

Modicon TM3 Bus Coupler IO Configurator User Guide

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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.

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Table of Contents



	Safety Information	5
	About the Book	7
Chapter 1	Getting Started	13
	System Requirements	14
	Supported Devices	17
	User Interface	25
	Managing Power Consumption	29
Chapter 2	Use Cases	31
	Creating a Configuration File	32
	Loading a Configuration File into a Bus Coupler (TM3BCEIP and TM3BCSL)	33
	Exporting Generic Configuration Files	34
Chapter 3	Configuring Devices	37
3.1	Configuring Bus Couplers	38
	Configuring TM3BCEIP Bus Couplers	39
	Configuring TM3BCSL Bus Couplers	40
	Configuring TM3BCCO Bus Couplers	41
3.2	Configuring TM3 Analog Input Modules	42
	TM3AI2H / TM3AI2HG	43
	TM3AI4 / TM3AI4G	46
	TM3AI8 / TM3AI8G	49
	TM3TI4 / TM3TI4G	53
	TM3TI4D / TM3TI4DG	57
	TM3TI8T / TM3TI8TG	60
3.3	Configuring TM3 Analog Mixed Modules	65
	TM3AM6 / TM3AM6G	66
	TM3TM3 / TM3TM3G	70
3.4	Configuring TM3 Analog Output Modules	74
	TM3AQ2 / TM3AQ2G	75
	TM3AQ4 / TM3AQ4G	77
3.5	Configuring TM3 Digital Modules	79
	Configuration Tab - Configuring TM3 Digital Modules	79

3.6	Configuring TM3 Expert Modules.	81
	TM3XTYS4.	82
	TM3SAK6R / TM3SAK6RG	84
	TM3SAFL5R / TM3SAFL5RG	86
	TM3SAF5R / TM3SAF5RG	88
	TM3SAC5R / TM3SAC5RG	90
3.7	Configuring CANopen PDO Transmission Mode for Analog Inputs. . .	92
	Configuring CANopen PDO Transmission Mode for Analog Inputs. . .	92
Chapter 4	Loading Configuration File into a Bus Coupler (TM3BCEIP and TM3BCSL).	93
	Loading the Configuration File into a Bus Coupler.	93
Chapter 5	Exporting the Configuration	95
	Exporting for EtherNet/IP	96
	Exporting for Modbus TCP / Modbus SL	97
	Exporting for CANopen	99
Chapter 6	Memory Mapping Table (TM3BCEIP and TM3BCSL) . . .	101
	Memory Mapping Table	102
	Exporting the Memory Mapping Table	106
Chapter 7	Modicon TM3 Bus Coupler Web Server.	107
7.1	EtherNet/IP (TM3BCEIP).	108
	Web Server	108
7.2	Modbus TCP / Modbus SL (TM3BCSL).	128
	Web Server	128
7.3	CANopen (TM3BCCO).	142
	Web Server	142
Chapter 8	Troubleshooting	155
	Troubleshooting	155
Appendices		157
Appendix A	Use Case Examples.	159
	Use Case 1: TM3BCEIP Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3	160
	Use Case 2: TM3BCSL Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3	164
	Use Case 3: TM3BCEIP Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14	167
	Use Case 4: TM3BCCO Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14	172
Glossary		177
Index		181

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 how to use the TM3 Bus Coupler IO Configurator software.

Validity Note

This document has been updated for the release of the TM3 Bus Coupler IO Configurator V1.0.

The technical characteristics of the devices described in the present document also appear online.

To access the information online, go to the Schneider Electric home page

<https://www.se.com/ww/en/download/>.

The characteristics that are described in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Modicon TM3 Bus Coupler - Hardware Guide	<i>EIO0000003635 (ENG)</i> <i>EIO0000003636 (FRA)</i> <i>EIO0000003637 (GER)</i> <i>EIO0000003638 (SPA)</i> <i>EIO0000003639 (ITA)</i> <i>EIO0000003640 (CHS)</i> <i>EIO0000003641 (POR)</i> <i>EIO0000003642 (TUR)</i>
Modicon TM3 Digital I/O Modules - Hardware Guide	<i>EIO0000003125 (ENG)</i> <i>EIO0000003126 (FRA)</i> <i>EIO0000003127 (GER)</i> <i>EIO0000003128 (SPA)</i> <i>EIO0000003129 (ITA)</i> <i>EIO0000003130 (CHS)</i> <i>EIO0000003424 (POR)</i> <i>EIO0000003425 (TUR)</i>
Modicon TM3 Analog I/O Modules - Hardware Guide	<i>EIO0000003131 (ENG)</i> <i>EIO0000003132 (FRA)</i> <i>EIO0000003133 (GER)</i> <i>EIO0000003134 (SPA)</i> <i>EIO0000003135 (ITA)</i> <i>EIO0000003136 (CHS)</i> <i>EIO0000003426 (POR)</i> <i>EIO0000003427 (TUR)</i>
Modicon TM3 Expert Modules - Hardware Guide	<i>EIO0000003137 (ENG)</i> <i>EIO0000003138 (FRA)</i> <i>EIO0000003139 (GER)</i> <i>EIO0000003140 (SPA)</i> <i>EIO0000003141 (ITA)</i> <i>EIO0000003142 (CHS)</i> <i>EIO0000003428 (POR)</i> <i>EIO0000003429 (TUR)</i>
Modicon TM3 Safety Modules - Hardware Guide	<i>EIO0000003353 (ENG)</i> <i>EIO0000003354 (FRA)</i> <i>EIO0000003355 (GER)</i> <i>EIO0000003356 (SPA)</i> <i>EIO0000003357 (ITA)</i> <i>EIO0000003358 (CHS)</i> <i>EIO0000003359 (POR)</i> <i>EIO0000003360 (TUR)</i>

Title of Documentation	Reference Number
Modicon TM3 Bus Coupler - Programming Guide (EcoStruxure Machine Expert)	EIO0000003643 (ENG) EIO0000003644 (FRA) EIO0000003645 (GER) EIO0000003646 (SPA) EIO0000003647 (ITA) EIO0000003648 (CHS)

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

Product Related Information

 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

Getting Started

Introduction

This chapter provides information to help you get started using the TM3 Bus Coupler IO Configurator.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
System Requirements	14
Supported Devices	17
User Interface	25
Managing Power Consumption	29

System Requirements

PC Configuration

The TM3 Bus Coupler IO Configurator can be installed on any PC that meets the following minimum hardware and software requirements:

Component	Minimum Requirement
Processor	Intel Core 2 Duo processor or greater
RAM	1 GB RAM
Display resolution	1280 x 768 pixels or greater
Operating system	Microsoft Windows 7 (32-bit or 64-bit processor) Microsoft Windows 8 (32-bit or 64-bit processor) Microsoft Windows 8.1 (32-bit or 64-bit processor) Microsoft Windows 10 (32-bit or 64-bit processor)

Match Software and Hardware Configuration

Use the TM3 Bus Coupler IO Configurator to build a configuration that matches the physical configuration of TM3 expansion modules connected to each bus coupler.

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.

Maximum Number of Modules

A maximum of 7 TM3 expansion modules can be added to a bus coupler.

By adding a pair of transmitter/receiver modules, an additional 7 TM3 expansion modules can be added, for a total of 14 TM3 expansion modules.

Optional Modules

TM3 expansion modules can be marked as optional in the TM3 Bus Coupler IO Configurator 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 bus coupler. 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 bus coupler 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 bus coupler 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 bus coupler ignores the absent I/O expansion modules that you have marked as optional, which then allows the bus coupler 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 bus coupler.

NOTE: TM3 Transmitter/Receiver modules (the TM3XTRA1 and the TM3XREC1) 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 TM3 Bus Coupler IO Configurator configuration:

Step	Action
1	Add the expansion module to your TM3 Bus Coupler IO Configurator project.
2	Select the Configuration tab.
3	In the Optional module line, select Yes in the Value column.

Shared Internal ID Codes

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

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
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

Supported Devices

Introduction

The following lists the devices supported by the TM3 Bus Coupler IO Configurator.

NOTE: Modicon TM2 expansion modules are not supported.

Modicon TM3 Bus Couplers

The following table shows the supported TM3 bus couplers, with port, communication, and terminal types:

Reference	Ports	Communication type	Terminal Type
TM3BCEIP	Isolated switched Ethernet ports: 2 USB mini-B ports: 1	EtherNet/IP Modbus TCP	RJ45 USB mini-B
TM3BCSL	Isolated RS-485 ports: 2 (daisy-chained) USB mini-B ports: 1	Modbus Serial line	RJ45 USB mini-B
TM3BCCO	Isolated CANopen ports: 2 (daisy-chained) USB mini-B ports: 1	CANopen	RJ45 USB mini-B

TM3 Digital Input Modules

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

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

TM3 Digital Mixed Input/Output Modules

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

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

TM3 Digital Output Modules

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

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

Reference	Channels	Channel Type	Voltage Current	Terminal Type / Pitch
TM3DQ16TG	16	Regular transistor outputs (source)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable spring terminal blocks / 3.81 mm
TM3DQ16U	16	Regular transistor outputs (sink)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable screw terminal blocks / 3.81 mm
TM3DQ16UG	16	Regular transistor outputs (sink)	24 Vdc 8 A maximum per common line / 0.5 A maximum per output	Removable spring terminal blocks / 3.81 mm
TM3DQ16TK	16	Regular transistor outputs (source)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connector
TM3DQ16UK	16	Regular transistor outputs (sink)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connector
TM3DQ32TK	32	Regular transistor outputs (source)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connectors
TM3DQ32UK	32	Regular transistor outputs (sink)	24 Vdc 2 A maximum per common line / 0.1 A maximum per output	HE10 (MIL 20) connectors

TM3 Analog Input Modules

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

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

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

TM3 Analog Mixed Input/Output Modules

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

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

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

TM3 Analog Output Modules

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

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

TM3 Expert Modules

The following table shows the TM3 expert expansion modules, with corresponding terminal types:

Reference	Description	Terminal Type / Pitch
TM3XTYS4	TeSys module	4 front connectors RJ-45 1 removable power supply connector / 5.08 mm
TM3SAC5R/G	Safety module, 1 function, CAT3, maximum PL d/SIL2	Removable screw/spring terminal block
TM3SAF5R/G	Safety module, 1 function, CAT4, maximum PL e/SIL3	Removable screw/spring terminal block
TM3SAK6R/G	Safety module, 3 functions, CAT4, maximum PL e/SIL3	Removable screw/spring terminal block
TM3SAFL5R/G	Safety module, 2 functions, CAT3, maximum PL d/SIL2	Removable screw/spring terminal block
TM3XTRA1	Data transmitter module for remote I/O	1 front connector RJ-45 1 screw for functional ground connection
TM3XREC1	Data receiver module for remote I/O	1 front connector RJ-45 1 removable power supply connector / 5.08 mm

User Interface

Introduction

Use the TM3 Bus Coupler IO Configurator to generate configuration files for Modicon TM3 Bus Couplers. This can be done *offline*; that is, the PC running the tool does not need to be physically connected to the bus coupler.

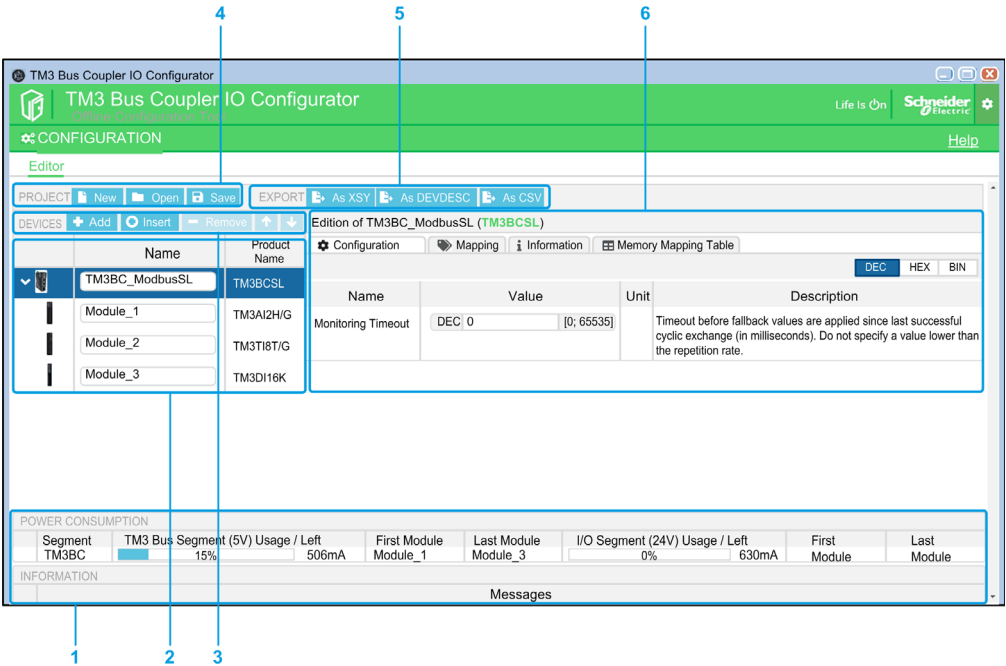
A configuration file contains details of the:

- Structure and number of expansion modules connected to the bus coupler
- Configuration of the bus coupler
- Configuration of each of the expansion modules connected to the bus coupler.

Each configuration file created with the TM3 Bus Coupler IO Configurator is specific to one bus coupler: if your configuration includes more than one bus coupler, create a separate configuration file for each.

The Configuration Window

The configuration window is displayed when you start the TM3 Bus Coupler IO Configurator:



- 1 Power Consumption (*see page 29*) of the current configuration
- 2 Structured view of the bus coupler and expansion module configuration
- 3 **DEVICES** toolbar
- 4 **PROJECT** toolbar
- 5 **EXPORT** toolbar
- 6 **Configuration** and **I/O Mapping** tabs to configure the selected module. **Information** tab to display details of the selected module. **Memory Mapping Table** tab for configuration of communication parameters for EtherNet/IP and Modbus SL/Modbus TCP.

On the **Configuration** tab, click the **DEC** (decimal), **HEX** (hexadecimal) or **BIN** (binary) button to display parameter values in the corresponding format.

Creating a New Project

To create a new project:

Step	Action
1	Start the TM3 Bus Coupler IO Configurator.
2	Click the New button  on the PROJECT toolbar. Result: The New Project window appears showing a list of the supported TM3 bus couplers.
3	Click the TM3 bus coupler to use. Result: The selected bus coupler appears in the configuration window.
4	Optionally, click in the text box below Name to edit the default name of the bus coupler. NOTE: Editing the bus coupler name does not automatically change the project file name. You can now proceed to configure the bus coupler and add modules to the project.
5	Click the Save button  on the PROJECT toolbar.
6	Type a project name and click Save . Result: The project file is saved as a <code>.spfi</code> file.

Opening an Existing Project

To open an existing project:

Step	Action
1	Click the Open button  on the PROJECT toolbar.
2	Navigate and select a project file (<code>.spfi</code>), then click Open . Result: The project appears in the configuration window.

Adding Modules

To add modules to the TM3 bus coupler:

Step	Action
1	Select the bus coupler in the configuration window.
2	Click the Add button  on the DEVICES toolbar. Result: The Add or insert a new device window appears.
3	Either: - Type the name of a TM3 expansion module in the Search modules text box. When you have typed 4 characters, a list of all matching modules appears. For example, type "TM3A" to display all TM3 Analog modules. - Click > to expand the module categories until the module to add appears.
4	Select a module and click the Add button.
5	Repeat the previous two steps to add more modules. When you have added 7 modules to the bus coupler segment, you are prompted to add a TM3XTRA1 module. Select the module and click Add to add the Transmitter/Receiver (TM3XTRA1 and TM3XREC1) modules to the configuration. You can then proceed to add up to 7 more modules to the transmitter/receiver segment.
6	When all modules have been added, click the Close button. Result: The new module or modules appear below the bus coupler in the configuration window.

Inserting Modules between Existing Modules

Inserting new modules:

Step	Action
1	In the configuration on the left of the configuration window, select the TM3 expansion module above which to insert a new module.
2	Click the Insert button  on the DEVICES toolbar. Result: The Add or insert a new device window appears.
3	Either: - Type the name of a TM3 expansion module in the Search modules text box. When you have typed 4 characters, a list of all matching modules appears. For example, type "TM3A" to display all TM3 Analog modules. - Click > to expand the module categories until the module to add appears.
4	Select a module and click Insert .
5	If required, repeat the previous two steps to insert more modules.
6	When all modules have been added, click Close to return to the configuration window. Result: The new module or modules appear in the configuration window below the module that was selected.

Configuring Modules

To configure a module:

Step	Action
1	Select the module in the configuration window. Result: The configuration parameters of the module appears.
2	Proceed to configure the module as described in Configuring Modules (<i>see page 37</i>).

Removing a Module

To remove a module from the configuration:

Step	Action
1	Select the module in the configuration window.
2	Click the Remove button  on the DEVICES toolbar. Result: The module is removed from the configuration.

Changing the Position of Modules

To move a module to a different position in the configuration:

Step	Action
1	Select a module in the configuration window.
2	Click the up arrow  or down arrow  buttons on the DEVICES toolbar until the module is in the new position. NOTE: You can only move modules within the bus coupler segment or the transmitter/receiver segment (<i>see page 29</i>). To move a module from one segment to another, first remove the module then add it to the other segment. If the segment already contains the maximum number of modules, you must first remove a module. NOTE: You cannot move the Transmitter/Receiver modules up or down in the configuration.

Managing Power Consumption

Overview

The TM3 Bus Coupler IO Configurator monitors the number of modules in the configuration and the power consumed by each module.

TM3 expansion modules consume power on the 5 Vdc TM3 internal bus.

Modules with an independent 24 Vdc power supply may also consume power on the 24 Vdc internal I/O bus. For example, the TM3XTYS4 modules consumes 37 mA on the 5 Vdc TM3 internal bus and 17 mA on the 24 Vdc internal I/O bus.

Segments

A TM3 Bus Coupler IO Configurator configuration comprises 1 or 2 *segments*:

- The bus coupler and the TM3 modules directly connected to it form the *bus coupler segment*.
- Adding the TM3XTRA1/TM3XREC1 module pair to the end of the bus coupler segment creates a new *transmitter/receiver segment*. Additional TM3 modules can then be connected to the TM3XREC1 module.

As the TM3XREC1 module has an independent power supply, it provides the power to the modules on the transmitter/receiver segment through the 5 Vdc TM3 internal bus.

The total power consumed by the modules on each segment must not exceed 100% of the power available on the corresponding bus.

Managing Power Consumption of Modules

The **Power Consumption** window appears at the bottom of the TM3 Bus Coupler IO Configurator window:

POWER CONSUMPTION							
Segment	TM3 Bus Segment (5V) Usage / Left		First Module	Last Module	I/O Segment (24V) Usage / Left		Last Module
TM3BC	29%	423mA	Module_1	Transmitter	2%	583mA	Module_1
Transmitter/Receiver	17%	463mA	Module_3	Module_4	3%	543mA	Module_3
Messages							

The **Power Consumption** window shows:

- **Segment.** The segment name: **TM3BC** (bus coupler) or **Transmitter/receiver**.
- **TM3 Bus Segment (5V) Usage / Left.** The percentage of 5 V TM3 Bus power being consumed by the segment and the remaining available power.

NOTE: As the bus coupler provides more power than the TM3XREC1 module, expansion modules consume a lower percentage of power on the bus coupler segment than on the transmitter/receiver segment.

- **First Module.** The name of the first expansion module on this segment.
- **Last Module.** The name of the last expansion module on this segment.

- **I/O Segment (24V) Usage / Left.** The percentage of 24 V IO Bus power being consumed by the segment and the remaining available power.

NOTE: As the bus coupler provides more power than the TM3XREC1 module, expansion modules consume a lower percentage of power on the bus coupler segment than on the transmitter/receiver segment.

- **First Module.** The name of the first expansion module on this segment.
- **Last Module.** The name of the last expansion module on this segment.

The TM3 Bus Coupler IO Configurator displays appropriate error or advisory messages in the **Messages** area of the **Power Consumption** window if:

- The maximum number of TM3 modules supported by the bus coupler is exceeded.
- The total power consumption of all modules in a segment exceeds 100% of available power.

NOTE: The current consumption figures presented by the Power Consumption function are based on assumed values rather than actual current measurements. The assumed values for the outputs are based on normal loads. The assumed values for input signals are based on known internal loads. While the use of the Power Consumption function to test the power budget is required, it is no substitute for real and complete system testing and commissioning.

Chapter 2

Use Cases

Introduction

This chapter describes the main use cases for deployment of the TM3 Bus Coupler IO Configurator.

For detailed example use cases, refer to Use Case Examples (*see page 159*).

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Creating a Configuration File	32
Loading a Configuration File into a Bus Coupler (TM3BCEIP and TM3BCSL)	33
Exporting Generic Configuration Files	34

Creating a Configuration File

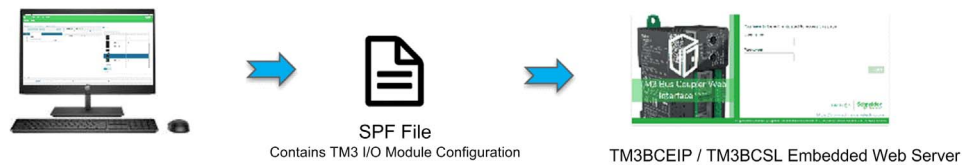
Creating a Configuration File

Step	Action
1	Use the TM3 Bus Coupler IO Configurator to reproduce the physical configuration of a TM3 bus coupler and the TM3 expansion modules connected to it:  This is described in User Interface section (see page 25).
2	Configure each of the devices in the configuration. This is described in the Configuring Devices chapter (see page 37).
3	Save the project, which generates the configuration file.
4	Configure the bus coupler: • For TM3BCEIP and TM3BCSL, directly import the configuration file into the bus coupler (see page 93). • For TM3BCCO, first export the configuration as a Device Configuration File (DCF), then import the DCF file into the relevant external software package (see page 99).

