

TM2

Discrete I/O Modules

Hardware Guide

05/2009



EIO0000000028.01

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

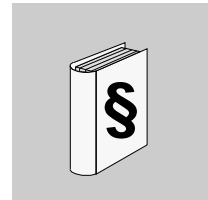


	Safety Information	7
	About the Book	9
Part I	TM2 Discrete I/O Modules	13
Chapter 1	General Overview and Rules for Implementing	15
1.1	General Overview	16
	General Description	17
	Physical description	19
	Accessories	20
1.2	General Rules for Implementing	22
	Installation Guidelines	23
	Mounting Positions and Minimum Clearances	26
	Assembling a Module to a Controller	27
	Disassembling a Module from a Controller	29
	How to Install and Remove the Controller with its Expansions from a Mounting Rail	30
	How to Directly Mount a Module on a Panel Surface	33
	Wiring Rules and Recommendations	35
Chapter 2	Environmental Specifications of TM2 I/O Modules	39
	Environmental Specifications of TM2 I/O Modules	39
Chapter 3	TM2DAI8DT Discrete Input Module	41
	Presentation of the TM2DAI8DT Module	42
	Characteristics of the TM2DAI8DT Module	43
	Connecting the TM2DAI8DT Module	45
Chapter 4	TM2DDI8DT Discrete Input Module	47
	Presentation of the TM2DDI8DT Module	48
	Characteristics of the TM2DDI8DT Module	49
	Connecting the TM2DDI8DT Module	52
Chapter 5	TM2DDI16DT Discrete Input Module	53
	Presentation of the TM2DDI16DT Module	54
	Characteristics of the TM2DDI16DT Module	55
	Connecting the TM2DDI16DT Module	58

Chapter 6	TM2DDI16DK Discrete Input Module	59
	Presentation of the TM2DDI16DK Module.	60
	Characteristics of the TM2DDI16DK Module.	61
	Connecting the TM2DDI16DK Module.	64
Chapter 7	TM2DDI32DK Discrete Input Module	65
	Presentation of the TM2DDI32DK Module.	66
	Characteristics of the TM2DDI32DK Module.	67
	Connecting the TM2DDI32DK Module.	70
Chapter 8	TM2DRA8RT Discrete Relay Output Module	71
	Presentation of the TM2DRA8RT Module.	72
	Characteristics of the TM2DRA8RT Module.	73
	Connecting the TM2DRA8RT Module.	76
Chapter 9	TM2DRA16RT Discrete Relay Output Module	77
	Presentation of the TM2DRA16RT Module.	78
	Characteristics of the TM2DRA16RT Module.	79
	Connecting the TM2DRA16RT Module.	82
Chapter 10	TM2DDO8UT Discrete Transistor Output Module	85
	Presentation of the TM2DDO8UT Module.	86
	Characteristics of the TM2DDO8UT Module.	87
	Connecting the TM2DDO8UT Module.	89
Chapter 11	TM2DDO8TT Discrete Transistor Output Module	91
	Presentation of the TM2DDO8TT Module.	92
	Characteristics of the TM2DDO8TT Module.	93
	Connecting the TM2DDO8TT Module.	95
Chapter 12	TM2DDO16UK Discrete Transistor Output Module	97
	Presentation of the TM2DDO16UK Module.	98
	Characteristics of the TM2DDO16UK Module.	99
	Connecting the TM2DDO16UK Module.	102
Chapter 13	TM2DDO16TK Discrete Transistor Output Module	103
	Presentation of the TM2DDO16TK Module.	104
	Characteristics of the TM2DDO16TK Module.	105
	Connecting the TM2DDO16TK Module.	107
Chapter 14	TM2DDO32UK Discrete Transistor Output Module	109
	Presentation of the TM2DDO32UK Module.	110
	Characteristics of the TM2DDO32UK Module.	111
	Connecting the TM2DDO32UK Module.	113
Chapter 15	TM2DDO32TK Discrete Transistor Output Module	115
	Presentation of the TM2DDO32TK Module.	116
	Characteristics of the TM2DDO32TK Module.	117
	Connecting the TM2DDO32TK Module.	119

Chapter 16	TM2DMM8DRT Discrete Mixed I/O Module	121
	Presentation of the TM2DMM8DRT Module	122
	Characteristics of the TM2DMM8DRT Module	123
	Connecting the TM2DMM8DRT Module	127
Chapter 17	TM2DMM24DRF Discrete Mixed I/O Module	129
	Presentation of the TM2DMM24DRF Module	130
	Characteristics of the TM2DMM24DRF Module	131
	Connecting the TM2DMM24DRF Module	135
Chapter 18	TELEFAST 2 Connection Interface Links for the Discrete I/O Modules	137
	General Overview of TELEFAST 2 Connection Interfaces for Discrete I/O Modules	138
	Dimensions of the Telefast [®] bases	141
	Specifications for the Telefast [®] Bases	142
	Telefast [®] Bases Wiring Schematics	144
	Wiring Specifications for the TeleFast Cables	149
Chapter 19	Agency Compliance	151
	Agency Requirements	151
Glossary	153
Index	155

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

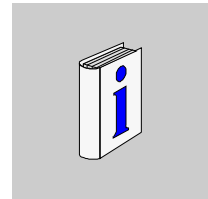
CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

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.

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

About the Book



At a Glance

Document Scope

This manual describes the hardware implementation of TM2 discrete I/O expansion modules. It provides parts descriptions, specifications, wiring diagrams, installation, and setup for TM2 discrete I/O expansion 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(ENG); 35013236 (FRE); 35013235 (GER); 35013245 (SPA); 35013246 (ITA)
Modbus Advantys OTB Remote I/O User Guide	1606383 02(ENG); 1606383 01 (FRE); 1606383 03(GER); 1606383 05(SPA); 1606383 04(ITA)
Advantys OTB CANopen Remote I/O User Guide	1606384 02(ENG); 1606384 01(FRE); 1606384 03(GER); 1606384 04(SPA); 1606384 05(ITA)

M238 Controller Hardware Guide	EIO000000016 (ENG); EIO000000017 (FRE); EIO000000018 (GER); EIO000000019 (SPA); EIO000000020 (ITA); EIO000000021 (CS)
TM2 Discrete I/O Modules Instruction Sheet	AAV8177300

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

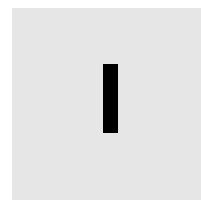
- Only use software that Schneider Electric has approved for use with your controller. This device has not been tested for proper operation with other software packages.
- Update your application program every time you change the hardware configuration of the expansion bus.

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 Discrete I/O Modules



Introduction

This part provides parts descriptions, specifications, wiring diagrams and installation about TM2 Discrete 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	15
2	Environmental Specifications of TM2 I/O Modules	39
3	TM2DAI8DT Discrete Input Module	41
4	TM2DDI8DT Discrete Input Module	47
5	TM2DDI16DT Discrete Input Module	53
6	TM2DDI16DK Discrete Input Module	59
7	TM2DDI32DK Discrete Input Module	65
8	TM2DRA8RT Discrete Relay Output Module	71
9	TM2DRA16RT Discrete Relay Output Module	77
10	TM2DDO8UT Discrete Transistor Output Module	85
11	TM2DDO8TT Discrete Transistor Output Module	91
12	TM2DDO16UK Discrete Transistor Output Module	97
13	TM2DDO16TK Discrete Transistor Output Module	103
14	TM2DDO32UK Discrete Transistor Output Module	109
15	TM2DDO32TK Discrete Transistor Output Module	115
16	TM2DMM8DRT Discrete Mixed I/O Module	121
17	TM2DMM24DRF Discrete Mixed I/O Module	129
18	TELEFAST 2 Connection Interface Links for the Discrete I/O Modules	137
19	Agency Compliance	151

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	16
1.2	General Rules for Implementing	22

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	17
Physical description	19
Accessories	20

General Description

Introduction

The range of TM2 I/O modules includes

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

The TM2 discrete I/O modules are equipped with either a HE10 connector, a non removable spring terminal block or a removable screw terminal block. For modules fitted with HE10 type connector outputs, a series of products known as TELEFAST 2 (TELEFAST connection interface links for the discrete I/O modules (*see page 137*)) are available that enable discrete input/output modules to be quickly connected to operational parts.

Module Features

The following table shows the discrete 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					
TM2DAI8DT	8	Inputs	120 VAC 7.5 mA	Removable screw terminal block	TM2DAI8DT (<i>see page 41</i>)
TM2DDI8DT	8	Inputs	24 VDC 7 mA	Removable screw terminal block	TM2DDI8DT (<i>see page 47</i>)
TM2DDI16DT	16	Inputs	24 VDC 7 mA	Removable screw terminal block	TM2DDI16DT (<i>see page 53</i>)
TM2DDI16DK	16	Inputs	24 VDC 5 mA	HE10 Connector	TM2DDI16DK (<i>see page 59</i>)
TM2DDI32DK	32	Inputs	24 VDC 5 mA	HE10 Connector	TM2DDI32DK (<i>see page 65</i>)
Output Modules					
TM2DRA8RT	8	Outputs Relay	30 VDC/230 VAC 2 A max	Removable screw terminal block	TM2DRA8RT (<i>see page 71</i>)
TM2DRA16RT	16	Outputs Relay	30 VDC/230 VAC 2 A max	Removable screw terminal block	TM2DRA16RT (<i>see page 77</i>)

Reference module	Channels	Channel type	Voltage/current	Terminal type	Reference page
TM2DD08UT	8	Outputs Transistor sink	24 VDC 0.3 A max per output	Removable screw terminal block	TM2DD08UT (see page 85)
TM2DD08TT	8	Outputs Transistor source	24 VDC 0.5 A max per output	Removable screw terminal block	TM2DD08TT (see page 91)
TM2DDO16UK	16	Outputs Transistor sink	24 VDC 0.1 A max per output	HE10 Connector	TM2DDO16UK (see page 97)
TM2DDO16TK	16	Outputs Transistor source	24 VDC 0.4 A max per output	HE10 Connector	TM2DDO16TK (see page 103)
TM2DDO32UK	32	Outputs Transistor sink	24 VDC 0.1 A max per output	HE10 Connector	TM2DDO32UK (see page 109)
TM2DDO32TK	32	Outputs Transistor source	24 VDC 0.4 A max per output	HE10 Connector	TM2DDO32TK (see page 115)
Mixed Modules					
TM2DMM8DRT	4 4	Inputs Outputs Relay	24 VDC/7 mA 30 VDC/230VAC 2 A max	Removable screw terminal block	TM2DMM8DRT (see page 121)
TM2DMM24DRF	16 8	Inputs Outputs Relay	24 VDC/7 mA 30 VDC/230VAC 2 A max	Non-removable spring terminal block	TM2DMM24DRF (see page 129)

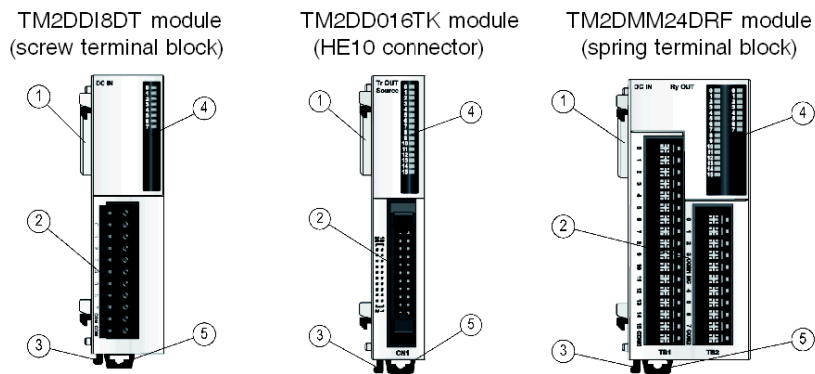
Physical description

Introduction

This section describes the parts of 3 discrete I/O modules, one with a HE10 connector, one with a removable screw terminal block and one with a non removable spring terminal block. In general, the modules with a HE10 connector have a reference ending in K whereas the modules with a terminal block have a reference ending in T. Your I/O module may differ from the illustrations but the parts will be the same.

Illustration

The following pictures show the parts of the 3 discrete I/O modules:



Elements

The following table describes the different elements of the 3 discrete I/O modules shown above:

Label	TM2DDI8DT	TM2DDO16TK	TM2DMM24DRF
1	Expansion connector for electrical connection (one on each side, right side not shown). It is designed to provide continuity of the electrical link between the modules connected.		
2	Removable screw terminal block (supplied with the module)	HE10 Connector	Non removable spring terminal block
3	Locking device for attachment to the previous module		
4	Led for displaying the channels and module diagnostics		
5	Clip-on lock		
6	Power supply screw terminal block		
7	Screw for functional ground		

Accessories

Introduction

This section describes the TM2 Discrete I/O modules accessories.

