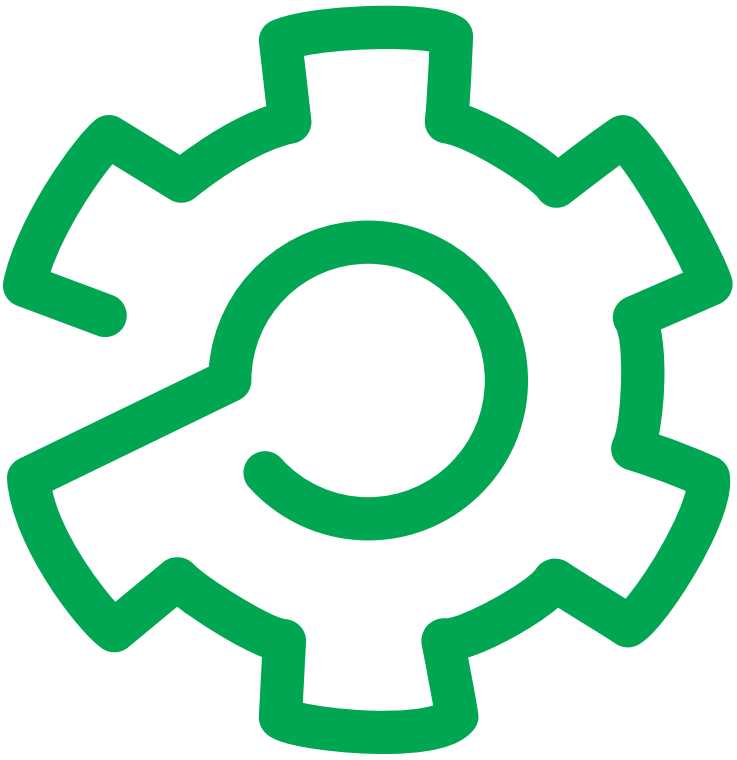
Machine Struxure™

Automation solutions for industrial machines

Catalog

2011



Schneider Electric™

MachineStruxure™

Improving your machine's performance... Maximizing your business opportunities...

Now, more than ever, choosing the right automation solution is absolutely essential to the success of your business. Supplying machines that are more efficient, more productive, and more reliable – with shorter lead times, and at a reduced cost – can make the difference in how you grow your business.

Today's machines must be:

- Productive
- Reliable
- Flexible
- Available
- Energy efficient
- Easily integrated into factory processes
- Easily integrated with machine safety solutions

Today's competitive markets require:

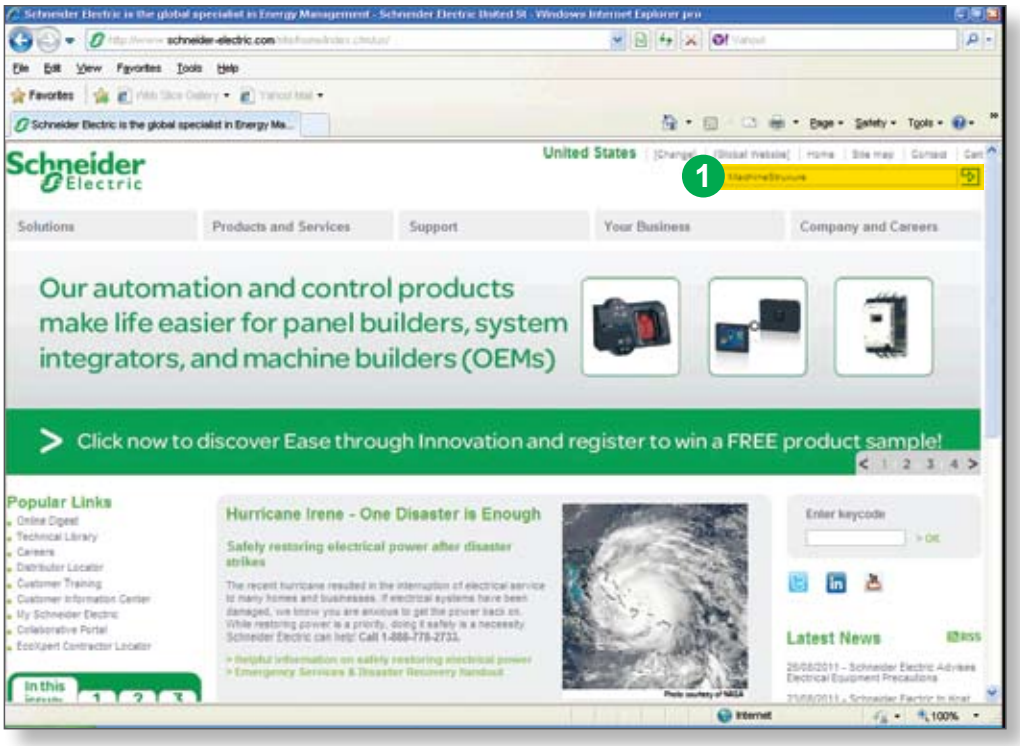
- Quicker time-to-market
- Optimized performance
- Increased productivity
- Rapid upgrades
- Compliance with global standards
- Worldwide service and support

To meet the demands of competitive markets, Schneider Electric offers MachineStruxure™ automation solutions, which help machine manufacturing OEMs to quickly design higher performance machines at reduced costs, and increased energy efficiency. MachineStruxure solutions allow you to:

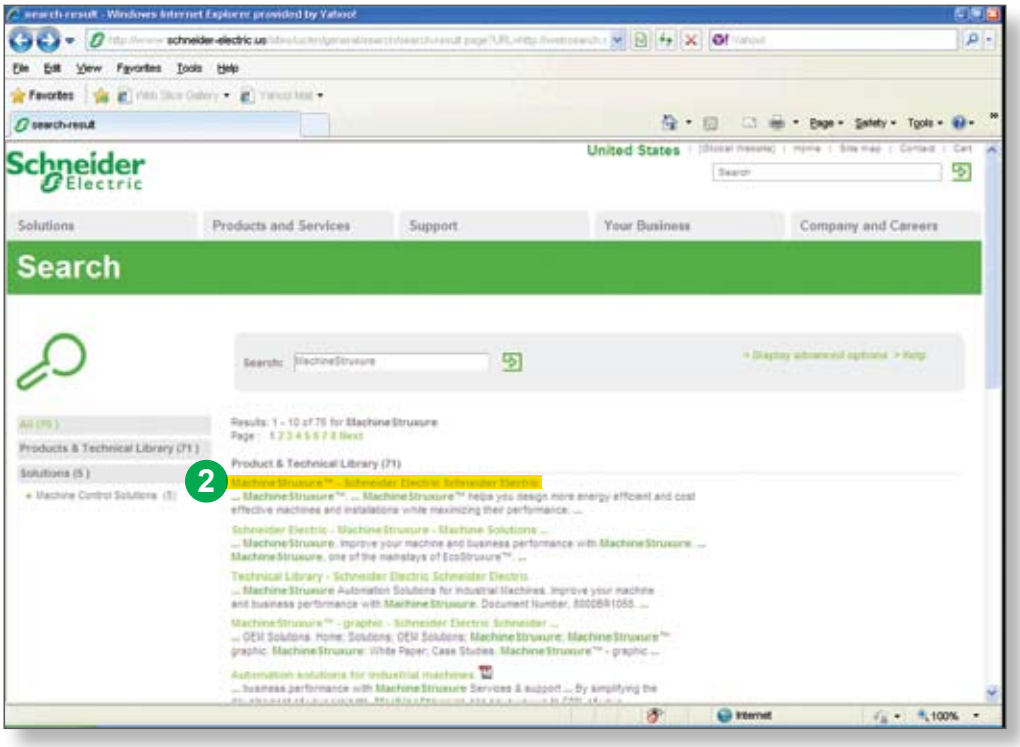
- Increase your machine's performance using a multi-faceted, flexible control system
- Reduce your machine's time-to-market using tested, validated and documented solutions that are ready to use
- Gain a competitive advantage at each stage of your machine life cycle

Go online to www.schneider-electric.com for technical information about products listed in this catalog, including:

To learn more about how to improve your machine and business performance with MachineStruxure™, follow these steps...

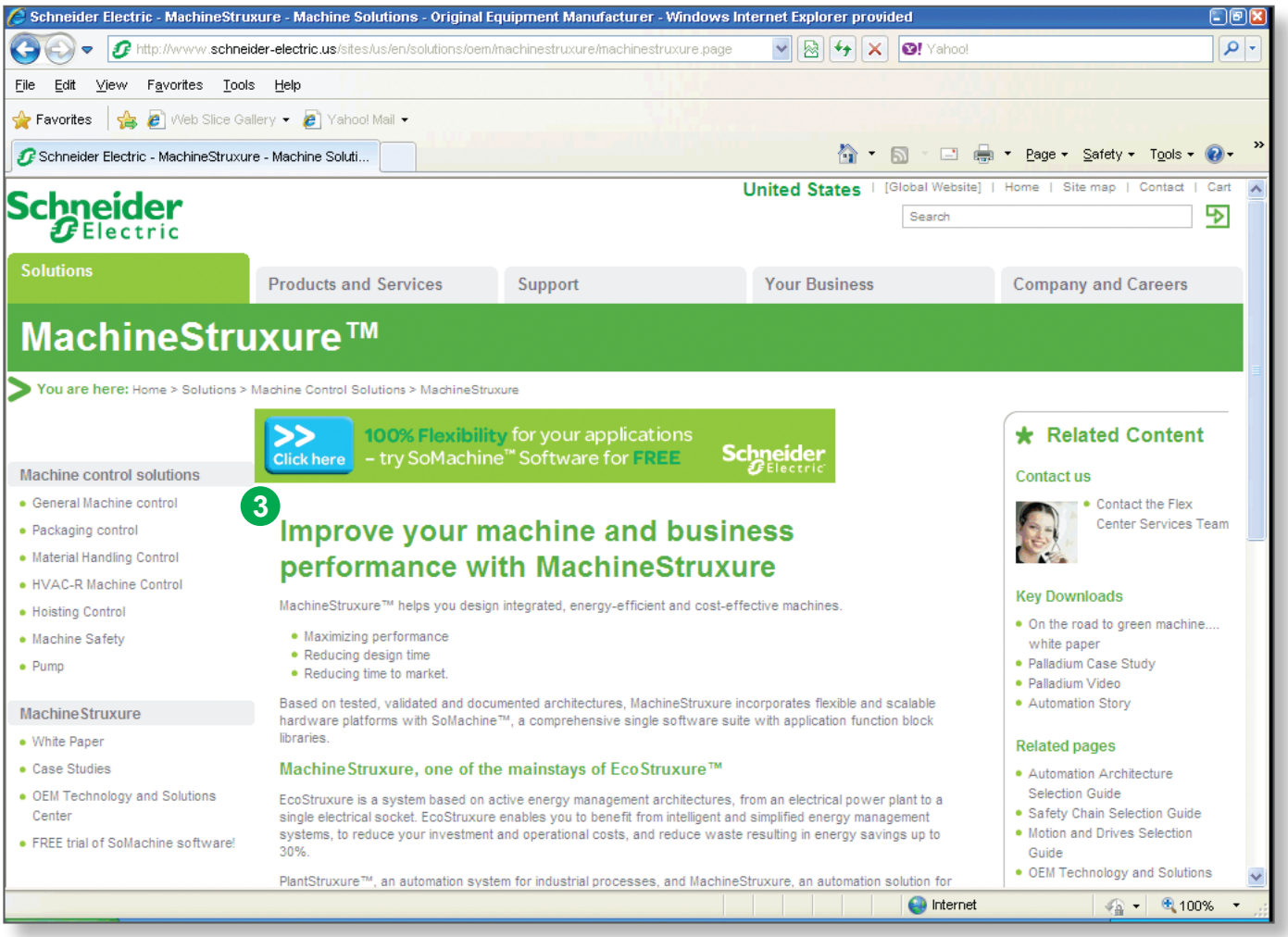


1 Go to: www.schneider-electric.com and enter **"MachineStruxure"** in the Search Box.



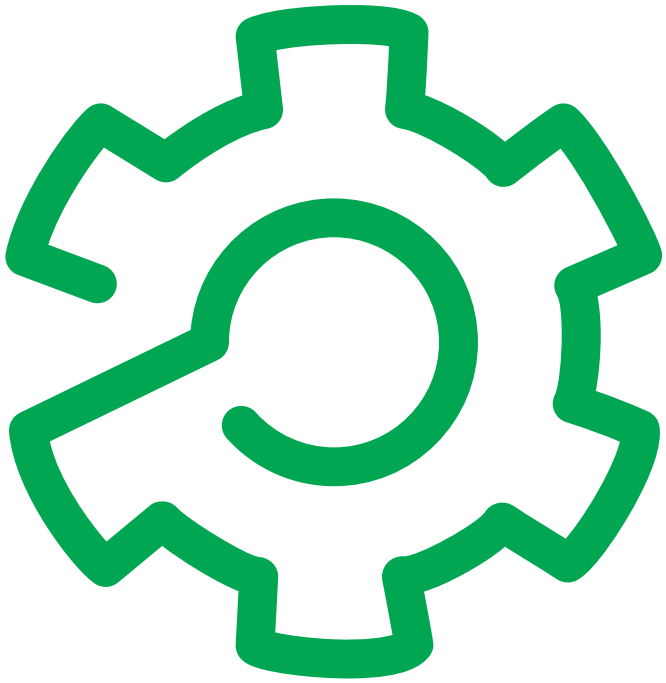
2 On the "Search" results page, select the first listing under "Product & Technical Library"... **MachineStruxure™ - Schneider Electric Schneider Electric.**

> Specifications > Dimensions > References
> Curves > Links to user guides and CAD files



3 Explore the "MachineStruxure™" page...try SoMachine™ software for FREE...check the "Key Downloads and Related Pages"...and feel free to contact us for more information.

General contents



MachineStruxure™
Automation solutions for industrial machines

MachineStruxure™

chapter 1

Overview

Contents ***chapter 1***

Overview

MachineStruxure™
Automation solutions for industrial machines

1

MachineStruxure™...improving the performance of your machines while reducing your costs

Providing you with an innovative, flexible control system...

Machines today need to be faster and more flexible, and to solve more complex automation functions than ever before. There is a movement towards servomotors and servo drives to increase accuracy and range of speed. There is also an emphasis on decentralized control, which can be accomplished by embedding or integrating logic controllers inside HMI or variable speed drives. In addition, rising development costs have created an ever greater demand for design efficiency.

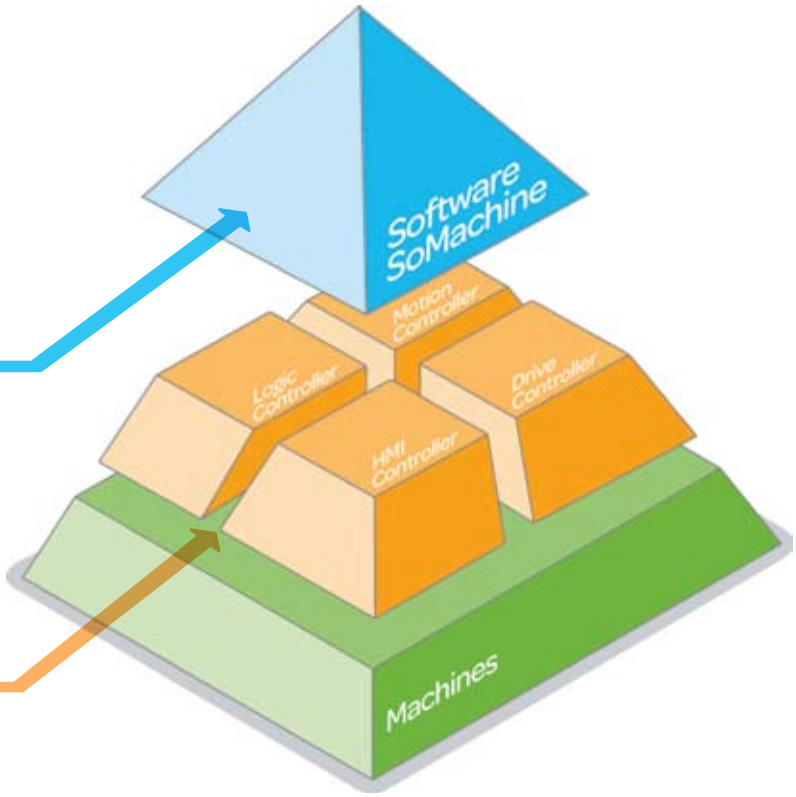
To be sure, flexibility is essential to providing an optimized control solution, and embedded intelligence lets you put the right amount of control right where it is needed.

One SoMachine™ software environment

> Simplifies machine programming and commissioning

Multiple hardware control platforms

> Provides embedded Intelligence where it is needed



In order to provide an optimized control solution to meet your needs, Schneider Electric provides a Flexible Machine Control approach, a key part of MachineStruxure™ solutions. This Flexible Machine Control approach utilizes embedded intelligence in its hardware control platforms, and a single software suite to provide an easy-to-use environment for developing, programming and commissioning your machines.

MachineStruxure™
Automation solutions for industrial machines

With MachineStruxure™, selecting the control platform best suited to optimize your machine's functions and increase its performance, can also reduce your production costs.

For more sophisticated automation systems that operate synchronized axes – motion controllers and Programmable Automation Controllers (PACs) offer the highest performance solutions.

Four types of control platforms
> HMI controller
> Motion controller
> Drive controller
> Logic controller

Motion controller / PAC
> high performance

HMI controller
> compact

For saving space, the HMI controller is best.

Drive controller
> efficient

For simple movement of axes, the drive controller provides a cost-effective solution

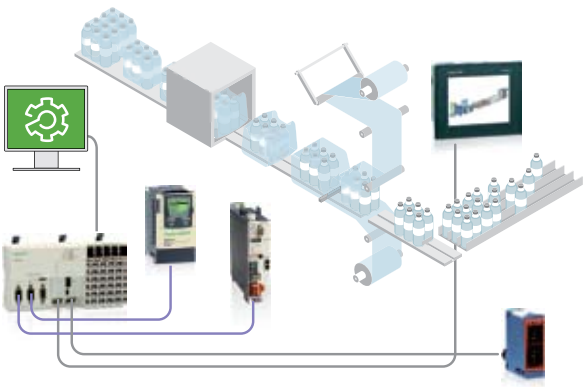
Logic controller
> flexible

For applications requiring considerable flexibility and scalable performance (I/O), the selection of programmable logic controllers (PLCs) is recommended.

Simplifying machine programming and commissioning with a single software suite…SoMachine™.

Modular and reusable, the SoMachine software suite simplifies programming and commissioning of your machine. It also allows you to capitalize on prior application development efforts by reusing your code on new applications which can also be applied to any of the other controller platforms supported by SoMachine. Simple and complete, SoMachine takes full control from the engineering process through to the commissioning of machines, that doesn't stop at the controller level. It enables programming and complete transparent access to the various automation system components, Human Machine Interfaces, motor control, sensors, and communication networks.

SoMachine™… a single software suite
to create and manage your complete automation solution from control and HMI, to remote devices:
> One software
> One download
> One connection
> One project file



Total flexibility and optimization of your machine functions

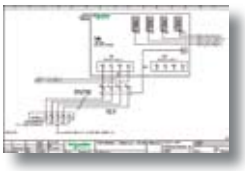
MachineStruxure™
Automation solutions for industrial machines

1

Reducing your machine's time-to-market

- **Tested**: in all possible configurations for proper function relative to performance
- **Validated**: for full functional compatibility of devices
- **Documented**: with a complete system user guide, predefined CAD panel design and wiring diagrams
- Predetermined equipment lists

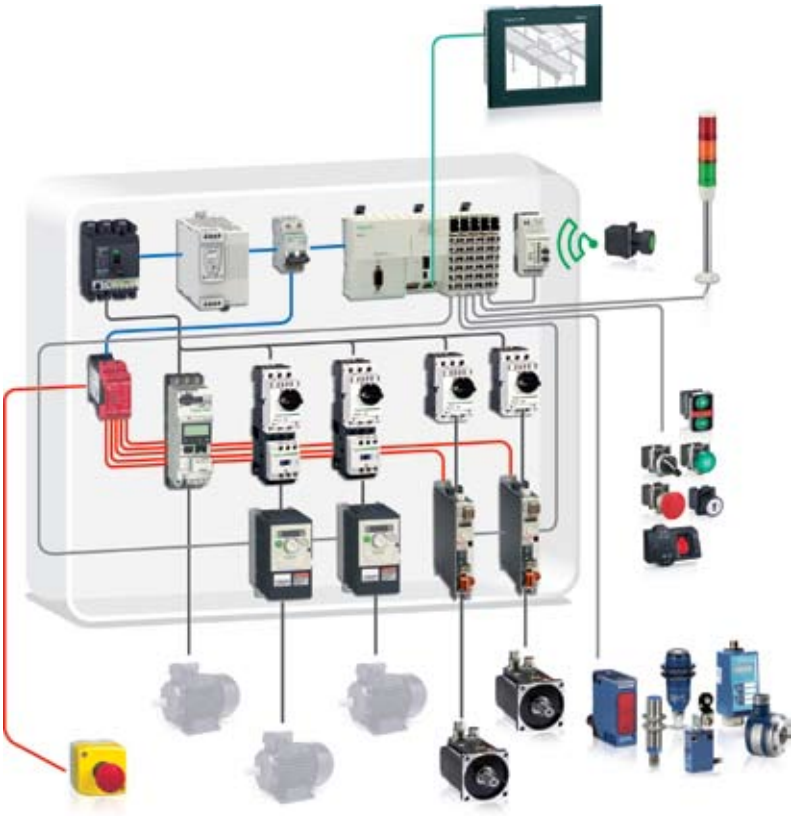
System user guide



Wiring diagrams and predetermined CAD panels

Using Tested, Validated and Documented Architectures and function blocks

Based upon our Flexible Machine Control approach, MachineStruxure™ solutions provide Tested, Validated and Documented Architectures with standard or application function block libraries.



Each TVDA includes:
- system user guides (SUG) for easy installation and programming,
- E-plan wiring diagrams to speed up panel and system design
- technical support for effective trouble-shooting.

Designed to reduce costs, minimize footprint and increase performance, MachineStruxure architectures are integrated within the SoMachine™ Software suite and are available:

- **for generic applications with ready-to-use Standard function block** libraries (TeSys™ U Motor Management, Controller logic algorithms, and PLCopen motion libraries on CANopen™ for your motion functions)

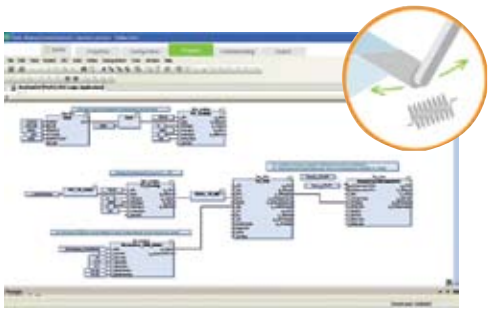
Hoisting, Material Handling, Packaging

- **for dedicated applications with ready-to-use Application functions** libraries ("Grouping/ungrouping", "anti-sway", "temperature control")

See page 1/5

Consult your Customer Care Center

MachineStruxure™
Automation solutions for industrial machines



Our pre-programmed function blocks offer speed in development for your applications. They can be configured with a simple "copy and paste" function. They can be quickly implemented in machine programs, reducing the effort required to create an application, and reducing the risk of errors.

MachineStruxure™…reducing the complexity of your program design and your implementation time, with SoMachine™ software suite

Using a rich set of templates and libraries:
- Programming and automation architectures templates,
- Graphical libraries,
- Logic libraries,
- Application function blocks libraries.

Using a variety of integrated expert functions:
- Variable indexing and tracing,
- Fast and easy sharing of variables between control and HMI,
- Smart coding,
- Commissioning screens.

MODBUS Ethernet CANopen CANmotion IEC 61131-3 PLCopen motion control

MachineStruxure™ solutions use open standards through IEC languages and open networks – and transparency through FDT/DTM technology, saving you time.

Customize your machines and upgrade them, without increasing your design phases or costs.

Simple customization and integration
- With our existing function blocks you can simply modify, reuse or create your own.
- Easily integrate your own systems into our architectures utilizing FDT/DTM technology.

Compliance with global standards for maximum flexibility and durability
- SoMachine and the control platforms support the 6 programming languages (FBD, ST, SFC, LD, IL, CFC) and is compliant with IEC 61131-3,
- PLCopen function blocks for movement control,
- Integrated open and standard networks in devices,
- SoMachine software combined with our control platforms allow you to simply upgrade your architectures.

+ Reduce design and implementation time by up to 50%

MachineStruxure™
Automation solutions for industrial machines

Machine control solutions overview

Discover a selection of Tested, Validated, Documented automation Architectures ranging from simple to complex machines.

MachineStruxure™ Architectures serve several types of machines and installations in industry, infrastructure, and building markets. Choose from a selection of 5 different controllers designed to meet your price and performance requirements.

Reduced cost, minimized footprint and performance, all you need to do is adapt them to your applications.

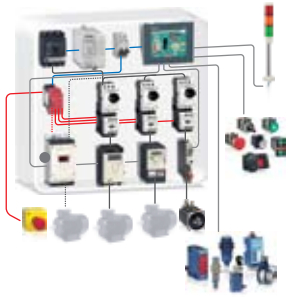
Optimized automation architectures

...for compact or modular machines

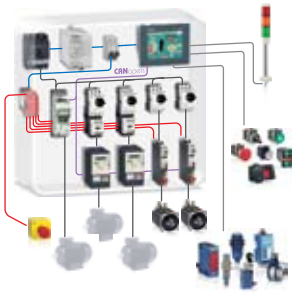
Compact™ / Hardwired / Logic controller / M238™
An excellent solution using simple controls architecture…

Compact / CANopen™ / Logic controller / M238
Simple setup with easy installation and maintenance…

...for compact or modular HMI-centric machines



Compact / CANopen / HMI controller / XBT GC
A compact cost-effective architecture for simple applications…



Compact / CANopen / HMI controller / XBT GC/GT/GK
A highly adaptable and compact architecture…

...for drives and motion-centric machines

Compact / CANopen / Drive controller / Altivar™ IMC
An innovative solution for drive-centric applications…

MachineStruxure™
Automation solutions for industrial machines

Performance automation architectures

Compact™ / Hardwired / Logic controller / M258™
An excellent performance solution using simple controls architecture…

Compact / CANopen™ / Logic controller / M258
Increased performance and flexibility for your Machine…

Compact / CANmotion / Motion controller / LMC058
Improved machine profile with advanced intelligence and ease-of-use

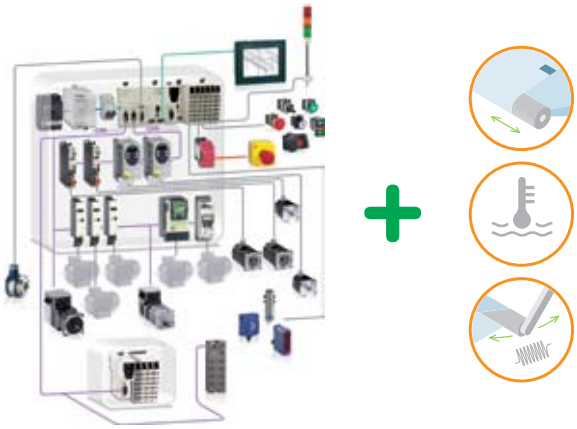
It's easy to select the right automation architectures with our online selector tools:
http://www.schneider-electric.com

Dedicated application control solutions

With MachineStruxure™ dedicated automation solutions architectures, you can integrate our ready-to-use professional know-how with your machine building expertise.

Provide higher performance and more innovative machines without compromising their reliability.

Hoisting, Material Handling, Packaging



Example for packaging

Application Function Blocks

Discover MachineStruxure application architectures and application function block libraries at http://www.schneider-electric.com

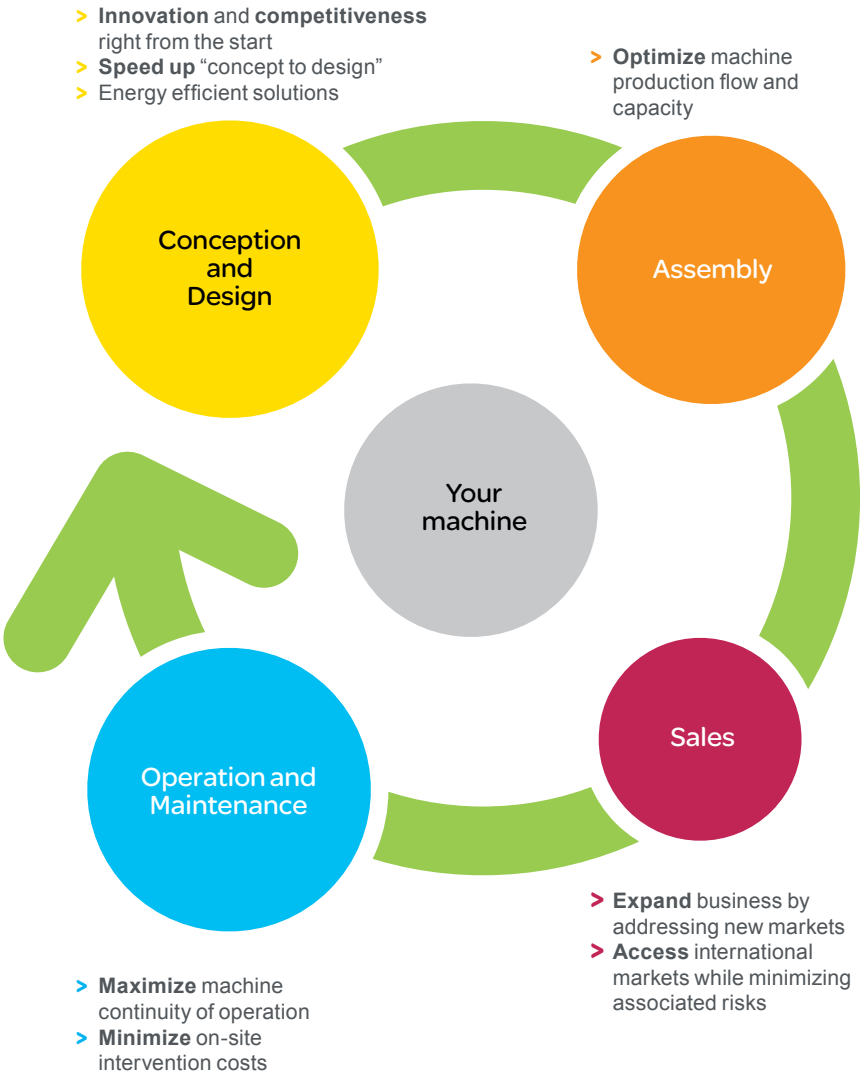
MachineStruxure™
Automation solutions for industrial machines

Developing your business…

Schneider Electric provides services and support throughout the complete machine life cycle.

MachineStruxure™ is much more than products and architectures adapted to your needs; it also includes services and support. Our expertise and experience allow you to increase your efficiency and competitiveness throughout the life cycle of your machines or installation.

Doing more with less at each stage. MachineStruxure™ keeps you one step ahead.



MachineStruxure™
Automation solutions for industrial machines

Your challenges are our challenges…

Make your machines stand out right from the start

Design energy efficient and optimized automation solutions with the help of our design engineers
What do we offer?
Compliment your design team by adding one of our Schneider Electric Application Design Engineers.

Our Application Design Engineer could provide:
> Assistance at the design and programming phase
> Optimized designs and integrated combinations to increase energy efficiency
> Performance testing, co-engineering, commissioning, panel building, project management, and turn-key solution for machines.

Our Engineers' expertise lies in a unique blend of hands-on industry application knowledge and intimate understanding of the Schneider Electric offer.

Design machines that are compliant with the new machine safety standards with our team of engineers
> Risk analysis and assessment,
> Application of functional safety specifications.

Improve your performance:
> A global network of training centers.

Conception and Design

Your benefits
> Fully customized solution making your design unique
> Energy efficient solutions
> Solutions compliant with new safety standard
> Tested and validated automation configurations
> Innovation

Energy Efficiency

International After-Sales Support

Your benefits
> Reduced costs: no travel abroad
> Technical capabilities available locally
> Fast response: Intervention provided by local technician at end-user site
> Ease of communication: speaking the language of your customer
> Global reach: Schneider Electric has operations all over the world
> Development of your own service activity using Schneider Electric local resources

Worldwide customer assistance and post sales support:

What's the offer?
Schneider Electric has a unique program in place called "Customer International Support" (CIS) based on:
> Network of 190 dedicated local country correspondents
> Web collaborative platform for most efficient communication
> Local service teams

The simple fact that your machine is equipped with Schneider Electric components entitles you to:
> Request for a local technician intervention on site where your machine is operating
> Access to local spare parts

Terms and conditions follow normal local practice

MachineStruxure™
Automation solutions for industrial machines

1

Choose a solutions partner you can rely on.

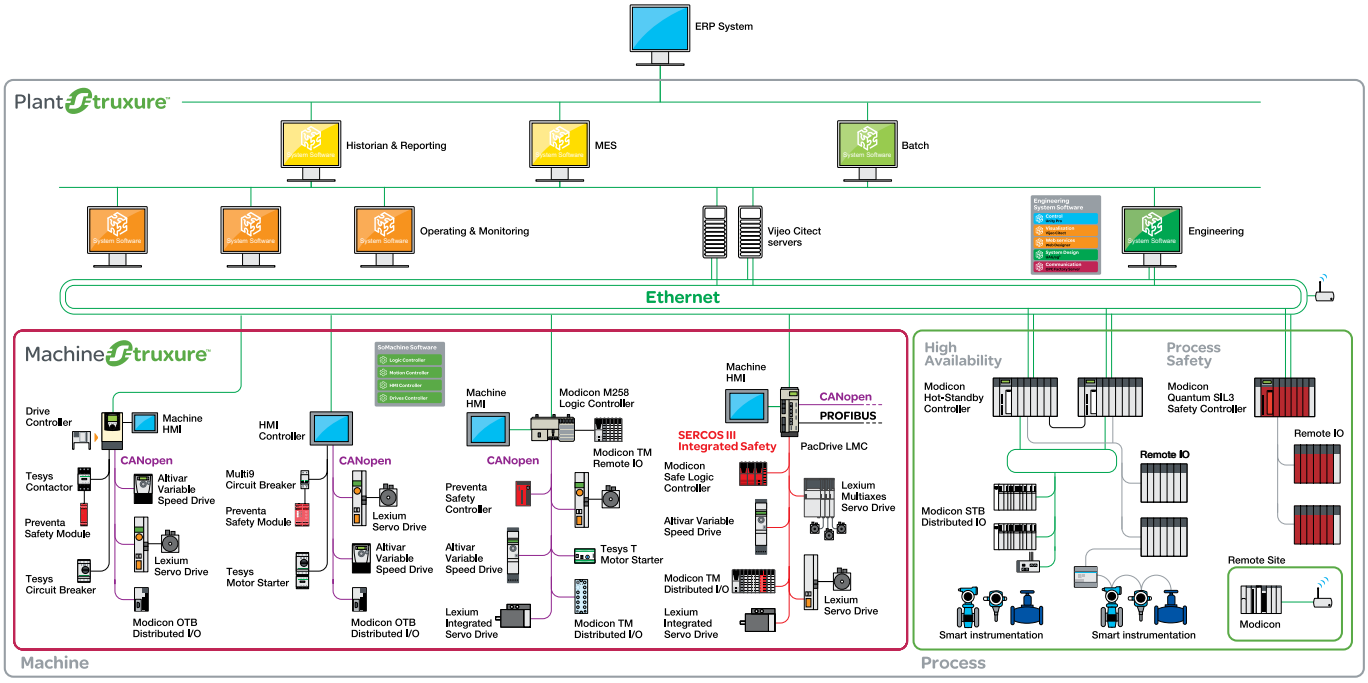
Choose Schneider Electric for simple stand-alone control products to global process automation systems.

Now you can easily integrate your machines into your customers' factory processes. Schneider Electric's equipment platforms and software suite are equipped with an integrated Ethernet connection to allow easy integration with factory-level information systems.

As a supplier of industrial process solutions for over 40 years, Schneider Electric understands the production environment of your customers, and can assist them in reaching their objectives via the PlantStruxure™ system and associated tools.

Our expertise
- Simple connectivity
- Transparent operation
- Consistent diagnostics
- Single company for support

PlantStruxure™ is a collaborative system that meets industry automation requirements, and at the same time is able to address the increasing requirements of energy management. In a single environment, it is possible to manage production, and to analyze and use energy measurements to optimize operations at all levels.



MachineStruxure™
Automation solutions for industrial machines

With innovative and reliable automation solutions from a broad, best-in-class product offer, you can count on Schneider Electric…

…for increased performance

By relying on the world leader in automation, you benefit from the latest technological developments that help ensure the commercial success of your machines. From actuators to control systems, you're certain to find the solution best suited to your specific needs at Schneider Electric.

- Wide range
- Simple to use
- Network opening
- Worldwide availability

Innovation dedicated to the reduction of:
- size of the enclosures
- wiring time
- installation time

See chapter 7

Motor control, movement control

Maximum productivity
- improve the efficiency of your machines
- reduce their energy consumption
- optimize their control mechanisms

Human/Machine interfaces

Market-leading design, ergonomics, and availability
- easy integration
- easy and efficient to use thanks to tactile, biometric, and wireless technologies
- effective configuration of your dialog applications

Robotics packs

Flexibility and maximum performance
- simplify your designs
- reduce the footprint
- flexible processes

Detecting, informing, distributing energy and switching
- assembly and supply systems
- protection and control of LV power circuits
- RFID detection and solutions

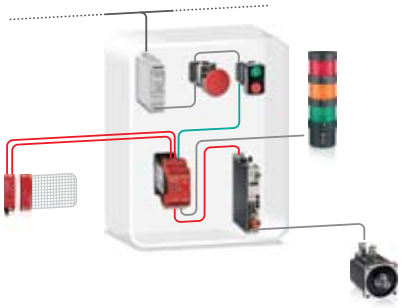
…for increased safety

One provider for the complete safety chain

Reduce cost on your safety machine applications by using only one automation and complete safety chain provider…Schneider Electric.

- Certification easily obtained for your installation
- minimize the risks of accidents and increase productivity
- quick response to incidents with events diagnosis

See chapter 6



Certified "Machine Safety Chain" Solutions can help you reduce your machine design time and simplify the determination of safety integrity (SIL) and performance (PL) levels.

Conventional safety solutions with TÜV certification

Machine Structure™

chapter 2

Hardware control platforms

Contents ***chapter 2***

Hardware control platforms

MachineStruxure™
Hardware control platforms
Logic controllers, motion controller, drive controller and HMI controllers

Applications		**High speed counter control and simple position control**	**Speed control, high speed counter control and motion control**
Machines		**Packaging, conveying**	**Packaging, conveying, assembly**
			
Configuration software		SoMachine	
Power supply		24 V ⎓ and 100/240 V ∿	24 V ⎓
Embedded inputs *(depending on model)*		□ 14 digital inputs, 8 of which can be configured as fast inputs	□ 26 to 38 digital inputs including 8 counter inputs (200 kHz) □ 4 analog inputs
Embedded outputs *(depending on model)*		□ 4 transistor outputs + 6 relay outputs or 10 transistor outputs, 4 of which can be configured as fast outputs	□ 16 to 28 transistor outputs including 4 reflex outputs □ Up to 12 relay outputs
I/O expansion		With Modicon™ TM2 modules: □ Digital I/O (see page 3/10) □ Analog I/O (see page 3/16) □ Counter I/O (see page 3/18)	With Modicon TM5 compact blocks: □ Digital and analog I/O (see page 3/22) With Modicon TM5 modules: □ Digital (see pages 3/26 and 3/28) □ Analog (see page 3/34) □ Expert (see page 3/38)
Integrated functions		□ HSC □ PTO □ PWM □ PID control □ Event processing	□ HSC □ Analog □ Position control □ PWM
Communication	Embedded	□ Master/slave type isolated serial link □ Protocols: SoMachine™-Network, Modbus™ master/slave RTU/ASCII, ASCII □ CANopen™ master	□ Serial links: RS232/RS485 □ Web/FTP servers □ Protocols: SoMachine-Network, Modbus master/slave RTU/ASCII, ASCII □ CANopen master □ Ethernet
	Option	□ Ethernet □ Profibus™ □ DeviceNet™	□ Modbus RS232 serial link □ Modbus RS485 serial link
User memory	RAM	500 or 1000 KB (depending on model)	64 MB (program + data)
	Flash	2 or 16 MB (depending on model)	128 MB
Controller		**M238 logic controllers**	**M258 logic controllers**
Pages		2/4	2/12

Speed control, high speed counter control and motion control for synchronized axes	Control by integration of automation functions on Altivar 61 and Altivar 71 variable speed drives	Data control and parameter-setting IEC 1131-2 control function Display of text messages, graphic objects and mimics
Packaging, conveying, assembly	**Textile, hoisting, pumping, woodworking**	**All machine types**
		
24 V ⎓	24 V ⎓	24 V ⎓
◻ 26 to 38 digital inputs including 8 counter inputs ◻ 4 analog inputs	◻ 10 digital inputs including 4 available for 2 HSC inputs or 2 incremental encoders ◻ 2 analog inputs	12 to 16 digital outputs
◻ 16 to 28 transistor outputs including 4 reflex outputs	◻ 6 transistor outputs ◻ 2 analog outputs	◻ 6 to 16 transistor outputs
With Modicon™ TM5 compact blocks: ◻ Digital and analog (see page 3/22) With Modicon TM5 modules: ◻ Digital (see pages 3/26 and 3/28) ◻ Analog (see page 3/34) ◻ Expert (see page 3/38)	With expansion card VW3A320●: ◻ Digital, analog, relay, frequency control and probe I/O (see page 2/34)	With Modicon TM2 expansion modules: ◻ Digital I/O (see page 2/50) ◻ Analog I/O (see page 2/51)
◻ HSC ◻ Analog ◻ Position control ◻ Master encoder ◻ PWM	◻ HSC ◻ Analog ◻ Position control	◻ Display of animated mimics and current date and time ◻ Control and modification of numeric or alphanumeric variables ◻ Real-time and trending curves with log ◻ Multiwindow management ◻ Page calls initiated by the operator ◻ Multilingual application management ◻ Recipe management ◻ Data processing via Java script ◻ Application support and external memory logs ◻ Management of printers and barcode readers ◻ Execution of programmed logic sequences ◻ CANopen fieldbus device management ◻ Management of digital/analog I/O on expansion modules
◻ Serial links: RS232/RS485 ◻ Web/FTP servers ◻ Protocols: SoMachine™-Network, Modbus™ master/slave RTU/ASCII, ASCII ◻ CANopen™ and CANmotion™ (master) ◻ Ethernet	◻ Protocols: Modbus/TCP, SoMachine, UDP, TCP, SNMP ◻ Web/FTP servers ◻ CANopen master ◻ Ethernet	◻ Serial links: RS 232C/RS 422/485 ◻ Protocols: Uni-TE, Modbus, Modbus TCP/IP ◻ Ethernet ◻ Parallel printer
◻ Modbus RS232 serial link ◻ Modbus RS485 serial link	◻ Modbus Plus™ ◻ Uni-Telway™ ◻ InterBus®-S ◻ Profibus™ DP ◻ DeviceNet™ ◻ Modbus/TCP ◻ FIPIO™ ◻ EtherNet/IP™ ◻ CC-Link ◻ LonWorks® (Altivar™ 61 series) ◻ METASYS® N2 (Altivar 61 series) ◻ APOGEE® FLN (Altivar 61 series) ◻ BACnet™(Altivar 61 series)	◻ CANopen master
64 MB (program + data)	2 MB	512 KB (SRAM)
128 MB	2 MB	16 to 32 MB (Flash EEPROM)
LMC058 motion controllers	**Altivar IMC integrated controller card**	**XBT GC, XBT GT, XBT GK HMI controller**
2/22	2/34	2/40

MachineStruxure™
Hardware control platforms
Modicon™ M238™ logic controller

Application		**Solution for packaging and conveying machines :** □ Vertical bagging machines □ Vertical packaging machines □ Rotary or linear labeling machines □ Conveyors	
			
Voltage		24 ⎓ (- 15% / + 20 %)	
Certifications		CE, UL, CSA, ACA (C-Tick), GOST (pending)	
Digital I/O	No. of 24 V ⎓ inputs	14, 8 of which can be configured as fast inputs	
	No. of outputs	10 transistor, 4 of which can be configured as fast outputs	
I/O expansion	Max. number of modules	7: digital, analog, high-speed counter, AS-Interface master (3 high-speed counter TM200HSC060●●, 2 TWDNOI10M3 AS-Interface master)	
	Max. number of digital I/O	136/192/248 *(1)*	
Embedded function	HSC	8 x 100 kHz simple channels, 4 x 100 kHz simple channels and 1 x 100 kHz advanced channel *(2)* or 2 x 100 kHz advanced channels *(2)*	
	Motion or Reflex functions	2 advanced channels, frequency: PMW: 20 kHz ; PTO: 100 kHz	4 channels, frequency: 100 Hz
	PID regulation	Yes	
	Event processing	Yes, up to 4 event tasks can be activated by the fast inputs or by the integrated counter channels (on threshold)	
Connection via		4 removable screw terminal blocks (supplied as standard) 4 removable spring terminal blocks with optional unit TM238 RSSPT (ordered separately)	
Embedded communication	**RS 485/RS 232 serial port**	Master/slave type isolated serial link	Master/slave type isolated serial link
		RJ45 port, marking on front panel SL1 : 1 channel Protocols: □ Default: SoMachine-Network (programming/debugging), □ Modbus™ master/slave RTU/ASCII, ASCII, SoMachine™-Network	RJ45 port, marking on front panel SL1 : 1 channel Protocols: □ Default : Modbus slave, □ Modbus master/slave RTU/ASCII, ASCII, SoMachine-Network
	RS 485 serial port	–	Master/slave type isolated serial link
			RJ45 port, marking on front panel SL2 : 1 channel Protocols: □ Default : SoMachine-Network (programming/debugging), □ Modbus master/slave RTU/ASCII, ASCII, SoMachine-Network
	Terminal port "Prg. Port"	1 USB 2.0 (Mini B USB connector): Programming port for SoMachine software	
	CANopen	–	Conformity class M10, limited to 16 slaves for 1 master
User zone in internal RAM	Capacity	500 KB	1000 KB
	No. of instructions	10 K instructions depending on the language and type of instruction used	25 K instructions depending on the language and type of instruction used
Type of compact base		**TM238LDD24DT**	**TM238LFCD24DT**
Page		2/8	2/8

(1) The 1st value corresponds to the maximum number of I/O (base and expansions) with expansion modules with screw terminals, the 2nd to expansion modules with spring terminals and the 3rd to expansion modules with HE 10 connectors.
(2) Advanced channel with two-phase signal inputs for encoder, threshold detection function and reflex function.

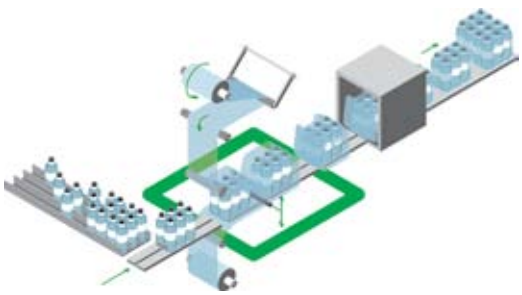
100-240 V ∼ (+ 10% / - 15 %)	
CE, UL, CSA, ACA (C-Tick), GOST (pending), CSA (Class 1, Division 2, Groups A, B, C, D)	
14, 8 of which can be configured as fast inputs	
4 transistor + 6 relay	
7: digital, analog, high-speed counter, AS-Interface master (3 high-speed counter TM200HSC060●●, 2 TWDNOI10M3 AS-Interface master)	
136/192/248 *(1)*	
8 x 100 kHz simple channels, 4 x 100 kHz simple channels and 1 x 100 kHz advanced channel *(2)* or 2 x 100 kHz advanced channels *(2)*	
2 advanced channels, frequency: PWM: 20 kHz ; PTO: 100 kHz	4 channels, frequency: 100 Hz
Yes	
Yes, up to 4 event tasks that can be activated by the base's fast inputs or by the integrated counter channels (threshold attained)	
4 removable screw terminal blocks (supplied as standard) 4 removable spring terminal blocks with optional unit TM238 RSSPT (ordered separately)	
Master/slave type isolated serial link	Master/slave type isolated serial link
RJ45 port, marking on front panel SL1 : 1 channel Protocols: □ Default: SoMachine™-Network (programming/debugging), □ Modbus™ master/slave RTU/ASCII, ASCII, SoMachine-Network	RJ45 Port, marking on front panel SL1 : 1 channel Protocols: □ Default : Modbus slave, □ Modbus master/slave RTU/ASCII, ASCII, SoMachine-Network
–	Master/slave type isolated serial link
	RJ45 port, marking on front panel SL2 : 1 channel Protocols: □ Default: SoMachine-Network (programming/debugging), □ Modbus master/slave RTU/ASCII, ASCII, SoMachine-Network
1 USB 2.0 (Connecteur type USB mini-B): Programming port for SoMachine software	
–	Conformity class M10, limited to 16 slaves for 1 master
500 KB	1000 KB
10 K instructions depending on the language and type of instruction used	25 K instructions depending on the language and type of instruction used
TM238 LDA24DR	**TM238 LFAC24DR**
2/8	2/8

MachineStruxure™
Hardware control platforms
Modicon™ M238™ logic controller

TM238 LFDC24DT

TM238 LFAC24DR

SoMachine software platform



Introduction

The Modicon™ M238™ logic controller is a compact, high-performance and fully expandable PLC. It is a key element in the Flexible Machine Control approach, and an important component of MachineStruxure™, which brings you maximum flexibility and helps ensure an optimized control solution.