Loading a Configuration File into a Bus Coupler (TM3BCEIP and TM3BCSL)

Overview

With the TM3BCEIP and TM3BCSL bus couplers, the configuration file can be loaded directly into the bus coupler using the Web server interface of the bus coupler:



Step	Action
1	Save the project in the TM3 Bus Coupler IO Configurator, which generates the configuration as an <code>SPF</code> file.
2	Load the file into the TM3BCEIP or TM3BCSL bus coupler (<i>see page 93</i>).

Exporting Generic Configuration Files

Overview

A generic configuration file can be exported from the TM3 Bus Coupler IO Configurator in a number of different formats, which can then be imported into external software packages.

The export process differs depending on the communication protocol being used:

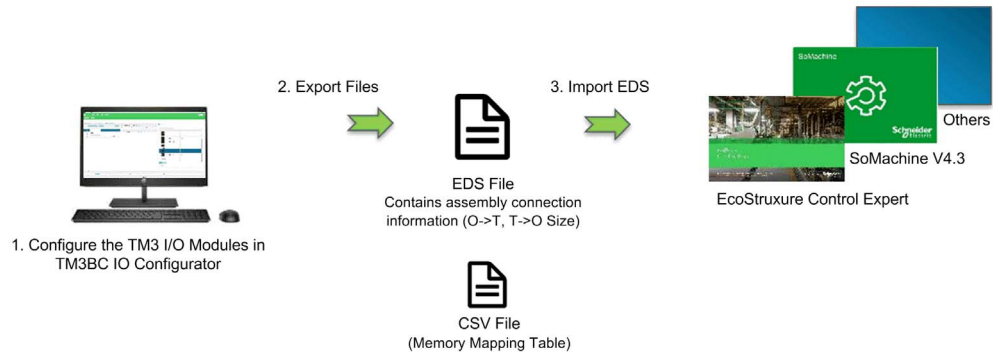
- EtherNet/IP ([see page 34](#))
- Modbus SL / Modbus TCP ([see page 35](#))
- CANopen ([see page 36](#))

EtherNet/IP

A configuration file for an EtherNet/IP bus coupler is exported as an Electronic Data Sheet (EDS) file. The EDS is a generic file that contains information about assembly instances and their size. The size of the input (T->O) and output (O->T) assemblies corresponds to the configuration of the TM3 modules connected to the bus coupler.

A Memory Mapping Table, a file that contains information about communication parameters (EtherNet/IP assembly instances, inputs and outputs data structures), can also be exported.

This figure shows examples of external software packages and controllers:



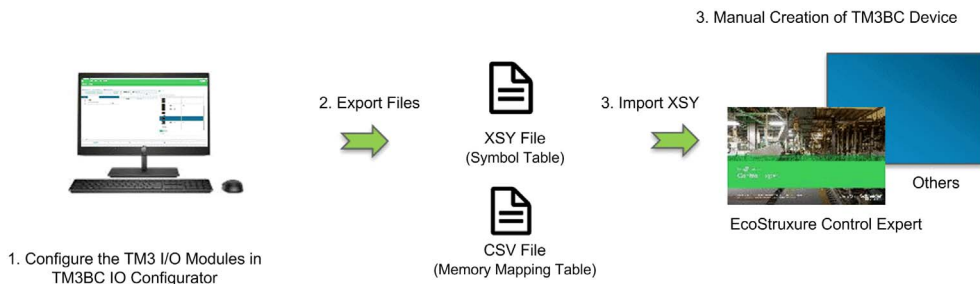
For details on exporting the EDS file, refer to Exporting for EtherNet/IP ([see page 96](#)).

For details on exporting the CSV file, refer to Memory Mapping Table ([see page 101](#)).

Modbus SL / Modbus TCP

This export process depends on the external software package used.

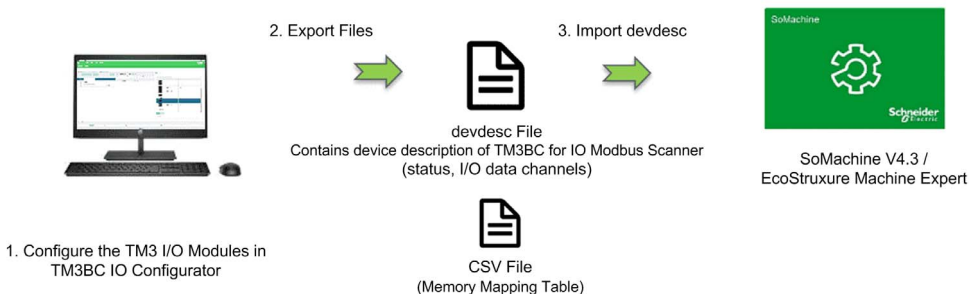
For EcoStruxure Control Expert, a symbol table is exported as an **XSX** file:



For details on exporting the:

- XSX file, refer to Exporting for Modbus SL / Modbus TCP ([see page 97](#)).
- CSV file, refer to Memory Mapping Table ([see page 101](#)).

For SoMachine V4.3 or EcoStruxure Machine Expert, the configuration file is exported as a **devdesc** file:



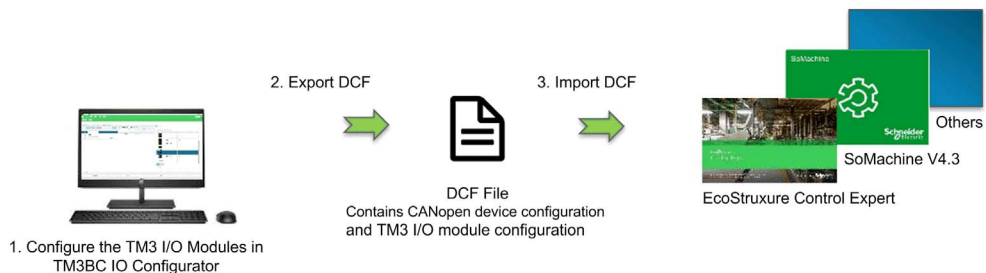
For details on exporting the:

- devdesc file, refer to Exporting for Modbus SL / Modbus TCP ([see page 97](#))
- CSV file, refer to Memory Mapping Table ([see page 101](#)).

CANopen

A configuration file for a CANopen bus coupler is exported as a Device Configuration File (DCF). DCF is a standardized file format that can be used by most IEC 61131-compliant software packages.

This figure shows examples of external software packages and controllers:



For details on exporting the DCF file, refer to Exporting for CANopen ([see page 99](#)).

Chapter 3

Configuring Devices

Introduction

This chapter describes how to configure the devices supported by the TM3 Bus Coupler IO Configurator.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
3.1	Configuring Bus Couplers	38
3.2	Configuring TM3 Analog Input Modules	42
3.3	Configuring TM3 Analog Mixed Modules	65
3.4	Configuring TM3 Analog Output Modules	74
3.5	Configuring TM3 Digital Modules	79
3.6	Configuring TM3 Expert Modules	81
3.7	Configuring CANopen PDO Transmission Mode for Analog Inputs	92

Section 3.1

Configuring Bus Couplers

What Is in This Section?

This section contains the following topics:

Topic	Page
Configuring TM3BCEIP Bus Couplers	39
Configuring TM3BCSL Bus Couplers	40
Configuring TM3BCCO Bus Couplers	41

Configuring TM3BCEIP Bus Couplers

Configuring TM3BCEIP for EtherNet/IP

The TM3BCEIP bus coupler for EtherNet/IP does not have any editable parameters.

Configuring TM3BCEIP for Modbus TCP

The TM3BCEIP bus coupler for Modbus TCP has the following configuration parameter:

Name	Value	Default (DEC)	Description
Monitoring Timeout	0...65535	1000	Timeout before fallback values are applied since last successful cyclic exchange (in milliseconds).

NOTE:

Setting **Monitoring Timeout** to 0 disables:

- the monitoring timeout in the bus coupler
- fallback management in the bus coupler
- the ability to manage the bus coupler using the Web server.

Configuring TM3BCSL Bus Couplers

Configuring TM3BCSL

The TM3BCSL bus coupler has the following configuration parameters:

Name	Value	Default (DEC)	Description
Monitoring Timeout	0...65535	0	Timeout (in milliseconds) before the bus coupler goes into fallback mode if the communication cable is disconnected or if the master does not send a request to the bus coupler within the configured time.

NOTE:

Setting **Monitoring Timeout** to 0 disables:

- the monitoring timeout in the bus coupler
- fallback management in the bus coupler
- the ability to manage the bus coupler using the Web server.

Configuring TM3BCCO Bus Couplers

Configuring the TM3BCCO

The TM3 CANopen bus coupler (TM3BCCO) does not have any editable parameters.

Section 3.2

Configuring TM3 Analog Input Modules

This section describes how to configure TM3 Analog input modules.

What Is in This Section?

This section contains the following topics:

Topic	Page
TM3AI2H / TM3AI2HG	43
TM3AI4 / TM3AI4G	46
TM3AI8 / TM3AI8G	49
TM3TI4 / TM3TI4G	53
TM3TI4D / TM3TI4DG	57
TM3TI8T / TM3TI8TG	60

TM3AI2H / TM3AI2HG

Introduction

The TM3AI2H (screw terminal block) / TM3AI2HG (spring terminal block) expansion module feature 2 analog input channels with 16-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0, IW1) you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
Maximum	0 - 10 V	-32768...32767	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	

Parameter	Value	Default Value	Description
Input Filter	0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling	1	1	Specifies the sampling period of the channel in ms. If an input filter is active, the sampling period is set internally to 10 ms.

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
(1) Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs ([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.

TM3AI4 / TM3AI4G

Introduction

The TM3AI4 (screw terminal block) / TM3AI4G (spring terminal block) expansion module feature 4 analog input channels with 12-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0 . . . IW3) you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

Parameter	Value	Default Value	Description
Input Filter	0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling	1 10	1	Specifies the sampling period of the channel in ms. If an input filter is active, the sampling period is set internally to 10 ms.
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.			

Diagnostics

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
(1) Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs (*see page 92*).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.

TM3AI8 / TM3AI8G

Introduction

The TM3AI8 (screw terminal block) / TM3AI8G (spring terminal block) expansion module feature 8 analog input channels with 12-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA
- 0...20 mA extended
- 4...20 mA extended

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0 . . . IW7), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA 0 - 20 mA extended ² 4 - 20 mA extended ²	Not used	Choose the mode of the channel.
Scope		Normal	Normal	The range of values for a channel.
Minimum	0 - 10 V	-32768...32767 ¹	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
	0 - 20 mA extended ²		0	
	4 - 20 mA extended ²		1200	

Parameter		Value	Default Value	Description
Maximum	0 - 10 V	-32768...32767 ¹	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
	0 - 20 mA extended ²		23540	
	4 - 20 mA extended ²		23170	
Input Filter		0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling		1 10	1	Specifies the sampling period of the channel, in ms. If an input filter is active, the sampling period is set internally to 10 ms.

¹ The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.

² The extended ranges are supported by modules from hardware version (PV) 03, firmware version (SV) 1.4. The firmware version of the expansion module is displayed on the **Information** tab.

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.

(1) Depends on the type and the unit of the input.

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs ([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
	IW4	Current value of the input 4.
	IW5	Current value of the input 5.
	IW6	Current value of the input 6.
	IW7	Current value of the input 7.

Variable	Channel	Symbol
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.
	IBStatusIW4	Status of input 4.
	IBStatusIW5	Status of input 5.
	IBStatusIW6	Status of input 6.
	IBStatusIW7	Status of input 7.

TM3TI4 / TM3TI4G

Introduction

The TM3TI4 (screw terminal block) / TM3TI4G (spring terminal block) expansion module feature 4 analog input channels with 16-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA
- K thermocouple
- J thermocouple
- R thermocouple
- S thermocouple
- B thermocouple
- E thermocouple
- T thermocouple
- N thermocouple
- C thermocouple
- PT100
- PT1000
- NI100
- NI1000

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0 . . . IW3), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA K Thermocouple J Thermocouple R Thermocouple S Thermocouple B Thermocouple E Thermocouple T Thermocouple N Thermocouple C Thermocouple PT100 PT1000 NI100 NI1000	Not used	Choose the mode of the channel.
Scope		Normal Celsius (0.1°C) Fahrenheit (0.1°F) Fahrenheit (0.2°F)*	Normal	The range of values for a channel. * Only for B and C thermocouples.
Min.	0 - 10 V	-32768...32767	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
	Temperature	See the table below		
Max.	0 - 10 V	-32768...32767	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
	Temperature	See the table below		
Input Filter		0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling		10ms/Channel 100ms/Channel	100ms/Channel	Specifies the sampling period of the channel. If an input filter is active, the sampling period is set internally to 10 ms.

Type	Normal		Celsius (0.1 °C)		Fahrenheit		
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Unit
K Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
J Thermocouple	-32768	32767	-2000	10000	-3280	18320	0.1 °F
R Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
S Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
B Thermocouple	-32768	32767	0	18200	160	16540	0.2 °F
E Thermocouple	-32768	32767	-2000	8000	-3280	14720	0.1 °F
T Thermocouple	-32768	32767	-2000	4000	-3280	7520	0.1 °F
N Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
C Thermocouple	-32768	32767	0	23150	160	20995	0.2 °F
PT100	-32768	32767	-2000	8500	-3280	15620	0.1 °F
PT1000	-32768	32767	-2000	6000	-3280	11120	0.1 °F
NI100	-32768	32767	-600	1800	-760	3560	0.1 °F
NI1000	-32768	32767	-600	1800	-760	3560	0.1 °F

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
(1) Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs ([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.

TM3TI4D / TM3TI4DG

Introduction

The TM3TI4D (screw terminal block) / TM3TI4DG (spring terminal block) expansion module feature 4 analog input channels with 16-bit resolution.

The channel input types are:

- K thermocouple
- J thermocouple
- R thermocouple
- S thermocouple
- B thermocouple
- E thermocouple
- T thermocouple
- N thermocouple
- C thermocouple

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (see page 15).

Inputs

For each input channel (IW0 . . . IW3), you can define:

Parameter	Value	Default Value	Description
Type	Not used K Thermocouple J Thermocouple R Thermocouple S Thermocouple B Thermocouple E Thermocouple T Thermocouple N Thermocouple C Thermocouple	Not used	Choose the mode of the channel.
Scope	Normal Celsius (0.1°C) Fahrenheit (0.1°F) Fahrenheit (0.2°F)*	Normal	The range of values for a channel. * Only for B and C thermocouples.

Parameter	Value	Default Value	Description
Minimum	See the table below		Specifies the lower measurement limit.
Maximum	See the table below		Specifies the upper measurement limit.
Input Filter	0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling	10 100	100	Specifies the sampling period of the channel, in ms. If an input filter is active, the sampling period is set internally to 10 ms.

Type	Normal		Celsius (0.1 °C)		Fahrenheit		
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Unit
K Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
J Thermocouple	-32768	32767	-2000	10000	-3280	18320	0.1 °F
R Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
S Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
B Thermocouple	-32768	32767	0	18200	160	16540	0.2 °F
E Thermocouple	-32768	32767	-2000	8000	-3280	14720	0.1 °F
T Thermocouple	-32768	32767	-2000	4000	-3280	7520	0.1 °F
N Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
C Thermocouple	-32768	32767	0	23150	160	20995	0.2 °F

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.

⁽¹⁾ Depends on the type and the unit of the input.

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs ([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.

TM3TI8T / TM3TI8TG

Introduction

The TM3TI8T (screw terminal block) / TM3TI8TG (spring terminal block) expansion module feature 8 analog input channels with 16-bit resolution.

The channel input types are:

- K thermocouple
- J thermocouple
- R thermocouple
- S thermocouple
- B thermocouple
- E thermocouple
- T thermocouple
- N thermocouple
- C thermocouple
- NTC thermistor
- PTC thermistor
- Ohmmeter

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel ($IW0 \dots IW7$) you can define the following parameters:

Parameter	Value	Default Value	Description
Type Not used	-	Not used	Choose the parameter type and scope for the channel.
Type - K Thermocouple - J Thermocouple - R Thermocouple - S Thermocouple - E Thermocouple - T Thermocouple - N Thermocouple - NTC Thermistor	Scope - Customized - Celsius (0.1 °C) - Fahrenheit (0.1 °F)	Celsius (0.1 °C)	
Type - B Thermocouple - C Thermocouple	Scope - Customized - Celsius (0.1 °C) - Fahrenheit (0.2 °F)	Celsius (0.1 °C)	
Type PTC Thermistor	Scope - Customized - Threshold	Threshold	
Type Ohmmeter	Scope Resistance (Ω)	Resistance	
Minimum	See the table below		Specifies the low measurement limit.
Maximum	See the table below		Specifies the high measurement limit.
Rref (used only with NTC probe)	1...65535	330	Reference resistance in Ohm at temperature Tref.
Tref (used only with NTC probe)	1...1000	25	Reference temperature value in Celsius.
Beta (used only with NTC probe)	1...32767	3569	Sensitivity of NTC probe in Kelvin.
Input Filter	0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling	100	100	Specifies the sampling period of the channel, in ms.
High Threshold (used only with PTC probe)	101...10000	3100	Activation threshold
Low Threshold (used only with PTC probe)	100...9999	1500	Reactivation threshold

The following table indicates the possible range values for the selected type of thermocouple:

Type	Customized	Range in Celsius	Range in Fahrenheit
K Thermocouple	-32768...32767	-2000...13000 (0.1°C)	-3280...23720 (0.1°F)
J Thermocouple		-2000...10000 (0.1°C)	-3280...18320 (0.1°F)
R Thermocouple		0...17600 (0.1°C)	320...32000 (0.1°F)
S Thermocouple		0...17600 (0.1°C)	320...32000 (0.1°F)
B Thermocouple		0...18200 (0.1°C)	160...16540 (0.2°F)
E Thermocouple		-2000...8000 (0.1°C)	-3280...14720 (0.1°F)
T Thermocouple		-2000...4000 (0.1°C)	-3280...7520 (0.1°F)
N Thermocouple		-2000...13000 (0.1°C)	-3280...23720 (0.1°F)
C Thermocouple		0...23150 (0.1°C)	160...20995 (0.2°F)
NTC Thermistor		-900...1500 (0.1°C)	-1300...3020 (0.1°F)
PTC Thermistor		—	—

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
(1) Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs (*see page 92*).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
	IW4	Current value of the input 4.
	IW5	Current value of the input 5.
	IW6	Current value of the input 6.
	IW7	Current value of the input 7.

Variable	Channel	Symbol
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.
	IBStatusIW4	Status of input 4.
	IBStatusIW5	Status of input 5.
	IBStatusIW6	Status of input 6.
	IBStatusIW7	Status of input 7.

Section 3.3

Configuring TM3 Analog Mixed Modules

This section describes how to configure TM3 analog mixed input/output modules.

What Is in This Section?

This section contains the following topics:

Topic	Page
TM3AM6 / TM3AM6G	66
TM3TM3 / TM3TM3G	70

TM3AM6 / TM3AM6G

Introduction

The TM3AM6 (screw terminal block) / TM3AM6G (spring terminal block) expansion module feature 4 analog input channels and 2 analog output channels with 12-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

The channel output types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0 . . . IW3), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767 ⁽¹⁾	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

Parameter		Value	Default Value	Description
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
Input Filter		0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling		1 10	1	Specifies the sampling period of the channel, in ms. If an input filter is active, the sampling period is set internally to 10 ms.
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

Diagnostics

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

Outputs

For each output channel (QW0 . . . QW3), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767 ⁽¹⁾	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

Parameter		Value	Default Value	Description
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
(1) Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs ([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
	IW2	Current value of the input 2.
	IW3	Current value of the input 3.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusIW2	Status of input 2.
	IBStatusIW3	Status of input 3.
	IBStatusQW0	Status of output 0.
	IBStatusQW1	Status of output 1.
Outputs	QW0	Current value of the output 0.
	QW1	Current value of the output 1.

TM3TM3 / TM3TM3G

Introduction

The TM3TM3 (screw terminal block) / TM3TM3G (spring terminal block) expansion module feature 2 analog input channels with 16-bit resolution and 1 analog output with 12-bit resolution.

The channel input types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA
- K thermocouple
- J thermocouple
- R thermocouple
- S thermocouple
- B thermocouple
- E thermocouple
- T thermocouple
- N thermocouple
- C thermocouple
- PT100
- PT1000
- NI100
- NI1000

The channel output types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Inputs

For each input channel (IW0, IW1), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA K Thermocouple J Thermocouple R Thermocouple S Thermocouple B Thermocouple E Thermocouple T Thermocouple N Thermocouple C Thermocouple PT100 PT1000 NI100 NI1000	Not used	Choose the mode of the channel.
Scope		Normal Celsius (0.1°C) Fahrenheit (0.1°F) Fahrenheit (0.2°F)*	Normal	The range of values for a channel. * Only for B and C thermocouples.
Minimum	0 - 10 V	-32768...32767	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
	Temperature	See the table below		
Maximum	0 - 10 V	-32768...32767	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
	Temperature	See the table below		
Input Filter		0...1000	0	Specifies the first order filter time constant (0...10 s) in increments of 10 ms.
Sampling		10 100	100	Specifies the sampling period of the channel, in ms. If an input filter is active, the sampling period is set internally to 10 ms.

Type	Normal		Celsius (0.1 °C)		Fahrenheit		
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Unit
K Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
J Thermocouple	-32768	32767	-2000	10000	-3280	18320	0.1 °F
R Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
S Thermocouple	-32768	32767	0	17600	320	32000	0.1 °F
B Thermocouple	-32768	32767	0	18200	160	16540	0.2 °F
E Thermocouple	-32768	32767	-2000	8000	-3280	14720	0.1 °F
T Thermocouple	-32768	32767	-2000	4000	-3280	7520	0.1 °F
N Thermocouple	-32768	32767	-2000	13000	-3280	23720	0.1 °F
C Thermocouple	-32768	32767	0	23150	160	20995	0.2 °F
PT100	-32768	32767	-2000	8500	-3280	15620	0.1 °F
PT1000	-32768	32767	-2000	6000	-3280	11120	0.1 °F
NI100	-32768	32767	-600	1800	-760	3560	0.1 °F
NI1000	-32768	32767	-600	1800	-760	3560	0.1 °F

Outputs

For the QW0 output channel, you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767 ⁽¹⁾	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	

(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.