Cables

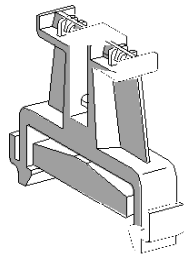
The following table lists the cables features:

Cable name	Reference
Discrete I/O Cables	
Cable equipped at a one end with an HE10 connector and in the other end with a free wire. (AWG 22 / 0.34 mm ² ; length: 3 m / 9.84 ft)	TWDFCW30K
Cable equipped at a one end with an HE10 connector and in the other end with a free wire. (AWG 22 / 0.34 mm ² ; length: 5 m / 16.4 ft)	TWDFCW50K
Telefast[®] Cables for TM2 discrete I/O expansion modules	
Cable equipped with a 20-way HE10 connector at each end. (AWG 28 / 0.08 mm ² ; length: 0.5 m / 1.64 ft)	ABFT20E050
Cable equipped with a 20-way HE10 connector at each end. (AWG 28 / 0.08 mm ² ; length: 1 m / 3.28 ft)	ABFT20E100
Cable equipped with a 20-way HE10 connector at each end. (AWG 28 / 0.08 mm ² ; length: 2 m / 6.56 ft)	ABFT20E200

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. 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.

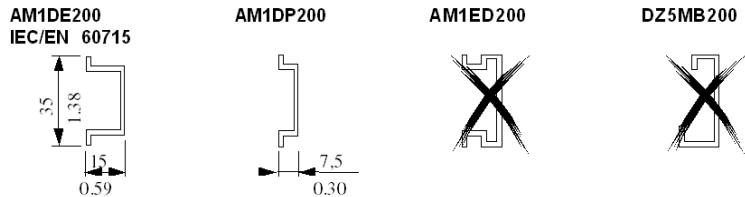
The following picture shows an end clamps type AB1AB8P35:



The DIN Rail

You can mount the controller and its expansions on a mounting rail. A mounting rail can be attached to a smooth mounting surface or suspended from a Electronic Industries Alliance rack or in a Type 4 cabinet.

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



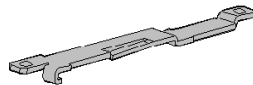
You can order the suitable DIN rail from Schneider Electric:

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 Mounting Strip

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



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	23
Mounting Positions and Minimum Clearances	26
Assembling a Module to a Controller	27
Disassembling a Module from a Controller	29
How to Install and Remove the Controller with its Expansions from a Mounting Rail	30
How to Directly Mount a Module on a Panel Surface	33
Wiring Rules and Recommendations	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 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 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.
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

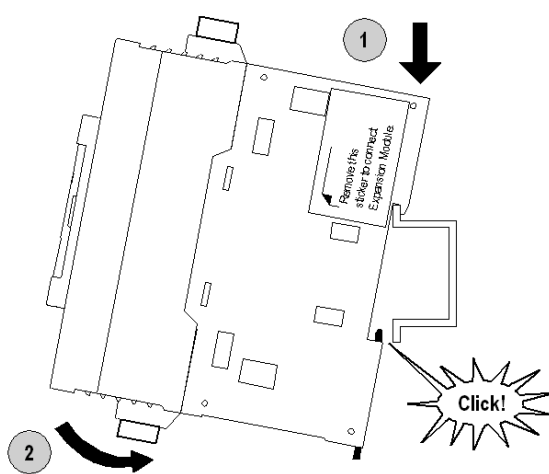
This section describes how to install and remove the controller with its expansions from a mounting rail.

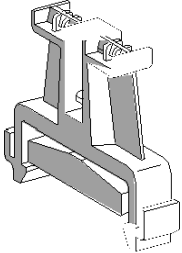
NOTE: When mounting a controller and its modules on a mounting rail, use two terminal block end clamps of type AB1 AB8P35 or equivalent in order to improve the shock and vibration characteristics of the assembly.

For additional information, The Mounting Rail.

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

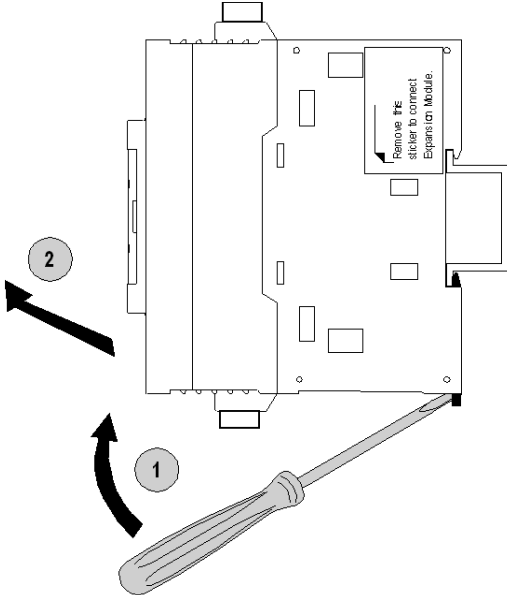
The following procedure describes how to install a controller with its expansions on a mounting rail.

Step	Action
1	Fasten the mounting rail to a panel using screws.
2	<p>Pull down the clip-on-lock 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 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. 

Step	Action
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

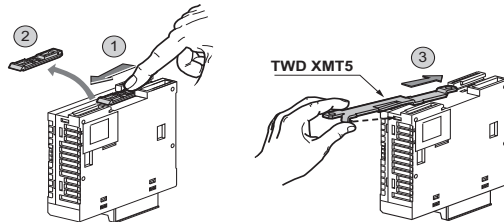
This section shows how to install your module using the Panel Mounting Kit. This section also provides mounting hole layout for all modules. Your module may differ from the module appearing in these illustrations but the procedure is still applicable.

Installing the Panel Mount Kit

The following procedure shows how to install a mounting strip.

Step	Action
1	Remove the clip-on-lock 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

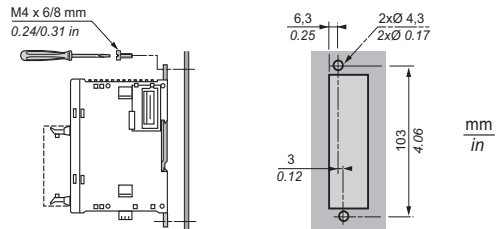
CAUTION

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 TM2 I/O module. Recommendations, when needed, are provided on how to comply with the rules.

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.

The following table shows the cable types and wire sizes for removable screw terminal block:

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	0,5
AWG	26...16	24...20	24...16	26...20	26...18	24...22	20

		N•m	0,23
Ø 2,5 mm (0.10 in)		lb-in.	2.0

Use copper conductors only

The table below shows the characteristics of the non-removable spring terminal blocks:

Characteristic		Available
Type of terminal blocks		Spring terminal blocks
Number of wires accommodated		1
Wire gauges accommodated	minimum	AWG 20 (0.5 mm ²)
	maximum	AWG 18 (1 mm ²)
Wiring constraints		To insert and remove wires from the connectors, use a 2,5 x 0,4 mm (0.10 x 0.02 in) screwdriver to open the round receptacle by pushing on the corresponding plate. Push the flexible plate down on the outside (the side closest to the corresponding receptacle). A screwing (rotating) or bending motion is not required.

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.

Contact Protection Circuit for Relay and Transistor Outputs

CAUTION

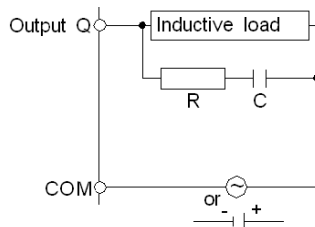
OUTPUT DAMAGE

When driving inductive loads one of the following protective circuits must be used. Ensure by calculation, simulation or test that the circuit chosen is capable of absorbing the inductive energy without exceeding the module ratings.

Failure to follow these instructions can result in equipment damage.

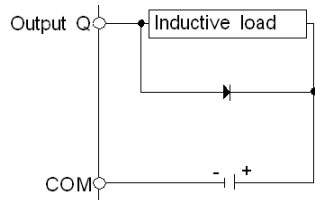
To limit the perturbations of your system created by the inductive load, it is necessary to reduce the electromagnetic emissions. Choose a protection circuit, from the following diagrams, according to the power supply. Connect the protection circuit as near as possible to the inductive load. Refer to information given on the load by the manufacturer.

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



- C represents a value from 0.1 to 1 μF .
- R represents a resistor of approximately the same resistance value as the load.

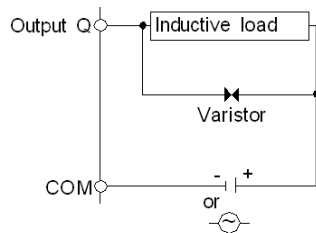
Protective circuit B: this protection circuit can be used for DC load power circuits.



Use a diode with the following ratings:

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

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



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

Environmental Specifications of TM2 I/O Modules

2

Environmental Specifications of TM2 I/O Modules

TM2 I/O Modules Environmental Specifications

All the TM2 discrete 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

Ambient operating temperature	0... 55 °C (32...131 °F)
Storage temperature (°C)	- 25...70 °C (-13...158 °F)
Relative humidity	10...95 % (non-condensing)
Degree of pollution	2 (IEC 60664)
Degree of protection	IP 20
Corrosion immunity	Free from corrosive gases
Altitude	Operation: 0...2,000 m (0...6,560 ft) Transport: 0...3,000 m (0...9,840 ft)
Vibration resistance When mounted on a DIN rail:	3.5 mm fixed amplitude from 5...8.5 Hz 9.8 m/s ² (1 g) fixed acceleration from 8.5...150 Hz

TM2 I/O Modules Climatic and Mechanical Specifications	
Vibration resistance When mounted on a panel surface:	10 mm fixed amplitude from 5...8.7 Hz 29.4 m/s ² (3 g) fixed acceleration from 8.7...150 Hz
Mechanical shock resistance	147 m/s ² (15 g) 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	2 kV
Induced electromagnetic field IEC/EN 61000-4-6	10 Veff (150...80 MHz)
Surge immunity IEC/EN 61000-4-5 24 VDC circuit:	1 kV in Common mode 0.5 kV in differential mode
Surge immunity IEC/EN 61000-4-5 230 VAC circuit:	2 kV in Common mode 1 kV in differential mode
Radiated and conducted emissions	Class B: according to IEC61000-6-4 For GL: according to EMC2 environment (for modules compliant to GL)

TM2DAI8DT Discrete Input Module

3

Overview

This chapter describes the TM2DAI8DT 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 TM2DAI8DT Module	42
Characteristics of the TM2DAI8DT Module	43
Connecting the TM2DAI8DT Module	45

Presentation of the TM2DAI8DT Module

Main Specifications

TM2DAI8DT Main Specifications	
Number of input channels	8
Sensor type	Type I
Signal type	AC type
Rated input voltage	120 VAC
Connection type	Removable screw terminal block

Characteristics of the TM2DAI8DT Module

Introduction

This section provides a description of the electrical and the input specifications of the TM2DAI8DT module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

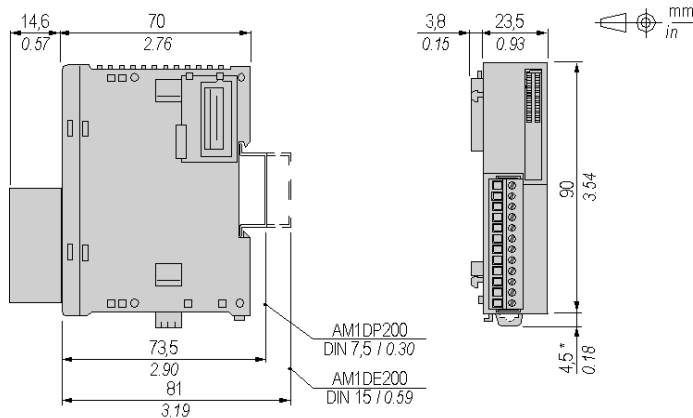
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DAI8DT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DAI8DT Electrical Specifications	
Isolation	Between input and internal bus: 1500 VAC Between input terminals: not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 VDC internal bus	55 mA (all outputs on) 25 mA (all outputs off)
Current draw on 24 VDC internal bus	0 mA (all outputs on) 0 mA (all outputs off)

Input Specifications

TM2DAI8DT Input Specifications	
Number of input channels	8
Common lines	2
Input signals type	AC type
Rated input voltage	120 VAC
Input voltage range	85...132 VAC
Rated input current at 100 VAC	7.5 mA
Input impedance	11 k Ω
OFF state	$U < 20 \text{ VAC}$
ON state	$U > 79 \text{ VAC}$ $I > 2 \text{ mA}$
Turn on time	25 ms
Turn off time	30 ms
Input type	Type I (IEC 61131-2)

Connecting the TM2DAI8DT Module

Introduction

TM2DAI8DT is a 8-channel, 120 VAC input signals module.

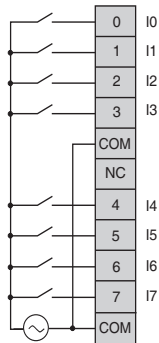
This module is fitted with a removable connection screw terminal block for the connection of inputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDAI8DT Wiring Diagram

The following diagram shows the connection of the inputs module (on the right) to the sensors (on the left).



The two COM terminals are **not** connected together internally.