Modicon M238 compact logic controllers offer an “all-in-one” solution in a compact unit (157 x 118 x 86 mm excluding expansion modules). Four models are available, with different embedded communications and supply voltages.

Models **TM238 LDD24DT** and **TM238 LFDC24DT**, powered with 24 V ⎓ offer:
- 14 x 24 V ⎓ inputs, including 8 fast inputs, dedicated to special functions such as high-speed counting (HSC)
- 10 x 24 V ⎓ solid state outputs, including 4 fast outputs, dedicated to special functions such as PWM and PTO.
- RS 232/RS 485 serial link (SoMachine-Network, Modbus, ASCII protocols)

Model **TM238 LFDC24DT** also has:
- CANopen™ bus master link
- Second RS 485 serial link (SoMachine™-Network, Modbus™, ASCII protocols)

Models **TM238 LDA24DR** and **TM238 LFAC24DR**, powered with 100-240 V ∿ offer:
- 14 x 24 V ⎓ inputs, including 8 fast inputs, dedicated to special functions such as high-speed counting (HSC)
- 4 x 24 V ⎓ solid state outputs, dedicated to HSC reflex functions, and 6 relay outputs
- RS 232/RS 485 serial link (SoMachine-Network, Modbus, ASCII protocols)

Model **TM238 LFAC24DR** also has:
- CANopen bus master link
- Second RS 485 serial link (SoMachine-Network, Modbus, ASCII protocols)

The number of I/O can be expanded on all four models by adding up to 7 expansion modules *(1)* of the following type on the right-hand side of the base unit:
- Digital **TM2 DDI/DDO/DMM/DRA**
- Analog **TM2 AMI/ALM/ARI/AMO/AVO/AMM**
- Up to 3 High-speed counters **TM200 HSC206DT/DF**
- Up to 2 AS-Interface master modules **TWD NOI 10M3**

Modems or communication gateways can be connected to the serial links in order to expand the connectivity capability to include Modbus/TCP, Profibus™ DP, and DeviceNet™.

Note: *A serial link on each controller delivers a 5 V ⎓ voltage dedicated primarily to powering a Magelis display unit or Small panel terminal* ***XBT N●00/R400/RT500*** *or the Ethernet gateway* **499 TWD 01100**.

The compact controller solution also has great flexibility in terms of wiring. With digital I/O expansion modules, several connection options are available, including removable screw terminals, spring terminals and HE 10 connectors, providing simple, quick, safe wiring. The Modicon Telefast™ ABE 7 prewiring system can be used for easy connection of expansion modules with HE 10 connectors.

(1) The addition of 7 expansion modules allows a maximum number per configuration of 136/192/248 I/O (depending on whether expansion modules with screw terminals, spring terminals or HE 10 connectors are being used).

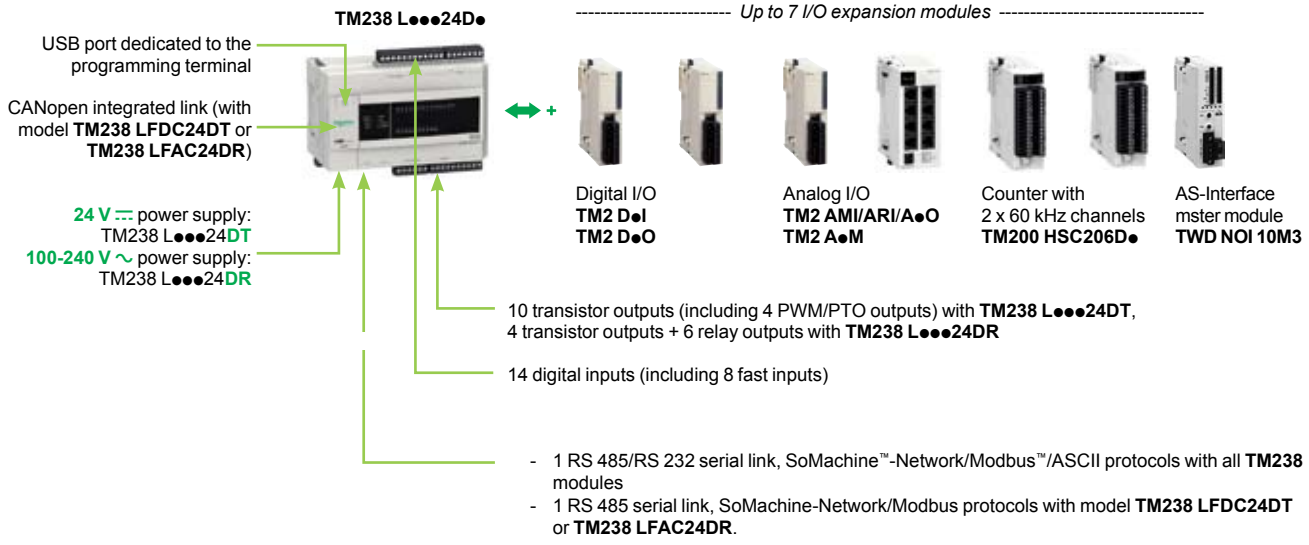
Design and installation of Modicon M238 applications

Schneider Electric's SoMachine software platform can be used to program Modicon M238 controllers using:
- IEC 61131-3 programming languages: Instruction List (IL), Ladder Diagram (LD), Function Block Diagram (FBD), Sequential Function Chart/Grafcet (SFC) and Structured Text (ST)
- CFC (Continuous Function Chart) language

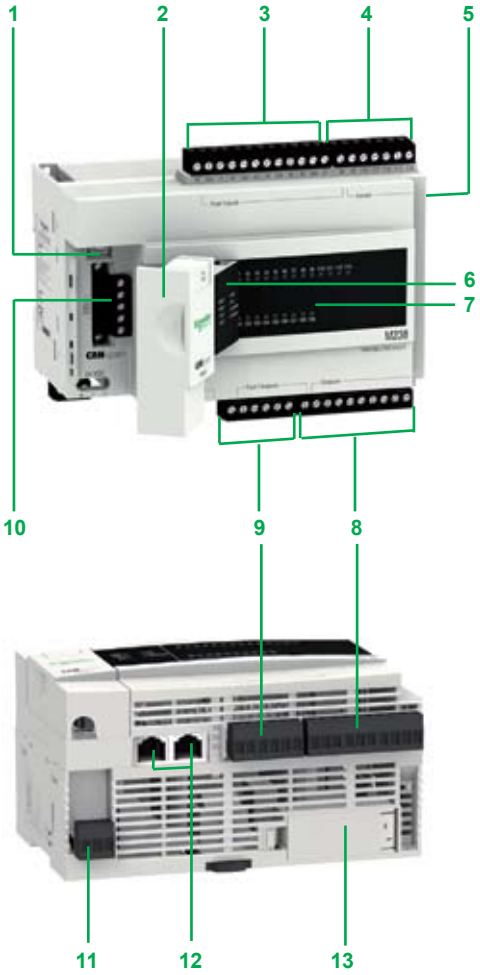
Modicon M238, the solution for packaging and conveying machines

The Modicon M238 controller's languages, dedicated function blocks and integrated functions – HSC (high-speed counting), PTO (Pulse Train Outputs) and PWM (Pulse Width Modulation) – make Modicon M238 controllers ideal for use with Altivar variable speed drives, Lexium servo drives, and Magelis HMI terminals in packaging machine applications:
- Vertical bagging machines
- Vertical packaging machines
- Rotary or linear labeling machines
- Conveyors

Compact base configuration



Description



The Modicon M238 logic controller bases **TM238 LDD24DT**/ **LFDC24DT** and **TM238 LDA24DR**/ **LFAC24DR** feature:

1 Mini B USB connector, marked Prg. Port, for connecting a programming terminal
2 Hinged access cover with 2 cable glands (1 removable for the terminal cordset and 1 for the CANopen™ cable)
3 Removable screw terminal block (12 terminals) for connecting the sensors (24 V ⎓ fast inputs)
4 Removable screw terminal block (7 terminals) for connecting the sensors (24 V ⎓ inputs)
5 Connector for up to 7 digital **TM2 D●●**, analog **TM2 A●●**, counter **TM200 HSC206D●**, and up to 2 AS-Interface master module **TWD NOI10M3 I/O** expansion modules
6 Display unit showing:
- The controller status by means of 4 LEDs (PWR, RUN, Batt and Err)
- The integrated communication port status by means of 4 LEDs (SL1, SL2, CAN Run and CAN Err)

7 Display unit showing the I/O states (I0 to I13 and Q0 to Q9)
8 Removable screw terminal block (10 terminals) for connecting 6 preactuators
9 Removable screw terminal block (6 terminals) for connecting 4 preactuators
10 Removable screw terminal block (5 terminals marked CANopen) for connection to the CANopen bus, with model **TM238 LFDC24DT** or **TM238 LFAC24DR**

Accessible from the underside of the controller:

11 Removable screw terminal block (3 terminals):
- +, -, ⏚ marked 24 VDC for connecting the 24 V ⎓ power supply
- L, N, ⏚ marked 100-240 VAC for connecting the 100-240 V ∿ power supply

12 One RJ45 connector marked SL1 (with model **TM238 LDD24DT** or **TM238 LDA24DR**) or 2 RJ45 connectors marked SL1 and SL2 (with model **TM238 LFDC24DT** or **TM238 LFAC24DR**) for connecting the serial links
13 Hinged cover for accessing the RAM backup battery (optional) and the internal real-time clock

The compact bases are mounted as standard on a symmetrical DIN rail or on a metal plate (two Ø 4.3 holes).

MachineStruxure™
Hardware control platforms
Modicon™ M238™ logic controller


TM238 LFDC24DT


TM238 LFAC24DR


TSX PLP 101


TCS XCN AMUM3P


TM200 RSRCEMC


499 TWD 01100 *LUF P●*


SR2 MOD03

References

Number of I/O	Inputs	Outputs	No. of I/O expansion modules	Integrated serial port	Integrated master CANopen™ port	Reference	Weight kg
Compact bases. 24 V ⎓ power supply							
24 I/O (removable battery to be ordered separately)	6 x 24 V ⎓ inputs (sink/source) 8 x 24 V ⎓ fast inputs (sink)	10 transistor outputs (source) including 4 fast	7 modules max	1 RS 232/485 *(1)* (marked SL1)	–	**TM238 LDD24DT**	0.560
				1 RS 232/485 (marked SL1) 1 RS 485 *(1)* (marked SL2)	1	**TM238 LFDC24DT**	0.595
Compact bases, 100-240 V ∿ power supply							
24 I/O (removable battery to be ordered separately)	6 x 24 V ⎓ inputs (sink/source) 8 x 24 V ⎓ fast inputs (sink)	4 transistor outputs (source) and 6 relay outputs	7 modules max	1 RS 232/485 *(1)* (marked SL1)	–	**TM238 LDA24DR**	0.560
				1 RS 232/485 (marked SL1) 1 RS 485 *(1)* (marked SL2)	1	**TM238 LFAC24DR**	0.595

Separate parts

Designation	Use		Length Sold	Reference	Weight kg
Removable backup batteries	Lithium thionyl chloride type for Modicon™ M238™ compact bases TM238 L●●●●●		Individual	**TSX PLP 01**	0.012
			Pack of 10	**TSX PLP 101**	0.189
Terminal port/USB port cordset	From the mini B USB port on the Modicon M238 base to the type A USB port on the PC terminal for programming and updating firmware		3 m	**TCS XCN AMUM3P**	0.065
RS 232 serial link cordsets for DTE/DCE terminal device	1 RJ45 connector and one 9-way SUB-D connector	For DTE terminal (printer)	3 m	**TCS MCN 3M4F3C2**	0.150
		For DCE terminal (modem, converter)	3 m	**TCS MCN 3M4M3S2**	0.150
Removable spring connectors for digital I/O	Set of 5 removable spring connectors. Replaces the 5 screw connectors supplied with Modicon M238 compact bases		–	**TM238 RSSPT**	0.048
Shielding connection clamps	Attachment and grounding of the cable shielding Pack of 25 clamps including 20 clamps for Ø 4.8 mm cable and 5 for Ø 7.9 mm cable		Pack of 25	**TM200 RSRCEMC**	–
Modbus communication gateways	Connection of Modicon M238 base to network/bus	Modbus™/TCP	*(2)*	**499 TWD 01100**	0.200
		Profibus™ DP	*(3)*	**LUF P7**	0.245
		DeviceNet™	*(3)*	**LUF P9**	0.245
GSM/GPRS modem (DCE terminal)	4-band 900/1800 MHz (Europe) and 850/1900 MHz (United States) IP 31 casing supplied with: - 1.5 m power cable - SMA-M magnetic GSM 4-band aerial with 2.5 m cable - Mounted on panel or DIN rail 5.5 to 24 V ⎓ supply voltage		–	**SR2 MOD03**	0.335

Designation	Use From	To	Length	Reference	Weight kg
Modbus cables equipped with 2 RJ45 connectors	Serial port marked SL1/SL2	Ethernet gateway 499 TWD 01100	2.5 m	**XBT Z9980**	–
		Profibus DP LUF P7 or DeviceNet LUF P9, TSX CUSB 485 converter	1 m	**VW3 A8 306 R10**	0.050
			3 m	**VW3 A8 306 R30**	0.150
			0.3 m	**VW3 A8 306 R03**	0.030

(1) RS 485 link delivering a 5 V ⎓/200 mA power supply.
*(2) Connection to serial port SL1 on controllers **TM238 LDD24DT** and **TM238 LDA24DR** or to serial port SL2 on controllers **TM238 LFDC24DT** and **TM238 LFAC24DR** via Modbus cable **XBT Z9980** (to be ordered separately).*
*(3) Connection to serial port SL1 on controller controllers **TM238 LDD24DT** and **TM238 LDA24DR**, to serial port SL1 or SL2 on controllers **TM238 LFDC24DT** and **TM238 LFAC24DR** via Modbus cable **VW3 A8 306 R●●** (to be ordered separately).*
Requires a 24 V ⎓ external power supply.
Gateway configurable via the ABC Config Tool software, downloadable from our website www.schneider-electric.com

HMI ZSUSBB

TSX CUSB 485

References

Accessories

Designation	Description	Length	Reference	Weight kg
Remote location of the USB port for M238 controllers and XBT GT2●●0 to GT7340, GT1●●5, GK●●●, GTW●●● terminals	Used to locate the USB port of M238 controllers (front) and XBTG terminals (rear) remotely on panel or enclosure door (Ø 21 mm mounting device)	1 m	**HMI ZSUSBB**	0.100

Connection elements for RS 485 OS download port for M238 version V1.0 *(1)*

Designation	Use	Length	Reference	Weight kg
USB/RS 485 converter	Used to connect the RS 485 port (SL1) to the USB port on the PC to update the controller operating system. Requires Modbus cable VW3 A8 306 R●● for the connection at the controller end	0.4 m (integrated cable at PC end)	**TSX CUSB 485**	0.144

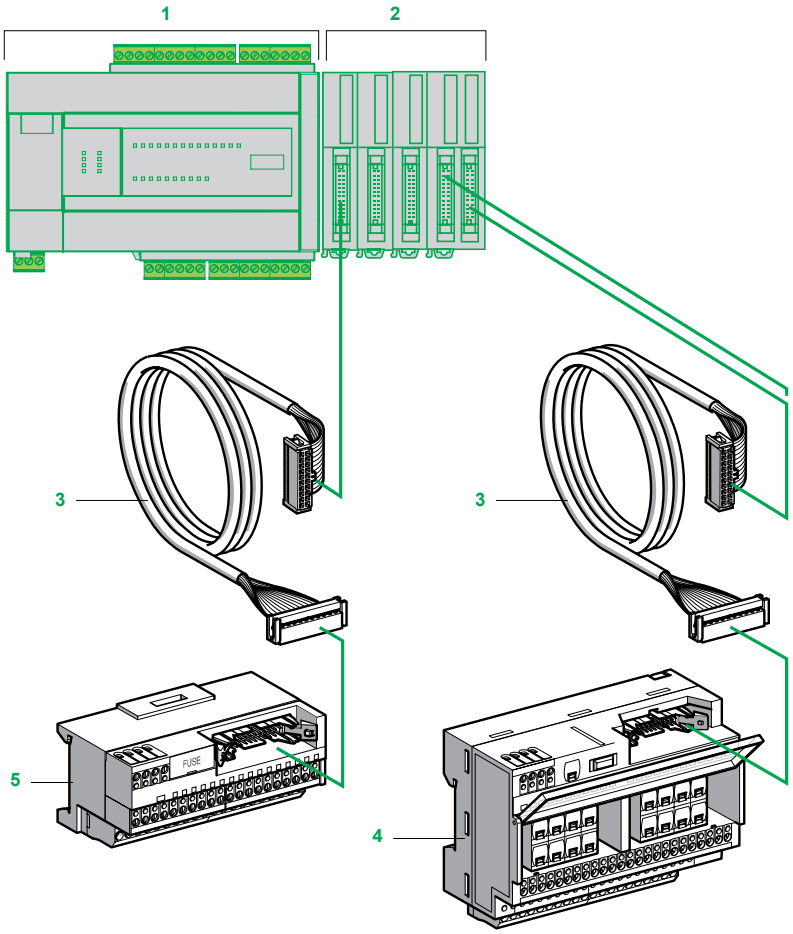
Replacement parts

Designation	Use	Reference	Weight kg
Removable screw connectors, supplied with Modicon™ M238™ compact bases	Set of 5 removable screw connectors for digital I/O	**TM238 RSSCT**	0.055
	One 5-way connector with line terminator for CANopen™ link	**TM238 CNTLSCT**	0.010

(1) For later versions, use the USB port and cable.

MachineStruxure™
Hardware control platforms
Modicon™ Telefast™ ABE 7 pre-wired system for Modicon™ M238™ logic controller

Introduction



1 Modicon™ M238™ logic controller.
2 **Discrete I/O** modules with 20-way HE 10 connectors. The modular sizes available are 16 or 32 I/O.
3 Cable (ABF T20E●●0) equipped with a 20-way HE 10 connector at each end. This cable is available in 0.5, 1, 2 and 3 m lengths (AWG 28/0.08 mm²).
4 16 channel sub-base (**ABE 7E16SPN22** or **ABE 7E16SRM20**) for output expansion modules.
5 16 channel sub-base (**ABE 7E16EPN20** or **ABE 7E16SPN20**) for input or output expansion modules.

Compatibility with I/O expansion modules

		Discrete I/O expansion modules	
		Inputs	Outputs (source)
		TM2 DDI 16DK (16 inputs) **TM2 DDI 32DK** (32 inputs)	**TM2 DDO 16TK** (16 outputs) **TM2 DDO 32TK** (32 outputs)
Terminal block types		HE 10 connectors, 20-ways	
Connection to I/O expansion modules		**ABF T20E●●0** (HE 10, 20-ways)	
Passive connection sub-bases			
16 channels	**ABE 7E16EPN20**	■	
	ABE 7E16SPN2●		■
Output adapter bases			
16 channels	**ABE 7E16SRM20**		■

■ Compatible

MachineStruxure™
Hardware control platforms
Modicon™ Telefast™ ABE 7 pre-wired system for Modicon™ M238™ logic controller

ABE 7E16EPN20

ABE 7E16SRM20

References

For discrete I/O expansion modules

Number of inputs	Type of inputs	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Sink ⎓ 24 V	TM2 DDI16DK, TM2 DDI32DK	No	No	**ABE 7E16EPN20**	0.430

Number of outputs	Type of outputs	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Source ⎓ 24 V	TM2 DDO16TK, TM2 DDO32TK	No	No	**ABE 7E16SPN20**	0.450
			Yes	Yes	**ABE 7E16SPN22**	0.450
	Relay ⎓ 24/∿ 250 V, 3 A	TM2 DDO16TK, TM2 DDO32TK	No	No	**ABE 7E16SRM20**	0.430

Connection cordset for discrete I/O expansion modules

Type of signal	Compatibility	Type of connection		Gauge/ C.s.a.	Length (1)	Reference	Weight kg
		TM2 side	Telefast side				
Discrete inputs/ outputs	TM2 DDI16DK, TM2 DDI32DK, TM2 DDO16TK, TM2 DDO32TK	HE 10 20-ways	HE 10 20-ways	AWG 28 0.08 mm²	0,5 m	**ABF T20E050**	0.060
					1 m	**ABF T20E100**	0.080
					2 m	**ABF T20E200**	0.140

Accessories

Description	Number of shunted terminals	Specifications	Sold in lots of	Unit reference	Weight kg
Optional snap-on terminal blocks	20	–	5	**ABE 7BV20**	0.060
	12 + 8	–	5	**ABE 7BV20TB**	0.060
Quick-blow fuses for ABE 7E16SPN22 sub-bases 5 x 20, 250 V, UL	–	0.125 A	10	**ABE 7FU012**	0.010
		0.315 A	10	**ABE 7FU030**	0.010
		1 A	10	**ABE 7FU100**	0.010
		2 A	10	**ABE 7FU200**	0.010

(1) For lengths > 2 m, please contact us.

Separate for connection components

Description	Type	Compatibility	Unit reference	Weight kg
Connectors Sold in lots of 5	HE 10 female 20-ways	TM2 DDI16DK, TM2 DDI32DK, TM2 DDO16TK, TM2 DDO32TK	**TWD FCN2K20**	–
Screw terminal blocks Sold in lots of 2	11-ways	TM2 DMM8DRT, TM2 AMI●●T, TM2 ARI8HT	**TWD FTB2T11**	–

Type of signal	Compatibility	Type of connection		Gauge/ C.s.a.	Length	Reference	Weight kg
		TM2 side	Other side				
Cables for discrete I/O	TM2 DDI16DK, TM2 DDI32DK, TM2 DDO16TK, TM2 DDO32TK	HE 10 20-ways	Bare wires	AWG 22 0.035 mm²	3 m	**TWD FCW30K**	0.405
					5 m	**TWD FCW50K**	0.670
Pre-formed cable, rolled	20 conductors	–	–	AWG 28 0.08 mm²	20 m	**ABF C20R200**	1.310

MachineStruxure™
Hardware control platforms
Modicon™ M258™ logic controller

Applications		**Industrial machines: packaging, conveying, material handling, textiles, food and beverage, woodworking, ceramics**	
		42 digital I/O	**42 digital I/O**
			
User memory	RAM	64 MB (program + data)	
	Flash	128 Mbytes	
Typical Boolean instruction time		22 ns	
User program size		128 program K instructions	
Power supply		24 V ⎓	
Channel connection		With removable spring terminal blocks (supplied)	
Inputs	Digital	26 x 24 V ⎓ inputs including 8 counter inputs (200 kHz)	
	Analog	–	
Digital outputs	Transistor	16 outputs (0.5 A) including 4 reflex outputs	
	Relay	–	
Built-in communication ports	USB-B mini-port	Programming port for SoMachine software	
	USB-A port	Connection of a USB memory stick for transferring programs, data files, firmware updates	
	RJ45 port (MBS)	RS232 serial link, RS485 serial link (supplies 250 mA, 5 V for HMI power supply) Protocols: Master/Slave Modbus™ ASCII/RTU, ASCII (character string)	
	SUB-D connector (male 9-way) (CAN0)	–	Master CANopen™ bus (32 slaves)
	RJ45 port (Ethernet)	Ethernet TCP IP, Web Server, FTP, Modbus TCP	
Optional communication ports		–	
Logic controller type		**TM258 LD42DT**	**TM258 LF42DT**
Page		2/20	2/20

42 digital I/O + 4 analog inputs	42 digital I/O + 4 analog inputs	42 digital I/O	66 digital I/O + 4 analog inputs
			
64 MB (program + data)			
128 Mbytes			
22 ns			
128 program K instructions			
24 V ⎓			
With removable spring terminal blocks (supplied)			
26 x 24 V ⎓ inputs including 8 counter inputs (200 kHz)			38 x 24 V ⎓ inputs including 8 counter inputs (200 kHz)
4 inputs + 10 V/- 10 V, 4-20 mA/0-20 mA, 12-bit resolution		–	4 inputs + 10 V/- 10 V, 4-20 mA/0-20 mA, 12-bit resolution
16 outputs (0.5 A) including 4 reflex outputs		4 reflex outputs (0.5 A)	28 outputs (0.5 A) including 4 reflex outputs
–		12	–
Programming port for SoMachine software			
Connection of a USB memory stick for transferring programs, data files, firmware updates			
RS232 serial link, RS485 serial link (supplies 250 mA, 5 V for HMI power supply) Protocols: Master/Slave Modbus™ ASCII/RTU, ASCII (character string)			
–	Master CANopen™ bus (32 slaves)		
Ethernet TCP IP Modbus slave, Web Server, FTP			
2 PCI slots available on controller for optional communication modules *(1)*			
TM258 LD42DT4L	**TM258 LF42DT4L**	**TM258 LF42DR**	**TM258 LF66DT4L**
2/20	2/20	2/21	2/21

(1) To be ordered separately.

MachineStruxure™
Hardware control platforms
Modicon™ M258™ logic controller

Modicon M258 logic controller

Introduction

Like the Modicon™ M238™ logic controller, the Modicon M258 logic controller is a compact, high-performance and fully expandable PLC. It is also a key element in the Flexible Machine Control approach, and an important component of MachineStruxure™, which brings you maximum flexibility and helps ensure an optimized control solution.
This PLC is designed for machine manufacturers (OEMs) focusing on applications such as packaging, conveying and storage, textiles and woodworking. It provides high-performance solutions for speed control, counting, axis control and communication functions.

Performance

In terms of performance, the Modicon M258 logic controller has a Dual-Core processor:
■ Core 1 is dedicated exclusively to managing program tasks and offers the maximum resources for real-time execution of the application code.
■ Core 2 is dedicated to executing communication tasks, which then have no further impact on the application execution performance.

The Modicon M258 logic controller has an execution speed of 22 ns for a Boolean instruction (i.e., more than 45,000 Boolean instructions per ms), the capacity to manage up to 2400 I/O, a 64 MB RAM memory that can store data and programs, as well as a 128 MB Flash memory for application and data backup. This enables the Modicon M258 logic controller to execute commands and operations rapidly.

The CPUs in the Modicon M258 logic controller come standard with:
■ 42 or 66 digital I/O
■ Embedded serial link and Ethernet port
■ 4 analog inputs (TM258 ●●●●4L references)

Development and technology

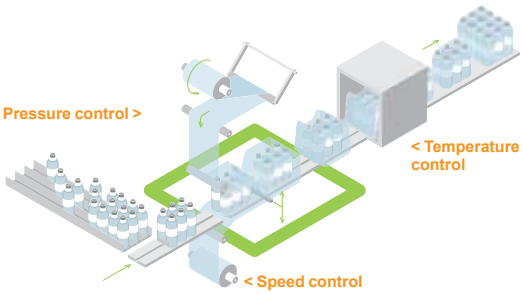
The Modicon M258 logic controller has been developed to minimize the costs of assembly, cabling, commissioning and maintenance.
To achieve this:
■ All the modules have removable terminals.
■ All the electrical connections are made on spring terminals, speeding up the wiring process and also avoiding the need for periodic retightening. In addition, each terminal has a test point for a voltage sensing device.
■ The embedded serial link and Ethernet port on the Modicon M258 logic controller have an RJ45 connection at 45° for quick visible connection of your communication channels.
■ The modularity of the various bases and expansion modules has been optimized in order to reduce significantly the number of references to be ordered and assembled, while ensuring the minimum investment in your configuration is necessary, thanks to a capacity of 2 to 42 channels per expansion module.
■ Mechanical assembly of the various parts has been designed to save a considerable amount of time during assembly.

Software configuration

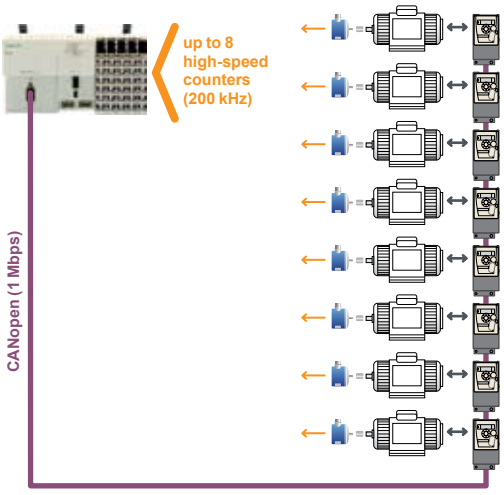
Configuration and programming of all M258 controllers and equipment in Schneider Electric's “Flexible Machine Control” concept are both designed to cut costs and optimize machine performance.
The SoMachine™ software offers six IEC 61131-3 programming languages:
□ Instruction List language (IL)
□ Ladder language (LD)
□ Function Block Diagrams (FBD)
□ Grafcet language (SFC)
□ Structured Text language (ST)
□ CFC language: Continuous Function Chart
This also includes PLCopen function blocks, for managing motion control and axis control on your machines.

Integration in the Schneider Electric product offer

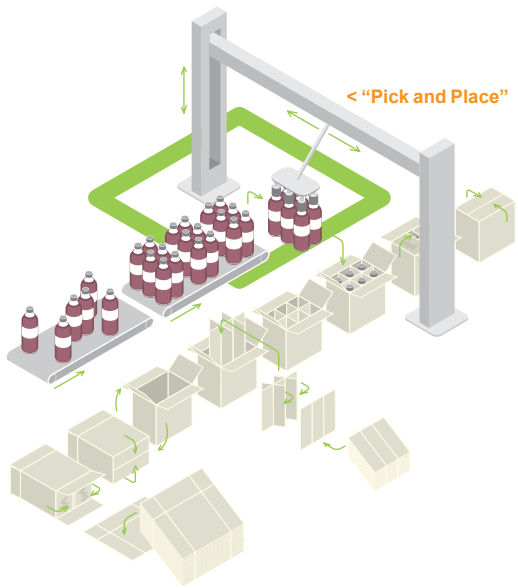
Combined with other products dedicated to machine manufacturers in the Schneider Electric offer, such as Altivar™ variable speed drives, Lexium servo drives, Magelis HMI terminals, TeSys motor starters and contactors, the Modicon M258 logic controller is now a must-have element in machine architectures, with unrivaled ease and speed of installation.



Analog functions



High-speed counter function (one-phase or two-phase)



Position control function

Functions

Analog functions

For machines that require functions to process data issued by analog sensors/actuators (voltage or current), temperature sensors or PID control sensors, a complete range of expansion modules as well as advanced programming functions are included in the Modicon™ M258™ logic controller offer.
In order to minimize the number of product references of your machines, optimize assembly time and cut costs, all M258 logic controllers with the reference **TM258 L●●●●4L** include as standard 4 voltage or current analog inputs with 12-bit resolution.
The different expansion modules are available in 2, 4 or 6-channel versions and with either 12 or 16-bit resolution.
The powerful performance of the M258 logic controller enables up to 200 analog I/O and/or temperature modules to be connected, thus extending the limits of machine requirements.

High-speed counter function (HSC)

In order to meet requirements for machine productivity, the Modicon M258 logic controller has 8 embedded high-speed counters with a counting frequency of 200 kHz for each channel as well as 4 reflex outputs. The availability of these embedded counters and also the presence of the Master CANopen link in **TM258L F●●●●** controllers makes it quick and easy to create low-cost, high-performance multi-axis functions.
With the availability of "PLCopen" function blocks specific to the motion control functions in the SoMachine™ software, you can be sure that the development of your applications will be done quickly and reliably.
Also, a complete range of high-speed counter modules is available so you can adapt your configuration to your machine's specific requirements.

Position control function

Several options are offered in terms of position control:
□ Either creating a sequence in Lexium 32 servo drives, with communication with the M258 logic controller achieved by the use of digital I/O
□ Or creating an application in the M258 logic controller and controlling Lexium 32 servo drives and/or SD3●● steppers via the integrated Master CANopen link available on **TM258L F●●●** bases.

Nota *Pick and Place function is available only on logic controllers* ***M258S0****: see page 5/5.*

Communication functions

Ethernet

All M258 logic controller references have an embedded RJ45 Ethernet port (10/100 Mbps, MDI/MDIX) with Ethernet TCP Modbus, EtherNet/IP™ Device, SoMachine on Ethernet, UDP, TCP and SNMP protocols.
In addition, all the M258 logic controllers have an embedded Web Server and FTP Server.
As well as the default address based on the MAC address, it is possible to assign a controller IP address via a DHCP server or via a BOOTP server.

CANopen

Depending on the reference, M258 logic controllers have an embedded CANopen master.
The link can be configured between 125 Kbps and 1 Mbps and supports up to 32 slaves.
Architectures based on CANopen can be used to distribute I/O modules as close to the sensors and actuators as possible, thus reducing wiring costs and times, and to communicate with different devices such as variable speed drives and servo drives.
The CANopen configurator is integrated in the SoMachine software and can also be used to import standard description files in EDS format.

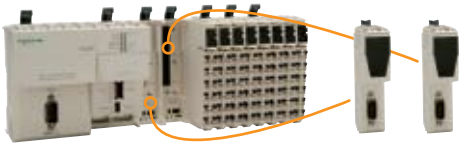
Modbus serial link

All M258 logic controllers have as standard a serial link that can be configured as either RS232/RS485 and incorporate the two most commonly used protocols on the market:
□ Master or Slave Modbus ASCII/RTU
□ Character string (ASCII)

2

TM258 LD42DT logic controller

TM258 LF42DT logic controller



TM258 LD42DT4L logic controller

TM5 PC●● communication modules

TM5 C compact block ▲

TM5 SD digital module

TM5 SA analog module

TM5 SE expert module

TM5 SPD Common Distribution module

TM5 SPS Power Distribution module

TM5 SBET1 transmitter module

TM5 SBER2 receiver module

Introduction

Product range

The Modicon™ M258™ logic controller product range is divided into two controller sizes:
- TM258 LD42DT and TM258 LF42DT are 175 mm wide.
- TM258 LD42DT4L, TM258 LF42DT4L, TM258 LF42DR, and TM258 LF66DT4L are at least 237.5 mm wide as they have two free PCI slots for optional communication modules (serial link).

The M258 logic controller product range is completed by an expansion module offer:
- Modicon TM5 Compact blocks
- Modicon TM5 Digital modules
- Modicon TM5 Analog modules
- Modicon TM5 Expert modules
- Modicon TM5 Common Distribution modules
- Modicon TM5 Power Distribution modules
- Modicon TM5 Transmitter and receiver modules

Functions

The main component in a system is the controller: six M258 logic controller models are offered to cover different control requirements (pressure, temperature, counting, speed, position control, motion).
M258 logic controllers and I/O modules are programmed with the SoMachine software.

Reference	Embedded functions
TM258 LD42DT, **TM258 LD42DT4L**	■ 42 digital I/O including 8 high-speed counters (200 kHz) ■ Depending on the reference, 4 voltage/current analog inputs can be added
TM258 LF42DT, **TM258 LF42DT4L,** **TM258 LF42DR,** **TM258 LF66DT4L**	■ 42 or 66 digital I/O including 8 high-speed counters (200 kHz) ■ Depending on the reference, 4 voltage/current analog inputs can be added ■ Up to 16 independent axes ■ CANopen master

All M258 controllers have two groups of high-speed I/O with, for each group:
- Four sink type high-speed inputs (up to 200 KHz), 2 standard inputs and 2 source type high-speed outputs (up to 100 KHz) dedicated to HSC or PWM functions
- High-speed input which can be used as an “Encoder capture input”
- Two commons for the inputs
- One common for the outputs
- Power supply (24 V ⎓) consisting of 3 units:
  - One for the CPU
  - One for the high-speed I/O modules
  - One for other modules (internal I/O Bus)

Conformity to standards

Type		Performance
Surge immunity 24 VDC circuit	EN/IEC 61000-4-5	1 kV in common mode
		0.5 kV in differential mode
Surge immunity 230 VAC circuit	EN/IEC 61000-4-5	2 kV in common mode
		1 kV in differential mode
Induced electromagnetic field	EN/IEC 61000-4-6	10 Veff (0.15 to 80 MHz)
Conducted emission	EN 55011 (IEC/CISPR11)	150 to 500 kHz, quasi peak 79 dBµV
		500 kHz to 30 MHz, quasi peak 73 dBµV
Radiated emission	EN 55011 (IEC/CISPR11)	30 to 230 MHz, 10 m @ 40 dBµV/m
		230 MHz to 1 GHz, 10 m @ 47 dBµV/m

Assembly and mounting

The components of this system have been designed for simple interlocking mechanical assembly.
An 8-way expansion bus connection (2 for the power supply, 2 for the bus and 4 for the data) is used to distribute data and the power supply when assembling the components: the M258 controller with compact blocks and modules (Digital, Analog, Expert, Common Distribution, Power Distribution, and Expansion Bus).
All the elements which make up the system are mounted and dismounted on a symmetrical rail using the locking levers located on top of each device.

Wiring and maintenance of devices is simplified since they are fitted with removable spring terminals. The spring terminals are undone by pressing a locking tab.

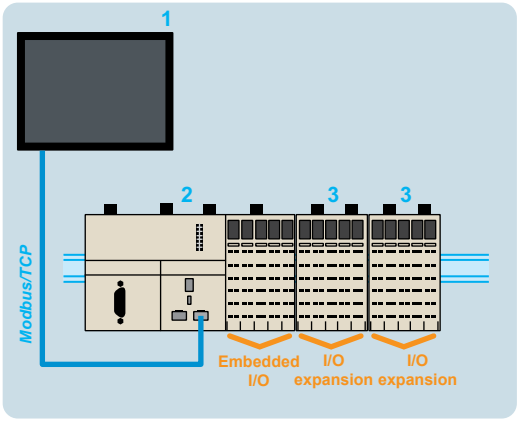
The system is integrated into communication networks: All of the connectors (RJ45, USB, mini-USB and SUB-D type depending on the model) are accessible, as they are located on the controller front panels.

Local or remote architecture

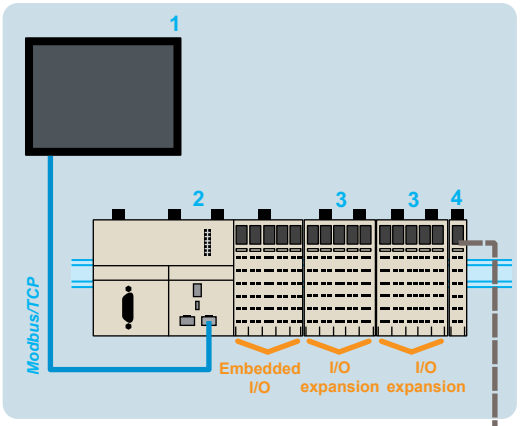
Local I/O

A PLC configuration can be local or remote. It consists of an M258 controller with its embedded input and output channels, used in conjunction with compact blocks and/or modules which are used to increase the number of channels and/or "Application-specific" functions.

■ Compact blocks represent a way of adding a large number of I/O with a single reference. This possibility reduces both the cost per channel, and also assembly times. These compact blocks are available in 4 references offering a high level of flexibility in configurations.
■ I/O modules (a combination of a bus base, an electronic module and a terminal block) complete this configuration and, being modular with between 2 and 12 channels, make it possible to adjust the number of channels to exactly that required. Addition of digital or analog modules, temperature or high-speed modules increases the processing capabilities of applications.



Local I/O

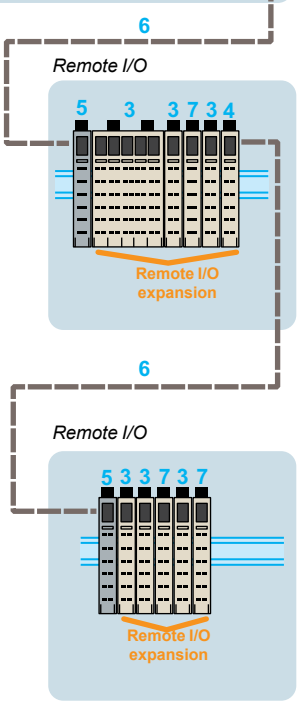


Configuration of local I/O
1 XBT GT supervision graphic touch screen terminal
2 M258 controller
3 Compact blocks or modules

Remote I/O

Because of its backplane bus management, the TM5 system can be used to control I/O remotely.
The same modules can be used in either a local and/or remote configuration, linked together with expansion bus cables.
The total maximum distance between 2 remote islands is 100 m and the maximum number of islands is 25, i.e. a total distance of up to 2500 m.

This function ensures a high level of flexibility, while retaining **synchronization of all data acquisition**, since all the expansion modules are on the same backplane bus.



Configuration of remote I/O
1 XBT GT supervision graphic touch screen terminal
2 M258 controller
3 Compact blocks or modules
4 Transmitter modules
5 Receiver modules
6 TM5 expansion bus cables
7 Common distribution modules

2

Communication

M258 logic controllers have the following built-in communication ports:

References	Communication ports	Use
TM258 LD42DT, TM258 LD42DT4L	RJ45 Configurable as RS232 or RS485	ASCII or RTU exchange with Modbus™ communication protocol
	1 x RJ45 (MDI/MDIX port)	□ FTP server □ Web server □ Modbus TCP server □ Modbus TCP client □ Manager SoMachine □ SNMP □ EtherNet/IP™ device □ Modbus device
	1 x USB-A	Connection of a USB memory stick for transferring (uploading/ downloading) programs, data and/ or firmware
	1 x mini-USB	Programming port (480 Mbps)
	2 PCI slots for communication module = 2 x 9-way male SUB-D	Optional addition of communication module for a serial link *(1)*
TM258 LF42DT, TM258 LF42DT4L, TM258 LF42DR, TM258 LF66DT4L	1 x RJ45 Configurable as RS232 or RS485	ASCII or RTU exchange with Modbus communication protocol
	1 x RJ45 (MDI/MDIX port)	□ FTP server □ Web server □ Modbus TCP server □ Modbus TCP client □ Manager SoMachine □ SNMP □ EtherNet/IP™ device □ Modbus device
	1 x USB-A	Connection of a USB memory stick for transferring (uploading/ downloading) programs, data and/ or firmware
	1 x mini-USB	Programming port (480 Mbps)
	1 x 9-way male SUB-D	Master CANopen™ connection
	2 PCI slots for communication module = 2 x 9-way male SUB-D	Optional addition of communication module for a serial link *(2)*

Embedded Ethernet

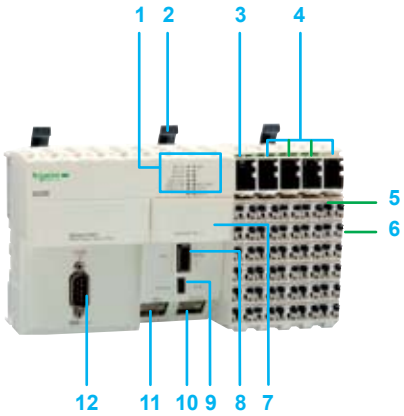
M258 logic controllers have an embedded Ethernet link via a direct connection to their RJ45 port.

- □ Speed: “10 BaseT” and “100 BaseTX” with auto-negotiation
- □ RJ45 port (MDI/MDIX): automatic adaptation to a straight or crossed cable

References	Protocols	Number of connections
TM258 LD42DT, TM258 LD42DT4L, TM258 LF42DT, TM258 LD42DT4L, TM258 LF42DR, TM258 LF66DT4L	Modbus server	8
	Modbus device	2
	EtherNet/IP™ device	16
	FTP server	4
	Web server	10

(1) Only on TM258 LD42DT4L.
(2) Only on TM258 LF●●4L and TM258 LF42DR.

MachineStruxure™
Hardware control platforms
Modicon™ M258™ logic controller

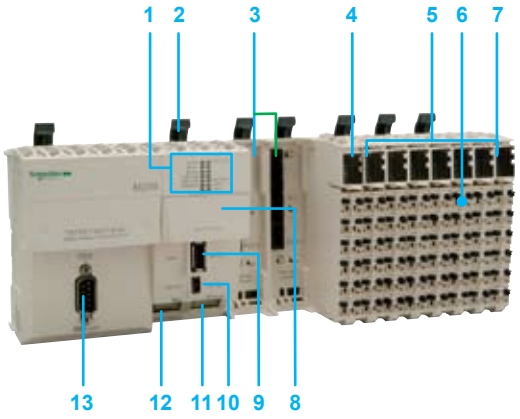


Description

The TM258 LD42DT and TM258 LF42DT logic controllers include:

1 Display block with:
- 4 controller status LEDs (RUN/MS, BATTERY, APP0 and APP1)
- 6 built-in communication port status LEDs (Eth LA, Eth ST, Eth NS, USB Host, MBS COM, CAN 0 STS)

2 Locking lever for mounting/dismounting on DIN symmetrical rail.
3 24 V ⎓ power supply module with removable terminal block and locking lever, display block and slot for a label.
4 I/O modules, each one with: a removable terminal block with locking lever, a display block showing the I/O states and a slot for a label-holder.
5 Removable terminal block with locking lever for locking/unlocking.
6 On the side, an expansion bus connection for the link with the next module.
7 Slot for the RTC (Real Time Clock) battery.
8 USB-A connector (marked Host) for connection of a USB memory stick for transferring programs, data or firmware updates.
9 USB-B mini-connector (marked Pgr Port) for connection to the programming PC
10 RJ45 connector (marked Ethernet) for connection to the Ethernet network and/or connection to the Magelis™ XBT GT graphic terminal.
11 RJ45 connector (marked MBS) for the RS232 or RS485 serial link.
12 9-way male SUB-D connector, marked CAN 0, for connection to the CANopen™ bus (TM258 LF42DT only).



The TM258 LD42DT4L/LF42DT4L/LF42DR/LF66DT4L logic controllers include:

1 Display block with:
- 4 controller status LEDs (RUN/MS, BATTERY, APP0 and APP1)
- 6 built-in communication port status LEDs (Eth LA, Eth ST, Eth NS, USB Host, MBS COM, CAN 0 STS)

2 Locking lever for mounting/dismounting on DIN symmetrical rail.
3 Two free PCI slots for the communication module.
4 24 V ⎓ power supply module with removable terminal block and locking lever, display block and slot for a label.
5 I/O modules, each one with: a removable terminal block with locking lever, a display block showing the I/O states and a slot for a label-holder.
6 Removable terminal block with locking lever for locking/unlocking.
7 On the side, an expansion bus connection for the link with the next module.
8 Slot for the RTC (Real Time Clock) battery.
9 USB-A connector (marked Host) for connection of a USB memory stick for transferring programs, data or firmware updates.
10 USB-B mini-connector (marked Pgr Port) for connection to the programming PC.
11 RJ45 connector (marked Ethernet) for connection to the Ethernet network and/or connection to the Magelis XBT GT graphic terminal.
12 RJ45 connector (marked MBS) for the RS232 or RS485 serial link.
13 9-way male SUB-D connector, marked CAN 0, for connection to the CANopen bus (TM258 LF42DT4L, TM258 LF42DR and TM258 LF66DT4L only).

