

Modicon TM2

Modules Configuration Programming Guide

05/2019

EIO00000003432.00

www.schneider-electric.com



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

You agree not to reproduce, other than for your own personal, noncommercial use, all or part of this document on any medium whatsoever without permission of Schneider Electric, given in writing. You also agree not to establish any hypertext links to this document or its content. Schneider Electric does not grant any right or license for the personal and noncommercial use of the document or its content, except for a non-exclusive license to consult it on an "as is" basis, at your own risk. All other rights are reserved.

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

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

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

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

© 2019 Schneider Electric. All rights reserved.

Table of Contents



	Safety Information	5
	About the Book	7
Chapter 1	I/O Configuration General Information	11
	I/O Configuration General Practices	12
	TM2 General Description	14
	Adding an Expansion Module	16
	Optional I/O Expansion Modules	18
	Configuring the Fallback Behavior	21
Chapter 2	TM2 Digital I/O Modules	23
	TM2DAI8DT	24
	TM2DDI8DT	25
	TM2DDI16DT	26
	TM2DDI16DK	28
	TM2DDI32DK	30
	TM2DRA8RT	32
	TM2DRA16RT	34
	TM2DDO8UT	36
	TM2DDO8TT	38
	TM2DDO16UK	40
	TM2DDO16TK	42
	TM2DDO32UK	44
	TM2DDO32TK	46
	TM2DMM8DRT	48
	TM2DMM24DRF	50
Chapter 3	TM2 Analog I/O Modules	53
	TM2AMI2HT	54
	TM2AMI2LT	56
	TM2AMI4LT	59
	TM2AMI8HT	63
	TM2ARI8HT	66
	TM2ARI8LRJ	71
	TM2ARI8LT	75
	TM2AMO1HT	79
	TM2AVO2HT	81

	TM2AMM3HT	83
	TM2AMM6HT	86
	TM2ALM3LT	89
	Analog I/O Modules Diagnostics	92
Glossary		95
Index		99

Safety Information



Important Information

NOTICE

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



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



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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

PLEASE NOTE

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

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

About the Book



At a Glance

Document Scope

This document describes the configuration of the TM2 Input/Output modules. For further information, refer to the separate documents provided in the EcoStruxure Machine Expert online help.

Validity Note

This document has been updated with the release of EcoStruxure™ Machine Expert V1.1.

Related Documents

Title of Documentation	Reference Number
Magelis XBTGC HMI Controller Programming Guide	<i>EIO0000000632 (ENG)</i> <i>EIO0000000633 (FRE)</i> <i>EIO0000000634 (GER)</i> <i>EIO0000000635 (SPA)</i> <i>EIO0000000636 (ITA)</i> <i>EIO0000000637 (CHS)</i>
Modicon TM2 Digital I/O Modules Hardware Guide	<i>EIO0000000028 (ENG)</i> <i>EIO0000000029 (FRE)</i> <i>EIO0000000030 (GER)</i> <i>EIO0000000031 (SPA)</i> <i>EIO0000000032 (ITA)</i> <i>EIO0000000033 (CHS)</i>
Modicon TM2 Analog I/O Modules Hardware Guide	<i>EIO0000000034 (ENG)</i> <i>EIO0000000035 (FRE)</i> <i>EIO0000000036 (GER)</i> <i>EIO0000000038 (SPA)</i> <i>EIO0000000037 (ITA)</i> <i>EIO0000000039 (CHS)</i>

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

WARNING

LOSS OF CONTROL

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

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

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

WARNING

UNINTENDED EQUIPMENT OPERATION

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

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

Terminology Derived from Standards

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

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

Among others, these standards include:

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

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

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

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

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

Chapter 1

I/O Configuration General Information

Introduction

This chapter provides the general information to configure I/O expansion modules.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
I/O Configuration General Practices	12
TM2 General Description	14
Adding an Expansion Module	16
Optional I/O Expansion Modules	18
Configuring the Fallback Behavior	21

I/O Configuration General Practices

Match Software and Hardware Configuration

The I/O that may be embedded in your controller is independent of the I/O that you may have added in the form of I/O expansion. It is important that the logical I/O configuration within your program matches the physical I/O configuration of your installation. If you add or remove any physical I/O to or from the I/O expansion bus or, depending on the controller reference, to or from the controller (in the form of cartridges), then you must update your application configuration. This is also true for any field bus devices you may have in your installation. Otherwise, there is the potential that the expansion bus or field bus no longer function while the embedded I/O that may be present in your controller continues to operate.

WARNING

UNINTENDED EQUIPMENT OPERATION

Update the configuration of your program each time you add or delete any type of I/O expansions on your I/O bus, or you add or delete any devices on your field bus.

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

Use the `GetRightBusStatus` (see *Modicon M218 Logic Controller, System Functions and Variables, M218 PLCSystem Library Guide*) function regularly to monitor the expansion bus status.

The Optional Feature for I/O Expansion Modules

I/O expansion modules can be marked as optional in the configuration. The **Optional module** feature provides a more flexible configuration by the acceptance of the definition of modules that are not physically attached to the controller. Therefore, a single application can support multiple physical configurations of I/O expansion modules, allowing a greater degree of scalability without the necessity of maintaining multiple application files for the same application.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

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

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

NOTE: For more details about this feature, refer to Optional I/O Expansion Modules ([see page 18](#)).

TM2 General Description

Introduction

The range of TM2 expansion modules includes:

- Digital expansion modules
- Analog expansion modules

Digital Expansion Modules Features

The following table shows the digital expansion modules features:

Module reference	Channels	Channel type	Voltage/current	Reference page
Input Modules				
TM2DAI8DT	8	Inputs	120 Vac 7.5 mA	TM2DAI8DT (see page 24)
TM2DDI8DT	8	Inputs	24 Vdc 7 mA	TM2DDI8DT (see page 25)
TM2DDI16DT	16	Inputs	24 Vdc 7 mA	TM2DDI16DT (see page 26)
TM2DDI16DK	16	Inputs	24 Vdc 5 mA	TM2DDI16DK (see page 28)
TM2DDI32DK	32	Inputs	24 Vdc 5 mA	TM2DDI32DK (see page 30)
Output Modules				
TM2DRA8RT	8	Outputs Relay	30 Vdc/230 Vac 2 A max	TM2DRA8RT (see page 32)
TM2DRA16RT	16	Outputs Relay	30 Vdc/230 Vac 2 A max	TM2DRA16RT (see page 34)
TM2DDO8UT	8	Outputs Transistor sink	24 Vdc 0.3 A max per output	TM2DDO8UT (see page 36)
TM2DDO8TT	8	Outputs Transistor source	24 Vdc 0.5 A max per output	TM2DDO8TT (see page 38)
TM2DDO16UK	16	Outputs Transistor sink	24 Vdc 0.1 A max per output	TM2DDO16UK (see page 40)
TM2DDO16TK	16	Outputs Transistor source	24 Vdc 0.4 A max per output	TM2DDO16TK (see page 42)
TM2DDO32UK	32	Outputs Transistor sink	24 Vdc 0.1 A max per output	TM2DDO32UK (see page 44)
TM2DDO32TK	32	Outputs Transistor source	24 Vdc 0.4 A max per output	TM2DDO32TK (see page 46)

Module reference	Channels	Channel type	Voltage/current	Reference page
Mixed Modules				
TM2DMM8DRT	4 4	Inputs Outputs Relay	24 Vdc/7 mA 30 Vdc/230VAC 2 A max	TM2DMM8DRT (see page 48)
TM2DMM24DRF	16 8	Inputs Outputs Relay	24 Vdc/7 mA 30 Vdc/230VAC 2 A max	TM2DMM24DRF (see page 50)

Analog Expansion Modules Features

The following table shows the analog expansion modules features:

Module reference	Channels	Channel type	Voltage/current	Reference page
Input Modules				
TM2AMI2HT	2	High-level inputs	0...10 Vdc 4...20 mA	TM2AMI2HT (see page 54)
TM2AMI2LT	2	Low-level inputs	Thermocouple type J,K,T	TM2AMI2LT (see page 56)
TM2AMI4LT	4	Inputs	0...10 Vdc 0...20 mA PT100/1000 Ni100/1000	TM2AMI4LT (see page 59)
TM2AMI8HT	8	Inputs	0...20 mA 0...10 Vdc	TM2AMI8HT (see page 63)
TM2ARI8HT	8	Inputs	NTC / PTC	TM2ARI8HT (see page 66)
TM2ARI8LRJ	8	Inputs	PT100/1000	TM2ARI8LRJ (see page 71)
TM2ARI8LT	8	Inputs	PT100/1000	TM2ARI8LT (see page 75)
Output Modules				
TM2AMO1HT	1	Outputs	0...10 Vdc 4...20 mA	TM2AMO1HT (see page 79)
TM2AVO2HT	2	Outputs	+/- 10 Vdc	TM2AVO2HT (see page 81)
Mixed Modules				
TM2AMM3HT	2	Inputs	0...10 Vdc 4...20 mA 0...10 Vdc 4...20 mA	TM2AMM3HT (see page 83)
	1	Outputs		
TM2AMM6HT	4	Inputs	0...10 Vdc 4...20 mA 0...10 Vdc 4...20 mA	TM2AMM6HT (see page 86)
	2	Outputs		
TM2ALM3LT	2	Low-level inputs	Thermo J,K,T, PT100 0...10 Vdc 4...20 mA	TM2ALM3LT (see page 89)
	1	Outputs		

Adding an Expansion Module

Procedure

To add an expansion module to your controller, select the expansion module in the **Hardware Catalog**, drag it to the **Devices tree**, and drop it on one of the highlighted nodes.