Diagnostics

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

CANopen

For each analog input, you can define:

Parameter	Value	Default Value	Description
Upper limit	Yes No	No	Enables the upper limit threshold event.
Upper limit threshold ⁽¹⁾	0...10000	0	The upper limit threshold value.
Lower limit	Yes No	No	Enables the lower limit threshold event.
Lower limit threshold ⁽¹⁾	0...10000	0	The lower limit threshold value.
Delta interrupt	Yes No	No	Enables the delta interrupt event.
Delta interrupt threshold ⁽¹⁾	0...10000	50	The delta interrupt threshold value.
⁽¹⁾ Depends on the type and the unit of the input.			

For details, refer to Configuring CANopen PDO Transmission Mode for Analog Inputs
([see page 92](#)).

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Inputs	IW0	Current value of the input 0.
	IW1	Current value of the input 1.
Diagnostic	IBStatusIW0	Status of input 0.
	IBStatusIW1	Status of input 1.
	IBStatusQW0	Status of output 0.
Outputs	QW0	Current value of the output 0.

Section 3.4

Configuring TM3 Analog Output Modules

This section describes how to configure TM3 analog output modules.

What Is in This Section?

This section contains the following topics:

Topic	Page
TM3AQ2 / TM3AQ2G	75
TM3AQ4 / TM3AQ4G	77

TM3AQ2 / TM3AQ2G

Introduction

The TM3AQ2 (screw terminal block) / TM3AQ2G (spring terminal block) expansion module feature 2 analog output channels with 12-bit resolution.

The channel output types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

Outputs

For each output channel (QW0, QW1), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767 ⁽¹⁾	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	
(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.				

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Diagnostic	IBStatusQW0	Status of output 0.
	IBStatusQW1	Status of output 1.
Outputs	QW0	Current value of the output 0.
	QW1	Current value of the output 1.

TM3AQ4 / TM3AQ4G

Introduction

The TM3AQ4 (screw terminal block) / TM3AQ4G (spring terminal block) expansion module features 4 analog output channels with 12-bit resolution.

The channel output types are:

- 0...10 V
- -10...+10 V
- 0...20 mA
- 4...20 mA

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostic

For this module, you can define:

Parameter	Value	Default Value	Description
Status Enabled	Yes No	Yes	Enables the status/diagnostic byte of this input channel. If disabled (value = No), status/diagnostic data is not included in the data structure.

Outputs

For each output channel (QW0 . . . QW3), you can define:

Parameter		Value	Default Value	Description
Type		Not used 0 - 10 V -10 - +10 V 0 - 20 mA 4 - 20 mA	Not used	Choose the mode of the channel.
Minimum	0 - 10 V	-32768...32767 ⁽¹⁾	0	Specifies the lower measurement limit.
	-10 - +10 V		-10000	
	0 - 20 mA		0	
	4 - 20 mA		4000	
Maximum	0 - 10 V	-32768...32767 ⁽¹⁾	10000	Specifies the upper measurement limit.
	-10 - +10 V		10000	
	0 - 20 mA		20000	
	4 - 20 mA		20000	

(1) The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767.

I/O Mapping Tab

I/O channels can be mapped to variables in the **Mapping** tab.

This table describes the **Mapping** tab:

Variable	Channel	Symbol
Diagnostic	IBStatusQW0	Status of output 0.
	IBStatusQW1	Status of output 1.
	IBStatusQW2	Status of output 2.
	IBStatusQW3	Status of output 3.
Outputs	QW0	Current value of the output 0.
	QW1	Current value of the output 1.
	QW2	Current value of the output 2.
	QW3	Current value of the output 3.

Section 3.5

Configuring TM3 Digital Modules

Configuration Tab - Configuring TM3 Digital Modules

Introduction

This section describes how to configure TM3 Digital modules.

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (see page 15).

Functional Mode

Only available on the following modules with software version SV 2.0 or greater:

- TM3DI• except TM3DI8A
- TM3DM•

For this module, you can define:

Parameter	Value	Default Value	Description
Functional Mode	1 2	1	Specifies the functional mode of the module: • 1 (Normal) • 2 (Filter)

Inputs

You can configure these parameters on the following modules when **Functional Mode** is set to **2** (Filter):

- TM3DI• except TM3DI8A
- TM3DM•

Parameter	Value	Default Value	Description
Latch	No	No	Not supported.
Filter	0 0.3 0.5 1 2 4 12	4	Specifies the noise filter duration for the input channel, in ms. Using a filter for the digital inputs reduces the noise on the input.

Outputs

Parameter	Value	Default Value	Description
Mode	Maintain Fallback Value	Fallback value	Maintain. The output retains its current value when the logic controller enters the STOPPED or an exception state. Fallback value Allows you to specify the Force Value parameter to apply to the corresponding output.
Force Value	0 1	0	The value that the output is forced to when the logic controller enters the STOPPED or an exception state.

Section 3.6

Configuring TM3 Expert Modules

Introduction

This section shows how to configure TM3 expert modules.

What Is in This Section?

This section contains the following topics:

Topic	Page
TM3XTYS4	82
TM3SAK6R / TM3SAK6RG	84
TM3SAFL5R / TM3SAFL5RG	86
TM3SAF5R / TM3SAF5RG	88
TM3SAC5R / TM3SAC5RG	90

TM3XTYS4

Introduction

The TeSys expansion module TM3XTYS4 is equipped with:

- 4 RJ-45 connectors to connect to TeSys motor starter devices
- 2 digital inputs for each channel:
 - Forward
 - Reverse
- 3 digital outputs for each channel:
 - Ready
 - Run
 - Trip
- Removable 24 Vdc power supply

The TeSys expansion module is connected to the controller through the TM3 bus. TM3XTYS4 expansion modules can be connected to the controller in any order.

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (see page 15).

Mapping Tab (TM3BCEIP Modbus TCP and TM3BCSL Modbus Serial Line only)

Configuration of the TM3XTYS4 module is carried out on the **Mapping** tab of the module.

The digital inputs of this module are:

Name	Description
CH1_Ready	Input active if the selector of TeSys is in the ON position.
CH1_Run	Input active if the power contacts of TeSys are closed.
CH1_Trip	Input active if the selector of TeSys is in the TRIP position.
CH2_Ready	Input active if the selector of TeSys is in the ON position.
CH2_Run	Input active if the power contacts of TeSys are closed.
CH2_Trip	Input active if the selector of TeSys is in the TRIP position.
CH3_Ready	Active if the selector of TeSys is in the ON position.
CH3_Run	Input active if the power contacts of TeSys are closed.
CH3_Trip	Input active if the selector of TeSys is in the TRIP position.

Name	Description
CH4_Ready	Input active if the selector of TeSys is in the ON position.
CH4_Run	Input active if the power contacts of TeSys are closed.
CH4_Trip	Input active if the selector of TeSys is in the TRIP position.
Error	Over current error flag of protect source outputs (0:Error, 1:Normal).

The digital outputs of this module are:

Name	Description
CH1_Dir1Control	This 24 V output drives the direct (forward) command of the motor.
CH1_Dir2Control	This 24 V output drives the reverse (backward) command of the motor.
CH2_Dir1Control	This 24 V output drives the direct (forward) command of the motor.
CH2_Dir2Control	This 24 V output drives the reverse (backward) command of the motor.
CH3_Dir1Control	This 24 V output drives the direct (forward) command of the motor.
CH3_Dir2Control	This 24 V output drives the reverse (backward) command of the motor.
CH4_Dir1Control	This 24 V output drives the direct (forward) command of the motor.
CH4_Dir2Control	This 24 V output drives the reverse (backward) command of the motor.

TM3SAK6R / TM3SAK6RG

Introduction

The main characteristics of the TM3SAK6R (screw) and TM3SAK6RG (spring) modules are:

- 2 channels
- 24 Vdc
- Removable screw or spring terminal

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostics

Diagnostic variables are defined and named in the **Mapping** tab. Additional information such as topological addressing is also provided in this tab.

For the input channel `IW0` you can define:

Name	Description
OutputOn	Safety output on
Supply	Supply available (A1/A2)
SupplyFail	Supply out of tolerance Acceptable range: 20.4...28.8 Vdc
CH1	Channel 1 active
CH2	Channel 2 active
Start	Start active
K1	Relay K1 activated
K2	Relay K2 activated
S1	S1 active
S2	S2 active
S3	S3 active
S4	S4 active
WaitingForStart	Waiting for start condition
SyncFailure	Synchronization time expired

For the output channel $QB0$ you can define:

Name	Description
Enable	TRUE enables the activation of safety outputs.
ResetModule	TRUE resets the module: current source switched off, outputs deactivated, and interlock reset.
KeepAlive	TRUE defines the safety function remains active even when a TM3 Bus time-out occurs.
SyncOn	TRUE enables the synchronization time monitoring of S2 and S3 inputs.

TM3SAFL5R / TM3SAFL5RG

Overview

The main characteristics of the TM3SAFL5R (screw) and TM3SAFL5RG (spring) modules are:

- 2 channels
- 24 Vdc
- Removable screw or spring terminal

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostics

Diagnostic variables are defined and named in the **Mapping** tab. Additional information such as topological addressing is also provided in this tab.

For the **IW0** input channel you can define:

Name	Description
OutputOn	Safety output on
Supply	Supply available (A1/A2)
SupplyFail	Supply out of tolerance Acceptable range: 20.4...28.8 Vdc
CH1	Channel 1 active
CH2	Channel 2 active
Start	Start active
K1	Relay K1 activated
K2	Relay K2 activated
S1	S1 active
Not applicable	Not valid as a TM3 safety function block output
S2	S2 active
S4	S4 active
WaitingForStart	Waiting for start condition
Not applicable	Not valid as a TM3 safety function block output
Reserved	-

For the $QB0$ output channel you can define:

Name	Description
Enable	TRUE enables the activation of safety outputs.
ResetModule	TRUE resets the module: current source switched off, outputs deactivated, and interlock reset.
KeepAlive	TRUE defines the safety function remains active even when a TM3 Bus time-out occurs.
Reserved	-

TM3SAF5R / TM3SAF5RG

Overview

The main characteristics of the TM3SAF5R (screw) and TM3SAF5RG (spring) modules are:

- 2 channels
- 24 Vdc
- Removable screw or spring terminal

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostics

Diagnostic variables are defined and named in the **Mapping** tab. Additional information such as topological addressing is also provided in this tab.

For the **IW0** input channel you can define:

Name	Description
OutputOn	Safety output on
Supply	Supply available (A1/A2)
SupplyFail	Supply out of tolerance Acceptable range: 20.4...28.8 Vdc
CH1	Channel 1 active
CH2	Channel 2 active
Start	Start active
K1	Relay K1 activated
K2	Relay K2 activated
Reserved	-
S1	S1 active
S2	S2 active
S4	S4 active
WaitingForStart	Waiting for start condition
Reserved	-

For the $QB0$ output channel you can define:

Name	Description
Enable	TRUE enables the activation of safety outputs.
ResetModule	TRUE resets the module: current source switched off, outputs deactivated, and interlock reset.
KeepAlive	TRUE defines the safety function remains active even when a TM3 Bus time-out occurs.
Reserved	-

TM3SAC5R / TM3SAC5RG

Introduction

The main characteristics of the TM3SAC5R (screw) and TM3SAC5RG (spring) modules are:

- 1 channel or 2 channels
- 24 Vdc
- Removable screw or spring terminal

Optional Module

For this module, you can define:

Parameter	Value	Default Value	Description
Optional module	Yes No	No	Specifies whether this module is optional. When set to Yes the module must conform to the rules described in Optional Modules (<i>see page 15</i>).

Diagnostics

Diagnostic variables are defined and named in the **Mapping** tab. Additional information such as topological addressing is also provided in this tab.

For the **IW0** input channel you can define:

Name	Description
OutputOn	Safety output on
Supply	Supply available (A1/A2)
SupplyFail	Supply out of tolerance Acceptable range: 20.4...28.8 Vdc
Not applicable	Not valid as a TM3 safety function block output
Not applicable	Not valid as a TM3 safety function block output
Start	Start active
K1	Relay K1 activated
K2	Relay K2 activated
Reserved	-
WaitingForStart	Waiting for start condition
Reserved	-

For the $QB0$ output channel you can define:

Name	Description
Enable	TRUE enables the activation of safety outputs.
ResetModule	TRUE resets the module: current source switched off, outputs deactivated, and interlock reset.
KeepAlive	TRUE defines the safety function remains active even when a TM3 Bus time-out occurs.
Reserved	-

Section 3.7

Configuring CANopen PDO Transmission Mode for Analog Inputs

Configuring CANopen PDO Transmission Mode for Analog Inputs

Overview

Process Data Objects (PDOs) are objects that control the exchange of data between CANopen bus couplers and remote devices on the network.

For analog inputs, CANopen supports using events to control data transmission. Data is only transmitted when an event is triggered. This helps reduce bus load and maintain transfer times.

Configuring CANopen PDO Transmission Mode for Analog Inputs

For analog inputs, events can be configured to trigger when values:

- Fall below a threshold value (lower limit)
- Exceed an upper threshold value (upper limit)
- Differ from the last transmitted value by a specified amount (delta)

Events can be configured individually or in combination. For example, if events are configured for both an upper limit of 5000 and a delta of 100, then a value must both exceed 5000 and differ from the previous value by more than ± 100 before the data is transmitted.

NOTE: If all events (upper limit, lower limit, and delta) are disabled and the PDO transmission mode is configured in the bus coupler as acyclic or asynchronous, no analog data is transmitted.

Configuring Events

To configure events:

Step	Action
1	In the TM3 Bus Coupler IO Configurator, create a project with a TM3BCCO bus coupler and a module with analog inputs.
2	On the Configuration tab, select a range mode by changing the value of Inputs → IWx → Type , where x is the input number.
3	In the corresponding CANopen → IWx section, set Lower limit , Upper limit or Delta interrupt to Yes .
4	Set Lower limit threshold , Upper limit threshold or Delta interrupt threshold to the required values.

Chapter 4

Loading Configuration File into a Bus Coupler (TM3BCEIP and TM3BCSL)

Loading the Configuration File into a Bus Coupler

Overview

Step	Action
1	Use the TM3 Bus Coupler IO Configurator to reproduce the physical configuration of a TM3 bus coupler and the TM3 expansion modules connected to it, as described in User Interface Basics (<i>see page 25</i>).
2	Configure the devices in the configuration, as described in Configuring Devices (<i>see page 37</i>).
3	Click the Save button  .
4	Type the project name and click Save . Result: The project file is saved as an <code>SPF</code> file.
5	Connect the PC running the TM3 Bus Coupler IO Configurator to the USB or Ethernet port (TM3BCEIP) of the bus coupler.
6	Start a Web browser on the PC and access the Web server interface of the bus coupler by typing the IP address or host name of the bus coupler in the address bar. NOTE: If you selected to install the PLCUsb driver during installation, the USB connection is configured automatically. If you deselected the option, then it may be necessary to reconfigure the Virtual Ethernet link as follows: 1. Open Network and sharing center on the PC. 2. Click Change adapter settings → Remote NDIS Compatible Device → Properties. 3. Select Internet Protocol version 4 (TCP/IPv4). 4. Click Properties. 5. Select Use the following IP address and type: IP address: 90.0.0.2 Subnet mask: 255.0.0.0 6. Click OK. 7. Close the Properties. 8. In the web browser, enter the IP address 90.0.0.1. NOTE: Refer to Modicon TM3 Bus Coupler Web Server (<i>see page 107</i>) for details on the Web server.
7	Navigate to the CONFIGURATION page of the Web server and click Open to load the configuration file generated by the TM3 Bus Coupler IO Configurator.

Step	Action
8	Click Apply to load the new configuration into the bus coupler. The bus coupler firmware configures the TM3 expansion modules using the information in the configuration file.
9	The firmware checks that the information in the configuration file is compatible with the hardware configuration. Appropriate error or advisory messages are displayed in the Web server. Refer to Commissioning (<i>see page 155</i>) for help on resolving configuration issues.

Chapter 5

Exporting the Configuration

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Exporting for EtherNet/IP	96
Exporting for Modbus TCP / Modbus SL	97
Exporting for CANopen	99

Exporting for EtherNet/IP

Introduction

The communication parameters file for an EtherNet/IP bus coupler can be loaded into an external software package using an Electronic Data Sheet (EDS) file. An EDS file describes how a device can be used on an EtherNet/IP network, including the objects, attributes and services available in the device.

Creating and Exporting an EtherNet/IP EDS File

To export an EtherNet/IP project:

Step	Action
1	Create and configure a project for the TM3BCEIP bus coupler for EtherNet/IP.
2	Click the As EDS button  on the EXPORT toolbar.
3	Select the folder and file name, then click Save . Result: The EtherNet/IP communication parameters are exported as an EDS file.
4	Open or import the EDS file into the external software package. Refer to the external software package documentation for details.
5	The external software package manages the EtherNet/IP communication configuration with the bus coupler. If any errors are detected by the external software, refer to Commissioning (see page 155) for help on resolving configuration issues.

Exporting for Modbus TCP / Modbus SL

Introduction

A configuration file for the Modbus protocol (TM3BCEIP or TM3BCSL) is exported depending on the target software:

- SoMachine V4.3 or EcoStruxure Machine Expert requires the `devdesc` file format. The `devdesc` file can be imported into any SoMachine V4.3 or EcoStruxure Machine Expert project using a controller that supports **Modbus I/O Scanner** or **Ethernet I/O Scanner** objects.
- EcoStruxure Control Expert requires the `xsy` file format. An `xsy` file is used to export and import variable files for use with EcoStruxure Control Expert.

Creating a Modbus TCP or Modbus SL devdesc File and Importing It into SoMachine V4.3 / EcoStruxure Machine Expert

Step	Action
1	Create and configure a project for the TM3BCEIP bus coupler for Modbus TCP or TM3BCSL.
2	Click the As DEVDESC button  on the EXPORT toolbar.
3	Enter the project name and click Save . Result: The project is exported as a <code>devdesc</code> file.
4	Import the <code>devdesc</code> file into SoMachine V4.3 or EcoStruxure Machine Expert. Refer to the SoMachine V4.3 or EcoStruxure Machine Expert documentation for details on creating a bus coupler device.
5	The external software package manages the download and application of the configuration to the bus coupler. If any errors are detected by SoMachine V4.3 or EcoStruxure Machine Expert when applying the configuration, refer to Commissioning (see page 155) for help on resolving configuration issues.

Creating a Modbus TCP or Modbus SL XSY File and Importing It into EcoStruxure Control Expert

Step	Action
1	Create and configure a project for the TM3BCEIP bus coupler for Modbus TCP or TM3BCSL.
2	Click the As XSY button  on the EXPORT toolbar.
3	Enter the project name and click Save . Result: The project is saved as an XSY file.
4	Import the XSY file in EcoStruxure Control Expert. To add a Modbus TCP slave or Modbus serial line slave, refer to the EcoStruxure Control Expert documentation.
5	The external software package manages the download and application of the configuration to the bus coupler. If any errors are detected by EcoStruxure Control Expert when applying the configuration, refer to Commissioning (see page 155) for help on resolving configuration issues.

Exporting for CANopen

Exporting a CANopen DCF File to an External Software Package

To export a CANopen project:

Step	Action
1	Create and configure a project for the TM3BCCO bus coupler.
2	Click the As DCF button  on the EXPORT toolbar.
3	Enter the project name and click Save . Result: The project is exported as a DCF file.
4	Open or import the DCF file into the external software package. Refer to the relevant external software package documentation for details.
5	The external software package manages the download and application of the configuration to the bus coupler. If any errors are detected by the software package, refer to Commissioning (see page 155) for help on resolving configuration issues.

Chapter 6

Memory Mapping Table (TM3BCEIP and TM3BCSL)

Overview

This chapter describes how to create and export a memory mapping table.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Memory Mapping Table	102
Exporting the Memory Mapping Table	106

Memory Mapping Table

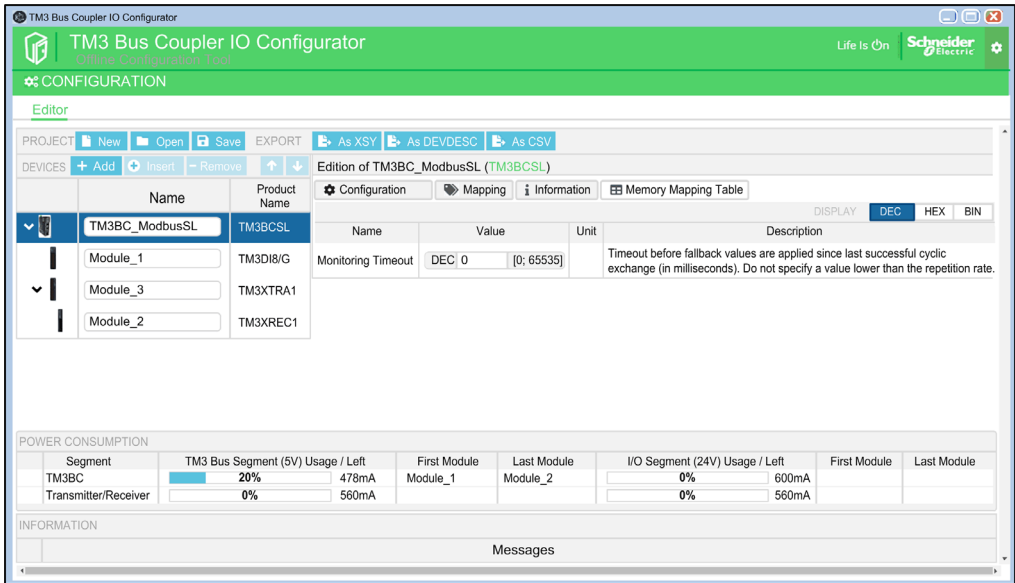
Overview

A Memory Mapping table contains information about communication parameters (EtherNet/IP assembly instances and Modbus I/O data sizes).

The Memory Mapping table is used with:

- EtherNet/IP (*see page 103*)
- Modbus SL / Modbus TCP (*see page 104*)

To display the memory mapping table, select the bus coupler in the **Configuration** window of the TM3 Bus Coupler IO Configurator and select the **Memory Mapping Table** tab:



NOTE: The **Memory Mapping Table** tab is not displayed for the TM3BCCO bus coupler.