TM2DDI8DT Discrete Input Module

4

Overview

This chapter describes the TM2DDI8DT 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 TM2DDI8DT Module	48
Characteristics of the TM2DDI8DT Module	49
Connecting the TM2DDI8DT Module	52

Presentation of the TM2DDI8DT Module

Main Specifications

TM2DDI8DT Main Specifications	
Number of input channels	8
Sensor type	Type I
Signal type	Sink/Source
Rated input voltage	24 VDC
Connection type	Removable screw terminal block

Characteristics of the TM2DDI8DT Module

Introduction

This section provides a description of the electrical and the input specifications of the TM2DDI8DT module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

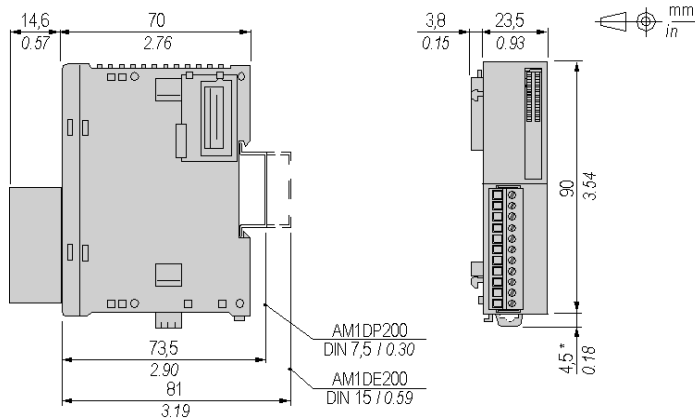
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DDI8DT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDI8DT Electrical Specifications	
Isolation	Between input and internal bus: 500 VAC Between input terminals: not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 VDC internal bus	25 mA (all inputs on) 5 mA (all inputs off)
Current draw on 24 VDC internal bus	0 mA (all inputs on) 0 mA (all inputs off)

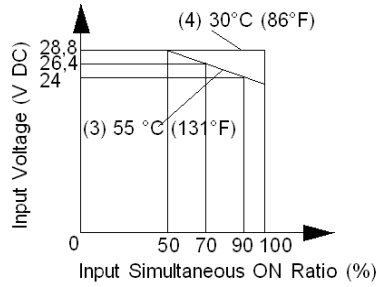
Input Specifications

TM2DDI8DT Input Specifications	
Number of input channels	8
Common lines	1
Input signals type	sink or source
Rated input voltage	24 VDC
Input voltage range	20.4...28.8 VDC
Rated input current at 24 VDC	7 mA
Input impedance	3.4 k Ω
OFF state	U < 5 VDC
ON state	U > 15 VDC I > 2 mA
Turn on time	4 ms
Turn off time	4 ms
Input type	Type I (IEC 61131-2)

Usage Limits

When using TM2DDI8DT:

- All inputs can be turned on simultaneously at 30 °C, 28.8 VDC input voltage.
- 90% of the inputs can be turned on simultaneously at 55 °C, 24 VDC input voltage.



Connecting the TM2DDI8DT Module

Introduction

TM2DDI8DT is a 8-channel, 24 VDC input signals module.

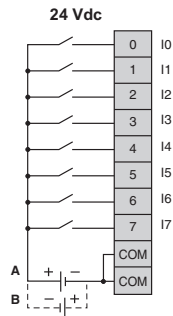
This module is fitted with a removable connection screw terminal block for the connection of inputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDI8DT Wiring Diagram

The following diagram shows the connection of the inputs module (on the right) to the sensors (on the left).



- The COM terminals are connected together internally.
- Both sink and source input wiring are supported.
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).

TM2DDI16DT Discrete Input Module

5

Overview

This chapter describes the TM2DDI16DT 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 TM2DDI16DT Module	54
Characteristics of the TM2DDI16DT Module	55
Connecting the TM2DDI16DT Module	58

Presentation of the TM2DDI16DT Module

Main Specifications

TM2DDI16DT Main Specifications	
Number of input channels	16
Sensor type	Type I
Signal type	Sink/Source
Rated input voltage	24 VDC
Connection type	Removable screw terminal block

Characteristics of the TM2DDI16DT Module

Introduction

This section provides a description of the electrical and the input specifications of the TM2DDI16DT module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

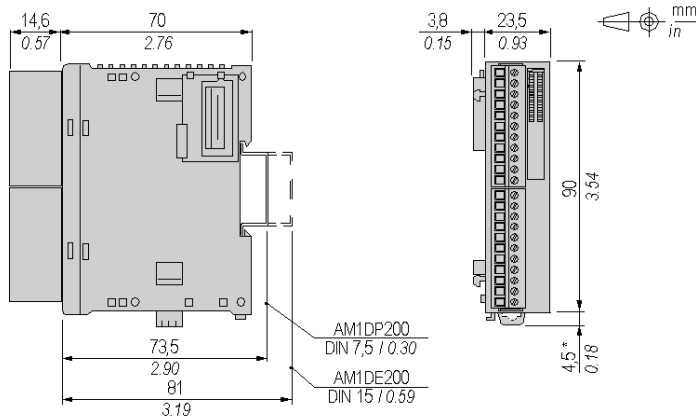
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DDI16DT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDI16DT Electrical Specifications	
Isolation	Between input and internal bus: 500 VAC Between input terminals: not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 VDC internal bus	40 mA (all inputs on) 5 mA (all inputs off)
Current draw on 24 VDC internal bus	0 mA (all inputs on) 0 mA (all inputs off)

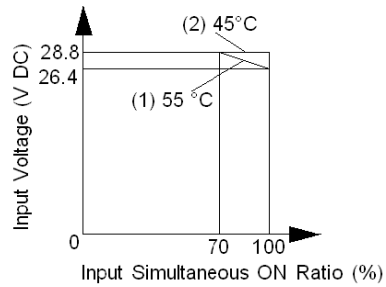
Input Specifications

TM2DDI16DT Input Specifications	
Number of input channels	16
Common lines	1
Input signals type	sink or source
Rated input voltage	24 VDC
Input voltage range	20.4...28.8 VDC
Rated input current at 24 VDC	7 mA
Input impedance	3.4 kΩ
OFF state	U < 5 VDC
ON state	U > 15 VDC I > 2 mA
Turn on time	4 ms
Turn off time	4 ms
Input type	Type I (IEC 61131-2)

Usage Limits

When using TM2DDI16DT:

- At 55°C (131 °F) in the normal mounting direction, limit the inputs which turn on simultaneously along line (1).
- At 45°C (113 °F), all inputs can be turned on simultaneously at 28.8 VDC as indicated with line (2).



Connecting the TM2DDI16DT Module

Introduction

TM2DDI16DT is a 16-channel, 24 VDC input signals module.

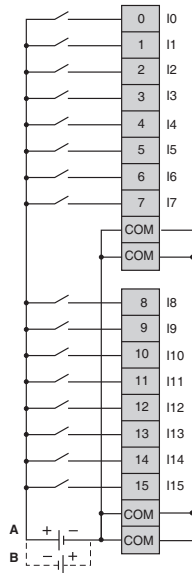
This module is fitted with a removable connection screw terminal block for the connection of inputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDI16DT Wiring Diagram

The following diagram shows the connection of the inputs module (on the right) to the sensors (on the left).



- The COM terminals are connected together internally.
- Both sink and source input wiring are supported.
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).

TM2DDI16DK Discrete Input Module

6

Overview

This chapter describes the TM2DDI16DK 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 TM2DDI16DK Module	60
Characteristics of the TM2DDI16DK Module	61
Connecting the TM2DDI16DK Module	64

Presentation of the TM2DDI16DK Module

Main Specifications

TM2DDI16DK Main Specifications	
Number of input channels	16
Sensor type	Type I
Signal type	Sink/Source
Rated input voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDI16DK Module

Introduction

This section provides a description of the electrical and the input specifications of the TM2DDI16DK module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

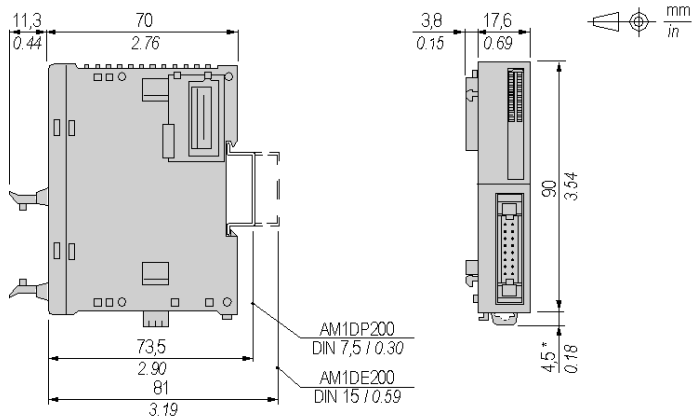
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DDI16DK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDI16DK Electrical Specifications	
Isolation	Between input and internal bus: 500 VAC Between input terminals: not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	35 mA (all inputs on) 5 mA (all inputs off)
Current draw on 24 Vdc internal bus	0 mA (all inputs on) 0 mA (all inputs off)

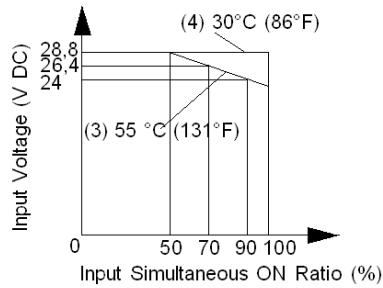
Input Specifications

TM2DDI16DK Input Specifications	
Number of input channels	16
Common lines	1
Input signals type	sink or source
Rated input voltage	24 VDC
Input voltage range	20.4...28.8 VDC
Rated input current at 24 Vdc	5 mA
Input impedance	4.4 kΩ
OFF state	U < 5 Vdc
ON state	U > 15 Vdc I > 2 mA
Turn on time	4 ms
Turn off time	4 ms
Input type	Type I (IEC 61131-2)

Usage Limits

When using TM2DDI16DK:

- At 55 °C (131 °F), limit the inputs which turn on simultaneously on each connector along line (3).
- At 30 °C (86 °F), all inputs can be turned on simultaneously at 28.8 VDC as indicated with line (4).



Connecting the TM2DDI16DK Module

Introduction

TM2DDI16DK is a 16-channel, 24 VDC input signals module.

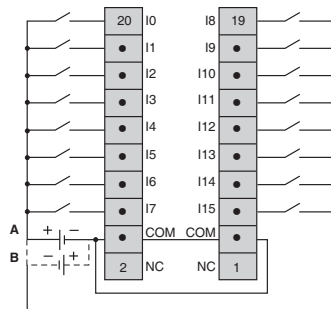
This module is fitted with HE10 connector for the connection of inputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDI16DK Wiring Diagram

The following diagram shows the connection of the inputs module to the sensors.



- The COM terminals are connected together internally.
- Both sink and source input wiring are supported.
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).

TM2DDI32DK Discrete Input Module

7

Overview

This chapter describes the TM2DDI32DK 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 TM2DDI32DK Module	66
Characteristics of the TM2DDI32DK Module	67
Connecting the TM2DDI32DK Module	70

Presentation of the TM2DDI32DK Module

Main Specifications

TM2DDI32DK Main Specifications	
Number of input channels	32
Sensor type	Type I
Signal type	Sink/Source
Rated input voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDI32DK Module

Introduction

This section provides a description of the electrical and the input specifications of the TM2DDI32DK module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

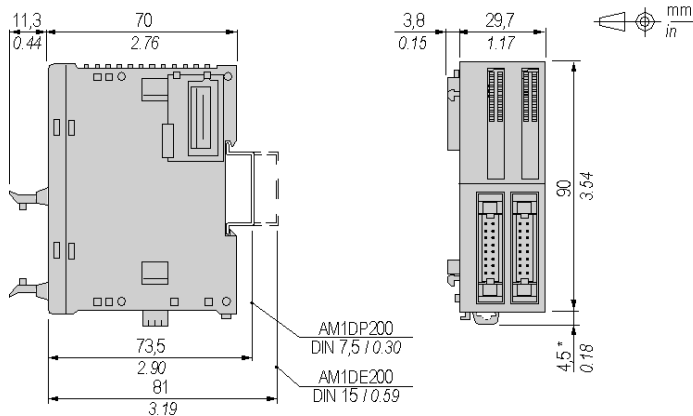
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DDI32DK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDI32DK Electrical Specifications	
Isolation	Between input and internal bus: 500 VAC Between input terminals: not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	65 mA (all inputs on) 10 mA (all inputs off)
Current draw on 24 Vdc internal bus	0 mA (all inputs on) 0 mA (all inputs off)

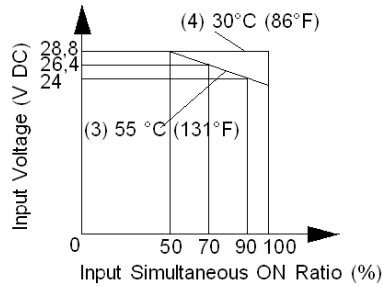
Input Specifications

TM2DDI32DK Input Specifications	
Number of input channels	32
Common lines	1 common line for 16 channels
Input signals type	sink or source
Rated input voltage	24 Vdc
Input voltage range	20.4...28.8 Vdc
Rated input current at 24 Vdc	5 mA
Input impedance	4.4 k Ω
OFF state	U < 5 Vdc
ON state	U > 15 Vdc I > 2 mA
Turn on time	4 ms
Turn off time	4 ms
Input type	Type I (IEC 61131-2)

Usage Limits

When using TM2DDI32DK:

- At 55°C (131°F), limit the inputs which turn on simultaneously on each connector along line (3).
- At 30°C (86°F), all inputs can be turned on simultaneously at 28.8 VDC as indicated with line (4).



Connecting the TM2DDI32DK Module

Introduction

TM2DDI32DK is a 32-channel, 24 VDC input signals module.

