying the channels and module diagnostics		
5	Clip-on lock		
6	-	Power supply screw terminal block: 24 VDC	
7	-	Screw for functional ground	

Accessories

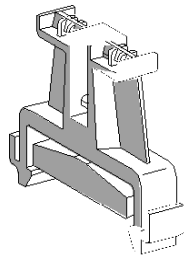
Introduction

This section describes the modules accessories.

Terminal Block End Clamp Type AB1AB8P35

Terminal Block End Clamps (reference AB1AB8P35) help reduce side-to-side movement of your controller and modules on the mounting rail (see page 28). A controller and its associated modules are mounted on the mounting rail between two end clamps in order to improve the shock and vibration characteristics of the assembly.

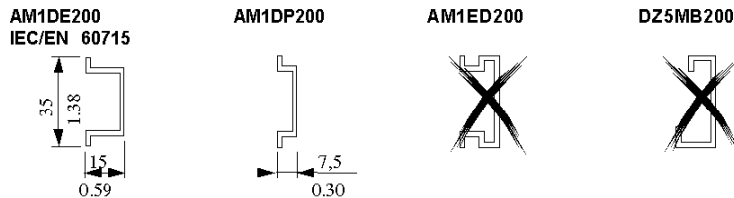
The following picture shows a AB1AB8P35 Terminal Block End Clamp:



The Mounting Rail

You can mount the controller and its expansion modules on a mounting rail (see page 28). A mounting rail can be attached to a smooth mounting surface or suspended from an Electronic Industries Alliance (EIA) rack or in a Type 4 cabinet.

The following picture shows the different sizes of the mounting rail:



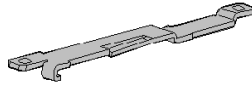
You can order the suitable mounting rail from Schneider Electric:

Rail depth	Catalogue part number
15 mm (0.59 in.)	AM1DE200
7,5 mm (0.30 in.)	AM1DP200

NOTE: Do not use AM1ED200 and DZ5MB200.

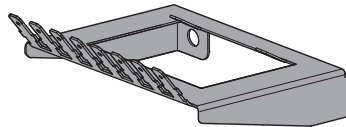
TWDXMT5 Panel Mount Kit

The following illustration shows a TWDXMT5 Panel Mount Kit (*see page 31*) which can be used instead of mounting rail to mount your controller and I/O modules directly to a panel:



TM2XMTGB Grounding Bar

The TM2XMTGB Grounding Bar is used to connect the shields of the cables and the functional ground of the modules to the ground (*see page 35*).



1.2 General Rules for Implementing

Introduction

This section presents the information necessary to install and configure the modules, including mounting, wiring, and grounding requirements.

What's in this Section?

This section contains the following topics:

Topic	Page
Installation Guidelines	21
Mounting Positions and Minimum Clearances	24
Assembling a Module to a Controller	25
Disassembling a Module from a Controller	27
How to Install and Remove the Controller with its Expansions from a Mounting Rail	28
How to Directly Mount a Module on a Panel Surface	31
Wiring Rules and Recommendations	33
Grounding of Modules	35

Installation Guidelines

NOTICE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

(c) 2009 Schneider Electric All Rights Reserved

Additional Information

Those responsible for the application, implementation or use of this product must ensure that the necessary design considerations have been incorporated into each application, completely adhering to applicable laws, performance and safety requirements, regulations, codes and standards.

General Notes

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the all devices before removing any covers or doors of the system, and prior to installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Disconnect the power at the controller and at the power source.
- Remove the terminal block before installing/removing the module from the rail, rack or enclosure. Terminal blocks must be connected or disconnected with sensor and pre-actuator voltage switched off.
- 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 your TM2 and associated products.

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

WARNING

EXPLOSION HAZARD

- This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or non-hazardous locations only.
- Substitution of components may impair suitability for Class I, Division 2 compliance.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

- This product is not intended for use in safety critical machine functions. Where personnel and or equipment hazards exist, use approved appropriate hard-wired safety interlocks.
- Do not disassemble, repair, or modify the modules.
- This controller is designed for use within an enclosure appropriately rated for its intended environment.
- Install the modules in the operating conditions described.
- Use the sensor power supply only for supplying power to sensors connected to the module.
- For power line and output circuits, use a fuse designed to Type T standards per IEC 60127. The fuse must meet the circuit voltage and current requirements.
Recommended: Littelfuse® 218 Series, 5x20 mm time lag (slow blow) fuses. These fuses are UL recognized and CSA approved.

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

⚠ 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 over-travel stop.
- 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 link¹.
- Each implementation of the controller 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.

¹For additional information refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control."

Before Starting

Before installing any of the products read the safety information at the beginning of this book.

⚠ CAUTION**EQUIPMENT DAMAGE**

Before adding/removing any module or adapter, turn off the power to the controller. Otherwise, the module, adapter, or controller may be damaged, or the controller may not operate correctly.

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

NOTE: All options and modules are to be assembled before installing the control system on a DIN rail, onto a mounting plate, or in a control panel. The control system should be removed from a DIN rail, a mounting plate, or a control panel before disassembling the modules.

Mounting Positions and Minimum Clearances

Introduction

For mounting positions and minimum clearances, modules are mounted according to the rules defined for the controller. Refer to the *Installation* chapter in the *Hardware Guide*.

NOTE: Keep adequate spacing for proper ventilation and to maintain an ambient temperature between 0°C (32°F) and 55°C (131°F).

WARNING

UNINTENDED EQUIPMENT OPERATION

- Place devices dissipating the most heat at the top of the cabinet and ensure adequate ventilation.
- Avoid placing the controller next to or above devices that might cause overheating.
- Install the controller in a location providing a minimum clearance of 50 mm (2 in.) or more from all adjacent structures and equipment.
- Install the controller in a horizontal panel or attach it to a vertical wall according to the figures on the following page.
- Keep the controller away from arc-generating devices such as magnetic switches and non-fused breakers.

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

Assembling a Module to a Controller

Introduction

This section describes how to assemble a module to a controller.

After attaching new I/O modules to the controller, it is important to update and re-download your application program before placing the system back in service. If you do not revise your application program to reflect the addition of new modules, I/O located on the expansion bus may no longer operate normally.

WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software that Schneider Electric has approved for use with your controller. This device has not been tested for proper operation with other software packages.
- Update your application program every time you change the hardware configuration of the expansion bus.

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

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove ALL power from the ALL devices before removing any covers or doors of the system, and prior to installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Disconnect the power at the controller and at the power source.
- Remove the terminal block before installing/removing the module from the rail, rack or enclosure. Terminal blocks must be connected or disconnected with sensor and pre-actuator voltage switched off.
- 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 your TM2 and associated products.

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

Assembling a Module to a Controller

The following procedure shows how to assemble a controller and a module together.

Step	Action
1	Remove all power and dismount any existing controller/IO assembly from its DIN/panel mounting.
2	Remove the expansion connector sticker from the controller or the outermost installed module.
3	Verify that the locking device (<i>see page 17</i>) on the new module is in the upper position.
4	Align the internal bus connector on the left side of the module with the internal bus connector on the right side of the controller or module.
5	Press the new module towards the controller or module until it "clicks" into place.
6	Push down the locking device (<i>see page 17</i>) on the top of the new module to lock it to the controller or previously installed module.

Disassembling a Module from a Controller

Introduction

This section describes how to disassemble a module from a controller.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove ALL power from the ALL devices before removing any covers or doors of the system, and prior to installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Disconnect the power at the controller and at the power source.
- Remove the terminal block before installing/removing the module from the rail, rack or enclosure. Terminal blocks must be connected or disconnected with sensor and pre-actuator voltage switched off.
- 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 your TM2 and associated products.

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

Disassembling a Module from a Controller

The following procedure describes how to disassemble a module from a controller.

Step	Action
1	Remove all power from the control system.
2	Dismount the assembled controller and modules from the mounting rail or panel (<i>see page 31</i>).
3	Push up the locking device from the bottom of the module to disengage it from the controller.
4	Pull apart the controller and module.

How to Install and Remove the Controller with its Expansions from a Mounting Rail

Introduction

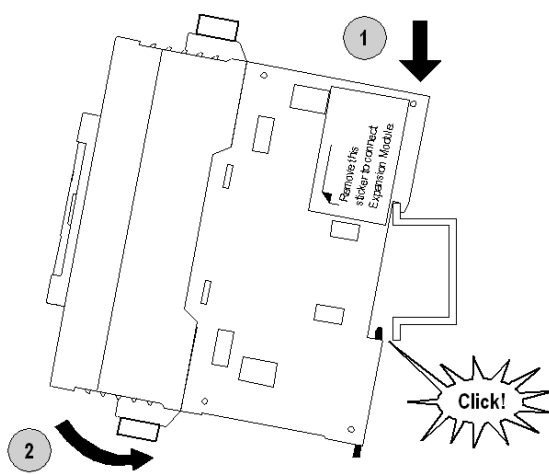
This section describes how to install and remove the controller with its expansions from a mounting rail.

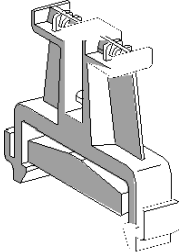
NOTE: When mounting a controller and its modules on a mounting rail, use two terminal block end clamps (see page 18) of type AB1 AB8P35 or equivalent in order to improve the shock and vibration characteristics of the assembly.

For additional information, The Mounting Rail (see page 31).

How to Install a Controller with its Expansions on a Mounting Rail

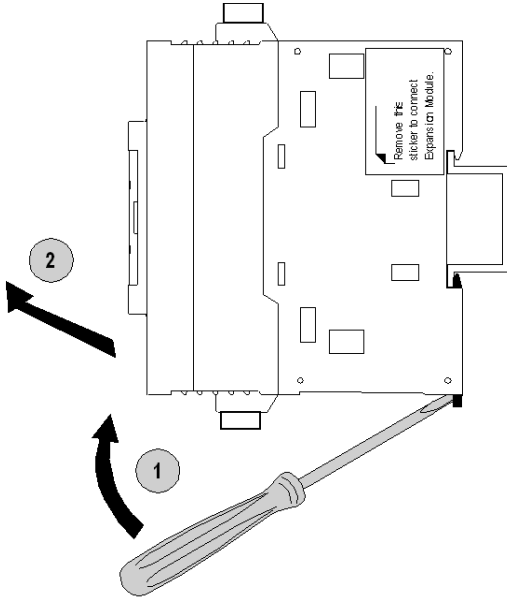
The following procedure describes how to install a controller with its expansions on a mounting rail.

Step	Action
1	Fasten the mounting rail to a panel using screws.
2	<p>Pull down the clip-on-lock (see page 17) at the bottom of the controller and module assembly.</p> 
3	Put the top groove of the controller and modules on the mounting rail and press the assembly toward the mounting rail.

Step	Action
4	Push the clip-on lock of the module into the mounting rail.
5	Place two terminal block end clamps (<i>see page 18</i>) on both sides of the controller and module assembly to help minimize side-to-side movement.
	

How to Remove a Controller with its Expansions from a Mounting Rail

The following procedure describes how to remove a controller with its expansions from a mounting rail.

Step	Action
1	Insert a flat screwdriver into the slot in the clip-on-lock (see page 17). 
2	Pull down the clip-on lock.
3	Tilt and lift the controller and its associated modules off of the mounting rail from the bottom.

How to Directly Mount a Module on a Panel Surface

Introduction

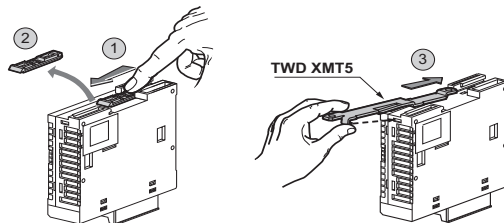
This section shows how to install your module using the Panel Mounting Kit. This section also provides mounting hole layout for all modules. Your module may differ from the module appearing in these illustrations but the procedure is still applicable.

Installing the Panel Mount Kit

The following procedure shows how to install a mounting strip.