EtherNet/IP Memory Mapping Table

To access an EtherNet/IP device, it is necessary to start a *connection* (global name used by EtherNet/IP protocol level). A connection allows the transfer of data combined into an *assembly*. Connections are managed by the logic controller.

For EtherNet/IP bus couplers, the memory mapping table provides information about:

- The TM3BCEIP bus coupler connections:
 - Inputs (T->O):** producing assembly configuration:
 - **Class:** Class identifier 4
 - **Instance:** Instance identifier 101
 - **Attribute:** Attribute identifier 3
 - **Size (Bytes):** Number of bytes to transfer. This depends on the type and number of modules connected to the TM3BCEIP bus coupler
 - Outputs (O->T):** consuming assembly configuration:
 - **Class:** Class identifier 4
 - **Instance:** Instance identifier 100
 - **Attribute:** Attribute identifier 3
 - **Size (Bytes):** Number of bytes to transfer. This depends on the type and number of modules connected to the TM3BCEIP bus coupler
- The structure of the data contained in the I/O buffers. This depends on the type and number of modules connected to the TM3BCEIP bus coupler.

This table shows the connections for an example configuration with a TM3BCEIP bus coupler + 1 TM3AI8/G module + 1 TM3DQ8R/G module:

Connection	Class	Instance	Attribute	Size (Bytes)
Inputs (T->O)	4	101	3	28
Outputs (O->T)	4	100	3	1

These tables show the structure of the **Inputs** and **Outputs** assemblies for the example configuration:

Inputs	Offset (Bytes)	Length (Bytes)
IO_Modules_Status	0	4
TM3AI8_Input_0	4	2
TM3AI8_Input_1	6	2
TM3AI8_Input_2	8	2
TM3AI8_Input_3	10	2
TM3AI8_Input_4	12	2
TM3AI8_Input_5	14	2
TM3AI8_Input_6	16	2
TM3AI8_Input_7	18	2

Inputs	Offset (Bytes)	Length (Bytes)
TM3AI8_Status_Input_0	20	2
TM3AI8_Status_Input_1	22	2
TM3AI8_Status_Input_2	24	2
TM3AI8_Status_Input_3	26	2
TM3AI8_Status_Input_4	28	2
TM3AI8_Status_Input_5	30	2
TM3AI8_Status_Input_6	32	2
TM3AI8_Status_Input_7	34	2

Outputs	Offset (bytes)	Length (bytes)
TM3AI8_Output_0	0	2

Modbus Serial Line / Modbus TCP Memory Mapping Table

For Modbus TM3 bus couplers, the memory mapping table provides the controller with the location of the read and write registers of the bus coupler I/O data buffers.

Inputs: Memory location containing the input data of the modules:

- **Memory Word:** Starting memory address of the input buffer (3001)
- **Size (Words):** Number of words containing input data. Depends on the type and number of modules configured in the bus coupler.

Outputs: Memory location containing the output data of the modules:

- **Memory Word:** Starting memory address of the output buffer (3501)
- **Size (Words):** Number of words containing output data. This depends on the type and number of modules configured in the bus coupler.

Status: Memory location containing the TM3 bus status data:

- **Memory Word:** Starting memory address of the status buffer (930)
- **Size (Words):** Number of words containing the status data (3)

Refer to the *Modicon TM3 Bus Coupler Programming Guide* for details on Modbus register mapping.

This table shows the register mapping for an example configuration with TM3BCEIP bus coupler + 1 TM3AI8/G module + 1 TM3DQ8R/G module:

Register type	Memory Word	Size (Words)
Inputs	3001	16
Outputs	3501	1
Status	930	3

This table shows the input register mapping for the example configuration:

Inputs	Offset (Words)	Length (Words)
TM3AI8_Input_IW0	0	1
TM3AI8_Input_IW1	1	1
TM3AI8_Input_IW2	2	1
TM3AI8_Input_IW3	3	1
TM3AI8_Input_IW4	4	1
TM3AI8_Input_IW5	5	1
TM3AI8_Input_IW6	6	1
TM3AI8_Input_IW7	7	1
TM3AI8_IBStatus_IW0	8	1
TM3AI8_IBStatus_IW1	9	1
TM3AI8_IBStatus_IW2	10	1
TM3AI8_IBStatus_IW3	11	1
TM3AI8_IBStatus_IW4	12	1
TM3AI8_IBStatus_IW5	13	1
TM3AI8_IBStatus_IW6	14	1
TM3AI8_IBStatus_IW7	15	1

This table shows the output register mapping for the example configuration:

Outputs	Offset (Words)	Length (Words)
TM3AI8_Output_QB0	0	1

This table shows the status register mapping for the example configuration:

Status	Offset (Words)	Length (Words)
IO_Modules_Status	0	2
System_State	2	1

Exporting the Memory Mapping Table

Introduction

The mapping table can be exported as a comma separated value (CSV) file. Fields in the CSV file are separated by a comma (",").

Exporting the Memory Mapping Table

To export the memory mapping table:

Step	Action
1	Select the bus coupler in the Configuration window. Result: the mapping table is displayed in the Memory Mapping Table tab.
2	Click the As CSV button  in the EXPORT toolbar.
3	Enter the project name and click Save . Result: The project is exported as a CSV file.

Open the CSV file in a spreadsheet editor such as Excel.

Chapter 7

Modicon TM3 Bus Coupler Web Server

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
7.1	EtherNet/IP (TM3BCEIP)	108
7.2	Modbus TCP / Modbus SL (TM3BCSL)	128
7.3	CANopen (TM3BCCO)	142

Section 7.1

EtherNet/IP (TM3BCEIP)

Web Server

Introduction

The TM3 bus coupler supports a web server, offering easy access to information such as configuration data, module status, I/O data, network statistics, and diagnostic information. All of this vital information is available using a simple web browser.

In addition the web server allows you to monitor this information, the bus coupler network and I/O remotely.

You can access the Web server with HTTPS (secure connections). HTTP (non secured connections) is not supported.

The Web server is accessible through the bus coupler USB port (*see Modicon TM3 Bus Coupler, Programming Guide*) and Ethernet port by specifying the IP address or hostname in the address bar. You can use the pages of the Web server for network setup and control the I/O module outputs as well as application diagnostics and monitoring. These pages are ready to use with a Web browser. No configuration or programming is required.

Any PC providing a USB (host) port and/or an Ethernet interface can connect to the Web server by using a Web browser.

The Web server can be accessed by the web browsers listed below:

- Microsoft Internet Explorer (version ≥ 11)
- Google Chrome (version ≥ 71)
- Mozilla Firefox (version ≥ 64)
- Microsoft Edge (version ≥ 42)

The Web server allows you to monitor a bus coupler remotely, to perform various maintenance activities including modifications to output modules data and network configuration parameters. Care must be taken to ensure that the immediate physical environment of the machine and process is in a state that will not present safety risks to people or property before exercising control remotely.

WARNING

UNINTENDED EQUIPMENT OPERATION

- Define a secure password for the Web server, and do not allow unauthorized or otherwise unqualified personnel to use this feature.
- Ensure that there is a local, competent, and qualified observer present when operating on the controller from a remote location.
- You must have a complete understanding of the application and the machine/process it is controlling before attempting to adjust data, stopping an application that is operating, or starting the controller remotely.
- Take the precautions necessary to assure that you are operating on the intended controller by having clear, identifying documentation within the controller application and its remote connection.

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

NOTE: The Web server must only be used by authorized and qualified personnel. A qualified person is one who has the skills and knowledge related to the construction and operation of the machine and the process controlled by the application and its installation, and has received safety training to recognize and avoid the hazards involved. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this feature.

Web Server Access

You can manage the user accounts on the Web server on MAINTENANCE / User Accounts (*see page 118*).

By default, the user name is Administrator, and the password is Administrator. You must change the password at the first login.

WARNING

UNAUTHORIZED DATA ACCESS

- Do not expose the device or device network to public networks and the Internet as much as possible.
- Immediately change the default password to a new secure password.
- Do not distribute passwords to unauthorized or otherwise unqualified personnel.
- Restrict access to unauthorized personnel.
- Use additional security layers like VPN for remote access and install firewall mechanisms.
- Validate the effectiveness of these measurements regularly and frequently.

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

NOTE: A secure password is one that has not been shared or distributed to any unauthorized personnel and does not contain any personal or otherwise obvious information. Further, a mix of upper and lower case letters and numbers offer greater security. You should choose a password length of at least ten characters.

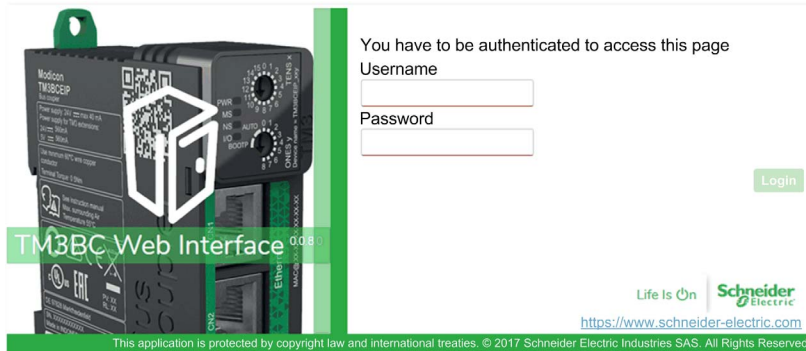
Resetting the Password

To reset the password:

Step	Action
1	Connect to the bus coupler using the USB port. Ensure the Ethernet cable is disconnected.
2	Open the browser.
3	Enter the IP address 90.0.0.1.
4	Move the position of any rotary switch to any other position. Result: MS LED is flashing red. The Restore user accounts button is displayed.
5	Click Restore user accounts .
6	Move the position of the changed rotary switch to its previous position. Result: The Restore user accounts button is no longer displayed.

Login Page

The login page is the entry point to get authenticated by the Web server. The certificate (see *Modicon TM3 Bus Coupler, Programming Guide*) must be validated. To access the website login page shown in the following illustration, type in your navigator the IP address of the TM3 bus coupler or IP address 90.0.0.1 if you are connected by USB. To login to the Web server, enter the user name and password and click **Login**.



The Web server contains the following pages:

- HOME (see page 112)
- DIAGNOSTICS (see page 112)
- CONFIGURATION (see page 115)
- MONITORING (see page 116)
- MAINTENANCE (see page 118)

NOTE: The timeout session for each login is ten minutes. When you do not perform any action after you logged in, it redirects you to the login page if you click any button. You need to log in again with user name and password to access the web pages.

HOME Page

The **HOME** page shows the product details of TM3 bus coupler.

The **identification** section of **HOME** page consists of:

Element	Description
Identification	
Vendor ID	Vendor ID of the bus coupler
Vendor Name	Vendor name of the bus coupler
Product ID	Product ID of the bus coupler
Product Name	Product name of the bus coupler
Product Reference	Product reference of the bus coupler
Serial Number	Serial number of the bus coupler
Locate Device 	Click the button to locate the bus coupler. The LEDs of the bus coupler flash red for few seconds.

DIAGNOSTICS Page

The **DIAGNOSTICS** page displays the status of the bus coupler.

The **DIAGNOSTICS** page contains the following sub-pages:

- Device ([see page 112](#))
- Ethernet ([see page 113](#))
- EtherNet/IP ([see page 114](#))
- Modbus TCP ([see page 115](#))

DIAGNOSTICS / Device

The **Device** sub-page displays the details about identification ([see page 112](#)) and status of the bus coupler:

Element	Description
Status	
Last Stop Cause	Displays the cause of the last stop of the bus coupler.
USB Port	Displays whether a USB cable is connected to the bus coupler.
Operating Mode	Displays one of the following operating modes of the bus coupler: • Idle • EtherNet/IP • Modbus TCP • Web interface • Firmware update in progress • Time Out

Element	Description
Configuration Status	Displays one of the following configuration status of the bus coupler: ● Not Configured ● Configured

DIAGNOSTICS / Ethernet

The **Ethernet** sub-page displays the configuration and status of Ethernet connection:

Element	Description
Configuration	
MAC Address	MAC address of the bus coupler.
Mode	Displays the IP mode of the bus coupler: ● DHCP ● BOOTP ● Manual ● FDR
IP Address	IP address of the bus coupler
Subnet Mask	Subnet mask of the bus coupler
Gateway Address	Gateway address of the bus coupler
Reset  Reset	Resets all the counter values to zero.
Refresh	Refreshes the values.
Statistics	
TXBytes	Displays the number of the bytes transmitted.
TX Frames	Displays the number of frames transmitted.
ErroneousTXFrames	Displays the number of the frames transmitted in error.
RxBytes	Displays the number of the bytes received.
RX Frames	Displays the number of frames received.
ErroneousRXFrames	Displays the number of the frames received in error.
Reset  Reset	Resets all the counter values to zero.
Refresh	Refreshes the values.
Rapid Spanning-Tree Protocol (RSTP)	
Service Status	Displays one of the following status of the bus coupler: ● Running ● Stopped
Bridge ID	Made from the Bridge Priority and the MAC address.
Bridge Priority	Read only. The Bridge Priority is defined in MAINTENANCE / Ethernet (see page 122).

Element	Description
Port State (1)	Displays one of the following states of the CN1 port: ● Disabled ● Discarding ● Learning ● Forwarding
Port Role (1)	Displays one of the following roles of the CN1 port: ● Root ● Designated ● Backup ● Alternate ● Disabled
Port State (2)	Displays one of the following states of the CN2 port: ● Disabled ● Discarding ● Learning ● Forwarding
Port Role (2)	Displays one of the following roles of the CN2 port: ● Root ● Designated ● Backup ● Alternate ● Disabled
Refresh	Refreshes the values.

DIAGNOSTICS / EtherNet/IP

The **EtherNet/IP** sub-page displays the status information of EtherNet/IP:

Element	Description
Reset  Reset	Resets all the counter values to zero.
Refresh	Refreshes the values.
Statistics	
TX I/O Messages	Displays the number of I/O messages transmitted through EtherNet/IP.
RX I/O Messages	Displays the number of I/O messages received through EtherNet/IP.
Failed TX I/O Messages	Displays the number of erroneous I/O messages that were not transmitted through EtherNet/IP.
Failed RX I/O Messages	Displays the number of erroneous I/O messages that were not received through EtherNet/IP.
UCMM Requests	Displays the number of UCMM requests.

DIAGNOSTICS / Modbus TCP

The **Modbus TCP** sub-page displays the status information of Modbus TCP:

Element	Description
Reset  Reset	Resets all the counter values to zero.
Refresh	Refreshes the values.
Statistics	
TX Messages	Displays the number of Modbus messages transmitted through Modbus TCP.
RX Messages	Displays the number of Modbus messages received through Modbus TCP.
Error Messages	Displays the number of Modbus detected error messages transmitted through Modbus TCP.

CONFIGURATION

The **CONFIGURATION** page displays the I/O modules configuration imported from the TM3 Bus Coupler IO Configurator. The configuration file is an .SPF format.

Element	Description
PROJECT toolbar	
New	Read only button.
Open	Allows you to import the I/O modules configuration files generated by the TM3 Bus Coupler IO Configurator. Click Open to import the files.
Save	Read only button.
CONFIGURATION toolbar	
Apply	Allows you to apply the I/O modules configuration files on the TM3 bus coupler. If the configuration mismatch the hardware, an error message is generated.
DEVICES toolbar	Read only toolbar.

MONITORING Page

The **MONITORING** page displays the and TM3 expansion modules that are connected to the TM3 bus coupler.

MONITORING page without detected modules:



MONITORING page with modules and details:

1

2

3

4

Detected modules

Detect

Release Bus Ownership

Slot 0

Slot 1

Slot 2

Slot 3

TM3DQ16

TM3DQ16

TM3DQ16

TM3DQ16

Configured

Controlled by Web interface

Details of slot 2 (TM3DQ16T/G)

Reconcile

Force

DISPLAY

DEC

HEX

BIN

Name	Value	Prepared Value	Unit	Description
QW0	0	DEC16383 [0:65535]		
Q0	False	True False		
Q1	False	True False		
Q2	False	True False		
Q3	False	True False		
Q4	False	True False		
Q5	False	True False		
Q6	False	True False		
Q7	False	True False		
Q8	False	True False		
Q9	False	True False		
Q10	False	True False		
Q11	False	True False		
Q12	False	True False		
Q13	False	True False		
Q14	False	True False		
Q15	False	True False		

TM3DQ16T (screw), TM3DQ16TG (spring) 16-channel, 0.5A source transistor outputs expansion module with 1 common line and removable terminal block.

- 1 Bus Monitoring
- 2 Selected module
- 3 Reconcile button
- 4 Module details

The **MONITORING** page shows and describes all the modules detected by the bus coupler and allows you to:

- See the state of a selected module (running or not running) and the protocol used.
- Read the value of an input or output.
- Force a value to an output by clicking **Force**.
- Identify a module by clicking **Reconcile**.

Element	Description
Detect	Allows you to detect the modules connected to the bus coupler.
Take Bus Ownership Release Bus Ownership	Reserves the bus to allow you to force the module outputs. You can click the button when the bus coupler is configured and not controlled by a controller (EtherNet/IP or Modbus TCP) ⁽¹⁾ . Result: You are notified that the I/O bus is controlled by the Web interface. You can edit the output values. Click Release Bus Ownership to release the control of the I/O bus.
(1) When connected on EtherNet/IP, the I/O bus is controlled, no matter the controller state. When connected on Modbus TCP, the I/O bus is not controlled when the controller is in STOPPED state.	

Module Details

The module details view provides the following data:

- Module name and description
- Module state
- A list of its I/Os
This list of I/Os allows you to view a real-time value of an input and to write the value of an output.

The view has **DISPLAY** buttons to modify the format of the displayed values.

Output Forcing

1. When **Take Bus Ownership** is enabled, click a module to force its outputs.
2. Set the output values you wish to force for the module in the **Prepared Values** column of the list of its I/Os.
3. Click the **Force** button.
Result: A message is displayed.
4. Click **I agree** to validate the modifications and send them to the bus coupler.
Click **I disagree** to cancel the modifications.

As the modules are not identified automatically, click the **Reconcile** button to identify the modules.

MAINTENANCE Page

The **MAINTENANCE** page allows you to view and edit the configuration of the bus coupler.

The **MAINTENANCE** page contains the following sub-pages:

- User Accounts (*see page 118*)
- Setup (*see page 120*)
- Ethernet (*see page 122*)
- Firmware (*see page 123*)
- Modules Firmware (*see page 124*)
- System Log Files (*see page 125*)
- Fast Device Replacement (FDR) (*see page 125*)

MAINTENANCE / User Accounts

The sub-page allows you to enter your login password to access the Web server:

Element	Description
Account Management Select an account to edit it	
User Name	List of the following user accounts: • Administrator The Administrator account is configured with a predefined password (Administrator / Administrator). Modify the predefined password after the first connection. • Operator This account is disabled by default. • Viewer This account is disabled by default. NOTE: Depending on your account, you have access to some web pages. See the table below for the accessible web pages.
Enabled	Selected if the account is enabled.
Account Management Provide a new password for account	
Current Password	Enter the current password of the user account.
New Password	Enter a password for the user account. NOTE: Minimum ten characters, maximum 32 characters and use a...z, A...Z, 0...9 alphanumeric characters. To reset the password, refer to Resetting the Password (<i>see page 110</i>).
Confirm New Password	Enter the password again of the selected account.
Apply	Saves your new password.

This table describes the accessible pages depending on the user account:

Web pages	Sub pages	Administrator	Operator	Viewer
HOME	–	✓	✓	✓
MONITORING	–	✓	✓	–
DIAGNOSTICS	Device	✓	✓	✓
	Ethernet	✓	✓	✓
	EtherNet/IP	✓	✓	✓
	Modbus TCP	✓	✓	✓
CONFIGURATION	–	✓	–	–
MAINTENANCE	Setup	✓	–	–
	Ethernet	✓	–	–
	User Accounts	✓	✓ ⁽¹⁾	✓ ⁽¹⁾
	Firmware	✓	–	–
	System Log Files - Syslog Server	✓	✓	–
			–	
	FDR	✓	–	–
(1) You can only modify your user account.				

System Use Notification

The sub-page allows you to define a **System Use Notification** message which is displayed to users at log-in:

Element	Description
System Use Notification	
Enabled	When selected, you can define a message that is displayed at log-in.
Message	Displays the message defined.
Reset	Reset to default message.
Apply	Applies your changes.

MAINTENANCE / Setup

The following illustration shows the **Setup** sub-page:

Device Configuration

Device Name

Enabled Fieldbuses

☒ EtherNet/IP

☐ Modbus TCP

Reset

Apply

Access Control List

Enabled

☒

+ Add

IP Address Range

10.10.0.0

/

1

Mask 128.0.0.0

End Address 127.255.255.255

×

192.168.0.0

/

1

Mask 128.0.0.0

End Address 255.255.255.255

×

Reset

Apply

The **Setup** sub-page allows you to change the configuration settings of the bus coupler:

Page	Description
Device Configuration	
Device Name	Name of the bus coupler used in DHCP mode. If you modified the Device Name , do a power cycle of the bus coupler to take it into account.
Enabled Fieldbuses	Allows you to select the communication types: ● EtherNet/IP ● Modbus TCP
Cancel	Cancels the configuration settings.
Apply ⁽¹⁾	Saves the configuration settings.
Access Control List (ACL)	
Enabled	Enables or disables the ACL management. Enable it to configure the IP address ranges allowed to communicate with the bus coupler.
Add	Adds a line of IP address range.
IP Address Range	Shows the ranges of IP addresses. Each line corresponds to an IP address range allowed to communicate with the bus coupler. The first field represents the starting IP address. The second one is the number of free bits. The maximum number of ranges is 10.
(1) Modifying the <code>Setup</code> configuration requires a power cycle of the bus coupler to apply the configuration settings.	