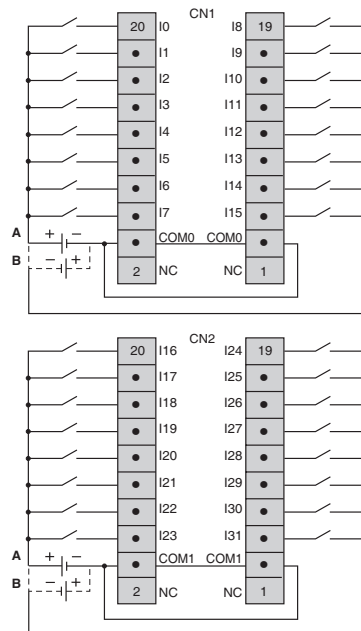
This module is fitted with HE10 connector for the connection of inputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDI32DK Wiring Diagram

The following diagram shows the connection of the inputs module to the sensors.



- The COM0 terminals are connected together internally.
- The COM1 terminals are connected together internally.
- The COM0 and COM1 terminals are **not** connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).

TM2DRA8RT Discrete Relay Output Module



Overview

This chapter describes the TM2DRA8RT 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 TM2DRA8RT Module	72
Characteristics of the TM2DRA8RT Module	73
Connecting the TM2DRA8RT Module	76

Presentation of the TM2DRA8RT Module

Main Specifications

TM2DRA8RT Main Specifications	
Output points and common lines	8 contacts in 2 common lines
Output type	Relay (1 NO contact)
Voltage/current	24 VDC/2 A max 240 VAC/2 A max
Connection type	Removable screw terminal block

Characteristics of the TM2DRA8RT Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DRA8RT module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

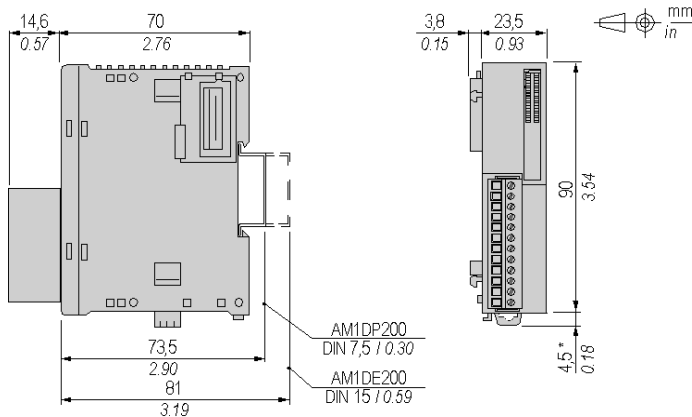
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DRA8RT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DRA8RT Electrical Specifications	
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	30 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	40 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DRA8RT Output Specifications	
Output channels	8
Common lines	1 common line for 4 channels
Output current	2 A max per output
	7 A max per common line
Rated voltage	24 VDC 230 / 240 VAC
Max voltage	30 VDC 264 VAC
In rush current	2 A max
Minimum switching load	0.1 mA 0.1 VDC
Contact resistance	45 mΩ max
Mechanical life	20 million operations minimum (no load 1,800 operations/h)
Resistive load Inductive load	See Power Limitation below
Capacitive load (ex: TeSys U starters)	Forbidden
Isolation	Between output and internal bus: 2300 VAC Between output and ground terminals: 1500 VAC Between output groups: 1500 VAC
T on	12 ms
T off	10 ms

Power Limitation

The following table shows the power limitation of the TM2DRA8RT module depending on the voltage, the type of load and the number of operations required:

TM2DRA8RT Power Limitation				
Voltage	24V	120V	240V	Number of operations
Power of resistive loads AC-12		240 VA 80 VA	480 VA 160 VA	100,000 300,000
Power of inductive loads AC-15 (cos x=0.3)		60 VA 18 VA	120 VA 36 VA	100,000 300,000
Power of inductive loads AC-14 (cos x=0.7)		120 VA 36 VA	240 VA 72 VA	100,000 300,000
Power of resistive loads DC-12	48 W 16 W			100,000 300,000
Power of inductive loads DC-13 L/R=7ms	24 W 7,2 W			100,000 300,000

TM2DRA16RT Discrete Relay Output Module

9

Overview

This chapter describes the TM2DRA16RT 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 TM2DRA16RT Module	78
Characteristics of the TM2DRA16RT Module	79
Connecting the TM2DRA16RT Module	82

Presentation of the TM2DRA16RT Module

Main Specifications

TM2DRA16RT Main Specifications	
Output points and common lines	16 contacts in 2 common lines
Output type	Relay (1 NO contact)
Voltage/current	24 VDC/2 A max 240 VAC/2 A max
Connection type	Removable screw terminal block

Characteristics of the TM2DRA16RT Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DRA16RT module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

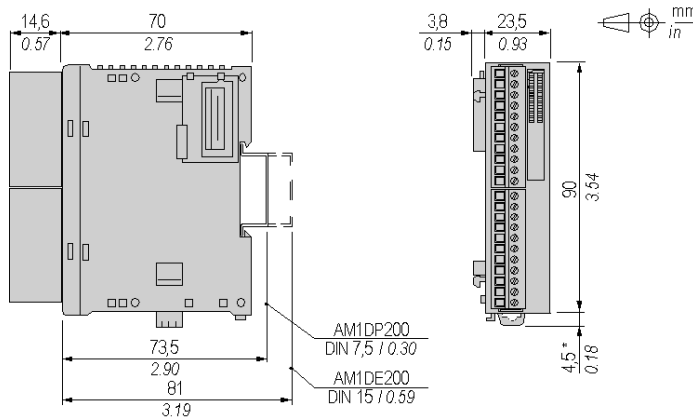
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DRA16RT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DRA16RT Electrical Specifications	
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	45 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	75 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DRA16RT Output Specifications	
Output channels	16
Common lines	1 common line for 8 channels
Output current	2 A max per output 8 A max per common line
Rated voltage	24 VDC 230 / 240 VAC
Rated voltage	30 VDC 264 VAC
Max voltage	2 A max
In rush current	0.1 mA 0.1 VDC
Minimum switching load	45 mΩ max
Contact resistance	20 million operations minimum (no load 1,800 operations/h)
Mechanical life	See Power Limitation below
Resistive load Inductive load	Forbidden
Isolation	Between output and internal bus: 2300 VAC
Isolation between output and ground terminals	1500 VAC
Isolation between output groups	1500 VAC
T on	12 ms
T off	10 ms

Power Limitation

The following table shows the power limitation of the TM2DRA16RT module depending on the voltage, the type of load and the number of operations required:

TM2DRA8RT Power Limitation				
Voltage	24V	120V	240V	Number of operations
Power of resistive loads AC-12		240 VA 80 VA	480 VA 160 VA	100,000 300,000
Power of inductive loads AC-15 (cos x=0.3)		60 VA 18 VA	120 VA 36 VA	100,000 300,000
Power of inductive loads AC-14 (cos x=0.7)		120 VA 36 VA	240 VA 72 VA	100,000 300,000
Power of resistive loads DC-12	48 W 16 W			100,000 300,000
Power of inductive loads DC-13 L/R=7ms	24 W 7.2 W			100,000 300,000

Connecting the TM2DRA16RT Module

Introduction

TM2DRA16RT is a 16-channel, relay output module.

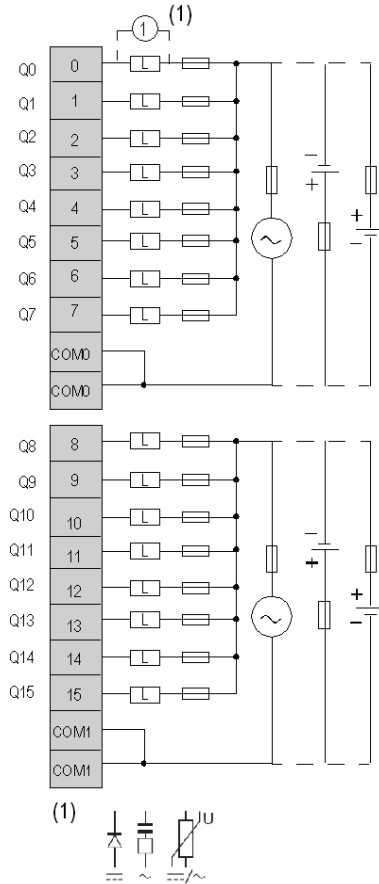
This module is fitted with a removable connection screw terminal block for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DRA16RT Wiring Diagram

The following diagram shows the connection of the outputs and the relay output wiring (see page 37).



- The COM0 terminals are connected together internally.
- The COM1 terminals are connected together internally.
- The COM0 and COM1 terminals are **not** connected together internally.
- Connect an appropriate fuse for the load.
- (1) is the protection for inductive load.

TM2DDO8UT Discrete Transistor Output Module

10

Overview

This chapter describes the TM2DDO8UT 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 TM2DDO8UT Module	86
Characteristics of the TM2DDO8UT Module	87
Connecting the TM2DDO8UT Module	89

Presentation of the TM2DDO8UT Module

Main Specifications

TM2DDO8UT Main Specifications	
Output points and common lines	8 transistor outputs in 1 common line
Signal type output	Sink
Output voltage	24 VDC
Connection type	Removable screw terminal block

Characteristics of the TM2DDO8UT Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO8UT module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

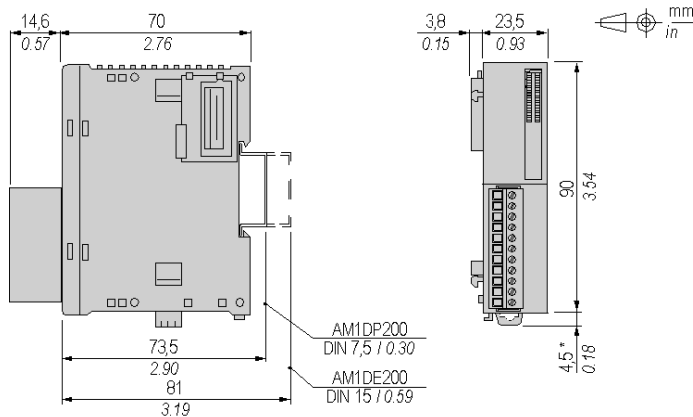
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO8UT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO8UT Electrical Specifications	
Isolation between output and internal bus	500 VAC
Isolation between output terminal	not isolated
Connector insertion/removal durability	Over 100 times
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	10 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	20 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO8UT Output Specifications	
Output channels	8
Common lines	1 common line for 8 channels
Output current	0.36 A max per output
	2.9 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	450 μ s
Turn off time	450 μ s
Protection against overload and short circuit	External fuse (type = fast blow, value = 0.36 A Max)
Protection against reverse polarity	No protected

Connecting the TM2DDO8UT Module

Introduction

TM2DDO8UT is a 8-channel, transistor output module.

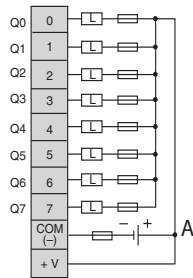
This module is fitted with a removable connection screw terminal block for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO8UT Wiring Diagram

The following diagram shows the connection of the outputs module (on the left) and the transistor output wiring (*see page 37*) (on the right).



- Connect an appropriate fuse for load.
- A is the sink wiring (positive logic).

TM2DDO8TT Discrete Transistor Output Module

11

Overview

This chapter describes the TM2DDO8TT 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 TM2DDO8TT Module	92
Characteristics of the TM2DDO8TT Module	93
Connecting the TM2DDO8TT Module	95

Presentation of the TM2DDO8TT Module

Main Specifications

TM2DDO8TT Main Specifications	
Output points and common lines	8 transistor outputs in 1 common line
Signal type output	Source
Output voltage	24 VDC
Connection type	Removable screw terminal block

Characteristics of the TM2DDO8TT Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO8TT module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

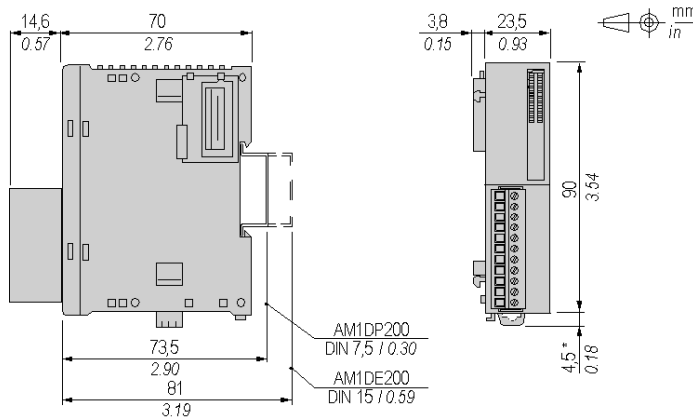
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO8TT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO8TT Electrical Specifications	
Isolation output and internal bus	500 VAC
Isolation between terminal	not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	10 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	20 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO8TT Output Specifications	
Output channels	8
Common lines	1 common line for 8 channels
Output current	0.5 A max per output
	4 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	450 μ s
Turn off time	450 μ s
Output protection against overcurrent and short circuit	Current limitation $I < 1.7$ A Output and temperature protection
Protection against temperature	8 outputs switch off Automatic restart when temperature decrease
Protection against reverse polarity	Protected

Connecting the TM2DDO8TT Module

Introduction

TM2DDO8TT is a 8-channel, transistor output module.

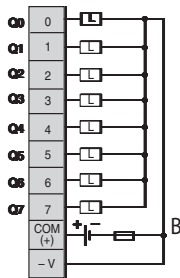
This module is fitted with a removable connection screw terminal block for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO8TT Wiring Diagram

The following diagram shows the connection of the outputs module (on the left) and the transistor output wiring (*see page 37*) (on the right).



- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).

TM2DDO16UK Discrete Transistor Output Module

12

Overview

This chapter describes the TM2DDO16UK 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 TM2DDO16UK Module	98
Characteristics of the TM2DDO16UK Module	99
Connecting the TM2DDO16UK Module	102

Presentation of the TM2DDO16UK Module

Main Specifications

TM2DDO16UK Main Specifications	
Output points and common lines	16 transistor outputs in 1 common line
Signal type output	Sink
Output voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDO16UK Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO16UK module.

See also Environmental Specifications (*see page 39*).

DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

WARNING

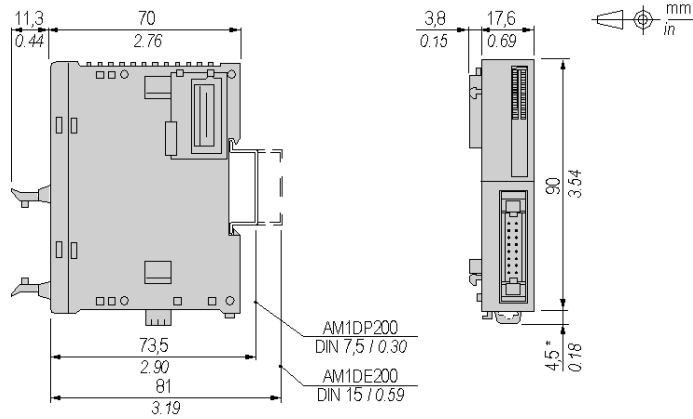
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO16UK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO16UK Electrical Specifications	
Isolation between output and internal bus	500 VAC
Isolation between output terminal	not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	10 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	40 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO16UK Output Specifications	
Output channels	16
Common lines	1 common line for 16 channels
Output current	0.12 A max per output
	2 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	300 μ s
Turn off time	300 μ s
Protection against overload and short circuit	External fuse = 0.125 A Max fast blow
Protection against reverse polarity	No protected

Connecting the TM2DDO16UK Module

Introduction

TM2DDO16UK is a 16-channel, transistor output module.

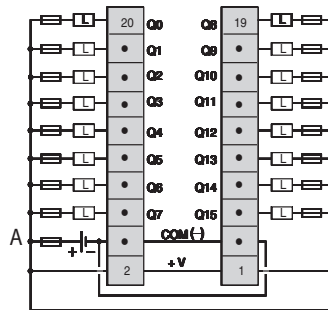
This module is fitted with an HE10 connector for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO16UK Wiring Diagram

The following diagram shows the connection of the outputs module and the transistor output wiring (*see page 37*).



- The COM0(-) terminals are connected together internally.
- The +V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- A is the sink wiring (positive logic).

TM2DDO16TK Discrete Transistor Output Module

13

Overview

This chapter describes the TM2DDO16TK 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 TM2DDO16TK Module	104
Characteristics of the TM2DDO16TK Module	105
Connecting the TM2DDO16TK Module	107

Presentation of the TM2DDO16TK Module

Main Specifications

TM2DDO16TK Main Specifications	
Output points and common lines	16 transistor outputs in 1 common line
Signal type output	Source
Output voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDO16TK Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO16TK module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

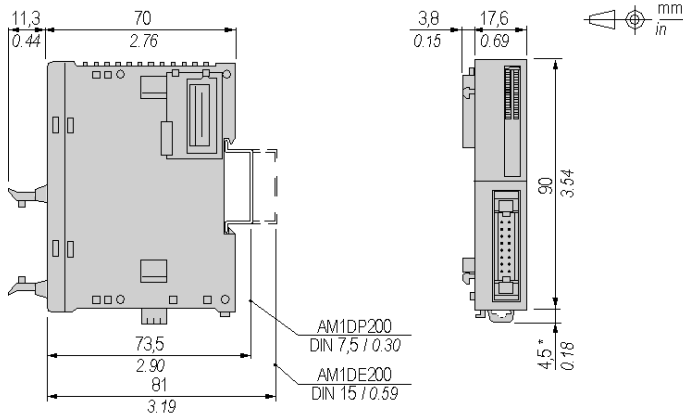
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO16TK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO16TK Electrical Specifications	
Isolation between output and internal bus	500 VAC
Isolation between output terminal	not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	15 mA (all outputs on) 5 mA (all outputs off)
Current draw on 24 Vdc internal bus	20 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO16TK Output Specifications	
Output channels	16
Common lines	1 common line for 16 channels
Output current	0.4 A max per output 2 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	450 μ s
Turn off time	450 μ s
Output protection against overcurrent and short circuit	Current limitation $I < 1.7$ A Output and temperature protection
Protection against temperature	16 outputs switch off Automatic restart when temperature decrease
Protection against reverse polarity	Protected

Connecting the TM2DDO16TK Module

Introduction

TM2DDO16TK is a 16-channel, transistor output module.

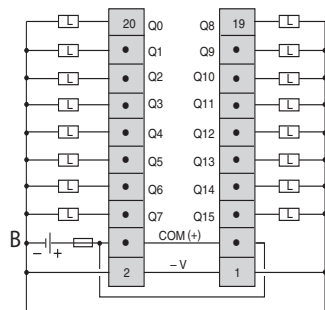
This module is fitted with an HE10 connector for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO16TK Wiring Diagram

The following diagram shows the connection of the outputs module and the transistor output wiring (*see page 37*).



- The COM0(+) terminals are connected together internally.
- The -V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).

TM2DDO32UK Discrete Transistor Output Module

14

Overview

This chapter describes the TM2DDO32UK 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 TM2DDO32UK Module	110
Characteristics of the TM2DDO32UK Module	111
Connecting the TM2DDO32UK Module	113

Presentation of the TM2DDO32UK Module

Main Specifications

TM2DDO32UK Main Specifications	
Output points and common lines	32 transistor outputs in 2 common lines
Signal type output	Sink
Output voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDO32UK Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO32UK module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

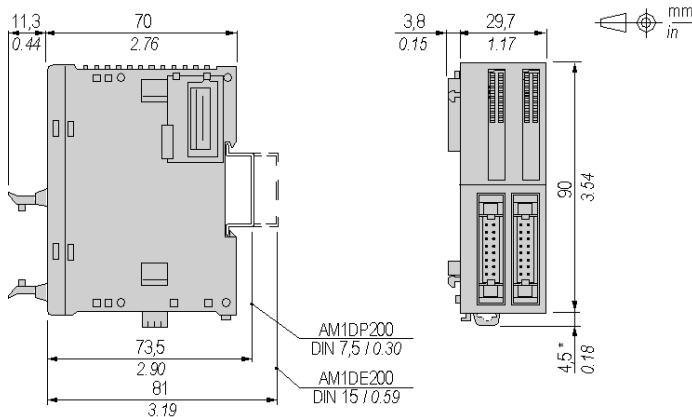
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO32UK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO32UK Electrical Specifications	
Isolation between output internal bus	500 VAC
Isolation between output terminal	Not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	20 mA (all outputs on) 10 mA (all outputs off)
Current draw on 24 Vdc internal bus	70 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO32UK Output Specifications	
Output channels	32
Common lines	1 common line for 16 channels
Output current	0.12 A max per output
	2 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	300 μ s
Turn off time	300 μ s
Protection against overload and short circuit	External fuse = 0.125 A Max fast blow
Protection against reverse polarity	Not protected

Connecting the TM2DDO32UK Module

Introduction

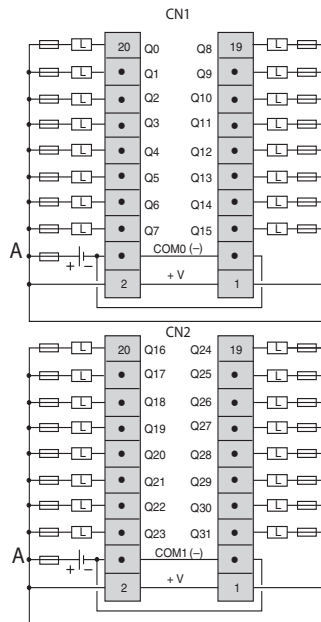
TM2DDO32UK is a 32-channel, transistor output module.
 This module is fitted with an HE10 connector for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO32UK Wiring Diagram

The following diagram shows the connection of the outputs module and the transistor output wiring (*see page 37*).



- Terminals on CN1 and CN2 are **not** connected together internally.
- The COM0(-) terminals are connected together internally.
- The COM1(-) terminals are connected together internally.
- The +V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- A is the sink wiring (positive logic).

TM2DDO32TK Discrete Transistor Output Module

15

Overview

This chapter describes the TM2DDO32TK 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 TM2DDO32TK Module	116
Characteristics of the TM2DDO32TK Module	117
Connecting the TM2DDO32TK Module	119

Presentation of the TM2DDO32TK Module

Main Specifications

TM2DDO32TK Main Specifications	
Output points and common lines	32 transistor outputs in 2 common lines
Signal type output	Source
Output voltage	24 VDC
Connection type	HE10 connector

Characteristics of the TM2DDO32TK Module

Introduction

This section provides a description of the power limitation, the electrical and the output specifications of the TM2DDO32TK module.

See also Environmental Specifications (*see page 39*).

⚠ DANGER

FIRE HAZARD

Possible current overload; size wire accordingly.

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

For more information refer to Installation Guidelines.

⚠ WARNING

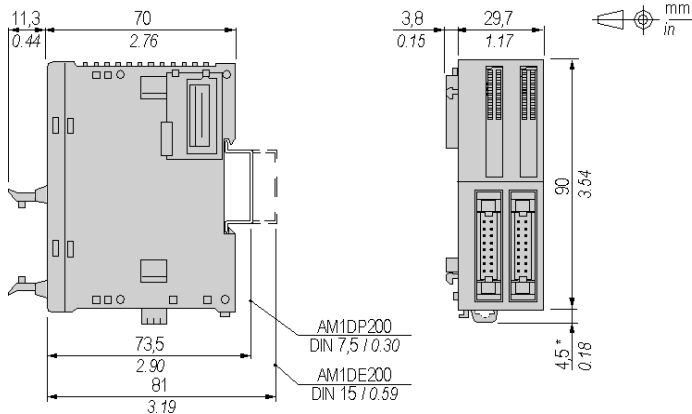
UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

Do not exceed any of the rated values specified below.

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

Dimensions

The following diagrams show the dimensions for the TM2DDO32TK module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DDO32TK Electrical Specifications	
Isolation between output and internal bus	500 VAC
Isolation between output terminal	Not isolated
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	25 mA (all outputs on) 10 mA (all outputs off)
Current draw on 24 Vdc internal bus	40 mA (all outputs on) 0 mA (all outputs off)

Output Specifications

TM2DDO32TK Output Specifications	
Output channels	32
Common lines	1 common line for 16 channels
Output current	0.4 A max per output 2 A max per common line
Output voltage	24 VDC
Output voltage range	20.4...28.8 VDC
Voltage drop	0.4 VDC max
Turn on time	450 μ s
Turn off time	450 μ s
Output protection against overcurrent and short circuit	Current limitation $I < 1.7$ A Output and temperature protection
Protection against temperature	32 outputs switch off Automatic restart when temperature decrease
Protection against reverse polarity	Protected

Connecting the TM2DDO32TK Module

Introduction

TM2DDO32TK is a 32-channel, transistor output module.

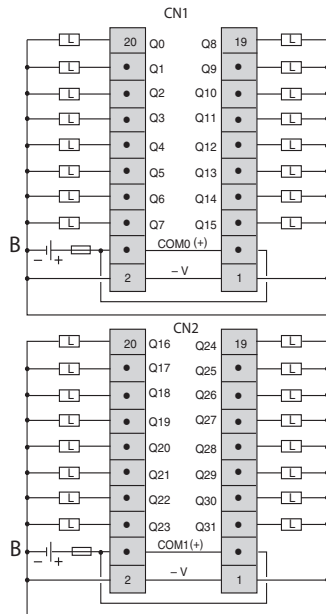
This module is fitted with an HE10 connector for the connection of outputs.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DDO32TK Wiring Diagram

The following diagram shows the connection of the outputs module and the transistor output wiring (*see page 37*).



- Terminals CN1 and CN2 are **not** connected together internally.
- The COM0(+) terminals are connected together internally.
- The COM1(+) terminals are connected together internally.
- The -V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).

TM2DMM8DRT Discrete Mixed I/O Module

16

Overview

This chapter describes the TM2DMM8DRT 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 TM2DMM8DRT Module	122
Characteristics of the TM2DMM8DRT Module	123
Connecting the TM2DMM8DRT Module	127

Presentation of the TM2DMM8DRT Module

Main Specifications

TM2DMM8DRT Main Specifications	
Connection type	Removable screw terminal block
Inputs	
Number of input channels	4
Input type	Type I
Signal type input	Sink/Source
Rated input voltage	24 VDC
Outputs	
Output points and common lines	4 contacts in 1 common line
Output type	Relay (1 NO contact)
Output Voltage/current	24 VDC/2 A max 240 VAC/2 A max

Characteristics of the TM2DMM8DRT Module

Introduction

This section provides a description of the power limitation, the electrical, the input and the output specifications of the TM2DMM8DRT module.