Step	Action
1	Remove the clip-on-lock (<i>see page 17</i>) from the back side of the module by pushing the clip-on lock upwards.
2	Insert the mounting strip, with the hook entering last, into the slot where the clip-on lock was removed.
3	Slide the mounting strip into the slot until the hook enters into the recess in the module.

The following illustration shows how to attach the TWD XMT5 Panel Mount Kit to a module:



Mounting Hole Layout for Modules

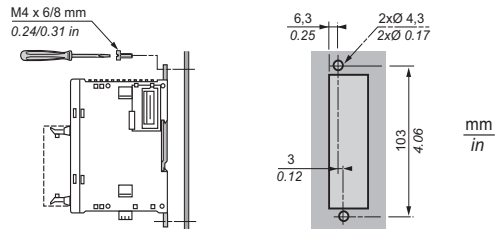
CAUTION

EQUIPMENT DAMAGE

Tighten the screws using a torque of 0.6 N•m (5.3 lb-in). Torques above 0.6 N•m (5.3 lb-in) may damage the terminal threads or screws.

Failure to follow these instructions can result in equipment damage.

The following diagram shows the mounting hole layout for all modules.



Wiring Rules and Recommendations

Introduction

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

For modules that have more than one terminal block or connector that is identical, any of them can be potentially plugged into any socket.

Despite the indicators on the terminal blocks, connectors and modules, it is possible to incorrectly install the terminal blocks or connectors and create incorrect wiring.

Plugging a connector into the wrong socket could cause unexpected behavior of the application.

WARNING

UNINTENDED EQUIPMENT OPERATION

Be sure to plug in the correct terminal block or connector into its appropriate, designated socket.

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

NOTE: Clearly and uniquely label each terminal block and connector with an appropriate system of identification.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove ALL power from the ALL devices before removing any covers or doors of the system, and prior to installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Disconnect the power at the controller and at the power source.
- Remove the terminal block before installing/removing the module from the rail, rack or enclosure. Terminal blocks must be connected or disconnected with sensor and pre-actuator voltage switched off.
- 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 your TM2 and associated products.

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

Rules

- Power supply wires and I/O wiring communication must be kept separate from power wires. Route wiring in separate cable ducting.
- Verify that the operating conditions and environments are within the specification values.
- Use proper wire size to meet voltage and current requirements.
- Use copper conductors only.
- Use shielded cables for analog signals.
- Twisted pair shielded cable is recommended.

The following table shows the characteristics of the removable screw terminal blocks:

	mm ²	0,14...1,5	0,25...0,5	0,25...1,5	0,14...0,5	0,14...0,75	0,25...0,34
AWG	26...16	24...20	24...16	26...20	26...18	24...22	20

		N•m	0,23
		lb-in.	2,0

Use copper conductors only

Terminal Tightening Torque

Recommended tightening torque of terminal blocks and cable type are listed for all products on the product label.

⚠ CAUTION
EQUIPMENT DAMAGE
Tighten the screws using a torque of 0.23 N•m (2.0 lb-in). Torques above 0.25 N•m (2.2 lb-in) may damage the terminal threads or screws.
Failure to follow these instructions can result in injury or equipment damage.

Grounding of Modules

Presentation

Electromagnetic perturbations may cause unexpected equipment operation.

⚠ WARNING

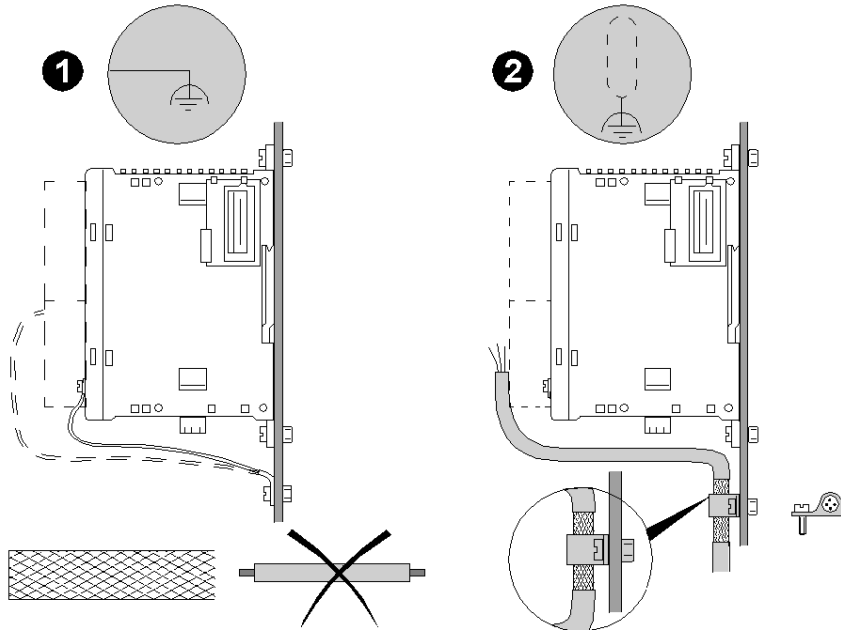
UNINTENDED EQUIPMENT OPERATION

Follow those instructions to reduce electromagnetic perturbations:

- Connect the module to the functional ground with the braid supplied with the module.
- Use shielded cables to connect the analog inputs and the analog outputs and connect the shield to the functional ground.

In an environment with high levels of electromagnetic interference, use a dedicated 24 VDC power supply and a shielded cable for connecting the supply to the module.

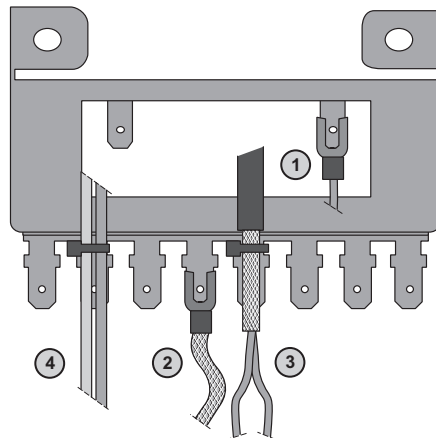
Failure to follow these instructions can result in death, serious injury, or equipment damage.



N°	Signification	Description
1	Grounding of the module	Connect the module to the functional ground (FG) terminal with the braid supplied with the module.
2	Grounding of the sensor	<p>Attach and ground the shielding of cables as close as possible to the PLC base:</p> <ul style="list-style-type: none"> ● Strip the shielding ● Attach the cable to the metal support by attaching the clamp to the stripped part of the shielding. <p>The shielding must be clamped tightly enough to the metal support to permit good contact.</p>

Grounding Bar TM2XMTGB

The figure below shows how to connect the grounding bar TM2XMTGB:



- 1 Controller functional grounding
- 2 Modules functional grounding
- 3 Analog fast I/O cable shielding
- 4 Cable attachment

NOTE: Schneider Electric recommends the use of the TM2XMTGB Grounding Bar for use with all TM2 I/O modules. Refer to BBV23483 for important instructions and details.

Environmental Specifications of TM2 I/O Modules

2

Environmental Specifications of TM2 I/O Modules

TM2 I/O Modules Environmental Specifications

All the TM2 Analog I/O modules are electrically isolated with the use of a photocoupler between the internal electronic circuit and the input/output channels.

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

TM2 I/O Modules Climatic and Mechanical Specifications		
Temperature	Operation	0 ... 55°C (32 ... 31 °F)
	Storage	- 25 ... 70°C (-13 ... 158 °F)
Relative humidity		30 ... 95 % (non-condensing)
Degree of pollution		2 (IEC 60664)
Degree of protection		IP 20 (IEC 60529)
Corrosion immunity		Free from corrosive gases
Altitude	Operation	0 ... 2000 m (0 ... 6,560 ft)
	Storage	0 ... 3000 m (0 ... 9,840 ft)

TM2 I/O Modules Climatic and Mechanical Specifications		
Vibration resistance	Mounted on a mounting rail	3.5 mm fixed amplitude from 5 ... 8.5 Hz 9.8 m/s ² (1 g _n) fixed acceleration from 8.5 ... 150 Hz
	Plate or panel mounted	10 mm fixed amplitude from 5 ... 8.7 Hz 29.4 m/s ² (3 g _n) fixed acceleration from 8.5 ... 150 Hz
Mechanical shock resistance		147 m/s ² (15g) for 11 ms duration

TM2 I/O Modules EMC Specifications	
Electrostatic discharge IEC/EN 61000-4-2	8 kV (air discharge) 6 kV (contact discharge)
Radiated electromagnetic field IEC/EN 61000-4-3	10 V/m (80 MHz... 2 GHz) 1 V/m (2... 2.7 GHz)
Magnetic field IEC/EN 61000-4-8	30 A/m
Fast Transient Burst IEC/EN 61000-4-4	Power supply: 2 kV I/O: 1 kV shielded cable: 1 kV Repetition rate: 5 and 100 kHz
Induced electromagnetic field IEC/EN 61000-4-6	10 V _{eff} (0.15...80 MHz)
Surge immunity IEC/EN 61000-4-5 24 VDC circuit:	1 kV in Common mode 0.5 kV in differential mode
Conducted emissions	Class A: according to EN 55022/55011 150 kHz...500 kHz quasi peak 79 dB μV 500 kHz...30 MHz quasi peak 73 dBμV
Radiated emissions	Class A: according to EN 55022/55011 d= 10 m (32.81 ft.) 30 MHz...230 MHz quasi peak 40 dB μV Class A: according to EN 55022/55011 d= 10 m (32.81 ft.) 230 MHz...2 GHz quasi peak 47 dB μV

TM2AMI2HT Analog Input Module

3

Overview

This chapter describes the **TM2AMI2HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMI2HT Module	40
Characteristics of the TM2AMI2HT Module	41
Connecting the TM2AMI2HT Module	45

Presentation of the TM2AMI2HT Module

Main Specifications

TM2AMI2HT Main Specifications		
Number of input channels	2	
Signal type	Voltage	Current
Input range	0...10 Vdc (non differential)	4....20 mA (non differential)
Resolution	12 bits (4096 points)	
Connection type	Removable screw terminal block	

Characteristics of the TM2AMI2HT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2AMI2HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

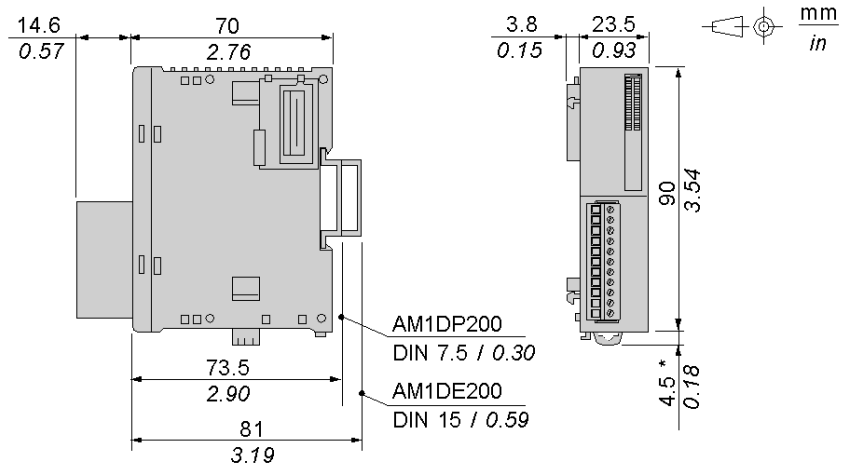
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMI2HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMI2HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	20.4...28.8 VDC
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	50 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	60 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2AMI2HT** module:

Characteristic	Voltage input	Current input
Input range	0...10 VDC	4...20 mA
Input impedance	1 M Ω min.	10 Ω
Sample duration time	16 ms max.	
Total input system transfer time	2 x 16 ms + 1 scan time ¹	
Input type	Non differential	Non differential
Operating mode	Self-scan	
Conversion mode	$\Sigma\Delta$ type ADC	
Input tolerance - maximum deviation at ambient 25°C (77°F)	± 0.2 % of full scale	
Input tolerance - temperature drift	± 0.006 % of full scale/°C	
Input deviation - repeatable after stabilization time	± 0.5 % of full scale	
Input tolerance - nonlinear	± 0.2 % of full scale	
Input tolerance - maximum deviation	± 1 % of full scale	
Discrete resolution	4096 increments (12 bits)	
Input value of LSB	2.5 mV	4.8 μ A
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ²	
Input data out of range detection	Yes ³	
Noise resistance - maximum temporary deviation during perturbations	± 3 % maximum when EMC perturbation is applied to the power and I/O wiring	
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Noise resistance - crosstalk	2 LSB maximum	
Isolation between external power supply and inputs	500 VAC	
Isolation between inputs and logic circuits	Photocoupler between input and internal circuit (2500 VAC by photocoupler isolation)	
Maximum continuous allowed overload (no damage)	13 VDC	40 mA

Characteristic	Voltage input	Current input
Selection of analog input signal type	Using software programming	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. Total input system transfer time = sample repetition x active channel number + 1 scan time.
2. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

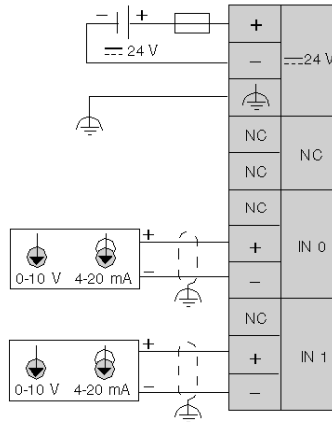
Connecting the TM2AMI2HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMI2HT Wiring Diagram

The following diagram shows the connection of the inputs module.