Page	Description
Cancel	Cancels the configuration settings.
Apply ⁽¹⁾	Saves the configuration settings.
SNMP	
Enabled	Enables or disables the SNMP management. Disabled by default.
Read-Only Community String	Shows the community name. Allows you to change the community name. The maximum number of characters is 16.
Cancel	Cancels the configuration settings.
Apply ⁽¹⁾	Saves the configuration settings.
Modbus TCP Data Consistency	
Enabled	Allows an internal copy of the input data registers (3000-3499 or 13000-13499) to be kept since the first read request is received until the second read request is received OR until the monitoring timeout is elapsed. Is enabled by default when the I/O modules configuration need more than 124 words to read the data of the input.
Cancel	Cancels the configuration settings.
Apply ⁽¹⁾	Saves the configuration settings.
Device Services	
Discovery (DPWS)	
Enabled	Allows the bus coupler to be located in the LAN via IPv6 or IPv4. Enabled by default.
Cancel	Cancels the configuration settings.
Apply ⁽¹⁾	Saves the configuration settings.
(1) Modifying the Setup configuration requires a power cycle of the bus coupler to apply the configuration settings.	

MAINTENANCE / Ethernet

The **Ethernet** sub-page allows you to change the network settings:

Element	Description
Network Configuration	
Mode	Allows you to select the following operating modes of the bus coupler: • Manual • DHCP • BOOTP
IP Address	IP address of the bus coupler. For more information, refer to TM3 Bus Coupler - Hardware Guide.
Subnet Mask	Subnet mask of the bus coupler.
Gateway Address	Gateway address of the bus coupler.
Apply⁽¹⁾	Saves the configuration settings.
Cancel	Cancels the configuration settings.
Ping Test	
Target IP Address	Allows you to enter the target IP address to check if the bus coupler can reach the device on the network.
Ping	Sends a message to the IP address.
RSTP Configuration	
Enabled	Enables or disables the RSTP configuration.
Bridge Priority	Configure the switch priority to be chosen as the root switch. A low number represents a high priority.
Hello Time (milliseconds)	Read only tab. Interval between the generation of spanning-tree configuration messages by the root switch. These messages mean that the switch is operational.
Maximum Age (milliseconds)	Read only tab. The number of seconds a switch waits without receiving spanning-tree configuration messages before attempting a configuration.
Forward Delay (milliseconds)	Read only tab. The number of seconds the port waits before changing from its spanning-tree learning and listening states to the forwarding state.
(1) Modifying the Ethernet configuration requires a power cycle of the bus coupler to apply the configuration settings.	

MAINTENANCE / Firmware

The **Firmware** sub-page shows the firmware version of the TM3 bus coupler and allows you to update its firmware:

Element	Description
Current Firmware	
Firmware	Firmware version
Web interface	Web server version
Firmware Update Select a new firmware version	
Select	Allows you to select the new firmware file for the bus coupler.
Apply	Allows you to apply the new firmware.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 116*).

To update the bus coupler firmware:

Step	Action
1	Remove power from the bus coupler.
2	Set the rotary switch ONES to the position AUTO .
3	Connect the Ethernet cable.
4	Apply power to the bus coupler.
5	Log into the Web server.
6	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.
7	Click MAINTENANCE / Firmware .
8	Click Select then select the firmware file. Result: A confirmation window is displayed.
9	Click I agree . Result: At the end of the download and verification of the file, a confirmation window is displayed.
10	Click Yes to close the confirmation window then click Apply . Result: At the end of the firmware update, a message is displayed to inform you whether the firmware update is completed successfully.

MAINTENANCE / Modules Firmware

The **Modules Firmware** sub-page shows the firmware version of the modules configured and allows you to update its firmware:

Element	Description
Modules Firmware Overview	
Slot	Slot number of the module
Reference	Reference of the module
Current Firmware	Firmware version of the module
Modules Firmware Management	
Select a new firmware version	
Select	Allows you to select the new firmware file for the module. NOTE: You can select only a single firmware file. All modules on the bus corresponding to the selected firmware are updated.
Apply	Allows you to apply the new firmware.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 116*).

To update the module firmware:

Step	Action
1	Remove power from the bus coupler.
2	Set the rotary switch are in address setting position e.g ONES to 1, TENS to 0.
3	Connect the USB cable.
4	Apply power to the bus coupler.
5	Log into the Web server.
6	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.
7	Click MAINTENANCE / Modules Firmware .
8	Click Select then select the firmware file. Result: The firmware file is selected.
9	Click Apply . Result: A confirmation window is displayed.
10	Click I agree . Result: A restart window is displayed.
11	Click Yes . Result: The file is verified and downloaded. Thereafter, a confirmation window is displayed. The TM3 bus coupler reboots and a confirmation window is displayed.
	Click No . Result: The firmware update is canceled.

MAINTENANCE / System Log Files

The **System Log Files** sub-page lists the log files. Some of the information in the log files comes from internal interactions of the firmware and is intended to be used by Schneider Electric Technical Support:

Element	Description
Log Files	
Name	Shows the list of the log files.
Size	Displays the size of the log files.
Download	Allows you to download the log files.
SysLogServer	
Enabled	Enable or disable the SysLogServer . Disabled by default.
Port (TCP)	Read-only tab. TCP port number for SysLogServer .
IP Address	Allows you to set the bus coupler IP Address.
Cancel	Cancels the configuration settings.
Apply	Saves the configuration settings.
Action	
Send Test Message	Allows you to send a test message stored under the folder /usr/Syslog.

MAINTENANCE / Fast Device Replacement (FDR)

The **Fast Device Replacement (FDR)** service allows you to replace an inoperable device by a new one without the need to configure it.

FDR mode activation:

Mode	Rotary switches position	
FDR mode enabled	TENS : 09 to 15	ONES : 0 to 9

Element	Description
Device Configuration	
Device Name	Name of the bus coupler. Syntax is TM3BCEIP_+XXY (XX represents TENS switch position and Y represents ONES rotary switch position). NOTE : If the bus coupler is in AUTO mode, the name might not respect this syntax.
Ethernet Mode	- Manual - DHCP - BOOTP - FDR

Element	Description
FDR Configuration	
Status	● Enabled ● Disabled
Auto backup	Allows you to enable or disable the automatic backup. When the TM3BCEIP is selected, it sends the .prm file to the FDR server, respecting the timing configured in the automatic backup period.
Auto backup period (seconds)	Allows you to set the backup period (600-90000 seconds). Default value for the backup period is 1800 seconds.
ControlConfiguration	When FDR is enabled and Auto backup is unchecked ● Server: at boot, the TM3BCEIP requests for the prm.file and applies the configuration. ● Stored: at boot, the TM3BCEIP does not request for the prm.file and applies the existing configuration. When FDR is enabled and Auto backup is checked with a Backup period of 600 seconds: ● Server: at boot, the TM3BCEIP requests for the prm.file and applies the configuration. The TM3BCEIP generates and pushes the prm.file to the server each 600 seconds. ● Stored: at boot, the TM3BCEIP does not request for the prm.file and applies the existing configuration. The TM3BCEIP generates and pushes the prm.file to the server each 600 seconds.
Cancel	Cancels any changes made to the values.
Apply	Saves the values to the Flash memory.
FDR Restore	
Current State	● Idle ● RestoreInProgress ● Error
LastError	● No Error ● EmptyFile ● NoFile ● ServerNotFound ● GenericError
Restore Config	Allows you to manually restore (by downloading) the device parameters file from the FDR server to the bus coupler and to apply the configuration received without restarting. This button cannot be clicked when the bus coupler is controlled by the controller or by the Web.

Element	Description
FDR Push	
Current State	• Idle • ConfigurationPushCompleted • Error
LastError	• No Error • EmptyFile • NoFile • ServerNotFound • GenericError
Push Config	Allows you to manually backup (by uploading) the device parameters file from the bus coupler to the FDR server.

Section 7.2

Modbus TCP / Modbus SL (TM3BCSL)

Web Server

Introduction

The TM3 Modbus Serial Line bus coupler supports a web server, offering easy access to information such as configuration data, module status, I/O data, network statistics, and diagnostic information. All of this vital information is available using a simple web browser.

In addition the web server allows you to monitor this information, the bus coupler network and I/O remotely.

You can access the Web server with HTTPS (secure connections). HTTP (non secured connections) is not supported.

The Web server is accessible through the bus coupler USB port (*see Modicon TM3 Bus Coupler, Programming Guide*). You can use the pages of the Web server for setup of the network speed and control the I/O modules outputs as well as diagnostics and monitoring. These pages are ready to use with a Web browser. No configuration or programming is required.

Any PC providing a USB (host) port can connect to the Web server by using a Web browser.

The Web server can be accessed by the web browsers listed below:

- Microsoft Internet Explorer (version ≥ 11)
- Google Chrome (version ≥ 71)
- Mozilla Firefox (version ≥ 64)
- Microsoft Edge (version ≥ 42)

The Web server allows you to monitor a bus coupler to perform various maintenance activities including modifications to outputs modules data and network speed configuration. Care must be taken to ensure that the immediate physical environment of the machine and process is in a state that will not present safety risks to people or property before exercising control remotely.

WARNING

UNINTENDED EQUIPMENT OPERATION

- Define a secure password for the Web server, and do not allow unauthorized or otherwise unqualified personnel to use this feature.
- Ensure that there is a local, competent, and qualified observer present when operating on the controller from a remote location.
- You must have a complete understanding of the application and the machine/process it is controlling before attempting to adjust data, stopping an application that is operating, or starting the controller remotely.
- Take the precautions necessary to assure that you are operating on the intended controller by having clear, identifying documentation within the controller application and its remote connection.

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

NOTE: The Web server must only be used by authorized and qualified personnel. A qualified person is one who has the skills and knowledge related to the construction and operation of the machine and the process controlled by the application and its installation, and has received safety training to recognize and avoid the hazards involved. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this feature.

Web Server Access

You can manage the user accounts on the Web server on MAINTENANCE / User Accounts (*see page 137*).

To access Web server, ensure that the rotary switches are in address setting location. For more information regarding address setting, please refer to the Modicon TM3 Bus Coupler - Hardware Guide, Setting the Serial Line Address.

By default, the user name is Administrator, and the password is Administrator. You must change the password at the first login.

WARNING

UNAUTHORIZED DATA ACCESS

- Do not expose the device or device network to public networks and the Internet as much as possible.
- Immediately change the default password to a new secure password.
- Do not distribute passwords to unauthorized or otherwise unqualified personnel.
- Restrict access to unauthorized personnel.
- Use additional security layers like VPN for remote access and install firewall mechanisms.
- Validate the effectiveness of these measurements regularly and frequently.

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

NOTE: A secure password is one that has not been shared or distributed to any unauthorized personnel and does not contain any personal or otherwise obvious information. Further, a mix of upper and lower case letters and numbers offer greater security. You should choose a password length of at least ten characters.

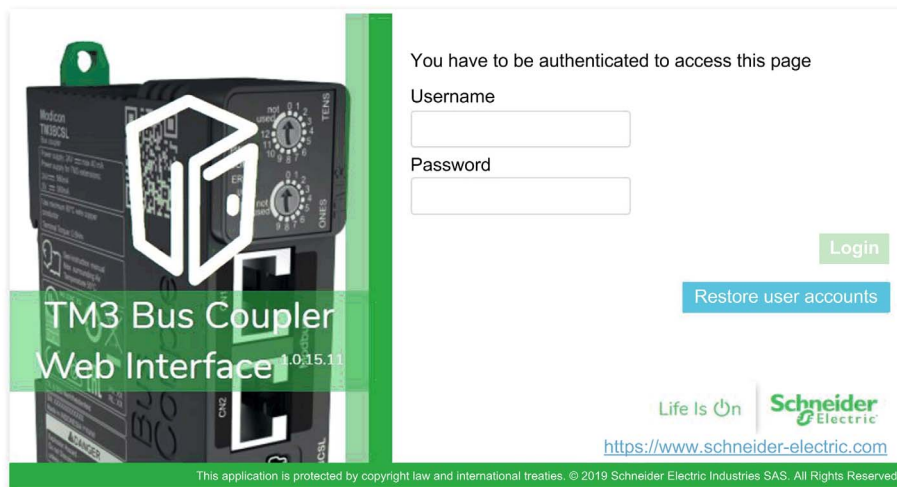
Resetting the Password

To reset the password:

Step	Action
1	Connect to the bus coupler using the USB port.
2	Open the browser.
3	Enter the IP address 90.0.0.1.
4	Move the position of any rotary switch to any other position. Result: ERR LED is flashing red. The Restore user accounts button is displayed.
5	Click Restore user accounts .
6	Move the position of the changed rotary switch to its previous position. Result: The Restore user accounts button is no longer displayed.

Login Page

The login page is the entry point to get authenticated by the Web server. The certificate (see *Modicon TM3 Bus Coupler, Programming Guide*) must be validated. To access the website login page shown in the following illustration, type in your navigator the IP address 90.0.0.1. To login to the Web server, enter the user name and password and click **Login**.



You have to be authenticated to access this page

Username

Password

Login

Restore user accounts

Life Is On | Schneider Electric

<https://www.schneider-electric.com>

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The Web server contains the following pages:

- HOME (see page 132)
- DIAGNOSTICS (see page 132)
- CONFIGURATION (see page 134)
- MONITORING (see page 134)
- MAINTENANCE (see page 137)

NOTE: The timeout session for each login is ten minutes. When you do not perform any action after you logged in, it redirects you to the login page if you click any button. You need to log in again with user name and password to access the web pages.

HOME / Equipment Overview

The **HOME** page displays the product details of TM3 bus coupler.

The **Identification** section of **HOME** page consists of:

Element	Description
Vendor Name	Vendor name of the bus coupler
Product ID	Product ID of the bus coupler
Product Name	Product name of the bus coupler
Product Reference	Product reference of the bus coupler
Serial Number	Serial number of the bus coupler
Locate Device 	Click the button to locate the bus coupler. The LEDs of the bus coupler flash red for few seconds.

DIAGNOSTICS Page

The **DIAGNOSTICS** page shows the status of the bus coupler.

The **DIAGNOSTICS** page contains the following sub-pages:

- Device (*see page 132*)
- Modbus Serial Line or Modbus TCP (*see page 133*)

DIAGNOSTICS / Device

The **Identification** section shows details about identification (*see page 132*) of the bus coupler:

Element	Description
Vendor Name	Vendor name of the bus coupler
Product ID	Product ID of the bus coupler
Product Name	Product name of the bus coupler
Product Reference	Product reference of the bus coupler
Serial Number	Serial number of the bus coupler

The **Status** section shows details about the status of the bus coupler:

Element	Description
Last Stop Cause	Displays the cause of the last stop of the bus coupler.
USB Port	Displays whether a USB cable is connected to the bus coupler.
Operating Mode	Displays one of the following operating modes of the bus coupler: ● Idle ● Modbus Serial ● Web interface ● Firmware update in progress ● Time Out
Configuration Status	Displays one of the following configuration status of the bus coupler: ● Not Configured ● Configured

DIAGNOSTICS / Modbus Serial Line

The **Configuration** section displays the status of Serial Line connection:

Element	Description
Current Speed	Transmission speed in baud rate.
Slave Address	Slave address of the bus coupler

The **Statistics** section shows the current configuration of Serial Line connection:

Element	Description
TX Messages	Displays the number of Modbus messages transmitted through the Serial Line.
RX Messages	Displays the number of Modbus messages received through the Serial Line.
Error Messages	Displays the number of Modbus messages with frame errors received through the Serial Line.
Reset	Resets the Statistics values to zero.
Refresh	Refreshes the Statistics values.

CONFIGURATION

The **CONFIGURATION** page displays the I/O modules configuration imported from the TM3 Bus Coupler IO Configurator. The configuration file is an .SPF format.

Element	Description
PROJECT toolbar	
New	Read only button.
Open	Allows you to import the I/O modules configuration files generated by the TM3 Bus Coupler IO Configurator. Click Open to import the files.
Save	Read only button.
CONFIGURATION toolbar	
Apply	Allows you to apply the I/O modules configuration files on the TM3 bus coupler. If the configuration mismatch the hardware, an error message is generated.
DEVICES toolbar	Read only toolbar.

MONITORING Page

The **MONITORING** page displays the expansion modules that are connected to the TM3 bus coupler.

MONITORING page without detected modules:



MONITORING page with modules and details:

Detected modules ↻ Detect 🔒 Release Bus Ownership

Slot 0 Slot 1 Slot 2 Slot 3
TM3DQ16 TM3DQ16 TM3DQ16 TM3DQ16

Configured | Controlled by Web interface

Details of slot 2 (TM3DQ16T/G) ↻ Reconcile ⚡ Force

DISPLAY DEC HEX BIN

Name	Value	Prepared Value	Unit	Description
✓ Outputs				
✓ QW0	0	DEC:16383 [0;65535]		
Q0	False	True False		
Q1	False	True False		
Q2	False	True False		
Q3	False	True False		
Q4	False	True False		
Q5	False	True False		
Q6	False	True False		
Q7	False	True False		
Q8	False	True False		
Q9	False	True False		
Q10	False	True False		
Q11	False	True False		
Q12	False	True False		
Q13	False	True False		
Q14	False	True False		
Q15	False	True False		

TM3DQ16T (screw), TM3DQ16TG (spring) 16-channel, 0.5A source transistor outputs expansion module with 1 common line and removable terminal block.

- 1 Bus Monitoring
- 2 Selected module
- 3 Reconcile button
- 4 Module details

The **MONITORING** page shows and describes all the modules detected by the bus coupler and allows you to:

- See the state of a selected module (running or not running) and the protocol used.
- Read the value of an input or output.
- Force a value to an output by clicking **Force**.
- Identify a module by clicking **Reconcile**.

Element	Description
Detect	Allows you to detect the modules connected to the bus coupler.
Take Bus Ownership Release Bus Ownership	Reserves the bus to allow you to force the module outputs. You can click the button when the bus coupler is configured and not controlled by a controller. Result: You are notified that the I/O bus is controlled by the Web interface. You can edit the output values. Click Release Bus Ownership to release the control of the I/O bus.

Module Details

The module details view provides the following data:

- Module name and description
- Module state
- Filter option to filter I/Os
- A list of its I/Os

This list of I/Os allows you to view a real-time value of an input and to write the value of an output.

The view has **DISPLAY** buttons to modify the format of the displayed values.

Output Forcing

1. When **Take Bus Ownership** is enabled, click a module to force its outputs.
2. Set the output values you wish to force for the module in the **Prepared Values** column of the list of its I/Os.
3. Click the **Force** button.
Result: A message is displayed.
4. Click **I agree** to validate the modifications and send them to the bus coupler.
Click **I disagree** to cancel the modifications.

As the modules are not identified automatically, click the **Reconcile** button to identify the modules.

MAINTENANCE Page

The **MAINTENANCE** page allows you to view and edit the configuration of the bus coupler.

The **MAINTENANCE** page contains the following sub-pages:

- User Accounts (*see page 137*)
- Firmware (*see page 139*)
- Modules Firmware (*see page 140*)
- System Log Files (*see page 141*)
- Modbus Serial Line (*see page 141*)

MAINTENANCE / User Accounts

Account Management

The sub-page allows you to define your login password to access the Web server:

Element	Description
Account Management Select an account to edit it	
User Name	List of the following user accounts: • Administrator The Administrator account is configured with a predefined password (Administrator / Administrator). Modify the predefined password after the first connection. • Operator This account is disabled by default. • Viewer This account is disabled by default. NOTE: Depending on your account, you have access to some web pages. See the table below for the accessible web pages.
Enabled	Selected if the account is enabled.
Account Management Provide a new password for account	
Current Password	Enter the current password of the user account.
New Password	Enter a password for the user account. NOTE: Minimum ten characters, maximum 32 characters and use a...z, A...Z, 0...9 alphanumeric characters. To reset the password, refer to Resetting the Password (<i>see page 130</i>).
Confirm New Password	Enter the password again of the selected account.
Apply	Saves your new password.

This table describes the accessible pages depending on the user account:

Web pages	Sub pages	Administrator	Operator	Viewer
HOME	–	✓	✓	✓
MONITORING	–	✓	✓	–
DIAGNOSTICS	Device	✓	✓	✓
	Modbus Serial Line	✓	✓	✓
CONFIGURATION	–	✓	–	–
MAINTENANCE	User Accounts	✓	✓ ¹	✓ ¹
	Firmware	✓	–	–
	System Log Files	✓	✓	–
	Modbus Serial Line	✓	–	–
(1) You can only modify your user account.				

System Use Notification

The sub-page allows you to define a **System Use Notification** message which is displayed to users at log-in:

Element	Description
System Use Notification	
Enabled	When selected, you can define a message that is displayed at log-in.
Message	Displays the message defined.
Reset	Reset to default message.
Apply	Applies your changes.

MAINTENANCE / Firmware

The **Firmware** sub-page shows the firmware version of the TM3 bus coupler and allows you to update its firmware:

Element	Description
Current Firmware	
Firmware	Firmware version
Web interface	Web server version
Firmware Update Select a new firmware version	
Select	Allows you to select the new firmware file for the bus coupler.
Apply	Applies the new firmware.
Cancel	Cancels firmware modifications.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 134*).

To update the bus coupler firmware:

Step	Action
1	Remove power from the bus coupler.
2	Ensure rotary switches are in address setting position e.g TENS to 0, ONES to 1.
3	Connect USB cable to PC then to bus coupler.
4	Apply power to the bus coupler.
5	Log into the Web server as Administrator.
6	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.
7	Click MAINTENANCE / Firmware .
8	Click Select then select the firmware file. Result: A confirmation window is displayed.
9	Click I agree . Result: At the end of the download and verification of the file, a confirmation window is displayed.
10	Click Yes to close the confirmation window then click Apply . Result: At the end of the firmware update, a message is displayed to inform you whether the firmware update is completed successfully.

MAINTENANCE / Modules Firmware

The **Modules Firmware** sub-page shows the firmware version of the modules configured and allows you to update its firmware:

Element	Description
Modules Firmware Overview	
Slot	Slot number of the module
Reference	Reference of the module
Current Firmware	Firmware version of the module
Modules Firmware Management Select a new firmware version	
Select	Allows you to select the new firmware file for the module. NOTE: You can select only a single firmware file. All modules on the bus corresponding to the selected firmware are updated.
Apply	Allows you to apply the new firmware.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 134*).