See also Environmental Specifications (*see page 39*).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION & EQUIPMENT DAMAGE

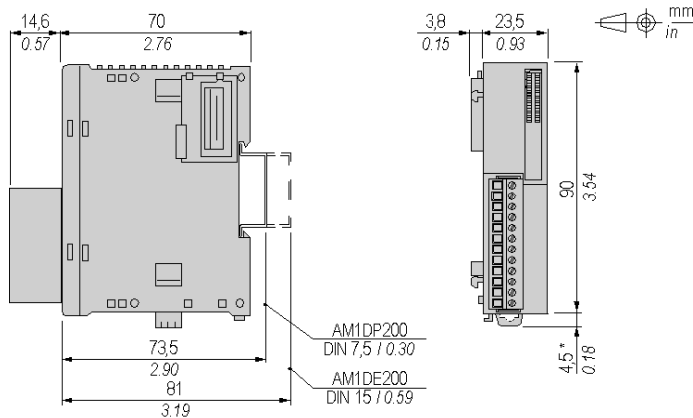
Do not exceed any of the rated values specified below.

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

For more information refer to Installation Guidelines.

Dimensions

The following diagrams show the dimensions for the TM2DMM8DRT module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DMM8DRT Electrical Specifications	
Connector insertion/removal durability	Over 100 times
Current draw on 5 Vdc internal bus	25 mA (all inputs and outputs on) 5 mA (all inputs and outputs off)
Current draw on 24 Vdc internal bus	20 mA (all inputs and outputs on) 0 mA (all inputs and outputs off)

Input Specifications

TM2DMM8DRT Input Specifications	
Number of input channels	4
Common lines	1
Input signals type	sink or source
Rated input voltage	24 VDC
Input voltage range	20.4...28.8 VDC
Rated input current at 24 Vdc	7 mA
Input impedance	3.4 k Ω
OFF state	U<5 Vdc
ON state	U>15 Vdc I>2 mA
Turn on time	4 ms
Turn off time	4 ms
Isolation between input internal bus	500 VAC
Isolation Between input terminals	Not isolated
Input type	Type I (IEC 61131-2)

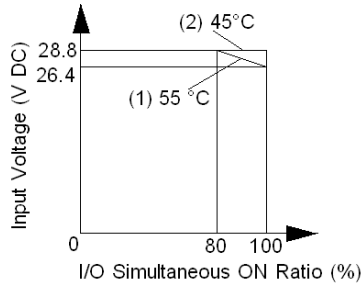
Output Specifications

TM2DMM8DRT Output Specifications	
Output channels	4
Common lines	1 common line for 4 channels
Output current	2 A max per output
	7 A max per common line
Rated voltage	24 VDC
	230 / 240 VAC
Max voltage	30 VDC
	264 VAC
In rush current	2 A max
Minimum switching load	0.1 mA
	0.1 VDC
Contact resistance	45 mΩ max
Mechanical life	20 million operations minimum (no load 1,800 operations/h)
Resistive load Inductive load	See Power Limitation below
Capacitive load (ex:TeSys U starters	Forbidden
Isolation between output and internal bus	2300 VAC
Isolation between output and ground terminals	1500 VAC
Isolation between output groups	1500 VAC
T on	12 ms
T off	10 ms

Usage Limits

When using TM2DMM8DRT:

- At an ambient temperature of 55°C (131°F) in the normal mounting direction, limit the inputs and outputs, respectively, which turn on simultaneously along line (1).
- At 45°C (113°F), all inputs and outputs can be turned on simultaneously at 28.8 VDC as indicated with line (2).



Power Limitation

The following table shows the power limitation of the TM2DMM8DRT module depending on the voltage, the type of load and the number of operations required:

TM2DMM8DRT Power Limitation				
Voltage	24V	120V	240V	Number of operations
Power of resistive loads AC-12		240 VA 80 VA	480 VA 160 VA	100,000 300,000
Power of inductive loads AC-15 (cos α =0.3)		60 VA 18 VA	120 VA 36 VA	100,000 300,000
Power of inductive loads AC-14 (cos α =0.7)		120 VA 36 VA	240 VA 72 VA	100,000 300,000
Power of resistive loads DC-12	48 W 16 W			100,000 300,000
Power of inductive loads DC-13 L/R=7ms	24 W 7.2 W			100,000 300,000

Connecting the TM2DMM8DRT Module

Introduction

TM2DMM8DRT is a 4-channel input/4-channel output, mixed I/O module.

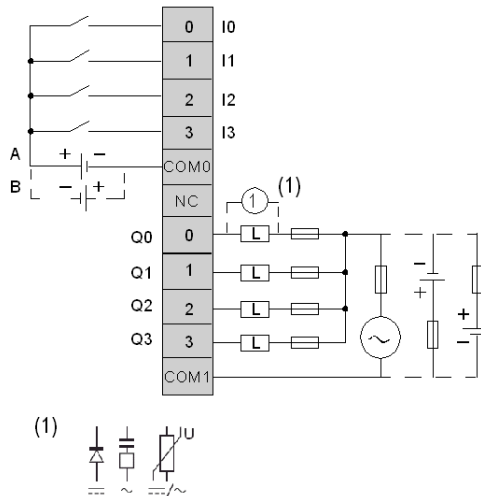
This module is fitted with a removable connection screw terminal block for the connection of inputs, outputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DMM8DRT Wiring Diagram

The following diagram shows the connection of the inputs module to the sensors (on the left) and the connection of the outputs with the relay output wiring (*see page 37*) (on the right).



- The COM0 and COM1 terminals are **not** connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
- (1) is the protection for inductive load.

TM2DMM24DRF Discrete Mixed I/O Module

17

Overview

This chapter describes the TM2DMM24DRF 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 TM2DMM24DRF Module	130
Characteristics of the TM2DMM24DRF Module	131
Connecting the TM2DMM24DRF Module	135

Presentation of the TM2DMM24DRF Module

Main Specifications


TM2DMM24DRF Main Specifications	
Connection type	Non removable spring terminal block
Inputs	
Number of input channels	16
Input type	Type I
Signal type input	Sink/Source
Rated input voltage	24 VDC
Outputs	
Output points and common lines	8 contacts in 2 common lines
Output type	Relay (1 NO contact)
Output Voltage/current	24 VDC/2 A max 240 VAC/2 A max

Characteristics of the TM2DMM24DRF Module

Introduction

This section provides a description of the power limitation, the electrical, the input and the output specifications of the TM2DMM24DRF module.

See also Environmental Specifications (*see page 39*).

 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 information refer to Installation Guidelines.

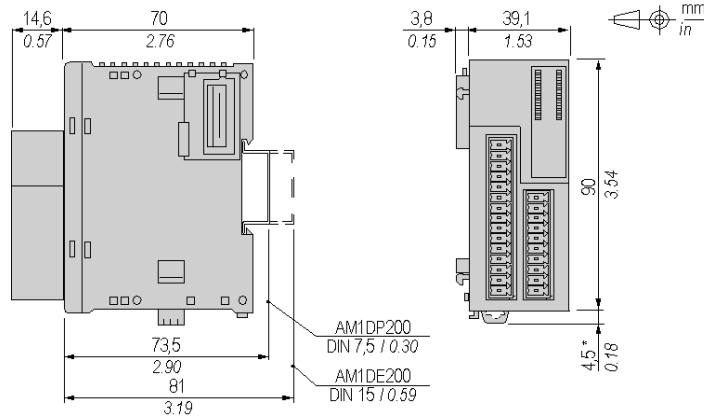
Rules

The table below shows the characteristics of the non-removable spring terminal blocks:

Characteristic		Available
Type of terminal blocks		Spring terminal blocks
Number of wires accommodated		1
Wire gauges accommodated	minimum	AWG 20 (0.5 mm ²)
	maximum	AWG 18 (1 mm ²)
Wiring constraints		To insert and remove wires from the connectors, use a 2,5 x 0,4 mm (0.10 x 0.02 in) screwdriver to open the round receptacle by pushing on the corresponding plate. Push the flexible plate down on the outside (the side closest to the corresponding receptacle). A screwing (rotating) or bending motion is not required.

Dimensions

The following diagrams show the dimensions for the TM2DMM24DRF module.



NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Electrical Specifications

TM2DMM24DRF Electrical Specifications	
Current draw on 5 Vdc internal bus	70 mA (all inputs and outputs on) 10 mA (all inputs and outputs off)
Current draw on 24 Vdc internal bus	40 mA (all inputs and outputs on) 0 mA (all inputs and outputs off)

Input Specifications

TM2DMM24DRF Input Specifications	
Number of input channels	16
Common lines	1
Input signals type	sink or source
Rated input voltage	24 VDC
Input voltage range	20.4...28.8 VDC
Rated input current at 24 Vdc	7 mA
Input impedance	3.4 kΩ
OFF state	U<5 Vdc
ON state	U>15 Vdc I>2 mA

TM2DMM24DRF Input Specifications	
Turn on time	4 ms
Turn off time	4 ms
Isolation between input and internal bus	500 VAC
Isolation Between input terminals	Between input terminals: not isolated
Input type	Type I (IEC 61131-2)

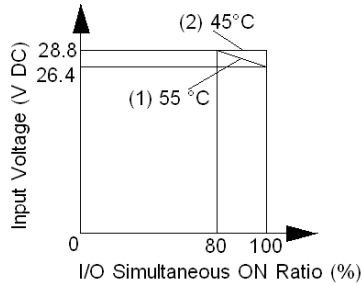
Output Specifications

TM2DMM24DRF Output Specifications	
Output channels	8
Common lines	1 common line for 4 channels
Output current	2 A max per output
	7 A max per common line
Rated voltage	24 VDC
	230 / 240 VAC
Max voltage	30 VDC
	264 VAC
In rush current	2 A max
Minimum switching load	0.1 mA
	0.1 VDC
Contact resistance	45 mΩ max
Mechanical life	20 million operations minimum (no load 1,800 operations/h)
Resistive load Inductive load	See Power Limitation below
Capacitive load (ex:TeSys U starters)	Forbidden
Isolation between output and internal bus	2300 VAC
Isolation between output and ground terminals	1500 VAC
Isolation between output groups	1500 VAC
T on	12 ms
T off	10 ms

Usage Limits

When using TM2DMM24DRF:

- At an ambient temperature of 55°C (131°F) in the normal mounting direction, limit the inputs and outputs, respectively, which turn on simultaneously along line (1).
- At 45°C (113°F), all inputs and outputs can be turned on simultaneously at 28.8 VDC as indicated with line (2).



Power Limitation

The following table shows the power limitation of the TM2DMM24DRF module depending on the voltage, the type of load and the number of operations required:

TM2DMM24DRF Power Limitation				
Voltage	24V	120V	240V	Number of operations
Power of resistive loads AC-12		240 VA 80 VA	480 VA 160 VA	100,000 300,000
Power of inductive loads AC-15 (cos $\alpha=0.3$)		60 VA 18 VA	120 VA 36 VA	100,000 300,000
Power of inductive loads AC-14 (cos $\alpha=0.7$)		120 VA 36 VA	240 VA 72 VA	100,000 300,000
Power of resistive loads DC-12	48 W 16 W			100,000 300,000
Power of inductive loads DC-13 L/R=7ms	24 W 7,2 W			100,000 300,000

Connecting the TM2DMM24DRF Module

Introduction

TM2DMM24DRF is a 16-channel input/8-channel output, mixed I/O module.

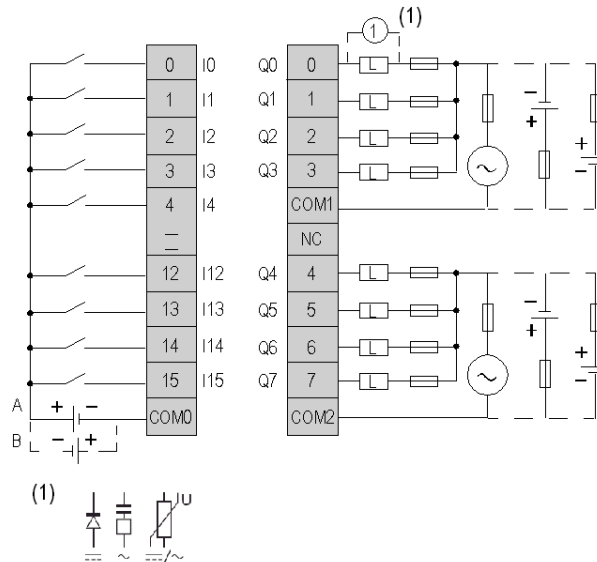
This module is fitted with a non removable connection spring terminal block for the connection of inputs, outputs and power supply.

Wiring Rules

See Wiring Rules and Recommendations (*see page 35*).

TM2DMM24DRF Wiring Diagram

The following diagram shows the connection of the inputs module to the sensors (on the left) and the connection of the outputs with the relay output wiring (*see page 37*) (on the right).



- The COM0, COM1 and COM2 terminals are **not** connected together internally.
- Connect an appropriate fuse for the load.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
- (1) is the protection for inductive load.

TELEFAST 2 Connection Interface Links for the Discrete I/O Modules

18

Overview

This chapter describes the TELEFAST 2 interface links for TM2 discrete input/output modules.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
General Overview of TELEFAST 2 Connection Interfaces for Discrete I/O Modules	138
Dimensions of the Telefast [®] bases	141
Specifications for the Telefast [®] Bases	142
Telefast [®] Bases Wiring Schematics	144
Wiring Specifications for the TeleFast Cables	149

General Overview of TELEFAST 2 Connection Interfaces for Discrete I/O Modules

Introduction

The TELEFAST 2 system is a group of products which enables discrete input and output modules to be quickly connected to operational components. It replaces 20-pin terminal blocks, thus doing away with single wire connections.