For more information on adding a device to your project, refer to:

- Using the Drag-and-drop Method (see *EcoStruxure Machine Expert, Programming Guide*)
- Using the Contextual Menu or Plus Button (see *EcoStruxure Machine Expert, Programming Guide*)

NOTE: You cannot use TM2 modules in configurations that include the TM3 transmitter and receiver modules.

I/O Configuration

To configure an expansion module, proceed as follows:

Step	Action
1	In the Devices tree , double-click the expansion module you added. Result: The I/O Mapping tab is displayed.
2	Select the I/O Configuration tab.

I/O Mapping Tab Description

Variables can be defined and named in the **I/O Mapping** tab. Additional information such as topological addressing is also performed in this tab.

The **I/O Mapping** tab contains these columns:

Column	Description
Variable	Lets you map the channel to a variable. Double-click the variable icon to enter the variable name; if it is a new variable, the variable is created. You can also map a channel to an existing variable using the variables. Click the ... button to access Input Assistant . New variables are automatically created on each channel according to the Automatic I/O mapping project option settings.
Mapping	An icon indicates if the channel is mapped to a new variable or an existing variable.
Channel	Name of the channel of the device
Address	Address of the channel
Type	Data type of the channel
Current Value	Current value of the channel, displayed in online mode

Column	Description
Default Value	Double-click to change the default value. NOTE: The default value is applied to the I/O memory variable during certain states assumed by the controller. For more information on when and how the value is applied, see the Programming Guide (<i>see Modicon M218 Logic Controller, Programming Guide</i>) of your controller.
Unit	Unit of the channel value
Description	Description of the channel. Double-click to enter a description.
Always update variables	Enabled 1 (use bus cycle task if not used in any task) Not editable.

I/O Configuration Tab Description

Digital expansion modules are configured using the **I/O Configuration** tab.

The **I/O Configuration** tab contains these columns:

Column	Description	Editable
Parameter	Parameter name	No
Type	Parameter data type	No
Value	Value of the parameter	If the parameter is editable, double-click the field to select or to enter a value.
Default Value	Default parameter value	No
Unit	Unit value of the parameter	No
Description	Short description of the parameter	No

NOTE: If a parameter is unavailable, the row is grayed.

Optional I/O Expansion Modules

Presentation

I/O expansion modules can be marked as optional in the configuration. The **Optional module** feature provides a more flexible configuration by the acceptance of the definition of modules that are not physically attached to the controller. Therefore, a single application can support multiple physical configurations of I/O expansion modules, allowing a greater degree of scalability without the necessity of maintaining multiple application files for the same application.

Without the **Optional module** feature, when the controller starts up the I/O expansion bus (following a power cycle, application download or initialization command), it compares the configuration defined in the application with the physical I/O modules attached to the I/O bus. Among other diagnostics made, if the controller determines that there are I/O modules defined in the configuration that are not physically present on the I/O bus, an error is detected and the I/O bus does not start.

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

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

The following module types can be marked as optional:

- TM3 I/O expansion modules
- TM2 I/O expansion modules

NOTE: TM3 Transmitter/Receiver modules (the TM3XTRA1 and the TM3XREC1) and TMC4 cartridges cannot be marked as optional.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

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

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

Marking an I/O Expansion Module as Optional

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

Step	Action																																																																														
1	Add the expansion module to your controller .																																																																														
2	In the Devices tree , double-click the expansion module.																																																																														
3	Select the I/O Configuration tab.																																																																														
4	In the Optional module line, select Yes in the Value column: <table><tr><th>Parameter</th><th>Type</th><th>Value</th><th>Default Value</th><th>Unit</th><th>Description</th></tr><tr><td> Optional module</td><td>Enumeration of BYTE</td><td>Yes </td><td>No</td><td></td><td></td></tr><tr><td> Outputs</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> QW0</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Type</td><td>Enumeration of BYTE</td><td>Not used</td><td>Not used</td><td></td><td>Range mode</td></tr><tr><td> Minimum</td><td>INT(-32768...32766)</td><td>-32768</td><td>-32768</td><td></td><td>Minimum value</td></tr><tr><td> Maximum</td><td>INT(-32767 ...32767)</td><td>32767</td><td>32767</td><td></td><td>Maximum value</td></tr><tr><td> QW1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Type</td><td>Enumeration of BYTE</td><td>Not used</td><td>Not used</td><td></td><td>Range mode</td></tr><tr><td> Minimum</td><td>INT(-32768...32766)</td><td>-32768</td><td>-32768</td><td></td><td>Minimum value</td></tr><tr><td> Maximum</td><td>INT(-32767 ...32767)</td><td>32767</td><td>32767</td><td></td><td>Maximum value</td></tr><tr><td> Diagnostic</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Status Enabled</td><td>Enumeration of BYTE</td><td>Yes</td><td>Yes</td><td></td><td></td></tr></table> Modifiable by programming = Yes = No	Parameter	Type	Value	Default Value	Unit	Description	Optional module	Enumeration of BYTE	Yes	No			Outputs						QW0						Type	Enumeration of BYTE	Not used	Not used		Range mode	Minimum	INT(-32768...32766)	-32768	-32768		Minimum value	Maximum	INT(-32767 ...32767)	32767	32767		Maximum value	QW1						Type	Enumeration of BYTE	Not used	Not used		Range mode	Minimum	INT(-32768...32766)	-32768	-32768		Minimum value	Maximum	INT(-32767 ...32767)	32767	32767		Maximum value	Diagnostic						Status Enabled	Enumeration of BYTE	Yes	Yes		
Parameter	Type	Value	Default Value	Unit	Description																																																																										
Optional module	Enumeration of BYTE	Yes	No																																																																												
Outputs																																																																															
QW0																																																																															
Type	Enumeration of BYTE	Not used	Not used		Range mode																																																																										
Minimum	INT(-32768...32766)	-32768	-32768		Minimum value																																																																										
Maximum	INT(-32767 ...32767)	32767	32767		Maximum value																																																																										
QW1																																																																															
Type	Enumeration of BYTE	Not used	Not used		Range mode																																																																										
Minimum	INT(-32768...32766)	-32768	-32768		Minimum value																																																																										
Maximum	INT(-32767 ...32767)	32767	32767		Maximum value																																																																										
Diagnostic																																																																															
Status Enabled	Enumeration of BYTE	Yes	Yes																																																																												

Shared Internal ID Codes

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

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

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

Modules sharing the same internal ID code
TM2DDI16DT, TM2DDI16DK
TM2DRA16RT, TM2DDO16UK, TM2DDO16TK
TM2DDI8DT, TM2DAI8DT
TM2DRA8RT, TM2DDO8UT, TM2DDO8TT
TM2DDO32TK, TM2DDO32UK
TM3DI16K, TM3DI16, TM3DI16G
TM3DQ16R, TM3DQ16RG, TM3DQ16T, TM3DQ16TG, TM3DQ16TK, TM3DQ16U, TM3DQ16UG, TM3DQ16UK
TM3DQ32TK, TM3DQ32UK
TM3DI8, TM3DI8G, TM3DI8A
TM3DQ8R, TM3DQ8RG, TM3DQ8T, TM3DQ8TG, TM3DQ8U, TM3DQ8UG
TM3DM8R, TM3DM8RG
TM3DM24R, TM3DM24RG
TM3SAK6R, TM3SAK6RG
TM3SAF5R, TM3SAF5RG
TM3SAC5R, TM3SAC5RG
TM3SAFL5R, TM3SAFL5RG
TM3AI2H, TM3AI2HG
TM3AI4, TM3AI4G
TM3AI8, TM3AI8G
TM3AQ2, TM3AQ2G
TM3AQ4, TM3AQ4G
TM3AM6, TM3AM6G
TM3TM3, TM3TM3G
TM3TI4, TM3TI4G
TM3TI4D, TM3TI4DG
TM3TI8T, TM3TI8TG

Configuring the Fallback Behavior

Introduction

This functionality is available for TM2 expansion modules with outputs.