To update the module firmware:

Step	Action	
1	Remove power from the bus coupler.	
2	Connect the USB cable.	
3	Apply power to the bus coupler.	
4	Log into the Web server.	
5	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.	
6	Click MAINTENANCE / Modules Firmware .	
7	Click Select then select the firmware file. Result: The firmware file is selected.	
8	Click Apply . Result: A confirmation window is displayed.	
9	Click I agree . Result: A restart window is displayed.	
10	Click Yes . Result: The file is verified and downloaded. Thereafter, a confirmation window is displayed. The TM3 bus coupler reboots and a confirmation window is displayed.	Click No . Result: The firmware update is canceled.

MAINTENANCE / System Log Files

The **System Log Files** sub-page lists the log files. Some of the information in the log files comes from internal interactions of the firmware and is intended to be used by Schneider Electric Technical Support:

Element	Description
Log Files	
Select one or more log files to download	
Select	Allows you to select one or more log files.
Name	Shows the list of the log files.
Size	Displays the size of the log files.
Download	Allows you to download the log files.

MAINTENANCE / Modbus Serial Line

The **Modbus Serial Line** sub-page allows you to change the network settings:

Element	Description
Configuration	
Speed (baud)	Allows you to set the baud rate. You can also set the baud rate using the rotary switch. Refer to Modicon TM3 Bus Coupler Hardware Guide.
Slave Address	Displays the Slave Address value for your device.
Parity	Used for error detection.
Data bits	Displays the number of bits for transmitting data.
Stop bits	Displays the number of stop bits.
Apply	Saves the configuration settings. NOTE: Upon confirmation, the bus coupler is automatically reset and the new speed is applied.
Cancel	Cancels configuration modifications.
Modbus Serial Data Consistency	
Enabled	Allows an internal copy of the input data registers (3000-3499 or 13000-13499) to be kept since the first read request is received until the second read request is received OR until the monitoring timeout is elapsed. Is enabled by default when the I/O modules configuration need more than 124 words to read the data of the input.
Cancel	Cancels the configuration settings.
Apply	Saves the configuration settings.

Section 7.3

CANopen (TM3BCCO)

Web Server

Introduction

The TM3 bus coupler supports a web server, offering easy access to information such as configuration data, module status, I/O data, network statistics, and diagnostic information. All of this vital information is available using a simple web browser.

In addition the web server allows you to monitor this information, the bus coupler network and I/O remotely.

You can access the Web server with HTTPS (secure connections). HTTP (non secured connections) is not supported.

The Web server is accessible through the bus coupler USB port (*see Modicon TM3 Bus Coupler, Programming Guide*). You can use the pages of the Web server for setup and control as well as application diagnostics and monitoring. These pages are ready to use with a Web browser. No configuration or programming is required.

Any PC providing a USB (host) port can connect to the Web server by using a Web browser.

The Web server can be accessed by the web browsers listed below:

- Microsoft Internet Explorer (version ≥ 11)
- Google Chrome (version ≥ 71)
- Mozilla Firefox (version ≥ 64)
- Microsoft Edge (version ≥ 42)

The Web server allows you to monitor a bus coupler and its application remotely, to perform various maintenance activities including modifications to data and configuration parameters. Care must be taken to ensure that the immediate physical environment of the machine and process is in a state that will not present safety risks to people or property before exercising control remotely.

WARNING

UNINTENDED EQUIPMENT OPERATION

- Define a secure password for the Web server, and do not allow unauthorized or otherwise unqualified personnel to use this feature.
- Ensure that there is a local, competent, and qualified observer present when operating on the controller from a remote location.
- You must have a complete understanding of the application and the machine/process it is controlling before attempting to adjust data, stopping an application that is operating, or starting the controller remotely.
- Take the precautions necessary to assure that you are operating on the intended controller by having clear, identifying documentation within the controller application and its remote connection.

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

NOTE: The Web server must only be used by authorized and qualified personnel. A qualified person is one who has the skills and knowledge related to the construction and operation of the machine and the process controlled by the application and its installation, and has received safety training to recognize and avoid the hazards involved. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this feature.

Web Server Access

You can manage the user accounts on the Web server on MAINTENANCE / User Accounts (*see page 150*).

To access Web server, ensure that the rotary switch are in address setting location. For more information regarding address setting, please refer to the Modicon TM3 Bus Coupler - Hardware Guide, Setting the CANopen Address (*see Modicon TM3 Bus Coupler, Hardware Guide*).

By default, the user name is Administrator, and the password is Administrator. You must change the password at the first login.

WARNING

UNAUTHORIZED DATA ACCESS

- Do not expose the device or device network to public networks and the Internet as much as possible.
- Immediately change the default password to a new secure password.
- Do not distribute passwords to unauthorized or otherwise unqualified personnel.
- Restrict access to unauthorized personnel.
- Use additional security layers like VPN for remote access and install firewall mechanisms.
- Validate the effectiveness of these measurements regularly and frequently.

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

NOTE: A secure password is one that has not been shared or distributed to any unauthorized personnel and does not contain any personal or otherwise obvious information. Further, a mix of upper and lower case letters and numbers offer greater security. You should choose a password length of at least ten characters.

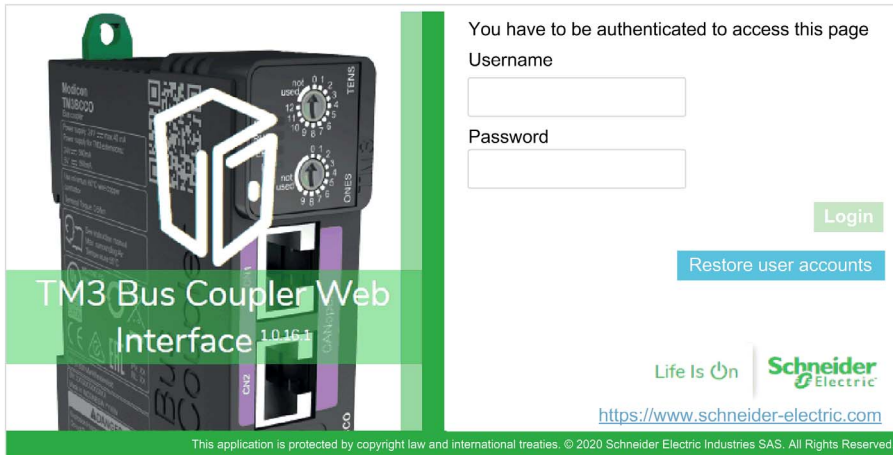
Resetting the Password

To reset the password:

Step	Action
1	Connect to the bus coupler using the USB port.
2	Open the browser.
3	Enter the IP address 90.0.0.1.
4	Move the position of any rotary switch to any other position. Result: ERR LED is flashing red. The Restore user accounts button is displayed.
5	Click Restore user accounts .
6	Move the position of the changed rotary switch to its previous position. Result: The Restore user accounts button is no longer displayed.

Login Page

The login page is the entry point to get authenticated by the Web server. The certificate (see *Modicon TM3 Bus Coupler, Programming Guide*) must be validated. To access the website login page shown in the following illustration, type in your navigator the IP address 90.0.0.1. To login to the Web server, enter the user name and password and click **Login**.



You have to be authenticated to access this page

Username

Password

Login

Restore user accounts

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The Web server contains the following pages:

- HOME (see page 146)
- DIAGNOSTICS (see page 146)
- MONITORING (see page 147)
- MAINTENANCE (see page 150)

NOTE: The timeout session for each login is ten minutes. When you do not perform any action after you logged in, it redirects you to the login page if you click any button. You need to log in again with user name and password to access the web pages.

HOME / Equipment Overview

The **HOME** page displays the product details of TM3 bus coupler.

The **identification** section of **HOME** page consists of:

Element	Description
Identification	
Vendor ID	Vendor ID of the bus coupler
Vendor Name	Vendor name of the bus coupler
Product ID	Product ID of the bus coupler
Product Name	Product name of the bus coupler
Product Reference	Product reference of the bus coupler
Serial Number	Serial number of the bus coupler
Locate Device 	Click the button to locate the bus coupler. The LEDs of the bus coupler flash red for few seconds.

DIAGNOSTICS Page

The **DIAGNOSTICS** page shows the status of the bus coupler.

The **DIAGNOSTICS** page contains the following sub-pages:

- Device (*see page 146*)
- CANopen (*see page 147*)

DIAGNOSTICS / Device

The **Status** section shows details about the status of the bus coupler:

Element	Description
Status	
Last Stop Cause	Displays the cause of the last stop of the bus coupler.
USB Port	Displays whether a USB cable is connected to the bus coupler.
Operating Mode	Displays one of the following operating modes of the bus coupler: • Idle • CANopen • Web interface • Firmware update in progress • Time Out
Configuration Status	Displays one of the following configuration status of the bus coupler: • Not Configured • Configured

DIAGNOSTICS / CANopen

The **Configuration** section displays the status of CANopen connection:

Element	Description
Bitrate (Kbits/s)	Current transmission speed in kilobits per second.
Node ID	Slave address of bus coupler.

The **Statistics** section shows the current state and latest error messages for the bus coupler:

Element	Description
Device State	Current CANopen state of the bus coupler.
Latest Error	Last 10 EMCY error codes issued by the bus coupler. The latest errors are displayed on top. Timestamp is in seconds since boot-up.

MONITORING Page

The **MONITORING** page displays the expansion modules that are connected to the TM3 bus coupler.

MONITORING page without detected modules:

Detected modules

 Detect  Take Bus Ownership

 No module detected

Not configured | Bus is off

MONITORING page with modules and details:

Detected modules

1

2

3

Slot 0 Slot 1 Slot 2 Slot 3
TM3DQ16 TM3DQ16 TM3DQ16 TM3DQ16

Configured | Controlled by Web interface

Details of slot 2 (TM3DQ16T/G)

4

Reconcile Force

DISPLAY DEC HEX BIN

Name	Value	Prepared Value	Unit	Description
▼ Outputs				
▼ QW0	0	DEC16383 [0;65535]		
Q0	False	True False		
Q1	False	True False		
Q2	False	True False		
Q3	False	True False		
Q4	False	True False		
Q5	False	True False		
Q6	False	True False		
Q7	False	True False		
Q8	False	True False		
Q9	False	True False		
Q10	False	True False		
Q11	False	True False		
Q12	False	True False		
Q13	False	True False		
Q14	False	True False		
Q15	False	True False		

TM3DQ16T (screw), TM3DQ16TG (spring) 16-channel, 0.5A source transistor outputs expansion module with 1 common line and removable terminal block.

- 1 Bus Monitoring
- 2 Selected module
- 3 Reconcile button
- 4 Module details

The **MONITORING** page shows and describes all the modules detected by the bus coupler and allows you to:

- See the state of a selected module (running or not running) and the protocol used.
- Read the value of an input or output.
- Force a value to an output by clicking **Force**.
- Identify a module by clicking **Reconcile**.

Element	Description
Detect	Allows you to detect the modules connected to the bus coupler.
Take Bus Ownership Release Bus Ownership	Reserves the bus to allow you to force the module outputs. You can click the button when the bus coupler is configured and not controlled by a controller. Result: You are notified that the I/O bus coupler is controlled by the Web interface when you are in Take Bus Ownership state. You can edit the output values. Click Release Bus Ownership to release the control of the I/O bus.

Module Details

The module details view provides the following data:

- Module name and description
- Module state
- Filter option to filter I/Os
- A list of its I/Os

This list of I/Os allows you to view a real-time value of an input and to write the value of an output. You can also view the value in binary state, hexadecimal state and decimal state.

The view has **DISPLAY** buttons to modify the format of the displayed values.

Output Forcing

1. When **Take Bus Ownership** is enabled, click a module to force its outputs.
2. Set the output values you wish to force for the module in the **Prepared Values** column of the list of its I/Os.
3. Click the **Force** button.

Result: A message is displayed.

4. Click **I agree** to validate the modifications and send them to the bus coupler.
Click **I disagree** to cancel the modifications.

As the modules are not identified automatically or correctly, click the **Reconcile** button to identify the modules.

MAINTENANCE Page

The **MAINTENANCE** page allows you to view and edit the configuration of the bus coupler.

The **MAINTENANCE** page contains the following sub-pages:

- User Accounts (*see page 150*)
- Firmware (*see page 152*)
- Modules Firmware (*see page 153*)
- System Log Files (*see page 154*)
- CANopen (*see page 154*)

MAINTENANCE / User Accounts

Account Management

The sub-page allows you to enter your login password to access the Web server:

Element	Description
Account Management Select an account to edit it	
User Name	List of the following user accounts: • Administrator The Administrator account is configured with a predefined password (Administrator / Administrator). Modify the predefined password after the first connection. • Operator This account is disabled by default. • Viewer This account is disabled by default. NOTE: Depending on your account, you have access to some web pages. See the table below for the accessible web pages.
Enabled	Selected if the account is enabled.
Account Management Provide a new password for account	
Current Password	Enter the current password of the user account.
New Password	Enter a password for the user account. NOTE: Minimum ten characters, maximum 32 characters and use a...z, A...Z, 0...9 alphanumeric characters. To reset the password, refer to Resetting the Password (<i>see page 144</i>).
Confirm New Password	Enter the password again of the selected account.
Apply	Saves your new password.

This table describes the accessible pages depending on the user account:

Web pages	Sub pages	Administrator	Operator	Viewer
HOME	–	✓	✓	✓
MONITORING	–	✓	✓	–
DIAGNOSTICS	Device	✓	✓	✓
	CANopen	✓	✓	✓
MAINTENANCE	User Accounts	✓	✓ ⁽¹⁾	✓ ⁽¹⁾
	Firmware	✓	–	–
	System Log Files	✓	✓	–
	CANopen	✓	–	–
(1) You can only modify your user account.				

System Use Notification

The sub-page allows you to define a **System Use Notification** message which is displayed to users at log-in:

Element	Description
System Use Notification	
Enabled	When selected, you can define a message that is displayed at log-in.
Message	Displays the message defined.
Reset	Reset to default message.
Apply	Applies your changes.

MAINTENANCE / Firmware

The **Firmware** sub-page shows the firmware version of the TM3 bus coupler and allows you to update its firmware:

Element	Description
Current Firmware	
Firmware	Firmware version
Web interface	Web server version
Firmware Update Select a new firmware version	
Select	Allows you to select the new firmware file for the bus coupler.
Apply	Allows you to apply the new firmware.
Cancel	Cancels firmware modifications.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 147*).

To update the bus coupler firmware:

Step	Action
1	Remove power from the bus coupler.
2	Ensure rotary switches are in address setting position e.g. ONES to 1, TENS to 0.
3	Connect USB cable to PC then to bus coupler.
4	Apply power to the bus coupler.
5	Log into the Web server as Administrator.
6	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.
7	Click MAINTENANCE / Firmware .
8	Click Select then select the firmware file. Result: A confirmation window is displayed.
9	Click I agree . Result: At the end of the download and verification of the file, a confirmation window is displayed.
10	Click Yes to close the confirmation window then click Apply . Result: At the end of the firmware update, a message is displayed to inform you whether the firmware update is completed successfully.

MAINTENANCE / Modules Firmware

The **Modules Firmware** sub-page shows the firmware version of the modules configured and allows you to update its firmware:

Element	Description
Modules Firmware Overview	
Slot	Slot number of the module
Reference	Reference of the module
Current Firmware	Firmware version of the module
Modules Firmware Management	
Select a new firmware version	
Select	Allows you to select the new firmware file for the module. NOTE: You can select only a single firmware file. All modules on the bus corresponding to the selected firmware are updated.
Apply	Allows you to apply the new firmware.

NOTE: You cannot update the firmware when the TM3 bus coupler cyclically exchanges data with the logic/motion controller. To make sure the bus coupler is not exchanging data, see **MONITORING** (*see page 147*).

To update the module firmware:

Step	Action	
1	Remove power from the bus coupler.	
2	Connect the USB cable.	
3	Apply power to the bus coupler.	
4	Log into the Web server.	
5	Verify in the MONITORING page that the bus coupler is not exchanging data with the controller.	
6	Click MAINTENANCE / Modules Firmware .	
7	Click Select then select the firmware file. Result: The firmware file is selected.	
8	Click Apply . Result: A confirmation window is displayed.	
9	Click I agree . Result: A restart window is displayed.	
10	Click Yes . Result: The file is verified and downloaded. The, a confirmation window is displayed. The TM3 bus coupler reboots and a confirmation window is displayed.	Click No . Result: The firmware update is canceled.

MAINTENANCE / System Log Files

The **System Log Files** sub-page lists the log files. Some of the information in the log files comes from internal interactions of the firmware and is intended to be used by Schneider Electric Technical Support:

Element	Description
Log Files Select one or more log files to download	
Select	Allows you to select one or more log files.
Name	Shows the list of the log files.
Size	Displays the size of the log files.
Download	Allows you to download the log files.

MAINTENANCE / CANopen

The **Configuration** sub-page allows you to configure the speed of the TM3 bus coupler:

Element	Description
Speed (Kbits/s)	Allows you to set the transmission speed in kilobits per second. You can also set the baud rate using the rotary switch. Refer to Modicon TM3 Bus Coupler Hardware Guide.
Node ID	Displays the Slave Address value for your device.
Apply	Saves the configuration settings. NOTE: Upon confirmation, the bus coupler will automatically reset and new speed will be applied.
Cancel	Cancels configuration modifications.

Chapter 8

Troubleshooting

Troubleshooting

Troubleshooting

Issue	Possible Cause	Solution
CONFIGURATION tab not available in the Web server of TM3 bus coupler	If you are using the TM3BCCO, this is normal, as configuration of the modules is done by the controller using a DCF file exported from the TM3 Bus Coupler IO Configurator.	Use the As DCF button to export the file, then import the file into your controller to configure the modules. Refer to Exporting for CANopen (<i>see page 99</i>).
	The firmware version is not at least version 2.0 in the TM3BCEIP or TM3BCSL bus coupler.	Update the firmware of the bus coupler. Refer to the <i>Modicon TM3 Bus Coupler Programming Guide</i> .
PDO objects for analog input values are not sent.	The analog inputs are disabled.	Analog inputs are disabled by default. Enable the analog inputs in the TM3 Bus Coupler IO Configurator and select the correct transmission mode in the bus coupler. Refer to Configuring CANopen PDO Transmission Mode for Analog Inputs (<i>see page 92</i>).
Configuration Error message when exporting DCF file.	Optional modules are not respecting the configuration rules.	Refer to System Requirements (<i>see page 14</i>).
Memory mapping table is empty	There are no I/O modules in the configuration.	The memory mapping table is generated only when there is at least one I/O module in the configuration. Add at least one I/O module to the bus coupler configuration.

Issue	Possible Cause	Solution
Failed to download the configuration to the bus coupler.	The I/O configuration in the TM3 Bus Coupler IO Configurator differs from that of the modules physically connected to the TM3 bus coupler.	Check the hardware configuration. Check that all modules are properly connected. Check the order of the connected I/O Modules.
Fallback mode is not applied in the TM3 digital output modules	Firmware version of the TM3 module is insufficient.	Fallback mode is only supported for TM3 digital output or mixed modules with SV $\geq$ 2.0. Check the firmware version of the modules using the MAINTENANCE → Modules Firmware page of the Web server.

Appendices



Appendix A

Use Case Examples

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Use Case 1: TM3BCEIP Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3	160
Use Case 2: TM3BCSL Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3	164
Use Case 3: TM3BCEIP Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14	167
Use Case 4: TM3BCCO Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14	172

Use Case 1: TM3BCEIP Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3

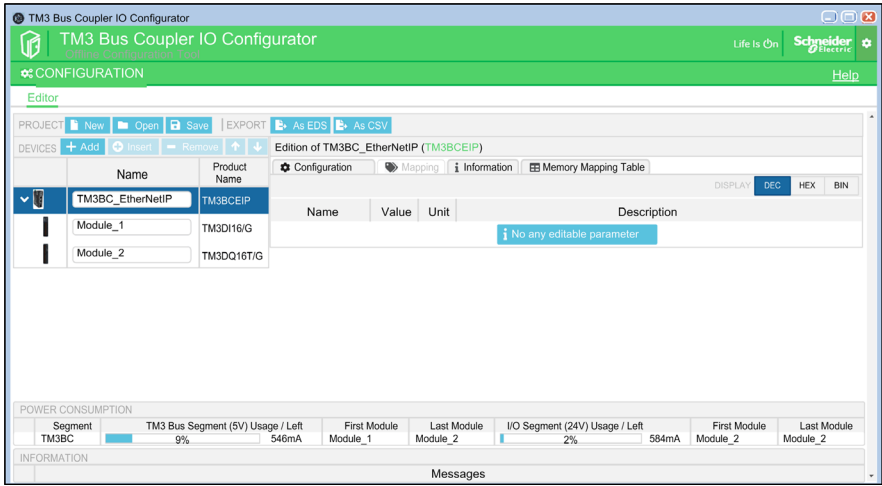
Introduction

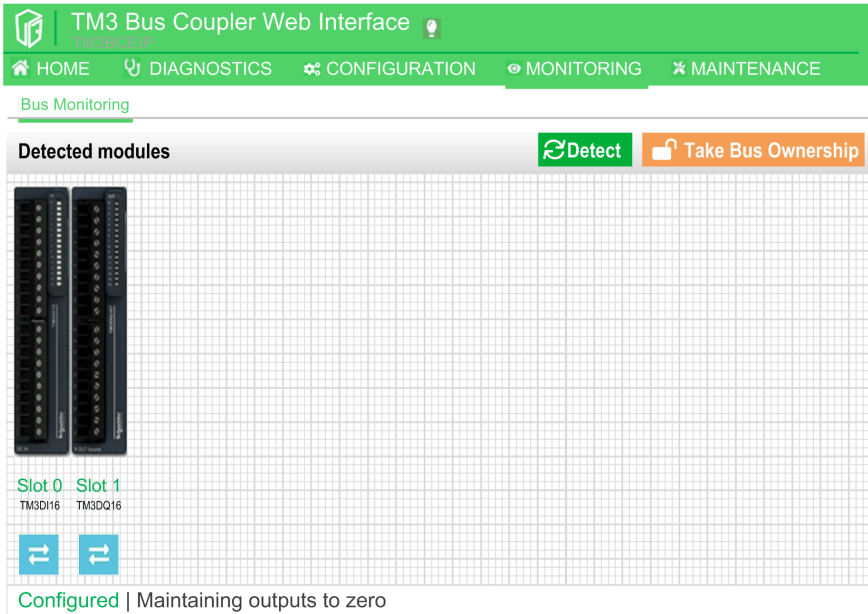
This section provides a detailed description of a typical use case for exporting a configuration file for an EtherNet/IP bus coupler and importing it into SoMachine V4.3.