Use the braid supplied with the module to connect the functional ground

- Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

NOTE: The (-) poles of inputs IN0 and IN1 are connected internally.

TM2AMI2LT Analog Input Module

4

Overview

This chapter describes the **TM2AMI2LT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMI2LT Module	48
Characteristics of the TM2AMI2LT Module	49
Connecting the TM2AMI2LT Module	53

Presentation of the TM2AMI2LT Module

Main Specifications

TM2AMI2LT Main Specifications	
Number of input channels	2
Sensor type	Thermocouple
Input type	Type K: -200...760°C (-328...1400°F) Type J: -270...1370°C (-454...2498°F) Type T: -270...400°C (-270...752°F)
Resolution	12 bits (4096 points)
Connection type	Removable screw terminal block

Characteristics of the TM2AMI2LT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2AMI2LT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

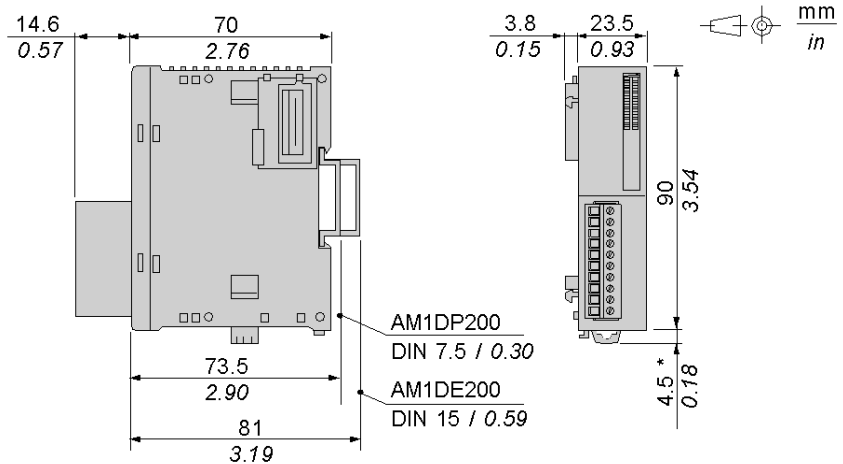
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMI2LT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMI2LT** module:

TM2AMI2LT Electrical Specifications	
Rated power supply voltage	24 VDC
Power supply range	20.4...28.8 VDC
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	100 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	21 mA (inrush, 30 mA)
Weight	85 g (3 oz)

I/O Specifications

The following table shows the input specifications of the **TM2AMI2LT** module:

Characteristic	Specification
Input range	Type K: -270...+1370 °C (-454...+2498 °F) Type J: -200...+760 °C (-328...+1400 °F) Type T: -270...+400 °C (-454...+752 °F)
Input impedance	1 MΩ min.

Characteristic	Specification
Sample duration time	200 ms
Total input system transfer time	400 ms + 1 scan time
Input type	Differential input
Operating mode	Self-scan
Conversion mode	$\Sigma\Delta$ ADC 16 bits
Maximum overload on input channel	± 7.5 VDC
Input tolerance - maximum deviation at 25°C (77°F)	0.2 % + temperature correction total error K, J, T: ± 5 °C
Input tolerance - temperature drift	± 0.006 % of full scale/°C
Input tolerance - repeatable after stabilization time	± 0.5 % of full scale
Input tolerance - nonlinear	± 0.2 % of full scale
Input tolerance- maximum deviation	± 1 % of full scale
Discrete resolution	Type T: 13 bits Type J, K: 14 bits
Input value of LSB	0.1 °C (0.18 °F)
Data type in application program	0 to 4095 (Standard) -32768 to 32767 (Custom) Celsius Fahrenheit
Input data out of range detection	Yes ¹
Noise resistance - maximum temporary deviation during perturbations	± 1 % maximum
Noise resistance - cable	Twisted-pair shielded cable is necessary
Noise resistance - crosstalk	2 LSB maximum
Isolation between inputs	None
Isolation between inputs and logic circuits	2500 VAC, by photocoupler
Isolation between external power supply and inputs	500 VAC
Selection of analog input signal type	Using software programming
Calibration or verification to maintain rated accuracy	Approximately 10 years
50/60 Hz rejection and filtering	50/60 Hz: 120 dB rejection typ. (common mode) 60 dB rejection typ. (differential mode) Numeric filtering function by firmware

Characteristic	Specification
Temperature drift	30 ppm/°C
Cold junction compensation	Internal temperature sensor
Default input value in case of sensor disconnection	Ambiant temperature of the module

NOTE:

1. Total input system transfer time = sample repetition x active channel number + 1 scan time.
2. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

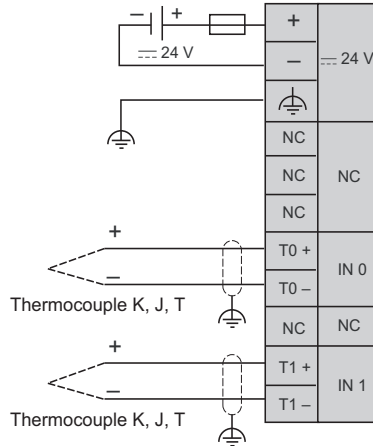
Connecting the TM2AMI2LT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMI2LT Wiring Diagram

The following diagram shows the connection of the module inputs.



(1) Thermocouple K, J, T

To use the braid supplied with the module to connect the functional ground

- Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not connect any wiring to unused channels.

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

TM2AMI4LT Analog Input Module

5

Overview

This chapter describes the **TM2AMI4LT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMI4LT Module	56
Characteristics of the TM2AMI4LT Module	57
Connecting the TM2AMI4LT Module	61

Presentation of the TM2AMI4LT Module

Main Specifications

TM2AMI4LT Main Specifications			
Number of input channels	4		
Signal/sensor type	Voltage	Current	Temperature
Input type	0...10 Vdc (non differential)	0....20 mA (non differential)	PT100/1000 Ni100/1000
Resolution	12 bits (4096 points)		
Connection type	Removable screw terminal block		

Characteristics of the TM2AMI4LT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2AMI4LT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

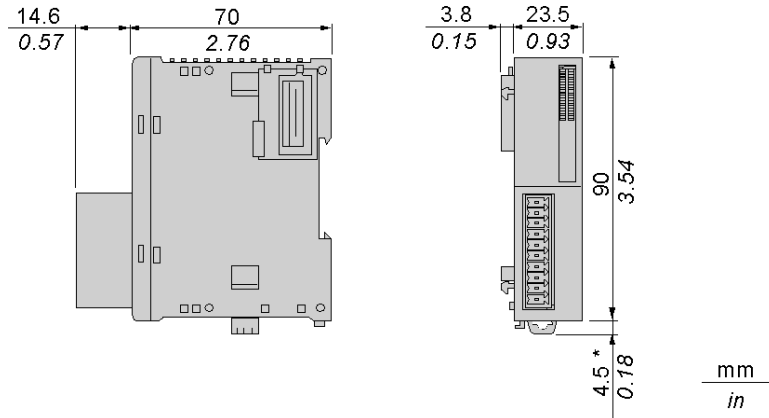
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2 AMI4LT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMI4LT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	50 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	60 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2AMI4LT** module.

Characteristic	Voltage input	Current input	Temperature probe input
Input range	0...10 VDC	0...20 mA	(RTD) Pt 100, Pt 1000, Ni 100, Ni 1000 3-wire type Pt sensor -200...600 °C (-328...1112 °F) Ni sensor -50...150 °C (-58...302 °F)
Input impedance	> 10 k Ω	< 250 Ω	> 10 k Ω
Sample duration time	160 ms		
Total input system transfer time	4x160 ms + 1 scan time		8x160 ms + 1 scan time
Input type	Non differential		
Operating mode	Self-scan		
Conversion mode	$\Sigma\Delta$ type ADC		
Input tolerance - maximum deviation at 25°C (77°F)	± 0.2 % of full scale ± 0.4 % temperature probe input		
Input tolerance - temperature drift	± 0.005 % of full scale/°C		
Input tolerance - repeatable after stabilization time	± 0.1 % of full scale		
Input tolerance - nonlinear	± 0.02 % of full scale		
Input tolerance - maximum deviation	± 0.5 % of full scale		
Discrete resolution	4096 increments (12 bits)		
Input value of LSB	2.5 mV	4.8 μ A	K: 0.15 °C (K: 0.27 °F)
Data type in application program	0 to 4095 (12 bit) Custom range up to -32768 to 32767 ²		
Input data out of range detection	Yes ³		
Noise resistance - cable	Twisted-pair shielded cable is necessary for improved noise immunity		
Noise resistance - external crosstalk	1 LSB maximum		

Characteristic	Voltage input	Current input	Temperature probe input
Isolation between inputs, external power supply and internal logic circuits	2500 VAC by photocoupler		
Isolation between inputs	None		
Type of protection	Photocoupler between input and internal circuit (1500 Vdc isolation)		
Maximum continuous allowed overload (no damage)	13 VDC	40 mA	–
Selection of analog input signal type	Using software programming NOTE: All inputs have the same voltage/current configuration or temperature. For temperature, it is possible to configure each channel independently of the type of probe.		
Calibration or verification to maintain rated accuracy	Approximately 10 years		
Default input value in case of temperature sensor disconnectio	Upper limit		

NOTE:

1. Total input system transfer time = sample repetition x 2 + 1 scan time.
2. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

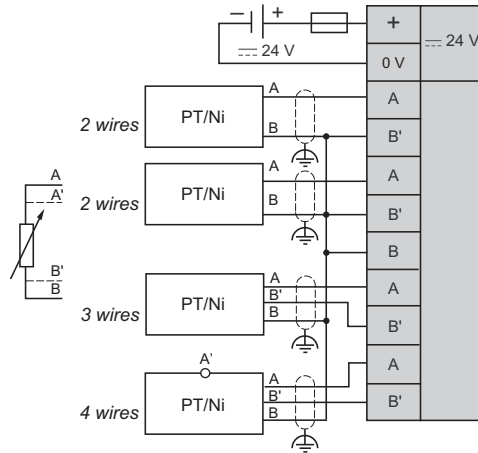
Connecting the TM2AMI4LT Module

Wiring Rules

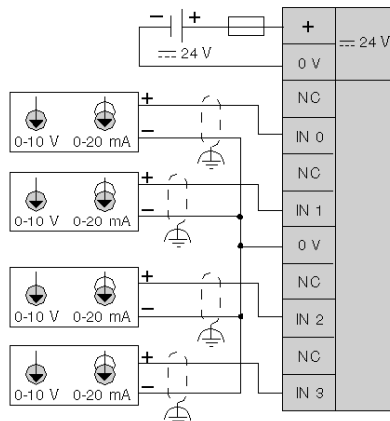
See Wiring Rules and Recommendations (*see page 33*).