You can configure the fallback behavior, if the expansion module is connected to a distributed device:

- OTB device
- TM3 bus coupler

The fallback is triggered when there is a communication error between:

- the controller and the distributed device.
- the distributed device and the expansion module.

Fallback Configuration

To configure the fallback behavior, double-click the expansion module node in the **Devices tree**. In the **I/O Configuration** tab, select the **Mode**:

- **Maintain**: The output remains in its current state.
- **Fallback Value**: The output is set to the configured value, either 0 or 1. The default **ForceValue** is 0.

You must configure the fallback behavior for each output.

Chapter 2

TM2 Digital I/O Modules

Introduction

This chapter will help you to configure the TM2 digital I/O modules.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
TM2DAI8DT	24
TM2DDI8DT	25
TM2DDI16DT	26
TM2DDI16DK	28
TM2DDI32DK	30
TM2DRA8RT	32
TM2DRA16RT	34
TM2DDO8UT	36
TM2DDO8TT	38
TM2DDO16UK	40
TM2DDO16TK	42
TM2DDO32UK	44
TM2DDO32TK	46
TM2DMM8DRT	48
TM2DMM24DRF	50

TM2DAI8DT

Introduction

This expansion module is an 8-point, 120 Vac input module with a terminal block.

For further hardware information, refer to TM2DAI8DT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and the channel name.

I/O Mapping							
I/O Configuration							
Information							
Channels							
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs							
		IB0	%IB2	BYTE			
		I0	%IX2.0	BOOL			
		I1	%IX2.1	BOOL			
		I2	%IX2.2	BOOL			
		I3	%IX2.3	BOOL			
		I4	%IX2.4	BOOL			
		I5	%IX2.5	BOOL			
		I6	%IX2.6	BOOL			
		I7	%IX2.7	BOOL			

Channel	Type	Description
IB0	BYTE	State of all inputs
I0	BOOL	State of input 0
...		...
I7		State of input 7

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
		No			
		Yes			

TM2DDI8DT

Introduction

This expansion module is an 8-point, 24 Vdc input module with a terminal block.

For further hardware information, refer to TM2DDI8DT (*see Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and the channel name.

I/O Mapping																
I/O Configuration			Information													
Channels																
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description									
  Inputs  																
 ixModule_2_I0		I0	%IX3.0	BOOL												
 ixModule_2_I1		I1	%IX3.1	BOOL												
 ixModule_2_I2		I2	%IX3.2	BOOL												
 ixModule_2_I3		I3	%IX3.3	BOOL												
 ixModule_2_I4		I4	%IX3.4	BOOL												
 ixModule_2_I5		I5	%IX3.5	BOOL												
 ixModule_2_I6		I6	%IX3.6	BOOL												
 ixModule_2_I7		I7	%IX3.7	BOOL												

Channel	Type	Description
IB0	BYTE	State of all inputs
I0	BOOL	State of input 0
...		...
I7		State of input 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
Optional module	Enumeration of BYTE	No	No		

TM2DDI16DT

Introduction

This expansion module is a 16-point, 24 Vdc input module with a terminal block.

For further hardware information, refer to TM2DDI16DT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and the channel name.

I/O Mapping							
Channels							
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs							
		IW0	%IW2	WORD			
ixModule_3_I0		I0	%IX4.0	BOOL			
ixModule_3_I1		I1	%IX4.1	BOOL			
ixModule_3_I2		I2	%IX4.2	BOOL			
ixModule_3_I3		I3	%IX4.3	BOOL			
ixModule_3_I4		I4	%IX4.4	BOOL			
ixModule_3_I5		I5	%IX4.5	BOOL			
ixModule_3_I6		I6	%IX4.6	BOOL			
ixModule_3_I7		I7	%IX4.7	BOOL			
ixModule_3_I8		I8	%IX5.0	BOOL			
ixModule_3_I9		I9	%IX5.1	BOOL			
ixModule_3_I10		I10	%IX5.2	BOOL			
ixModule_3_I11		I11	%IX5.3	BOOL			
ixModule_3_I12		I12	%IX5.4	BOOL			
ixModule_3_I13		I13	%IX5.5	BOOL			
ixModule_3_I14		I14	%IX5.6	BOOL			
ixModule_3_I15		I15	%IX5.7	BOOL			

Channel	Type	Description
IW0	WORD	State of all inputs
I0	BOOL	State of input 0
...		...
I15		State of input 15

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an option module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No No Yes	No		

TM2DDI16DK

Introduction

This expansion module is a 16-point, 24 Vdc input module with a HE10 connector.

For further hardware information, refer to TM2DDI16DK (*see Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Inputs		IW0	%IW3	WORD				
ixModule_4_I0		I0	%IX6.0	BOOL				
ixModule_4_I1		I1	%IX6.1	BOOL				
ixModule_4_I2		I2	%IX6.2	BOOL				
ixModule_4_I3		I3	%IX6.3	BOOL				
ixModule_4_I4		I4	%IX6.4	BOOL				
ixModule_4_I5		I5	%IX6.5	BOOL				
ixModule_4_I6		I6	%IX6.6	BOOL				
ixModule_4_I7		I7	%IX6.7	BOOL				
ixModule_4_I8		I8	%IX7.0	BOOL				
ixModule_4_I9		I9	%IX7.1	BOOL				
ixModule_4_I10		I10	%IX7.2	BOOL				
ixModule_4_I11		I11	%IX7.3	BOOL				
ixModule_4_I12		I12	%IX7.4	BOOL				
ixModule_4_I13		I13	%IX7.5	BOOL				
ixModule_4_I14		I14	%IX7.6	BOOL				
ixModule_4_I15		I15	%IX7.7	BOOL				

Channel	Type	Description
IW0	WORD	State of all inputs
I0	BOOL	State of input 0
...		...
I15		State of input 15

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No No Yes	No		

TM2DDI32DK

Introduction

This expansion module is a 32-point, 24 Vdc input module with a HE10 connector.

For further hardware information, refer to TM2DDI32DK (*see Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Inputs		ID0	%ID2	DWORD				
ixModule_5_I0		I0	%IX8.0	BOOL				
ixModule_5_I1		I1	%IX8.1	BOOL				
ixModule_5_I2		I2	%IX8.2	BOOL				
ixModule_5_I3		I3	%IX8.3	BOOL				
ixModule_5_I4		I4	%IX8.4	BOOL				
ixModule_5_I5		I5	%IX8.5	BOOL				
ixModule_5_I6		I6	%IX8.6	BOOL				
ixModule_5_I7		I7	%IX8.7	BOOL				
ixModule_5_I8		I8	%IX9.0	BOOL				
ixModule_5_I9		I9	%IX9.1	BOOL				
ixModule_5_I10		I10	%IX9.2	BOOL				
ixModule_5_I11		I11	%IX9.3	BOOL				
ixModule_5_I12		I12	%IX9.4	BOOL				
ixModule_5_I13		I13	%IX9.5	BOOL				
ixModule_5_I14		I14	%IX9.6	BOOL				
ixModule_5_I15		I15	%IX9.7	BOOL				
ixModule_5_I16		I16	%IX1...	BOOL				
ixModule_5_I17		I17	%IX1...	BOOL				
ixModule_5_I18		I18	%IX1...	BOOL				
ixModule_5_I19		I19	%IX1...	BOOL				
ixModule_5_I20		I20	%IX1...	BOOL				
ixModule_5_I21		I21	%IX1...	BOOL				
ixModule_5_I22		I22	%IX1...	BOOL				
ixModule_5_I23		I23	%IX1...	BOOL				
ixModule_5_I24		I24	%IX1...	BOOL				
ixModule_5_I25		I25	%IX1...	BOOL				
ixModule_5_I26		I26	%IX1...	BOOL				
ixModule_5_I27		I27	%IX1...	BOOL				
ixModule_5_I28		I28	%IX1...	BOOL				
ixModule_5_I29		I29	%IX1...	BOOL				
ixModule_5_I30		I30	%IX1...	BOOL				
ixModule_5_I31		I31	%IX1...	BOOL				

Channel	Type	Description
ID0	WORD	State of all inputs
I0	BOOL	State of input 0
...		...
I31		State of input 31

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No No Yes	No		

TM2DRA8RT

Introduction

This expansion module is an 8-point relay output module with a terminal block.