Hardware Configuration

TM3BCEIP bus coupler + 1 TM3DI16G module + 1 TM3DQ16TG module

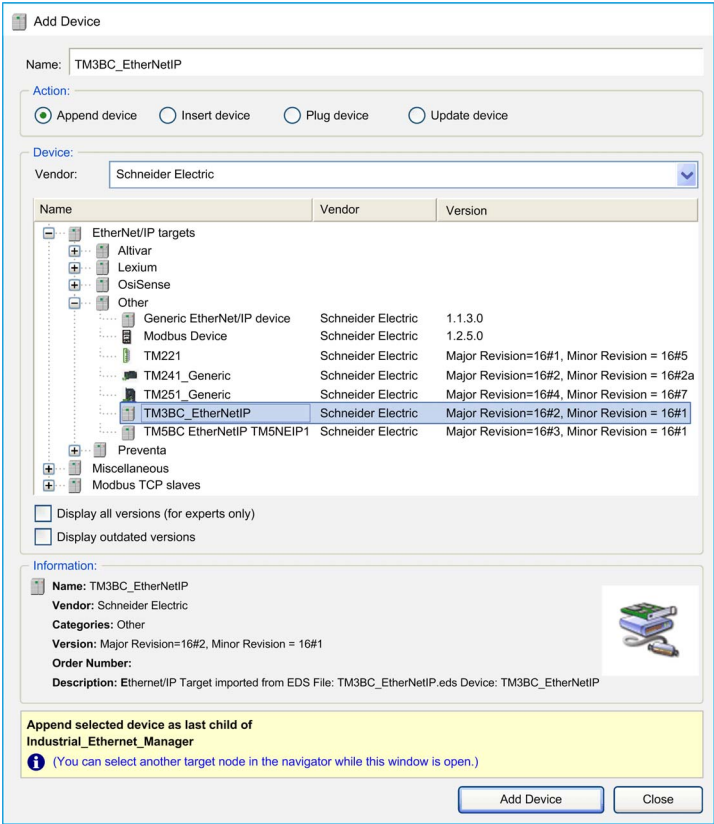
Step 1: Importing the Configuration into the Web Server

Step	Action
1	Create the example configuration in the TM3 Bus Coupler IO Configurator:  NOTE: Check that the same modules are physically connected to the bus coupler. Refer to Match Software and Hardware Configuration (<i>see page 14</i>).
2	Click the Save button on the EXPORT toolbar.
3	Click the Save button on the window that appears to save the configuration as an SPF project file.
4	Connect to the Web server of the TM3BCEIP bus coupler using a Web browser: • USB: <code>https://90.0.0.1</code> • Ethernet: <code>https://10.10.MAC5.MAC6</code> By default, <i>MAC5</i> is the decimal value of the 5th octet of the bus coupler module MAC address, and <i>MAC6</i> is the decimal value of the 6th octet.

Step	Action
5	Type your credentials to log in to the Web interface. By default, the user name is Administrator and the password is Administrator .
6	To apply the I/O modules configuration in the TM3BC, select the CONFIGURATION tab of the Web server and click the Open button.
7	Browse and select the previously saved project file (SPF), then click Open . Result: The configuration appears in the Web server window.
8	Click the Apply button. Result: The Configuration Download message is displayed. NOTE: The configuration is only applied if the physical configuration is identical to the configuration contained in the SPF file.
9	Click the I Agree button. Result: The configuration is downloaded to the devices. When complete, the following message is displayed:  A green checkmark icon followed by the text "Configuration Download". Below it, a message box says "The device has been configured successfully." with a "Close" button.
10	Click the MONITORING tab in the Web server and check that the TM3 bus has detected the modules:  A screenshot of the TM3 Bus Coupler Web Interface. The top bar is green with the title "TM3 Bus Coupler Web Interface" and a lightbulb icon. Below it is a navigation menu with "HOME", "DIAGNOSTICS", "CONFIGURATION", "MONITORING" (selected), and "MAINTENANCE". Under "Monitoring", there's a "Bus Monitoring" section. It shows "Detected modules" with two buttons: "Detect" (green) and "Take Bus Ownership" (orange). Below this is a grid showing two modules: "Slot 0: TM3D116" and "Slot 1: TM3DQ16". At the bottom, it says "Configured Maintaining outputs to zero".

Step 2: Importing the Configuration into SoMachine V4.3

Step	Action
1	In the TM3 Bus Coupler IO Configurator, click the As EDS button on the EXPORT toolbar.
2	Click the Save button on the window that appears to save the configuration file as an EDS file.
3	Start the Logic Builder component of SoMachine V4.3 and create a new project for the TM251MESE logic controller.
4	Choose Tools → Device Repository . Result: The Device Repository window appears.
5	Click Install . Result: The Install Device Description window appears.
6	In the object type drop-down list, select EDS and DCF files (*.dcf, *;.dcf) , browse and select the exported EDS file, and click Open .
7	Click Close to close the Install Device Description window.
8	In the Devices tree window, right-click on the Ethernet_2 → Industrial Ethernet Manager node and choose Add Device from the contextual menu that appears. Result: The Add Device window appears.

Step	Action
9	Expand EtherNet/IP Targets → Other, select TM3BC_EtherNetIP and click the Add Device button:  Result: The TM3BC_EtherNetIP node appears under the Industrial Ethernet Manager node in the Devices tree window.
10	Click Close .
11	In the Devices tree window, double-click the TM3BC_EtherNetIP node and select the Target settings tab.
12	Select Fixed IP Address and enter the IP address of the TM3BCEIP bus coupler.
13	Select the Connections tab and click the Add Connection button.
14	Select the Exclusive Owner connection, and click OK . Result: The bus coupler device is now configured and ready to use.

Use Case 2: TM3BCSL Bus Coupler, Modicon M251 Logic Controller, and SoMachine V4.3

Introduction

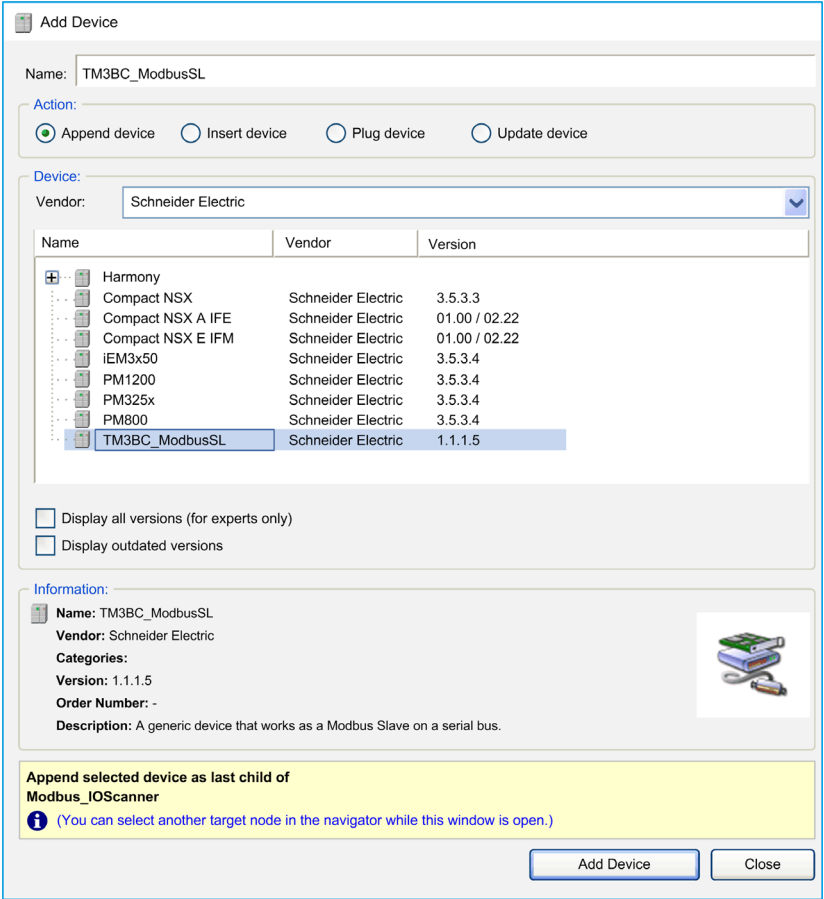
This section provides a detailed description of a typical use case for exporting a configuration file for a Modbus bus coupler and importing it into SoMachine V4.3.

Hardware Configuration

TM3BCSL bus coupler + 1 TM3DI16G module + 1 TM3DQ16T/G module

Step 2: Importing the Configuration into SoMachine V4.3

Step	Action
1	Perform Step 1: Importing the Configuration into the Web Server (<i>see page 160</i>). Result: The <code>SPE</code> project file is loaded into the bus coupler using the Web server interface of the bus coupler.
2	In the TM3 Bus Coupler IO Configurator, click the As devdesc button on the EXPORT toolbar.
3	Click the Save button on the window that appears to save the configuration file as a <code>devdesc</code> file.
4	Start the Logic Builder component of SoMachine V4.3 and create a new project for the TM251MESE logic controller.
5	Choose Tools → Device Repository . Result: The Device Repository window appears.
6	Click Install . Result: The Install Device Description window appears.
7	In the Object type drop-down list, select Device description files (devdesc.xml) , browse and select the exported <code>devdesc</code> file, and click Open .
8	Click Close to close the Install Device Description window.
9	In the Devices tree window, right-click on Serial_Line_1 → SoMachine_Network_Manager and choose Delete from the contextual menu.
10	In the Devices tree window, right-click on Serial_Line_1 and choose Add Device from the contextual menu.
11	Select Modbus_IOScanner and click Add Device . Result: In the Devices tree window, Modbus_IOScanner is added below the Serial_Line_1 node.
12	Right-click on the Serial_Line_1 → Modbus_IOScanner node and choose Add Device from the contextual menu. Result: The Add Device window appears.

Step	Action
13	Select TM3BC_ModbusSL and click the Add Device button:  Result: The TM3BC_ModbusSL node appears under the Modbus_IOScanner node in the Devices tree window. NOTE: Select Display all versions (for experts only) to display all the versions of devices added into the device repository.
14	Click Close.

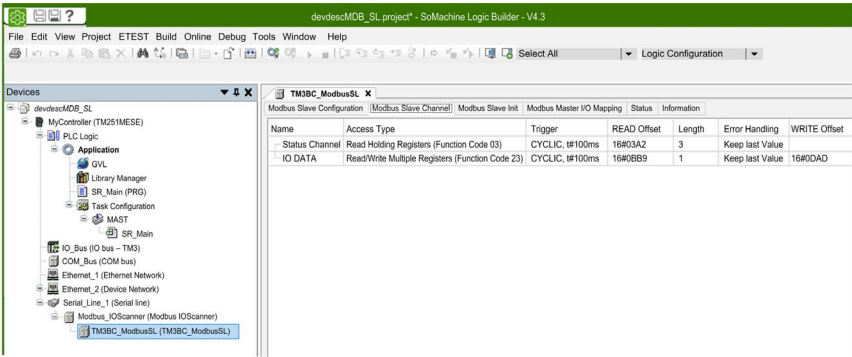
Step

Action

15

In the **Devices tree** window, double-click the **TM3BC_ModbusSL** node and select the **Modbus Slave Channel** tab.

Result: The connections are configured, as described in the imported `devdesc` file:



The screenshot displays the SoMachine Logic Builder interface for a project named 'devdescMDB_SL.project'. The left-hand 'Devices' tree shows a hierarchy starting with 'MyController (TM251MESE)' containing 'PLC Logic', which in turn contains an 'Application' node. Under 'Application', there is a 'GVL' (Global Variable List) node, followed by 'Library Manager', 'SR_Main (PRG)', 'Task Configuration', and 'MAST'. The 'SR_Main' node is expanded, showing 'IO_Bus (IO bus - TM3)', 'COM_Bus (COM bus)', 'Ethernet_1 (Ethernet Network)', 'Ethernet_2 (Device Network)', 'Serial_Line_1 (Serial line)', 'Modbus_IOScanner (Modbus IOScanner)', and 'TM3BC_ModbusSL (TM3BC_ModbusSL)'. The 'TM3BC_ModbusSL' node is selected and highlighted in blue.

The right-hand pane shows the configuration for the selected 'TM3BC_ModbusSL' node, specifically the 'Modbus Slave Channel' tab. This tab contains a table with the following data:

Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset
Status Channel	Read Holding Registers (Function Code 03)	CYCLIC, #100ms	16#03A2	3	Keep last Value	
IO DATA	Read/Write Multiple Registers (Function Code 23)	CYCLIC, #100ms	16#0BB9	1	Keep last Value	16#0DAD

The bus coupler device is now configured and ready to use.

Use Case 3: TM3BCEIP Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14

Introduction

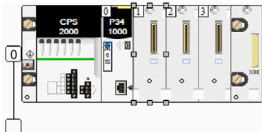
This section provides a detailed description of a typical use case for exporting a configuration file for an EtherNet/IP bus coupler and importing it into EcoStruxure Control Expert V14.

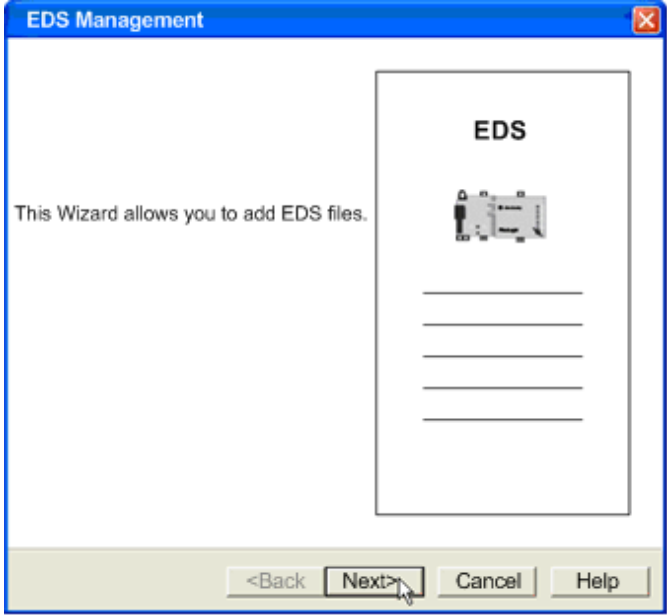
Hardware Configuration

TM3BCEIP bus coupler + 1 TM3DI16/G module + 1 TM3DQ16T/G module

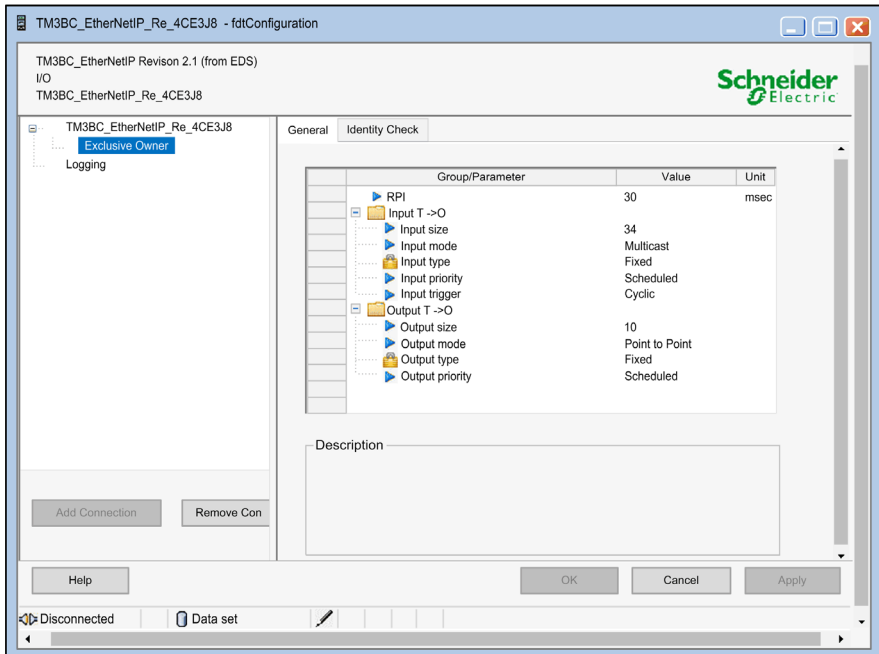
Step 2: Importing the Configuration into EcoStruxure Control Expert V14

Step	Action																																										
1	Perform Step 1: Importing the Configuration into the Web Server (<i>see page 160</i>). Result: The <code>SEF</code> project file is loaded into the bus coupler using the Web server interface of the bus coupler.																																										
2	In the TM3 Bus Coupler IO Configurator, click the As EDS button on the EXPORT toolbar.																																										
3	Click the Save button on the window that appears.. Result: The configuration file is saved as an <code>EDS</code> file.																																										
4	Open EcoStruxure Control Expert and create a new project for the Modicon M340 controller: New Project ☐ Show all versions <table><thead><tr><th>PLC</th><th>Min. OS Version</th><th>Description</th></tr></thead><tbody><tr><td>Modicon M340</td><td></td><td></td></tr><tr><td>BMX P34 1000</td><td>02.70</td><td>CPU 340-10 Modbus</td></tr><tr><td>BMX P34 2000</td><td>02.70</td><td>CPU 340-20 Modbus</td></tr><tr><td>BMX P34 2010</td><td>02.00</td><td>CPU 340-20 Modbus CANopen</td></tr><tr><td>BMX P34 20102</td><td>02.70</td><td>CPU 340-20 Modbus CANopen2</td></tr><tr><td>BMX P34 2020</td><td>02.70</td><td>CPU 340-20 Modbus Ethernet</td></tr><tr><td>BMX P34 2030</td><td>02.00</td><td>CPU 340-20 Ethernet CANopen</td></tr><tr><td>BMX P34 20302</td><td>02.70</td><td>CPU 340-20 Ethernet CANopen2</td></tr><tr><td>BMX PRA 0100</td><td>02.70</td><td>Peripheral Remote I/O Adaptor</td></tr><tr><td>Modicon M580</td><td></td><td></td></tr><tr><td>Momentum</td><td></td><td></td></tr><tr><td>Premium</td><td></td><td></td></tr><tr><td>Quantum</td><td></td><td></td></tr></tbody></table> OK Cancel Help	PLC	Min. OS Version	Description	Modicon M340			BMX P34 1000	02.70	CPU 340-10 Modbus	BMX P34 2000	02.70	CPU 340-20 Modbus	BMX P34 2010	02.00	CPU 340-20 Modbus CANopen	BMX P34 20102	02.70	CPU 340-20 Modbus CANopen2	BMX P34 2020	02.70	CPU 340-20 Modbus Ethernet	BMX P34 2030	02.00	CPU 340-20 Ethernet CANopen	BMX P34 20302	02.70	CPU 340-20 Ethernet CANopen2	BMX PRA 0100	02.70	Peripheral Remote I/O Adaptor	Modicon M580			Momentum			Premium			Quantum		
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Premium																																											
Quantum																																											

Step	Action																																								
5	Add a new BMX NOC 0401 EtherNet/IP communication device: PLC bus Bus: 0 BMX P34 1000 02.70  New Device Topological Address: 0.1 <table><thead><tr><th>Part Number</th><th>Description</th></tr></thead><tbody><tr><td>Modicon M340 local drop</td><td></td></tr><tr><td> Analog</td><td></td></tr><tr><td> Communication</td><td></td></tr><tr><td> BMX EIA 0100</td><td>AS-interface Module V3</td></tr><tr><td> BMX NOC 0401</td><td>Ethernet 4 Port 10/100 RJ45</td></tr><tr><td> BMX NOC 0401.2</td><td>Ethernet 4 Port 10/100 RJ45</td></tr><tr><td> BMX NOE 0100</td><td>Ethernet 1 Port 10/100 RJ45</td></tr><tr><td> BMX NOE 0100.2</td><td>Ethernet 1 Port 10/100 RJ45</td></tr><tr><td> BMX NOE 0110</td><td>Ethernet 1 Port 10/100 RJ45</td></tr><tr><td> BMX NOE 0110.2</td><td>Ethernet 1 Port 10/100 RJ45</td></tr><tr><td> BMX NOM 0200</td><td>Bus Module 2 RS485/232 port</td></tr><tr><td> BMX NOM 0200.2</td><td>Bus Module 2 RS485/232 port (SV >= V1.2)</td></tr><tr><td> BMX NOR 0200</td><td>Ethernet 1 Port 10/100 RJ45 - RTU</td></tr><tr><td> BMX NRP 0200</td><td>Fiber Converter MM/LC 2CH 100Mb</td></tr><tr><td> BMX NRP 0201</td><td>Fiber Converter SM/LC 2CH 100Mb</td></tr><tr><td> Counting</td><td></td></tr><tr><td> Discrete</td><td></td></tr><tr><td> Motion</td><td></td></tr><tr><td> Third party products</td><td></td></tr></tbody></table> OK Cancel Help	Part Number	Description	Modicon M340 local drop		Analog		Communication		BMX EIA 0100	AS-interface Module V3	BMX NOC 0401	Ethernet 4 Port 10/100 RJ45	BMX NOC 0401.2	Ethernet 4 Port 10/100 RJ45	BMX NOE 0100	Ethernet 1 Port 10/100 RJ45	BMX NOE 0100.2	Ethernet 1 Port 10/100 RJ45	BMX NOE 0110	Ethernet 1 Port 10/100 RJ45	BMX NOE 0110.2	Ethernet 1 Port 10/100 RJ45	BMX NOM 0200	Bus Module 2 RS485/232 port	BMX NOM 0200.2	Bus Module 2 RS485/232 port (SV >= V1.2)	BMX NOR 0200	Ethernet 1 Port 10/100 RJ45 - RTU	BMX NRP 0200	Fiber Converter MM/LC 2CH 100Mb	BMX NRP 0201	Fiber Converter SM/LC 2CH 100Mb	Counting		Discrete		Motion		Third party products	
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Third party products																																									

Step	Action
6	In the DTM Browser window, right click on the controller and choose Device Menu → Additional functions → Add EDS to library. Result: The first page of the EDS Addition wizard is displayed: 
7	Click Next .
8	Click Browse , select the previously exported EDS file, then click Next .
9	Click Next then Finish to close the EDS Addition wizard.
10	Open the Hardware Catalog and click Update. Result: The DTM Browser window is displayed.