MachineStruxure™
Hardware control platforms
Modicon™ M258™ logic controller

References

Logic controllers, 24 V ⎓ power supply *(1)*

Nbr. of I/O	Inputs	Outputs	Built-in communication ports	Reference	Weight kg
42 I/O	■ 26 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz)	■ 16 transistor digital outputs (0.5 A) including 4 reflex outputs	□ 1 RJ45 port: Ethernet □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link	**TM258 LD42DT**	0.500
			□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen master □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link	**TM258 LF42DT**	0.550
42 + 4 I/O	■ 26 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz) ■ 4 analog inputs 10 V/- 10 V, 4-20 mA/0-20 mA, 12-bit resolution	■ 16 digital transistor outputs (0.5 A) including 4 reflex outputs	□ 1 RJ45 port: Ethernet □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link □ + 2 free PCI slots for optional communication module *(2)*: RS232/RS485 serial link	**TM258 LD42DT4L**	0.770
			□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen™ master □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link □ + 2 free PCI slots for optional communication module *(2)*: RS232/RS485 serial link	**TM258 LF42DT4L**	0.770
42 I/O	■ 26 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz)	■ 4 digital transistor (reflex) outputs (0.5 A) ■ 12 relay outputs	□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen master □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link □ + 2 free PCI slots for optional communication module *(2)*: RS232/RS485 serial link	**TM258 LF42DR**	0.800
66 + 4 I/O	■ 38 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz) ■ 4 analog inputs + 10 V/- 10 V, 4-20 mA/0-20 mA, 12-bit resolution	■ 28 digital transistor outputs (0.5 A) including 4 reflex outputs	□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen master □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link □ + 2 free PCI slots for optional communication module *(2)*: RS232/RS485 serial link	**TM258 LF66DT4L**	0.800

TM258LD42DT

TM258LF42DT

TM258LD42DT4L

TM258LF42DT4L

TM258LF42DR

TM258LF66DT4L

(1) The Modicon™ M258™ logic controllers require a power supply with a nominal voltage of 24 V ⎓.
The 24 V ⎓ power supply must be rated Separated Extra Low Voltage (SELV-rated) according to IEC 61140.
The SELV-rating means that SELV isolation is provided between the electrical input and output of the power supply.
(2) To be ordered separately.


TM5 ACTLC100


TM5 ACTCH100

TM5 ACLITW1


TM5 ACLT1

References

Accessories

Type	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030

Connection cables

Description	Use from	to	Length	Reference	Weight kg
Software programming cable Baud rate: 480 Mbps max. Protocol: Modbus™, HTTP, FTP, Code sys or virtual, non-isolated	PC USB port	USB mini-port on M258 controllers, the Altivar™ IMC card or XBT GT graphic touch screen terminals	3 m	**TCS XCN AM UM3P**	0.065
Programming cable	PC USB port	USB-B mini-port on M258 controllers	1.8 m	**BMX XCA USB H018**	0.230
RS485 serial link cables Modbus protocol	SUB-D port (25-way) on Small Panel compact display units: XBT N401, XBT N410, XBT R410, XBT R411, XBT GT2 to GT7	RJ45 port on M258 controllers	1.8 m	**XBT Z938**	0.230
	RJ45 port on XBT GT graphic touch screen terminals	RJ45 port on M258 controllers	2.5 m	**XBT Z9980**	0.230
RS232 serial link cables Character mode	SUB-D port (9-way female) on DTE equipment *(1)*: printer, hand-held bar code reader	RJ45 port on M258 controllers	3 m	**TCS MCN 3M4F3C2**	0.150
	SUB-D port (9-way female) on DCE equipment *(2)*: GSM modem	RJ45 port on M258 controllers	3 m	**TCS MCN 3M4M3S2**	0.150

(1) DTE: Data Terminal Equipment.
(2) DCE: Data Communication Equipment.

MachineStruxure™
Hardware control platforms
Modicon™ LMC058 motion controller

Applications		**Industrial machines: packaging, conveying, material handling, assembly, wood and metal working, ceramics**
		42 digital I/O

User memory	RAM	64 MB (program + data)
	Flash	128 MB
Typical Boolean instruction time		22 ns
User program size		128 program Kinstructions
Power supply		24 V ⎓
Channel connection		Via removable spring terminal blocks (supplied)
Inputs	Digital	26 x 24 V ⎓ inputs including 8 counter inputs (200 kHz)
	Analog	–
Digital outputs	Transistor	16 outputs (0.5 A) including 4 reflex outputs
	Relay	–
Built-in communication ports	USB-B mini-port	Programming port for SoMachine V2.0 software
	USB-A port	Connection of a USB memory stick for transferring programs, data files, firmware updates
	RJ45 port (MBS)	RS232 serial link RS485 serial link (supplies 250 mA, 5 V for HMI power supply) Protocols: Modbus™ ASCII/RTU Master/Slave, ASCII (character string)
	SUB-D connector (9-way male) (CAN0)	CANopen bus master (32 slaves)
	SUB-D connector (9-way male) (CAN1)	CANmotion bus master (32 slaves)
	SUB-D connector (15-way female) (Encoder)	Encoder input (incremental or SSI)
	RJ45 port (Ethernet)	Ethernet TCP IP, Web Server, FTP, Modbus TCP
Optional communication ports		–
Motion controller type		**LMC058 LF42**
Page		2/32

Industrial machines: packaging, conveying, material handling, assembly, wood and metal working, ceramics
42 digital I/O + 4 analog inputs

64 MB (program + data)
128 MB
22 ns
128 program Kinstructions
24 V ⎓
Via removable spring terminal blocks (supplied)
26 x 24 V ⎓ inputs including 8 counter inputs (200 kHz)
4 inputs + 10 V/- 10 V, 4-20 mA/0-20 mA 12-bit resolution
16 outputs (0.5 A) including 4 reflex outputs
–
Programming port for SoMachine V2.0 software
Connection of a USB memory stick for transferring programs, data files, firmware updates
RS232 serial link, RS485 serial link (supplies 250 mA, 5 V for HMI power supply) Protocols: Modbus™ ASCII/RTU Master/Slave, ASCII (character string)
CANopen bus master (32 slaves)
CANmotion bus master (32 slaves)
Encoder input (incremental or SSI)
Ethernet TCP IP Modbus slave, Web Server, FTP
2 PCI slots available on controller for optional communication modules *(1)*
LMC058 LF424
2/32

(1) To be ordered separately

MachineStruxure™
Hardware control platforms
Modicon™ LMC058 motion controller

Modicon LMC058 motion controller

Introduction

The Modicon™ LMC058 motion controller is the optimum solution for axis control and positioning, including automation functions. It is also a key element in the Flexible Machine Control approach, and an important component of MachineStruxure™, which brings you maximum flexibility and helps ensure an optimized control solution. The Modicon LMC058 motion controller meets the needs of a wide range of applications in all business sectors.

This motion controller is designed for machine manufacturers (OEMs) who require synchronized axes, focusing on applications such as packaging, conveying and storage machines, metal and wood working machines – and offers high-performance solutions for velocity control, counting, axis control and communication functions.
To achieve this, the LMC058 master motion controller includes as standard:
- A CANopen™ master
- A CANmotion™ master dedicated to control of up to 8 synchronized axes, with a performance of 2 ms for 4 axes

With Modicon LMC058 motion controllers, Lexium™ 32 and Lexium SD3 drives, and BSH and BDH servo motors, Schneider Electric offers a complete, high-performance and cost-effective solution.

Applications

The Modicon LMC058 motion controller performs axis synchronization and coordination, via a fieldbus, for applications requiring control of up to 8 synchronized axes.

It integrates the standard motion control functions, including:
- Velocity control and torque control
- Relative or absolute positioning
- Cam profiles for slave axes and control of programmable cam switches
- Virtual axes
- Electronic gearing function for velocity and position, linear and circular interpolations (2½D)
- Master axis using an external encoder
- Distance measurement and position capture on high-speed (30 µs) digital input

The Modicon LMC058 motion controller is specifically designed for applications such as:
- Material handling machines (conveyors, palletizers, storage and retrieval systems) and transfer machines (cranes)
- Assembly machines (tool mounting, clamping)
- Inspection and quality control machines
- Packaging machines working “on the fly” (flying shear, printing, marking)
- Wood and metal working machines

Performance

In terms of performance, the Modicon LMC058 motion controller has a Dual-Core processor:
- Core 1 is dedicated exclusively to managing program tasks and offers the maximum resources for real-time execution of synchronized axis control and the application code.
- Core 2 is dedicated to executing communication tasks, which then have no further impact on the application execution performance.

Execution of the Motion task is synchronized with the CANmotion bus cycle time. This task calculates the position of the synchronized axes and is programmed with SoMachine™ software, which offers six IEC 61131-3 programming languages:
- Instruction List (IL)
- Ladder (LD)
- Function Block Diagram (FBD)
- Grafcet (SFC)
- Structured Text (ST)
- Continuous Function Chart (CFC)

The ease of use of PLCopen function blocks significantly reduces the time taken to program motion control and control independent and synchronized axes on machines.
The ability to combine motion functions with standard automation functions offers both maximum flexibility and a high level of performance. The LMC058 master motion controller is able to control synchronization of real, remote and virtual axes.

Performance (continued)

To improve the performance and reliability of your machines, the LMC058 motion controller has a 15-way SUB-D connection for a master encoder (incremental or SSI). With an execution speed of 22 ns for a Boolean instruction (i.e., more than 45,000 Boolean instructions per ms), the capacity to manage up to 2400 I/O, a 64 MB RAM that can store data and programs as well as a 128 MB Flash memory for application and data backup…the Modicon™ LMC058 motion controller greatly enhances your machine's capabilities.
The CPUs in the Modicon LMC058 motion controller come standard with:
- 42 digital I/O
- Embedded serial link and Ethernet port
- 4 analog inputs (reference LMC058 LF424)
- CANopen™ master
- CANmotion™ master

Development and technology

The Modicon LMC058 motion controller has been developed to minimize the costs of assembly, cabling, commissioning and maintenance.
To achieve this:
- All the modules have removable terminals.
- All the electrical connections are made on spring terminals, speeding up the wiring process and also avoiding the need for periodic retightening. In addition, each terminal has a test point for a voltage sensing device.
- The embedded serial link and Ethernet port on the Modicon LMC058 motion controller have an RJ45 connection at 45° for quick visible connection of the communication channels.
- The modularity of the various bases and expansion modules has been optimized in order to significantly reduce the number of references to be ordered and assembled, while ensuring the minimum investment in your configuration is necessary, thanks to a capacity of between 2 and 42 channels per expansion module.
- Mechanical assembly of the various parts has been designed to save a considerable amount of time during assembly.

Software configuration

Configuration and programming of all Modicon LMC058 motion controllers and equipment in Schneider Electric's "Flexible Machine Control" concept are both designed to cut costs and optimize machine performance, using SoMachine software.

To reduce the configuration time of device, a selection of function blocks is available in the "Motion Library":
- Library for Altivar™ drives on CANopen
- Lexium™ library for Lexium 32 and Lexium SD3 on CANopen and CANmotion
- Lexium library for the whole ILx range on CANopen

This PLCopen-compliant library consists of administrative function blocks (read/write parameters, states) and single-axis and multi-axis function blocks.
The main functions are as follows:
- Power On, stop, reset
- Relative, absolute or additional positioning
- Continuous positioning (reaching a position at a predefined speed)
- Velocity control
- Velocity profile
- Position profile
- Cam profile
- Electronic gearing
- Phasing
- Programmable cam switch
- Linear or circular interpolation

User library
With SoMachine™ software, it is very easy to create your own function blocks (user library) to reduce programming times. Creating a user library simplifies the standardization and reuse of programs and also allows the user to protect proprietary information.

SoMachine software platform

2

Application function blocks (AFB)

AFB is a library of functions developed specifically by Schneider Electric. It contains application functions currently encountered in applications in the fields of assembly, material handling and cut-to-length. Each function block has a large number of mechanical and application variants.
The use of function blocks:
- Saves programming time
- Saves setup time
- Simplifies reading

The function blocks available in the library are:
- Flying shear
- Rotary knife
- Grouping/ungrouping
- Clamping with torque control

*Nota: AFB are available only on the type S motion controllers : **LMC058●●●S0** with SoMachine™ extension. See page 5/5.*

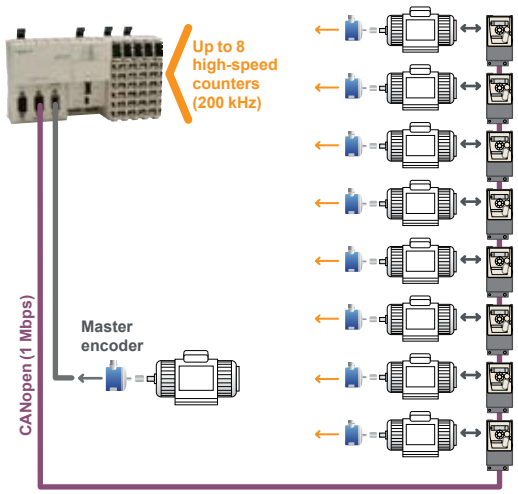
Functions

Analog functions

For machines that require functions to process data issued by analog sensors/ actuators (voltage or current), temperature sensors or PID control sensors, a complete range of expansion modules as well as advanced programming functions are included in the motion controller Modicon™ LMC058 offer.

In order to minimize the number of machine product references, optimize assembly time and cut costs, the LMC058 LF424 motion controller includes 4 voltage or current analog inputs with 12-bit resolution as standard.

The different expansion modules are available in 2, 4 or 6-channel versions and with either 12 or 16-bit resolution.
The powerful performance of the LMC058 motion controller enables up to 200 analog I/O and/or temperature modules to be connected, thus extending the limits of machine requirements.

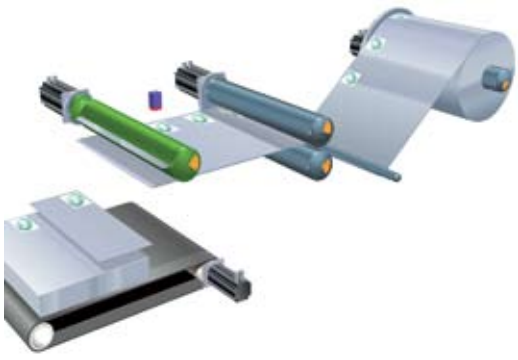


High-speed counter function (one-phase or two-phase)

High-speed counter function (HSC)

In order to meet requirements for machine productivity, the LMC058 motion controller has 8 embedded high-speed counters with a counting frequency of 200 kHz for each channel and 4 reflex outputs.
These embedded counters, together with the CANopen master link, make it quick and easy to create cost-effective, high-performance multi-axis functions to suit the machines' limitations.

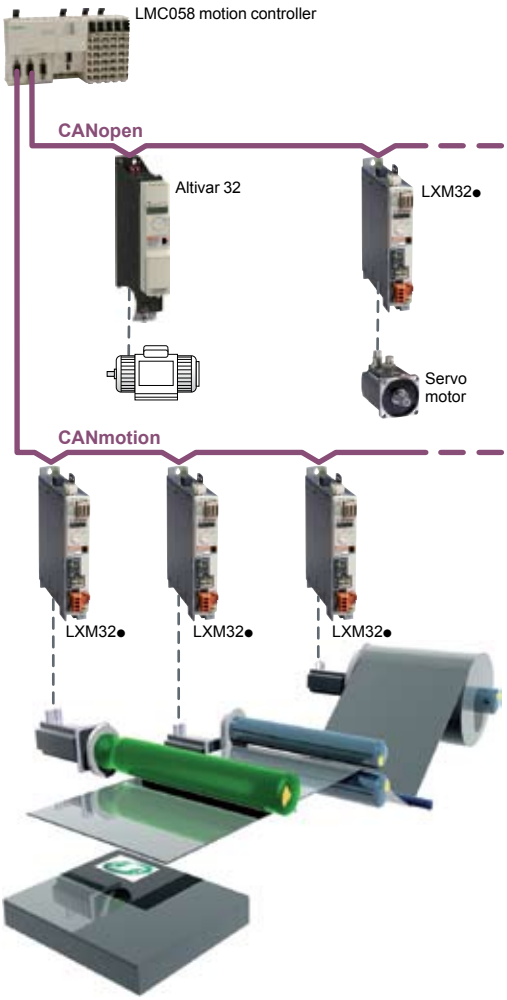
With the availability of PLCopen function blocks specific to the motion control functions in the SoMachine software, you can be sure that the development of your applications will be done quickly and reliably.
Also, a complete range of high-speed counter modules is available so you can adapt your configuration to your machine's specific requirements.



Lexium 32 servo drives: monitoring cutting to length

Position control function

Several options are offered in terms of position control:
□ Creating a sequence in Lexium 32 servo drives, with communication with the LMC058 motion controller achieved by the use of digital I/O
□ Creating an application in the LMC058 motion controller and controlling Lexium 32 drives and servo drives and/or Lexium™ SD3 stepper drives via the integrated CANopen™ master link available on LMC058 motion controllers (in this case the Motion tasks are independent axis Motion tasks)
□ Creating an application in the LMC058 motion controller and controlling the Lexium 32 drives and servo drives and/or Lexium SD3 stepper drives via the integrated CANmotion master link available on all LMC058 motion controllers (in this case the Motion tasks are independent and/or synchronized axis Motion tasks - cam profiles, electronic gearing, interpolation)



Ethernet communication

All motion controller Modicon™ LMC058 references have an embedded RJ45 Ethernet port (10/100 Mbps, MDI/MDIX) with Ethernet TCP Modbus™, EtherNet/IP™ Device, SoMachine™ on Ethernet, UDP, TCP and SNMP protocols.

In addition, all the LMC058 motion controllers have an embedded Web Server and FTP Server. As well as the default address based on the MAC address, it is possible to assign a motion controller IP address via a DHCP server or BOOTP server.

CANmotion™/CANopen™ communication

The CANopen machine bus is now very widely used in industry because of its high performance. In accordance with international standard ISO 11898 promoted by the CAN in Automation association of users and manufacturers, it offers a high level of openness and interoperability thanks to its standardized communication and equipment profiles.
CANmotion and CANopen buses use a double shielded twisted pair. Each end of the bus must be equipped with a line terminator.
A staged CANmotion and CANopen connectivity solution reduces costs and optimizes your architecture, thanks to:
- Reduced cabling time
- Greater reliability of the cabling
- Flexibility to add or remove a device

CANmotion

All Modicon LMC058 motion controller references have an embedded CANmotion master.
This bus is dedicated to synchronizing the drives (conforming to standard CiA DSP 402, the Device Profile for Drives and Motion Control).
This CANmotion link can be configured between 250 kbps and 1 Mbps, and offers the option of configuring and controlling up to 8 Lexium™ 32 servo drives and/or Lexium SD3 stepper drives.
The CANmotion bus cycle time ensures that the axis positions will be refreshed.
To ensure maximum performance on the motion bus, we recommend using a daisy chain cabling architecture.

CANopen

All Modicon LMC058 motion controller references have an embedded CANopen master.
This bus is dedicated to expansion of the automation capabilities, such as the I/O, drives and encoders.
The link can be configured between 125 kbps and 1 Mbps and supports up to 32 slaves. Architectures based on CANopen can be used to distribute I/O modules as close to the sensors and actuators as possible, thus reducing wiring costs and times, and to communicate with different devices such as variable speed drives and servo drives.
The CANopen configurator is integrated in the SoMachine software and can also be used to import standard description files in EDS format.

Modbus communication

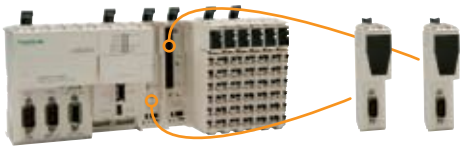
All motion controllers Modicon LMC058 have a serial link as standard that can be configured as either RS232 or RS485 and incorporates the two most commonly used protocols on the market:
- Modbus ASCII/RTU Master or Slave
- Character string (ASCII)

Integration in the Schneider Electric product offer

Combined with other products dedicated to machine manufacturers in the Schneider Electric offer, such as Altivar™ variable speed drives, Lexium servo drives, Magelis HMI terminals, TeSys motor starters and contactors, the Modicon LMC058 motion controller is now a must-have element in machine architectures, with unrivaled ease and speed of installation.

2

LMC058 LF42 motion controller



LMC058 LF424 motion controller

TM5 PC●● communication modules

TM5 C compact block ▲

TM5 SD digital module

TM5 SA analog module

TM5 SE Expert module

TM5 SPD Common Distribution module

TM5 SPS Power Distribution modules

TM5 SBET1 transmitter module

TM5 SBER2 receiver module

Introduction

Product range

The LMC058 motion controller range is divided into two sizes:
- The LMC058 LF42 motion controller is 177 mm wide.
- The LMC058 LF424 motion controller is 237.5 mm wide as it has two free PCI slots for optional communication modules (serial link).

This range is completed by an extensive expansion module offer:
- Modicon™ TM5 Compact blocks
- Modicon TM5 Digital modules
- Modicon TM5 Analog modules
- Modicon TM5 Expert modules
- Modicon TM5 Common Distribution modules
- Modicon TM5 Power Distribution modules
- Modicon TM5 Transmitter and receiver modules

Functions

The main component in a system is the motion controller. Two LMC058 motion controller models are offered to cover different control requirements (pressure, temperature, counting, velocity, positioning, motion). LMC058 motion controllers and I/O modules are programmed using SoMachine™ software.

Reference	Embedded functions
LMC058 LF42	■ 42 digital I/O including 8 high-speed counters (200 kHz) ■ CANopen master ■ CANmotion master
LMC058 LF424	■ 42 digital I/O including 8 high-speed counters (200 kHz) ■ 4 voltage/current analog inputs ■ CANopen master ■ CANmotion master

All LMC058 motion controllers have two groups of high-speed I/O with, for each group:
- Four sink type high-speed inputs (up to 200 kHz), 2 standard inputs and 2 source type high-speed outputs (up to 100 kHz) dedicated to HSC or PWM functions
- A high-speed input which can be used as an “Encoder capture input”
- Two commons for the inputs
- One common for the outputs
- Power supply (24 V ⎓) consisting of 3 units:
  - One for the CPU
  - One for the high-speed I/O modules
  - One for other modules (internal I/O Bus).

Conformity to standards

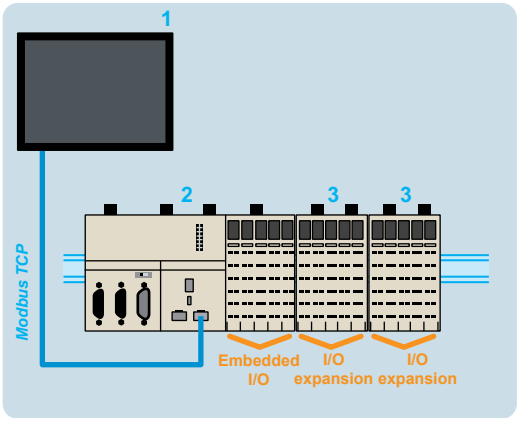
Type		Performance
Surge immunity 24 VDC circuit	EN/IEC 61000-4-5	1 kV in common mode
		0.5 kV in differential mode
Surge immunity 230 VAC circuit	EN/IEC 61000-4-5	2 kV in common mode
		1 kV in differential mode
Induced electromagnetic field	EN/IEC 61000-4-6	10 Veff (0.15 to 80 MHz)
Conducted emission	EN 55011 (IEC/CISPR11)	150 to 500 kHz, quasi peak 79 dBµV
		500 kHz to 30 MHz, quasi peak 73 dBµV
Radiated emission	EN 55011 (IEC/CISPR11)	30 to 230 MHz, 10 m @ 40 dBµV/m
		230 MHz to 1 GHz, 10 m @ 47 dBµV/m

Assembly and mounting

The components of the Modicon™ LMC058 motion controller system have been designed for simple interlocking mechanical assembly.
An 8-way expansion bus connection (2 for the power supply, 2 for the bus and 4 for the data) is used to distribute data and the power supply when assembling the components: the LMC058 motion controller with compact blocks and modules (Digital, Analog, Expert, Common Distribution, Power Distribution, and Expansion Bus).
All the elements which make up the system are mounted on a symmetrical rail using the locking levers located on top of each device.

Wiring and maintenance of devices is simplified by the use of removable spring terminals. The spring terminals are undone by pressing a locking tab.

The system is integrated into communication networks. All connectors (RJ45, USB, mini-USB and SUB-D type) are accessible, as they are located on the motion controller front panels.



Local I/O

Local or remote architecture

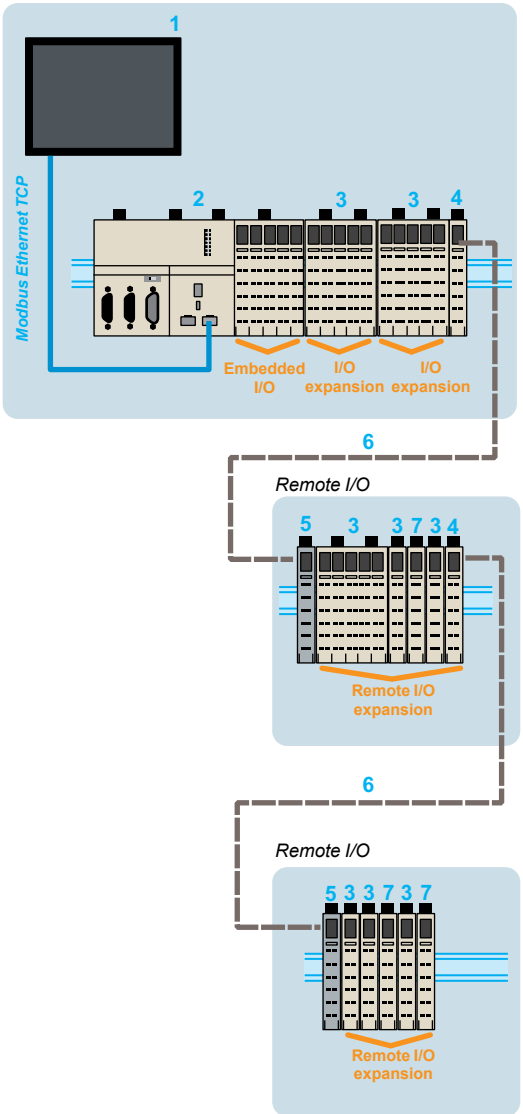
Local I/O

A PLC configuration can be local or remote. It consists of an LMC058 motion controller with its embedded input and output channels, used in conjunction with compact blocks and/or expansion modules which are used to increase the number of channels and/or application-specific functions.

■ Compact blocks represent a way of adding a large number of I/O with a single component, and thus only a single product reference.
■ I/O modules (combination of a bus base, an electronic module and a terminal block) complete this configuration and, being modular with between 2 and 12 channels, make it possible to adjust the number of channels to exactly that required. The addition of digital or analog modules, temperature or high-speed counter modules increases the processing capabilities of applications.

Local I/O configuration

1 XBT GT supervisory graphic touch screen terminal
2 LMC058 motion controller
3 Compact blocks or modules



Remote I/O

Because of its backplane bus management, the TM5 system can be used to control I/O remotely.
The same modules can be used in either a local and/or remote configuration, linked together with bus expansion cables.
The maximum distance between two remote islands is 100 m and the maximum number of islands is 25, i.e. a total distance of up to 2500 m.

This function ensures a high level of flexibility, while retaining **synchronization of all data acquisition**, since all the expansion modules are on the same backplane bus.

Remote I/O configuration

1 XBT GT supervisory graphic touch screen terminal
2 LMC058 motion controller
3 Compact blocks or modules
4 Transmitter modules
5 Receiver modules
6 TM5 expansion bus cables
7 Common distribution modules

2

Communication

LMC058 motion controllers have the following built-in communication ports:

References	Communication ports	Use
LMC058LF42	RJ45 Configurable as RS232 or RS485	ASCII or RTU exchange with Modbus™ communication protocol
	1 x RJ45 (MDI/MDIX port)	□ FTP server □ Web server □ Modbus TCP server □ Modbus TCP client □ SoMachine™ Manager □ SNMP □ EtherNet/IP™ device □ Modbus device
	1 x USB-A	Connection of a USB memory stick for transferring (uploading/downloading) programs, data and/or firmware
	1 x mini-USB	Programming port (480 Mbps)
	1 x 9-way male SUB-D	CANopen™ master connection
	1 x 9-way male SUB-D	CANmotion™ master connection
	1 x 15-way female SUB-D	Master encoder
LMC058LF424	1 x RJ45 Configurable as RS232 or RS485	ASCII or RTU exchange with Modbus communication protocol
	1 x RJ45 (MDI/MDIX port)	□ FTP server □ Web server □ Modbus TCP server □ Modbus TCP client □ SoMachine Manager □ SNMP □ EtherNet/IP™ device □ Modbus device
	1 x USB-A	Connection of a USB memory stick for transferring (uploading/downloading) programs, data and/or firmware
	1 x mini-USB	Programming port (480 Mbps)
	1 x 9-way male SUB-D	CANopen master connection
	1 x 9-way male SUB-D	CANmotion master connection
	1 x 15-way female SUB-D	Master encoder
	2 PCI slots for communication module = 2 x 9-way male SUB-D	Optional addition of communication module for a serial link

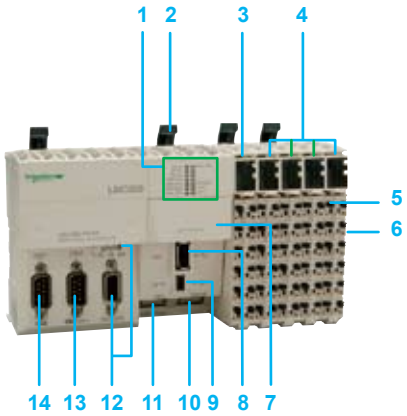
Embedded Ethernet

LMC058 motion controllers have an embedded Ethernet link via a direct connection to their RJ45 port.

- □ Speed: “10 BaseT” and “100 BaseTX” with auto-negotiation
- □ RJ45 port (MDI/MDIX): automatic adaptation to a straight or crossed cable

References	Protocols	Number of connections
LMC058LF42	Modbus server	8
LMC058LF424	Modbus device	2
	EtherNet/IP™ device	16
	FTP server	4
	Web server	10

MachineStruxure™
Hardware control platforms
Modicon™ LMC058 motion controller

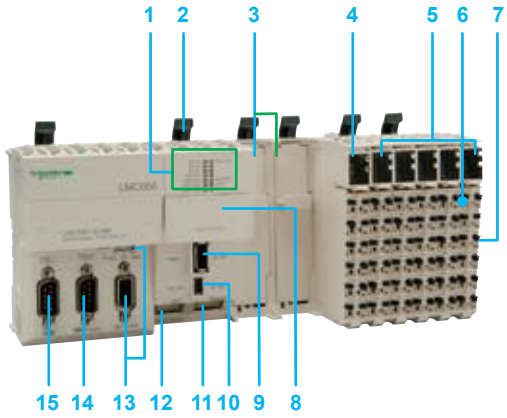


Description

The LMC058LF42 motion controller includes:

1 Display block with:
- 4 motion controller status LEDs (RUN/MS, BATTERY, APP0 and APP1)
- 7 built-in communication port status LEDs (Eth LA, Eth ST, Eth NS, USB Host, MBS COM, CAN 0 STS, CAN 1 STS)

2 Locking lever for mounting/dismounting on DIN symmetrical rail
3 24 V ⎓ power supply module with removable terminal block and locking lever, display block and slot for a label
4 I/O modules, each one with a removable terminal block with locking lever, a display block showing the I/O states and a slot for a label-holder
5 Removable terminal block with locking lever for locking/unlocking
6 Expansion bus connector on the side for connecting to the next module
7 Slot for the RTC (Real Time Clock) battery
8 USB-A connector (marked Host) for connecting a USB memory stick for transferring programs, data or firmware updates
9 USB-B mini-connector (marked Pgr Port) for connecting to the programming PC
10 RJ45 connector (marked Ethernet) for connecting to the Ethernet network and/or Magelis™ XBT GT graphic terminal
11 RJ45 connector (marked MBS) for the RS232 or RS485 serial link
12 15-way female SUB-D connector, marked ENCODER, for connecting the master encoder and a selector switch for the 3 encoder supply voltage states (5 V, Off, 24 V)
13 9-way male SUB-D connector, marked CAN0, for connecting to the CANopen™ bus
14 9-way male SUB-D connector, marked CAN1, for connecting to the CANmotion™ bus



The LMC058LF424 motion controller includes:

1 Display block with:
- 4 motion controller status LEDs (RUN/MS, BATTERY, APP0 and APP1)
- 7 built-in communication port status LEDs (*Eth* LA, *Eth* ST, *Eth* NS, USB Host, MBS COM, CAN 0 STS, CAN 1 STS)

2 Locking lever for mounting/dismounting on DIN symmetrical rail
3 Two free PCI slots for the communication module
4 24 V ⎓ power supply module with removable terminal block and locking lever, display block and slot for a label
5 I/O modules, each one with a removable terminal block with locking lever, a display block showing the I/O states and a slot for a label-holder
6 Removable terminal block with locking lever for locking/unlocking
7 Expansion bus connection on the side for the link with the next module
8 Slot for the RTC (Real Time Clock) battery
9 USB-A connector (marked Host) for connecting a USB memory stick for transferring programs, data or firmware updates
10 USB-B mini-connector (marked Pgr Port) for connecting to the programming PC
11 RJ45 connector (marked Ethernet) for connecting to the Ethernet network and/or Magelis XBT GT graphic terminal
12 RJ45 connector (marked MBS) for the RS232 or RS485 serial link15-way female SUB-D connector, marked ENCODER, for connecting the master encoder and a selector switch for the 3 encoder supply voltage states (5 V, Off, 24 V)
13 9-way male SUB-D connector, marked CAN0, for connecting to the CANopen bus
14 9-way male SUB-D connector, marked CAN1, for connecting to the CANmotion bus

MachineStruxure™
Hardware control platforms
Modicon™ LMC058 motion controller

LMC058LF42

LMC058LF424

References

LMC058 motion controllers, 24 V ⎓ power supply *(1)*

No. of I/O	Inputs	Outputs	Built-in communication ports	Reference	Weight (kg)
42 I/O	■ 26 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz)	■ 16 digital transistor outputs (0.5 A) including 4 reflex outputs	□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen™ master □ 1 SUB-D port (9-way male): CANmotion™ master □ 1 SUB-D port (15-way female): master encoder □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link	**LMC058LF42**	0.550
42 + 4 I/O	■ 26 x 24 V ⎓ digital inputs including 8 counter inputs (200 kHz) ■ 4 analog inputs 10 V/- 10 V, 4-20 mA/ 0-20 mA, 12-bit resolution	■ 16 digital transistor outputs (0.5 A) including 4 reflex outputs	□ 1 RJ45 port: Ethernet □ 1 SUB-D port (9-way male): CANopen master □ 1 SUB-D port (9-way male): CANmotion master □ 1 SUB-D port (15-way female): master encoder □ 1 USB-A port: program transfer □ 1 USB-B mini-port: software programming □ 1 RJ45 port: RS232/RS485 serial link □ + 2 free PCI slots for optional communication module *(2)*: RS232/ RS485 serial link	**LMC058LF424**	0.770

(1) The motion controllers Modicon™ LMC058 require a power supply with a nominal voltage of 24 V ⎓.
The 24 V ⎓ power supply must be rated Separated Extra Low Voltage (SELV-rated) according to IEC 61140.
The SELV-rating means that SELV isolation is provided between the electrical input and output of the power supply.
(2) To be ordered separately


TM5 ACTLC100


TM5 ACTCH100

TM5 ACLITW1


TM5 ACLT1

References

Accessories

Designation	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	labeling the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Terminal block shield locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Sheet of 92 precut paper labels	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic markers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 markers	Black	1	**TM5 ACLT1**	0.030

Connection cables

Designation	Used from	to	Length	Reference	Weight kg
Software programming cable Baud rate: 480 Mbps max. Protocol: Modbus™, HTTP, FTP, Codesys or virtual, non-isolated	PC USB port	USB mini-port on LMC058 motion controllers, the Altivar™ IMC card or XBT GT graphic touch screen terminals	3 m	**TCS XCN AM UM3P**	0.065
Programming cable	PC USB port	USB-B mini-port on LMC058 motion controllers	1.8 m	**BMX XCA USB H018**	0.230
RS485 serial link cables Modbus protocol	SUB-D port (25-way) on Small Panels: XBT N401, XBT N410, XBT R410, XBT R411, XBT GT2 to GT7	RJ45 port on LMC058 motion controllers	1.8 m	**XBT Z938**	0.230
	RJ45 port on XBT GT graphic touch screen terminals	RJ45 port on LMC058 motion controllers	2.5 m	**XBT Z9980**	0.230
RS232 serial link cables Character mode	SUB-D port (9-way female) on DTE *(1)*: printer, hand-held bar code reader	RJ45 port on LMC058 motion controllers	3 m	**TCS MCN 3M4F3C2**	0.150
	SUB-D port (9-way female) on DCE *(2)*: GSM modem	RJ45 port on LMC058 motion controllers	3 m	**TCS MCN 3M4M3S2**	0.150
Cable for master encoder input	Incremental encoders or SSI serial absolute encoders (1 stripped end)	15-way female SUB-D port on LMC058 motion controllers (1 High Density 15-way male SUB-D connector)	1 m	**VW3 M4 701**	–

(1) DTE: Data Terminal Equipment
(2) DCE: Data Communication Equipment

MachineStruxure™

Hardware control platforms

Drive controller: Altivar™ IMC integrated controller card for Altivar 61 and Altivar 71 variable speed drives

Altivar IMC integrated controller card

Introduction

The Altivar™ IMC integrated controller card is also an important element in the Flexible Machine Control approach, and a key component of MachineStruxure™, which brings you maximum flexibility and helps ensure an optimized control solution. This Altivar IMC integrated controller card (**VW3 A3521S0**) is a compact optimized solution developed for Altivar 61 and 71 variable speed drives. When equipped with the Altivar IMC card, Altivar 61 and 71 drives become controllers capable of meeting the needs of machine manufacturers (OEMs) in applications such as textiles, hoisting, pumping or woodworking.

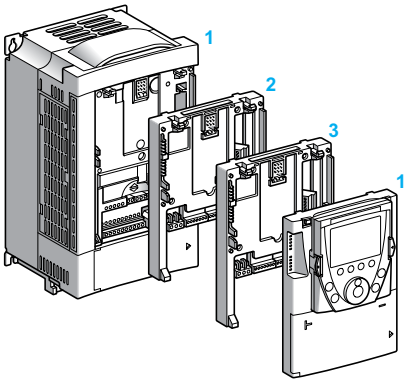
The Altivar IMC integrated controller card is configured and programmed using SoMachine™ software (see page 5/2).

The expansion capability of the Altivar IMC card is based on Schneider Electric's "Flexible Machine Control" concept.

The Altivar IMC card boosts the expansion capability of machines and allows us to meet the OEM market's requirements in terms of performance, simplicity of use and openness.

Installation

The Altivar IMC card is designed for integration on Altivar 61 and 71 variable speed drives in conjunction with other Altivar 61 and 71-specific cards, such as I/O expansion cards and communication cards.



1 Altivar 61/ Altivar 71 drive and graphic display terminal
2 Altivar IMC card **VW3 A3521S0**
3 I/O expansion card **VW3 A32●●** or communication card **VW3 A33●●**

***Note**: Only one I/O expansion card or communication card can be mounted simultaneously with the Altivar IMC card on an Altivar 61 or 71 drive.*

Special features of the Altivar IMC integrated controller card

User memory	RAM	2 MB
	Flash	2 MB
Data storage memory (Ferroelectric RAM)	FRAM	64 KB
Typical time (for 1000 Boolean instructions)		942 µs
User program size		1 MB
Power supply		24 V ⎓
Inputs	Digital	10 x 24 V ⎓ inputs, 4 of which can be used for 2 high-speed counter inputs (100 kHz) or 2 incremental encoders (A/B) (100 kHz)
	Analog	2 x 0 to 20 mA inputs
Outputs	Digital	6 transistor outputs (2 A) - source
	Analog	2 x 0 to 20 mA outputs
Built-in communication ports	RJ45 port	Modbus/TCP, Web/FTP Server
	SUB-D connector (male 9-way)	Master CANopen bus (16 slaves)
	USB Mini-B port	SoMachine software programming
Real-time clock		Integrated

MachineStruxure™

Hardware control platforms

Drive controller: Altivar™ IMC integrated controller card for Altivar 61 and Altivar 71 variable speed drives

Performance

The Altivar™ IMC integrated controller card with SoMachine™ software reduces the development time for your machines

■ The use of a single SoMachine programming software environment offers a number of advantages:
- □ Single project file
- □ Single software program
- □ Single download for the whole application

■ The ease of use of PLCopen function blocks significantly reduces the time needed to program motion control and independent axis control on machines.

A more powerful machine

The Altivar IMC integrated controller card has 8 tasks to suit different machine requirements (cyclic, event-triggered, free).
A task can be synchronized with the task of the drive in which it is embedded. This task manages the speed reference, the torque reference, the speed feedback, the torque feedback, the number of encoder pulses feedback in order to increase machine performance.

A more intelligent drive
- □ Performs more complex operations (2 MB memory)
- □ Reduces program loading time (Mini-B USB connectors)
- □ Communicates with all the other system devices (built-in Ethernet and CANopen™ connection ports)

Transparency of your machines

Access to all the other devices in the system architecture via CANopen is totally transparent due to FDT/DTM technology.

Development and technology

The Altivar IMC integrated controller card has been developed with two criteria in mind: efficiency and practicality.

■ Efficiency, because the standard equipment for the Altivar IMC card includes:
- □ Sixteen discrete I/Os
- □ Built-in Ethernet port
- □ Two analog inputs
- □ Two analog outputs
- □ CANopen master

■ Practicality, because the Altivar IMC card is ideal for integration in Altivar 61 and 71 drives, and can use:
- □ Their inputs/outputs
- □ Their communication cards
- □ Their parameters: speed, current, torque
- □ Their remote graphic display terminal
- □ The inputs/outputs in their I/O expansion cards
- □ The speed feedback counter in the encoder interface cards

Software configuration

Configuration and programming of the Altivar IMC integrated controller card and equipment in Schneider Electric's “Flexible Machine Control” concept are both designed to cut costs and optimize your machine performance.
The SoMachine software offers six IEC 61131-3 programming languages:
- ■ Instruction List (IL)
- ■ Ladder (LD)
- ■ Function Block Diagrams (FBD)
- ■ Grafcet (SFC)
- ■ Structured Text (ST)
- ■ CFC: Continuous Function Chart

Additionally, the software offers PLCopen function blocks, for handling motion control and axis control on your machines.

SoMachine software platform

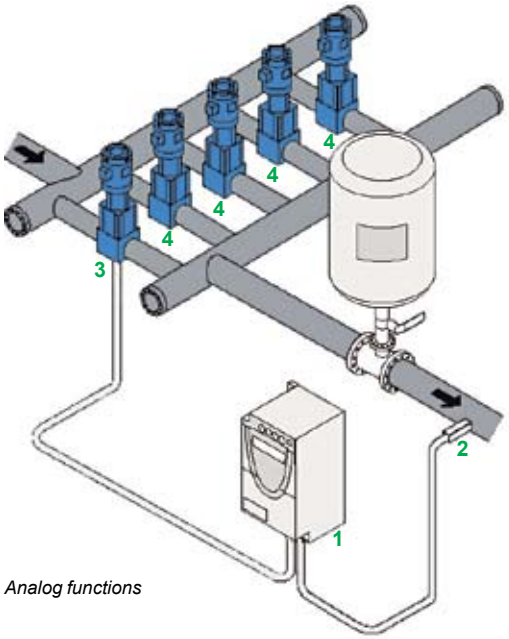
Integration in the Schneider Electric product offer

Combined with other dedicated OEM products in the Schneider Electric offer, such as Altivar variable speed drives, Lexium™ servo drives, Magelis™ HMI terminals, TeSys™ motor starters and contactors, the Altivar IMC integrated controller card can be integrated transparently in a number of architectures.

MachineStruxure™

Hardware control platforms

Drive controller: Altivar™ IMC integrated controller card for Altivar 61 and Altivar 71 variable speed drives



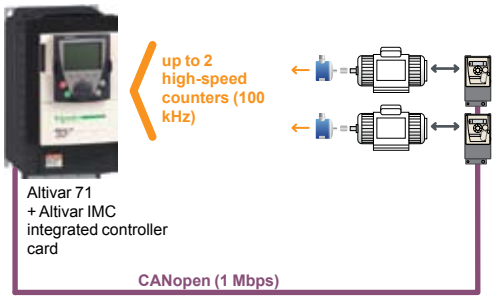
Analog functions

Functions

Analog functions

For machines that require functions to process data issued by analog sensors/ actuators (voltage or current), temperature sensors, pressure or PID control sensors, the Altivar™ IMC card has, as standard, 2 analog inputs (voltage or current) with 10-bit resolution and 2 analog outputs (current) with 10-bit resolution.

1 Altivar IMC integrated controller card installed on Altivar 61
2 Pressure sensor
3 Variable speed pump
4 Mounted speed pumps



High-speed counter function (one-phase or two-phase)

HSC high-speed counting and/or incremental encoder function

In order to meet requirements for machine productivity, the Altivar IMC has 2 embedded high-speed counters with a counting frequency of 100 kHz for each channel as well as 4 reflex outputs.
The availability of these embedded counters and also the presence of the master CANopen™ link makes it quick and easy to create low-cost, high-performance multi-axis functions that suit your machines' requirements.
With the availability of "PLCopen" function blocks specific to the motion control functions in the SoMachine™ software, application development is sure to be rapid and reliable.
In addition, these high-speed counting inputs can be used as an incremental encoder (A/B) with a frequency of 100 kHz in order to adapt to the machine's specific requirements.

Machine with CANopen architecture:
- *Lifting motion: Altivar 71*
- *Translatory motion: Altivar 312*
- *Carriage motion: Altivar 312*

Position control function

Several options are offered in terms of position control:
■ Either creating a sequence in Lexium 32 servo drives, with communication with the Altivar IMC integrated controller card achieved by the use of discrete I/O
■ Or creating an application in the Altivar IMC card and controlling the Lexium 32A/ Lexium 32M servo drives and/or SD3●● stepper motor drives via the master CANopen integrated link.

Functions (continued)

Communication function

Ethernet

The Altivar™ IMC integrated controller card has a built-in RJ45 Ethernet port (10/100 Mbps, MDI/MDIX) with Ethernet TCP Modbus™, SoMachine™ on Ethernet, UDP, TCP and SNMP protocols.
In addition, the Altivar IMC card has an embedded Web Server and FTP Server.
As well as the default address based on the MAC address, it is possible to assign a controller IP address via a DHCP server or via a BOOTP server.

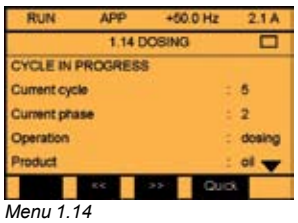
CANopen

The Altivar IMC integrated controller card has an embedded CANopen™ master which can be used to control devices on a communication bus with ease.
The link can be configured between 20 kbps and 1 Mbps and supports up to 16 slaves.
Architectures based on CANopen can be used to distribute I/O modules as close to the sensors and actuators as possible, thus reducing wiring costs and times, and to communicate with different devices such as variable speed drives and servo drives.
The CANopen configurator is integrated in the SoMachine software and can also be used to import standard description files in EDS format. See page 4/8.

Customization function on the graphic display terminal

Menu 1.14

The remote graphic display terminal on Altivar 61 or 71 drives includes a menu dedicated to the Altivar IMC integrated controller card.
The user is offered a graphic display of 8 lines of 24 characters.
This menu can be customized simply and directly using the SoMachine software.
The user can define the language, name, unit, decimal point, and the type of parameter he wishes to customize for his own application. The user can also define alarms and error messages for his application.



Menu 1.14

Clock function

A time and date-stamping function combined with a clock backed up by a lithium battery makes it possible to keep a log of events that have occurred. When the Altivar IMC integrated controller card is installed in the drive, drive faults are automatically time and date-stamped without the need for any special programming.

Communication

The Altivar™ IMC integrated controller card has the following built-in communication ports:

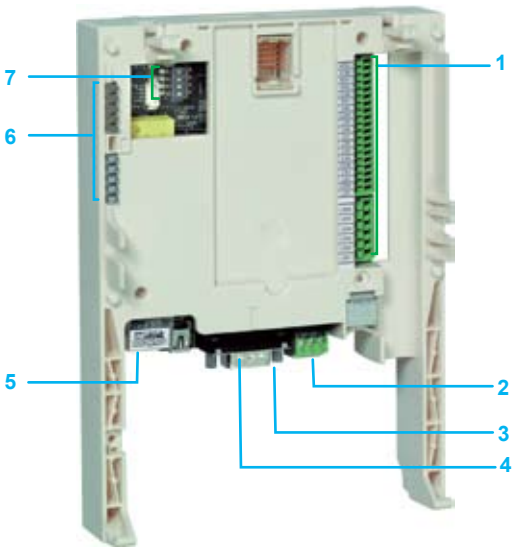
Communication ports	Use
1 x RJ45 (MDI/MDIX port)	□ FTP server □ Web server □ Modbus™ TCP server □ Modbus TCP client □ Manager SoMachine □ SNMP □ Modbus device
1 x mini-USB	Programming port (480 Mbps)
1 x 9-way male SUB-D	Master CANopen™ connection

Embedded Ethernet

The Altivar IMC integrated controller card has an embedded Ethernet link via a direct connection to its RJ45 port.