TM2AMI4LT Wiring Diagram

This wiring diagram is for inputs configured for measuring temperature.



This wiring diagram is for inputs configured for measuring voltage/current.



Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

 WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not connect any wiring to unused channels.

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

NOTE: To avoid disturbances on the analog I/O, the power supply of the TM2AMI4LT module must be turned on or off at the same time than the base controller power supply.

 WARNING

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AMI4LT module and the associated controller on and off at the same time.

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

TM2AMI8HT Analog Input Module

6

Overview

This chapter describes the **TM2AMI8HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMI8HT Module	64
Characteristics of the TM2AMI8HT Module	65
Connecting the TM2AMI8HT Module	69

Presentation of the TM2AMI8HT Module

Main Specifications

TM2 AMI8HT Main Specifications		
Number of input channels	8	
Signal type	Voltage	Current
Input range	0...10 Vdc (non differential)	0....20 mA (non differential)
Resolution	10 bits (1024 points)	
Connection type	Removable screw terminal block	

Characteristics of the TM2AMI8HT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2AMI8HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

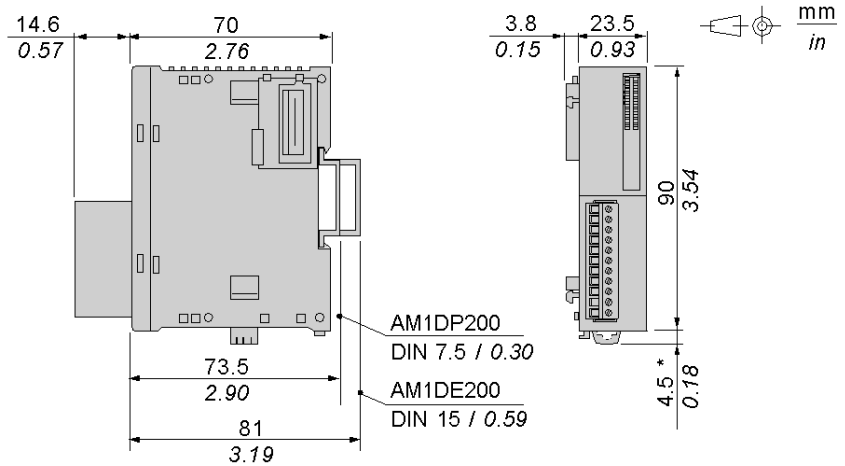
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMI8HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMI8HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	60 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	45 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2AMI8HT** module:

Characteristic	Voltage input	Current input
Input range	0...10 VDC	0...20 mA DC
Input impedance	10 K Ω min.	< 250 Ω
Sample duration time	160 ms	
Total input system transfer time	8 x 160 ms + 1 scan time	
Input type	Non differential	
Operating mode	Self-scan	
Conversion mode	$\Sigma\Delta$ type ADC	
Input error - maximum error at 25°C (77°F)	± 0.2 % of full scale	
Input tolerance - temperature drift	± 0.5 % of full scale/°C	
Input tolerance - repeatable after stabilization time	± 0.4 % of full scale	
Input tolerance - nonlinear	± 0.002 % of full scale	
Input tolerance - maximum deviation	1 % of full scale	
Discrete resolution	1024 increments (10 bits)	
Input value of LSB	9.7 mV	19.5 μ A
Data type in application program	0 to 1023 (10 bit) Custom range up to -32768 to 32767	
Input data out of range detection	Yes ¹	
Noise resistance - maximum temporary deviation during perturbations	± 1 % of full scale	
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Noise resistance - crosstalk	1 LSB maximum	
Isolation between inputs and power supply	None	
Isolation between inputs	None	
Isolation between power supply, inputs and internal logic circuits	2500 VAC by photocoupler	

Characteristic	Voltage input	Current input
Maximum continuous allowed overload (no damage)	13 VDC	40 mA
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. Total input system transfer time = sample repetition x 2 + 1 scan time.
2. The 10-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

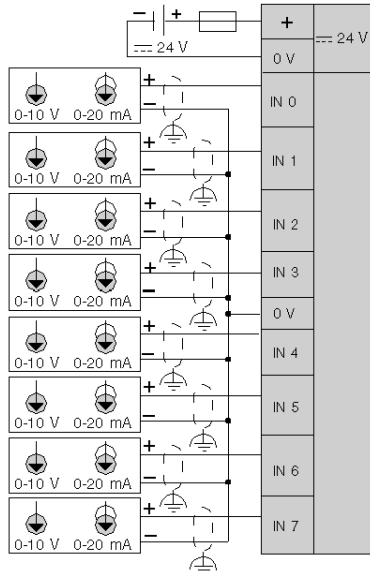
Connecting the TM2AMI8HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMI8HT Wiring Diagram

The following diagram shows the connection of the module inputs.



Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not connect any wiring to unused channels.

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

NOTE: to avoid disturbances on the analog I/O, the power supply of the TM2AMI8HT module must be turned on or off at the same time than the base controller power supply.

 **WARNING**

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AMI8HT module and the associated controller on and off at the same time.

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

TM2ARI8HT Analog Input Module



Overview

This chapter describes the **TM2ARI8HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2ARI8HT Module	72
Characteristics of the TM2ARI8HT Module	73
Connecting the TM2ARI8HT Module	77

Presentation of the TM2ARI8HT Module

Main Specifications

TM2ARI8HT Main Specifications	
Number of input channels	8
Signal type	Temperature
Input range	NTC/PTC, $100 \Omega < R < 10 \text{ k}\Omega$
Resolution	10 bits (1024 points)
Connection type	Removable screw terminal block

Characteristics of the TM2ARI8HT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2ARI8HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

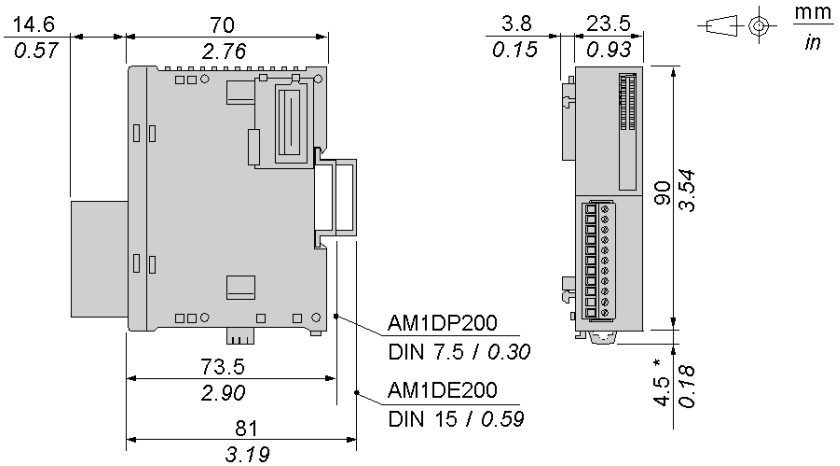
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2ARI8HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2ARI8HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	60 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	45 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the input specifications of the **TM2ARI8HT** module:

Characteristic	Specification
Input range	NTC or PTC thermistor Resistance range: 100...1000 Ω
Input impedance	1 M Ω min.
Sample duration time	160 ms
Total input system transfer time	8x160 ms + 1 scan time
Input type	Non differential input
Operating mode	Self-scan
Conversion mode	$\Sigma\Delta$ type ADC
Input tolerance - maximum deviation at 25°C (77°F)	± 0.2 % of full scale
Input tolerance - temperature drift	± 0.01 % of full scale/°C
Input tolerance - repeatable after stabilization time	± 0.4 % of full scale
Input tolerance - nonlinear	± 0.002 % of full scale
Input tolerance - maximum deviation	± 1 % of full scale
Discrete resolution	1024 increments (10 bits)
Input value of LSB	Depending on the probe
Data type in application program	0 to 1023 (10 bit data) Custom range up to -32768 to 32767
Input data out of range detection	Yes ¹
Noise resistance - maximum temporary deviation during perturbations	± 1 % of full scale
Noise resistance - cable	Twisted-pair shielded cable is necessary
Noise resistance - crosstalk	1 LSB maximum
Isolation between power supply and inputs	None

Characteristic	Specification
Isolation between inputs	None
Isolation between power supply, inputs and internal logic circuits	2500 VAC by photocoupler
Calibration or verification to maintain rated accuracy	Approximately 10 years

NOTE:

1. Total input system transfer time = sample repetition x 2 + 1 scan time.
2. The 10-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

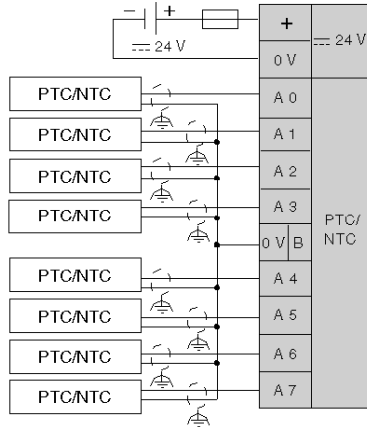
Connecting the TM2ARI8HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2ARI8HT Wiring Diagram

The following diagram shows the connection of the module inputs.



Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

⚠ WARNING

UNINTENDED EQUIPEMENT OPERATION & EQUIPEMENT DAMAGE

Do not connect any wiring to unused channels.

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

NOTE: To avoid disturbances on the analog I/O, the power supply of the TM2ARI8HT module must be turned on or off at the same time than the base controller power supply.

 **WARNING**

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2ARI8HT module and the associated controller on and off at the same time.

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

TM2ARI8LRJ Analog Input Module



8

Overview

This chapter describes the **TM2ARI8LRJ** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2ARI8LRJ Module	80
Characteristics of the TM2ARI8LRJ Module	81
Connecting the TM2ARI8LRJ Module	85

Presentation of the TM2ARI8LRJ Module

Main Specifications

TM2ARI8LRJ Main Specifications	
Number of input channels	8
Sensor type	Temperature probe
Input type	PT100 / PT1000
Resolution	12 bits (4096 points)
Connection type	8 x RJ11 connector

Characteristics of the TM2ARI8LRJ Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2ARI8LRJ** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

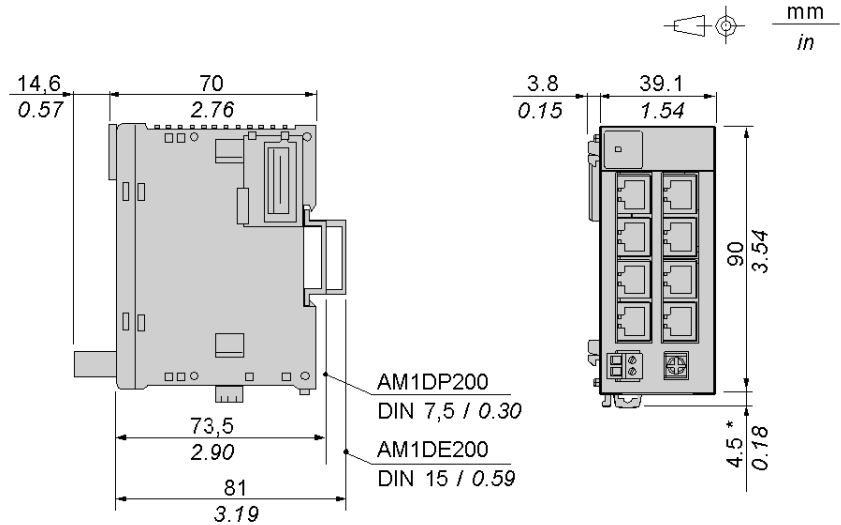
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2ARI8LRJ analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2ARI8LRJ** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
RJ11 connector	50 times minimum
Power supply connector	50 times minimum
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	90 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	140 mA
Weight	118 g (4.17 oz)