For further hardware information, refer to TM2DRA8RT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Outputs		QB0	%QB2	BYTE				
qxModule_6_Q0		Q0	%QX2.0	BOOL				
qxModule_6_Q1		Q1	%QX2.1	BOOL				
qxModule_6_Q2		Q2	%QX2.2	BOOL				
qxModule_6_Q3		Q3	%QX2.3	BOOL				
qxModule_6_Q4		Q4	%QX2.4	BOOL				
qxModule_6_Q5		Q5	%QX2.5	BOOL				
qxModule_6_Q6		Q6	%QX2.6	BOOL				
qxModule_6_Q7		Q7	%QX2.7	BOOL				

Channel	Type	Default Value	Description
QB0	BYTE	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q7			Command bit of output 7

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an option module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior *(see page 21)*.

TM2DRA16RT

Introduction

This expansion module is a 16-point relay output module with a terminal block.

For further hardware information, refer to TM2DRA16RT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Outputs		QW0	%QW2	WORD				
qxModule_7_Q0		Q0	%QX4.0	BOOL				
qxModule_7_Q1		Q1	%QX4.1	BOOL				
qxModule_7_Q2		Q2	%QX4.2	BOOL				
qxModule_7_Q3		Q3	%QX4.3	BOOL				
qxModule_7_Q4		Q4	%QX4.4	BOOL				
qxModule_7_Q5		Q5	%QX4.5	BOOL				
qxModule_7_Q6		Q6	%QX4.6	BOOL				
qxModule_7_Q7		Q7	%QX4.7	BOOL				
qxModule_7_Q8		Q8	%QX5.0	BOOL				
qxModule_7_Q9		Q9	%QX5.1	BOOL				
qxModule_7_...		Q10	%QX5.2	BOOL				
qxModule_7_...		Q11	%QX5.3	BOOL				
qxModule_7_...		Q12	%QX5.4	BOOL				
qxModule_7_...		Q13	%QX5.5	BOOL				
qxModule_7_...		Q14	%QX5.6	BOOL				
qxModule_7_...		Q15	%QX5.7	BOOL				

Channel	Type	Default Value	Description
QW0	WORD	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q15			Command bit of output 15

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

TM2DDO8UT

Introduction

This expansion module is an 8-point transistor sink output module with a terminal block.

For further hardware information, refer to TM2DDO8UT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Outputs		QW0	%QW2	WORD				
qxModule_7_Q0		Q0	%QX4.0	BOOL				
qxModule_7_Q1		Q1	%QX4.1	BOOL				
qxModule_7_Q2		Q2	%QX4.2	BOOL				
qxModule_7_Q3		Q3	%QX4.3	BOOL				
qxModule_7_Q4		Q4	%QX4.4	BOOL				
qxModule_7_Q5		Q5	%QX4.5	BOOL				
qxModule_7_Q6		Q6	%QX4.6	BOOL				
qxModule_7_Q7		Q7	%QX4.7	BOOL				
qxModule_7_Q8		Q8	%QX5.0	BOOL				
qxModule_7_Q9		Q9	%QX5.1	BOOL				
qxModule_7_...		Q10	%QX5.2	BOOL				
qxModule_7_...		Q11	%QX5.3	BOOL				
qxModule_7_...		Q12	%QX5.4	BOOL				
qxModule_7_...		Q13	%QX5.5	BOOL				
qxModule_7_...		Q14	%QX5.6	BOOL				
qxModule_7_...		Q15	%QX5.7	BOOL				

Channel	Type	Default Value	Description
QB0	BYTE	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q7			Command bit of output 7

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

TM2DDO8TT

Introduction

This expansion module is an 8-point transistor source output module with a terminal block.

For further hardware information, refer to TM2DDO8TT (*see Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Outputs								
qxModule_7_Q0		QW0	%QW2	WORD				
qxModule_7_Q1		Q0	%QX4.0	BOOL				
qxModule_7_Q2		Q1	%QX4.1	BOOL				
qxModule_7_Q3		Q2	%QX4.2	BOOL				
qxModule_7_Q4		Q3	%QX4.3	BOOL				
qxModule_7_Q5		Q4	%QX4.4	BOOL				
qxModule_7_Q6		Q5	%QX4.5	BOOL				
qxModule_7_Q7		Q6	%QX4.6	BOOL				
qxModule_7_Q8		Q7	%QX4.7	BOOL				
qxModule_7_Q9		Q8	%QX5.0	BOOL				
qxModule_7_...		Q9	%QX5.1	BOOL				
qxModule_7_...		Q10	%QX5.2	BOOL				
qxModule_7_...		Q11	%QX5.3	BOOL				
qxModule_7_...		Q12	%QX5.4	BOOL				
qxModule_7_...		Q13	%QX5.5	BOOL				
qxModule_7_...		Q14	%QX5.6	BOOL				
qxModule_7_...		Q15	%QX5.7	BOOL				

Channel	Type	Default Value	Description
QB0	BYTE	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE	...
Q7		FALSE	Command bit of output 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (*see page 21*).

TM2DDO16UK

Introduction

This expansion module is a 16-point transistor sink output module with a HE10 connector.

For further hardware information, refer to TM2DDO16UK (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Outputs								
qxModule_10_...		QW0	%QW2	WORD				
qxModule_10_...		Q0	%QX4.0	BOOL				
qxModule_10_...		Q1	%QX4.1	BOOL				
qxModule_10_...		Q2	%QX4.2	BOOL				
qxModule_10_...		Q3	%QX4.3	BOOL				
qxModule_10_...		Q4	%QX4.4	BOOL				
qxModule_10_...		Q5	%QX4.5	BOOL				
qxModule_10_...		Q6	%QX4.6	BOOL				
qxModule_10_...		Q7	%QX4.7	BOOL				
qxModule_10_...		Q8	%QX5.0	BOOL				
qxModule_10_...		Q9	%QX5.1	BOOL				
qxModule_10_...		Q10	%QX5.2	BOOL				
qxModule_10_...		Q11	%QX5.3	BOOL				
qxModule_10_...		Q12	%QX5.4	BOOL				
qxModule_10_...		Q13	%QX5.5	BOOL				
qxModule_10_...		Q14	%QX5.6	BOOL				
qxModule_10_...		Q15	%QX5.7	BOOL				

Channel	Type	Default Value	Description
QW0	WORD	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q15			Command bit of output 15

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

TM2DDO16TK

Introduction

This expansion module is a 16-point transistor source output module with a HE10 connector.

For further hardware information, refer to TM2DDO16TK (*see Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information							
Channels							
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Outputs		QW0	%QW2	WORD			
qxModule_11_Q0		Q0	%QX4.0	BOOL			
qxModule_11_Q1		Q1	%QX4.1	BOOL			
qxModule_11_Q2		Q2	%QX4.2	BOOL			
qxModule_11_Q3		Q3	%QX4.3	BOOL			
qxModule_11_Q4		Q4	%QX4.4	BOOL			
qxModule_11_Q5		Q5	%QX4.5	BOOL			
qxModule_11_Q6		Q6	%QX4.6	BOOL			
qxModule_11_Q7		Q7	%QX4.7	BOOL			
qxModule_11_Q8		Q8	%QX5.0	BOOL			
qxModule_11_Q9		Q9	%QX5.1	BOOL			
qxModule_11_...		Q10	%QX5.2	BOOL			
qxModule_11_...		Q11	%QX5.3	BOOL			
qxModule_11_...		Q12	%QX5.4	BOOL			
qxModule_11_...		Q13	%QX5.5	BOOL			
qxModule_11_...		Q14	%QX5.6	BOOL			
qxModule_11_...		Q15	%QX5.7	BOOL			

Channel	Type	Default Value	Description
QW0	WORD	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q15			Command bit of output 15

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

TM2DDO32UK

Introduction

This expansion module is a 32-point transistor sink output module with a HE10 connector.