- Speed: “10 BaseT” and “100 BaseTX” with auto-negotiation
- RJ45 port (MDI/MDIX): automatic adaptation to a straight or crossed cable

Protocols	Number of connections
Modbus server	8
Modbus device	2
FTP server	4
Web server	10



Description

The Altivar IMC integrated controller card features:

1 Three spring connectors for:
  - 10 digital inputs
  - 6 digital outputs
  - 2 analog inputs
  - 2 analog outputs
  - 2 commons

2 Connector with removable screw terminals, 3 contacts at intervals of 3.81 for the 24 V ⎓ power supply

3 Mini USB-B connector for programming using SoMachine software

4 9-way SUB-D connector for connection to the CANopen machine bus

5 RJ45 connector for connection of the SoMachine software workshop and/or connection to an Modbus/TCP network

6 Five LEDs:
  - 1 green/yellow ETH LED for Ethernet activity
  - 1 green/red NS (Network status) LED
  - 1 green/red MS (Module status) LED
  - 1 green/red CAN (CANopen activity) LED
  - 1 green/red LED programmable by the user

7 Four configuration selector switches

MachineStruxure™

Hardware control platforms

Drive controller: Altivar™ IMC integrated controller card for Altivar 61 and Altivar 71 variable speed drives

Altivar 71 variable speed drive

VW3 A3521S0

VW3 A3 202

Variable speed drives

Designation	Reference
Altivar™ 61 variable speed drives	Refer to the "Altivar 61 variable speed drives" catalog or visit our website www.schneider-electric.com
Altivar 71 variable speed drives	Refer to the "Altivar 71 variable speed drives" catalog or visit our website www.schneider-electric.com

Cards for Altivar 61 and 71 variable speed drives

Altivar IMC integrated controller card

Designation	Voltage	Reference	Weight kg
Altivar IMC integrated controller card	24 V ⎓	**VW3 A3521S0**	0.185

I/O expansion cards *(1)*

Designation	Type of I/O						Reference	Weight
	Logic input	Logic output	Analog input	Analog output	PTC probe input *(2)*	Frequency control input		kg
I/O expansion cards *(2)*	4	3	–	–	1	–	**VW3 A3 201**	0.300
	4	3	2	2	1	1	**VW3 A3 202**	0.300

For more information about digital I/O cards, visit our website www.schneider-electric.com.

Communication cards

Designation	Protocols available (depending on model)	Reference
VW3 A3 3●● communication cards	□ Modbus™ Plus □ Uni-Telway™ □ InterBus®-S □ Profibus™ DP □ DeviceNet™ □ Modbus™/TCP □ FIPIO™ □ EtherNet/IP™ □ CC-Link □ LonWorks® (Altivar 61) □ METASYS® N2 (Altivar 61) □ APOGEE® FLN (Altivar 61) □ BACnet™ (Altivar 61)	Refer to "Altivar 61 variable speed drives" or "Altivar 71 variable speed drives" catalog, or visit our website www.schneider-electric.com

(1) Altivar 61 and 71 variable speed drives can only take one I/O expansion card with the same reference.
(2) This PTC probe input must never be used to protect an ATEX motor in applications in explosive atmospheres. Please refer to the ATEX guide which is available on our website "www.schneider-electric.com".

MachineStruxure™

Hardware control platforms

HMI Controllers: Magelis™ XBT GC HMI controller, Magelis XBT GT/GK Advanced Panels + control function

Applications		**Display of text messages, graphic objects and mimics Control and configuration of data**		
		Control function IEC 1131-2		
Terminal type		**HMI Controllers**		
				
Display	Type	Back-lit monochrome (amber or red mode) STN LCD (320 x 240 pixels)	Back-lit monochrome STN LCD (320 x 240 pixels)	Color STN LCD (320 x 240 pixels)
	Capacity	3.8” (monochrome)	5.7” (monochrome)	5.7” (color)
Data entry		Via touch screen		
	Static function keys	–		
	Dynamic function keys	–		
	Service keys	–		
	Alphanumeric keys	–		
Memory capacity	Application	16 MB Flash EPROM		
	Extension	–		
Functions	Maximum number of pages and maximum number of instructions	Limited by internal Flash EPROM memory capacity		
	Variables per page	Unlimited (8000 variables max.)		
	Programmed logic	5 languages according to IEC 1131-2 (LD, ST, FBD, SFC, IL)		
	Counting/positioning	4 x 100 kHz fast counter inputs/4 x 65 kHz pulse train outputs		
	Control (PID)	Yes		
	Reintroduction of variables	Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, indicator		
	Recipes	32 groups of 64 recipes comprising 1024 ingredients max.		
	Curves	Yes, with log		
	Alarm logs	Yes		
	Real-time clock	Built-in		
I/O	Integrated	12 discrete inputs 24 V ⎓ 6 transistor outputs, sink or source *(1)*	16 discrete inputs 24 V ⎓ 16 transistor outputs, sink or source *(1)*	
	Modular I/O expansion	Two M238 I/O modules max.	Three M238 I/O modules max.	
Communication	Downloadable protocols	–	Uni-TE™, Modbus™, Modbus TCP/IP *(1)* and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens	
	Asynchronous serial link	–	RS 232C/RS 422/485 (COM1)	
	USB ports	1		
	Buses and networks	1 CANopen™ master with optional module (XBT ZGC CAN)		
		–		Ethernet TCP/IP (10BASET/100 BASE-TX)
	Printer link	USB port for parallel printer		
Design software		SoMachine™, with Microsoft Windows® XP and Windows Vista® (see page 5/5)		
Operating system		Magelis™ (CPU 131 MHz RISC)		
Terminal type		**XBT GC 1100 T/U**	**XBT GC 2120 T/U**	**XBT GC 2230 T/U**
Pages		2/48	2/48	2/48

(1) Depending on model

Display of text messages, graphic objects and mimics Control and configuration of data	
Control function IEC 1131-2	
Touch screen Advanced Panels + control function	**Advanced Panels with keypad + control function**
	
Monochrome or color STN LCD, back-lit color TFT LCD (320 x 240 pixels to 1024 x 708 pixels) *(1)*	Monochrome STN LCD or color TFT LCD (320 x 240 pixels or 640 x 480 pixels) *(1)*
5.7” (monochrome or color) 7.5”, 10.4”, 12.1” or 15” (color) *(1)*	5.7” (monochrome or color) or 10.4” (color) *(1)*
Via touch screen	Via keypad and/or touch screen (configurable) and/or by industrial pointer
–	10 or 12 *(1)*
–	14 or 18 *(1)*
–	8
–	12
16 MB Flash EPROM or 32 MB Flash EPROM *(1)*	
By 128 MB to 4 GB CF card *(1)*	
Limited by internal Flash EPROM memory capacity	
Unlimited (8000 variables max.)	
5 languages according to IEC 1131-2 (LD, ST, FBD, SFC, IL)	
–	
Yes	
Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, indicator	
32 groups of 64 recipes comprising 1024 ingredients max.	
Yes, with log	
Yes	
Built-in	
–	
–	
Uni-TE™, Modbus™, Modbus TCP/IP *(1)* and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens	
RS 232C/RS 422/485 (COM1) and RS 485 (COM2)	
1 or 2 *(1)*	
1 CANopen™ master with external module (XBT ZG CANM) which is mandatory for the control function	
Ethernet TCP/IP (10BASET/100BASE-TX) *(1)*	
USB port for parallel printer	
SoMachine™, with Microsoft Windows® XP and Windows Vista® (see page 5/5)	
Magelis™ (CPU 131 MHz RISC or 266 MHz RISC) *(1)*	Magelis (CPU 266 MHz RISC)
XBT GT 2●/4●/5●/63/73 + XBT ZG CANM	**XBT GK 2●/53 + XBT ZG CANM**
4/13	

(1) Depending on model

MachineStruxure™

Hardware control platforms

HMI Controllers: Magelis™ XBT GC HMI controller, Magelis XBT GT/GK Advanced Panels + control function

Magelis XBT GC HMI Controller

XBT GT Advanced panels

XBT GK Advanced panels

XBT ZG CANM module

HMI function: Magelis XBT GT/GK Advanced Panels
+
Control function: XBT ZG CANM CANopen master module

Introduction

The Magelis™ HMI Controller is also an important part in Flexible Machine Control approach, and a key component of MachineStruxure™, which brings you maximum flexibility, and helps ensure an optimized control solution.
The Magelis HMI Controller offer brings together HMI and control functions in a single product. This reduces the amount of equipment required and the associated costs throughout the life cycle of the machine.

This offer is comprised of two product ranges:
- The compact range: Magelis XBT GC HMI Controller
- The modular range: Magelis XBT GT/GK Advanced Panels + XBT ZC CANM CANopen™ module

Magelis XBT GC HMI Controllers
(compact range)

Magelis XBT GC HMI Controllers minimize setup time due to their compact design.

This product range is comprised of 6 touch screen terminals, with the following components, depending on the model:
- 3.8” monochrome screen, 12 integrated inputs/6 integrated outputs (sink or source)
- 5.7” monochrome or color screen, 16 integrated inputs/16 integrated outputs (sink or source)
- A wide choice of communication interfaces: USB, serial link, CANopen and Ethernet

In order to adapt easily to different configurations, it is possible to add discrete I/O expansion modules at the rear of the Controller.

Magelis XBT GT/GK Advanced Panels + XBT ZC CANM CANopen module
(modular range)

This range is comprised of complete Magelis XBT GT or Magelis XBT GK Advanced Panel offers to which a control part is added with the CANopen module XBT ZG CANM. During operation, this module controls the I/O and the peripherals distributed via the CANopen bus.

The combination with Magelis XBT GT or Magelis XBT GK Advanced Panels gives a wide choice of screen sizes and types of data entry, depending on the model:
- 17 XBT GT touch screen terminals:
  - 5.7” monochrome or color screens
  - 7.5”, 10.4”, 12.1” and 15” color screens
- 3 XBT GK terminals with keypad and/or touch screen:
  - 5.7” monochrome or color screens
  - 10.4” color screens

This combination also offers numerous advanced functions such as video and data management (sharing of data, log).

Operation

With their fast, multitasking processors, all the HMI Controllers combine HMI and control functions and share the same screen and communication features and dimensions.

The internal memory can be freely used by both the HMI function and the control function. Processing is split 75% on the HMI part and 25% on the control part, and processing can be configured for 3 tasks, including 1 master task.

XBT GC HMI Controllers also have the same I/O modules, the same Telefast™ pre-wired system and the same peripherals on the CANopen bus as the Modicon™ M238™ logic controller.

MachineStruxure™

Hardware control platforms

HMI Controllers: Magelis™ XBT GC HMI controller, Magelis XBT GT/GK Advanced Panels + control function

SoMachine

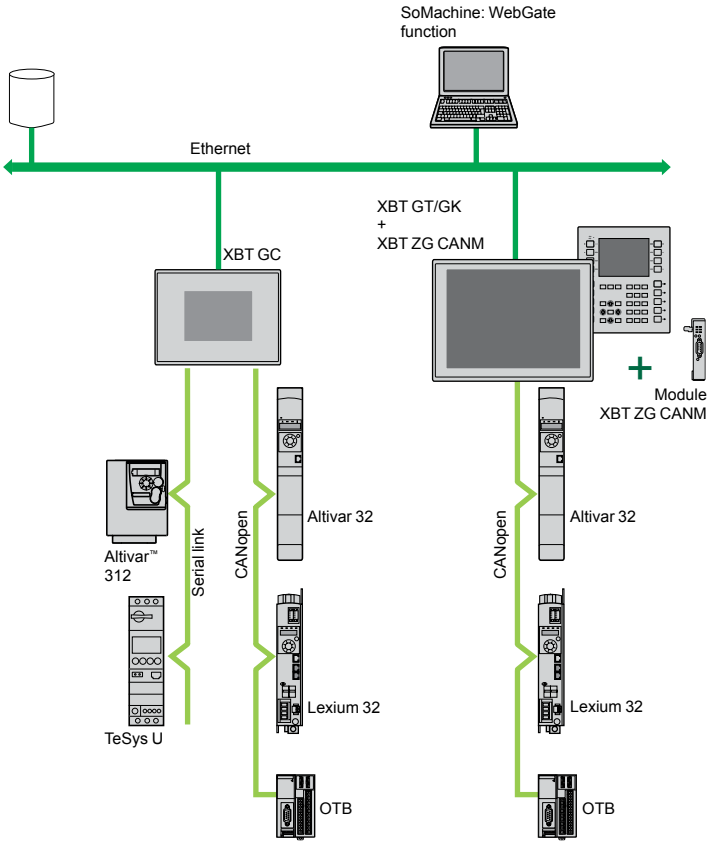
Vijeo Designer (included in SoMachine)

Configuration

Magelis™ XBT GC HMI Controllers and Magelis XBT GT/GK Advanced Panels can be configured with SoMachine™, Schneider Electric's unique machine automation software. (See page 5/2)

This software, combining both HMI and control functions, is based on the Vijeo™ Designer™ software in the Microsoft Windows® XP and Windows Vista® environments. The SoMachine software boasts an advanced user interface with many configurable windows, enabling unique projects to be developed quickly and easily.

Communication



Examples of communication architectures

Depending on the model, Magelis™ XBT GC HMI Controllers and Magelis XBT GT/GK Advanced Panels communicate with automation equipment via 1 or 2 integrated serial links, based on communication protocols:

- Schneider Electric (Uni-TE™, Modbus™)
- Third party: Mitsubishi Electric, Omron, Allen-Bradley and Siemens

Depending on the model, they can be connected to Ethernet TCP/IP networks with the Modbus TCP protocol or a third-party protocol, and can be used as the CANopen™ master to control all the peripherals which can be connected on this bus.

MachineStruxure™

Hardware control platforms

HMI Controllers: Magelis™ XBT GC HMI controller, Magelis XBT GT/GK Advanced Panels + control function

Functions

Magelis™ XBT GC HMI Controllers and Magelis XBT GT/GK Advanced Panels provide the following HMI functions:

- Display of animated mimics with 8 types of animation (pressing the touch panel, color changes, filling, movement, rotation, size, visibility and value display)
- Control, modification of numeric and alphanumeric values
- Display of current date and time
- Real-time curves and trend curves with log
- Alarm display, alarm log and management of alarm groups
- Multi-window management
- Page calls initiated by the operator
- Multilingual application management (10 languages simultaneously)
- Recipe management
- Data processing via Java script
- Application support and USB key external memory logs
- Management of serial printers and barcode readers

Magelis XBT GC HMI Controllers and Magelis XBT GT/GK Advanced Panels *(1)* have been designed for Transparent Ready™ architectures and equipment (combination of web and Ethernet TCP/IP technologies).

With the WebGate function, it is possible to control or carry out maintenance tasks remotely.

These Magelis XBT GC HMI Controllers provide the following control functions:

- Execution of programmed logic sequences with the 5 IEC 1131-2 languages (LD, ST, FBD, SFC, IL)
- Management of equipment on the CANopen fieldbus

In addition to these functions, Magelis XBT GC HMI Controllers can manage:

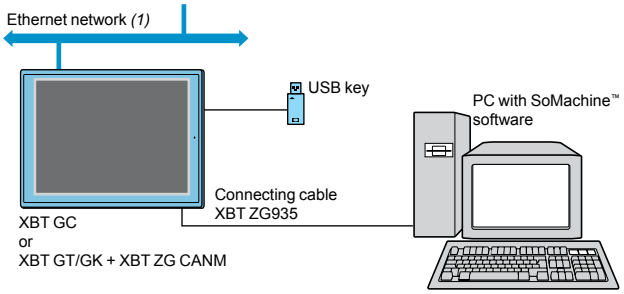
- Discrete I/O on integrated or remote expansion modules
- Analog I/O on remote expansion modules

(1) Depending on model

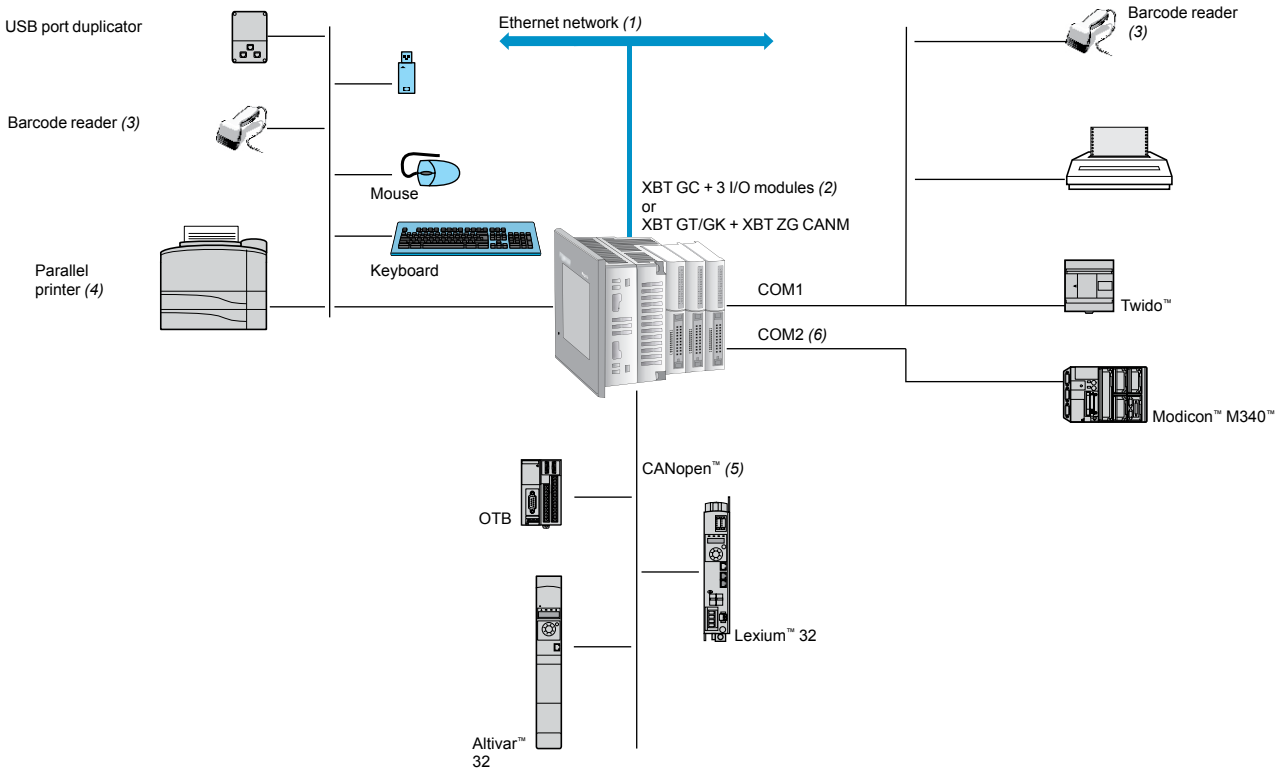
Operating modes for the terminals

The illustrations below show which equipment can be connected to XBT terminals based on their two operating modes.

Edit mode



Run mode

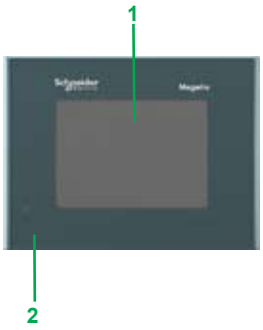


(1) With XBT GC 2230T/U, XBT GT●●30, XBT GT●●40, XBT GK●●30
(2) With XBT GC ●●●●T/U
(3) Should be a DataLogic Gryphon barcode reader
(4) Should be a Hewlett Packard printer via a USB/PIO converter
(5) Requires:
- For XBT GC: XBT ZGC CAN CANopen master module
- For XBT GT/GK: XBT ZG CANM CANopen master module
(6) With XBT GT/GK

MachineStruxure™

Hardware control platforms

HMI Controllers: Magelis™ XBT GC HMI Controller with 3.8” screen

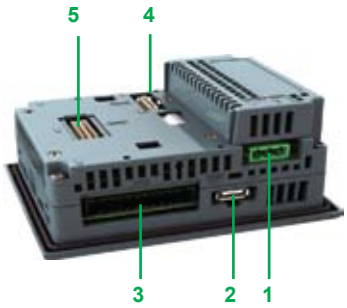


Description

Magelis™ XBT GC1100 T/U HMI Controller

The front panel features:

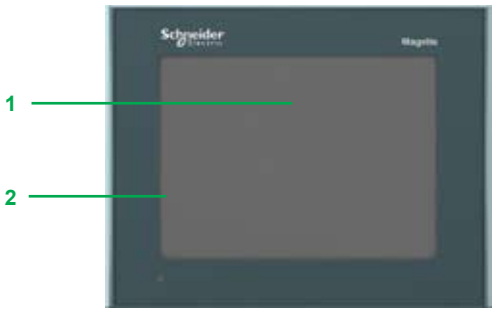
1 Touch screen for displaying mimics (3.8” amber or red mode monochrome)
2 Control indicator showing the terminal's operating mode



The rear panel features:

1 Removable screw terminal block for the 24 V ⎓ power supply
2 Type A USB master connector for peripheral connection and application transfer
3 Removable terminal block for 12 discrete inputs and 6 discrete outputs
4 Interface for connecting M238 logic controller I/O expansion modules
5 Interface for connecting the CANopen™ bus master module (see page 4/8)
6 Discrete I/O expansion module (TM2 D●●). To be ordered separately (see page 2/50)

MachineStruxure™
Hardware control platforms
HMI Controllers: Magelis™ XBT GC with 5.7” screen

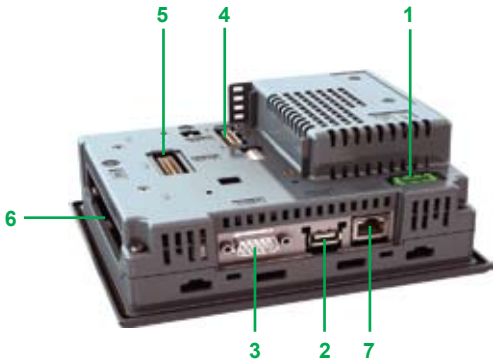


Description

Magelis™ XBT GC2●20 and XBT GC2●30 HMI Controller

The front panel features:

1 Touch screen for displaying mimics (5.7" monochrome or color)
2 Multicolor indicator (green, orange and red) showing the terminal's operating mode

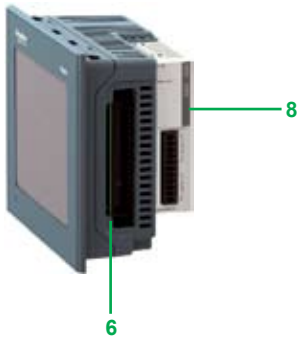


The rear panel features:

1 Removable screw terminal block for 24 V ⎓ supply
2 Type A USB master connector for peripheral connection and application transfer
3 9-way male SUB-D connector for RS 232C or RS 422/485 serial link to PLCs (COM1)
4 Interface for connecting the M238 logic controller I/O expansion module
5 Interface for connecting the CANopen™ bus master module (see page 4/13)
6 Removable terminal block for 16 discrete inputs and 16 discrete outputs

On XBT GC2330 only:

7 RJ45 connector for Ethernet TCP/IP, 10BASE-T/100BASE-TX connection
8 Discrete I/O expansion module (TM2 D●●). To be ordered separately (see page 2/50)



MachineStruxure™
Hardware control platforms
HMI Controllers: Magelis™ XBT GC Advanced Panels

XBT GC1100●

XBT GC2●●●

XBT ZGUSB

Magelis™ XBT GC HMI Controller *(1)*

Type of screen	No. of ports	Application memory capacity	Compact Flash memory	Integrated I/O	No. of Ethernet ports	Reference	Weight kg
3.8" screen							
STN amber or red	1 USB	16 MB	No	12 I/6 O source	-	**XBT GC1100T**	0.400
				12 I/6 O sink	-	**XBT GC1100U**	0.400
5.7" screen							
STN black and white mode	1 COM1	16 MB	No	16 I/16 O source	-	**XBT GC2120T**	1.000
	1 USB			16 I/16 O sink	-	**XBT GC2120U**	1.000
5.7" screen							
STN color	1 COM1	16 MB	No	16 I/16 O source	1	**XBT GC2230T**	1.000
	1 USB			16 I/16 O sink	1	**XBT GC2230U**	1.000

Separate parts

Designation	Compatibility	Size	Reference	Weight kg
Protective sheets	XBT GC 1100	–	**XBT ZG60**	
(5 peel-off sheets)	XBT GC2●●0	–	**XBT ZG62**	0.200

Designation	Description	Length	Reference	Weight kg
Remote USB port location for type A XBT terminal	Enables the USB port to be located remotely on the rear of the XBT terminal on a panel or cabinet door (Ø 21 mm mounting device)	1 m	**XBT ZGUSB**	–
Remote USB port location for mini type B XBT terminal		-	**XBT ZGUSBB**	–
XBT GC connection to CANopen™ master fieldbus	Connection via card on expansion bus	-	**XBT ZGCCAN**	–
Cable for transferring application to PC	USB connector, type TTL	2 m	**XBT ZG 935**	–

Replacement parts

Designation	Use for	Reference	Weight kg
Installation gaskets	XBT GC1100	**XBT ZG51**	0.030
	XBT GT21●0	**XBT ZG52**	0.030
USB spring clip	XBT GC 1100	**XBT ZGCLP2**	–
	XBT GC 2●●0	**XBT ZGCLP4**	–
Spring clip for expansion modules on XBT GC	XBT GC2●●0 terminals	**XBT ZGCHOK**	0.030
Power supply connector	XBT GC1●●●/GC2●●●	**XBT ZGPWS1**	0.030
Direct I/O connector	XBT GC1000	**XBT ZG DIO1**	–
	XBT GC2000	**XBT ZG DIO2**	–

(1) Terminals supplied with mounting kit (clips with screws), locking catch for USB connectors, spring clip for expansion modules (except XBT GC 1100) and instruction sheets. The setup documentation for XBT GC terminals is supplied in electronic format with the SoMachine™ software (see page 5/5).

XBT GC1●●● Combining two TM2 expansion modules (1)				
Combinations	**Type**	**Type**	**Total thickness (mm)**	**Combination**
	A	A	35.2	**Authorized**
	A	B	41.1	
	B	B	47.0	
	A	C	47.3	
	B	C	53.2	
	A	D	56.7	
	C	C	59.4	
	B	D	62.6	**Prohibited**
	C	D	68.8	
	D	D	78.2	

XBT GC2●●● Combining two TM2 expansion modules (1)				
Combinations	**Type**	**Type**	**Total thickness (mm)**	**Combination**
	A	A	35.2	**Authorized**
	A	B	41.1	
	B	B	47.0	
	A	C	47.3	
	B	C	53.2	
	A	D	56.7	
	C	C	59.4	
	B	D	62.6	**Prohibited**
	C	D	68.8	
	D	D	78.2	

Combining three TM2 expansion modules (1)					
Combinations	**Type**	**Type**	**Type**	**Total thickness (mm)**	**Combination**
	A	A	A	52.8	**Authorized with hook** *(2)*
	A	A	B	58.7	
	A	B	B	64.6	
	B	B	B	70.5	
	Any other combination				**Prohibited**

(1) Modicon™ TM2 expansion modules: see page 3/6.

(2) Hook supplied with the product

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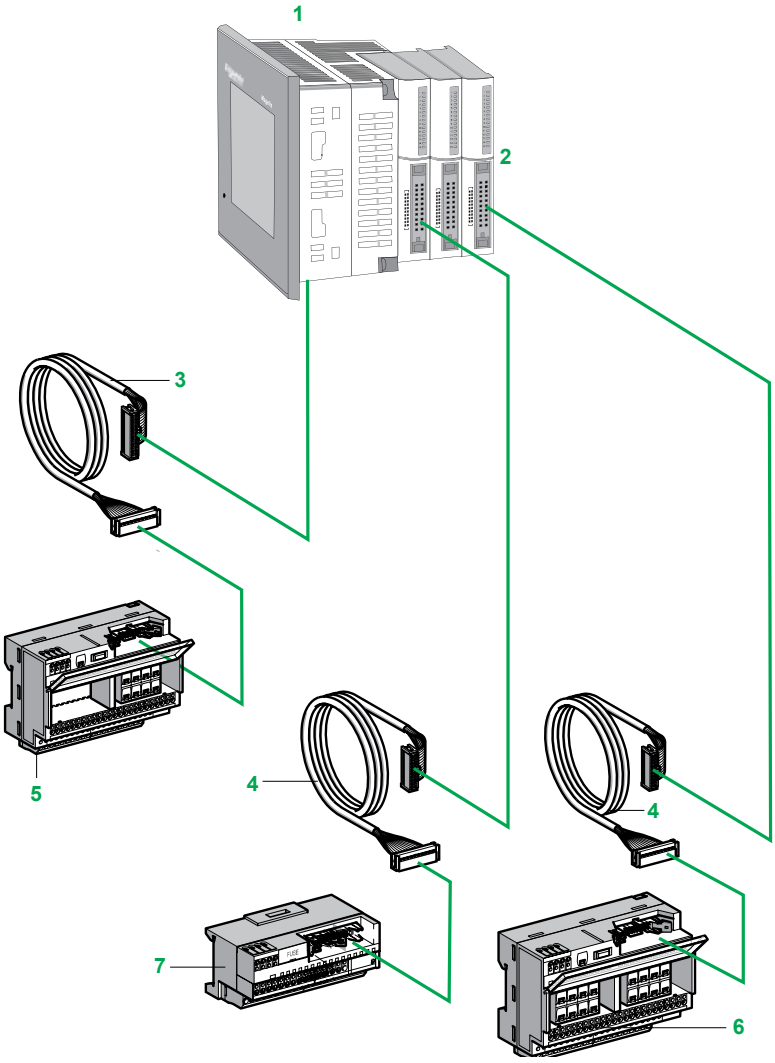
Hardware control platforms

HMI Controllers: Modicon™ Telefast™ ABE 7 pre-wired system for Magelis™ XBT GC HMI Controller

Combinations



1 XBT GC equipped with direct I/O 22 or 38-way connectors. The modularity options offered have 18 or 32 I/O.

2 Input and output modules equipped with 20-way HE 10 connectors. The modularity options offered have 16 or 32 I/O.

3 2 m AWG 28/0.08 mm^2 cables, depending on the model:
- For XBT GC 1100T/U: XBT ZG ABE1 cable equipped with a 26-way HE 10 connector and a 22-way direct I/O-XBT GC connector at each end.
- For XBT GC 2pppT/U: XBT ZG ABE2 cable equipped with two 20-way HE10 connectors and a 38-way direct I/O-XBT GC connector.

4 ABF T20E●●0 cable equipped with a 20-way HE 10 connector at each end. This cable is available in 0.5, 1, 2 and 3 meter lengths (AWG 28/0.08 mm2).

5 Depending on model:
- For XBT GC1100T: ABE 7B20MPN2p or ABE 7B20MRM20 20 channel sub-base for bases.
- For XBT GC 2●●●T: ABE 7E16EPN20 or ABE 7E16SPN2p 16-channel sub-base.

6 **ABE 7E16SPN22** or **ABE 7E16SRM20** 16-channel sub-base for output expansion modules.

7 **ABE 7E16EPN20** or **ABE 7E16SPN20** 16-channel sub-base for input or output expansion modules.

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Hardware control platforms

HMI Controllers: Modicon™ Telefast™ ABE 7 pre-wired system for Magelis™ XBT GC HMI Controller

Combinations involving modular bases and I/O expansion modules

		XBT GC				Discrete I/O expansion modules	
		Integrated I/O				Inputs	Outputs (source)
		XBT GC 1100T		XBT GC 2●●●T		TM2 DDI 16DK (16 I) TM2 DDI 32DK (32 I)	TM2 DDO 16TK (16 O) TM2 DDO 32TK (32 O)
Integrated in Twido™ programmable controllers		12 I	6 O source	16 I	16 O source		
Types of connection terminal block		Direct I/O, 22-way		Direct I/O, 38-way		HE 10, 20-way	
Connection to XBT GC HMI programmable controller		**XBT ZG ABE1**		**XBT ZG ABE2**		**ABF T20E●●0** (HE 10, 20-way)	
Passive connection sub-bases							
20 channels	**ABE 7B20MPN2●**		*(1)*				
16 channels	**ABE 7E16EPN20**						
	ABE 7E16SPN2●						
Output adaptor sub-bases							
20 channels	**ABE 7B20MRM20**		*(2)*				
16 channels	**ABE 7E16SRM20**						

Compatible

Not compatible

Note: Telefast™ cables and modules are not compatible with XBT GC which have sink outputs (sufmount U).

(1) 6 channels used out of 8 available

(2) 6 channels used out of 8 available with 2 transistor outputs and 4 relay outputs

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Hardware control platforms

HMI Controllers: Modicon™ Telefast™ ABE 7 pre-wired system for Magelis ™XBT GC HMI Controller

ABE 7B20MPN20

ABE 7E16EPN20

ABE 7E16SRM20

References

For XBT GC 1100T bases

Number of I/O	No./ type of input	No./ type of output	Compatibility	LED per channel	Fuse	Reference	Weight kg
20	12, sink 24 V ⎓	6, source 24 V ⎓	XBT GC1100T	No	No	**ABE 7B20MPN20**	0.430
				Yes	Yes	**ABE 7B20MPN22**	0.430
	12, sink 24 V ⎓	2, source 24 V ⎓, 2 A and 4, relay 24/250 V ⎓ ∿, 3 A	XBT GC1100T	No	No	**ABE 7B20MRM20**	0.430

For expansion modules or for XBT GC 2●●0T bases

Number of inputs	Type of input	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Sink 24 V ⎓	TM2 DDI16DK/ DDI32K and XBT GC2●●●T	No	No	**ABE 7E16EPN20**	0.430

Number of outputs	Type of output	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Source 24 V ⎓	TM2 DDO16TK/ DDO32TK and XBT GC2●●●T	No	No	**ABE 7E16SPN20**	0.450
			Yes	Yes	**ABE 7E16SPN22**	0.450
	Relay 24/250 V ⎓ ∿, 3 A		No	No	**ABE 7E16SRM20**	0.430

Connection cables for XBT GC

Type of signal	Compatibility	Connection type		Gauge Cross-sect.	Length *(1)*	Reference	Weight kg
		XBT GC side	Telefast side				
Discrete I/O	XBT GC 1100T	Direct I/O 22-way	HE 10 26-way	AWG 28 0.08 mm²	2.0 m	**XBT ZG ABE1**	0.180
	XBT GC 2●●0T	Direct I/O 38-way	2 x HE 10 20-way		2.0 m	**XBT ZG ABE2**	0.180
	TM2 DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE 10 20-way	HE 10 20-way	AWG 28 0.08 mm²	0.5 m	**ABF T20E050**	0.060
					1 m	**ABF T20E100**	0.080
					2 m	**ABF T20E200**	0.140

Accessories

Designation	Number of shunted terminals	Specifications	Sold in lots of	Unit reference	Weight kg
Optional snap-on terminal blocks	20	–	5	**ABE 7BV20**	0.060
	12+8	–	5	**ABE 7BV20TB**	0.060
Quick-blow fuses 5 x 20, 250 V, UL	–	0.125 A	10	**ABE 7FU012**	0.010
		0.315 A	10	**ABE 7FU030**	0.010
		1 A	10	**ABE 7FU100**	0.010
		2 A	10	**ABE 7FU200**	0.010

(1) Please contact us for lengths > 2 m

References (continued)

Separate parts

Description	Type	Compatibility	Reference	Weight kg
Connectors Sold in lots of 5	HE 10 female 26-way	TWD LMDA20DTK/ LMDA40DTK	**TWD FCN2K26**	–
	HE 10 female 20-way	TM2 DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	**TWD FCN2K20**	–
Screw terminals Sold in lots of 5	10-way	TM2 DDI●DT/DAI8DT/ DDO8●T/DRA●RT	**TWD FTB2T10**	–
	11-way	TM2 DMM8DRT/ AMI●●T/ARI8HT	**TWD FTB2T11**	–

Designation	Compatibility	Connection type		Gauge/ Cross-sect.	Length	Reference	Weight kg
		Twido side	Other side				
Cables for discrete I/O	TM2 DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE 10 20-way	Flying leads	AWG 22 0.035 mm^2	3 m	**TWD FCW30K**	0.405
					5 m	**TWD FCW50K**	0.670
Rolled ribbon cable	20 conductors	–	–	AWG 28 0.08 mm^2	20 m	**ABF C20R200**	1.310

Machine Structure™

chapter 3

I/O expansion modules

I/O expansion modules

MachineStruxure™
I/O expansion modules
Local and remote I/O expansion modules

Applications		**Local I/O (IP 20)**		
Compatibility		■ Modicon™ M238™ logic controller ■ XBT GC HMI controllers ■ Modicon OTB		
I/O type		**Digital**	**Analog**	**Expert**
Remote I/O configuration	Hardware	–	–	–
	Bus type	–	–	–
				
Inputs	Number (depending on model)	4 to 32 inputs	2 to 8 inputs	2 channels with 6 inputs
	Type (depending on model)	24 V ⎓ 120 V ∿	Voltage, Current, Temperature	24 V ⎓ sensors (2-wire and 3-wire) 15 to 30 V ⎓ incremental encoders (60 kHz)
Outputs	Number (depending on model)	8 to 32 outputs	1 to 2 outputs	2 channels with 2 outputs
	Type (depending on model)	24 V ⎓ transistor, Relay	0 to 10 V, ± 10 V, 4 to 20 mA	24 V ⎓ transistor
Type of expansion module		**Modicon TM2 digital module**	**Modicon TM2 analog module**	**Modicon TM2 expert module**
Page		3/6	3/14	3/18

For distributed I/O configurations, see the following pages and the "Communication" section in chapter 4.

Local and/or remote I/O (IP 20)				Remote I/O expansion bus (IP 67)	
■ Modicon™ M258™ logic controller ■ Modicon LMC058 motion controller				■ Modicon M258 logic controller ■ Modicon LMC058 motion controller	
Digital	**Analog**	**Digital/analog**	**Expert**	**Digital**	**Analog**
 *Modicon TM5 transmitter/receiver:* ***For use with remote I/O** (1)* + *TM5 expansion bus*				 *Modicon TM5 transmitter/receiver:* ***Required** (1)* + *TM7 expansion bus*	
					
2 to 12 inputs	2 to 6 inputs	Digital: 12 to 14 inputs Analog: 4 inputs	1 or 2 channels with 2 inputs	8 to 16 inputs	2 to 4 inputs
24 V ⎓ 100/120 V ∿, 100/240 V ∿	Voltage, Current, Temperature	Digital: 24 V ⎓ Analog: Voltage, Current	5 V ⎓, 24 V ⎓ (from 50 kHz to 1 MHz)	24 V ⎓	Voltage, Current, Temperature Resistance
2 to 12 outputs	2 to 4 outputs	Digital: 6 to 18 outputs Analog: 2 outputs	–	8 to 16 outputs	2 to 4 outputs
24 V ⎓ 30/230 V ∿, 100/240 V ∿	- 10 to + 10 V, 0 to 20 mA	Digital: 24 V ⎓ Analog: Voltage/Current	–	24 V ⎓ Transistor/Source	- 10 to + 10 V, 0 to 20 mA
Modicon TM5 digital module	**Modicon TM5 analog module**	**Modicon TM5 compact block**	**Modicon TM5 expert module**	**Modicon TM7 digital block**	**Modicon TM7 analog block**
3/24	3/32	3/20	3/36	3/44	3/44

(1) Modicon TM5 transmitter/receiver modules, see page 3/42.

MachineStruxure™
I/O expansion modules
Distributed I/O expansion modules

Applications		**Optimum distributed I/O (IP 20)**
Compatibility		■ Modicon™ M238 logic controller ■ XBT GC HMI controller, XBT GT/GK with monitoring function ■ Altivar™ IMC drive controller

Available buses and networks		■ Modbus/TCP/IP ■ CANopen bus ■ Modbus serial link (RS 485)
Configuration with I/O expansion modules	Module type	**Modicon TM2**: □ Digital I/O modules □ Analog I/O modules □ Expert modules □ Common distribution modules
	Capacity	For 1 Modicon OTB interface module: 7 Modicon TM2 modules max. Including: □ Digital I/O modules: - 132 I/O max. with modules with screw terminals - 188 I/O max. with modules with spring terminals - 244 I/O max. with modules with HE10 connector □ Analog I/O modules with screw terminals: up to 7 x 8 inputs, or 7 x 2 outputs, or 7 x (4I/2O) □ Expert modules □ Common distribution module
Integrated I/O	Number and type (depending on model)	12 x 24 V ⎓ digital inputs 2 x 24 V ⎓ solid state outputs 6 x 30 V ⎓/240 V ∿ relay outputs 2 channels: 5 kHz/20 kHz 2 PWM function channels
Type of distributed I/O expansion module		**Modicon OTB interface modules**
Page		4/14

Performance distributed I/O (IP 20)	Performance distributed I/O (IP 67)
■ Modicon™ M258™ logic controller ■ Modicon LMC058 motion controller	■ Modicon M258 logic controller ■ Modicon LMC058 motion controller
	
■ CANopen™ bus	■ CANopen bus
Modicon TM5 modules and/or Modicon TM7 blocks: □ Digital I/O modules □ Analog I/O modules □ Common distribution modules (TM5 only)	**Modicon TM5 modules and/or Modicon TM7 blocks**: □ Digital I/O modules □ Analog I/O modules □ Common distribution modules (TM5 only)
For 1 Modicon TM5 interface module: 40 TM5/TM7 modules max. Including: □ Digital I/O modules: 240 inputs and 240 outputs max. □ Analog I/O modules: 20 inputs and 20 outputs Maximum distance from the expansion bus (TM5 or TM7): 2500 m. Maximum distance between 2 islands of TM5 modules: 100 m. Maximum distance between 2 TM7 blocks: 100 m. Maximum distance between 1 island of TM5 modules and 1 TM7 block: 100 m.	For 1 TM7 CANopen interface block: 40 TM5/TM7 modules max. Including: □ Digital I/O modules: 240 inputs and 240 outputs max. □ Analog I/O modules: 20 inputs and 20 outputs Maximum distance from the expansion bus (TM5 or TM7): 2500 m. Maximum distance between 2 islands of TM5 modules: 100 m. Maximum distance between 2 TM7 blocks: 100 m. Maximum distance between 1 island of TM5 modules and 1 TM7 block: 100 m.
–	8 to 16 digital channels that can be configured as inputs (24 V ⎓) or outputs (24 V ⎓)
Modicon TM5 CANopen interface module	**Modicon TM7 CANopen interface blocks**
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MachineStruxure™

I/O expansion modules

Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC

Applications	Type of expansion modules	**Digital inputs with removable screw terminal block**		
	Compatibility	■ Modicon™ M238™ logic base controllers ■ Twido™ compact and modular controllers ■ Magelis™ HMI Controller XBT GC ■ Modicon OTB I/O distributed Interfaces		
				
Number and type		8 ⎓ 24 V inputs	8 ∿ 120 V inputs	16 ⎓ 24 V inputs
Connection		By removable screw terminal block		
Inputs	Voltage range	⎓ 20.4 to 28.8 V	∿ 85 to 132 V	⎓ 20.4 to 28.8 V
	Input current	7 mA per channel	7.5 mA per channel	7 mA per channel
	Input logic	Sink/source *(1)*	–	Sink/source *(1)*
	Commons	1 x 8 channels	1 x 8 channels	1 x 16 channels
	Response time Off-on	4 ms	25 ms	4 ms
	On-off	4 ms	30 ms	4 ms
Outputs	Output types			
	Voltage range			
	Commons			
	Output current Per output			
	Per group of channels			
Isolation	Between channels	None		
	Between channels and internal logic	500 V rms ∿ for 1 min	1500 V rms ∿ for 1 min	500 V rms ∿ for 1 min
I/O module type		**TM2 DDI 8DT**	**TM2 DAI 8DT**	**TM2 DDI 16DT**
Pages		3/12		

(1) Sink input: positive logic, source input: negative logic.

Digital inputs with HE10 connector		Digital I/O with removable screw terminal block	Digital I/O with non-removable spring terminal block
■ Modicon™ M238™ logic base controllers ■ Twido™ compact and modular controllers ■ Magelis™ HMI Controller XBT GC ■ Modicon OTB I/O distributed Interfaces			
			
16 ⎓ 24 V inputs	32 ⎓ 24 V inputs	4 ⎓ 24 V inputs/4 relay outputs	16 ⎓ 24 V inputs/8 relay outputs
By HE10 connector Allows use of the Modicon Telefast ABE 7 pre-wired system		By removable screw terminal block	By non-removable spring terminal block
⎓ 20.4 to 28.8 V		⎓ 20.4 to 28.8 V	
5 mA per channel		7 mA per channel	
Sink/source *(1)*		Sink/source *(1)*	
1 x 16 channels	2 x 16 channels	1 x 4 channels	1 x 16 channels
4 ms		4 ms	
4 ms		4 ms	
		1 N/O contact	
		∿ 240 V, ⎓ 30V	
		1 x 4 channels	2 x 4 channels
		2 A (Ith)	
		7 A (Ith)	
None		None between input channels, none between output channels	
		Between input group and output groups: 1500 V rms ∿ for 1 min	
		Between output groups: 1500 V rms ∿ for 1 min	
500 V rms ∿ for 1 min		Between input channels and internal logic: 500 V rms ∿ for 1 min	
		Between output channels and internal logic: 2300 V rms ∿ for 1 min	
TM2 DDI 16DK	**TM2 DDI 32DK**	**TM2 DMM 8DRT**	**TM2 DMM 24DRF**
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MachineStruxure™

I/O expansion modules

Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC

Applications	Type of expansion modules	**8/16 outputs with removable screw terminal block**			
	Compatibility	■ Modicon™ M238™ logic base controllers ■ Twido™ compact and modular controllers ■ Magelis™ HMI Controller XBTGC ■ Modicon OTB I/O distributed Interfaces			
					
Type		8 ⎓ 24 V transistor outputs		8 relay outputs	16 relay outputs
Connection		By removable screw terminal block			
Outputs	Output types	Transistor		Relay with 1 N/O contact	
	Voltage range	⎓ 20.4 to 28.8 V		∿ 240 V, ⎓ 30 V	
	Logic *(1)*	Sink	Source	–	
	Commons	1 x 8 channels		2 x 4 channels	2 x 8 channels
	Output current Per output	0.3 A max.	0.5 A max.	2 A max.	
	Per group of channels	3 A at 28.8 V	4 A at 28.8 V	7 A max.	8 A max.
	Protection against overload and short-circuit	–	Yes, with automatic reactivation on elimination of the fault	–	
Isolation	Between channels	None		None	
	Between group of channels	–		1500 V rms for 1 min	
	Between channels and internal logic	500 V rms ∿ for 1 min		2300 V rms ∿ for 1 min	
Output module type		**TM2 DDO 8UT**	**TM2 DDO 8TT**	**TM2 DRA 8RT**	**TM2 DRA 16RT**
Pages		3/12			

(1) Source output: positive logic, sink output: negative logic.

16/32 outputs with HE 10 connectors

- Modicon™ M238™ logic base controllers
- Twido™ compact and modular controllers
- Magelis™ HMI Controller XBTGC
- Modicon OTB I/O distributed Interfaces

16 ⎓ 24 V transistor outputs	16 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs
By HE10 connector	By HE10 connector Allows use of the Modicon Telefast™ ABE 7 pre-wired system	By HE10 connector	By HE10 connector Allows use of the Modicon Telefast ABE 7 pre-wired system
Transistors			
⎓ 20.4 to 28.8 V			
Sink	Source	Sink	Source
1 x 16 channels		2 x 16 channels	
0.1 A max.	0.4 A max.	0.1 A max.	0.4 A max.
1 A at 28.8 V	2 A at 28.8 V	1 A at 28.8 V	2 A at 28.8 V
–	Yes, with automatic reactivation on elimination of the fault	–	Yes, with automatic reactivation on elimination of the fault
None			
–			
500 V rms ∿ for 1 min			
TM2 DDO 16UK	**TM2 DDO 16TK**	**TM2 DDO 32UK**	**TM2 DDO 32TK**
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MachineStruxure™

I/O expansion modules

Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC

Introduction

The Schneider Electric digital I/O product offer includes: input modules, output modules and mixed input/output modules. With the 15 I/O modules offered – in addition to the I/O integrated in 24 I/O compact base controllers and modular base controllers – configurations can be adapted to best suit application requirements, while reducing costs.