Inputs Specifications

The following table shows the input specifications of the **TM2ARI8LRJ** module:

Characteristic	Specification
Input range	PT1000: -50...200°C (-58...392°F) PT100: -200...600°C (-328...1112°F)
Input impedance	> 10 kΩ
Sample duration time	320 ms per channel
Total input system transfer time	4 x 320 ms + 1 scan time
Input type	Non differential input
Operating mode	Self-scan
Conversion mode	ΣΔ type ADC
Input tolerance - maximum deviation at ambient 25°C (77°F)	PT1000: ± 0.5 °C (0.9 °F) PT100: ± 1.5 °C (2.7 °F) Range -50 °C (-58 °F) to 200 °C (392 °F): ±1 °C (33.8 °F) Range -200 °C (392 °F) to 600 °C (1112 °F): +0.1% / -0.5% full scale
Input tolerance- temperature drift	± 0.5 °C (0.9 °F)
Input deviation- repeatable after stabilization time	± 0.1°C(32.18 °F)
Discrete resolution	4096 increments (12 bits)
Input value of LSB	PT1000: ±1°C (33.8 °F) PT100: +1°C / -4°C (33.8 °F / 24.8 °F)
Total maximum deviation	PT1000: 0.06°C (0.108 °F) PT100: 0.2°C (0.36 °F)
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767
Input data out of range detection	Yes ⁽¹⁾
Broken wire detection	Yes ⁽¹⁾
Noise resistance - maximum temporary deviation during perturbations	±1 % of full scale
Cable resistance compensation	100 Ω max
Noise resistance - crosstalk	1 LSB maximum
Isolation between inputs	None
Isolation between inputs, power supply and internal logic circuits	2500 VAC by photocouplers

Characteristic	Specification
Isolation between inputs and external power supply	500 VAC
Dielectric strength	- 1500 Vrms between inputs and internal bus - 500 Vrms between inputs and ground - 1500 Vrms between internal bus and ground
Type of protection with terminal bus	Photocoupler between input and internal circuit: 1500 VAC isolation
Selection of analog input signal type	Using software programming NOTE: It is possible to use PT100 and PT1000's probe.
Default input value in case of temperature sensor disconnection	Upper limit

NOTE:

1. Total input system transfer time = sample repetition x 2 + 1 scan time.
2. The 10-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

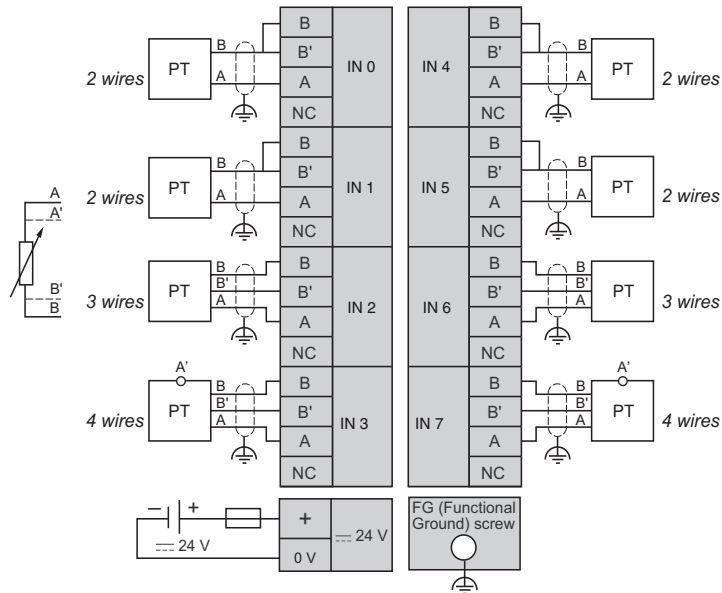
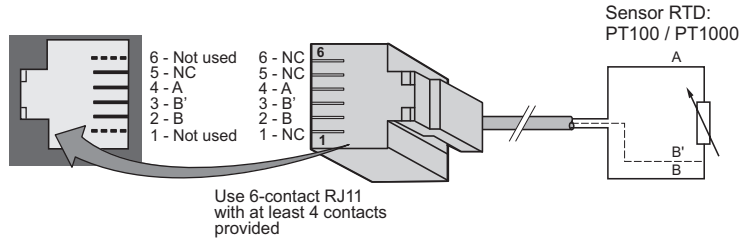
Connecting the TM2ARI8LRJ Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2ARI8LRJ Wiring Diagram

The following diagram shows the connection of the module inputs.



- Use RJ11 6 pins connectors with a minimum of 4 pins equipped.
- Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.
- For functional ground screw, use a screw-driver with a diameter of 3.5 mm (0.14 in) and apply a torque of 0.5 N.m (4.4 lb-in).

⚠ WARNING



UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not connect any wiring to unused channels.

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

The following table shows the characteristics of the functional ground connection:



 Ø 3,5 mm (0.14 in)		N.m	0,5
		lb-in	4.4

TM2ARI8LT Analog Input Module

9

Overview

This chapter describes the **TM2ARI8LT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2ARI8LT Module	88
Characteristics of the TM2ARI8LT Module	89
Connecting the TM2ARI8LT Module	93

Presentation of the TM2ARI8LT Module

Main Specifications

TM2ARI8LT Main Specifications	
Number of input channels	8
Sensor type	Temperature probe
Input type	PT100 / PT1000
Resolution	12 bits (4096 points)
Connection type	2 x Removable screw terminal block

Characteristics of the TM2ARI8LT Module

Introduction

This section provides a description of the electrical and the input specifications of the **TM2ARI8LT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

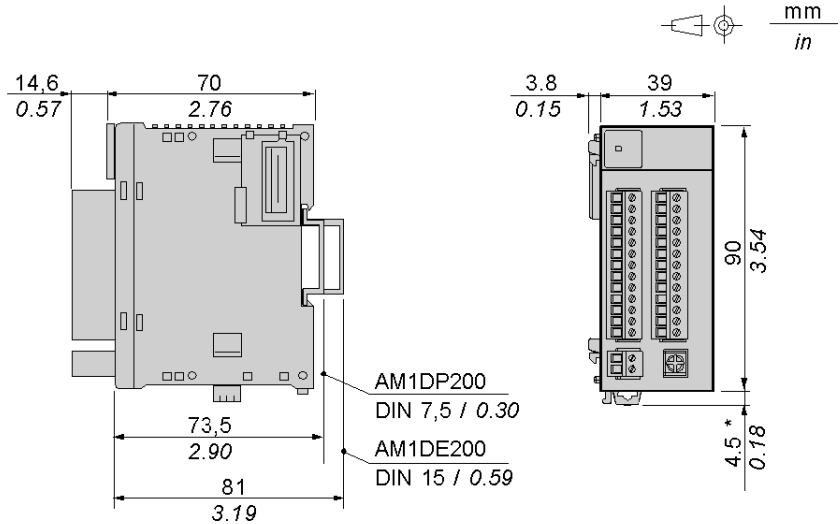
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2ARI8LT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2ARI8LT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	90 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	140 mA
Weight	147 g (8.06 oz)

Inputs Specifications

The following table shows the input specifications of the **TM2ARI8LT** module:

Characteristic	Specification
Input range	PT1000: -50...200°C (-58...392°F) PT100: -200...600°C (-328...1112°F)
Input impedance	> 10 kΩ
Sample duration time	320 ms per channel
Total input system transfer time	4 x 320 ms + 1 scan time
Input type	Differential input
Operating mode	Self-scan
Conversion mode	ΣΔ type ADC
Input tolerance - maximum deviation at ambient ± 25°C (77°F)	PT1000: ± 0.5 °C (0.9 °F) PT100: ± 1.5 °C (2.7 °F) Range -50 °C (-58 °F) to 200°C(392°F): ±1°C(±33.8 °F) Range -200 °C (392 °F) to 600 °C (1112 °F): +0.1% / -0.5% full scale
Input tolerance- temperature drift	± 0.5 °C (0.9 °F)
Input deviation - repeatable after stabilization time	±0.1 °C (±32.18 °F)
Discrete resolution	4096 increments (12 bits)
Input value of LSB	PT1000: 0.06°C (0.108 °F) PT100: 0.2°C (0.36 °F)
Total maximum deviation	PT 1000: ±1 °C (±33.8 °F) PT100: +1 °C (33.8 °F) / -4 °C (24.8 °F)
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767
Input data out of range detection	Yes ⁽¹⁾
Broken wire detection	Yes ⁽¹⁾
Noise resistance - maximum temporary deviation during perturbations	±1 % of full scale
Cable resistance compensation	100 Ω max
Noise resistance - crosstalk	1 LSB maximum
Isolation between inputs	None
Isolation between inputs and external power supply	500 VAC

Characteristic	Specification
Isolation between inputs, power supply and internal logic circuits	2500 VAC by photocouplers
Dielectric strength	- 1500 Vrms between inputs and internal bus - 500 Vrms between inputs and ground - 1500 Vrms between internal bus and ground
Type of protection with terminal bus	Photocoupler between input and internal circuit: 1500 VAC isolation
Selection of analog input signal type	Using software programming NOTE: It is possible to use PT100 and PT 1000's probe.
Default input value in case of temperature sensor disconnection	Upper limit

NOTE:

1. Total input system transfer time = sample repetition x 2 + 1 scan time.
2. The 10-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

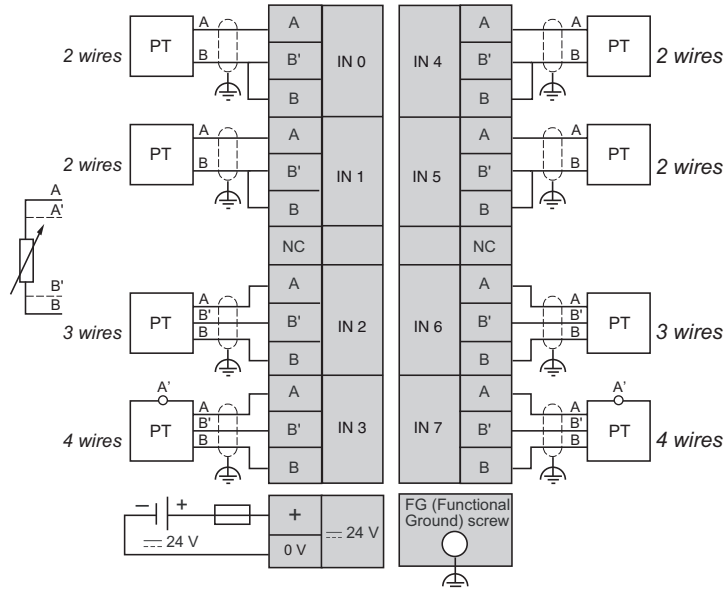
Connecting the TM2ARI8LT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2ARI8LT Wiring Diagram

The following diagram shows the connection of the module inputs.



- Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.
- Do not connect any wiring to unused channels.

⚠ WARNING



UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not connect any wiring to unused channels.