For further hardware information, refer to TM2DDO32UK (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information							
Channels							
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Outputs							
		QD0	%QD2	DWORD			
qxModule_12_Q0		Q0	%QX8.0	BOOL			
qxModule_12_Q1		Q1	%QX8.1	BOOL			
qxModule_12_Q2		Q2	%QX8.2	BOOL			
qxModule_12_Q3		Q3	%QX8.3	BOOL			
qxModule_12_Q4		Q4	%QX8.4	BOOL			
qxModule_12_Q5		Q5	%QX8.5	BOOL			
qxModule_12_Q6		Q6	%QX8.6	BOOL			
qxModule_12_Q7		Q7	%QX8.7	BOOL			
qxModule_12_Q8		Q8	%QX9.0	BOOL			
qxModule_12_Q9		Q9	%QX9.1	BOOL			
qxModule_12_Q...		Q10	%QX9.2	BOOL			
qxModule_12_Q...		Q11	%QX9.3	BOOL			
qxModule_12_Q...		Q12	%QX9.4	BOOL			
qxModule_12_Q...		Q13	%QX9.5	BOOL			
qxModule_12_Q...		Q14	%QX9.6	BOOL			
qxModule_12_Q...		Q15	%QX9.7	BOOL			
qxModule_12_Q...		Q16	%QX1...	BOOL			
qxModule_12_Q...		Q17	%QX1...	BOOL			
qxModule_12_Q...		Q18	%QX1...	BOOL			
qxModule_12_Q...		Q19	%QX1...	BOOL			
qxModule_12_Q...		Q20	%QX1...	BOOL			
qxModule_12_Q...		Q21	%QX1...	BOOL			
qxModule_12_Q...		Q22	%QX1...	BOOL			
qxModule_12_Q...		Q23	%QX1...	BOOL			
qxModule_12_Q...		Q24	%QX1...	BOOL			
qxModule_12_Q...		Q25	%QX1...	BOOL			
qxModule_12_Q...		Q26	%QX1...	BOOL			
qxModule_12_Q...		Q27	%QX1...	BOOL			
qxModule_12_Q...		Q28	%QX1...	BOOL			
qxModule_12_Q...		Q29	%QX1...	BOOL			
qxModule_12_Q...		Q30	%QX1...	BOOL			
qxModule_12_Q...		Q31	%QX1...	BOOL			

Channel	Type	Default Value	Description
QD0	DWORD	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE	...
Q31		FALSE	Command bit of output 31

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (*see page 21*).

TM2DDO32TK

Introduction

This expansion module is a 32-point transistor source output module with a HE10 connector

For further hardware information, refer to TM2DDO32TK (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each output and the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable		Mapping	Channel	Address	Type	Default Value	Unit	Description
Outputs								
			QD0	%QD3	DWORD			
	qxModule_13_...		Q0	%QX1...	BOOL			
	qxModule_13_...		Q1	%QX1...	BOOL			
	qxModule_13_...		Q2	%QX1...	BOOL			
	qxModule_13_...		Q3	%QX1...	BOOL			
	qxModule_13_...		Q4	%QX1...	BOOL			
	qxModule_13_...		Q5	%QX1...	BOOL			
	qxModule_13_...		Q6	%QX1...	BOOL			
	qxModule_13_...		Q7	%QX1...	BOOL			
	qxModule_13_...		Q8	%QX1...	BOOL			
	qxModule_13_...		Q9	%QX1...	BOOL			
	qxModule_13_...		Q10	%QX1...	BOOL			
	qxModule_13_...		Q11	%QX1...	BOOL			
	qxModule_13_...		Q12	%QX1...	BOOL			
	qxModule_13_...		Q13	%QX1...	BOOL			
	qxModule_13_...		Q14	%QX1...	BOOL			
	qxModule_13_...		Q15	%QX1...	BOOL			
	qxModule_13_...		Q16	%QX1...	BOOL			
	qxModule_13_...		Q17	%QX1...	BOOL			
	qxModule_13_...		Q18	%QX1...	BOOL			
	qxModule_13_...		Q19	%QX1...	BOOL			
	qxModule_13_...		Q20	%QX1...	BOOL			
	qxModule_13_...		Q21	%QX1...	BOOL			
	qxModule_13_...		Q22	%QX1...	BOOL			
	qxModule_13_...		Q23	%QX1...	BOOL			
	qxModule_13_...		Q24	%QX1...	BOOL			
	qxModule_13_...		Q25	%QX1...	BOOL			
	qxModule_13_...		Q26	%QX1...	BOOL			
	qxModule_13_...		Q27	%QX1...	BOOL			
	qxModule_13_...		Q28	%QX1...	BOOL			
	qxModule_13_...		Q29	%QX1...	BOOL			
	qxModule_13_...		Q30	%QX1...	BOOL			
	qxModule_13_...		Q31	%QX1...	BOOL			

Channel	Type	Default Value	Description
QD0	DWORD	-	Command byte of all outputs
Q0	BOOL	-	Command bit of output 0
...		TRUE FALSE	...
Q31			Command bit of output 31

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (*see page 21*).

TM2DMM8DRT

Introduction

This expansion module is a 4-point input/4-point output module with a terminal block.

For further hardware information, refer to TM2DMM8DRT (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and output with the channel name.

I/O Mapping I/O Configuration Information								
Channels								
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
Inputs								
		IB0	%IB2	BYTE				
		I0	%IX2.0	BOOL				
		I1	%IX2.1	BOOL				
		I2	%IX2.2	BOOL				
		I3	%IX2.3	BOOL				
Outputs								
		QB0	%QB6	BYTE				
		Q0	%QX6.0	BOOL				
		Q1	%QX6.1	BOOL				
		Q2	%QX6.2	BOOL				
		Q3	%QX6.3	BOOL				

Channel		Type	Default Value	Description
Inputs	IB0	BYTE	-	State of all inputs
	I0	BOOL	-	State of input 0
	...			...
	I3			State of input 3
Outputs	QB0	BYTE	-	Command byte of all outputs
	Q0	BOOL	- TRUE FALSE	Command bit of output 0
	...			...
	Q3			Command bit of output 3

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

TM2DMM24DRF

Introduction

This expansion module is a 16-point input/8-point output module with a wire-clamp terminal block.

For further hardware information, refer to TM2DDMM24DRF (see *Modicon TM2, Digital I/O Modules, Hardware Guide*).

I/O Mapping Tab

This table identifies the addresses of each input and output with the channel name.

I/O Mapping I/O Configuration Information							
Channels							
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs							
ixModule_15_I0		I0	%IW2	WORD			
ixModule_15_I1		I1	%IX4.0	BOOL			
ixModule_15_I2		I2	%IX4.2	BOOL			
ixModule_15_I3		I3	%IX4.3	BOOL			
ixModule_15_I4		I4	%IX4.4	BOOL			
ixModule_15_I5		I5	%IX4.5	BOOL			
ixModule_15_I6		I6	%IX4.6	BOOL			
ixModule_15_I7		I7	%IX4.7	BOOL			
ixModule_15_I8		I8	%IX5.0	BOOL			
ixModule_15_I9		I9	%IX5.1	BOOL			
ixModule_15_I...		I10	%IX5.2	BOOL			
ixModule_15_I...		I11	%IX5.3	BOOL			
ixModule_15_I...		I12	%IX5.4	BOOL			
ixModule_15_I...		I13	%IX5.5	BOOL			
ixModule_15_I...		I14	%IX5.6	BOOL			
ixModule_15_I...		I15	%IX5.7	BOOL			
Outputs							
qxModule_15_QB0		QB0	%QB7	BYTE			
qxModule_15_Q0		Q0	%QX7.0	BOOL			
qxModule_15_Q1		Q1	%QX7.1	BOOL			
qxModule_15_Q2		Q2	%QX7.2	BOOL			
qxModule_15_Q3		Q3	%QX7.3	BOOL			
qxModule_15_Q4		Q4	%QX7.4	BOOL			
qxModule_15_Q5		Q5	%QX7.5	BOOL			
qxModule_15_Q6		Q6	%QX7.6	BOOL			
qxModule_15_Q7		Q7	%QX7.7	BOOL			

Channel		Type	Default Value	Description
Inputs	IW0	WORD	-	State of all inputs
	I0	BOOL	-	State of input 0
	...			...
	I15			State of input 15

Channel		Type	Default Value	Description
Outputs	QB0	BYTE	-	Command byte of all outputs
	Q0	BOOL	- TRUE FALSE	Command bit of output 0
	...			...
	Q7			Command bit of output 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This tab allows you to configure the module as an optional module:

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 Q0					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value
 Q1					
 Mode	Enumeration of BYTE	Fallback value	Fallback value		Fallback mode
 ForceValue	Enumeration of BYTE	0	0		Force value

If the module is connected to a distributed device, you can configure the fallback behavior (*see page 21*).