The following digital I/O modules are available:
- Four ⎓ 24 V digital input modules,including: an 8, 16 and a 32-channel module, equipped with either removable screw terminal blocks or HE 10 connector, depending on the model. These modules can be either “sink” or “source” .
- One ∿ 120 V digital input module, 8 channels, equipped with a removable screw terminal block.
- Eight digital output modules, including: two output modules with 8 and 16 relay outputs, output modules with 8, 16 or 32-channel “sink” or “source” transistor outputs – equipped with either removable screw terminal blocks or HE 10 connector, depending on the model.
- Two mixed digital input and output modules, including: one 4-channel input/4-channel relay output module with removable screw terminal block and one 16-channel input/8-channel relay output module with non-removable spring terminal block.

The narrow width of these I/O modules (17.5 mm, 23.5 mm, 29.7 mm or 39.1 mm) makes it possible to build Modicon™ M238™, Twido™ or Modicon™ OTB configurations of up to 248 I/O with a minimal overall size of L 364.9 mm x H 90 mm x D 81.3 mm.

Digital I/O expansion modules and analog I/O modules are connected to a different base controller according to the following rules:
- Modicon M238 24 I/O compact base controllers, **TM238 L●●●●●●** : 7 modules max.
- Twido 24 E/S compact base controllers, **TWD LC●A 24DRF**: 4 modules max.
- Twido 40 E/S compact base controllers, **TWD LC●● 40DRF**: 7 modules max.
- Twido 20 E/S modular base controllers, **TWD LMDA 20D●K**: 4 modules max.
- Twido 20 E/S and 40 E/S modular base controllers, **TWD LMDA 20DRT/40D●K**: 7 modules max.
- Magelis™ HMI Controller, **XBT GC1100●**: 2 modules max.
- Magelis HMI Controller, **XBT GC2●●0●**: 3 modules max
- Modicon OTB Interface 20 E/S, **OTB 1●0 DM9LP**: 7 modules max.

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

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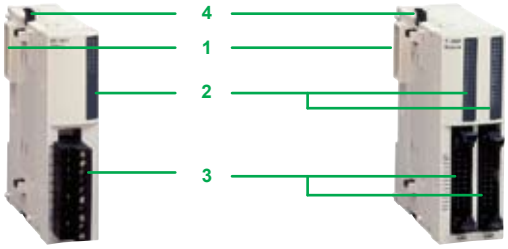
I/O expansion modules

Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC



Module with removable screw terminal block

Module with HE 10 connector

Description

Digital I/O expansion modules include:

1 Extension connector for electrical connection to the previous module (1).
2 One or two blocks for displaying the channels and module diagnostics.
3 One or two connection components of varying type, depending on the model:
- removable screw terminal block (1 or 2) for modules whose reference ends in T
- HE 10 connector (1 or 2) for modules whose reference ends in K
- non-removable spring terminal block for module TM2 DMM 24DRF

4 Latching mechanism for attachment to the previous module.

These modules are mounted on a symmetrical DIN rail. Mounting kit TWD XMT 5 (supplied in lots of 5) allows plate or panel mounting. For modules with removable screw terminal block, the terminal blocks are supplied with the module.

The **OTB 9ZZ 61JP** supply common distribution module (2 isolated groups of 10 terminals) simplifies the wiring of supply commons of sensors or actuators via 2 removable screw terminal blocks.

(1) A connector on the right-hand side helps ensure continuity of the electrical link with the next I/O module.

MachineStruxure™
I/O expansion modules
Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC

References

These digital I/O modules are mounted as standard on symmetrical DIN rails to the right of the Twido base controller. The maximum number of digital and/or analog I/O modules that may be mounted depends on the type of base controller:

Base controller type	Twido™ compact TWD				Twido modular TWD			Modicon™ M238™	Magelis™ HMI Controller		Modicon OTB Interface
	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K	TM238 L●●●●●●	XBT GC 1100●	XBT GC 2●●0●	OTB 1●0 DM9LP
Number of modules	0	0	4	7	4	7	7	7	2	3	7

TM2 DDI 8DT

TM2 DDI 32DK

TM2 DDO 8●T/DRA 8RT

TM2 DDO 16●K

TM2 DDO 32●K

TM2 DRA 16RT

TM2 DMM 8DRT

TM2 DMM 24DRF

Digital input modules

Input voltage	No. of channels	No. of common points	Connection	Reference	Weight kg
⎓ 24 V sink/source	8	1	Removable screw terminal block (supplied)	**TM2 DDI 8DT**	0.085
	16	1	Removable screw terminal block (supplied)	**TM2 DDI 16DT**	0.100
			HE 10 connector	**TM2 DDI 16DK** *(1)*	0.065
	32	2	HE 10 connector	**TM2 DDI 32DK** *(1)*	0.100
∼ 120 V	8	1	Removable screw terminal block (supplied)	**TM2 DAI 8DT**	0.081

Digital output modules

Type	No. of channels	No. of common points	Connection	Reference	Weight kg
Transistors ⎓ 24 V	8, sink 0.3 A	1	Removable screw terminal block (supplied)	**TM2 DDO 8UT**	0.085
	8, source 0.5 A	1	Removable screw terminal block (supplied)	**TM2 DDO 8TT**	0.085
Transistors ⎓ 24 V	16, sink 0.1 A	1	HE 10 connector	**TM2 DDO 16UK**	0.070
	16, source 0.4 A	1	HE 10 connector	**TM2 DDO 16TK** *(1)*	0.070
	32, sink 0.1 A	2	HE 10 connector	**TM2 DDO 32UK**	0.105
	32, source 0.4 A	2	HE 10 connector	**TM2 DDO 32TK** *(1)*	0.105
Relay 2 A (Ith) **∼ 230 V/⎓ 30 V**	8 (N/O contact)	2	Removable screw terminal block (supplied)	**TM2 DRA 8RT**	0.110
	16 (N/O contact)	2	Removable screw terminal block (supplied)	**TM2 DRA 16RT**	0.145

Digital mixed input/output modules

No. of I/O	No., type of input	No., type of output	No. of common points	Connection	Reference	Weight kg
8	4 I, ⎓ 24 V sink/source	4 O, relay (N/O contact) 2 A (Ith)	Inputs: 1 common Outputs: 1 common	Removable screw terminal block (supplied)	**TM2 DMM 8DRT**	0.095
24	16 I, ⎓ 24 V sink/source	8 O, relay (N/O contact) 2 A (Ith)	Inputs: 1 common Outputs: 2 commons	Non-removable spring terminal block	**TM2 DMM 24DRF**	0.140

(1) Module that allows use of the Modicon™ Telefast™ ABE 7 pre-wired system.

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I/O expansion modules

Modicon™ TM2 Digital modules for Modicon M238™ logic controller and HMI controllers XBT GC

OTB 9ZZ 61JP

References

Separate components

Description	Application	Reference	Weight kg
Mounting kit Sold in lots of 5	For plate or panel mounting of the digital modules.	**TWD XMT 5**	0.065
Common distribution module	For distribution of supply commons. 8 A max. Connection on 2 removable screw terminal blocks	**OTB 9ZZ 61JP**	0.100

Pre-formed cables for digital I/O modules with HE 10 connectors

Description	For use with Twido	Gauge C.s.a.	Cable length	Reference	Weight kg
Pre-formed cables 1 pre-formed cable: one end fitted with HE 10 connector, one end with free wires	I/O expansions TM2 DDI 16DK/32DK TM2 DDO 16●K/32●K	AWG 22 0.035 mm²	3 m	**TWD FCW 30K**	0.405
		AWG 22 0.035 mm²	5 m	**TWD FCW 50K**	0.670

Pre-formed connecting cables *(1)*

Description	Association	Gauge C.s.a.	Cable length	Reference	Weight kg
Digital input pre-formed cables, 1 pre-formed cable: one end with 20-way HE 10 connector on TM2 side, one end with 20-way HE 10 connector on sensor side	Inputs TM2 DDI 16DK/32DK	AWG 28 0.080 mm²	1 m	**ABF TE20EP100**	0,080
		AWG 28 0.080 mm²	2 m	**ABF TE20EP200**	0.140
		AWG 28 0.080 mm²	3 m	**ABF TE20EP300**	0.210
Digital output pre-formed cables 1 pre-formed cable: one end with 20-way HE 10 connector on TM2 side, one end with 20-way HE 10 connector on preactuator side	Outputs TM2 DDO 16TK/32TK	AWG 28 0.080 mm²	1 m	**ABF TE20SP100**	0,080
		AWG 28 0.080 mm²	2 m	**ABF TE20SP200**	0.140
		AWG 28 0.080 mm²	3 m	**ABF TE20SP300**	0.210

(1) Cables strictly for applications other than use of Modicon™ Telefast™ ABE 7 sub-bases with Twido controllers. For use of Modicon Telefast ABE 7 sub-bases with Twido controllers, please consult your custommer care center.

MachineStruxure™
I/O expansion modules
Modicon™ TM2 Analog modules for Modicon M238™ logic controller and HMI controllers XBT GC

Applications	**Type of expansion modules**	**Analog inputs**			
	Compatibility	■ Modicon™ M238™ logic base controllers ■ Twido™ compact and modular controllers ■ Magelis™ HMI controller ■ Modicon OTB I/O distributed Interfaces			
					
Type		2 inputs		4 inputs	8 inputs
Nature		Voltage/current	Thermocouple inputs	Voltage/current Temperature probe	Voltage/current
Connection		Removable screw terminal block			
Inputs	Range	0 to 10 V 4 to 20 mA (non differential)	Thermocouple type J, K and T (differential)	□ 0 to 10 V or 0 to 20 mA *(Transfer time: 160 ms per channel)* □ Temperature probe 2, 3 or 4-wire: - Pt 100/1000: - 200 to 600 °C, - Ni 100/1000: - 50 to 150 °C (non differential) *(Transfer time: 320 ms per channel + 1 controller cycle time)*	0 to 10 V 0 to 20 mA (non differential)
	Resolution	12 bits (4096 points)	12 bits (4096 points)	12 bits (4096 points)	10 bits (1024 points)
	Acquisition period	10 ms per channel + 1 controller cycle time	200 ms per channel + 1 controller cycle time	□ 160 ms per channel □ 320 ms per channel + 1 controller cycle time	160 ms per channel + 1 controller cycle time
Outputs	Range				
	Resolution				
	Transfer time				
External suplly	Nominal voltage	⎓ 24 V			
	Limit values	⎓ 20.4 to 28.8 V			
Isolation	Between channels	Non isolated			
	Between channels and sensor supply	∿ 500 V rms		Non isolated	
	Between channels and internal logic	∿ 500 V rms	∿ 2500 V rms	∿ 2500 V rms	
Analog I/O module type		**TM2 AMI 2HT**	**TM2 AMI 2LT**	**TM2 AMI 4LT**	**TM2 AMI 8HT**
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Analog inputs (continued)			**Analog outputs**		**Analog I/O**		
■ Modicon™ M238™ logic base controllers ■ Twido™ compact and modular controllers ■ Magelis™ HMI controller ■ Modicon OTB I/O distributed Interfaces							
		 *(2)*					
8 inputs			1 output	2 outputs	2 inputs/1 output		4 inputs/2 outputs
Temperature probe inputs			Voltage/current	Voltage	Voltage/current	Thermocouple/ temperature probe inputs Voltage/current output	Voltage/current
Removable screw terminal block		Removable screw terminal block and RJ11 connectors	Removable screw terminal block				
NTC probe (non diffe- rential)	PTC probe ⚠ Threshold detection (high and low) (non dif.)	Temperature probe 2 or 3-wire Pt100: - 200 to 600 °C Pt1000: - 50 to 200 °C) (non differential)			0 to 10 V 4 to 20 mA (non differential)	Thermocouple type J, K and T Temperature probe 2 or 3-wire Pt100: - 100 to 500 °C (non differential)	0 to 10 V 4 to 20 mA (non differential)
10 bits (1024 pts)	**1** < range **2** = range **4** > range	12 bits (4096 points)			12 bits or 11 bits + sign (4096 points)		12 bits (4096 points)
160 ms per channel + 1 controller cycle time		320 ms per channel (1280 ms maxi.) + 1 controller cycle time			10 ms per channel + 1 controller cycle time	50 ms per channel + 1 controller cycle time	64 ms per channel + 1 controller cycle time
			0 to 10 V 4 to 20 mA	± 10 V	0 to 10 V 4 to 20 mA		
			12 bits (4096 points)	11 bits (2048 points) + sign	12 bits (4096 points)		
			10 ms + 1 controller cycle time	2 ms + 1 controller cycle time	20 ms + 1 controller cycle time		
⎓ 24 V			⎓ 24 V				
⎓ 20.4 to 28.8 V		⎓ 19.2 to 30 V	⎓ 19.2 to 30 V				
Non isolated							
Non isolated		∿ 500 V rms	∿ 500 V rms	Non isolated	∿ 500 V rms		∿ 800 V rms
∿ 2500 V rms			∿ 500 V rms	∿ 2500 V rms	∿ 500 V rms		∿ 1500 V rms
TM2 ARI 8HT		**TM2 ARI 8LT** *(1)* **TM2 ARI 8LRJ** *(2)*	**TM2 AMO 1HT**	**TM2 AVO 2HT**	**TM2 AMM 3HT**	**TM2 ALM 3LT**	**TM2 AMM 6HT**

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(1) Connection by a removable screw terminal block.
(2) Connection by a RJ11 connector.

MachineStruxure™
I/O expansion modules
Modicon™ TM2 Analog modules for Modicon M238™ logic controller and HMI controllers XBT GC

Introduction

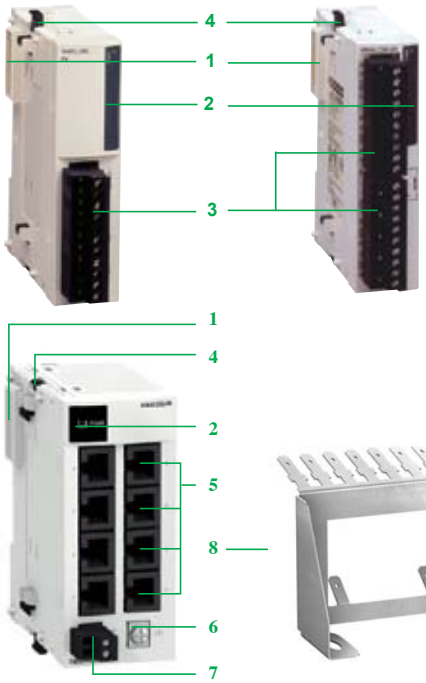
Analog I/O expansion modules enable the acquisition of various analog values found in industrial applications.
Analog output modules are used to control the preactuators in devices such as: variable speed drives, valves and applications that require process control where the output current or voltage is proportional to the numerical value defined by the user program. When the controller stops, the outputs can be configured with fallback (reset to the lowest scale value, or to hold the last value received). This function, when set to 'hold', is useful when debugging the application, or when a detected fault occurs, to help ensure that the process being controlled is not disrupted.

The following 10 analog I/O modules are available:
- One module with 2 inputs: 0 to 10 V, 4 to 20 mA
- One module with 2 inputs for type J, K and T thermocouples
- One module with 4 inputs: 0 to 10 V, 0 to 20 mA, Pt 100/1000 range - 200 to 600°C, Ni100/1000 range - 50 to 150°C
- Two modules with 8 temperature probe inputs: Pt100 range - 200 to 600°C and Pt1000 range - 50 to 200°C (with RJ11 connectors or removable screw terminal block)
- One module with 8 inputs: 0 to 10 V, 0 to 20 mA
- One module with 8 inputs: PTC/NTC *(1)*
- One module with 1 output: 0 to 10 V, 4 to 20 mA
- One module with 2 outputs: ± 10 V
- One mixed module with 2 inputs (0 to 10 V, 4 to 20 mA) and 1 output (0 to 10 V, 4 to 20 mA)
- One mixed module with 2 thermocouple (type J, K and T) or temperature probe inputs and 1 output 0 to 10 V, 4 to 20 mA
- One mixed module with 4 inputs (0 to 10 V, 4 to 20 mA) and 2 outputs (0 to 10 V, 4 to 20 mA)

Analog expansion modules offer a resolution of 10 bits, 11 bits + sign and 12 bits, with connection by removable screw terminal block. An external 24 V ⎓ power supply is required for each analog module.

Discrete I/O expansion modules and analog I/O modules are connected to the different base controllers according to the following rules:
- Modicon™ M238 24 I/O compact base controllers, **TM238 L●●●●●●**: 7 modules max.
- Twido™ 24 I/O compact base controllers, **TWD LC●A 24DRF**: 4 modules max.
- Twido 40 I/O compact base controllers, **TWD LC●● 40DRF**: 7 modules max.
- Twido 20 I/O modular base controllers, **TWD LMDA 20D●K**: 4 modules max.
- Twido 20 I/O and 40 I/O modular base controllers, **TWD LMDA 20DRT/40D●K**: 7 modules max.
- Magelis™ HMI Controller, **XBT GC1100●**: 2 modules max.
- Magelis HMI Controller, **XBT GC2●●0●**: 3 modules max.
- Modicon OTB Interface 20 I/O, **OTB 1●0 DM9LP**: 7 modules max.

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



Description

Analog I/O modules include:
1 Extension connector for electrical connection to the adjacent module (2)
2 PWR display block
3 One (or two, depending on model) removable screw terminal block(s) for connecting the 24 V ⎓ external power supply, the sensors and the preactuators
4 Latching mechanism for attachment to the adjacent module
5 For modules with 8 temperature probe inputs:
6 8 RJ11 connectors. A version of this module is available with 2 removable screw terminal blocks (2 x 13 terminals)
7 Screw terminal for connecting the functional ground (FG)
8 Removable screw terminal block for connecting the 24 V ⎓ power supply

The **TM2 XMTGB** ground connection plate 8 simplifies connection of the analog sensor and actuator cable shielding. This shielding must be connected to the device's functional ground (FG).
These modules are mounted on a symmetrical DIN rail. Mounting kit **TWD XMT 5** (supplied in lots of 5) can be used for plate or panel mounting.

(1) With PTC probe, threshold detection inputs (high and low).
(2) A connector on the right-hand side panel ensures continuity of the electrical link with the adjacent I/O module.

MachineStruxure™
I/O expansion modules
Modicon™ TM2 Analog modules for Modicon M238™ logic controller and HMI controllers XBT GC

References

These analog I/O expansion modules are mounted on symmetrical DIN rails to the right of the base controller shown below. The maximum number of I/O and/or analog modules which may be mounted depends on the type of base controller:

Base controller type	Twido™ compact TWD				Twido modular TWD			Modicon™ M238™	Magelis™ HMI Controller		Modicon OTB Interface
	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K	TM238 L●●●●●●	XBT GC 1100●	XBT GC 2●●0●	OTB 1●0 DM9LP
Number of modules	0	0	4	7	4	7	7	7	2	3	7

TM2 AMI 2HT

TM2 AMI 2LT

TM2 ARI 8LRJ

TM2 ARI 8LT

TM2 ALM LT

TM2 AMM 6HT

TM2 XMTGB

TM200 RSRCEMC

Analog input modules

Channel type	Input range	Output range	Resolution	Connection by	Reference	Weight kg
2 inputs	0 to 10 V 4 to 20 mA	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 2HT**	0.085
	Thermocouple K, J, T	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 2LT**	0.085
4 inputs	0 to 10 V 0 to 20 mA Temperature	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 4LT**	0.085
8 inputs	0 to 10 V 0 to 20 mA	–	10 bits	Removable screw terminal block (supplied)	**TM2 AMI 8HT**	0.085
	Pt 100 Pt 1000	–	12 bits	RJ11 connector	**TM2 ARI 8LRJ**	0.190
				Removable screw terminal block (supplied)	**TM2 ARI 8LT**	0.190
	PTC/NTC	–	10 bits for NTC 2-threshold detection with PTC	Removable screw terminal block (supplied)	**TM2 ARI 8HT**	0.085

Analog output modules

1 output	–	0 to 10 V 4 to 20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMO 1HT**	0.085
2 outputs	–	± 10 V	11 bits + sign	Removable screw terminal block (supplied)	**TM2 AVO 2HT**	0.085

Analog I/O modules

2 inputs and 1 output	0 to 10 V 4 to 20 mA	0 to 10 V 4 to 20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMM 3HT**	0.085
	J, K, T thermocouple 3-wire Pt 100 temperature probe	0 to 10 V 4 to 20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 ALM 3LT**	0.085
4 inputs and 2 outputs	0 to 10 V 4 to 20 mA	0 to 10 V 4 to 20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMM 6HT**	0.085

Separate components

Description	Description	Reference	Weight kg
Ground connection plate	Plate equipped with male Faston connector for connecting cable shielding (via Faston clamp 6.35 mm, not supplied) and functional grounds (FG)	**TM2 XMTGB**	0.045
Shielding connection clamps	Attach and ground the shielding of the cables Sold in lots of 25 (20 for cable Ø 4.8 mm and 5 for cable Ø 7.9 mm)	**TM200 RSRCEMC**	–
Mounting kit	For plate or panel mounting of the analog modules. Sold in lots of 5	**TWD XMT 5**	0.065

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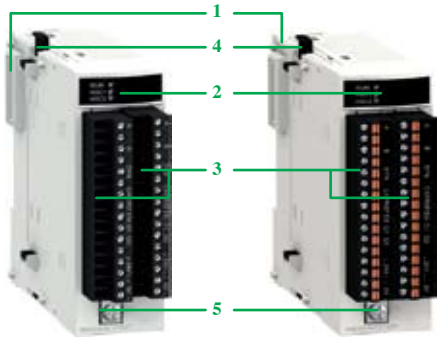
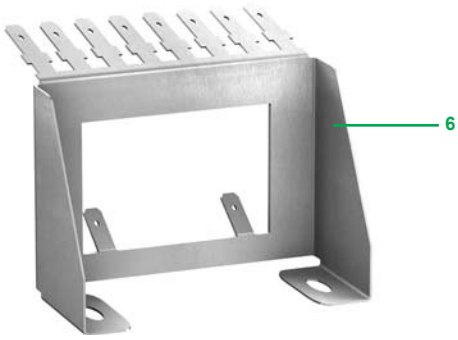
I/O expansion modules
Modicon™ TM2 Expert modules for Modicon M238™ logic controller and HMI controllers XBT GC





Introduction

TM200 HSC 206DT/DF Expert modules for the Modicon™ M238™ logic controller are used to count the pulses generated by a sensor, or to process the signals from an incremental encoder.
The two modules, both with two 60 KHz counter channels, differ in the way they are connected:
- □ Removable screw terminal block (2 x 16 contacts): **TM200 HSC 206DT**
- □ Removable spring terminals **TM200 HSC 206DF**

Expert modules	No. of channels	Maximum frequency	Integrated functions	Physical I/O per channel	
				Inputs	Outputs
TM200 HSC 206DT **TM200 HSC 206DF** (3 modules max. per TM238 base)	2	60 KHz	Upcounting Downcounting Period meter Frequency meter Frequency generator Axis following with encoder	6	2

The sensors used on each channel can be:
- 2-wire 24 V proximity sensors,
- 3-wire PNP 24 V proximity sensors,
- Limit switches (N/O or N/C contact),
- 15/30 V output signal incremental encoders and source outputs (positive logic).

TM200 HSC 206D● Expert modules meet the requirements of such applications as:
- Alarm generation on empty unwinder status using the ratio,
- Sorting small parts using the period meter,
- Single electronic cam using the dynamic setting thresholds,
- Speed control using the period meter,
- Grouping/ungrouping for packaging machines,
- Event counting,
- Flow or speed measurement.

TM200 HSC 206D● Expert modules are considered to be expansion modules and are connected to the Modicon M238 base by stacking them on a DIN rail starting at the right-hand side panel of the base. Seven expansion modules are permitted in total, a maximum of 3 of which can be **TM200 HSC 206D●** Expert modules.
The function parameters are set by configuration using SoMachine software.

Description

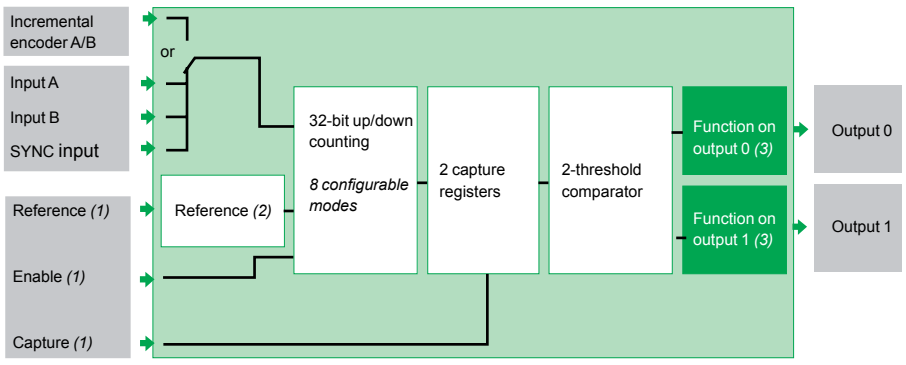
TM200 HSC 206D● 60 KHz Expert modules include:
1. Extension connector for linking with the adjacent module *(1)*.
2. Channel and module diagnostics display block.
3. 2 removable screw or spring terminal blocks marked TB0 and TB1 for connecting the sensors and preactuators.
4. Mechanical device for locking to the adjacent module.
5. Screw terminal for the functional ground (FG) connection.

The **TM2 XMTGB** ground connection plate **6** simplifies connection of the sensor and encoder cable shielding. This shielding must be connected to the device's functional ground.
These modules are mounted as standard on a symmetrical DIN rail. The TWD XMT 5 mounting kit (supplied in lots of 5) can be used for plate or panel mounting.

(1) A connector on the right-hand side panel ensures continuity of the link with the adjacent I/O module.

Operation

Block diagram of a TM200 HSC 206DT/DF module counter channel



(1) Optional inputs.
(2) Reference: 4 operating modes for "IN_SYNC" SYNC and "IN_REF" Reference inputs.
(3) Function on outputs: 11 possible types of behavior.

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I/O expansion modules

Modicon™ TM2 Expert modules for Modicon M238™ logic controller and HMI controllers XBT GC

TM2 00HSC 206DT

TM2 00HSC 206DF

TM2 XMTGB

References

Expert modules (3 modules max. per TM238 base)

Description	No. of channels	Specifications	Connection	Reference	Weight kg
Counter modules for: - 24 V ⎓ 2 and 3-wire sensors - 15/30 V ⎓ incremental encoders with source outputs (positive logic)	2	60 kHz counting	Screw terminals	**TM200 HSC 206DT**	0,150
			Spring terminals	**TM200 HSC 206DF**	0,150

Separate parts

Designation	Description	Reference	Weight kg
Ground connection plate	Support equipped with 10 male Faston connectors for connecting the cable shielding (via 6.35 mm connectors, not supplied) and the functional grounds (FG)	**TM2 XMTGB**	0.045
Mounting kit Sold in lots of 5	For plate or panel mounting of the analog modules	**TWD XMT 5**	0.065

Note: *The shielding of the cordsets carrying the counter signals must be connected to the metal plate or panel (grounded casing) which is connected to the device's protective ground (PE).*

⚠ *Connecting the shielding does not remove the need to connect the functional ground screw terminal FG (item* **5** *on page 3/18) on the module to ground via the* **TM2 XMTGB** *ground connection plate.*

MachineStruxure™

I/O expansion modules

Modicon™ TM5 compact blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications	Type of TM5 compact block	42 I/O	20 I/O
	Compatibility	Modicon™ M258™ logic controller Modicon LMC058 motion controller	
			
Channel connection		With removable spring terminal blocks (supplied)	
Digital inputs	Number	24	12
	Nominal input voltage	24 V ⎓	24 V ⎓
	IEC/EN 61131-2 conformity	Type 1	Type 1
	Type of signal *(1)*	Sink	Sink
	Type of wiring	1-wire	3-wire
	Limit values	20.4 to 28.8 V ⎓	20.4 to 28.8 V ⎓
	Nominal input current	3.75 mA	3.75 mA
	Input impedance	6.4 kΩ	6.4 kΩ
	State 0	5 V max. ⎓	5 V max. ⎓
	State 1	15 V min. ⎓	15 V min. ⎓
Digital outputs	Number	18, transistor	8, transistor
	Nominal output voltage	24 V ⎓	24 V ⎓
	Output current per channel	0.5 A	0.5 A
	Output current per group of channels	2 A max.	1 A max.
	Type of signal *(1)*	Source	Source
	Type of wiring	2-wire	3-wire
	Limit values	20.4 to 28.8 V ⎓	20.4 to 28.8 V ⎓
	Short-circuit and overload protection	Yes	Yes
Analog inputs	Number		
	Type		
	Range		
	Resolution		
	Sampling period without filtering		
	Sampling period with filtering		
Analog outputs	Number		
	Type		
	Range		
	Resolution		
	Response time		
Power supply			
Isolation	Channel-to-channel		
	Between channel groups		
	Channel-to-bus		
Type of TM5 compact block		TM5 C24D18T	TM5 C12D8T
Page		3/23	

(1) Source output: PNP output. Sink output: NPN output.

24 I/O	36 I/O
Modicon™ M258™ logic controller **Modicon LMC058 motion controller**	
	
With removable spring terminal blocks (supplied)	
12	24
24 V ⎓	24 V ⎓
Type 1	Type 1
Sink	Sink
2-wire	1-wire
20.4 to 28.8 V ⎓	20.4 to 28.8 V ⎓
3.75 mA	3.75 mA
6.4 kΩ	6.4 kΩ
5 V max. ⎓	5 V max. ⎓
15 V min. ⎓	15 V min. ⎓
6, transistor	12, relays with NO contact
24 V ⎓	24 V ⎓
0.5 A	0.5 A
2 A max.	5 A max.
Source	Source
2-wire	1-, 2- or 3-wire
20.4 to 28.8 V ⎓	20.4 to 28.8 V ⎓
Yes	Yes
4	
Voltage/current	
- 10 to + 10 V DC 0 to 20 mA/4 to 20 mA	
12 bits	
300 µs	
1 ms	
2	
Voltage/current	
- 10 to + 10 V DC 0 to 20 mA	
12 bits	
1 ms max.	
Internal	
Non-isolated	
–	
500 V ∼ RMS	
TM5 C12D6T6L	**TM5 C24D12R**
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MachineStruxure™

I/O expansion modules

Modicon™ TM5 compact blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

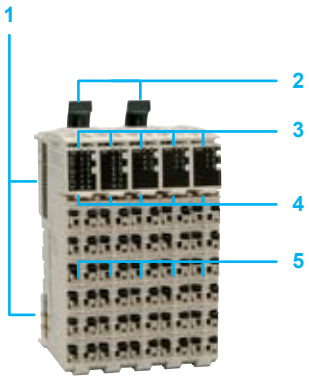
Modicon™ TM5 compact blocks offer a low-cost solution for expanding digital and/or analog I/O control system configurations.
They consist of a block containing the circuit boards, the bus bases, and the TM5 ACTB12 removable terminal blocks.

These TM5 compact blocks complement the embedded I/O in the various M258 controllers and LMC058 motion controllers, and represent a cost-effective way to create configurations requiring a large number of digital or analog channels.

The TM5 C●●●●●●● I/O compact block offer consists of:
- 24 V ⎓ digital I/O compact block, with 24 sink/source inputs and 18 transistor outputs
- 24 V ⎓ digital I/O compact block, with 12 sink/source inputs and 8 transistor outputs
- 24 V ⎓ mixed I/O compact block, with 12 sink/source digital inputs and 4 analog inputs, and 6 transistor digital outputs and 2 analog outputs
- 24 V ⎓ digital I/O compact block, with 24 sink/source inputs and 12 relay outputs

Regardless of which compact block is chosen, the format is the same and corresponds to five I/O expansion modules.
TM5 compact blocks are connected to the TM5 expansion bus on M258 controllers and LMC058 motion controllers.

The advantage of these blocks is their compact size, ease of wiring and – depending on the reference – the option of combining different types of channel.



Description

TM5 compact blocks include:
1. On each side of the base, a bus expansion connection for the link with the previous controller or block
2. Two mechanical locking clips for mounting/dismounting on a symmetrical rail
3. Five LED display blocks for the channels and compact block diagnostics
4. Five slots for the plain text cover holder (label-holder)
5. Five removable spring terminal blocks, each with locking clip and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 compact blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: white

TM5 C24D18T

TM5 C12D8T

TM5 C12D6T6L

TM5 C24D12R

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

References

TM5 I/O compact blocks

Number of I/O	Inputs	Outputs (1)	Reference	Weight kg
42 I/O	24 digital inputs, 24 V ⎓, Sink, 1-wire	18 transistor digital outputs, 24 V ⎓, Source, 0.5 A, 2-wire	**TM5 C24D18T**	0.037
20 I/O	12 digital inputs, 24 V ⎓, Sink, 3-wire	8 transistor digital outputs, 3-wire, 24 V ⎓, Source, 0.5 A	**TM5 C12D8T**	0.037
24 I/O	12 digital inputs, 24 V ⎓, Sink, 2-wire 4 analog inputs - 10 to + 10 V, 0 to 20 mA, 4 to 20 mA, resolution 12 bits	6 transistor digital outputs, 2-wire, 24 V ⎓, Source, 0.5 A 2 analog outputs, - 10 to + 10 V, 0 to 20 mA, resolution 12 bits	**TM5 C12D6T6L**	0.037
36 I/O	24 digital inputs, 24 V ⎓, Sink, 1-wire, 0.5 A max	12 digital outputs, 5 A relay, with NO contact, 30 V ⎓/230 V ∿	**TM5 C24D12R**	0.037

Terminal blocks

Use	Description	Sold in lots of	Unit reference	Weight kg
For I/O compact blocks, 24 V ⎓ power supply	12 spring terminals	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.200

Accessories

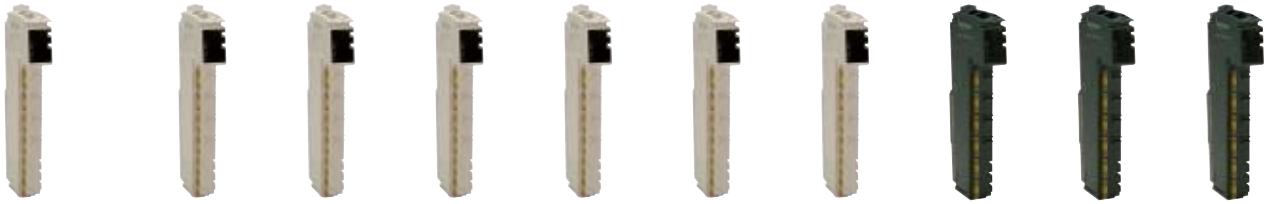
Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.200
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.100
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.100
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030

(1) Source output: PNP output, sink output: NPN output.

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Digital modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications	Type of expansion module	**2 to 12 digital input channels**						
	Compatibility	**Modicon™ M258™ logic controller, Modicon LMC058 motion controller**						
								
Channel connection		With removable spring terminal blocks (to be ordered separately)						
Inputs	Number	2	4	6	12	2	4	6
	Nominal input voltage	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	100/240 V ∿	100/240 V ∿	100/240 V ∿
	IEC/EN 61131-2 conformity	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1
	Type of signal *(1)*	Sink	Sink	Sink	Sink	–	–	–
	Type of wiring	1-, 2- or 3-wire	1-, 2- or 3-wire	1 or 2-wire	1-wire	1-, 2- or 3-wire	1 or 2-wire	1 or 2-wire
	Limit values	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	∿ 100 to 240 V	∿ 100 to 240 V	∿ 100 to 120V
	Nominal input current	3.75 mA	3.75 mA	3.75 mA	3.75 mA	5 mA at ∿ 100 V 11 mA at ∿ 240 V	5 mA at ∿ 100 V 11 mA at ∿ 240 V	10 mA at ∿ 120 V
	Input impedance	6.4 kΩ	6.4 kΩ	6.4 kΩ	6.4 kΩ	–	–	–
	State 0	⎓ 5 V max.	⎓ 5 V max.	⎓ 5 V max.	⎓ 5 V max.	–	–	–
	State 1	⎓ 15 V min.	⎓ 15 V min.	⎓ 15 V min.	⎓ 15 V min.	–	–	–
Outputs	Number							
	Nominal output voltage							
	Output current per channel							
	Output current per group of channels							
	Type of signal *(1)*							
	Type of wiring							
	Limit values							
	Short-circuit and overload protection							
Type of electronic expansion module		**TM5 SDI2D**	**TM5 SDI4D**	**TM5 SDI6D**	**TM5 SDI12D**	**TM5 SDI2A**	**TM5 SDI4A**	**TM5 SDI6U**
								
Associated bus base (to be ordered separately)	TM5 ACBM11	Yes	Yes	Yes	Yes	No	No	No
	TM5 ACBM15	Yes	Yes	Yes	Yes	No	No	No
	TM5 ACBM12	No	No	No	No	Yes	Yes	Yes
								
Associated terminal block (to be ordered separately)	TM5 ACTB06	Yes	Yes	Yes	No	No	No	No
	TM5 ACTB12	Yes	Yes	Yes	Yes	No	No	No
	TM5 ACTB32	No	No	No	No	Yes	Yes	Yes
Page		3/29				3/31		

(1) Source output: PNP output, sink output: NPN output.

8 digital input channels 4 transistor output channels	2 to 12 transistor output channels						2 transistor output channels	2 to 4 relay output channels	
Modicon™ M258™ logic controller, Modicon LMC058 motion controller									
									
With removable spring terminal blocks (to be ordered separately)									
8									
24 V ⎓									
Type 1									
Sink									
1-wire									
⎓ 20.4 to 28.8 V									
3.75 mA									
6.4 kΩ									
⎓ 5 V max.									
⎓ 15 V min.									
4	2	4	4	6	8	12	2	2	4
24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	100/240 V ∿	⎓ 30/∿ 230 V	⎓ 30/∿ 230 V
0.5 A	0.5 A	0.5 A	2 A	0.5 A	2 A	0.5 A	1 A	5 A	5 A
2 A max.	1 A max.	2 A max.	4 A max.	3 A max.	8 A max.	6 A max.	1 A	10 A max.	10 A max.
Source	Source	Source	Source	Source	Source	Source	Solid state relay	Relay	Relay
1-wire	1-, 2- or 3-wire	1-, 2- or 3-wire	1-, 2- or 3-wire	1 or 2-wire	1-wire	1-wire	3-wire	NO/NC contact	NO/NC contact
⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V	∿ 80 to 264 V	⎓ 24 to 36 V ∿ 184 to 276 V	⎓ 24 to 36 V ∿ 184 to 276 V
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
TM5 SDM12DT	**TM5 SDO2T**	**TM5 SDO4T**	**TM5 SDO4TA**	**TM5 SDO6T**	**TM5 SDO8TA**	**TM5 SDO12T**	**TM5 SDO2S**	**TM5 SDO2R**	**TM5 SDO4R**
									
Yes	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
Yes	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
No	**No**	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**
									
No	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**
Yes	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
No	**No**	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**
3/29							3/31		

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Digital modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

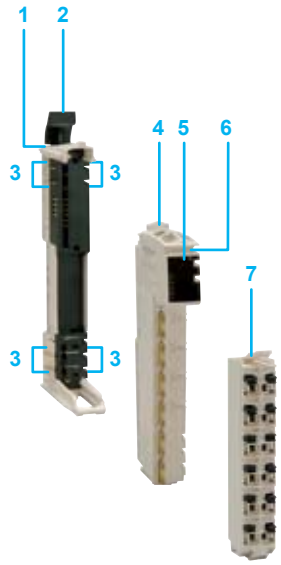
The Modicon™ TM5 SD●●●● digital module offer consists of 11 input, mixed I/O and output electronic modules (sensor and preactuator 24 V ⎓ power supply).
They complement the embedded I/O in the various M258 controllers and LMC058 motion controllers and are used to adapt to the application requirements as closely as possible – to reduce installation and wiring costs.

Each digital expansion module consists of three parts to be ordered separately:
- □ I/O electronic module
- □ Bus base
- □ Terminal block

These TM5 modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- □ Removable terminal
- □ Spring terminals that can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening
- □ Hot swapping

The digital modules offer includes:
- ■ Four 24 V ⎓ digital input electronic modules with 2, 4, 6 or 12 sink inputs
- ■ One 24 V ⎓ digital mixed I/O electronic module, with 8 sink inputs and 4 source transistor outputs
- ■ Six digital output electronic modules with 2, 4, 6, 8 or 12 source transistor outputs

Description



TM5 S●●●● digital modules include:

1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each side of the base for the link with the previous controller or module
4 Digital input, I/O or output electronic module
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Digital modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: White

TM5 SD●●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

References

Digital input electronic modules

Voltage	Number and type of channels (1)	Reference	Weight kg
24 V ⎓ inputs	2 sink inputs	**TM5 SDI2D**	0.025
	4 sink inputs	**TM5 SDI4D**	0.025
	6 sink inputs	**TM5 SDI6D**	0.025
	12 sink inputs	**TM5 SDI12D**	0.025

Digital mixed I/O electronic modules

24 V ⎓ I/O	8 sink inputs 4 source transistor outputs	**TM5 SDM12DT**	0.025

Digital output electronic modules

24 V ⎓ outputs	2 source transistor outputs	0.5 A per channel	**TM5 SDO2T**	0.025
	4 source transistor outputs	0.5 A per channel	**TM5 SDO4T**	0.025
	4 source transistor outputs	2 A per channel, 4 A per module	**TM5 SDO4TA**	0.025
	6 source transistor outputs	0.5 A per channel	**TM5 SDO6T**	0.025
	8 source transistor outputs	2 A per channel	**TM5 SDO8TA**	0.025
	12 source transistor outputs	0.5 A per channel	**TM5 SDO12T**	0.025

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
24 V ⎓	–	1	**TM5 ACBM11**	0.020
		10	**TM5 ACBM1110**	0.020
	Address setting	1	**TM5 ACBM15**	0.020
		10	**TM5 ACBM1510**	0.020

Terminal blocks

Use	Description	Sold in lots of	Unit reference	Weight kg
For digital I/O electronic modules, 24 V ⎓ power supply	6 contacts	1	**TM5 ACTB06**	0.016
		10	**TM5 ACTB0610**	0.016
	12 contacts	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.020

Accessories

Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

(1) Source output: PNP output, sink output: NPN output.

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Digital modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

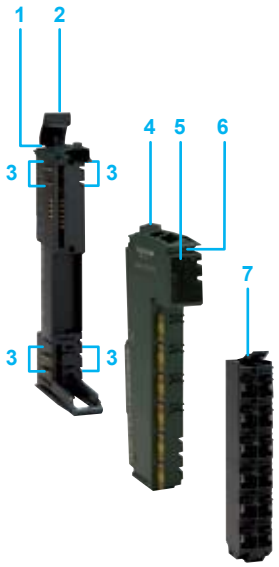
Introduction

The **TM5 SD●●●** digital module offer consists of six input and output electronic modules (sensor and preactuator 100/240 V ∿ power supply).
These TM5 modules complement the embedded I/O in the various M258 controllers and LMC058 motion controllers, and are used to adapt to the application requirements as closely as possible – to reduce installation and wiring costs.

Each digital module consists of three parts to be ordered separately:
- An I/O electronic module
- A bus base
- A terminal block

TheseTM5 modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal
- Spring terminals that can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening.
- Hot swapping

The digital modules offer includes:
- Two 100/240 V ∿ digital input electronic modules, with 2 or 4 inputs
- 100/120 V ∿ digital input electronic module, with 6 inputs
- 100/240 V ∿ digital output electronic modules, with 2 outputs
- Two 30 V ⎓/230 V ∿ digital output electronic modules, with 2 or 4 relay outputs



Description

TM5 SD●●● digital modules include:
1. Bus base
2. Mechanical locking lever for mounting/dismounting on a symmetrical rail
3. Bus expansion connection on each side of the base for the link with the previous controller or module
4. Digital input or output electronic module
5. Channel and module diagnostics LED display block
6. Slot for labeling (label-holder)
7. Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Digital modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: black

TM5 SDI●●

TM5 SDO●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

TM5 ACADL100

References

Multivoltage digital input electronic modules

Voltage	Number and type of channels (1)	Reference	Weight kg
100/240 V ∿ inputs	2 inputs	**TM5 SDI2A**	0.025
	4 inputs	**TM5 SDI4A**	0.025
100/120 V ∿ inputs	6 inputs	**TM5 SDI6U**	0.025

Digital output electronic modules

100/240 V ∿ outputs	2 x 1 A transistor outputs	**TM5 SDO2S**	0.025
30 V ⎓/230 V ∿ outputs	2 x 5 A relay outputs, NO/NC contact	**TM5 SDO2R**	0.025
	4 x 5 A relay outputs, NO/NC contact	**TM5 SDO4R**	0.025

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
∿ 240 V	–	1	**TM5 ACBM12**	0.020
		10	**TM5 ACBM1210**	0.020

Terminal blocks

Use	Description	Sold in lots of	Unit reference	Weight kg
For digital I/O electronic module, 240 V ∿ power supply	12 contacts	1	**TM5 ACTB32**	0.025
		10	**TM5 ACTB3210**	0.025

Accessories

Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

(1) Source output: PNP output, sink output: NPN output.

MachineStruxure™

I/O expansion modules

Modicon™ TM5 common distribution modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

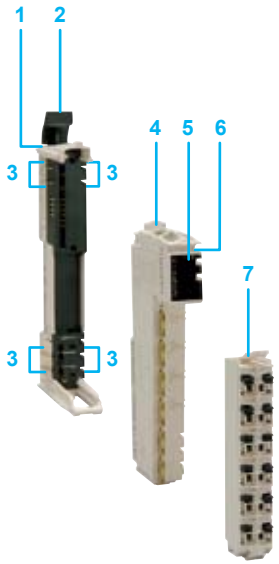
TM5 SP●●● common distribution modules make cabling more flexible by “branching” the various voltages needed to power the I/O expansion modules used.

Each common distribution module consists of three parts to be ordered separately:
- Common distribution electronic module
- Bus base
- Terminal block to be chosen according to the number of terminals

These modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal
- Spring terminals that can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening
- Hot swapping

The power supply common modules offer includes four common distribution electronic modules which have a removable fuse.

A non-functioning dummy module, the TM5 SD000 which can be used to:
- Increase the flexibility in managing the various options for an installation: machine with or without temperature sensors for example.
- Reserve a physical slot and a logical address on the backplane bus, for adding a functioning module at a later date: application-specific I/O expansion for example.