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

The following table shows the connection of the functional ground screw:



 Ø 3,5 mm (0.14 in)		N.m	0,5
		lb-in	4.4

TM2AMO1HT Analog Output Module

10

Overview

This chapter describes the **TM2AMO1HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMO1HT Module	96
Characteristics of the TM2AMO1HT Module	97
Connecting the TM2AMO1HT Module	101

Presentation of the TM2AMO1HT Module

Main Specifications

TM2AMO1HT Main Specifications		
Number of output channels	1	
Signal type	Voltage	Current
Output range	0...10 Vdc	4....20 mA
Resolution	12 bits (4096 points)	
Connection type	Removable screw terminal block	

Characteristics of the TM2AMO1HT Module

Introduction

This section provides a description of the electrical and the output specifications of the **TM2AMO1HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

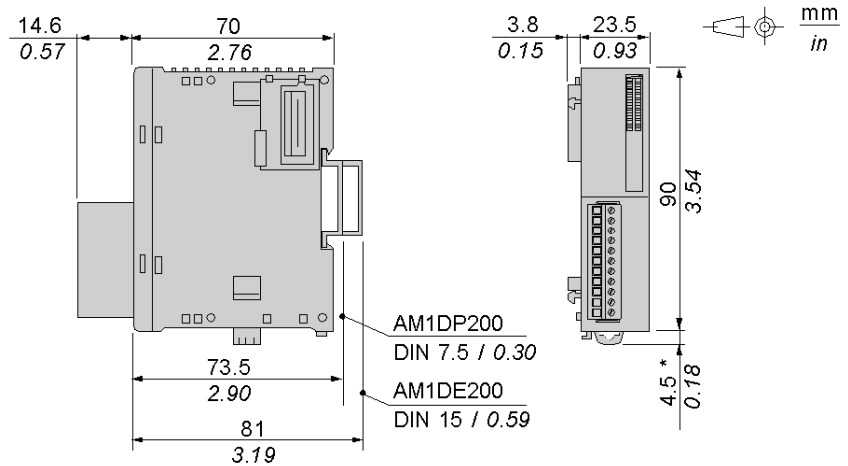
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMO1HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMO1HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	50 mA
Internal 24 VDC current draw	0 mA)
External 24 VDC current draw	40 mA
Weight	85 g (3 oz)

Outputs Specifications

The following table shows the outputs specifications of the **TM2AMO1HT** module:

Characteristic	Voltage output	Current output
Output range	0...10 VDC	4...20 mA
Load impedance	2 k Ω minimum	300 Ω maximum
Application load type	Resistive load	
Settling time	10 ms	
Total output system transfer Time	10 ms + 1 scan time	
Output tolerance - maximum deviation at 25°C (77°F)	$\pm 0.2\%$ of full scale	
Output tolerance - temperature drift	$\pm 0.015\%$ of full scale/ $^{\circ}\text{C}$	
Output tolerance - repeatable after stabilization time	$\pm 0.5\%$ of full scale	
Output tolerance - output voltage drop	$\pm 1\%$ of full scale	
Output tolerance - nonlinear	$\pm 0.2\%$ of full scale	
Output tolerance - output ripple	1 LSB maximum	
Output tolerance - overshoot	0%	
Output tolerance - total deviation	$\pm 1\%$ of full scale	
Discrete resolution	4096 increments (12 bits)	
Output value of LSB	2.5 mV	4.8 μA
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ¹	
External power supply connection	Detected ²	Detected ²
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Isolation between output and external power supply	500 VAC	
Isolation between output and power supply	500 VAC	
Isolation between output, external power supply and internal logic circuits	500 VAC by photocoupler	

Characteristic	Voltage output	Current output
Selection of analog output signal type	Using software programming	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2. When the external 24 VDC is not connected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

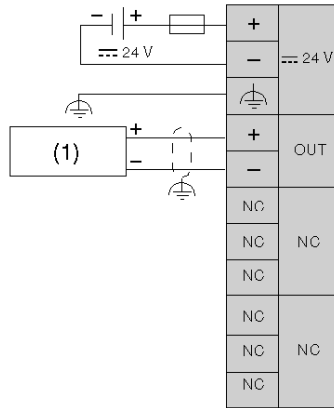
Connecting the TM2AMO1HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMO1HT Wiring Diagram

The following diagram shows the connection of the output module.



(1) Voltage/current preactuator

To use the braid supplied with the module to connect the functional ground.

Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

NOTE: to avoid disturbances on the analog output, the power supply of the TM2AMO1HT module must be turned on or off at the same time than the base controller power supply.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AMO1HT module and the associated controller on and off at the same time.

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

TM2AVO2HT Analog Output Module

11

Overview

This chapter describes the **TM2AVO2HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AVO2HT Module	104
Characteristics of the TM2AVO2HT Module	105
Connecting the TM2AVO2HT Module	108

Presentation of the TM2AVO2HT Module

Main Specifications

TM2AVO2HT Main Specifications	
Number of output channels	2
Signal type	Voltage
Output range	± 10 Vdc
Resolution	11 bits + sign
Connection type	Removable screw terminal block

Characteristics of the TM2AVO2HT Module

Introduction

This section provides a description of the electrical and the output specifications of the **TM2AVO2HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

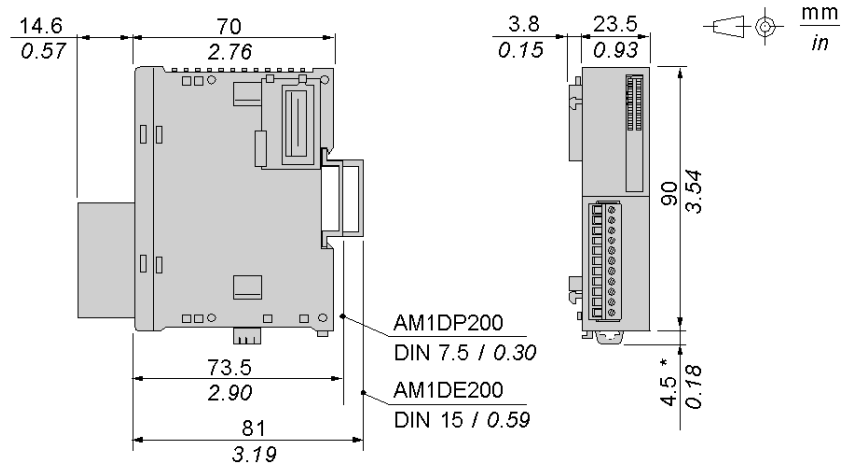
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AVO2HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AVO2HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	60 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	60 mA
Weight	85 g (3 oz)

Outputs Specifications

The following table shows the outputs specifications of the **TM2AVO2HT** module:

Characteristic	Voltage output
Output range	± 10 VDC
Load impedance	3 kΩ min
Application load type	Resistive load

Characteristic	Voltage output
Settling time	2 ms
Total output system transfer Time	2 ms + 1 scan time
Output tolerance - maximum deviation at 25°C (77°F)	±0.5% of full scale
Output tolerance - temperature drift	±0.01% of full scale/°C
Output tolerance - repeatable after stabilization time	±0.1% of full scale
Output tolerance - output voltage drop	±0.5% of full scale
Output tolerance - nonlinear	±0.2% of full scale
Output tolerance - output ripple	1 LSB maximum
Output tolerance - overshoot	0%
Output tolerance - total deviation	±1% of full scale
Discrete resolution	11 bits + sign
Output value of LSB	± 9.8 mV
Data type in application program	-2,048 to 2,047 ¹ Custom range up to -32768 to 32767
Current loop open	Not detectable
Noise resistance - maximum temporary deviation during perturbations	±1% of full scale
Noise resistance - cable	Twisted-pair shielded cable is necessary
Isolation between outputs	None
Isolation between outputs and external power supply	None
Isolation between outputs, external power supply and internal logic circuits	2500 VAC by photocoupler
Selection of analog output signal type	Using software programming
Calibration or verification to maintain rated accuracy	Approximately 10 years

NOTE:

1. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

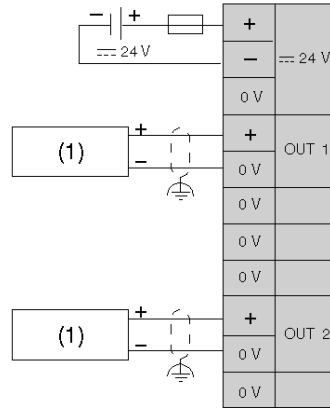
Connecting the TM2AVO2HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AVO2HT Wiring Diagram

The following diagram shows the connection of the module outputs.



(1) Voltage/current preactuator

To use the braid supplied with the module to connect the functional ground.

Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

NOTE: to avoid disturbances on the analog outputs, the power supply of the TM2AVO2HT module must be turned on or off at the same time than the base controller power supply.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AVO2HT module and the associated controller on and off at the same time.

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

TM2AMM3HT Analog Mixed I/O Module

12

Overview

This chapter describes the **TM2AMM3HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMM3HT Module	110
Characteristics of the TM2AMM3HT Module	111
Connecting the TM2AMM3HT Module	116

Presentation of the TM2AMM3HT Module

Main Specifications

TM2AMM3HT Main Specifications				
Number of I/O channels	2 Inputs		1 Output	
Signal type	Voltage	Current	Voltage	Current
Range	0...10 VDC (non differential)	4...20 mA (non differential)	0...10 VDC	4...20 mA
Resolution	12 bits (4096 points)			
Connection type	Removable screw terminal block			

Characteristics of the TM2AMM3HT Module

Introduction

This section provides a description of the electrical and the I/O specifications of the **TM2AMM3HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

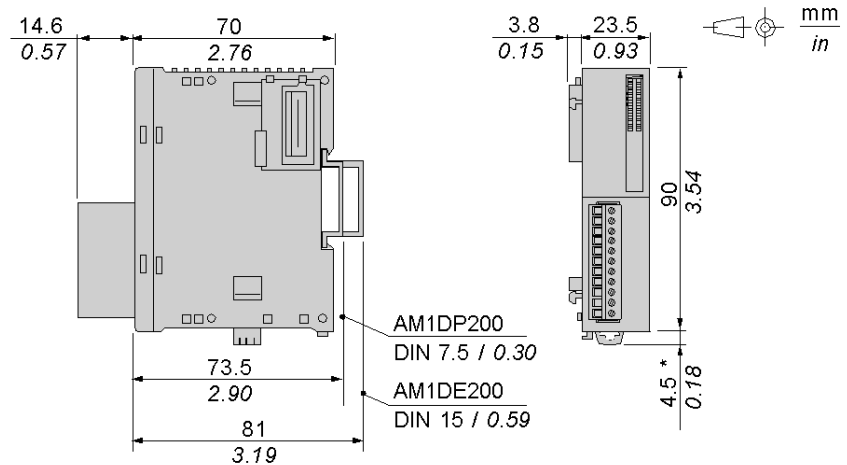
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMM3HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMM3HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2 ... 30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	50 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	50 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2AMM3HT** module:

Characteristic	Voltage input	Current input
Input range	0...10 VDC	4...20 mA
Input impedance	1 M Ω min.	10 Ω
Sample duration time	10 ms max.	
Total input system transfer time	60 ms + 1 scan time	
Input type	Non differential	
Operating mode	Self-scan	
Conversion mode	$\Sigma\Delta$ type ADC	
Input tolerance - maximum deviation at 25°C (77°F)	± 0.2 % of full scale	
Input tolerance - temperature drift	± 0.006 % of full scale/ $^{\circ}\text{C}$	
Input deviation - repeatable after stabilization time	± 0.5 % of full scale	
Input tolerance - nonlinear	± 0.2 % of full scale	
Input tolerance - maximum deviation	± 1 % of full scale	
Discrete resolution	4096 increments (12 bits)	
Input value of LSB	2.5 mV	4.8 μA
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ¹	
Input data out of range detection	Yes ²	
Noise resistance - maximum temporary deviation during perturbations	± 1 % of full scale when a 500 VDC clamp voltage is applied to the power and I/O wiring	
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Noise resistance - crosstalk	2 LSB maximum	
Isolation between inputs	None	
Isolation between inputs and power supply	500 VAC	
Isolation between inputs, external power supply and internal logic circuits	500 VAC by photocoupler	

Characteristic	Voltage input	Current input
Maximum continuous allowed overload (no damage)	13 VDC	40 mA
Selection of analog input signal type	Using software programming. It is possible to use current and voltage types.	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Outputs Specifications

The following table shows the outputs specifications of the **TM2AMM3HT** module:

Characteristic	Voltage output	Current output
Output range	0...10 VDC	4...20 mA
Load impedance	2 kΩ minimum	300 Ω maximum
Application load type	Resistive load	
Settling time	10 ms	
Total output system transfer Time	10 ms + 1 scan time	
Output tolerance - maximum deviation at 25°C (77°F)	±0.2 % of full scale	
Output tolerance-temperature drift	±0.015 % of full scale/°C	
Output tolerance - repeatable after stabilization time	±0.5 % of full scale	
Output tolerance - output voltage drop	±1 % of full scale	
Output tolerance - nonlinear	±0.2 % of full scale	
Output tolerance - output ripple	1 LSB maximum	
Output tolerance - overshoot	0%	
Output tolerance - total error	±1% of full scale	

Characteristic	Voltage output	Current output
Discrete resolution	4096 increments (12 bits)	
Output value of LSB	2.5 mV	4.8 μ A
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ¹	
External power supply connection	Detected ²	Detected ²
Noise resistance - maximum temporary deviation during perturbations	1% of full scale	
Noise resistance - cable	Twisted-pair shielded cable is necessary for improved noise immunity	
Isolation between output and external power supply	500 VAC	
Isolation between output, external power supply and internal logic circuits	500 VAC by photocoupler	
Selection of analog output signal type	Using software programming	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2. When the external 24 VDC is not connected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

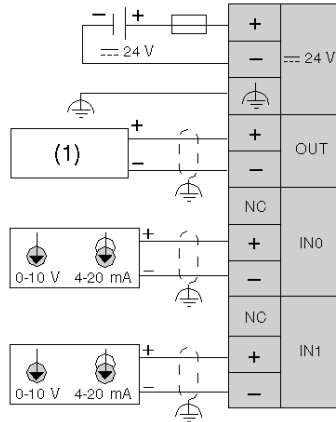
Connecting the TM2AMM3HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMM3HT Wiring Diagram

The following diagram shows the connection of the module I/O.