Chapter 3

TM2 Analog I/O Modules

Introduction

This chapter will help you to configure the TM2 analog I/O modules.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
TM2AMI2HT	54
TM2AMI2LT	56
TM2AMI4LT	59
TM2AMI8HT	63
TM2ARI8HT	66
TM2ARI8LRJ	71
TM2ARI8LT	75
TM2AMO1HT	79
TM2AVO2HT	81
TM2AMM3HT	83
TM2AMM6HT	86
TM2ALM3LT	89
Analog I/O Modules Diagnostics	92

TM2AMI2HT

Introduction

This expansion module is a 2-point input module with a terminal block.

For further hardware information, refer to TM2AMI2HT (see *Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping I/O Configuration Information					
Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No 	No		
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...4095)	0	0		Minimum value
 Maximum	INT(0...32767)	4095	4095		Maximum value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...4095)	0	0		Minimum value
 Maximum	INT(0...32767)	4095	4095		Maximum value

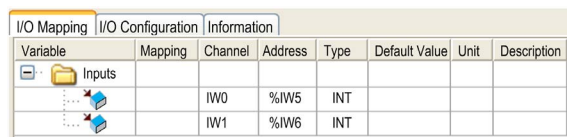
For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:



Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
IW1	INT	Current value of the input 1

For further generic descriptions, refer to I/O Mapping Tab Description ([see page 16](#)).

TM2AMI2LT

Introduction

This expansion module is a 2-point input thermocouple module with a terminal block.

For further hardware information, refer to TM2AMI2LT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O MappingI/O ConfigurationInformation					
Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No 	No		
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
 Maximum	INT(-32768...32767)	32767	32767		Maximum value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
 Maximum	INT(-32768...32767)	32767	32767		Maximum value

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used Thermocouple K Thermocouple J Thermocouple T	Not used	This identifies the mode of the channel.
Scope		Normal Customized Celsius (0.1 °C) Fahrenheit (0.1 °F)	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	32767	

Scope	Normal		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Thermocouple K	0	4095	-2700	13700	-4540	24980
Thermocouple J	0	4095	-2000	7600	-3280	14000
Thermocouple T	0	4095	-2700	4000	-4540	7520

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping							
I/O Configuration		Information					
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
IW1	INT	Current value of the input 1

For further generic descriptions, refer to I/O Mapping Tab Description ([see page 16](#)).

TM2AMI4LT

Introduction

This expansion module is a 4-point input module, current, voltage and temperature, with a terminal block.

NOTE: All inputs used must be of the same type (voltage, current, or temperature).

For further hardware information, refer to TM2AMI4LT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping I/O Configuration Information					
Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No 	No		
 Mode	Enumeration of BYTE	Voltage	Voltage		Mode
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(0...4095)	0	0		Minimum value
 Maximum	INT(0...4095)	4095	4095		Maximum value
 Lower Limit	INT(0...0)	0	0		Lower limit value
 Upper Limit	INT(0...0)	0	0		Upper limit value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(0...4095)	0	0		Minimum value
 Maximum	INT(0...4095)	4095	4095		Maximum value
 Lower Limit	INT(0...0)	0	0		Lower limit value
 Upper Limit	INT(0...0)	0	0		Upper limit value
 IW2					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(0...4095)	0	0		Minimum value
 Maximum	INT(0...4095)	4095	4095		Maximum value
 Lower Limit	INT(0...0)	0	0		Lower limit value
 Upper Limit	INT(0...0)	0	0		Upper limit value
 IW3					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(0...4095)	0	0		Minimum value
 Maximum	INT(0...4095)	4095	4095		Maximum value
 Lower Limit	INT(0...0)	0	0		Lower limit value
 Upper Limit	INT(0...0)	0	0		Upper limit value

For each input, you can define:

Parameter		Value	Default Value	Description
Mode		Voltage Current Temperature	Voltage	This identifies the mode of all channels.
Type		Not used 0...10 V 0...20 mA PT100 PT1000 NI100 NI1000	Not used	This identifies the type of the channel. If 'Voltage' mode is enabled, then the type 'Not used' and '0...10V' are available. If 'Current' mode is enabled, then the type 'Not used' and '0...20 mA' are available. If 'Temperature' mode is enabled, then the type 'Not used', 'PT100', 'PT1000', 'NI100' and 'NI1000' are available.
Scope		Not used Normal Customized Resistance (Ohm) Celsius (0.1 °C) Fahrenheit (0.1 °F)	Not used	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Resistance (Ohm)			
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Resistance (Ohm)			
	Customized	-32768...32767	32767	

Scope	Normal		Resistance (Ohm)		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
PT100	0	4095	18	314	-2000	6000	-3280	11120
PT1000	0	4095	184	3138	-2000	6000	-3280	11120
NI100	0	4095	74	199	-500	1500	-580	3020
NI1000	0	4095	742	1987	-500	1500	-580	3020

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping							
I/O Configuration		Information					
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			
		IW2	%IW7	INT			
		IW3	%IW8	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
IW1	INT	Current value of the input 1
IW2	INT	Current value of the input 2
IW3	INT	Current value of the input 3

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

TM2AMI8HT

Introduction

This expansion module is an 8-point input module, current, and voltage, with a terminal block.

NOTE: All inputs used must be of the same type (voltage or current).

For further hardware information, refer to TM2AMI8HT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping I/O Configuration Information					
Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No 	No		
 Type	Enumeration of BYTE	0 – 10 V	0 – 10 V		Mode
 Inputs					
 IW0					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW1					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW2					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW3					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW4					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW5					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW6					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value
 IW7					
 Scope	Enumeration of BYTE	Not used	Not used		Unit
 Minimum	INT(-32768...1023)	0	0		Minimum value
 Maximum	INT(0...32767)	1023	1023		Maximum value

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 0- 20 mA	Not used	This identifies the mode of all channels.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	1023	1023	Specifies the upper measurement limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration		Information			
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			
		IW2	%IW7	INT			
		IW3	%IW8	INT			
		IW4	%IW9	INT			
		IW5	%IW10	INT			
		IW6	%IW11	INT			
		IW7	%IW12	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
...	...	...
IW7	INT	Current value of the input 7

For further generic descriptions, refer to I/O Mapping Tab Description ([see page 16](#)).

TM2ARI8HT

Introduction

This expansion module is an 8-point input module, temperature, with a terminal block.

For further hardware information, refer to TM2ARI8HT (see *Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

NTC Probe

The temperature (Tm) varies in relation to the resistance (r) following the equation below:

$$Tm(r) = \frac{1}{\frac{1}{T} + \frac{1}{B} \ln \left[\frac{r}{R} \right]}$$

Where:

- Tm = temperature measured by the probe, in Kelvin
- r = physical value of the resistance in Ohm
- R = reference resistance in Ohm at temperature T
- T = reference temperature in Kelvin
- B = sensitivity of the NTC probe in Kelvin

R, T, and B must be greater or equal to 1.

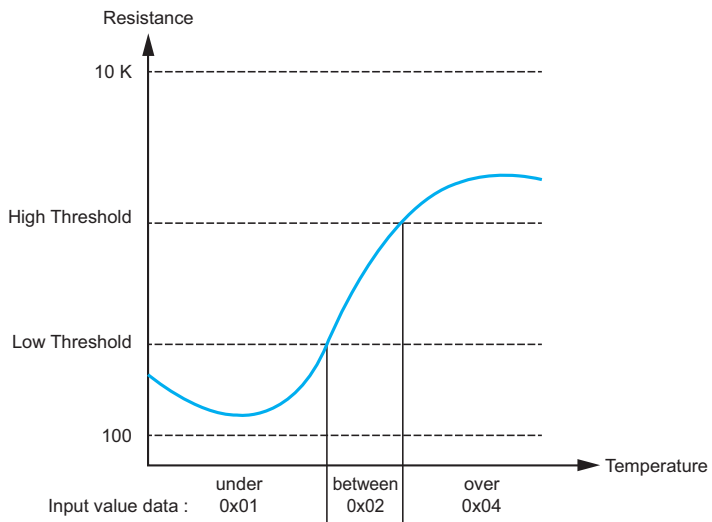
If the resistance is selected as unit, the displayed value is equal to the probe resistance.