Description

Common distribution modules comprise:
1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each sie of the base for the link with the previous controller or module
4 Common distribution electronic module
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 common distribution modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: white

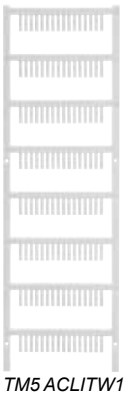
TM5 SPDG●●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100



TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

References

Common distribution electronic modules *(1)*

Power supply type	Specifications	Reference	Weight kg
24 V ⎓	12 common x 0 V DC with 1 fuse	**TM5 SPDG12F**	0.025
	12 common x 24 V DC with 1 fuse	**TM5 SPDD12F**	0.025
	5 common x 0 V DC 5 common x 24 V DC with 1 fuse	**TM5 SPDG5D4F**	0.025
	6 common x 0 V DC 6 common x 24 V DC with 1 fuse	**TM5 SPDG6D6F**	0.025

Dummy electronic module

Specifications	Used for	Reference	Weight kg
Non-functioning	Reservation of slots and logical address	**TM5 SD000**	0.015

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
24 V ⎓	–	1	**TM5 ACBM11**	0.020
		10	**TM5 ACBM1110**	0.020
	Address setting	1	**TM5 ACBM15**	0.020
		10	**TM5 ACBM1510**	0.020

Terminal blocks

Use	Description	Sold in lots of	Unit reference	Weight kg
For common distribution electronic module, 24 V ⎓ power supply	6 contacts	1	**TM5 ACTB06**	0.016
		10	**TM5 ACTB0610**	0.016
	12 contacts	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.020

Accessories

Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

(1) Equipped with 5 x 20 internal fuse, slow-blow 6.3 A

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Analog modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications	Type of expansion module		**2 to 6 analog input channels**			
	Compatibility		**Modicon™ M258™ logic controller, Modicon LMC058 motion controller**			
						
Channel connection			With removable spring terminal blocks (to be ordered separately)			
Analog inputs	Number		2	2	4	4	2
	Type		Voltage/current	Voltage/current	Voltage/current	Voltage/current	Pt100/Pt1000 temperature probe
	Range		- 10 to + 10 V DC 0 to 20 mA/ 4 to 20 mA	- 10 to + 10 V DC 0 to 20 mA/ 4 to 20 mA	- 10 to + 10 V DC 0 to 20 mA/ 4 to 20 mA	- 10 to + 10 V DC 0 to 20 mA	- 200 to + 850°C
	Resolution		12 bits + sign	15 bits + sign	12 bits + sign	15 bits + sign	16 bits
	Sampling period	without filtering	300 µs	–	400 µs	–	–
		with filtering	1 ms	50 µs	1 ms	50 µs	–
Analog outputs	Number						
	Type						
	Range						
	Resolution						
	Response time						
Power supply			Internal	Internal	Internal	Internal	Internal
Isolation	Channel-to-channel		Non-isolated	Non-isolated	Non-isolated	Non-isolated	Non-isolated
	Between channel groups		–	–	–	–	–
	Channel-to-bus		∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS
Type of electronic expansion module			**TM5 SAI2L**	**TM5 SAI2H**	**TM5 SAI4L**	**TM5 SAI4H**	**TM5 SAI2PH**
							
Associated bus base (to be ordered separately)	TM5 ACBM11		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	TM5 ACBM15		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
							
Associated terminal block (to be ordered separately)	TM5 ACTB06		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	TM5 ACTB12		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
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			2 to 4 analog output channels			
						
With removable spring terminal blocks (to be ordered separately)						
2	4	6				
J, K, S, N thermocouple	Pt100/Pt1000 temperature probe	J, K, S, N thermocouple				
Type J: - 210 to + 1200°C Type K: - 270 to + 1372°C Type S: - 50 to + 1768°C Type N: - 270 to + 1300°C	- 200 to + 850°C	Type J: - 210 to + 1200°C Type K: - 270 to + 1372°C Type S: - 50 to + 1768°C Type N: - 270 to + 1300°C				
16 bits	16 bits	16 bits				
–	–	–				
–	–	–				
			2	2	4	4
			Voltage/current	Voltage/current	Voltage/current	Voltage/current
			- 10 to + 10 V DC 0 to 20 mA	- 10 to + 10 V DC 0 to 20 mA	- 10 to + 10 V DC 0 to 20 mA	- 10 to + 10 V DC 0 to 20 mA
			12 bits + sign	15 bits + sign	12 bits + sign	15 bits + sign
			1 ms max.	1 ms max.	1 ms max.	1 ms max.
Internal	Internal	Internal	Internal	Internal	Internal	Internal
Non-isolated	Non-isolated	Non-isolated	Non-isolated	Non-isolated	Non-isolated	Non-isolated
–	–	–	–	–	–	–
∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS	∼ 500 V RMS
TM5 SAI2TH	**TM5 SAI4PH**	**TM5 SAI6TH**	**TM5 SAO2L**	**TM5 SAO2H**	**TM5 SAO4L**	**TM5 SAO4H**
						
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
						
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
3/35						

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Analog modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

TM5 SA●●● Analog modules are used to acquire various analog values found in industrial applications.
Analog output modules are used to control preactuators in devices, such as: variable speed drives, and valves and applications where process control is required. The output current or voltage is proportional to the numerical value defined by the user program.
On a controller “stop”, the outputs can be configured with fallback (set to the bottom scale value or held at their value). This function, with holding the value, is used when debugging the application, or on a detected fault, so as not to disrupt the controlled process.

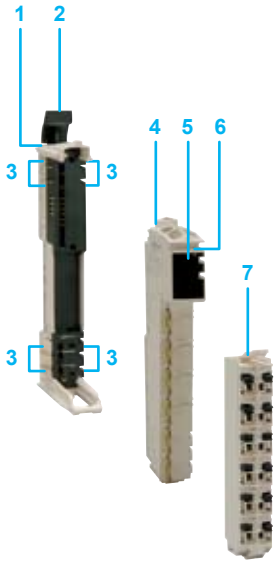
Each Analog module consists of three parts to be ordered separately:
- I/O electronic module
- Bus base
- Terminal block

These modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal
- Spring terminals that can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening
- Hot swapping

There are 12 TM5 SA●●● Analog modules:
- Four electronic modules with 2 or 4 voltage/current inputs
- Two electronic modules with 2 or 4 Pt100/Pt1000 temperature probes
- Two electronic modules with 2 or 6 J, K, S and N thermocouple inputs
- Four electronic modules with 2 or 4 voltage/current outputs

Depending on the application requirements, these electronic modules are available in 12 or 16 bit-resolution.

It is advisable to use the TM2XMTGB grounding plate which simplifies connection of the analog sensor and actuator cable shielding. This shielding must be connected to the device's functional ground.



Description

TM5 SA●●● Analog modules include:
1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each side of the base for the link with the previous controller or module
4 Analog input or output electronic module
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Analog modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: white

TM5 SAI●●

TM5 SAO●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

TM5 ACADL100

TM2 XMTGB

TM200 RSRCEMC

References

Analog input electronic modules

Number and type of inputs	Input range	Resolution	Reference	Weight kg
2 voltage/current inputs	- 10 to + 10 V DC 0 to 20 mA/4 to 20 mA	12 bits + sign	**TM5 SAI2L**	0.025
		15 bits + sign	**TM5 SAI2H**	0.025
4 voltage/current inputs	- 10 to + 10 V DC 0 to 20 mA/4 to 20 mA	12 bits + sign	**TM5 SAI4L**	0.025
	- 10 to + 10 V DC, 0 to 20 mA	15 bits + sign	**TM5 SAI4H**	0.025
2 Pt100/Pt1000 temperature probe inputs	- 200 to + 850°C	16 bits	**TM5 SAI2PH**	0.025
2 J, K, S, N thermocouple inputs	Type J: - 210 to + 1200°C Type K: - 270 to + 1372°C Type S: - 50 to + 1768°C Type N: - 270 to + 1300°C	16 bits	**TM5 SAI2TH**	0.025
4 Pt100/Pt1000 temperature probe inputs	- 200 to + 850°C	16 bits	**TM5 SAI4PH**	0.025
6 J, K, S, N thermocouple inputs	Type J: - 210 to + 1200°C Type K: - 270 to + 1372°C Type S: - 50 to + 1768°C Type N: - 270 to + 1300°C	16 bits	**TM5 SAI6TH**	0.025

Analog output electronic modules

Number and type of outputs	Output range	Resolution	Reference	Weight kg
2 voltage/current outputs	- 10 to + 10 V DC, 0 to 20 mA	12 bits + sign	**TM5 SAO2L**	0.025
		15 bits + sign	**TM5 SAO2H**	0.025
4 voltage/current outputs	- 10 to + 10 V DC, 0 to 20 mA	12 bits + sign	**TM5 SAO4L**	0.025
		15 bits + sign	**TM5 SAO4H**	0.025

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
24 V ⎓	–	1	**TM5 ACBM11**	0.020
		10	**TM5 ACBM1110**	0.020
	Address setting	1	**TM5 ACBM15**	0.020
		10	**TM5 ACBM1510**	0.020

Terminal blocks

Use	Type	Sold in lots of	Unit reference	Weight kg
For analog I/O electronic module, 24 V ⎓ power supply	6 contacts	1	**TM5 ACTB06**	0.016
		10	**TM5 ACTB0610**	0.016
	12 contacts	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.020

Accessories

Designation	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLITp1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

Separate parts

Designation	Description	Unit reference	Weight kg
Grounding plate	Support equipped with 10 male Faston connectors for connecting the cable shielding (via 6.35 mm connectors, not supplied) and the functional grounds (FE)	**TM2 XMTGB**	0.045
Shielding connection clamps Sold in lots of 25	Attachment and grounding of the cable shielding. Pack of 25 clamps including 20 for Ø 4.8 mm cable and 5 for Ø 7.9 mm cable	**TM200 RSRCEMC**	–
Mounting kit Sold in lots of 5	For mounting the analog modules on a plate or panel	**TWD XMT 5**	0.065

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Expert modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications	**Upcounting, downcounting, period measurement, frequency meter, frequency generator, axis following with encoder**	
Compatibility	**Modicon™ M258™ logic controller, Modicon LMC058 motion controller**	
		
Channel connection	With removable spring terminal blocks (to be ordered separately)	
Number of counter channels	2	1
IEC/EN 61131-2 conformity	Type 1	Incremental
Type of signal *(1)*	Sink	RS422
Type of input	1-, 2- or 3-wire	–
Nominal input voltage	24 V ⎓	24 V ⎓ asymmetrical
Voltage limit values	⎓ 20.4 to 28.8 V	–
Frequency per channel	50 kHz	100 kHz
Resolution	–	16/32 bits
Functions	Event counting Interval measurement	2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply
Types of counter module	**TM5 SDI2DF**	**TM5 SE1IC01024**
		
Associated bus base (to be ordered separately) TM5 ACBM11	**Yes**	**Yes**
TM5 ACBM15	**Yes**	**Yes**
		
Associated terminal block (to be ordered separately) TM5 ACTB12	**Yes**	**Yes**
Page	3/39	

(1) Source output: PNP output, sink output: NPN output.

Upcounting, downcounting, period measurement, frequency meter, frequency generator, axis following with encoder		
Modicon™ M258™ logic controller **Modicon LMC058 motion controller**		
		
With removable spring terminal blocks (to be ordered separately)		
2	1	1
Incremental	Incremental	SSI absolute
Sink	RS422, sink	Sink
–	–	–
⎓ 24 V asymmetrical	⎓ 5 V symetrical	⎓ 5 V symetrical
–	⎓ 20.4 to 28.8 V	⎓ 20.4 to 28.8 V
100 kHz	250 kHz	1 MHz
16/32 bits	16/32 bits	32 bits
2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply	2 x 24 V ⎓ auxiliary inputs	2 x 24 V ⎓ auxiliary inputs
TM5 SE2IC01024	**TM5 SE1IC02505**	**TM5SE1SC10005**
		
Yes	**Yes**	**Yes**
Yes	**Yes**	**Yes**
		
Yes	**Yes**	**Yes**

MachineStruxure™
I/O expansion modules
Modicon™ TM5 Expert modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

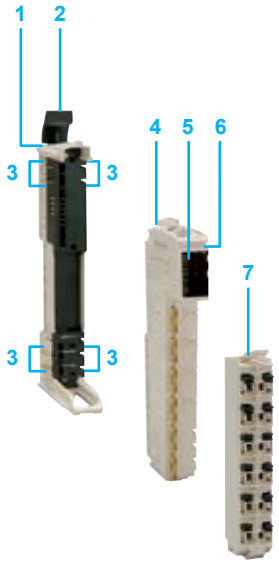
TM5 SDI12DF and **TM5 SE●●●●●●●** Expert modules for Modicon™ M258™ logic controller and LMC058 motion controllers are used to count the pulses generated by a sensor, or to process the signals from an incremental encoder, depending on the reference chosen.
The extent of the high-speed counter module offer makes it possible to adapt the configuration to the machine's precise requirements. The five counter modules differ in their frequency and their functions.

Expert electronic modules	No. of channels	Max. frequency	Integrated functions	Signal
TM5 SDI12DF	2	50 kHz	Event counting, interval measurement	Sink
TM5 SE1IC01024	1	100 kHz	2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply	RS422
TM5 SE2IC01024	2	100 kHz	2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply	Sink
TM5 SE1IC02505	1	250 kHz	2 x 24 V ⎓ auxiliary inputs ⎓ 5 V encoder power supply	RS422, Sink
TM5 SE1SC10005	1	1 MHz	2 x 24 V ⎓ auxiliary inputs ⎓ 5 V SSI encoder power supply	Sink

The function parameters are set by configuration using SoMachine™ software.

Each Expert module consists of three parts to be ordered separately:
- Electronic counter module
- Bus base
- Terminal block

These modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal
- Spring terminals that can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening
- Hot swapping



Description

TM5 Expert modules include:
1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each side of the base for the link with the previous controller or module
4 Electronic counter module
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Expert modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: white

TM5 SDI2DF

TM5 SE●●●●●●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

TM5 ACADL100

References

Expert electronic modules

Counting frequency	Number of channels	Function	Reference	Weight kg
50 kHz	2	Event counting, interval measurement	**TM5 SDI2DF**	0.025
100 kHz	1	2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply	**TM5 SE1IC01024**	0.025
	2	2 x 24 V ⎓ auxiliary inputs 24 V ⎓ encoder power supply	**TM5 SE2IC01024**	0.025
250 kHz	1	2 x 24 V ⎓ auxiliary inputs	**TM5 SE1IC02505**	0,025
1 MHz	1	2 x 24 V ⎓ auxiliary inputs	**TM5SE1SC10005**	0,025

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
24 V ⎓	–	1	**TM5 ACBM11**	0.020
		10	**TM5 ACBM1110**	0.020
	Address setting	1	**TM5 ACBM15**	0.020
		10	**TM5 ACBM1510**	0.020

Terminal blocks

Use	Description	Sold in lots of	Unit reference	Weight kg
For electronic counter module powered with 24 V ⎓	12 contacts	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.020

Accessories

Designation	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

MachineStruxure™

I/O expansion modules

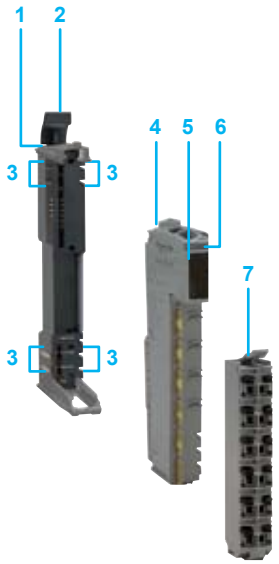
Modicon™ TM5 Power distribution modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

TM5 SP●● Power distribution modules are designed to supply power to the I/O modules and/or the TM5 bus.

Each Power distribution module consists of three parts to be ordered separately:
- Power distribution electronic module
- Bus base
- Terminal block

These modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal
- Spring terminals which can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening



Description

Power distribution modules include:
1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each side of the base for the link with the previous controller or module
4 Power distribution electronic module
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Power distribution modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

Device color: gray

TM5 SP●●

TM5 ACBM●●

TM5 ACTB●●

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

TM5 ACADL100

References

Power distribution electronic modules

Input power supply	Used for	Fuse	Reference	Weight kg
24 V ⎓	Supplying power to the I/O modules in 24 V ⎓ Total I max: 10 A	–	**TM5 SPS1**	0.030
		6.3 A internal fuse	**TM5 SPS1F**	0.030
	Supplying power □ to the I/O modules in 24 V ⎓ □ and the TM5 bus (Bus power supply: 7 W)	–	**TM5 SPS2**	0.030
		6.3 A internal fuse	**TM5 SPS2F**	0.030

Bus bases

Power supply	Specifications	Sold in lots of	Unit reference	Weight kg
24 V ⎓	Isolated on the left on the power supply to the I/O modules in 24 V ⎓	1	**TM5 ACBM01R**	0.020
		10	**TM5 ACBM01R10**	0.020
	Isolated on the left on the power supply to the I/O modules in 24 V ⎓ Address setting	1	**TM5 ACBM05R**	0.020
		10	**TM5 ACBM05R10**	0.020

Terminal block

Use	Specifications	Reference	Weight kg
For power distribution electronic module 24 V ⎓	12 contacts	**TM5 ACTB12PS**	0.020

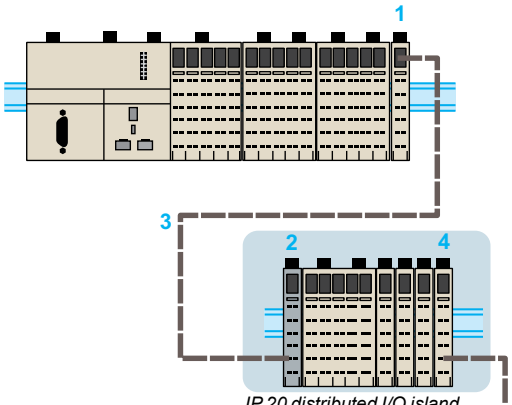
Accessories

Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the terminal blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Transmitter and Receiver modules for Modicon M258™ logic controller and Modicon LMC058 motion controller



IP 20 distributed I/O island

IP 67 distributed I/O island

Introduction

M258 logic controllers and LMC058 motion controllers can provide IP 20 islands of distributed I/O via the TM5 expansion bus.
This makes it possible to:

- Adapt the architecture as closely as possible to the machine topology
- Reduce the wiring costs by minimizing the distance between the modules and the sensors/preactuators
- Take full advantage of the TM5 expansion bus exchange performance
- Save the cost of a fieldbus connection

In addition, regardless of the expansion module local or remote slot, the modules remain synchronized due to use of the same expansion bus. Modicon TM5 Remote modules are needed to:

- Increase the number of remote I/O on a M258 logic controller and an LMC058 motion controller beyond 100 m
- Exchange incoming and outgoing data produced by the I/O expansion modules
- Guarantee the performance of data exchanges

Three remote modules are available:

- **TM5 SBET1** electronic module: transmitter (1), white, for data transmission between IP 20 islands
- **TM5 SBET7** electronic module: transmitter (4), white, for data transmission from an IP 20 island to an IP 67 island *(1)* via a TM7 expansion bus (5)
- **TM5 SBER2** electronic modules: receiver (2), gray, like all the power distribution modules

The transmitter (1) and receiver (2) modules are physically linked by the remote connection cable (3) **TCS XCNNXNX100**.
The maximum distance between islands is 100 m and it is possible to connect up to 25 remote islands.

Each remote module consists of three parts to be ordered separately:

- Electronic module, either transmitter or receiver
- Bus base
- Connection block

These modules can be mechanically assembled before mounting on a symmetrical rail, and offer the following advantages:

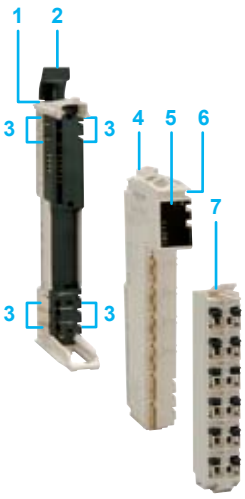
- Removable connector
- Spring terminals which can be used for quick, tool-free connection of the sensors and preactuators. In addition, the quality of the spring terminals reduces the need for periodic retightening

Description

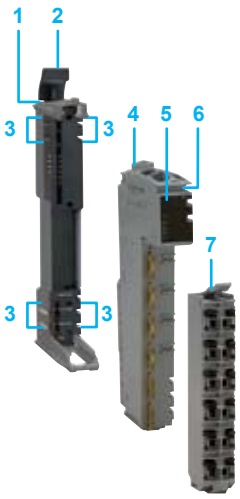
These TM5 Transmitter and Receiver modules include:

1 Bus base
2 Mechanical locking lever for mounting/dismounting on a symmetrical rail
3 Bus expansion connection on each side of the base for the link with the previous controller or module
4 Remote I/O electronic module, either transmitter or receiver
5 Channel and module diagnostics LED display block
6 Slot for labeling (label-holder)
7 Removable spring terminal block with locking lever and slots for colored identifiers

(1) IP 67 islands. Composition: TM7 blocks and TM7 expansion bus. See page 3/44.



Transmitter module



Receiver module

MachineStruxure™

I/O expansion modules

Modicon™ TM5 Transmitter and Receiver modules for Modicon M258™ logic controller and Modicon LMC058 motion controller

TM5 SBET1 TM5 SBET7

TM5 SBER2

TM5 ACBM1●

TM5 ACBM0●R

TM5 ACTB●●

TM5 ACTB12PS

TM5 ACTLC100

TM5 ACTCH100

TM5 ACLITW1

TM5 ACLT1

TM5 ACLPL10

TM5 ACLPR10

TM5 ACADL100

References

Remote I/O electronic modules

Description	Specifications	Reference	Weight kg
Transmitter module	Electronic module for data transmission between IP 20 I/O islands *(1)* Module color: white	**TM5 SBET1**	0.025
	Electronic module for data transmission between IP 20 I/O island and IP 67 I/O island *(2)* Module color: white Includes the power supply for the TM7 expansion modules *(2)*	**TM5 SBET7**	0.025
Receiver module	Data reception electronic module Power distribution module for electronic modules and the TM5 bus, 24 V ⎓ power supply Module color: gray	**TM5 SBER2**	0.025

Expansion bus

Description	Usage	Length	Reference	Weight kg
Remote connection cable	Bus extension by linking transmitter and receiver modules	100 m	**TCS XCNNXNX100**	8.800

Bus bases

Power supply	For use with	Sold in lots of	Unit reference	Weight kg
–	TM5 SBET1 and TM5 SBET7 transmitter modules	1	**TM5 ACBM11**	0.020
		10	**TM5 ACBM1110**	0.020
	TM5 SBET1 and TM5 SBET7 transmitter modules with address setting	1	**TM5 ACBM15**	0.020
		10	**TM5 ACBM1510**	0.020
24 V ⎓	TM5 SBER2 receiver module	1	**TM5 ACBM01R**	0.020
		10	**TM5 ACBM01R10**	0.020
	TM5 SBER2 receiver module, with address setting	1	**TM5 ACBM05R**	0.020
		10	**TM5 ACBM05R10**	0.020

Terminal blocks

For use with	Specifications	Sold in lots of	Unit reference	Weight kg
Transmitter module TM5 SBET1	6 contacts	1	**TM5 ACTB06**	0.016
		10	**TM5 ACTB0610**	0.016
Transmitter modules TM5 SBET1 and TM5 SBET7	12 contacts	1	**TM5 ACTB12**	0.020
		10	**TM5 ACTB1210**	0.020
Receiver module TM5 SBER2	12 contacts	1	**TM5 ACTB12PS**	0.020

Accessories

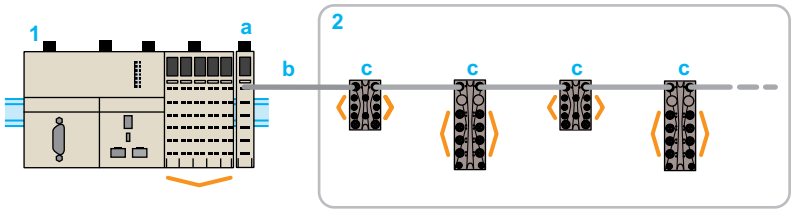
Description	Used for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	Marking the connection blocks on the I/O channels	Transparent	100	**TM5 ACTCH100**	0.002
Plain text cover holder locking clip *(Order with plain text cover holder TM5 ACTCH100)*	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.001
Precut legend strips of paper	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.001
Colored plastic identifiers	Marking the 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For modules	Black	100	**TM5 ACADL100**	0.001

(1) IP 20 I/O islands, see page 4/20.
(2) IP 67 I/O islands, see page 3/44.

MachineStruxure™
I/O expansion modules
Modicon™ TM7 blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Introduction

To enhance its “Flexible Machine Control” concept, Schneider Electric offers Modicon™ TM7 IP 67 blocks for mounting outside electrical cabinets, directly on the installation.
The IP 67 protection provided by these blocks enables them to be used within processes or machines in harsh environments (splashing water, oil, dust).
They have the following specifications:
- Dust and damp proof
- Robust and compact
- Rapid wiring, economical to use



1 Modicon™ M258™ logic controller, Modicon LMC058 motion controller: CANopen™ bus masters + transmitter module TM5SBET7 (a) *(1)*.
2 IP 67 distributed I/O islands. Composition: TM7 expansion bus cable (b) + TM7 digital/analog I/O expansion blocks (c).

Modicon TM7 block offer

Modicon TM7 IP 67 blocks are available in various compositions and for different functions.

Digital blocks

The offer includes:
- Three input blocks
- Three configurable I/O blocks
- One output block


Digital I/O expansion block

Analog blocks

The offer includes:
- Two expansion blocks with 4 inputs for connecting 4 sensors
- Two expansion blocks with 4 outputs for connecting 4 actuators
- Two mixed expansion blocks with 2 inputs and 2 outputs
- Two expansion blocks with 4 resistive temperature probe or thermocouple temperature measurement channels


Analog I/O expansion block

Power distribution block

A power distribution block is available as an option to supply I/O expansion blocks on the TM7 expansion bus.
This power distribution block is necessary to avoid voltage drops in the following situations:
- With a TM7 NCOM08B CANopen interface block followed by 4 *(2)* TM7 I/O expansion blocks
- With a TM5SBET7 transmitter module *(1)* followed by 6 *(2)* TM7 I/O expansion blocks (mounted vertically)
- With a TM7 NCOM16A/16B CANopen interface block followed by 18 *(2)* TM7 I/O expansion blocks


Power distribution block

Note: These limits must be weighted according to the cable lengths.
Consult the SPIG (System Planning and Installation Guide) for the Modicon TM7 IP 67 block offer on www.schneider-electric.com

Connection accessories

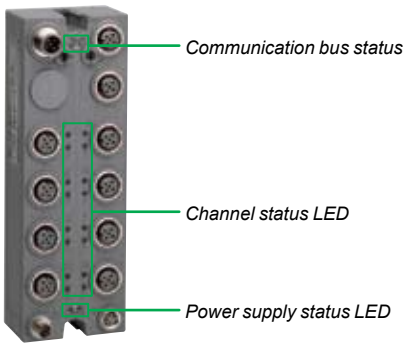
A range of cables and connectors is available for connecting the:
- CAN bus
- TM7 expansion bus
- I/O
- 24 V ⎓ power supplies on TM7 expansion blocks

CANopen interface blocks with digital I/O (see page 4/24)

The interface I/O block offer includes IP 67 blocks that connect to a CANopen bus and have digital channels that can be configured as inputs or outputs, including:
- CANopen interface block with 8 configurable I/O for connection via M8 connector
- Two CANopen interface blocks with 16 configurable I/O

(1) TM5 transmitter (see page 3/42).
(2) Minimum number.

MachineStruxure™
I/O expansion modules
Modicon™ TM7 blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller



Diagnostics functions

The diagnostic monitoring of detected faults is indicated by LEDs on CANopen™ interface I/O blocks, expansion blocks and power distribution blocks, and is communicated to the control system (Modicon™ M258™ logic controller, or Modicon M340™ or Premium™ automation platforms) via the TM7 bus.

Each Modicon TM7 block has LEDs:
- ■ To display the status of the TM7 bus, the channel and the power supply
- ■ For quick, precise location of a detected fault

There are several levels of diagnostics:
- ■ Diagnostics per channel:
  - □ State of inputs
  - □ State of outputs
- ■ Diagnostics per expansion block:
  - □ Sensor/actuator power supply present
  - □ Undervoltage detected fault on the I/O power supply
  - □ Analog input diagnostics
  - □ Short-circuit or overload on one or more digital outputs
- ■ Communication bus diagnostics:
  - □ On CAN bus (CANopen interface I/O block)
  - □ On TM7 expansion bus (CANopen interface I/O block and I/O expansion blocks)
- ■ Diagnostics of the power supply via the TM7 bus (expansion block only)

Specifications

Conformity with standards		IEC 61131-2
Product certifications		CE, cURus, GOST-R and c-Tick, ATEX (II 3g EEx nA II T5, IP 67, Ta = 0 to 60°C)
Temperature	Operation	- 10 to + 60°C (14 to 140°F)
	Storage	- 25 to + 85°C (- 13 to 185°F)
Relative humidity		5 to 95% (without condensation)
Degree of pollution conforming to IEC 60664		2
Degree of protection conforming to IEC 61131-2		IP 67
Altitude	Operation	0 to 2000 m (0 to 6560 ft.) *(1)*
	Storage	0 to 3000 m (0 to 9842 ft.)
Vibration resistance conforming to IEC 60721-3-5 Class 5M3	DIN rail mounted	7.5 mm (0.295 in.) 2 to 8 Hz mounted amplitude 20 m/s² (2 gn) 8 to 200 Hz mounted acceleration 40 m/s² (4 gn) 200 to 500 Hz mounted acceleration
Shock resistance conforming to IEC 60721-3-5 Class 5M3		300 m/s² (30 gn) for 11 ms, 1/2 sine wave, type 1 shock
Connectors	Type	M8 and/or M12
	Number of operations	50 min.

Electromagnetic compatibility

Electrostatic discharges conforming to IEC/EN 61000-4-2	± 8 kV, criterion B (air discharge) ± 4 kV, criterion B (direct discharge)
Electromagnetic fields conforming to IEC/EN 61000-4-3	10 V/m, amplitude modulation 80% at 1 kHz (80 MHz to 2 GHz) 1 V/m (2 to 2.7 GHz)
Fast transients conforming to IEC/EN 61000-4-4	Supply: 2 kV, criterion B I/O: 1 kV, criterion B Shielded cable: 1 kV, criterion B Repetition frequency: 5 and 100 kHz
Immunity to overvoltages, 24 V ⎓ circuit conforming to IEC/EN 61000-4-5	Supply: □ 1 kV (12 Ω), criterion B in common mode □ 0.5 kV (2 Ω), criterion B in differential mode Unshielded links: □ 1 kV (42 Ω), criterion B in common mode □ 0.5 kV (42 Ω), criterion B in differential mode Shielded links: □ 1 kV (12 Ω), criterion B in common mode □ 0.5 kV (2 Ω), criterion B in differential mode
Induced magnetic fields conforming to IEC/EN 61000-4-6	Line supply, I/O signal connections > 10 m (32.8 ft.) Functional ground connection: 10 Vrms, criterion A, amplitude modulation 80% at 1 kHz (150 to 80 MHz)
Conducted emissions conforming to EN 55011 (IEC/CISPR11)	150 to 500 kHz, peak 79 dB µV 500 kHz to 30 MHz, peak 73 dB µV
Radiated emissions conforming to EN 55011 (IEC/CISPR11)	30 to 230 MHz, 10 m (32.8 ft) at 40 dB (µV/m) 230 MHz to 1 GHz, 10 m (32.8 ft) at 47 dB (µV/m)

(1) Temperature reduction of 0.5°C (32.9°F) for every additional 100 m (328 ft.) altitude above 2000 m (6560 ft.).
Refer to the instruction sheet for each product, downloadable from www.schneider-electric.com

MachineStruxure™

I/O expansion modules

Modicon™ TM7 digital blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications			Digital I/O expansion blocks		
					
Degree of protection			IP 67	IP 67	IP 67
Type of housing			Plastic	Plastic	Plastic
Modularity (number of channels)	Max. number of digital channels		8	16	16
	Digital inputs		8	16	16
	Digital outputs		–	–	–
Digital inputs	Voltage/current		24 V ⎓/7 mA	24 V ⎓/7 mA	24 V ⎓/7 mA
	Type		Sink *(1)*	Sink *(1)*	Sink *(1)*
	IEC 61131-2 conformity		Type 1	Type 1	Type 1
Digital outputs	Voltage		–	–	–
	Type		–	–	–
	Current per output		–	–	–
	Current per expansion block		–	–	–
Sensor/actuator power supply	Voltage		24 ➞ ⎓	24 V ⎓	24 V ⎓
	Max. current		500 mA for all channels	500 mA for all channels	500 mA for all channels
	Protection against		Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity
Connection	TM7 expansion bus	Bus input connector	B-coded 4-way male M12	B-coded 4-way male M12	B-coded 4-way male M12
		Bus output connector	B-coded 4-way female M12	B-coded 4-way female M12	B-coded 4-way female M12
	Digital I/O channels	Sensor connector	3-way female M8, 1 channel per connector	3-way female M8, 1 channel per connector	A-coded 5-way female M12, 2 channels per connector
		Actuator connector	–	–	–
	Expansion block power supply	Input connector	4-way male M8	4-way male M8	4-way male M8
		Output connector	4-way female M8	4-way female M8	4-way female M8
Diagnostics	By expansion block		Yes	Yes	Yes
	By channel		Yes	Yes	Yes
	By communication on TM7 bus		Yes	Yes	Yes
Type of expansion block			**TM7 BDI8B**	**TM7 BDI16B**	**TM7 BDI16A**
Pages			3/49	3/49	3/49

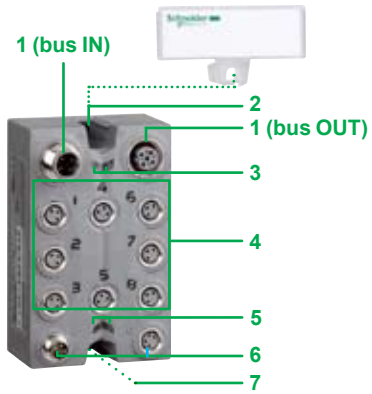
(1) Sink inputs: positive logic
(2) Source outputs: positive logic

			
IP 67	IP 67	IP 67	IP 67
Plastic	Plastic	Plastic	Plastic
8	8	16	16
–	0 to 8 software-configurable	0 to 16 software-configurable	0 to 16 software-configurable
8	0 to 8 software-configurable	0 to 16 software-configurable	0 to 16 software-configurable
–	24 V ⎓/4.4 mA	24 V ⎓/4.4 mA	24 V ⎓/4.4 A max.
–	Sink *(1)*	Sink *(1)*	Sink *(1)*
–	Type 1	Type 1	Type 1
24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
Transistor/Source *(2)*	Transistor/Source *(2)*	Transistor/Source *(2)*	Transistor/Source *(2)*
2 A max.	0.5 A max.	0.5 A max.	0.5 A max.
8 A max.	4 A max.	8 A max.	8 A max.
24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
500 mA for all channels	500 mA for all channels	500 mA for all channels	500 mA for all channels
Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity
B-coded 4-way male M12	B-coded 4-way male M12	B-coded 4-way male M12	B-coded 4-way male M12
B-coded 4-way female M12	B-coded 4-way female M12	B-coded 4-way female M12	B-coded 4-way female M12
–	3-way female M8, 1 channel per connector	A-coded 5-way female M12, 2 channels per connector	3-way female M8, 1 channel per connector
3-way female M8, 1 channel per connector	3-way female M8, 1 channel per connector	5-way female M12, 2 channels per connector	3-way female M8, 1 channel per connector
4-way male M8	4-way male M8	4-way male M8	4-way male M8
4-way female M8	4-way female M8	4-way female M8	4-way female M8
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
TM7 BDO8TAB	**TM7 BDM8B**	**TM7 BDM16A**	**TM7 BDM16B**
3/49	3/49	3/49	3/49

MachineStruxure™

I/O expansion modules

Modicon™ TM7 digital blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

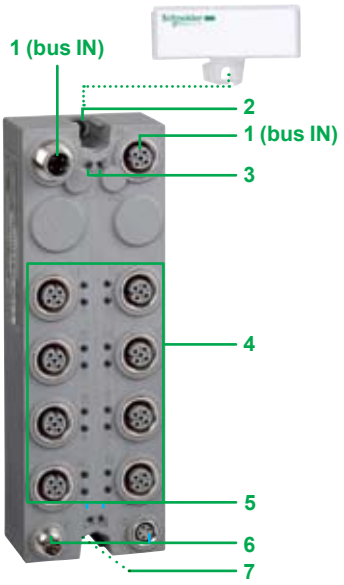


Description

Digital I/O expansion blocks

8-channel digital I/O expansion blocks feature the following on the front panel:

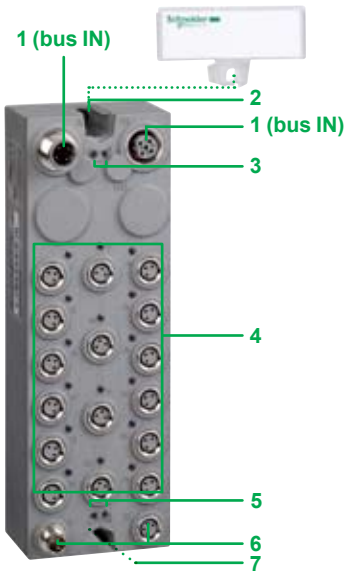
1. Male M12 connector (bus IN) and a female M12 connector (bus OUT) for connecting the TM7 expansion bus
2. Slot for the expansion block label *(1)*
3. Two bus diagnostic LEDs
4. Eight female M8 connectors for connecting sensors and actuators with LEDs for indicating channel status
5. Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
6. Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
7. Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support



16-channel digital I/O expansion blocks feature the following on the front panel:

1. Male M12 connector (bus IN) and a female M12 connector (bus OUT) for connecting the TM7 expansion bus
2. Slot for the expansion block label *(1)*
3. Two bus diagnostic LEDs
4. Eight M12 connectors (2 channels per connector) or sixteen M8 connectors for connecting sensors and actuators with LEDs for indicating channel status
5. Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
6. Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
7. Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support

(1) Label-holder supplied with IP 67 block.



MachineStruxure™
I/O expansion modules
Modicon™ TM7 digital blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

TM7 BDI8B, TM7 BDO8TAB, TM7 BDM8B

TM7 BDM16B, TM7 BDI16B

TM7 BDI16A, TM7 BDM16A

Digital I/O expansion blocks

Max. no. of channels	Number, type of inputs *(1)*	Number, type of outputs *(2)*	Sensor and actuator connection	Communication bus	Reference	Weight kg
8 input	8, sink *(3)*	–	8 x female M8 connectors	TM7 bus	**TM7 BDI8B**	0.180
16 input	16, sink *(3)*	–	16 x female M8 connectors	TM7 bus	**TM7 BDI16B**	0.320
	16, sink *(3)*	–	8 x female M12 connectors	TM7 bus	**TM7 BDI16A**	0.320
8 output	–	8, transistor/ source *(4)*, 2 A max.	8 x female M8 connectors	TM7 bus	**TM7 BDO8TAB**	0.185
8 configurable I/O	0 to 8, sink *(3)*	0 to 8, transistor/ source *(4)*, 0.5 A max.	8 x female M8 connectors	TM7 bus	**TM7 BDM8B**	0.190
16 configurable I/O	0 to 16, sink *(3)*	0 to 16, transistor/ source *(4)*, 0.5 A max.	8 x female M12 connectors	TM7 bus	**TM7 BDM16A**	0.320
			16 x female M8 connectors	TM7 bus	**TM7 BDM16B**	0.320

(1) 24 V ⎓ IEC type 1
(2) 24 V ⎓
(3) Sink inputs: positive logic
(4) Source outputs: positive logic

Architecture, Connecting cables
See page 4/30

Connection accessories
See page 4/32

Separate parts
See page 4/33

Configuration software
- SoMachine™ software, see page 5/2
- Performance distributed I/O configuration software, please consult our site www.schneider-electric.com

MachineStruxure™

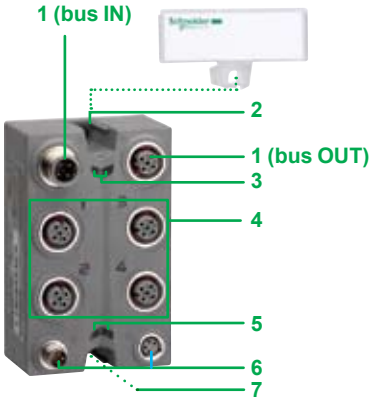
I/O expansion modules

Modicon™ TM7 analog blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller

Applications			Analog I/O expansion blocks		
					
Degree of protection			IP 67	IP 67	IP 67
Type of housing			Plastic	Plastic	Plastic
Modularity (number of channels)	Max. number of analog channels		4	4	4
	Analog inputs		4	4	–
	Temperature inputs		–	–	4
	Analog outputs		–	–	–
Inputs	Type		Voltage - 10 to + 10 V ⎓	Current 0 to 20 mA	Pt 100 temperature probe, Pt 1000 temperature probe, KTY 10 silicon temperature probe, KTY 84 silicon temperature probe, Resistance 0 to 3276 Ohm
	Resolution		11 bits + sign	12 bits	16 bits
Analog outputs	Type		–	–	–
	Resolution		–	–	–
	Current per expansion block		–	–	–
Sensor/actuator power supply	Voltage		24 V ⎓	24 V ⎓	–
	Max. current		500 mA for all channels	500 mA for all channels	–
	Protection against		Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	–
Connection	TM7 expansion bus	Bus input connector	4-way male M12 B-coded	4-way male M12 B-coded	4-way male M12 B-coded
		Bus output connector	4-way female M12 B-coded	4-way female M12 B-coded	4-way female M12 B-coded
	Analog I/O channels	Sensor connector	5-way female M12 A-coded	5-way female M12 A-coded	5-way female M12 A-coded
		Actuator connector	–	–	–
	Expansion block power supply	Input connector	4-way male M8	4-way male M8	4-way male M8
		Output connector	4-way female M8	4-way female M8	4-way female M8
Diagnostics	By expansion block		Yes	Yes	Yes
	By channel		Yes	Yes	Yes
	By communication on TM7 bus		Yes	Yes	Yes
Type of expansion block			**TM7 BAI4VLA**	**TM7 BAI4CLA**	**TM7 BAI4TLA**
Pages			3/52		

				
IP 67	IP 67	IP 67	IP 67	IP 67
Plastic	Plastic	Plastic	Plastic	Plastic
4	4	4	4	4
–	–	–	2	2
4	–	–	–	–
–	4	4	2	2
J, K, S thermocouple Voltage 0 to 65536 µV	–	–	Voltage - 10 to + 10 V ⎓	Current 0 to 20 mA
16 bits	–	–	11 bits + sign	12 bits
–	Voltage - 10 to + 10 V ⎓	Current 0 to 20 mA	Voltage - 10 to + 10 V ⎓	Current 0 to 20 mA
–	11 bits + sign	12 bits	11 bits + sign	12 bits
–	–	–	–	–
–	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
–	500 mA for all channels	500 mA for all channels	500 mA for all channels	500 mA for all channels
–	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity
4-way male M12 B-coded	4-way male M12 B-coded	4-way male M12 B-coded	4-way male M12 B-coded	4-way male M12 B-coded
4-way female M12 B-coded	4-way female M12 B-coded	4-way female M12 B-coded	4-way female M12 B-coded	4-way female M12 B-coded
A-coded 5-way female M12	–	–	A-coded 5-way female M12	A-coded 5-way female M12
–	A-coded 5-way female M12	A-coded 5-way female M12	A-coded 5-way female M12	A-coded 5-way female M12
4-way male M8	4-way male M8	4-way male M8	4-way male M8	4-way male M8
4-way female M8	4-way female M8	4-way female M8	4-way female M8	4-way female M8
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
TM7 BAI4PLA	**TM7 BAO4VLA**	**TM7 BAO4CLA**	**TM7 BAM4VLA**	**TM7 BAM4CLA**

MachineStruxure™
I/O expansion modules
Modicon™ TM7 analog blocks for Modicon M258™ logic controller and Modicon LMC058 motion controller



Description

Analog I/O expansion blocks

Analog I/O expansion blocks feature the following on the front panel:

1 Male M12 connector (bus IN) and a female M12 connector (bus OUT) for connecting the TM7 expansion bus
2 Slot for the expansion block label *(1)*
3 Two bus diagnostic LEDs
4 Four female M12 connectors for connecting sensors and/or actuators with LEDs for indicating channel status
5 Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
6 Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
7 Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support

(1) Label-holder supplied with IP 67 block.

TM7 BAI4●LA, TM7 BAO4●LA, TM7 BAM4●LA

Analog I/O expansion blocks

Max. no. of channels	Input range	Output range	Resolution	Sensor and actuator connection	Communication bus	Reference	Weight kg
4 input	Voltage	–	11 bits + sign	4 female M12 connectors	TM7 bus	**TM7 BAI4VLA**	0.200
	Current 0 to 20 mA	–	12 bits	4 female M12 connectors	TM7 bus	**TM7 BAI4CLA**	0.200
	Pt 100, Pt 1000 temperature probe KTY 10, KTY 84 silicon temperature probe Resistance 0 to 3276 Ω	–	16 bits	4 female M12 connectors	TM7 bus	**TM7 BAI4TLA**	0.200
	J, K, S thermocouple Voltage 0 to 65536 µV	–	16 bits	4 female M12 connectors	TM7 bus	**TM7 BAI4PLA**	0.200
4 output	–	Voltage - 10 to + 10 V ⎓	11 bits + sign	4 female M12 connectors	TM7 bus	**TM7 BAO4VLA**	0.200
	–	Current 0 to 20 mA	12 bits	4 female M12 connectors	TM7 bus	**TM7 BAO4CLA**	0.200
2 input + 2 output	Voltage - 10 to + 10 V ⎓	Voltage - 10 to + 10 V ⎓	11 bits + sign	4 female M12 connectors	TM7 bus	**TM7 BAM4VLA**	0.200
	Current 0 to 20 mA	Current 0 to 20 mA	12 bits	4 female M12 connectors	TM7 bus	**TM7 BAM4CLA**	0.200

Architecture, Connecting cables

See page 4/30

Connection accessories

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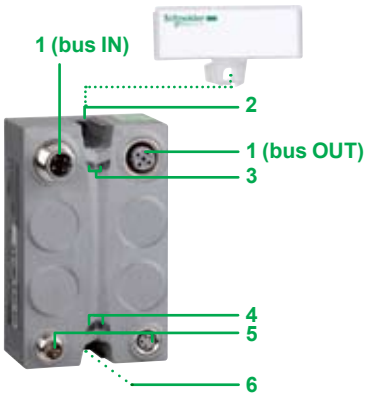
Separate parts

See page 4/33

Configuration software

- SoMachine™ software, see page 5/2
- Performance distributed I/O configuration software, please consult our site www.schneider-electric.com



Description

Power distribution block

Power distribution blocks feature the following on the front panel:

1 Male M12 connector (bus IN) and a female M12 connector (bus OUT) for connecting the TM7 expansion bus
2 Slot for the power distribution block label *(1)*
3 Two TM7 bus diagnostic LEDs
4 Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
5 Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
6 Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support

(1) Label-holder supplied with IP 67 block.

TM7 SPS1A

Power distribution block

Function	Connection	Communication bus	Reference	Weight kg
24 V ⎓/15 W power supply for I/O expansion blocks on the TM7 expansion bus	Supply: 2xM8 connectors, 1 male and 1 female TM7 bus: 2xM12 connectors, 1 male and 1 female	TM7 bus	**TM7 SPS1A**	0.190

Architecture, Connecting cables

See page 4/30

Connection accessories

See page 4/32

Separate parts

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Configuration software

- SoMachine™ software, see page 5/2
- Performance distributed I/O configuration software, please consult our site www.schneider-electric.com

Machine Structure™

chapter 4

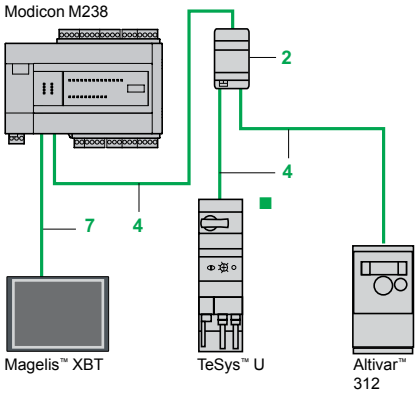
Communication

Communication

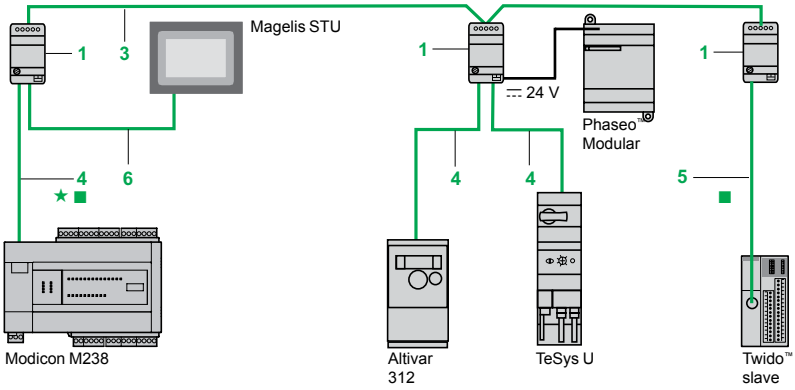
MachineStruxure™
Communication
Modbus™ and Character Mode serial link for Modicon™ M238™ logic controller

Modbus™ cabling system

Non isolated link (Modicon™ M238™ master)



Isolated link (Modicon M238 master)



Cable length between Modicon M238 and Altivar™ 31: ⩽ 30 m max.

- Total length of cables between tap isolation boxes 1: ⩽ 1000 m
- Length of tap link cables 4, 5 or 6: ⩽ 10 m

★ *Line polarization active*
■ *Line end adapter*

References

Tap-off and adapter components for RS 485 serial link

Description	Application	Item	Length	Reference	Weight kg
Tap isolation box Screw terminal block for main cable 2 x RJ45 for tap-off	- RS 485 line isolation *(1)* - Line end adapter (RC 120 Ω, 1nF) - Line pre-polarization (2 R 620 Ω) ⎓ 24 V supply (screw terminal block) or ⎓ 5 V (via RJ45) Mounting on 35 mm DIN rail	1	–	**TWD XCA ISO**	0.100
Tap junction box 1 x RJ45 for main cable 2 x RJ45 for tap-off	- Line end adapter (RC 120 Ω, 1nF) - Line pre-polarization (2 R 620 Ω) Mounting on 35 mm DIN rail	2	–	**TWD XCA T3RJ**	0.080
Modbus hub Screw terminal block for main cable 10 x RJ45 for tap-off	Mounting on 35 mm DIN rail, on mounting plate or panel (2 x Ø 4 mm screws)	–	–	**LU9 GC3**	0.500
T-junction boxes 2 x RJ45 for main cable	1 integrated cable with RJ45 connector for Altivar variable speed drive dedicated tap-off	–	0.3 m	**VW3 A8 306 TF03**	–
			1 m	**VW3 A8 306 TF10**	–
Passive tap junction box	- Line extension and single-channel tap-off on screw terminal block - Line end adapter	–	–	**TSX SCA 50**	0.520
RS 232C/RS 485 line converter	- Flow rate 19.2 Kbit/s max. - Without modem signals ⎓ 24 V/20 mA supply, Mounting on 35 mm DIN rail	–	–	**XGS Z24**	0.100

(1) Line isolation recommended for distances > 10 m.