(1) Voltage/current preactuator

To use the braid supplied with the module to connect the functional ground.

Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

NOTE: to avoid disturbances on the analog outputs, the power supply of the TM2AMM3HT module must be turned on or off at the same time than the base controller power supply.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AMM3HT module and the associated controller on and off at the same time.

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

NOTE: The (-) poles of inputs IN0 and IN1 are connected internally.

TM2AMM6HT Analog Mixed I/O Module

13

Overview

This chapter describes the **TM2AMM6HT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2AMM6HT Module	118
Characteristics of the TM2AMM6HT Module	119
Connecting the TM2AMM6HT Module	124

Presentation of the TM2AMM6HT Module

Main Specifications

TM2AMM6HT Main Specifications				
Number of I/O channels	4 Inputs		2 Outputs	
Signal type	Voltage	Current	Voltage	Current
Range	0...10 VDC (non differential)	4...20 mA (non differential)	0...10 VDC	4...20 mA
Resolution	12 bits (4096 points)			
Connection type	Removable screw terminal block			

Characteristics of the TM2AMM6HT Module

Introduction

This section provides a description of the electrical and the I/O specifications of the **TM2AMM6HT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

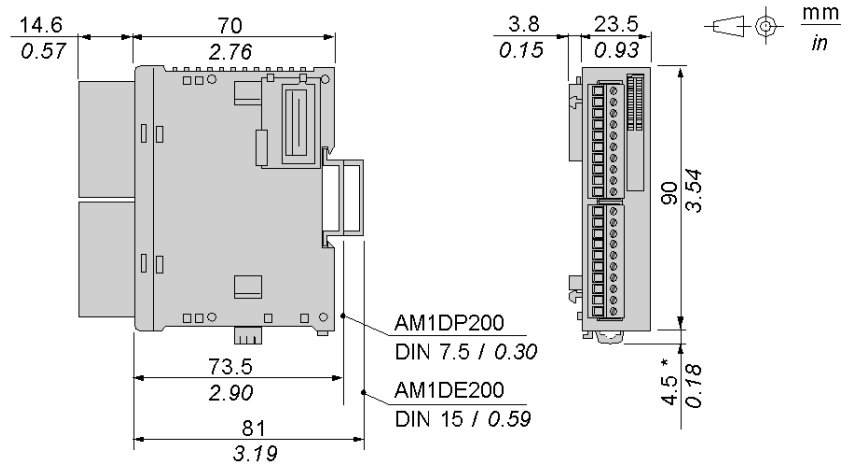
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2AMM6HT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2AMM6HT** module:

Characteristic	Specification
Rated power supply voltage	24 VDC
Power supply range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	60 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	80 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2AMM6HT** module:

Characteristic	Voltage input	Current input
Input range	0...10 VDC	4...20 mA
Input impedance	1 MΩ min	< 250 Ω
Sample duration time	64 ms max.	

Characteristic	Voltage input	Current input
Filtering	It is possible to adjust by software the acquisition time for each channel from 16 ms to 64 ms.	
Total input system transfer time	4 x 64 ms + 1 scan time ⁽¹⁾	
Input type	Non differential	
Operating mode	Self-scan	
Conversion mode	$\Sigma\Delta$ type ADC	
Input tolerance - maximum deviation at 25°C (77°F)	±0.5 % of full scale	
Input tolerance - temperature drift	±0.015 % of full scale/°C	
Input deviation - repeatable after stabilization time	±0.5 % of full scale	
Input tolerance - nonlinear	±0.4 % of full scale	
Input tolerance - maximum deviation	±1 % of full scale	
Discrete resolution	4096 increments (12 bits)	
Input value of LSB	2.5 mV	4.8 μ A
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ⁽²⁾	
Input data out of range detection	Yes ³	
Input protection	Against reverse polarity and short circuit	
Noise resistance - maximum temporary deviation during perturbations	±2 % of full scale	
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Noise resistance - crosstalk	1 LSB maximum	
Isolation between inputs	None	
Isolation between inputs and outputs, between inputs and external power supply	800 VAC between inputs and outputs, between channels and PSU	
Isolation between inputs, power supply and internal logic circuits	1500 VAC by photocoupler	
Maximum continuous allowed overload (no damage)	30 VDC	40 mA

Characteristic	Voltage input	Current input
Selection of analog input signal type	Using software programming. It is possible to mix the type current and voltage.	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. Total input system transfer time = sample duration time x active channel number + 1 scan time.
2. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
3. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Outputs Specifications

The following table shows the outputs specifications of the **TM2AMM6HT** module:

Characteristic	Voltage output	Current output
Output range	0...10 VDC	4...20 mA
Load impedance	2 kΩ minimum	300 Ω maximum
Application load type	Resistive load	
Settling time	20 ms	
Total output system transfer Time	20 ms + 1 scan time	
Output tolerance - maximum deviation at 25°C (77°F)	±0.9 % of full scale	
Output tolerance - temperature drift	±0.015 % of full scale/°C	
Output deviation - repeatable after stabilization time	±1 % of full scale	
Output tolerance - output voltage drop	±1 % of full scale	
Output tolerance - nonlinear	±0.5 % of full scale	
Output tolerance - output ripple	±0.5% of full scale	
Output deviation - overshoot	±0.5% of full scale	
Output tolerance - total deviation	±1.5% of full scale	

Characteristic	Voltage output	Current output
Discrete resolution	4096 increments (12 bits)	
Output value of LSB	2.5 mV	4.8 μ A
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ¹	
Noise resistance - maximum temporary deviation during perturbations	± 1 % of full scale	
Noise resistance - cable	Twisted-pair shielded cable is necessary for improved noise immunity	
Noise resistance - crosstalk	0.1% of full scale maximum	
Isolation between inputs	None	
Isolation between outputs and external power supply	800 VAC	
Isolation between outputs and outputs	800 VAC	
Isolation between outputs and internal logic circuits	1500 VAC by photocoupler	
Selection of analog output signal type	Using software programming. It is possible to mix the type current and voltage	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12-bit data (0 to 4095) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

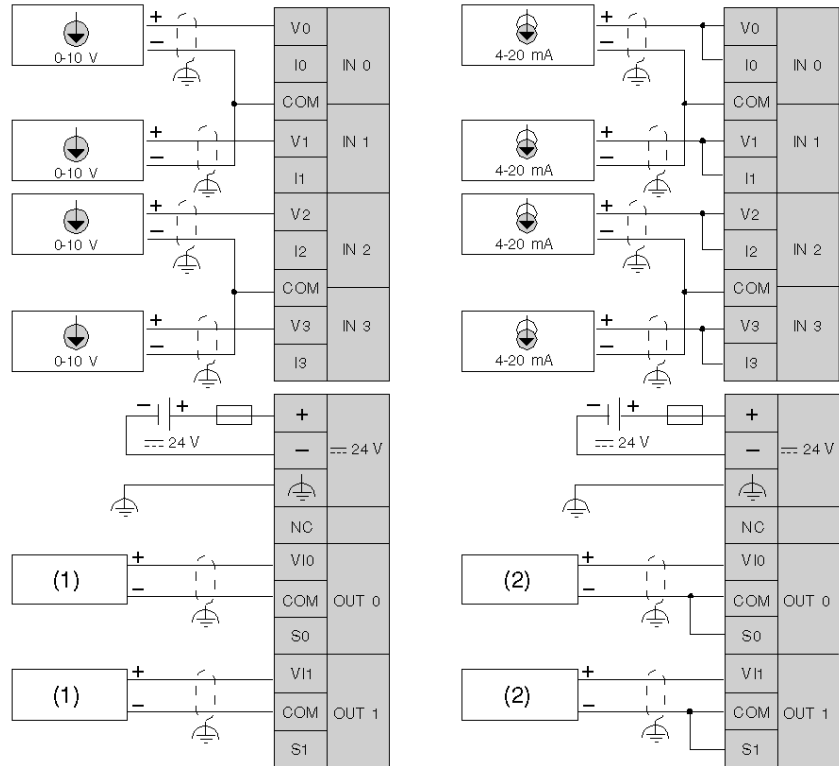
Connecting the TM2AMM6HT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2AMM6HT Wiring Diagram

The following diagram shows the connection of the module I/O.



(1) Voltage preactuator

(2) Current preactuator

To use the braid supplied with the module to connect the functional ground.

Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.

NOTE: To avoid unintended operation of analog I/Os, the TM2AMM6HT power supply must be switched off when the PLC module is switched off.

 WARNING

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2AMM6HT module and the associated controller on and off at the same time.

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

 WARNING

UNINTENDED EQUIPEMENT OPERATION

Do not connect any wiring to unused channels.

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

TM2ALM3LT Analog Mixed I/O Module

14

Overview

This chapter describes the **TM2ALM3LT** module, its characteristics and its connection to the different sensors.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the TM2ALM3LT Module	128
Characteristics of the TM2ALM3LT Module	129
Connecting the TM2ALM3LT Module	134

Presentation of the TM2ALM3LT Module

Main Specifications

TM2ALM3LT Main Specifications				
Number of I/O channels	2 Inputs		2 Outputs	
Signal/sensor type	Thermocouple	Temperature probe	Voltage	Current
Input type	Type J, K and T	Pt100/1000 Ni100/1000	0...10 VDC	4...20 mA
Resolution	12 bits (4096 points)			
Connection type	Removable screw terminal block			

Characteristics of the TM2ALM3LT Module

Introduction

This section provides a description of the electrical and the I/O specifications of the **TM2ALM3LT** module.

See also Environmental Specifications (*see page 37*).

DANGER

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

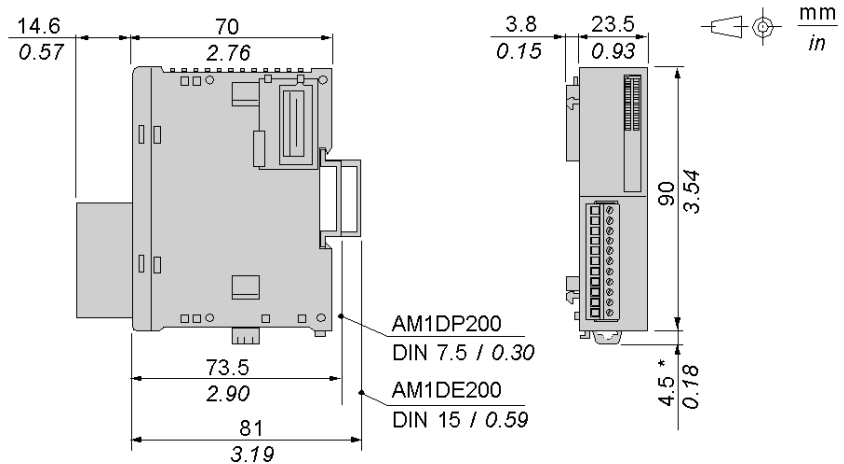
Do not exceed any of the rated values specified below.