NOTE: 25 °C = 77 °F = 298.15 K

PTC Probe

This table shows the read value according to the resistance value:

Resistance Value	Read Value
Less than low threshold	1
Between threshold	2
Greater than high threshold	4



I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping		I/O Configuration		Information	
Parameter	Type	Value	Default Value	Unit	Description
Optional module	Enumeration of BYTE	No	No		
Inputs					
IW0					
Type	Enumeration of BYTE	Not used	Not used	Unit	
Scope	Enumeration of BYTE	Not used	Not used	Unit	
Minimum	INT(-32768...32767)	-32768	-32768	Minimum value	
Maximum	INT(-32768...32767)	32767	32767	Maximum value	
Rref	UNIT(1...65535)	330	330	Reference resistance in Ohm at reference temperature	
Tref	INT(1...65000)	29815	29815	Reference temperature value in Kelvin (0.01 K)	
Beta	INT(1...32767)	3569	3569	Sensitivity of the probe	
High threshold	INT(1501...10000)	3100	3100	Activation threshold	
Low threshold	INT(100...3099)	1500	1500	Reactivation threshold	
IW1					
Type	Enumeration of BYTE	Not used	Not used	Unit	
Scope	Enumeration of BYTE	Not used	Not used	Unit	
Minimum	INT(-32768...32767)	-32768	-32768	Minimum value	
Maximum	INT(-32768...32767)	32767	32767	Maximum value	
Rref	UNIT(1...65535)	330	330	Reference resistance in Ohm at reference temperature	
Tref	INT(1...65000)	29815	29815	Reference temperature value in Kelvin (0.01 K)	
Beta	INT(1...32767)	3569	3569	Sensitivity of the probe	
High threshold	INT(1501...10000)	3100	3100	Activation threshold	
Low threshold	INT(100...3099)	1500	1500	Reactivation threshold	
IW2					
Type	Enumeration of BYTE	Not used	Not used	Unit	
Scope	Enumeration of BYTE	Not used	Not used	Unit	
Minimum	INT(-32768...32767)	-32768	-32768	Minimum value	
Maximum	INT(-32768...32767)	32767	32767	Maximum value	
Rref	UNIT(1...65535)	330	330	Reference resistance in Ohm at reference temperature	
Tref	INT(1...65000)	29815	29815	Reference temperature value in Kelvin (0.01 K)	
Beta	INT(1...32767)	3569	3569	Sensitivity of the probe	
High threshold	INT(1501...10000)	3100	3100	Activation threshold	
Low threshold	INT(100...3099)	1500	1500	Reactivation threshold	
IW3					
Type	Enumeration of BYTE	Not used	Not used	Unit	
Scope	Enumeration of BYTE	Not used	Not used	Unit	
Minimum	INT(-32768...32767)	-32768	-32768	Minimum value	

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used NTC PTC	Not used	This identifies the mode of the channel.
Scope		Normal Customized Resistance (Ohm) Celsius (0.1 °C) Fahrenheit (0.1 °F)	Normal for NTC type Resistance (Ohm) for PTC type	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	1023	1023	Specifies the upper measurement limit.
	Customized	-32768...32767	32767	
Rref (used only with NTC probe)		1...65535	330	Reference resistance in Ohm at temperature Tref
Tref (used only with NTC probe)		1...65000	29815	Reference temperature value in Kelvin (0.01 K)
Beta (used only with NTC probe)		1...32767	3569	Sensitivity of NTC probe in Kelvin (0.01 K)
High threshold (used only with PTC probe)		100...10000	3100	Activation threshold
Low threshold (used only with PTC probe)		100...10000	1500	Reactivation threshold

Scope	Resistance (Ohm)		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
NTC	100	10000	-789	2114	-1101	4125
PTC	100	10000	-	-	-	-

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping							
I/O Configuration		Information					
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			
		IW2	%IW7	INT			
		IW3	%IW8	INT			
		IW4	%IW9	INT			
		IW5	%IW10	INT			
		IW6	%IW11	INT			
		IW7	%IW12	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
...	...	...
IW7	INT	Current value of the input 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

TM2ARI8LRJ

Introduction

This expansion module is an 8-point output module, temperature, with RJ11 connectors.

For further hardware information, refer to TM2ARI8LRJ (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

<i>NOTICE</i>
INOPERABLE EQUIPMENT Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel. Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping I/O Configuration Information					
Parameter	Type	Value	Default Value	Unit	Description
Optional module	Enumeration of BYTE	No	No		
Inputs					
IW0					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW1					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW2					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW3					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW4					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW5					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used PT100 PT1000	Not used	This identifies the mode of the channel.
Scope		Not used Normal Customized Celsius (0.1 °C) Fahrenheit (0.1 °F)	Not used	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	32767	

Scope	Normal		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
PT100	0	4095	-2000	6000	-3280	11120
PT1000	0	4095	-500	2000	-580	3920

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping							
I/O Configuration		Information					
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			
		IW2	%IW7	INT			
		IW3	%IW8	INT			
		IW4	%IW9	INT			
		IW5	%IW10	INT			
		IW6	%IW11	INT			
		IW7	%IW12	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
...	...	...
IW7	INT	Current value of the input 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

TM2ARI8LT

Introduction

This expansion module is an 8-point input module, temperature, with 2 terminal blocks.

For further hardware information, refer to TM2ARI8LT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs.

I/O Mapping I/O Configuration Information					
Parameter	Type	Value	Default Value	Unit	Description
Optional module	Enumeration of BYTE	No	No		
Inputs					
IW0					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW1					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW2					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW3					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW4					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW5					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value
IW6					
Type	Enumeration of BYTE	Not used	Not used		Range mode
Scope	Enumeration of BYTE	Not used	Not used		Unit
Minimum	INT(-32768...32767)	-32768	-32768		Minimum value
Maximum	INT(-32768...32767)	32767	32767		Maximum value

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used PT100 PT1000	Not used	This identifies the mode of the channel.
Scope		Not used Normal Customized Celsius (0.1 °C) Fahrenheit (0.1 °F)	Not used	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	32767	

Scope	Normal		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
PT100	0	4095	-2000	6000	-3280	11120
PT1000	0	4095	-500	2000	-580	3920

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration	Information				
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs							
		IW0	%IW5	INT			
		IW1	%IW6	INT			
		IW2	%IW7	INT			
		IW3	%IW8	INT			
		IW4	%IW9	INT			
		IW5	%IW10	INT			
		IW6	%IW11	INT			
		IW7	%IW12	INT			

Channel	Type	Description
IW0	INT	Current value of the input 0
...	...	...
IW7	INT	Current value of the input 7

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

TM2AMO1HT

Introduction

This expansion module is a 1-point output module with a terminal block.

For further hardware information, refer to TM2AMO1HT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration		Information			
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Outputs		QW0	%QW2	INT			

Channel	Type	Default Value	Description
QW0	INT	-32768...32767	Command word of the output 0

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the output.

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 QW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(0...4095)	4095	4095		Maximum value

If the module is connected to a distributed device, you can configure the fallback behavior ([see page 21](#)).

For the output, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

TM2AVO2HT

Introduction

This expansion module is a 2-point output module with a terminal block.

For further hardware information, refer to TM2AVO2HT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration		Information				
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description	
 Outputs								
		QW0	%QW3	INT				
		QW1	%QW4	INT				

Channel	Type	Default Value	Description
QW0	INT	-32768...32767	Command word of the output 0
QW1	INT	-32768...32767	Command word of the output 1

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the outputs.

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Outputs					
 QW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(-2048...2046)	-2048	-2048		Minimum value
 Maximum	INT(-2047...2047)	2047	2047		Maximum value
 QW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(-2048...2046)	-2048	-2048		Minimum value
 Maximum	INT(-2047...2047)	2047	2047		Maximum value

If the module is connected to a distributed device, you can configure the fallback behavior ([see page 21](#)).

For each output, you can define:

Parameter		Value	Default Value	Description
Type		Not used -10...10 Vdc	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	-2048	-2048	Specifies the lower limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	2047	2047	Specifies the upper limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

TM2AMM3HT

Introduction

This expansion module is a 2-point input/1-point output module with a terminal block.