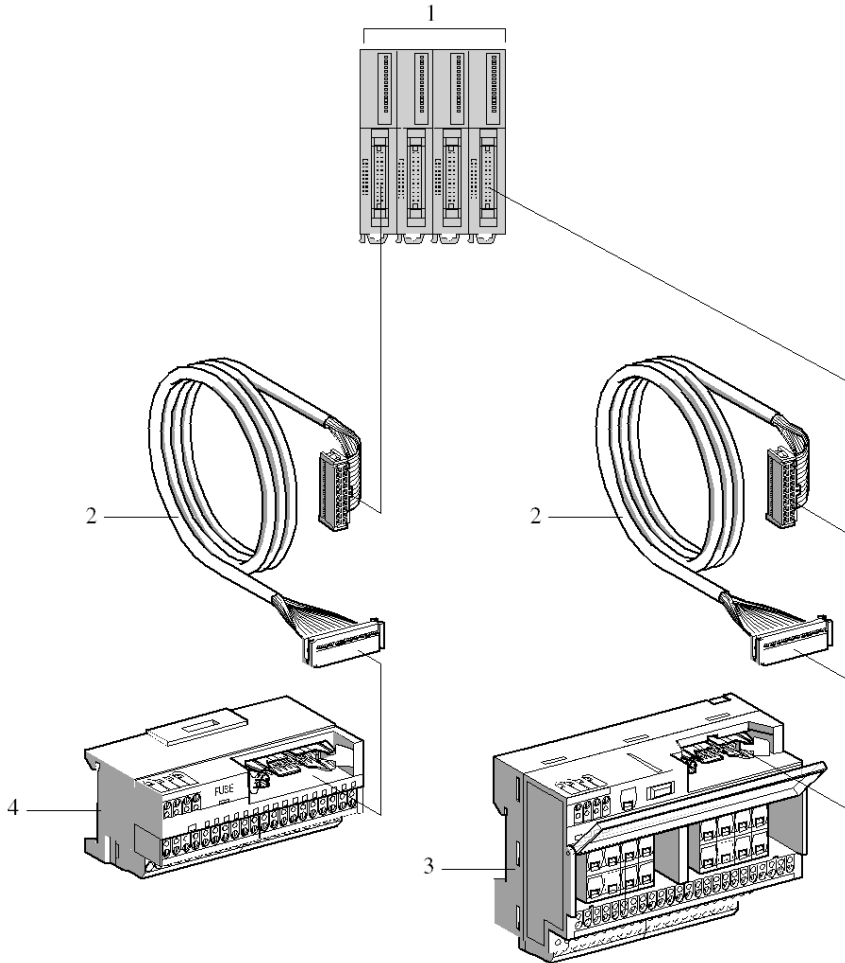
The TELEFAST 2 system, which consists of connection bases for interfaces and connection cables, can be connected to modules which are fitted with 20-pin connectors.

Several base types can be identified:

- connection interface bases for 8/12/16-channel discrete inputs/outputs
- bases for connection and adaptation interfaces for inputs with 16 isolated channels
- bases for connection and adaptation interfaces for static outputs with 8 and 16 channels
- bases for connection and adaptation interfaces relating to relay outputs with 8 and 16 channels
- bases for adapter splitting 16 channels into 2 x 8 channels
- bases for connection and adaptation interfaces relating to outputs, with or without removable electromechanical or static relays, with 16 channels
- input bases for 12.5-mm wide static relays

Illustration

The following illustration shows the Telefast® system for discrete I/O modules:



Legend

Telefast system parts shown in the previous illustration are listed below:

1. Input and output modules with 20-way HE 10 connectors. The modular sizes available are 16 or 32 I/O.
2. Cable (ABFT20E**0) equipped with a 20-way HE 10 connector at each end. This cable is available in 0.5, 1, 2 and 3 meter lengths (AWG 28/0.08 mm²).
3. 16 channel sub-base (ABE7E16SPN22 or ABE7E16SRM20) for output extension modules.
4. 16 channel sub-base (ABE7E16EPN20 or ABE7E16SPN20) for input or output extension modules.

Compatibility Table

The following table describes compatibility between I/O modules and Telefast®:

		Discrete I/O modules	
		Inputs	Outputs
Incorporated in Twido programmable controllers		TM2DDI16DK (16 I) TM2DDI32DK (32 I)	TM2DDO16TK (16 O) TM2DDO32TK (32 O)
Terminal block types		HE 10 connector, 20-way	
Connection to Twido programmable controller		ABFT20E**0 (HE 10, 20-way)	
Passive connection sub-bases			
16 channels	ABE7E16EPN20	Yes	
	ABE7E16SPN2*		Yes
Output adapter bases			
16 channels	ABE7E16SRM20		Yes

Dimensions of the Telefast® bases

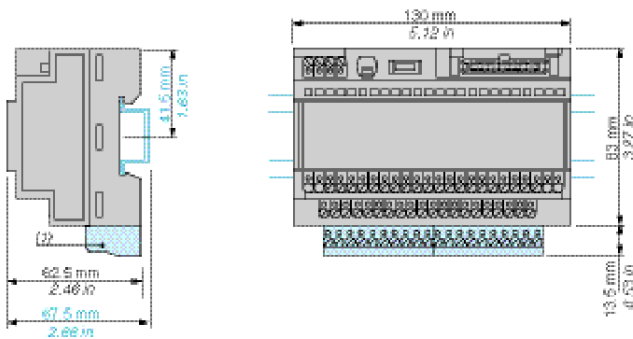
Introduction

The following section shows the dimensions for the Telefast® bases.

ABE7E16SPN22 ABE7E16SRM20

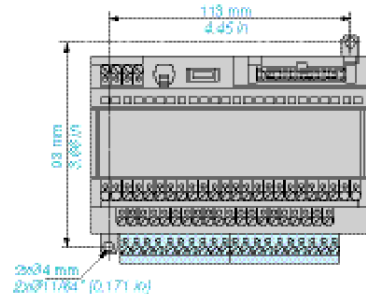
The following diagrams show the dimensions for the ABE7E16SPN22 and ABE7E16SRM20 Telefast® bases.

Mounting on 35 mm rail



(1) ABE7E16SPN22, ABE7E16SRM20

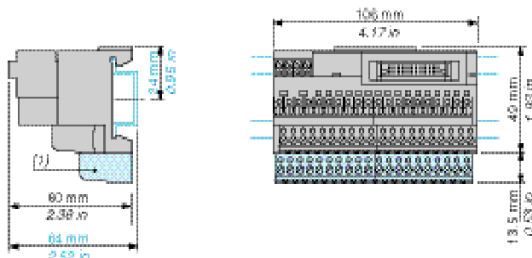
Screw fixing (retractable lugs)



ABE7E16EPN20 ABE7E16SPN20

The following diagrams show the dimensions for the ABE7E16EPN20 and ABE7E16SPN20 Telefast® bases.

Mounting on 35 mm rail



(1) ABE7E16EPN20, ABE7E16SPN20

Specifications for the Telefast® Bases

Introduction

This section provides specifications for the Telefast® bases.

See Catalog "Advantys, TeleFast® pre-wired system" for more specifications on these Telefast® bases.

Supply Specifications (controller side)

The following table provides supply specifications on the Telefast® bases at controller side:

Supply voltage	Conforming to IEC 61131-2	VDC	19..30(Un=24)
Maximum supply current per sub-base		A	2
Voltage drop on supply fuse		VDC	0.3
Supply overload and short-circuit protection by quick-blow fuse (included)		A	2

Control Circuit Specifications (controller side)

The following table provides specifications on the Telefast® bases control circuit (per channel) at controller side:

Sub-base type	ABE 7	Unit	Passive connection sub-bases for discrete signals		Connection sub-bases with soldered relays
			E16EPN20	E16SPN2*	E16SRM20
Number of channels	Passive input		16	–	–
	Passive output		–	16	–
	Relay output		–	–	16
Rated voltage Ue		VDC	24		
Min/max voltage	Conforming to IEC 61131-2	VDC	20.4/26.4	20.4/28.8	19/30
Internal current per channel at Ue	Passive input	mA	–		
	Passive output	mA	–	– (3.2 for ABE7 E16SPN22)	–
	Relay output	mA	–	–	9
State 1 guaranteed	Relay output	V	–		
State 0 guaranteed	Relay output	V	–		
State 1 guaranteed	Relay output	V	–		
State 0 guaranteed	Relay output	V	–		
Conformity	Conforming to IEC 61131-2		Type 1	–	–

Output Circuit Specifications (preactuator side)

The following table provides specifications on the Telefast® bases output circuit (per channel) at preactuator side:

Sub-base type		Unit	Passive connection sub-bases for discrete signals	Connection sub-bases with soldered relays
ABE 7			E16SPN2*	E16SPM20
Number of channels	Passive output		16	–
	Relay output		–	16
Contact arrangement			–	1 N/O relay
Rated voltage at Ue	Passive output	V DC	24	–
	Relay output	V DC	–	5...30
		V AC	–	110...250
Current switched per I/O channel	Passive input/output	mA	–/100	–
	Relay output	A	–	3
Maximum current per common	Passive output	A	1.6	–
	Relay output	A	–	5
Rated operational current (60 °C max) (for 500 000 operations)	DC12	A	–	–/3
	DC13	A	–	–/0.5
	AC12, relay	A	–	2
	AC15, relay	A	–	0.4
Minimum current		mA	–	–/100
Rated insulation voltage		V	Not isolated	300
Maximum response time	From state 0 to state 1	Relay output	ms	–
	From state 1 to state 0	Relay output	ms	–
Channel fuse protection		mA	– (125 for ABE7 E16SPN22)	–

Telefast® Bases Wiring Schematics

Introduction

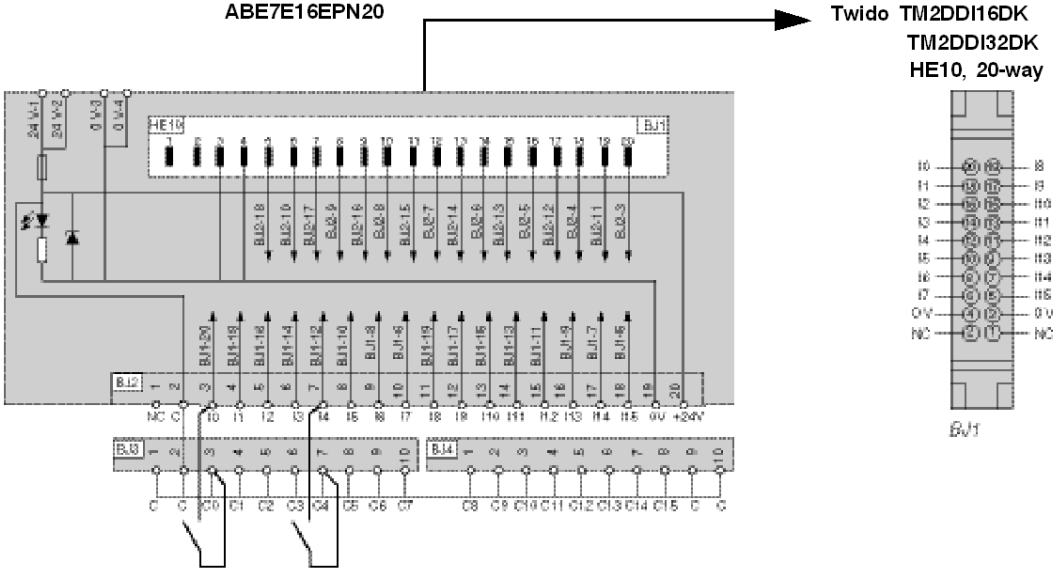
This section provides wiring schematics for the Telefast® bases.

NOTE: When multiple ABE7 modules are connected to a single PLC output source, module outputs may remain active after an internal fuse is removed or blown. To deactivate module outputs or to service the equipment, halt the PLC, disconnect all power and disconnect the HE10.

 WARNING
ABE7 INTERNAL FUSE MAY NOT DEACTIVATE OUTPUTS
If an ABE7 internal fuse opens or is removed, halt the PLC, disconnect all power from all devices, and disconnect the HE10 connections.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

ABE7E16EPN20

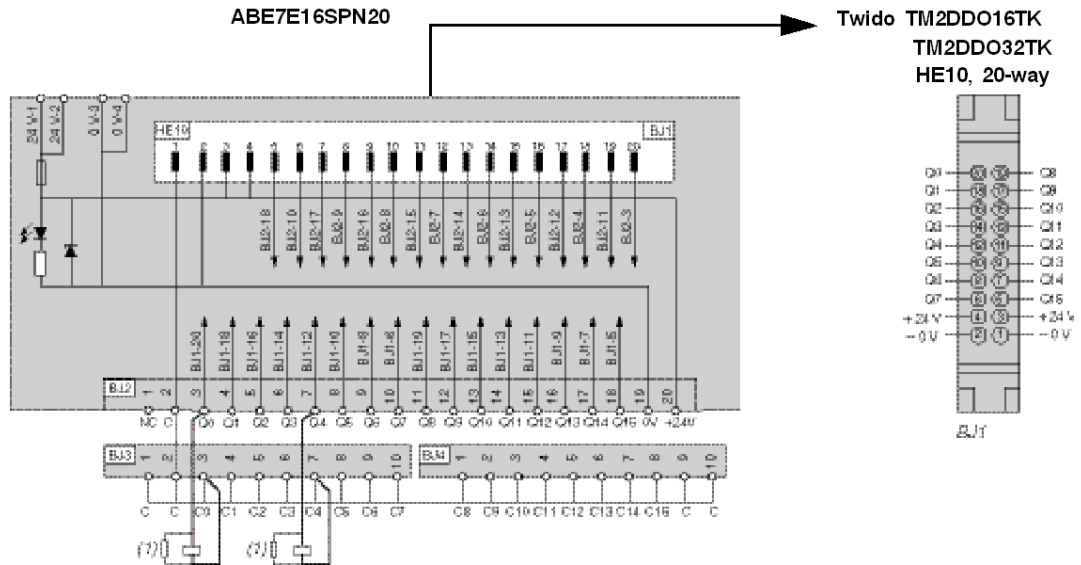
The following diagram provides specifications for the ABE7E16EPN20 Telefast® base wiring.