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

For more informations refer to Installation Safety Guidelines (*see page 21*).

Dimensions

The following diagrams show the dimensions for the TM2ALM3LT analog I/O module.



NOTE: * 8.5 mm (0.33 in) when the clip-on lock is pulled out.

General Specifications

The following table shows the general specifications of the **TM2ALM3LT** module:

Characteristic	Specification
Rated power voltage	24 VDC
Allowable voltage range	19.2...30 VDC including ripple
Connector insertion/removal durability	100 times minimum
Internal 5 VDC current draw	60 mA
Internal 24 VDC current draw	0 mA
External 24 VDC current draw	80 mA
Weight	85 g (3 oz)

Inputs Specifications

The following table shows the inputs specifications of the **TM2ALM3LT** module:

Characteristic	Thermocouple input	Temperature probe input
Input range	Type K: -270...1370 °C (-454...2498 °F) Type J: -200...760 °C (-328...1400 °F) Type T: -270...400 °C (-454...752 °F)	(RTD) Pt 100 3-wire type -100...500 °C (-148...932 °F)
Input impedance	250 Ω min (TBC)	1 MΩ min
Sample duration time	20 ms max	
Total input system transfer time	80 ms + 1 scan time	
Input type	Differential	
Operating mode	Self-scan	
Conversion mode	ΣΔ type ADC	
Input tolerance - maximum deviation at 25°C (77°F)	±0.2 % of full scale plus reference junction compensation accuracy ±4°C max	±0.2 % of full scale
Input tolerance - temperature drift	±0.006 % of full scale/°C	
Input tolerance - repeatable after stabilization time	±0.5 % of full scale	
Input tolerance - nonlinear	±0.2 % of full scale	
Input tolerance - maximum deviation	±1 % of full scale	
Discrete resolution	Type K and J: 14 bits Type T: 12 bits	
Input value of LSB	K: 0.1 °C (32.18 °F) J: 0.1 °C (32.18 °F) T: 0.1 °C (32.18 °F)	0.1 °C (32.18 °F)
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ⁽²⁾	
Input data out of range detection	Yes ³	
Noise resistance - maximum temporary deviation during perturbations	±3 % maximum when a 500 VDC clamp voltage is applied to the power and I/O wiring PT 100: ±1% of full scale PT1000: ±1% of full scale	TBD
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Isolation between output and external power supply	500 VAC	

Characteristic	Thermocouple input	Temperature probe input
Isolation between output, power supply and internal logic circuits	500 VAC by photocoupler	
Selection of analog input signal type	Using software programming. It is possible to mix the type of input on the module.	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12, 13 or 14-bit data (0 to 4095) and 10-bit data (0 to 1023) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2. When an input error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Outputs Specifications

The following table shows the outputs specifications of the **TM2ALM3LT** module:

Characteristic	Voltage output	Current output
Output range	0...10 VDC	4...20 mA
Load impedance	> 2 kΩ	300 Ω maximum
Application load type	Resistive load	
Settling time	10 ms	
Total output system transfer Time	10 ms + 1 scan time	
Output tolerance - maximum deviation at 25°C (77°F)	±0.2% of full scale	
Output tolerance - temperature drift	±0.015% of full scale/°C	
Output tolerance - repeatable after stabilization time	±0.5 % of full scale	
Output tolerance - output voltage drop	±1% of full scale	
Output tolerance - nonlinear	±0.2% of full scale	
Output tolerance - output ripple	1 LSB maximum	
Output tolerance - overshoot	0%	

Characteristic	Voltage output	Current output
Output tolerance - total deviation	±1% of full scale	
Discrete resolution	4096 increments (12 bits)	
Output value of LSB	2.5 mV	4.8 µA
Data type in application program	0 to 4095 (12 bit data) Custom range up to -32768 to 32767 ¹	
External power supply connection	Detected	Detected ²
Noise resistance - maximum temporary deviation during perturbations	±1% of full scale	
Noise resistance - cable	Twisted-pair shielded cable is necessary	
Isolation between output and external power supply	500 VAC	
Isolation between inputs, power supply and internal logic circuits	500 VAC by photocoupler	
Selection of analog output signal type	Using software programming	
Calibration or verification to maintain rated accuracy	Approximately 10 years	

NOTE:

1. The 12-bit data (0 to 4095) and 10-bit data (0 to 1023) processed in the Analog I/O module can be linear-converted to a value between -32768 and 32767. The optional range designation and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2. When an output error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

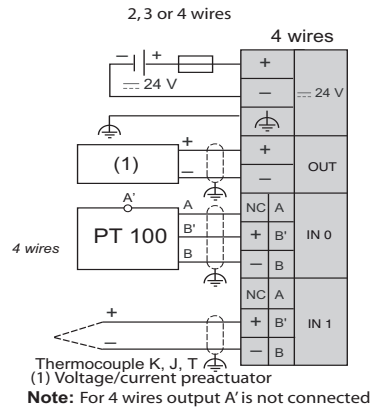
Connecting the TM2ALM3LT Module

Wiring Rules

See Wiring Rules and Recommendations (*see page 33*).

TM2ALM3LT Wiring Diagram

The following diagram shows the connection of the module I/O.



To use the braid supplied with the module to connect the functional ground.

- Connect an appropriate fuse for the applied voltage and current draw, at the position shown in the diagram.
- When connecting an PT100 temperature probe, connect the wires to terminals A, B', and B of input channel 0 or 1.
- When connecting a thermocouple, connect the two wires to terminals B' and B of input channel 0 or 1.

 **DANGER**

FIRE HAZARDS

Possible current overload; size wire accordingly.

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

NOTE: to avoid disturbances on the analog outputs, the power supply of the TM2ALM3LT module must be turned on or off at the same time than the base controller power supply.

 **WARNING**

UNINTENDED EQUIPMENT OPERATION

Turn the power supplies for the TM2ALM3LT module and the associated controller on and off at the same time.

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

Agency Compliance

15

Agency Requirements

Introduction

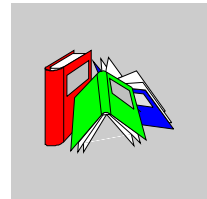
This section provides agency standards for the TM2 products.

Standards

TM2 Analog I/O modules comply with the main national and international standards concerning electronic industrial control devices.

Reference	CE	Tüv Selon IEC EN 61131-2 edition 2 2003	UL	CSA	UL / CSA Haz loc	CUL us	Nemko - GL - LR - DNV
TM2ALM3LT	OK	OK	UL	OK	OK		OK
TM2AMI2HT	OK	OK	UL	OK	OK		OK
TM2AMI2LT	OK		UL	OK	OK		
TM2AMI4LT	OK		UL FILE E204608- V3-section 4	OK	OK		
TM2AMI8HT	OK		UL FILE E204608- V3-section 4	OK	OK		
TM2AMM3HT	OK	OK	UL	OK	OK		OK
TM2AMM6HT	OK		UL FILE E204608- V3-section 5	OK	OK	OK	
TM2AMO1HT	OK	OK	UL	OK	OK		OK
TM2ARI8HT	OK		UL FILE E204608- V3-section 4	OK	OK		
TM2AVO2HT	OK		UL FILE E204608- V3-section 4	OK	OK		
TM2ARI8LRJ	OK		UL 508	OK			
TM2ARI8LT	OK		UL 508	OK			

Glossary



E

expansion connector

A connector to attach expansion I/O modules.

expansion connector sticker

A cover to protect the expansion connector.

expansion I/O module

Either a discrete or analog module that adds additional I/O to the base controller.

I

I/O

Input/Output.

I/O terminals

Terminals at the front of expansion I/O modules used to connect input and output signals.

input terminals

Terminals at the front of expansion I/O modules used to connect input signals from input devices such as sensors, push buttons, and limit switches. For certain modules, the input terminals accept both sink and source DC input signals.

O

output terminals

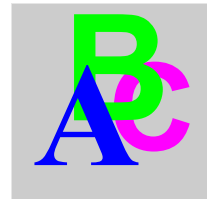
Terminals at the front of expansion I/O modules used to connect output signals to output devices such as electromechanical relays and solenoid valves.

P

PWR LED

An LED that illuminates when power is supplied to the module.

Index



A

- Accessories, *18*
- Agency requirements, *137*
- Analog I/O modules, *15*
 - Physical description, *17*
 - Specifications, *15*
- Assembling to a controller, *25*

C

- Controllers
 - Disassembling a module, *27*

D

- Dimensions
 - TM2ALM3LT, *130*
 - TM2AMI2HT, *42*
 - TM2AMI2LT, *50*
 - TM2AMI4LT, *58*
 - TM2AMI8HT, *66*
 - TM2AMM3HT, *112*
 - TM2AMM6HT, *120*
 - TM2AMO1HT, *98*
 - TM2ARI8HT, *74*
 - TM2ARI8LRJ, *82*
 - TM2ARI8LT, *90*
 - TM2AVO2HT, *106*

G

- General specifications
 - TM2ALM3LT, *130*
 - TM2AMI2HT, *42*
 - TM2AMI2LT, *50*
 - TM2AMI4LT, *58*
 - TM2AMI8HT, *66*
 - TM2AMM3HT, *112*
 - TM2AMM6HT, *120*
 - TM2AMO1HT, *98*
 - TM2ARI8HT, *74*
 - TM2ARI8LRJ, *82*
 - TM2ARI8LT, *90*
 - TM2AVO2HT, *106*

I

- Input specifications
 - TM2AMI2LT, *50*
 - TM2AMO1HT, *99*
 - TM2ARI8HT, *75*
 - TM2ARI8LRJ, *83*
 - TM2ARI8LT, *91*
 - TM2AVO2HT, *106*
- Inputs specifications
 - TM2ALM3LT, *131*
 - TM2AMI2HT, *43*
 - TM2AMI4LT, *59*
 - TM2AMI8HT, *67*
 - TM2AMM3HT, *113*
 - TM2AMM6HT, *120*

Installation

Read before starting, 23

Installation , 21

Installing on a mounting rail, 28

M

Mounting hole layout, 32

Mounting Position, 24

Mounting rail

15 mm AM1DE200 rail, 18

725 mm AM1DP200 rail, 18

Mounting strip installation, 31

O

Outputs specifications

TM2ALM3LT, 132

TM2AMM3HT, 114

TM2AMM6HT, 122

P

Physical description

Connector RJ11, 17

Terminal block, 17

R

Removing from a mounting rail, 30

S

Specifications

Analog I/O modules, 15

Standards, 137

Starting, 23

T

Terminal Block End Clamp type

AB1AB8P35, 18

TM2 I/O modules

Environmental specifications, 37

TM2ALM3LT, 127, 128, 129, 134

TM2AMI2HT, 39, 40, 41, 45

TM2AMI2LT, 47, 48, 49, 53

TM2AMI4LT, 55, 56, 57, 61

TM2AMI8HT, 63, 64, 65, 69

TM2AMM3HT, 109, 110, 111, 116

TM2AMM6HT, 117, 118, 119, 124

TM2AMO1HT, 95, 96, 97, 101

TM2ARI8HT, 71, 72, 73, 77

TM2ARI8LRJ, 79, 80, 81, 85

TM2ARI8LT, 88, 89, 93

TM2ARI8LTARI8LT, 87

TM2AVO2HT, 104

TM2AVO2HT, 103, 105, 108

TM2XMTGB, 19

TWDXMT5 mounting strip, 19

W

Wiring diagram

TM2ALM3LT, 134

TM2AMI2HT, 45

TM2AMI2LT, 53

TM2AMI4LT, 61

TM2AMI8HT, 69

TM2AMM3HT, 116

TM2AMM6HT, 124

TM2AMO1HT, 101

TM2ARI8HT, 77

TM2ARI8LRJ, 85

TM2ARI8LT, 93

TM2AVO2HT, 108

Wiring rules, 33