TWD XCA ISO

TWD XCA T3RJ

LU9 GC3

TSX SCA 50

XGS Z24

References (continued)

Connection cables for RS 485 serial link

Description	Application		Item	Length	Unit reference	Weight kg
Main cables double shielded twisted pair RS 485	Modbus™ serial link, supplied without connector		3	100 m	**TSX CSA 100**	5.680
				200 m	**TSX CSA 200**	10.920
				500 m	**TSX CSA 500**	30.000
Modbus cordsets RS 485	2 x RJ45 connectors		4	0.3 m	**VW3 A8 306 R03**	0.030
				1 m	**VW3 A8 306 R10**	0.050
				3 m	**VW3 A8 306 R30**	0.150
	1 x RJ45 connector and 1 end with free wires		–	1 m	**TWD XCA FJ010**	0.060
				3 m	**VW3 A8 306 D30**	0.150
	1 mini-DIN connector for Twido™ controller and 1 RJ45 connector		–	0.3 m	**TWD XCA RJ003**	0.040
				1 m	**TWD XCA RJ010**	0.090
				3 m	**TWD XCA RJ030**	0.160
	1 mini-DIN connector for Twido controller and 1 RJ45 connector *(1) (2)*		5	0.3 m	**TWD XCA RJP03**	0.027
	1 mini-DIN connector for Twido controller and 1 RJ45 connector Dedicated programming protocol *(2) (3)*		–	0.3 m	**TWD XCA RJP03P**	0.027
	1 mini-DIN connector for Twido controller and 1 end with free wires		–	1 m	**TWD XCA FD010**	0.062
				10 m	**TSX CX 100**	0.517
Modicon™ M238™ cordsets (SL1, SL2) **to Magelis™ HMI terminal**	2 x RJ45 connectors	XBT N200/R400 XBT RT500/511 XBT GT11●●/1335	7	2.5 m	**XBT Z9980**	0.150
	1 x RJ45 connector and 1 x SUB-D 25-way connector	Small Panel XBT N401/410 XBT R410/411	6, 7	2.5 m	**XBT Z938**	0.210
	1 x RJ45 connector and 1 x SUB-D 9-way connector	Advanced panel XBT GT2●●0 to 7340 XBT GK●●●0	7	2,5 m	**XBT Z9008**	0.150
Cordsets for Magelis Small Panel	2 x RJ45 connectors	Small panel XBT N200/R400 XBT RT500/511	7	3 m	**VW3 A8 306 R30**	0.150
Twido cordsets (terminal port) **to Magelis Small Panel**	1 mini-DIN con. and 1 RJ 45 connector	Small panel XBT N200/R400 XBT RT500/511	–	2.5 m	**XBT Z9780**	0.180
	1 mini-DIN conector and SUD-D 25-way connector	Small panel XBT N401/410 XBT R410/411	–	2.5 m	**XBT Z968**	0.210
Line end adapter	For RJ45 connector R = 120 Ω, C = 1 nf		–	Order in multiples of 2	**VW3 A8 306 RC**	0.200

Connection cables for RS 232 serial link

Description	Application	Length	Reference	Weight kg
Cordset for DTE terminal (printer) *(4)*	Serial link for terminal device (DTE) 1 x RJ45 connector and 1 x 9-way SUB-D female connector	3 m	**TCS MCN 3M4F3C2**	0.150
Cordset for DCE terminal (modem, converter)	Serial link for point to point device (DCE) 1 x RJ45 connector and 1 x 9-way SUB-D male connector	3 m	**TCS MCN 3M4M3S2**	0.150

(1) Forcing the configuration of RS 485 integrated port with TwidoSuite™ programming protocol parameters.

*(2) Carries ⎓ 5 V voltage (supplied by RS 485 integrated port of Twido controller) for **TWD XCA ISO** tap isolation box (not using the ⎓ 5 V external power supply).*

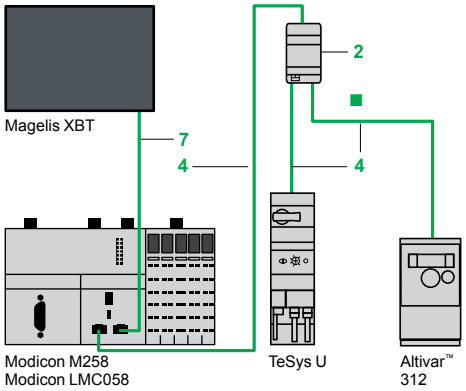
(3) Allows the using of RS 485 integrated port with the parameters defined in configuration.

*(4) If the terminal is equipped with a 25-way SUB-D connector, a SUB-D 25-way female/9-way male adapter **TSX CTC 07** must also be ordered.*

MachineStruxure™
Communication
Modbus™ and Character mode serial links for Modicon™ M258™ logic controller and Modicon™ LMC058 motion controller

Modbus™ cabling system

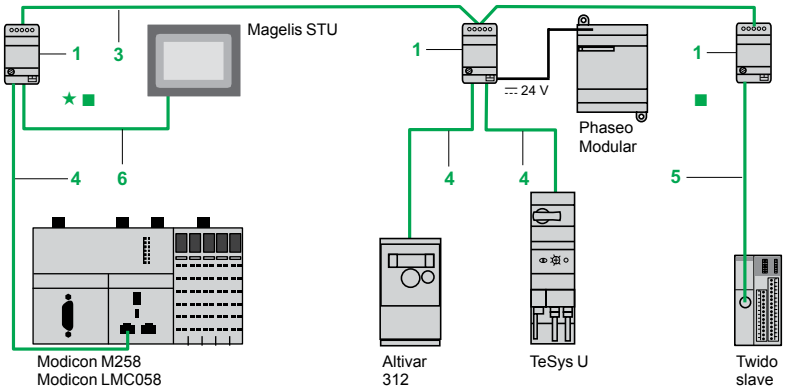
Non-isolated link (Modicon™ M258™ master)



- Length of cables between Modicon M258 and Altivar™: ⩽ 30 m max.

★ *Line polarization active*
■ *Line termination*

Isolated link (Modicon M258 master)



- Total length of cables between isolation boxes 1: ⩽ 1000 m
- Length of tap cables 4, 4 or 6: ⩽ 10 m

References

Extension and adaptation elements for RS 485 serial link

Designation	Description	No.	Length	Reference	Weight kg
Isolation box Screw terminal block for trunk cable 2 x RJ45 connectors for tap-off	- Isolation of the RS485 link *(1)* - Line termination (RC 120 Ω, 1 nF) - Line pre-polarization (2 R 620 Ω), Power supply 24 V [DC symbol] (screw terminal block) or 5 V [DC symbol] (via RJ45), Mounting on 35 mm DIN rail	1	–	**TWD XCA ISO**	0.100
Junction box 1 RJ45 for trunk cable 2 x RJ45 for tap-off	- Line termination (RC 120 Ω, 1 nF) - Line pre-polarization (2 R 620 Ω), Mounting on 35 mm DIN rail	2		**TWD XCA T3RJ**	0.080
Modbus splitter box Screw terminal block for trunk cable 10 x RJ45 for tap-off	Mounting on 35 mm DIN rail on plate or panel (2 x Ø 4 mm screws)	–	–	**LU9 GC3**	0.500
T-junction boxes 2 x RJ45 for trunk cable	1 integrated cable with RJ45 connector for tap-off dedicated to Altivar variable speed drive	–	0.3 m	**VW3 A8 306 TF03**	–
			1 m	**VW3 A8 306 TF10**	–
Passive T-junction box	- 1-channel line extension and tap-off on screw terminal block - Line termination	–	–	**TSX SCA 50**	0.520
RS 232C/RS 485 line converter	- Max. data rate 19.2 Kbps - No modem signals 24 V ⎓/20 mA power supply, Mounting on 35 mm DIN rail	–	–	**XGS Z24**	0.100

(1) Line isolation recommended for line distances > 10 m.


TWD XCA ISO


TWD XCA T3RJ


LU9 GC3


TSX SCA 50


XGS Z24

MachineStruxure™
Communication
Modbus™ and Character Mode serial links for Modicon™ M258™ logic controller and Modicon™ LMC058 motion controller

References (continued)

Cables and cordsets for RS 232 serial link

Designation	Description		No.	Length	Unit reference	Weight kg
RS 485 double shielded twisted pair trunk cables	Modbus™ serial link, supplied without connector		3	100 m	**TSX CSA 100**	5.680
				200 m	**TSX CSA 200**	10.920
				500 m	**TSX CSA 500**	30.000
Modbus RS 485 cordsets	2 x RJ45 connectors		4	0.3 m	**VW3 A8 306 R03**	0.030
				1 m	**VW3 A8 306 R10**	0.050
				3 m	**VW3 A8 306 R30**	0.150
	1 x RJ45 connector and 1 end with flying leads		–	1 m	**TWD XCA FJ010**	0.060
				3 m	**VW3 A8 306 D30**	0.150
	1 x mini-DIN connector for Twido™ controller and 1 x RJ45 connector		–	0.3 m	**TWD XCA RJ003**	0.040
				1 m	**TWD XCA RJ010**	0.090
				3 m	**TWD XCA RJ030**	0.160
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector *(1) (2)*		5	0.3 m	**TWD XCA RJP03**	0.027
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector Dedicated to Programming protocol *(2) (3)*		–	0.3 m	**TWD XCA RJP03P**	0.027
	1 mini-DIN connector for Twido controller and 1 end with flying leads		–	1 m	**TWD XCA FD010**	0.062
				10 m	**TSX CX 100**	0.517
Cordsets Modicon™ M258™ (SL1, SL2) **to Magelis™ display unit and terminal**	2 x RJ45 connectors	XBT N200/R400 XBT RT500/511 XBT GT11●●/1335	7	2.5 m	**XBT Z9980**	0.150
	1 x RJ45 connector and 1 x 25-way SUB-D connector	Small Panel XBT N401/410 XBT R410/411	6, 7	2.5 m	**XBT Z938**	0.210
	1 x RJ45 connector and 1 x 9-way SUB-D connector	Advanced Panel XBT GT2●●0 to 7340 XBT GK●●●0	7	2.5 m	**XBT Z9008**	0.150
Cordset for Magelis Small Panel display unit and terminal	2 x RJ45 connectors	Small Panel XBT N200/R400 XBT RT500/511	6	3 m	**VW3 A8 306 R30**	0.150
Line terminator	For RJ45 connector R = 120 Ω, C = 1 nf Sold in lots of 2		–	–	**VW3 A8 306 RC**	0.200

Cordsets for RS 232 serial link

Designation	Description	Length	Reference	Weight kg
Cordset for DTE terminal (printer) *(4)*	Serial link for DTE equipment (2) 1 x RJ45 connector and 1 x 9-way female SUB-D connector	3 m	**TCS MCN 3M4F3C2**	0.150
Cordset for DCE terminal (modem, converter)	Serial link for DCE 1 x RJ45 connector and 1 x 9-way male SUB-D connector	3 m	**TCS MCN 3M4M3S2**	0.150

(1) Forces configuration of the Twido™ controller built-in RS 485 port with the TwidoSuite™ programming protocol parameters.

(2) Carries the 5 V ⎓ voltage (supplied by the Twido controller built-in RS 485 port) required by the **TWD XCA ISO isolation box,** *thus avoiding the need for a 24 V ⎓ external power supply.*

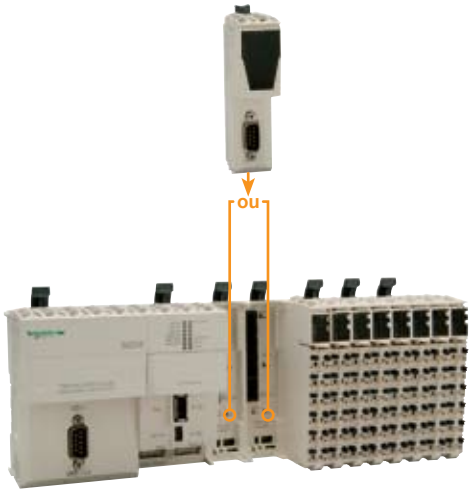
(3) Allows the Twido controller built-in RS 485 port to be used with the parameters described in the configuration.

(4) If the terminal is equipped with a 25-way SUB-D connector, you will also need to order the 25-way female/9-way male SUB-D adaptor **TSX CTC 07**.

MachineStruxure™

Communication

TM5 communication modules for Modbus™ serial link: for Modicon™ M258™ logic controller and Modicon™ LMC058 motion controller

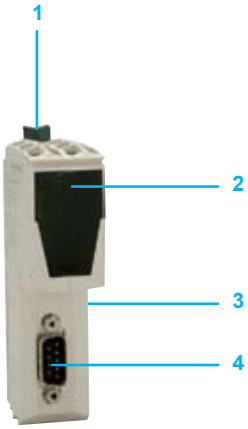


TM5 PCRS● communication module: for mounting on one of the the two free PCI slots on the M258 logic controller or LMC058 motion controller

Introduction

TM5 PCRS● communication modules are designed to function with: **TM258 LD42DT4L**, **TM258 LF42DT4L**, **TM258 LF42DR**, and **TM258 LF66DT4L** logic controllers, and **LMC 058LF424●** motion controllers. They are installed in one of the two free PCI slots on the controller.

These versatile **TM5 PCRS●** communication modules can be used to configure an additional Modbus™ or ASCII serial link as RS232 or RS485



Description

TM5 PCRS● communication modules feature:

1 Locking clip for mounting/dismounting on the controller
2 Channel and module diagnostics LED display block
3 Connector for linking to the controller
4 SUB-D connector (male 9-way) for connection to the serial link

Serial link		
LED	**Color**	**Status: on**
Status	Green	Operation in progress
	Red	Controller starting
RXD	Yellow	Reception on interface: □ RS232 with TM258 PCRS2 □ RS485 with TM258 PCRS4
TXD	Yellow	Transmission on interface: □ RS232 with TM258 PCRS2 □ RS485 with TM258 PCRS4

MachineStruxure™

Communication

TM5 communication modules for Modbus™ serial link: for Modicon™ M258™ logic controller and Modicon™ LMC058 motion controller

TM5 PCRS●

References

Description	Used for	Physical layer/ protocol	Built-in port	Reference	Weight kg
Serial link communication modules	□ Logic controllers: TM258 LD42DT4L, TM258 LF42DT4L, TM258 LF42DR, TM258 LF66DT4L	RS232/ Modbus™/ASCII	SUB-D connector (male 9-way)	**TM5 PCRS2**	0.064
	□ Motion controllers: LMC 058LF424●	RS485 or RS422/ Modbus/ASCII	SUB-D connector (male 9-way)	**TM5 PCRS4**	0.064

4

MachineStruxure™
Communication
CANopen™ Optimized Architecture with Modicon™ OTB

Introduction

Schneider Electric has selected CANopen™ communications technology for use with its machines and installations because of its wealth of functions and its wide acceptance throughout the automation engineering community. With its ready accessibility and flexibility, the CANopen bus is increasingly used in control system architectures – and is an important component in MachineStruxure™ Solutions.

CANopen is an open communication bus supported by more than 400 companies worldwide, and promoted by CAN in Automation (CIA) http://www.can-cia.org/. CANopen conforms to standards EN 50325-4 and ISO 15745-2.

CANopen brings transparency to Ethernet

The CANopen bus is a multi-master bus ensuring reliable, deterministic access to real-time data in control system equipment. The CSMA/CA protocol is based on broadcast exchanges, sent cyclically or on an event, to ensure optimum use of the bandwidth. A message handling channel can also be used to define slave parameters.

The bus uses a double shielded twisted pair on which, with the Modicon™ M238™ logic controller, Magelis™ XBTGC HMI controllers, XBTGT/GK with control function and Altivar™ IMC drive controller, a maximum of 16 slave devices are connected by daisy-chaining or by tap junctions. The variable data rate between 20 kbps and 1 Mbps depends on the length of the bus (between 20 m and 1000 m).
Each end of the bus must be fitted with a line terminator.

The CANopen bus is a set of profiles on CAN systems, with multiple features, including:
- Open bus system
- Data exchanges in real time without overloading the protocol
- Modular design allowing modification of size
- Interconnection and interchangeability of devices
- Standardized network configuration
- Access to all device parameters
- Synchronization and circulation of data from cyclic and/or event-controlled processes (short system response time)

TeSys U with communication module LUL C08

Modicon OTB

Preventa XPS MC

Altivar 71

Altivar 32

LEX 32A

Lexium ILA1B

Connectable Schneider Electric devices

The following Schneider Electric devices can be connected to the CANopen™ bus:
- Ø 58 mm OsiSense™ XCC multi-turn absolute encoders: **XCC 3510P/3515C S84CB**.
- TeSys™ U starter-controllers with communication module **LUL C08**.
- TeSys T motor management system with controller **LTM R●●C●●**.
- Modicon™ OTB IP 20 distributed I/O with I/O expansion modules with interface module **OTB 1C0 DM9LP**.
- Preventa™ configurable safety controllers **XPS MC16ZC/MC32ZC**.
- Altivar™ 61/71 variable speed drives for asynchronous motors (0.75 to 630 kW) **Altivar 61/71H●●●●**.
- Altivar 32 variable speed drives for asynchronous motors (0.18 to 15 kW) **Altivar 32H●●●●**.
- Lexium™ 32 servo drives (0.15 to 7 kW) for BSH/BSM servo motors **LXM 32A●D●●●●**.
- Lexium integrated drives **ILA1B**, **ILE1B** and **ILS1B**.

CANopen Optimized Architecture

Wiring system, see page 4/16.

MachineStruxure™
Communication
Integrated CANopen™ bus port: Modicon™ M238™ logic controller

Tested, Validated and Documented Architecture

TM238 LFDC24DT and **TM238 LFAC24DR** logic controllers act as CANopen™ masters. The bus consists of a master station, the Modicon™ M238™ controller and slave stations. The master is in charge of configuration, exchanges and diagnostics on the slaves.

The CANopen bus is a communication type bus and allows management of various slaves such as:
- Digital slaves
- Analog slaves
- Variable speed controllers
- Motor starters

The Modicon M238 CANopen master controls up to 16 slaves, each with an input PDO (*Process Data Object*) and an output PDO.
If a slave has more than one PDO, the maximum number of slaves is reduced by an equivalent number.

CANopen conformity class

Schneider Electric has defined the conformity classes for CANopen master and slave devices. Conformity classes are used to identify the services and levels of service supported by each CANopen device or product. These services are described in section 4 of our “Machines and Installations with industrial communications” catalog.
The table below shows product combination possibilities according to their conformity class.

Conformity class		Slave device		
		S10	S20	S30
Master product	M10			
	M20			
	M30			

Combination possible: Modicon M238 controller master M10 class with slave device S10 class

Use restriction: Modicon M238 controller master M10 class with slave device S20 and S30 classes limits the level of service to that of the lower conformity class, either S20 or S30.

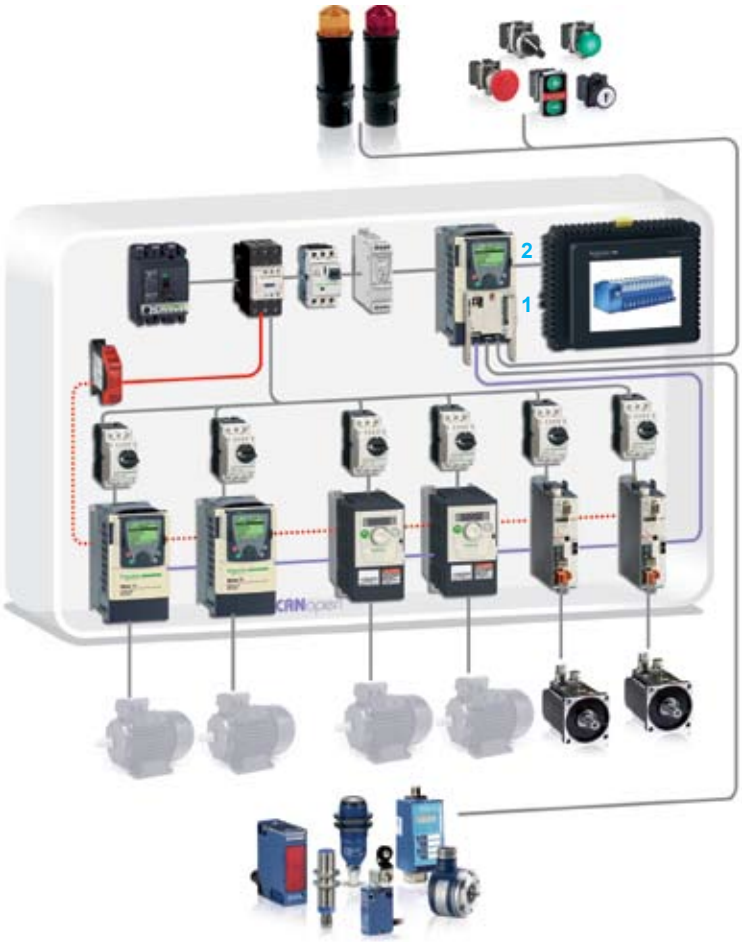
CANopen Optimized architecture

Wiring system, see page 4/16.

(1) 16 slaves max. with max. limit of: 32 RPDOs and 32 TPDOs

MachineStruxure™
Communication
Integrated CANopen™ bus port: Altivar™ IMC drive controller for Altivar 61/71 variable speed drives

Tested ,Validated and Documented Architecture



1 Altivar™ IMC card
2 Altivar 61/71 variable speed drive

Altivar IMC integrated controller card CANopen™ port

The Altivar IMC integrated controller card has a built-in 9-way male SUB-D CANopen port and acts as the CANopen master.
The bus consists of a master station, the Altivar IMC card, and slave stations. The master is in charge of configuration, exchanges and diagnostics to the slaves.
The CANopen bus is used to manage a variety of slaves such as:
- Discrete slaves
- Analog slaves
- Variable speed drives
- Motor starters

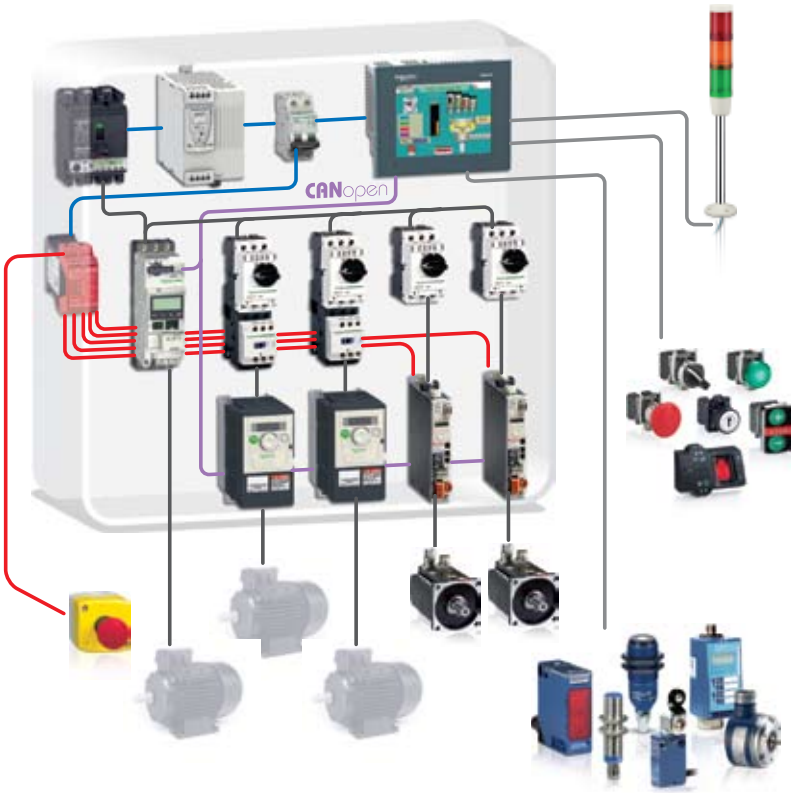
CANopen port							
Standards		DS 301 V4.02, DR 303-1					
Class		Conformity class M20, limited to 16 slaves					
Data rate	Max. length (m)	**20**	**100**	**250**	**500**	**1000**	**2500**
	Data rate (kbps)	1000	500	250	125	50	20
Number of slaves		16 max. with max. limit of: 32 RPDOs and 32 TPDOs					
Connection		On 9-way male SUB-D port					

CANopen Optimized architecture

Wiring system, see page 4/16.

MachineStruxure™
Communication
CANopen™ bus master module: Magelis™ XBTGC HMI controllers, XBTGT/GK with control function

Tested, Validated and Documented Architecture



Introduction

The SoMachine™ software is used to configure the CANopen™ bus on the XBT GC HMI Controller.
The CANopen bus master module provides the control function for XBT GT (5.7”, 10.4”, 12.1” or 15”) and XBT GK (5.7” or 10.4”) Advanced Panels an is configured with the SoMachine software.

The various services available are:
■ One or more profiles are supplied for Schneider Electric slaves such as Altivar™ 312/61/71 variable speed drives and Lexium™ 32 servo drives. This makes it possible to configure the slave according to a predefined mode.
Profiles provide a defined operating mode so that there is no need for users to configure the mode.
■ For third-party slaves
□ The user can choose from a list which can be modified. This simply involves importing an EDS (Electronic Data Sheet) description file
□ The slave can be positioned on the bus: the slave number, speed, and monitoring can be defined
□ The user can select variables from the list of variables managed by the slave
□ A link between variables and the data exchanged
□ Symbolization of data exchanged

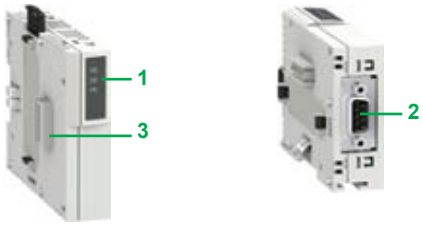
CANopen Optimized architecture

Wiring system, see page 4/16.

MachineStruxure™

Communication

CANopen™ bus master module: Magelis™ XBTGC HMI controllers, XBTGT/GK with control function



XBT ZGC CAN

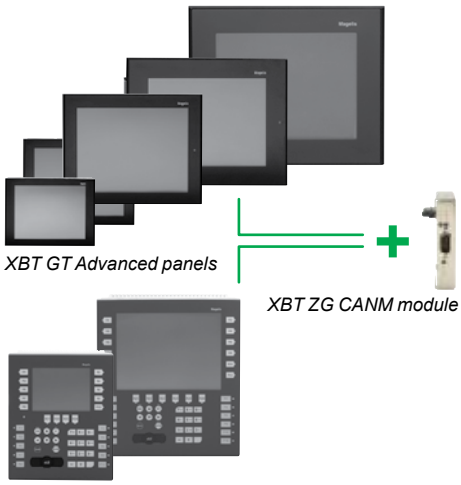
Description

The **XBT ZGC CAN** CANopen bus master module consists of:

1 3 LEDs (PWR, RUN, ERR) providing details of power supply status and module operation
2 9-way male SUB-D connector for connecting to the CANopen™ bus
3 Connector for connecting to the XBT GC HMI Controller

Reference

Description	Reference	Weight kg
CANopen bus master module for Magelis™ XBT GC HMI Controller. Conformity class M10	**XBT ZGC CAN**	0.100



XBT GT Advanced panels

XBT ZG CANM module

Advanced panels XBT GK

HMI function: Magelis XBT GT/GK Advanced Panels
+
Control function: XBT ZG CANM CANopen master module

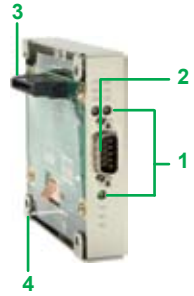
Description

The **XBT ZG CANM** CANopen bus master module consists of:

1 3 LEDs (PWR, RUN, ERR) providing details of power supply status and module operation
2 9-way male SUB-D connector for connecting to the CANopen bus
3 Connector for connecting to the rear of the Magelis XBT GT/GK Advanced Panels
4 Positions for mounting screws

Reference

Description	Reference	Weight kg
CANopen bus master module for Magelis XBT GT/GK Advanced Panels Conformity class M10	**XBT ZG CANM**	0.100



XBT ZGC CAN

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ OTB (IP 20)

OTB 1C0 DM9LP
CANopen bus interface module

Introduction

The Modicon™ OTB requires fewer references for the spare parts and accessories that are required to create an island.

The Modicon OTB has also been designed for simplicity. It is compatible with the **Modicon M238™ logic controller, Magelis™ XBTGC HMI controllers, XBTGT/GK with control function and Altivar™ IMC drive controller**, and includes 2 communication bases (interface modules) for the various types of fieldbus:
- CANopen™ bus,
- Modbus™ RS 485 Serial Line.

Inputs and outputs are directly integrated in the interface modules. Each base incorporates 20 I/O:
- 12 ⎓ 24 V inputs,
- 6 relay outputs,
- 2 ⎓ 24 V solid-state outputs.

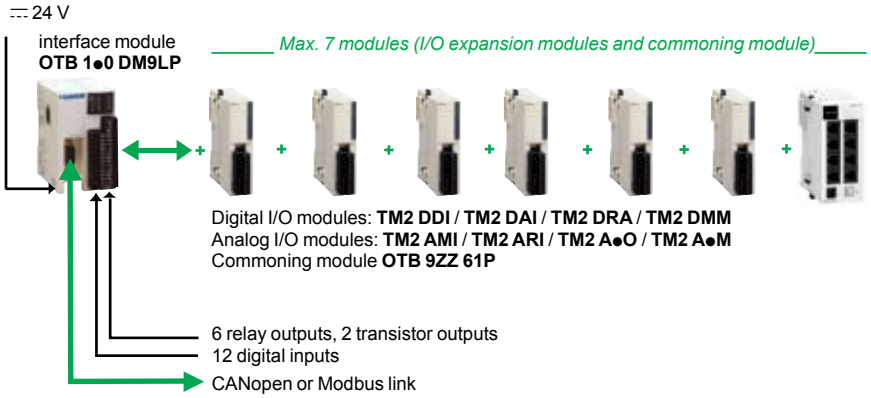
All the bases use a ⎓ 24 V supply. With its monobloc design, each Modicon OTB interface module can be fitted with expansion modules of the Modicon M238 logic controller.

With its range of I/O expansions, the Modicon OTB provides a modularity that meets all requirements starting with a base that can be fitted with up to 7 digital I/O modules **TM2 D●●** or analog I/O modules **TM2 A●●**. The expansion modules, like the interface modules, simply clip-on to 35 mm symmetrical rails and enable configurations of up to 244 digital I/O and up to 42 analog I/O channels – or a mixture of both types (within the limit of 7 expansion modules).

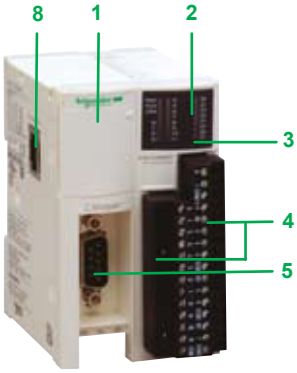
Sensors and actuators are connected to the interface modules and I/O expansion modules using removable screw terminal blocks.
All Modicon OTB modules provide an IP 20 degree of protection.

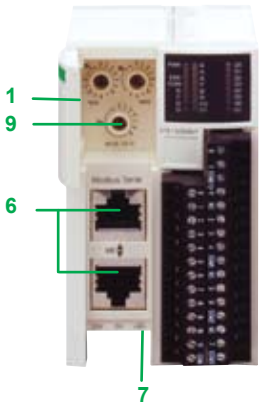
To simplify sensor and actuator connections, as well as linking commons, the Modicon OTB offer also includes a commoning module **OTB 9ZZ 61JP**. This module, as with all the other modules of the Modicon OTB range, allows the through connection of the internal bus or network (passively in this case) and enables connection of the commons in two isolated groups for each commoning module.

Configuration of interface modules



MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ OTB (IP 20)





Description

The Modicon™ **OTB 1●0 DM9LP** *(1)* interface modules feature:

1 Access door.
2 Indicator lights:
- □ module and communication status (PWR, RUN, ERR, COM, STAT)
- □ I/O states (IN● and OUT●)

3 Connector for expansion modules (right-hand side).
4 Two removable screw terminal connectors for connection of inputs/outputs.
5 or 6 Depends on model:
5 SUB-D 15-way connector for connection CANopen™ bus with OTB 1C0 DM9LP model.
6 Two RJ45 connectors for connection Modbus™ serial link with OTB 1S0 DM9LP model.
7 Terminal for connection of ⎓ 24 V supply.
8 One RJ45 connector for operating system update of interface.

Via access door 1

9 Two or three coding wheels (depending on model) for OTB island address and communication data rate adjustment.

Mounting: the interface modules are mounted on 35 mm symmetrical DIN rails. The mounting kit **TWD XMT5** (supplied in lots of 5) allows plate or panel mounting.

4

Interface modules with integrated digital I/O

Supply voltage	Number and type of integrated I/O			Connection by	Link	Reference	Weight kg
	Inputs	Solid-state outputs	Relay outputs				
⎓ **24 V**	12 I ⎓ 24 V IEC type 1 (1 common)	2 O ⎓ 24 V 0.3 A (1 common)	6 O ⎓ 30 V/ ∿ 240 V 2 A (3 commons)	Removable screw terminal block	CANopen bus	**OTB 1C0 DM9LP**	0.195
					Modbus RS 485 serial link	**OTB 1S0 DM9LP**	0.190

OTB 1C0 DM9LP

Separate parts

Description	Application	Number of commons	Connection by	Number of wires	Reference	Weight kg
Commoning modules	For grouping input or output commons, 8 A maximum; inter-module	2 isolated groups	Removable screw terminal block	2 x 10	**OTB 9ZZ 61JP**	0.100
Mounting kit Sold in lots of 5	Plate or panel mounting of modules	–	–	–	**TWD XMT5**	–

OTB 1S0 DM9LP

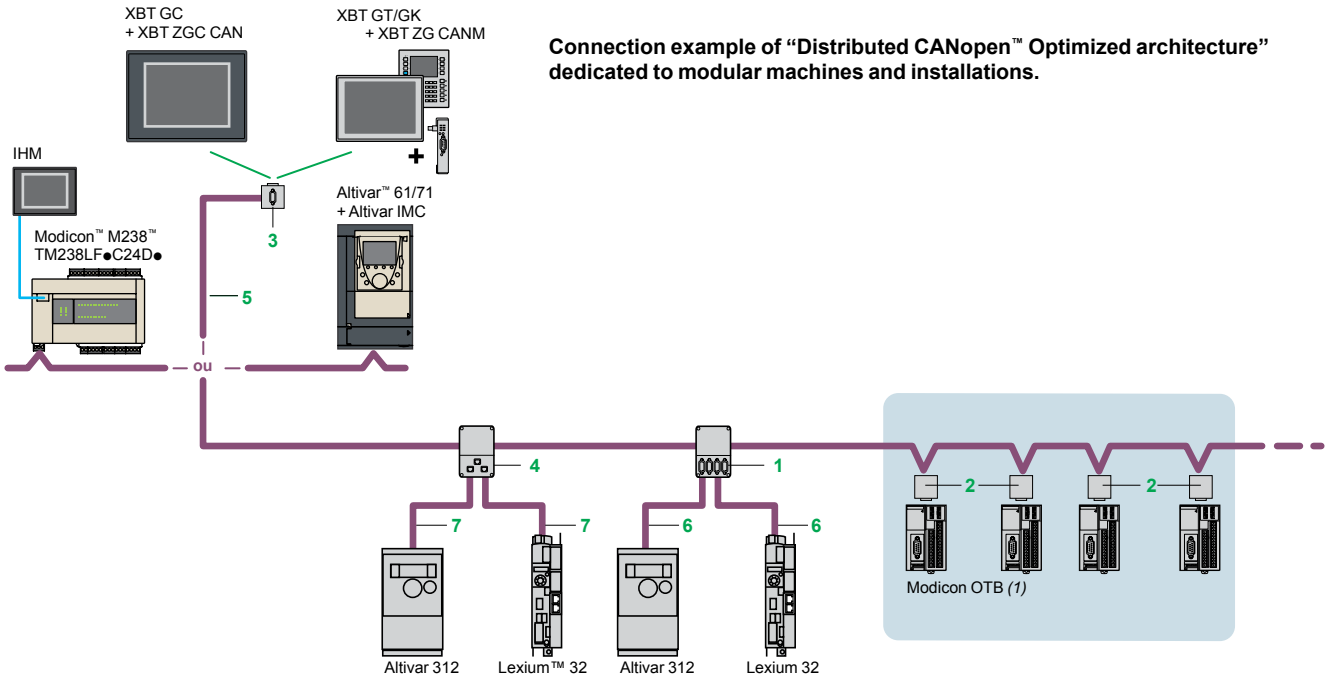
Connection accessories

Description	Application	Reference –
CANopen bus	Cabling system: junction boxes, cables, cordsets, IP 20 and IP 67 accessories	See page 4/16
Modbus serial link	Cabling system: ta-off, hub, cables, cordsets, line end adapter	See page 4/2

OTB 9ZZ 61JP

(1) Only the communication part 5, 6 and 9 is dedicated to each model and can differ, the general description remains the same.

CANopen Optimized architecture



Connection example of "Distributed CANopen™ Optimized architecture" dedicated to modular machines and installations.

References

Standard junction boxes and connectors

Description	Composition	Item	Length	Unit reference	Weight kg
CANopen IP 20 tap junction box	4 SUB-D ports. Screw terminal blocks for connection of main cables Line end adapter	1	–	**TSX CAN TDM4**	0.196
IP 20 connectors CANopen 9-way SUB-D female. Line end adapter switch	Elbowed (90°)	2	–	**TSX CAN KCDF 90T**	0.046
	Straight *(2)*	–	–	**TSX CAN KCDF 180T**	0.049
	Elbowed (90°) with 9-way SUB-D connector for connection to PC or diagnostic tool	3	–	**TSX CAN KCDF 90TP**	0.051
M12 connectors IP 67	Male	–	–	**FTX CN 12M5**	0.050
	Female	–	–	**FTX CN 12F5**	0.050
CANopen IP 20 tap junction box for Altivar and Lexium 05	2 x RJ45 ports	4	–	**VW3 CAN TAP2**	0.250
Daisy chain taps	Equipped with: - 2 spring terminal blocks for connecting the CANopen bus in a daisy chain - 1 preassembled cordset with an RJ45 connector for connecting the drive	–	0.6	**TCS CTN 026M 16M**	–
	Equipped with: - 2 RJ45 connectors for connecting the CANopen bus in a daisy chain - 1 preassembled cordset with an RJ45 connector for connecting the drive	–	0.3	**TCS CTN 023F 13M03**	–
CANopen line terminators	For RJ45 connector Sold in packs of 2	–	–	**TCS CAR013M120**	–
	For screw terminal connector Sold in packs of 2	–	–	**TCS CAR01NM120**	–

(1) Modicon OTB product range. See page 4/14.
(2) For connection to an integrated controller card Altivar IMC.


TSX CAN TDM4


VW3 CAN TAP2


TSX CAN KCD F90T


TSX CAN KCD F180T


TSX CAN KCD F90TP


TCS CAR013M120

VW3 CAN A71

AM0 2CA 001V000

FTX DP21●●

References (continued)

Standard IP 20 formed cables

Description	Application	Item	Length	Unit reference	Weight kg
CANopen™ cables (2 x AWG 22 2 x AWG 24)	For standard environments *(2)*, CE marking: low fume emission. Halogen-free. Non flame propagating (IEC 60332-1)	5	50 m	**TSX CAN CA50**	4.930
			100 m	**TSX CAN CA100**	8.800
			300 m	**TSX CAN CA300**	24.560
	For standard environments *(2)*, UL certified, CE marking: non flame propagating (IEC 60332-2)	5	50 m	**TSX CAN CB50**	3.580
			100 m	**TSX CAN CB100**	7.840
			300 m	**TSX CAN CB300**	21.870
	For standard environments *(2)* or mobile installation, CE marking: low fume emission. Halogen-free. Non flame propagating (IEC 60332-1). Oil resistant	5	50 m	**TSX CAN CD50**	3.510
CANopen formed cables 1 x 9-way SUB-D female connector at each end.	For standard environments *(2)*, CE marking: low fume emission. Halogen-free. Non flame propagating (IEC 60332-1)	–	0.3 m	**TSX CAN CADD03**	0.091
			1 m	**TSX CAN CADD1**	0.143
			3 m	**TSX CAN CADD3**	0.295
			5 m	**TSX CAN CADD5**	0.440
	For standard environments *(2)*, UL certified, CE marking: non flame propagating (IEC 60332-2)	–	0.3 m	**TSX CAN CBDD03**	0.086
			1 m	**TSX CAN CBDD1**	0.131
			3 m	**TSX CAN CBDD3**	0.268
			5 m	**TSX CAN CBDD5**	0.400
CANopen formed cables	Formed cables with 1 x 9-way SUB-D female connector and 1 x RJ45 connector	6	0.5 m	**TCS CCN 4F3 M05T**	0.100
			1 m	**TCS CCN 4F3 M1T**	0.100
				VW3 M38 05 R010 *(2)*	0.100
			3 m	**VW3 M38 05 R030** *(2)*	0.300
				TCS CCN 4F3 M3T	0.160
	Formed cables with 2 x 9-way SUB-D connectors, 1 female and 1 male	–	0.5 m	**TLA CD CBA 005**	0.100
			1.5 m	**TLA CD CBA 015**	0.120
			3 m	**TLA CD CBA 030**	0.190
			5 m	**TLA CD CBA 050**	0.350

IP 20 connection accessories

CANopen connector for Altivar™ 71 *(3)*	9-way SUB-D female. Line end adapter switch. 180° cable entry	–	–	**VW3 CAN KCDF 180T**	0.100
Adapter for Altivar 71 variable speed controller	CANopen SUB-D to RJ45 adapter	–	–	**VW3 CAN A71**	0.100
Formed CANopen cables	1 RJ45 connector at each end.	7	0.3 m	**VW3 CAN CARR03**	0.100
			1 m	**VW3 CAN CARR1**	0.100
CANopen bus adapter for Lexium™ 17D	Hardware interface for link conforming to the CANopen standard + 1 connector for connection of PC terminal	–	–	**AM0 2CA 001V000**	0.110
Y connector	CANopen/Modbus™	–	–	**TCS CTN011M11F**	0.100

(1) Standard environment: without any particular environmental restrictions, operating temperature between + 5 °C and + 60 °C, and for mounted installation.Harsh environments: resistant to hydrocarbons, industrial oils, detergents, solder splashes, hygrometry up to 100%, saline environment, wide temperature variations, operating temperature between - 10 °C and + 70 °C, or mobile installation.
(2) Cable equipped with line end adapter.
(3) For variable speed controllers **Altivar 71H●●●M3**, **Altivar 71HD11M3X**, **HD15M3X**, **Altivar 71H075N4** *to* **HD18N4**, *this connector can be replaced by connector* **TSX CAN KCDF 180T**.

MachineStruxure™
Communication
CANopen™ Performance architecture with Modicon™ TM5/TM7

Introduction

With its wide degree of acceptance in the automation engineering community, CANopen™ is an excellent fit for Schneider Electric and its MachineStruxure™ Solutions Technology.

CANmotion™ and CANopen specifications

CANmotion and CANopen buses are multi-master buses ensuring reliable, deterministic access to real-time data in control system equipment. The CSMA/CA protocol is based on broadcast exchanges, sent cyclically or on an event, to ensure optimum use of the bandwidth.
A message handling channel can also be used to define slave parameters.

CANmotion and CANopen buses are a set of profiles on CAN systems with multiple features, including:
- Open bus system
- Data exchanges in real time without overloading the protocol
- Modular design allowing modification of size
- Interconnection and interchangeability of devices
- Standardized network configuration
- Access to all device parameters
- Synchronization and circulation of cyclical and/or event-controlled process data (short system response time)

TeSys U + communication module LUL C08

ModiconTM5 Transmitter/ Receiver module

Modicon TM7 CANopen interface Blocks

Preventa XPS MC

Altivar 71

Altivar 32

LEX 32A

Lexium ILA1B

Connectable Schneider Electric devices

The following Schneider Electric devices can be connected to the CANopen bus:
- Ø 58 mm OsiSense™ XCC multi-turn absolute encoders: **XCC 3510P, XCC 3515CS84CB**
- TeSys™ U starter-controllers with communication module: **LUL C08**
- TeSys T motor management system with controller: **LTM R●●C●●**
- Modicon™ **TM5** Transmitter/Receiver modules (IP 20)
- Modicon **TM7** I/CANopen interface blocks (IP 67)
- Preventa™ safety configurable controllers **XPS MC16ZC, XPS MC32ZC**.
- Altivar™ 61/71 variable speed drives for asynchronous motors (0.75 to 630 kW): **Altivar 61H /71H ●●●●●**
- Altivar 32 variable speed drives for asynchronous motors (0,18 to 15Kw): **Altivar 32H●●●●**
- Lexium™ 32 servo drives (0.15 to 7 kW) for BSH/BSM servo motors: **LXM 32A●D●●●●**
- Lexium **SD3** stepper drives
- Lexium integrated drives: **ILA1B**, **ILE1B** and **ILS1B**

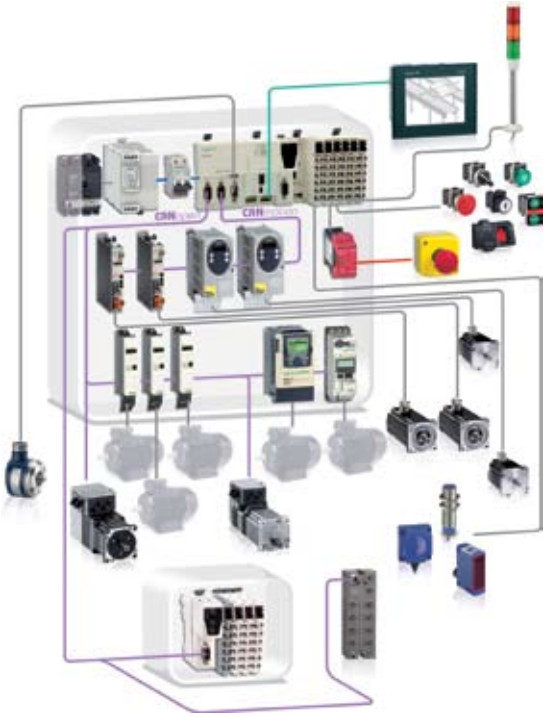
CANopen Performance architecture

Wiring system, see page 4/34.