(1) Example of output connections.
 When connecting an inductive load, include a diode or a varistor.

ABE7E16SPN20

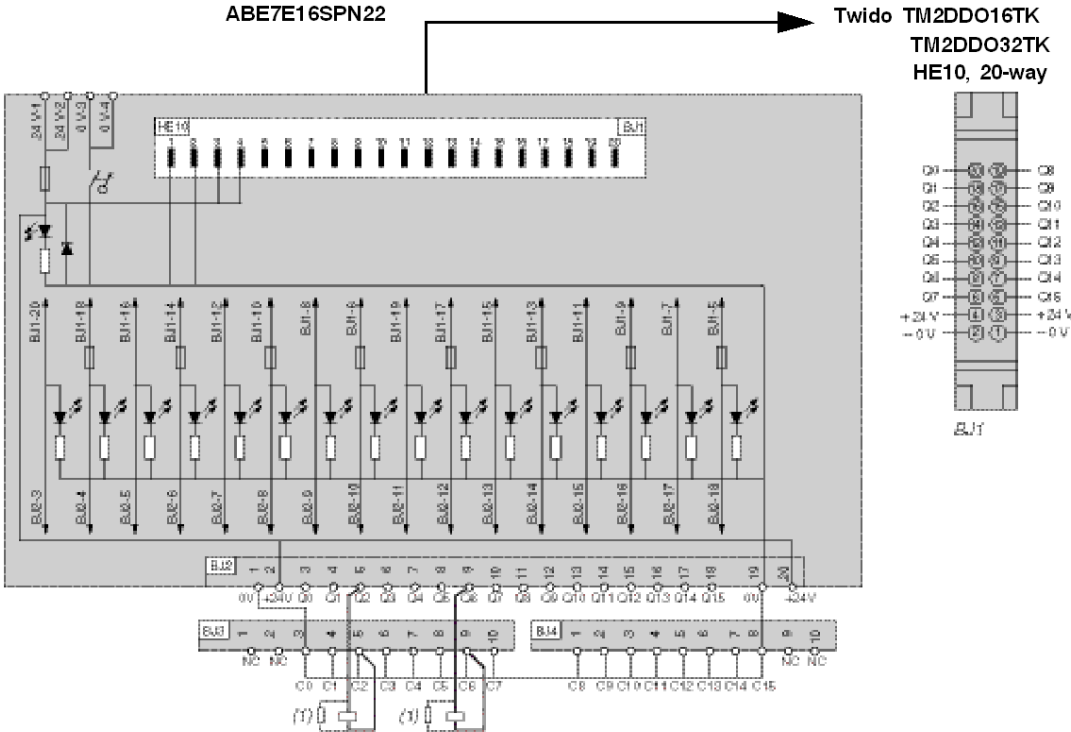
The following diagram provides specifications for the ABE7E16SPN20 Telefast® base wiring.



(1) Example of output connections.
 When connecting an inductive load, include a diode or a varistor.

ABE7E16SPN22

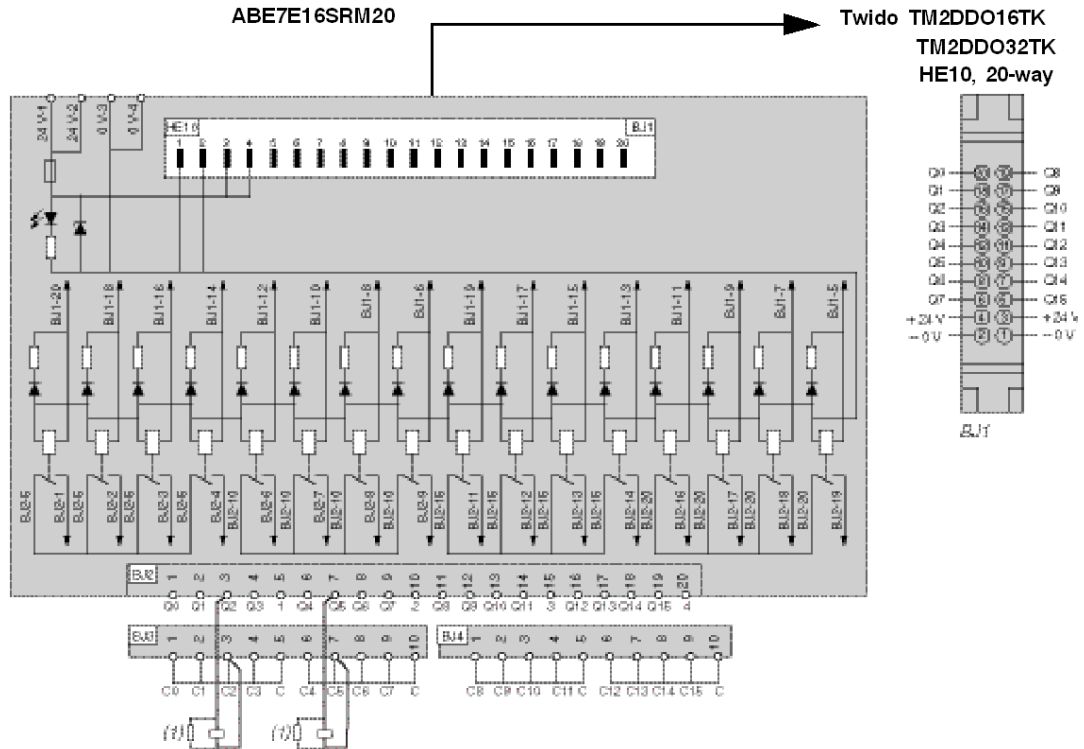
The following diagram provides specifications for the ABE7E16SPN22 Telefast® base wiring.



(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

ABE7E16SRM20

The following diagram provides specifications for the ABE7E16SRM20 Telefast® base wiring.



(1) Example of output connections.

When connecting an inductive load, include a diode or a varistor.

Wiring Specifications for the TeleFast Cables

Introduction

This section provides cable wiring specifications for the TWDFCW30K/50K TeleFast cables that connect to the controller discrete I/Os.

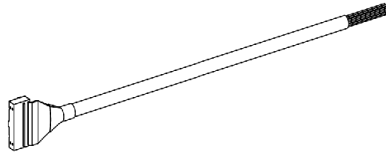
TWDFCW30K/50K

The following table provides specifications for the TWDFCW30K/50K with free wires for 20-pin Modular controller.

Pin Connector A Controller Connector Side	Wire Color
1	White
2	Brown
3	Green
4	Yellow
5	Grey
6	Pink
7	Blue
8	Red
9	Black
10	Violet
11	Grey/Pink
12	Red/Blue
13	White/Green
14	Brown/Green
15	White/Yellow
16	Yellow/Brown
17	White/Grey
18	Grey/Brown
19	White/Pink
20	Pink/Brown

Illustration

Illustration of a TWDFCW30K cable:



Agency Compliance

19

Agency Requirements

Introduction

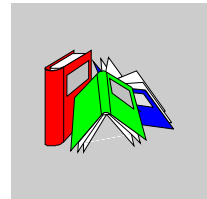
This section provides agency standards for the TM2 discrete I/O modules.

Standards

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

Reference	CE	Tüv IEC EN 61131-2 edition 2 2003	UL	CSA	UL / CSA Haz loc	Nemko - GL - LR - DNV ABS - BV
TM2DAI8DT	OK		OK	OK	OK	
TM2DDI16DK	OK	OK	OK	OK	OK	OK
TM2DDI16DT	OK	OK	OK	OK	OK	OK
TM2DDI32DK	OK	OK	OK	OK	OK	OK
TM2DDI8DT	OK	OK	OK	OK	OK	OK
TM2DDO16TK	OK	OK	OK	OK	OK	OK
TM2DDO16UK	OK	OK	OK	OK	OK	OK
TM2DDO32TK	OK	OK	OK	OK	OK	OK
TM2DDO32UK	OK	OK	OK	OK	OK	OK
TM2DDO8TT	OK	OK	OK	OK	OK	OK
TM2DDO8UT	OK	OK	OK	OK	OK	OK
TM2MM24DRF	OK	OK	OK	OK	OK	OK
TM2MM8DRT	OK	OK	OK	OK	OK	OK
TM2DRA16RT	OK	OK	OK	OK	OK	OK
TM2DRA8RT	OK	OK	OK	OK	OK	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.

F

free wire

The end of a discrete I/O cable whose wires do not have a connector. This scheme provides connectivity from controller to discrete I/O points.

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 filter

A special function that rejects input noises. This function is useful for eliminating input noises and chatter in limit switches. All inputs provide a level of input filtering using the hardware. Additional filtering using the software is also configurable through the programming or the configuration software.

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.

N

NC contact

Normally Closed contact. A relay contact pair that is closed when the relay coil is deenergized and open when the coil is energized.

NO contact

Normally Open contact. A relay contact pair that is open when the relay coil is deenergized and closed when the coil is energized.

O

output terminals

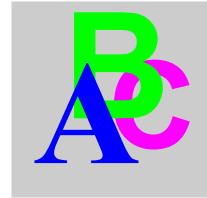
Terminals at the front of expansion I/O modules used to connect output signals to output devices such as electromechanical relays and solenoid valves.

P

PWR LED

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

Index



A

- Accessories, *20*
- Agency requirements, *151*
- Assembling to a controller, *27*

C

- Cables
 - Discrete I/O cables, *20*
 - Telefast cables, *20*
- connection bases, *137*
- Controllers
 - Disassembling a module, *29*

D

- Dimensions
 - TM2DAI8DT, *43*
 - TM2DDI16DK, *61*
 - TM2DDI16DT, *55*
 - TM2DDI32DK, *67*
 - TM2DDI8DT, *49*
 - TM2DDO16TK, *105*
 - TM2DDO16UK, *100*
 - TM2DDO32TK, *117*
 - TM2DDO32UK, *111*
 - TM2DDO8TT, *93*
 - TM2DDO8UT, *87*
 - TM2DMM24DRF, *132*
 - TM2DMM8DRT, *123*
 - TM2DRA16RT, *79*
 - TM2DRA8RT, *73*

DIN rail

- 15 mm AM1DE200 rail, *21*
- 7,5 mm AM1DP200 rail, *21*
- Discrete I/O modules, *17*
 - Physical description, *19*
 - Specifications, *17*

I

- Installation
 - Read before starting, *25*
- Installation , *23*
- Installing on a mounting rail, *30*

M

- Mounting hole layout, *34*
- Mounting Position, *26*
- Mounting strip installation, *33*

P

- Physical description
 - Connector HE10, *19*
 - Terminal block, *19*
- Power limitation
 - TM2DMM24DRF, *134*
 - TM2DMM8DRT, *126*
 - TM2DRA16RT, *81*
 - TM2DRA8RT, *75*

R

Removing from a mounting rail, *31*

S

Specifications

Discrete I/O modules, *17*

Standards, *151*

Starting, *25*

T

Telefast

Dimensions, *141*

Specifications, *142*

Wiring schematics, *144*

TELEFAST 2, *137*

Terminal block end clamp type AB1AB8P35,
20

TM2 I/O modules

Environmental specifications, *39*

Relay and transistor output, *37*

Wiring rules, *35*

TM2DAI8DT, *41, 42, 43, 45*

TM2DDI16DK, *59, 60, 61, 64*

TM2DDI16DT, *53, 54, 55, 58*

TM2DDI32DK, *65, 66, 67, 70*

TM2DDI8DT, *47, 48, 49, 52*

TM2DDO16TK, *103, 104, 105*

TM2DDO16UK, *97, 98, 99*

TM2DDO32TK, *115, 116, 117*

TM2DDO32UK, *109, 110, 111*

TM2DDO8TT, *91, 92, 93*

TM2DDO8UT, *85, 86, 87*

TM2DMM24DRF, *129, 130, 131*

TM2DMM8DRT, *121, 122, 123*

TM2DRA16RT, *77, 78, 79*

TM2DRA8RT, *71, 72, 73*

TWDXMT5 mounting strip, *21*

U

Usage limits

TM2DDI16DK, *63*

TM2DDI16DT, *57*

TM2DDI32DK, *69*

TM2DDI8DT, *51*

TM2DMM24DRF, *134*

TM2DMM8DRT, *126*

W

Wiring diagram

TM2DAI8DT, *45*

TM2DDI16DK, *64*

TM2DDI16DT, *58*

TM2DDI32DK, *70*

TM2DDI8DT, *52*

Wiring schematics

Telefast bases, *144*