For further hardware information, refer to TM2AMM3HT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration		Information			
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
 Inputs		IW0	%IW1	INT			
		IW1	%IW2	INT			
 Outputs		QW0	%QW1	INT			

Channel		Type	Default Value	Description
Inputs	IW0	INT	-	Current value of the input 0
	IW1	INT	-	Current value of the input 1
Outputs	QW0	INT	-32768...32767	Command word of the output 0

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs and the outputs.

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 Outputs					
 QW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0...10 V 4...20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Customized	-32768...32767	32767	

For each output, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper limit.
	Customized	-32768...32767	32767	

NOTE: When the value set by the controller is lower than the configured range, the analog output of the module configured in 4...20 mA can be lower than 4 mA.

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

TM2AMM6HT

Introduction

This expansion module is a 4-point input/2-point output module with 2 terminal blocks.

For further hardware information, refer to TM2AMM6HT (see *Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration	Information					
Variable		Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs								
			IW0	%IW3	INT			
			IW1	%IW4	INT			
			IW2	%IW5	INT			
			IW3	%IW6	INT			
Outputs								
			QW0	%QW2	INT			
			QW1	%QW3	INT			

Channel		Type	Default Value	Description
Inputs	IW0	INT	-	Current value of the input 0
	...	...	...	...
	IW3	INT	-	Current value of the input 3
Outputs	QW0	INT	-32768...32767	Command word of the output 0
	QW1	INT	-32768...32767	Command word of the output 1

For further generic descriptions, refer to I/O Mapping Tab Description (see page 16).

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs and the outputs.

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 IW2					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 IW3					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 Outputs					
 QW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 QW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value

If the module is connected to a distributed device, you can configure the fallback behavior ([see page 21](#)).

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Customized	-32768...32767	32767	

For each output, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of the channel.
Scope		Normal Customized	Normal	This identifies the range of values for the channel.
Minimum	Normal	0	0	Specifies the lower limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

TM2ALM3LT

Introduction

This expansion module is a 2-point input/1-point output module with a terminal block and accepts thermocouple and resistance thermometer signals.

For further hardware information, refer to TM2ALM3LT (*see Modicon TM2, Analog I/O Modules, Hardware Guide*).

If you have physically wired the analog channel for a voltage signal and you configure the channel for a current signal in EcoStruxure Machine Expert, you may damage the analog circuit.

NOTICE

INOPERABLE EQUIPMENT

Verify that the physical wiring of the analog circuit is compatible with the software configuration for the analog channel.

Failure to follow these instructions can result in equipment damage.

I/O Mapping Tab

This identifies the addresses of each input and the channel name:

I/O Mapping		I/O Configuration		Information			
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Inputs		IW0	%IW1	INT			
		IW1	%IW2	INT			
Outputs		QW0	%QW1	INT			

Channel		Type	Default Value	Description
Inputs	IW0	INT	-	Current value of the input 0
	IW1	INT	-	Current value of the input 1
Outputs	QW0	INT	-32768...32767	Command word of the output 0

For further generic descriptions, refer to I/O Mapping Tab Description (*see page 16*).

I/O Configuration Tab

This table allows you to configure the module as an optional module and configure the inputs and the outputs.

Parameter	Type	Value	Default Value	Unit	Description
 Optional module	Enumeration of BYTE	No	No		
 Inputs					
 IW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 IW1					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value
 Outputs					
 QW0					
 Type	Enumeration of BYTE	Not used	Not used		Range mode
 Scope	Enumeration of BYTE	Not used	Not used		Unit / Range
 Minimum	INT(0...4094)	0	0		Minimum value
 Maximum	INT(1...4095)	4095	4095		Maximum value

If the module is connected to a distributed device, you can configure the fallback behavior (see page 21).

For each input, you can define:

Parameter		Value	Default Value	Description
Type		Not used PT100 Thermocouple K Thermocouple J Thermocouple T	Not used	This identifies the mode of a channel.
Scope		Normal Customized Celsius (0.1 °C) Fahrenheit (0.1 °F)	Normal	This identifies the range of values for a channel.
Minimum	Normal	0	0	Specifies the lower measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper measurement limit.
	Celsius (0.1 °C)	See the table below	See the table below	
	Fahrenheit (0.1 °F)			
	Customized	-32768...32767	.32767	

Scope	Normal		Celsius (0.1 °C)		Fahrenheit (0.1 °F)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Thermocouple K	0	4095	-2700	13700	-4540	24980
Thermocouple J	0	4095	-2000	7600	-3280	14000
Thermocouple T	0	4095	-2700	4000	-4540	7520
PT100	0	4095	-1000	5000	-1480	9320

For each output, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0- 10 V 4 - 20 mA	Not used	This identifies the mode of a channel.
Scope		Normal Customized	Normal	This identifies the range of values for a channel.
Minimum	Normal	0	0	Specifies the lower limit.
	Customized	-32768...32767	-32768	
Maximum	Normal	4095	4095	Specifies the upper limit.
	Customized	-32768...32767	32767	

For further generic descriptions, refer to I/O Configuration Tab Description ([see page 17](#)).

Analog I/O Modules Diagnostics

Introduction

The operating status of each I/O channel is given by the diagnostic bytes in the **I/O Mapping** tab:

- IBStatusIWx for input channel x
- IBStatusQWx for output channel x

Diagnostic bytes are available for the following modules:

- TM2AMM3HT
- TM2ALM3LT
- TM2AMI2HT
- TM2AMO1HT

NOTE: If the **Status Enabled** parameter in the **I/O Configuration** tab is deactivated, it is possible to update the value of the diagnostic bytes by calling the `TM3_GetModuleInternalStatus` function.

For more information about `TM3_GetModuleInternalStatus` function:

- Refer to *M241 Controller PLCSystem Library Guide* for Modicon M241 Logic Controller.
- Refer to *M251 Controller PLCSystem Library Guide* for Modicon M251 Logic Controller.
- Refer to *M262 System Library Guide* for Modicon M262 Logic/Motion Controller.

Input Diagnostic Byte Description

This table describes the IBStatusIWx diagnostic byte:

Byte value	Description
0	Normal
1	Undefined
2	Undefined
3	Configuration error detected
4	External power supply error detected
5	Wiring error detected (high limit exceeded)
6	Wiring error detected (low limit exceeded)
7	General hardware error detected
8...255	Undefined

Output Diagnostic Byte Description

This table describes the IBStatusQWx diagnostic byte:

Byte value	Description
0	Normal
1	Undefined
2	Undefined
3	Configuration error detected
4	External power supply error detected
5	Undefined
6	Undefined
7	General hardware error detected
8...255	Undefined



A

application

A program including configuration data, symbols, and documentation.

B

BOOL

(*boolean*) A basic data type in computing. A `BOOL` variable can have one of these values: 0 (`FALSE`), 1 (`TRUE`). A bit that is extracted from a word is of type `BOOL`; for example, `%MW10.4` is a fifth bit of memory word number 10.

byte

A type that is encoded in an 8-bit format, ranging from 00 hex to FF hex.

C

configuration

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

control network

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

Two kinds of topologies are supported:

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

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

controller

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

D

digital I/O

(*digital input/output*) An individual circuit connection at the electronic module that corresponds directly to a data table bit. The data table bit holds the value of the signal at the I/O circuit. It gives the control logic digital access to I/O values.

DWORD

(*double word*) Encoded in 32-bit format.

E

expansion bus

An electronic communication bus between expansion I/O modules and a controller or bus coupler.

F

function

A programming unit that has 1 input and returns 1 immediate result. However, unlike FBs, it is directly called with its name (as opposed to through an instance), has no persistent state from one call to the next and can be used as an operand in other programming expressions.

Examples: boolean (AND) operators, calculations, conversions (BYTE_TO_INT)

H

HE10

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

I

I/O

(*input/output*)

INT

(*integer*) A whole number encoded in 16 bits.

S

source output

A wiring arrangement in which the output electronic module provides current to the device. A source output is referenced to +24 Vdc.

T

terminal block

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

V**variable**

A memory unit that is addressed and modified by a program.

W**WORD**

A type encoded in a 16-bit format.



A

analog I/O modules, *14*

E

expansion modules
 adding, *16*

T

TM2, *11*
TM2 analog, *11*
TM2 analog I/O modules
 diagnostics, *92*
TM2 digital, *11*
TM2 expert, *11*