Step	Action																																																																																																				
11	Select the NOC0401 interface, right-click and choose Add from the contextual menu that appears. Result: The Add window is displayed: Add <table><tr><th>Device</th><th>Type</th><th>Vendor</th><th>Version</th><th>Date</th></tr><tr><td>STB NIC2212</td><td>Device</td><td>Schneider Electric</td><td>2.x, 3.x</td><td></td></tr><tr><td>STB NIP2x1x</td><td>Device</td><td>Schneider Electric</td><td>1.x, 2...</td><td></td></tr><tr><td>STBNIC2212 (from EDS)</td><td>Device</td><td>Schneider Electric</td><td>2.10</td><td></td></tr><tr><td>TM262_Generic_MyContr...</td><td>Device</td><td>Schneider Electric</td><td>5.1</td><td></td></tr><tr><td>TM3BC_EtherNetIP Revis...</td><td>Device</td><td>Schneider Electric</td><td>2.1</td><td></td></tr><tr><td>TM3BCEIP Revision 12.1...</td><td>Device</td><td>Schneider Electric</td><td>12.133</td><td></td></tr><tr><td>TM5BC EthernetIP TM5N</td><td>Device</td><td>Schneider Electric</td><td>3.1</td><td></td></tr><tr><td>TSXETC100 (from EDS)</td><td>Device</td><td>Schneider Electric</td><td>1.1</td><td></td></tr><tr><td>TSXETC101 (from EDS)</td><td>Device</td><td>Schneider Electric</td><td>1.1</td><td></td></tr><tr><td>TSXETC101 Revision 2.1...</td><td>Device</td><td>Schneider Electric</td><td>2.1</td><td></td></tr><tr><td>AMCI-NR25-ENIP (from E...</td><td>Device</td><td>Advanced Micro...</td><td>1.2</td><td></td></tr><tr><td>AMCI-NX1F2E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>AMCI-NX1F4E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>AMCI-NX2A4E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>AMCI-NX2C4E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>AMCI-NX2E4E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>AMCI-NX3A1E (from EDS)</td><td>Device</td><td>Advanced Micro...</td><td>1.3</td><td></td></tr><tr><td>Applicom Produit (from EDS)</td><td>Device</td><td>AGM Electronics...</td><td>1.1</td><td></td></tr><tr><td>Beckhoff – BK9105 (from...)</td><td>Device</td><td>Beckhoff Autom</td><td>1.2</td><td></td></tr></table> Add DTM Close	Device	Type	Vendor	Version	Date	STB NIC2212	Device	Schneider Electric	2.x, 3.x		STB NIP2x1x	Device	Schneider Electric	1.x, 2...		STBNIC2212 (from EDS)	Device	Schneider Electric	2.10		TM262_Generic_MyContr...	Device	Schneider Electric	5.1		TM3BC_EtherNetIP Revis...	Device	Schneider Electric	2.1		TM3BCEIP Revision 12.1...	Device	Schneider Electric	12.133		TM5BC EthernetIP TM5N	Device	Schneider Electric	3.1		TSXETC100 (from EDS)	Device	Schneider Electric	1.1		TSXETC101 (from EDS)	Device	Schneider Electric	1.1		TSXETC101 Revision 2.1...	Device	Schneider Electric	2.1		AMCI-NR25-ENIP (from E...	Device	Advanced Micro...	1.2		AMCI-NX1F2E (from EDS)	Device	Advanced Micro...	1.3		AMCI-NX1F4E (from EDS)	Device	Advanced Micro...	1.3		AMCI-NX2A4E (from EDS)	Device	Advanced Micro...	1.3		AMCI-NX2C4E (from EDS)	Device	Advanced Micro...	1.3		AMCI-NX2E4E (from EDS)	Device	Advanced Micro...	1.3		AMCI-NX3A1E (from EDS)	Device	Advanced Micro...	1.3		Applicom Produit (from EDS)	Device	AGM Electronics...	1.1		Beckhoff – BK9105 (from...)	Device	Beckhoff Autom	1.2	
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AMCI-NX1F4E (from EDS)	Device	Advanced Micro...	1.3																																																																																																		
AMCI-NX2A4E (from EDS)	Device	Advanced Micro...	1.3																																																																																																		
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Beckhoff – BK9105 (from...)	Device	Beckhoff Autom	1.2																																																																																																		

Step	Action																																							
12	Select the TM3BC_EtherNetIP... device in the list and click Add DTM:  The screenshot shows the 'TM3BC_EtherNetIP_Re_4CE3J8 - fdtConfiguration' window. The left sidebar lists the device 'TM3BC_EtherNetIP_Re_4CE3J8' with sub-items 'Exclusive Owner' and 'Logging'. The main area has two tabs: 'General' and 'Identity Check'. The 'Identity Check' tab is active, displaying a table of parameters and their values. Below the table is a 'Description' text area. At the bottom, there are buttons for 'Add Connection', 'Remove Con', 'Help', 'OK', 'Cancel', and 'Apply'. The status bar at the very bottom shows 'Disconnected' and 'Data set'. <table><tr><th>Group/Parameter</th><th>Value</th><th>Unit</th></tr><tr><td>RPI</td><td>30</td><td>msec</td></tr><tr><td>Input T ->O</td><td></td><td></td></tr><tr><td>Input size</td><td>34</td><td></td></tr><tr><td>Input mode</td><td>Multicast</td><td></td></tr><tr><td>Input type</td><td>Fixed</td><td></td></tr><tr><td>Input priority</td><td>Scheduled</td><td></td></tr><tr><td>Input trigger</td><td>Cyclic</td><td></td></tr><tr><td>Output T ->O</td><td></td><td></td></tr><tr><td>Output size</td><td>10</td><td></td></tr><tr><td>Output mode</td><td>Point to Point</td><td></td></tr><tr><td>Output type</td><td>Fixed</td><td></td></tr><tr><td>Output priority</td><td>Scheduled</td><td></td></tr></table> Result: The device is now configured and ready for use.	Group/Parameter	Value	Unit	RPI	30	msec	Input T ->O			Input size	34		Input mode	Multicast		Input type	Fixed		Input priority	Scheduled		Input trigger	Cyclic		Output T ->O			Output size	10		Output mode	Point to Point		Output type	Fixed		Output priority	Scheduled	
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Use Case 4: TM3BCCO Bus Coupler, Modicon M340 Controller, and EcoStruxure Control Expert V14

Introduction

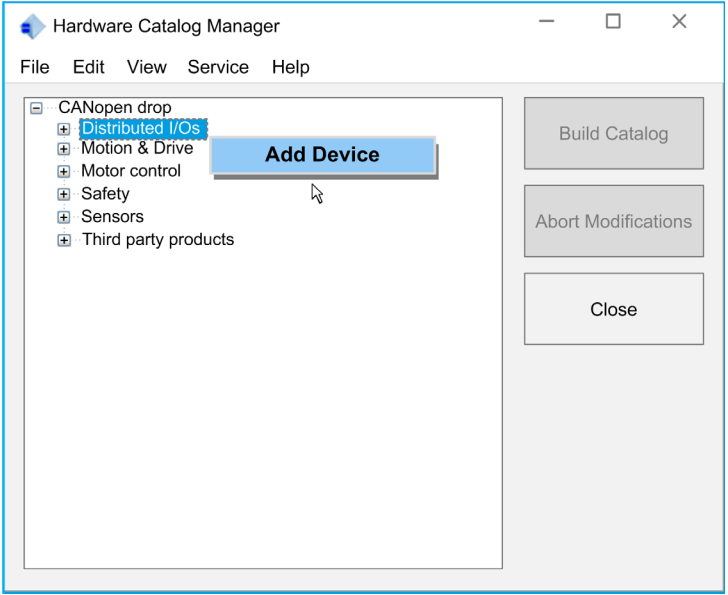
This section provides a detailed description of a typical use case for exporting a configuration file for a CANopen bus coupler and importing it into EcoStruxure Control Expert V14.

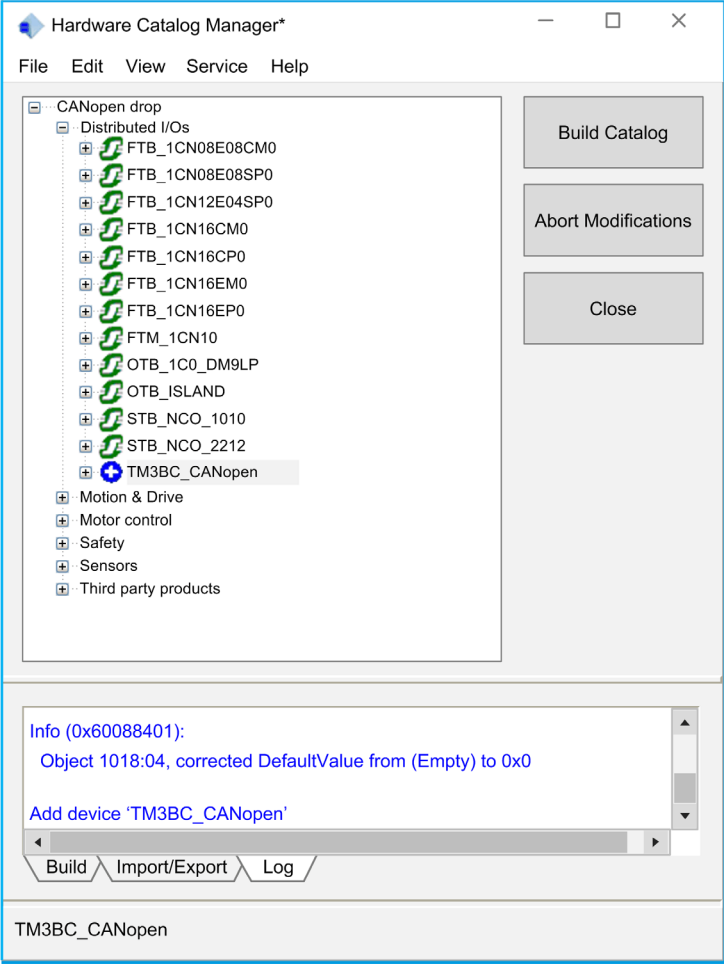
Hardware Configuration

TM3BCCO bus coupler + 1 TM3DI16/G module + 1 TM3DQ16T/G module

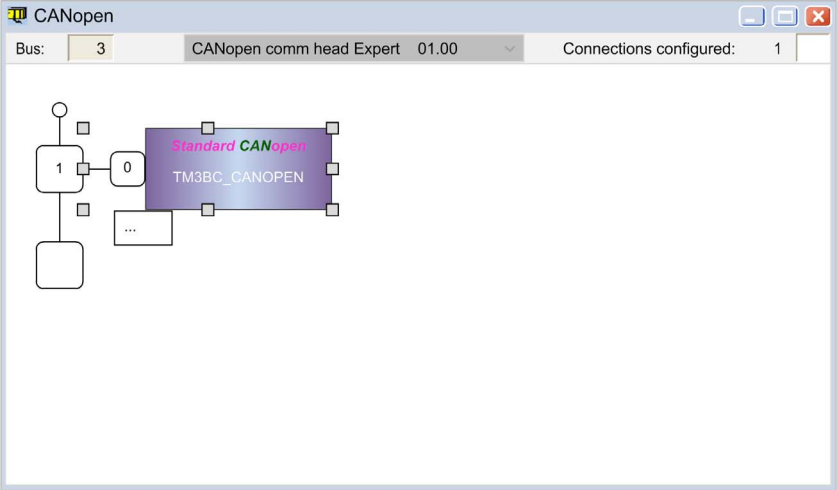
Procedure

Step	Action
1	Create the example configuration in the TM3 Bus Coupler IO Configurator:
2	Click the As DCF button on the EXPORT toolbar to export a DCF configuration file.
3	Click Save on the window that appears.
4	Close any active instances of EcoStruxure Control Expert.
5	Launch the Hardware Catalog Manager application.

Step	Action
6	Right-click on Distributed I/Os and select Add Device from the contextual menu that appears:  The screenshot shows the 'Hardware Catalog Manager' application window. On the left, a tree view under 'CANopen drop' lists several categories: 'Distributed I/Os' (which is highlighted in blue), 'Motion & Drive', 'Motor control', 'Safety', 'Sensors', and 'Third party products'. A right-click context menu is open over 'Distributed I/Os', and the 'Add Device' option is highlighted in blue. On the right side of the window, there are three buttons: 'Build Catalog', 'Abort Modifications', and 'Close'. Result: The Object type list appears.
7	Select DCF Files (*.dcf) , then browse and open the previously exported DCF configuration file.

Step	Action
8	Click the OK button in the Device Profile Window that appears. Result: A new TM3BC_CANopen device is added to the list of Distributed I/Os:  The screenshot shows the 'Hardware Catalog Manager' window. On the left, a tree view under 'CANopen drop' shows 'Distributed I/Os' expanded, listing various devices. 'TM3BC_CANopen' is highlighted at the bottom of this list. On the right, there are three buttons: 'Build Catalog', 'Abort Modifications', and 'Close'. Below the tree view, a text area displays information: 'Info (0x60088401): Object 1018:04, corrected DefaultValue from (Empty) to 0x0' and 'Add device 'TM3BC_CANopen''. At the bottom of the window, there are tabs for 'Build', 'Import/Export', and 'Log', with 'Build' currently selected. Below the tabs, the name 'TM3BC_CANopen' is displayed.
9	Click the Build Catalog button to add the new device to the catalog used by EcoStruxure Control Expert.
10	Click Close.

Step	Action																																																								
11	Open EcoStruxure Control Expert and create a new project for a Modicon M340 controller supporting CANopen: New Project Show all versions <table><thead><tr><th>PLC</th><th>Min. OS Version</th><th>Description</th></tr></thead><tbody><tr><td>Modicon M340</td><td></td><td></td></tr><tr><td>BMX P34 1000</td><td>02.70</td><td>CPU 340-10 Modbus</td></tr><tr><td>BMX P34 2000</td><td>02.70</td><td>CPU 340-20 Modbus</td></tr><tr><td>BMX P34 2010</td><td>02.00</td><td>CPU 340-20 Modbus CANopen</td></tr><tr><td>BMX P34 20102</td><td>02.70</td><td>CPU 340-20 Modbus CANopen2</td></tr><tr><td>BMX P34 2020</td><td>02.70</td><td>CPU 340-20 Modbus Ethernet</td></tr><tr><td>BMX P34 2030</td><td>02.00</td><td>CPU 340-20 Ethernet CANopen</td></tr><tr><td>BMX P34 20302</td><td>02.70</td><td>CPU 340-20 Ethernet CANopen2</td></tr><tr><td>BMX PRA 0100</td><td>02.70</td><td>Peripheral Remote I/O Adaptor</td></tr><tr><td>Modicon M580</td><td></td><td></td></tr><tr><td>Momentum</td><td></td><td></td></tr><tr><td>Premium</td><td></td><td></td></tr><tr><td>Quantum</td><td></td><td></td></tr></tbody></table><table><thead><tr><th>Rack</th><th>Description</th></tr></thead><tbody><tr><td>BME XBP 1002</td><td>10 SLOTS REDUNDANT ETHERNET BACKPLANE</td></tr><tr><td>BME XBP 1200</td><td>12 SLOTS ETHERNET BACKPLANE</td></tr><tr><td>BMX XBP 0400</td><td>4 SLOTS BACKPLANE</td></tr><tr><td>BMX XBP 0600</td><td>6 SLOTS BACKPLANE</td></tr><tr><td>BMX XBP 0800</td><td>8 SLOTS BACKPLANE</td></tr><tr><td>BMX XBP 1200</td><td>12 SLOTS BACKPLANE</td></tr></tbody></table> Project Settings Settings File: <default settings> ... OK Cancel Help	PLC	Min. OS Version	Description	Modicon M340			BMX P34 1000	02.70	CPU 340-10 Modbus	BMX P34 2000	02.70	CPU 340-20 Modbus	BMX P34 2010	02.00	CPU 340-20 Modbus CANopen	BMX P34 20102	02.70	CPU 340-20 Modbus CANopen2	BMX P34 2020	02.70	CPU 340-20 Modbus Ethernet	BMX P34 2030	02.00	CPU 340-20 Ethernet CANopen	BMX P34 20302	02.70	CPU 340-20 Ethernet CANopen2	BMX PRA 0100	02.70	Peripheral Remote I/O Adaptor	Modicon M580			Momentum			Premium			Quantum			Rack	Description	BME XBP 1002	10 SLOTS REDUNDANT ETHERNET BACKPLANE	BME XBP 1200	12 SLOTS ETHERNET BACKPLANE	BMX XBP 0400	4 SLOTS BACKPLANE	BMX XBP 0600	6 SLOTS BACKPLANE	BMX XBP 0800	8 SLOTS BACKPLANE	BMX XBP 1200	12 SLOTS BACKPLANE
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12	In the Structural view window, navigate to Project → Configuration, right-click on CANopen, and select New Device. Result: The New Device window appears.																																																								

Step	Action
13	Select TM3BC_CANopen in the Distributed I/Os Devices section and click OK. Result: The TM3BC_CANopen device is displayed:  The screenshot shows a software window titled 'CANopen'. At the top, there is a 'Bus:' dropdown menu set to '3', a 'CANopen comm head Expert' version '01.00' dropdown, and a 'Connections configured:' field showing '1'. The main area displays a network diagram. On the left, a vertical line represents a bus, with a square node labeled '1' and a smaller square node below it. To the right of node '1' is a square node labeled '0'. Further right is a large purple rectangular block labeled 'TM3BC_CANOPEN' with the text 'Standard CANopen' in pink above it. A line connects node '0' to the left side of the 'TM3BC_CANOPEN' block. Below node '0' is a small square node containing three dots '...'. The window has standard Windows-style window controls (minimize, maximize, close) in the top right corner. The bus coupler is now configured and ready for use.



A

analog input

Converts received voltage or current levels into numerical values. You can store and process these values within the logic controller.

analog output

Converts numerical values within the logic controller and sends out proportional voltage or current levels.

application

A program including configuration data, symbols, and documentation.

ASCII

(American standard code for Information Interchange) A protocol for representing alphanumeric characters (letters, numbers, certain graphics, and control characters).

C

CANopen

An open industry-standard communication protocol and device profile specification (EN 50325-4).

configuration

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

controller

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

CSV

Comma Separated Values.

D

DCF

Device Configuration File. A standardized file format, supported by most IEC 61131-compliant tools, containing the minimum, maximum, and default configuration values for devices.

E

EDS

Electronic Data Sheet. A file that describes how a device can be used on an EtherNet/IP network, including the objects, attributes and services available in the device.

Ethernet

A physical and data link layer technology for LANs, also known as IEEE 802.3.

EtherNet/IP

(Ethernet industrial protocol) An open communications protocol for manufacturing automation solutions in industrial systems. EtherNet/IP is in a family of networks that implement the common industrial protocol at its upper layers. The supporting organization (ODVA) specifies EtherNet/IP to accomplish global adaptability and media independence.

expansion bus

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

F

firmware

Represents the BIOS, data parameters, and programming instructions that constitute the operating system on a controller. The firmware is stored in non-volatile memory within the controller.

H

hex

(hexadecimal)

I

I/O

(input/output)

IEC 61131-3

Part 3 of a 3-part IEC standard for industrial automation equipment. IEC 61131-3 is concerned with controller programming languages and defines 2 graphical and 2 textual programming language standards. The graphical programming languages are ladder diagram and function block diagram. The textual programming languages include structured text and instruction list.

input/output

The index of the ARRAY.

M

Memory Mapping table

A file containing information about communication parameters (Assembly Instances, data sizes, and so on).

Modbus

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

Modbus SL

(*Modbus serial line*) The implementation of the protocol over a RS-232 or RS-485 serial connection.

ms

(*millisecond*)

P

protocol

A convention or standard definition that controls or enables the connection, communication, and data transfer between 2 computing system and devices.

R

repetition rate

Polling interval of the Modbus request that is sent.

V

variable

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



A

- analog input modules
 - specifications, *21*
- analog mixed I/O modules
 - specifications, *22*
- analog output modules
 - specifications, *23*

C

- CANopen
 - controlling transmission with PDOs, *92*
 - Web server, *142*

D

- digital I/O modules
 - specifications, *17, 18, 19*

E

- Ethernet
 - Web server, *108*
- events
 - PDO transmission (CANopen), *92*

M

- Modbus Serial Line
 - Web server, *128*

P

- Process Data Object (PDO), *92*

R

- regular inputs, *17, 18, 19*
- regular transistor outputs, *17, 18, 19*
- relay outputs, *17, 18, 19*

S

- specifications
 - analog input modules, *21*
 - analog mixed I/O modules, *22*
 - analog output modules, *23*
 - digital I/O modules, *17, 18, 19*
 - modules, *24*
- system requirements, *14*

T

- TeSys module, *82*
- Tesys modules
 - specifications, *24*
- TM3 analog I/O modules
 - TM3AI8 / TM3AI8G , *49*
 - TM3AM6 / TM3AM6G , *66*
 - TM3AQ2 / TM3AQ2G , *75*
 - TM3AQ4 / TM3AQ4G, *77*
 - TM3TI4 / TM3TI4G , *53*
 - TM3TI4D / TM3TI4DG , *57*
 - TM3TI8T / TM3TI8TG , *60*
 - TM3TM3 / TM3TM3G , *70*
- TM3 expert I/O expansion modules
 - TM3XTYS4, *82*
- TM3 safety modules
 - TM3SAC5R / TM3SAC5RG , *90*
 - TM3SAF5R / TM3SAF5RG , *88*
 - TM3SAFL5R / TM3SAFL5RG, *86*
 - TM3SAK6R / TM3SAK6RG , *84*
- troubleshooting, *155*

W

- Web server
 - CANopen, *142*
 - Ethernet, *108*
- Web Server
 - Modbus Serial Line, *128*