Tested, Validated and Documented Architectures

Modicon™ M258™ logic controller

Modicon LMC058 motion controller



CANopen™ port on M258 logic controller and LMC058 motion controller

Modicon M258 logic controllers (**TM258 LF●●●●**) and all LMC058 motion controllers include a 9-way male SUB-D CANopen port and act as the CANopen master.
The bus consists of a master station, M238 logic controller or LMC058 motion controller and slave stations. The master is in charge of configuration, exchanges and diagnostics to the slaves.
The CANopen bus is a communication bus and is used to manage a variety of slaves, such as:

- Digital slaves
- Analog slaves
- Variable speed drives
- Motor starters

CANopen port									
Standards		DS 301 V4.02, DR 303-1							
Class		Conformity class M10, limited to 32 slaves							
Data rate	Max. length (m)	**20**	**40**	**100**	**250**	**500**	**1000**	**2500**	**5000**
	Data rate (kbps)	1000	800	500	250	125	50	20	10
Number of slaves		32 max. with max. limit of: 64 TDPOs/64 RPDOs							
Connection		On 9-way male SUB-D port							

CANmotion port on LMC058 motion controllers

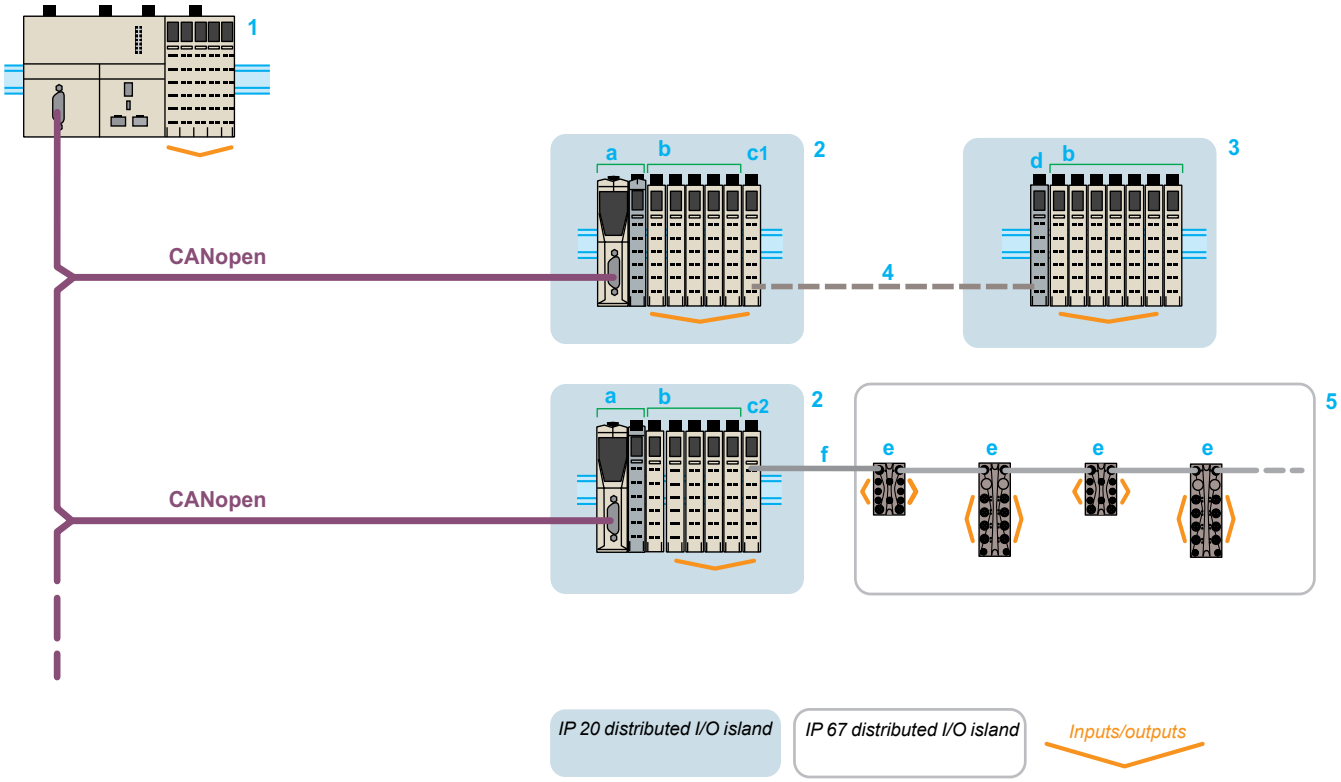
LMC058 motion controllers include a 9-way male SUB-D CANmotion port and act as the CANmotion master.
This CANmotion connection offers the option of configuring and controlling up to 8 Lexium 32 drives and/or Lexium SD3 stepper drives.
The CANmotion bus cycle time ensures that axis positions will be refreshed.

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM5 (IP 20) interface module

Introduction

To support its “Flexible Machine Control” concept, a key component of MachineStruxure™, and the Modicon™ M258™ logic controller and Modicon LMC058 motion controller offers…Schneider Electric offers a Modicon TM5 CANopen™ interface module providing CANopen access to distributed I/O.

■ M258 logic controllers and Modicon LMC058 motion controllers allow the creation of distributed I/O islands via the TM5 expansion bus, which enables the architecture to be adapted to match the topology of the machine as closely as possible, while reducing wiring costs.
■ The Modicon TM5 CANopen interface module allows the connection of distributed I/O islands (sensors and actuators) that are distributed over machines via the CANopen fieldbus. These islands communicate on the CANopen bus.



1 Modicon M258 logic controller or Modicon LMC058 motion controller: CANopen bus masters.
2 IP 20 distributed I/O islands. Composition: TM5 CANopen interface module (slave) (a) + TM5 compact block *(1)* or I/O modules (b) *(2)* + transmitter modules TM5 SBET1 (c1)/TM5 SBET7 (c2) *(3)*.
3 IP 20 distributed I/O island. Composition: receiver module TM5 SBER2 (d) + TM5 compact block *(1)* or TM5 I/O modules (b) *(2)*.
4 TM5 expansion bus. Composition: remote I/O connection cable TCS XCNNXNX100.
5 IP 67 distributed I/O island. Composition: TM7 IP 67 I/O blocks (digital or analog) (e) *(4)* + expansion bus cable TM7 TCS XCN●●●E *(5)* (f).

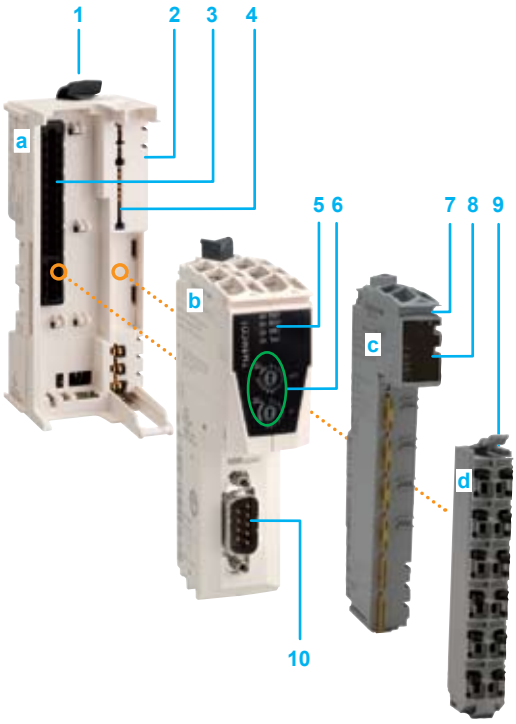
(1) Modicon TM5 Compact block: see page 3/22.
(2) Modicon TM5 Digital modules: see page 3/26 ; Modicon TM5 analog modules: see page 3/34.
(3) Modicon TM5 Transmitter modules and TM5 expansion bus: see page 3/42.
(4) Modicon TM7 I/O blocks: see page 3/44.
(5) TM7 expansion bus cables: see page 4/30.

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM5 (IP 20) interface module

Introduction

The TM5 CANopen™ interface module consists of 4 parts to be ordered separately:
- Bus base, TM5 ACBN1 (1)
- CANopen electronic interface module, TM5 NCO1
- Power distribution electronic module, TM5 SPS3
- Removable terminal block, TM5 ACTB12PS

The modules can be mechanically assembled on the bus base before mounting on a symmetrical rail, and offer the following advantages:
- Removable terminal block
- Spring terminals for connecting the power supply of the interface module and the I/O expansion modules quickly, with no tools required. In addition, the quality of the spring terminals reduces the need for periodic retightening



Description

The CANopen interface module is a combination of 4 components: (a) TM5 ACBN1 bus base + (b) TM5 NCO1 CANopen electronic interface module + (c) TM5 SPS3 power distribution electronic module (1) + (d) TM5 ACTB12PS removable terminal block.

This assembly includes:

1 Mechanical locking lever for mounting/dismounting on a symmetrical rail
2 Expansion bus connection on the side of the base for the link with the next module
3 Slot for the CANopen interface module with connector
4 Slot for the power distribution module with connector
5 Channel and interface module diagnostics LED display block
6 Two rotary selector switches for addresses on the bus
7 Slot for labeling (label-holder)
8 Channel and power distribution module diagnostics LED display block
9 Removable spring terminal block with locking clip and slots for colored identifiers
10 9-way male SUB-D connector for connecting to the CANopen bus

(1) Supplied with 2 protective plates, TM5 ACPL10 and TM5 ACPR10.

Specifications

Conformity with standards		IEC 61131-2
Product certifications		CE, UL, CSA, GOST-R and c-Tick
Temperature	Operation	Horizontal mounting: - 10 to + 60°C *(1)* Vertical mounting: - 10 to + 50°C
	Storage	- 40 to + 70°C
Relative humidity		95% max. without condensation
Degree of protection		IP 20 conforming to IEC 61131-2
Degree of pollution		≤ 2 conforming to IEC 60664
Altitude	Operation	0 to 2000 m
	Storage	0 to 3000 m
Vibration resistance (mounting on rail)		5 to 8.4 Hz (3.5 mm mounted amplitude) 8.4 to 150 Hz (9.8 m/s^2 mounted acceleration)
Shock resistance		147 m/s^2 (15 gn) for 11 ms
Connector	Type	Removable spring terminals
	Number of operations	50 min.

Electromagnetic compatibility

Electrostatic discharges conforming to EN/IEC 61000-4-2	8 kV: air discharge 4 kV: direct contact
Electromagnetic fields conforming to EN/IEC 61000-4-3	10 V/m (80 MHz to 2 GHz) 1 V/m (2 to 2.7 GHz)
Fast transients conforming to EN/IEC 61000-4-4	Supply: 2 kV I/O: 1 kV Shielded cable: 1 kV (repetition frequency 5 and 100 kHz)
Immunity to overvoltages, 24 V⎓ circuit conforming to EN/IEC 61000-4-5	1 kV in common mode
	0.5 kV in differential mode
Induced magnetic fields conforming to EN/IEC 61000-4-6	10 Vrms (0.15 to 80 MHz)
Conducted emissions conforming to EN/IEC 55011/CISPR11	150 to 500 kHz, quasi-peak at 79 dBµV
	500 kHz to 30 MHz, quasi-peak at 73 dBµV
Radiated emissions conforming to EN/IEC 55011/CISPR11	30 to 230 MHz, 10 m @ 40 dBµV/m
	230 MHz to 1 GHz, 10 m @ 47 dBµV/m

(1) Some devices have an operating temperature which requires a weighting factor between 55° and 60°C and may be subject to other restrictions. Refer to the user guide, which can be downloaded from www.schneider-electric.com

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM5 (IP 20) interface module


TM5 NCO1


TM5 SPS3


TM5 ACBN1


TM5 ACTB12PS


TM5 ACTLC100


TM5 ACTCH100

TM5 ACLITW1


TM5 ACLT1


TM5 ACLPL10


TM5 ACLPR10


TM5 ACADL100

References

CANopen™ electronic interface module

Description	Specifications	Reference	Weight kg
CANopen electronic interface module	CAN bus communication module with CANopen protocol Module color: white	**TM5 NCO1**	0.025

Power distribution electronic module

Input power supply	Specifications	Reference	Weight kg
24 V ⎓	Power supply for the CANopen bus interface and I/O expansion modules Module color: gray	**TM5 SPS3**	0.025

Bus base

Power supply	Specifications	Unit reference	Weight kg
24 V ⎓	Use for TM5 NCO1 and TM5 SPS3 electronic modules Supplied with 2 protective plates TM5 ACPL10 and TM5 ACPR10 Color of the base: white	**TM5 ACBN1**	0.020

Terminal block

Used for	Specifications	Unit reference	Weight kg
Power distribution electronic module TM5 SPS3	12 spring terminals Terminal block color: gray	**TM5 ACTB12PS**	0.016

Accessories

Description	Use for	Color	Sold in lots of	Unit reference	Weight kg
Plain text cover holder (label-holder)	labeling the I/O channel terminal blocks	Transparent	100	**TM5 ACTCH100**	0.200
Terminal block shield locking clip (Order with plain text cover holder TM5 ACTCH100)	Locking plain text cover holder TM5 ACTCH100	Transparent	100	**TM5 ACTLC100**	0.100
Precut sheet of paper labels	Plain text cover holder TM5 ACTCH100	White	100	**TM5 ACTLS100**	0.100
Colored plastic identifiers	labeling 16 connection channel terminals	White	1	**TM5 ACLITW1**	0.015
		Red	1	**TM5 ACLITR1**	0.015
		Blue	1	**TM5 ACLITB1**	0.015
Metal tool	Inserting/removing TM5 ACLIT●1 identifiers	Black	1	**TM5 ACLT1**	0.030
Retaining plates for bus bases	Held on the left side	White	10	**TM5 ACLPL10**	0.004
	Held on the right side	White	10	**TM5 ACLPR10**	0.004
Locking clips	For electronic modules	Black	100	**TM5 ACADL100**	0.001

Configuration software

- SoMachine™ software, see page 5/2
- Performance distributed I/O configuration software, please consult our website www.schneider-electric.com

(1) Modicon™ TM5 Transmitter/Receiver modules (see page 3/42)

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

Applications			CANopen™ bus interface with digital I/O	
				
Degree of protection			IP 67	IP 67
Type of housing			Plastic	Plastic
Modularity (number of channels)	Max. number of digital channels		8 channels configurable as inputs or outputs	16 channels configurable as inputs or outputs
	Digital inputs		0 to 8 according to software configuration	0 to 16 according to software configuration
	Digital outputs		0 to 8 according to software configuration	0 to 16 according to software configuration
Digital inputs	Voltage/current		24 V ⎓/4.4 mA	24 V ⎓/4.4 mA
	Type		Sink *(1)*	Sink *(1)*
	IEC 61131-2 conformity		Type 1	Type 1
Digital outputs	Voltage		24 V ⎓	24 V ⎓
	Type		Transistor/Source *(2)*	Transistor/Source *(2)*
	Current per output		0.5 A max.	0.5 A max.
	Current per interface I/O block		4 A max.	4 A max.
Sensor/actuator power supply	Voltage		24 V ⎓	24 V ⎓
	Max. current		500 mA for all channels	500 mA for all channels
	Protection against		Overloads, short-circuits and reverse polarity	Overloads, short-circuits and reverse polarity
Connection	CANopen bus	Bus input connector	A-coded 5-way male M12	A-coded 5-way male M12
		Bus output connector	–	A-coded 5-way female M12
	TM7 expansion bus	Bus input connector	–	–
		Bus output connector	B-coded 4-way female M12	B-coded 4-way female M12
	Digital I/O channels	Sensor connector	3-way female M8, 1 channel per connector	3-way female M8, 1 channel per connector
		Actuator connector	3-way female M8, 1 channel per connector	3-way female M8, 1 channel per connector
	Interface I/O block power supply	Input connector	4-way male M8	4-way male M8
		Output connector	4-way female M8	4-way female M8
Diagnostics	By interface I/O block		Yes	Yes
	By channel		Yes	Yes
	By communication	On CANopen bus	Yes	Yes
		On TM7 bus	Yes	Yes
Type of CANopen interface I/O block			**TM7 NCOM08B**	**TM7 NCOM16B**
Pages			4/29	4/29

(1) Sink inputs: positive logic
(2) Source outputs: positive logic

IP 67
Plastic
16 channels configurable as inputs or outputs
0 to 16 according to software configuration
0 to 16 according to software configuration
24 V ⎓/4.4 mA
Sink *(1)*
Type 1
24 V ⎓
Transistor/Source *(2)*
0.5 A max.
4 A max.
24 V ⎓
500 mA for all channels
Overloads, short-circuits and reverse polarity
A-coded 5-way male M12
A-coded 5-way female M12
–
B-coded 4-way female M12
A-coded 5-way female M12, 2 channels per connector
A-coded 5-way female M12, 2 channels per connector
4-way male M8
4-way female M8
Yes
Yes
Yes
Yes

TM7 NCOM16A

4/29

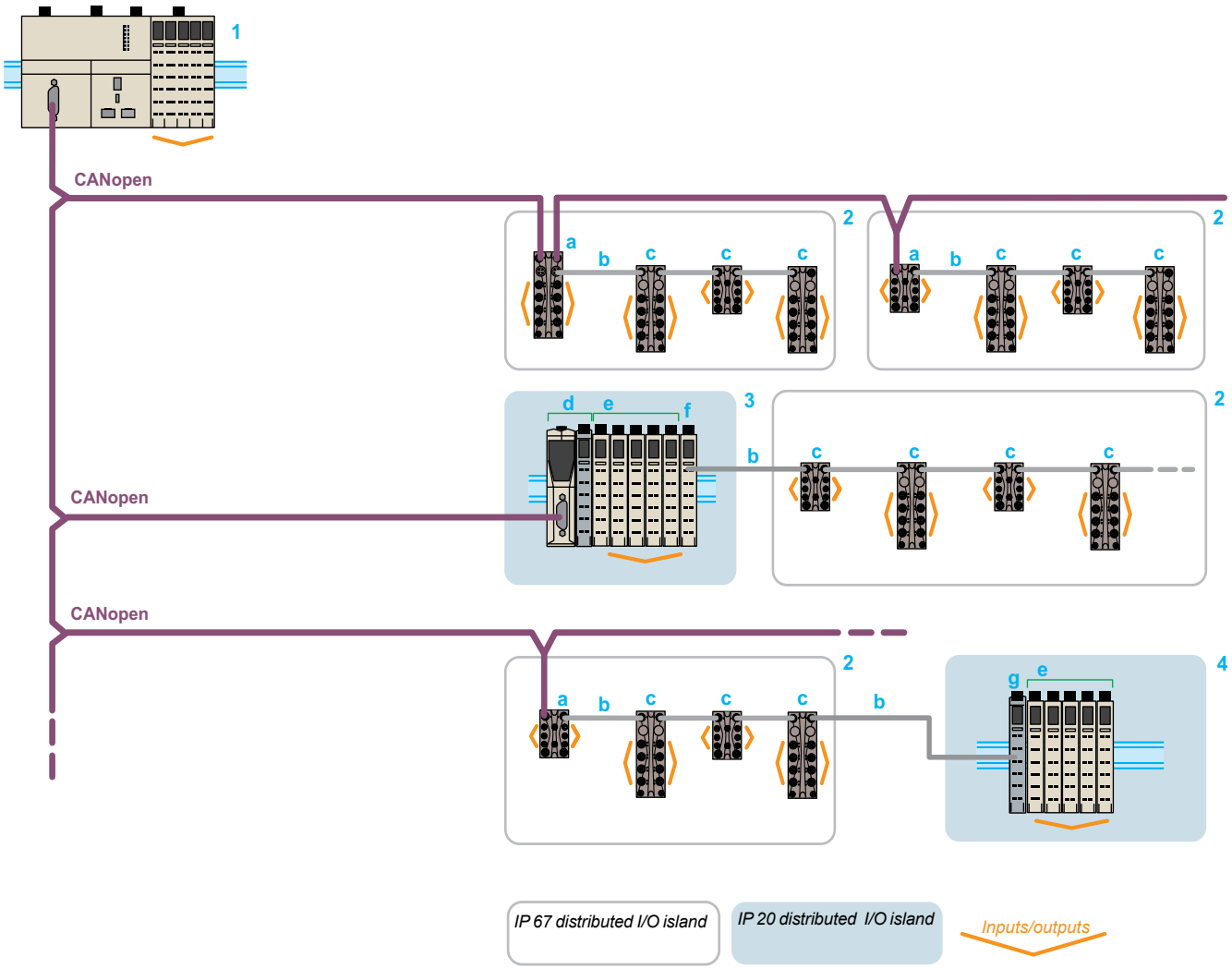
MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

Introduction

To support its “Flexible Machine Control” concept, a key component of MachineStruxure™, Schneider Electric offers Modicon™ TM7 IP 67 blocks for mounting outside electrical cabinets, directly on the installation. The IP 67 protection of these blocks enables them to be used within processes or machines in harsh environments (splashing water, oil, dust).
These blocks are:
- Dust and damp proof
- Robust and compact
- Made for rapid wiring
- Economical to use

The CANopen™ interface I/O blocks enable sensors and actuators distributed over machines to be connected via the CANopen fieldbus. These interface I/O blocks communicate on the bus. They have one part for connecting sensors and actuators using M8 or M12 connectors and one part for connection to the CANopen fieldbus.

The interface I/O block offer features IP 67 blocks that connect to a CANopen bus and have digital channels that can be configured as inputs or outputs, including:
- CANopen interface block with 8 configurable I/O for connection via M8 connector
- Two CANopen interface blocks with 16 configurable I/O, that are combined with:
  - Digital I/O expansion blocks, see page 3/44
  - Analog input expansion blocks, see page 3/44
  - Power distribution block, see page 3/44
  - Connection accessories, see page 4/32

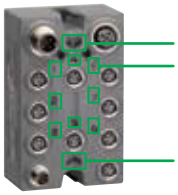


1 Modicon M258 logic controller or Modicon LMC058 motion controller: CANopen bus masters.
2 IP 67 distributed I/O islands. Composition: TM7 CANopen interface block (slave) with digital I/O (a) + TM7 expansion bus cable (b) + TM7 digital/analog blocks (c) *(1)*.
3 IP 20 distributed I/O island. Composition: TM5 CANopen interface module (slave) (d) + TM5 compact *(2)* or TM5 modules (e) *(3)* + transmitter module TM5SBET7 (f) *(4)*.
4 IP 20 distributed I/O island. Composition: receiver module TM5SBER2 (g) *(4)* + TM5 modules (e) *(3)*.

(1) Modicon TM7 Digital or analog block, see page 3/44
(2) Modicon TM5 compact blocks, see page 3/22
(3) Modicon TM5 digital modules, see page 41041/2. Modicon TM5 analog modules, see page 3/34
(4) Modicon TM5 transmitter and receiver modules, see page 3/42

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

CANopen interface block with digital I/O



Diagnostics functions

Diagnostic monitoring of detected faults is indicated by LEDs on CANopen™ interface I/O blocks, expansion blocks and power distribution blocks…and informs the control system (M258 logic controller or LMC058 motion controller) via the TM7 bus.

Each Modicon™ TM7 block has LEDs
- To display the status of the TM7 bus, the channel and the power supply
- For quick, precise location of a detected fault

There are several levels of diagnostics:
- Diagnostics per channel:
  - State of inputs
  - State of outputs
- Communication bus diagnostics:
  - On CAN bus (CANopen interface I/O block)
  - On TM7 expansion bus (CANopen interface I/O block and I/O expansion blocks).

4

Specifications

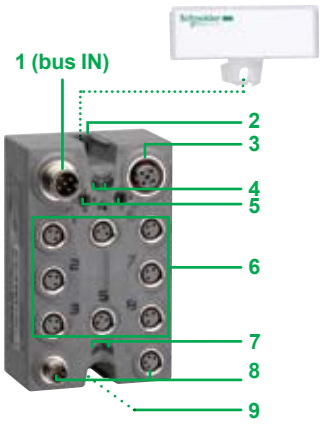
Conformity with standards		IEC 61131-2
Product certifications		CE, cURus, GOST-R and c-Tick, ATEX (II 3g EEx nA II T5, IP 67, Ta = 0 to 60°C)
Temperature	Operation	- 10 to + 60°C (14 to 140°F)
	Storage	- 25 to + 85°C (- 13 to 185°F)
Relative humidity		5 to 95% (without condensation)
Degree of pollution conforming to IEC 60664		2
Degree of protection conforming to IEC 61131-2		IP 67
Altitude	Operation	0 to 2000 m (0 to 6560 ft.) *(1)*
	Storage	0 to 3000 m (0 to 9842 ft.)
Vibration resistance conforming to IEC 60721-3-5 Class 5M3	DIN rail mounted	7.5 mm (0.295 in.) 2 to 8 Hz mounted amplitude 20 m/s² (2 gn) 8 to 200 Hz mounted acceleration 40 m/s² (4 gn) 200 to 500 Hz mounted acceleration
Shock resistance conforming to IEC 60721-3-5 Class 5M3		300 m/s² (30 gn) for 11 ms, 1/2 sine wave, type 1 shock
Connectors	Type	M8 and/or M12
	Number of operations	50 min.

Electromagnetic compatibility

Electrostatic discharges conforming to IEC/EN 61000-4-2	± 8 kV, criterion B (air discharge) ± 4 kV, criterion B (direct discharge)
Electromagnetic fields conforming to IEC/EN 61000-4-3	10 V/m, amplitude modulation 80% at 1 kHz (80 MHz to 2 GHz) 1 V/m (2 to 2.7 GHz)
Fast transients conforming to IEC/EN 61000-4-4	Supply: 2 kV, criterion B I/O: 1 kV, criterion B Shielded cable: 1 kV, criterion B Repetition frequency: 5 and 100 kHz
Immunity to overvoltages, 24 V ⎓ circuit conforming to IEC/EN 61000-4-5	Supply: □ 1 kV (12 Ω), criterion B in common mode □ 0.5 kV (2 Ω), criterion B in differential mode Unshielded links: □ 1 kV (42 Ω), criterion B in common mode □ 0.5 kV (42 Ω), criterion B in differential mode Shielded links: □ 1 kV (12 Ω), criterion B in common mode □ 0.5 kV (2 Ω), criterion B in differential mode
Induced magnetic fields conforming to IEC/EN 61000-4-6	Line supply, I/O signal connections > 10 m (32.8 ft.) Functional ground connection: 10 Vrms, criterion A, amplitude modulation 80% at 1 kHz (150 to 80 MHz)
Conducted emissions conforming to EN 55011 (IEC/CISPR11)	150 to 500 kHz, peak 79 dB µV 500 kHz to 30 MHz, peak 73 dB µV
Radiated emissions conforming to EN 55011 (IEC/CISPR11)	30 to 230 MHz, 10 m (32.8 ft) at 40 dB (µV/m) 230 MHz to 1 GHz, 10 m (32.8 ft) at 47 dB (µV/m)

(1) Temperature reduction of 0.5°C (32.9°F) for every additional 100 m (328 ft.) altitude above 2000 m (6560 ft.).
Refer to the instruction sheet for each product, downloadable from www.schneider-electric.com

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

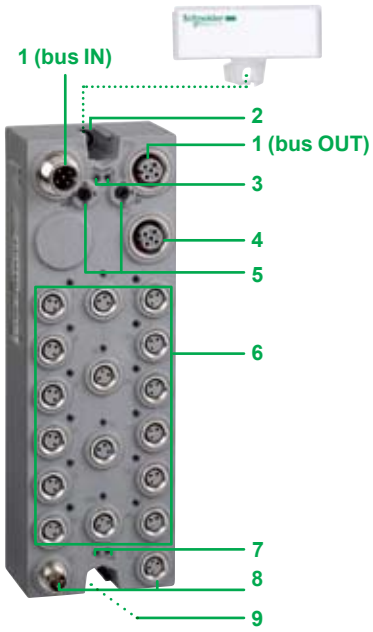


Description

CANopen™ interface I/O blocks

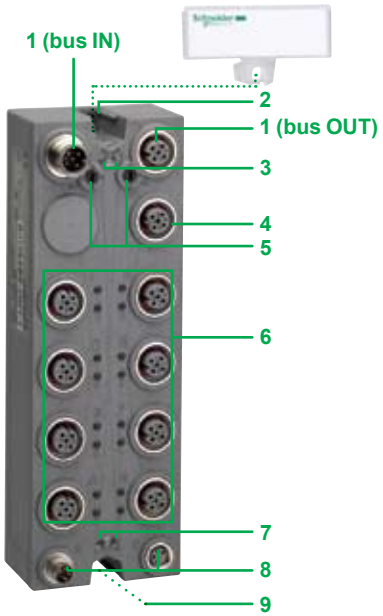
CANopen **8-channel** interface I/O blocks feature the following on the front panel:

1 Male M12 connector (bus IN) for connecting the CANopen bus
2 Slot for the interface I/O block label (1)
3 Female M12 connector for connecting the TM7 expansion bus
4 Two bus diagnostic LEDs
5 CANopen address settings rotary switches
6 Eight female M8 connectors for connecting sensors and actuators with eight LEDs for indicating channel status
7 Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
8 Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
9 Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support



CANopen **16-channel** interface I/O blocks feature the following on the front panel:

1 Male M12 connector (bus IN) and a female M12 connector (bus OUT) for connecting the CANopen bus
2 Slot for the interface I/O block label (1)
3 Two bus diagnostic LEDs
4 Female M12 connector for connecting the TM7 expansion bus
5 CANopen address settings rotary switches
6 Eight M12 connectors (2 channels per connector) or sixteen M8 connectors for connecting sensors and actuators with LEDs for indicating channel status
7 Two LEDs indicating the status of the sensor and actuator 24 V ⎓ power supplies
8 Two M8 connectors for connecting the 24 V ⎓ sensor and actuator power supplies: male for PWR IN, female for PWR OUT
9 Mounting using two Ø 4 screws (not supplied) and connection of the functional ground when mounting the block on a metal support



(1) Label-holder supplied with IP 67 block

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

TM7 NCOM08B

TM7 NCOM16B

TM7 NCOM16A

Modicon™ TM7 CANopen™ interface blocks with digital I/O

Max. no. of channels	Number, type of inputs	Number, type of outputs	Sensor/actuator connection	Communication bus	Reference	Weight kg
8 I/O	8, sink *(1)*	8, transistor/ source *(2)*	8 female M8 connectors	CANopen, TM7 bus	**TM7 NCOM08B**	0.195
16 I/O	16, sink *(1)*	16, transistor/ source *(2)*	16 female M8 connectors	CANopen, TM7 bus	**TM7 NCOM16B**	0.320
	16, sink *(1)*	16, transistor/ source *(2)*	8 female M12 connectors	CANopen, TM7 bus	**TM7 NCOM16A**	0.320

(1) Sink inputs: positive logic
(2) Source outputs: positive logic

Architecture, connecting cables

See page 4/30

Modicon TM7 I/O expansion blocks

See page 3/44

Connection accessories

See page 4/32

Separate parts

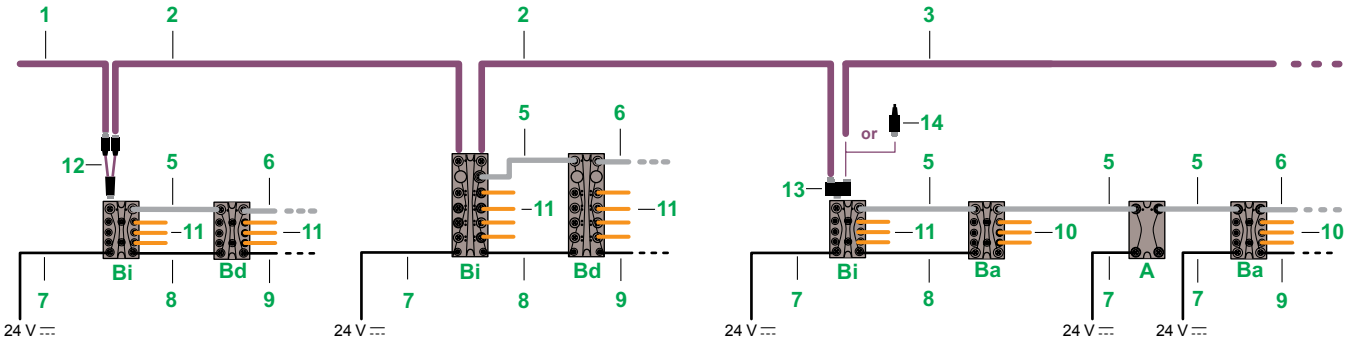
See page 4/33

Configuration software

- SoMachine™ software, see page 5/2
- Performance distributed I/O configuration software, please consult our site www.schneider-electric.com

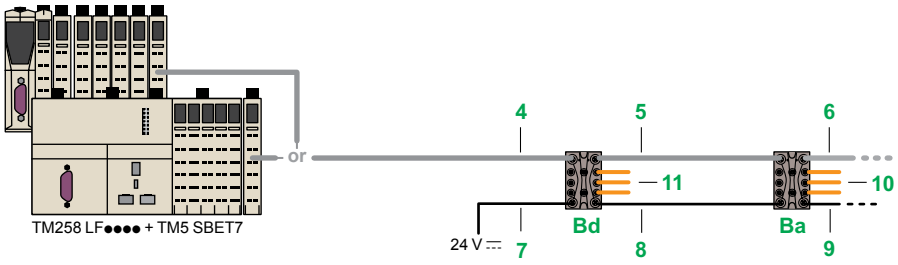
MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

CANopen™ architecture



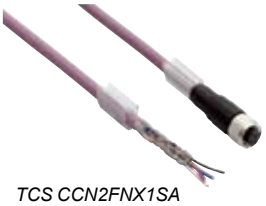
TM7 expansion bus architecture

TM5 NCO1 + TM5 SBET7



A Power distribution block
Ba Analog I/O expansion block
Bd Digital I/O expansion block
Bi CANopen interface I/O block

References



TCS CCN2FNX1SA

TCS CCN1MNX●●SA

Cables for connection to the CANopen bus

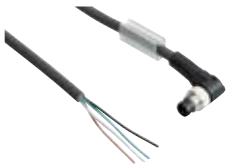
Designation	Description	Item no.	Length (m)	Reference	Weight kg
CANopen bus connection cables (bus IN)	Equipped with one A-coded 5-way angled female M12 connector and 1 flying lead	1	3	**TCS CCN2FNX3SA**	0.195
			10	**TCS CCN2FNX10SA**	0.563
			25	**TCS CCN2FNX25SA**	1.352
	Equipped with one A-coded 5-way straight female M12 connector and 1 flying lead	1	3	**TCS CCN1FNX3SA**	0.195
			10	**TCS CCN1FNX10SA**	0.563
CANopen bus daisy chain cables	Equipped with two A-coded 5-way angled M12 connectors, 1 male and 1 female, at each end	2	0.3	**TCS CCN2M2F03**	0.090
			1	**TCS CCN2M2F1**	0.127
			2	**TCS CCN2M2F2**	0.179
			5	**TCS CCN2M2F5**	0.337
			10	**TCS CCN2M2F10**	0.600
			15	**TCS CCN2M2F15**	0.863
	Equipped with two A-coded 5-way straight M12 connectors, 1 male and 1 female, at each end	2	0.3	**TCS CCN1M1F03**	0.090
			1	**TCS CCN1M1F1**	0.127
			2	**TCS CCN1M1F2**	0.179
			5	**TCS CCN1M1F5**	0.337
			10	**TCS CCN1M1F10**	0.600
			15	**TCS CCN1M1F15**	0.863
CANopen bus connection cables (bus OUT)	Equipped with one A-coded 5-way angled male M12 connector and 1 flying lead	3	3	**TCS CCN2MNX3SA**	0.195
			10	**TCS CCN2MNX10SA**	0.563
	Equipped with one A-coded 5-way straight male M12 connector and 1 flying lead	3	3	**TCS CCN1MNX3SA**	0.195
			10	**TCS CCN1MNX10SA**	0.563
TM7 expansion bus cables					
TM7 expansion bus cables (bus IN)	Equipped with one B-coded 4-way angled female M12 connector and 1 flying lead	4	3	**TCS XCN2FNX3E**	0.195
			10	**TCS XCN2FNX10E**	0.563
	Equipped with one B-coded 4-way straight female M12 connector and 1 flying lead	4	3	**TCS XCN1FNX3E**	0.195
			10	**TCS XCN1FNX10E**	0.563


TCS XCN1M1F●●E


TCS XCN1MNX●●E


TCS XCNDFNX●●V


TCS XCNDMDF●●V


TCS XCNEXNX●●V


TCS XCN1M●●SA

Connection accessories (continued)

Designation	Description	Item no.	Length (m)	Reference	Weight kg
TM7 expansion bus cables (continued)					
TM7 bus daisy chain cables	Equipped with two B-coded 4-way angled M12 connectors, 1 male and 1 female, at each end	5	0.3	**TCS XCN2M2F03E**	0.090
			1	**TCS XCN2M2F1E**	0.127
			2	**TCS XCN2M2F2E**	0.179
			5	**TCS XCN2M2F5E**	0.337
			10	**TCS XCN2M2F10E**	0.600
			15	**TCS XCN2M2F15E**	0.863
	Equipped with two B-coded 4-way straight M12 connectors, 1 male and 1 female, at each end	5	0.3	**TCS XCN1M1F03E**	0.090
			1	**TCS XCN1M1F1E**	0.127
			2	**TCS XCN1M1F2E**	0.179
			5	**TCS XCN1M1F5E**	0.337
			10	**TCS XCN1M1F10E**	0.600
			15	**TCS XCN1M1F15E**	0.863
TM7 expansion bus cables (bus OUT)	Equipped with one B-coded 4-way angled male M12 connector and 1 flying lead	6	1	**TCS XCN2MNX1E**	0.089
			3	**TCS XCN2MNX3E**	0.195
			10	**TCS XCN2MNX10E**	0.563
			25	**TCS XCN2MNX25E**	1.352
	Equipped with one B-coded 4-way straight male M12 connector and 1 flying lead	6	3	**TCS XCN1MNX3E**	0.195
			10	**TCS XCN1MNX10E**	0.563
Power distribution cables					
Power IN power distribution cables	Equipped with one 4-way angled female M8 connector and 1 flying lead	7	1	**TCS XCNEFNX1V**	0.041
			3	**TCS XCNEFNX3V**	0.105
			10	**TCS XCNEFNX10V**	0.329
			25	**TCS XCNEFNX25V**	0.809
	Equipped with one 4-way straight female M8 connector and 1 flying lead	7	1	**TCS XCNDFNX1V**	0.041
			3	**TCS XCNDFNX3V**	0.105
			10	**TCS XCNDFNX10V**	0.329
			25	**TCS XCNDFNX25V**	0.809
Power daisy chain cables	Equipped with two 4-way angled M8 connectors, 1 male and 1 female, at each end	8	0.3	**TCS XCNEMEF03V**	0.028
			1	**TCS XCNEMEF1V**	0.050
			2	**TCS XCNEMEF2V**	0.082
			5	**TCS XCNEMEF5V**	0.178
			10	**TCS XCNEMEF10V**	0.338
			15	**TCS XCNEMEF15V**	0.498
	Equipped with two 4-way straight M8 connectors, 1 male and 1 female, at each end	8	0.3	**TCS XCNDMDF03V**	0.105
			1	**TCS XCNDMDF1V**	0.329
			2	**TCS XCNDMDF2V**	0.809
			5	**TCS XCNDMDF5V**	0.105
			10	**TCS XCNDMDF10V**	0.329
			15	**TCS XCNDMDF15V**	0.809
Power OUT power distribution cables	Equipped with one 4-way angled male M8 connector and 1 flying lead	9	1	**TCS XCNEXNX1V**	0.041
			3	**TCS XCNEXNX3V**	0.105
			10	**TCS XCNEXNX10V**	0.329
			25	**TCS XCNEXNX25V**	0.809
	Equipped with one 4-way straight male M8 connector and 1 flying lead	9	1	**TCS XCNDMNX1V**	0.041
			3	**TCS XCNDMNX3V**	0.105
			10	**TCS XCNDMNX10V**	0.329
			25	**TCS XCNDMNX25V**	0.809
Cables for connecting analog sensors and actuators					
Cables for connecting sensors and actuators	Equipped with one A-coded 5-way angled male M12 connector and 1 flying lead	10	2	**TCS XCN2M2SA**	0.143
			5	**TCS XCN2M5SA**	0.258
			15	**TCS XCN2M15SA**	0.546
	Equipped with one A-coded 5-way straight male M12 connector and 1 flying lead	10	2	**TCS XCN1M2SA**	0.143
			5	**TCS XCN1M5SA**	0.258
			15	**TCS XCN1M15SA**	0.546
Cables for connecting digital sensors and actuators					
Please consult our **"**Detection for OsiSense™ automation solutions**" catalog**		11			
Accessories					
See page 4/32		12			
		13			
		14			

4

MachineStruxure™
Communication
Distributed I/O on CANopen™ bus with Modicon™ TM7 (IP 20) interface blocks IP67

TM7 ACYCJ

TM7 ACYC

TM7 ACTHA

Connection accessories *(continued)*

Description	Composition	Item no.	Reference	Weight kg
CAN bus Y cable	Equipped with 2x5-way M12 connectors, 1 male and 1 female, and at the other end: 1x5-way male M12 connector	12	**TM7 ACYCJ**	0.031
CAN Y connector	For connecting 2xM12 connectors, 1 male and 1 female, to male M12 connector on the expansion block	13	**TM7 ACYC**	0.100
Line terminator (for end of bus)	Equipped with 1x5-way male M12 connector	14	**TM7 ACTLA**	0.023
Connector with temperature probe for measurement by thermocouple *(1)*	Equipped with 1x5-way male M12 connector	–	**TM7 ACTHA**	0.100

(1) For use with the **TM7 BAI4PLA** *expansion block for measurement with compensation of the temperature of the connector.*

TM7 ACMP

Separate parts

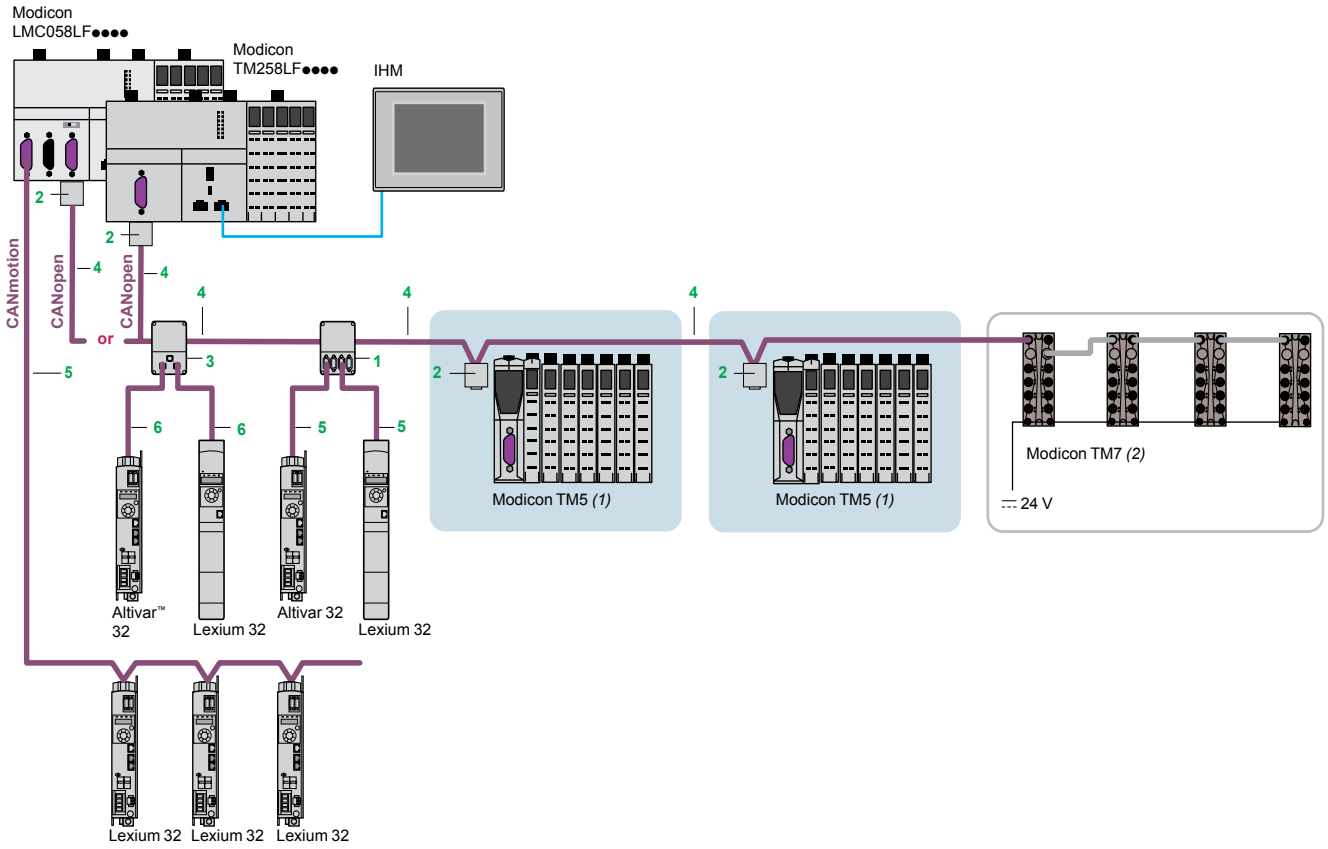
Description	Composition	Unit reference	Weight kg
Sealing plugs *(1)*	For M8 connector for Modicon™ TM7 IP 67 blocks **Lot of 50**	**TM7 ACCB**	0.100
	For M12 connector for Modicon TM7 IP 67 blocks **Lot of 50**	**TM7 ACCA**	0.100
Mounting plate on symmetrical DIN rail	For Modicon TM7 IP 67 blocks	**TM7 ACMP**	0.020
	For Modicon TM7 IP 67 blocks **Lot of 10**	**TM7 ACMP10**	0.200

(1) The use of sealing plugs ensures that unused connectors on Modicon TM7 IP 67 blocks have IP 67 protection.

MachineStruxure™
Communication
CANopen™ Performance architecture with Modicon™ TM5/TM7

CANopen™ Performance architecture

Example of connection of a CANopen Performance architecture dedicated to machines and modular installations.



References

Standard tap junctions and connectors

Designation	Description	Item no.	Length	Reference	Weight kg
IP 20 CANopen tap junction	4 SUB-D ports. Screw terminal block for connecting the trunk cables Line termination	1	–	**TSX CANTDM4**	0.196
IP 20 connectors CANopen 9-way female SUB-D. Switch for line termination	90° angled	2	–	**TSX CANKCDF90T**	0.046
	Straight *(3)*	–	–	**TSX CANKCDF180T**	0.049
	90° angled with 9-way SUB-D for connecting a PC or diagnostic tool	–	–	**TSX CANKCDF90TP**	0.051
IP 20 CANopen tap junction for Altivar and Lexium	2 RJ45 ports	3	–	**VW3 CANTAP2**	0.250

TSX CAN TDM4

VW3 CAN TAP2

TSX CAN KCD F90T

TSX CAN KCD F180T

TSX CAN KCD F90TP

(1) Modicon™ TM5 offer (see pages 3/26 , 3/34, and 3/38).
(2) Modicon TM7 offer: TM7 IP 67 I/O blocks, expansion cable, and accessories (see page 3/44).
(3) For connection to Altivar™ IMC integrated controller card.

References (continued)

IP 20 standard cables and preassembled cordsets

Designation	Description	Item no.	Length	Reference	Weight kg
CANopen™ cables (2 x AWG 22 2 x AWG 24)	For standard environment *(1)*, CE marking: low smoke. Zero halogen. Flame-retardant (IEC 60332-1)	4	50 m	**TSX CAN CA50**	4.930
			100 m	**TSX CAN CA100**	8.800
			300 m	**TSX CAN CA300**	24.560
	For standard environment *(1)*, UL certification, CE marking: flame-retardant (IEC 60332-2)	4	50 m	**TSX CAN CB50**	3.580
			100 m	**TSX CAN CB100**	7.840
			300 m	**TSX CAN CB300**	21.870
	For harsh environments *(1)* or mobile installations, CE marking: low smoke. Zero halogen. Flame-retardant (IEC 60332-1). Oil-resistant	4	50 m	**TSX CAN CD50**	3.510
CANopen preassembled cordsets One 9-way female SUB-D connector at each end.	For standard environment *(1)*, CE marking: low smoke. Zero halogen. Flame-retardant (IEC 60332-1)	–	0.3 m	**TSX CAN CADD03**	0.091
			1 m	**TSX CAN CADD1**	0.143
			3 m	**TSX CAN CADD3**	0.295
			5 m	**TSX CAN CADD5**	0.440
	For standard environment *(1)*, UL certification, CE marking: flame-retardant (IEC 60332-2)	–	0.3 m	**TSX CAN CBDD03**	0.086
			1 m	**TSX CAN CBDD1**	0.131
			3 m	**TSX CAN CBDD3**	0.268
			5 m	**TSX CAN CBDD5**	0.400
CANopen preassembled cordsets	Cordsets with one 9-way female SUB-D connector and one RJ45 connector	5	0.5 m	**TCS CCN 4F3M05T**	0.100
			1 m	**TCS CCN 4F3M1T**	0.100
				VW3 M38 05R010 *(2)*	0.100
			3 m	**TCS CCN 4F3M3T**	0.160
	Cordsets with two 9-way SUB-D connectors, one female and one male	–	0.5 m	**TLA CDCBA005**	0.100
			1.5 m	**TLA CDCBA015**	0.120
			3 m	**TLA CDCBA030**	0.190
			5 m	**TLA CDCBA050**	0.350

IP 20 connection accessories

VW3 CAN A71

AM0 2CA 001V000

CANopen connector for Altivar™ 71 *(3)*	9-way female SUB-D Switch for line termination. Cables exit at 180°	–	–	**VW3 CAN KCDF180T**	0.100
Adaptor for Altivar 71 drive	SUB-D to RJ45 CANopen adaptor	–	–	**VW3 CANA71**	0.100
CANopen preassembled cordsets	1 RJ45 connector at each end	6	0.3 m	**VW3 CANCARR03**	0.100
			1 m	**VW3 CANCARR1**	0.100
CANopen bus adaptor for Lexium™ 17D	Hardware interface for CANopen-compliant link + 1 connector for a PC terminal	–	–	**AM0 2CA001V000**	0.110
Y-connector	CANopen/Modbus	–	–	**TCS CTN011M11F**	0.100

IP 67 cables and preassembled cordsets, IP 67 connection accessories for Modicon TM7 blocks

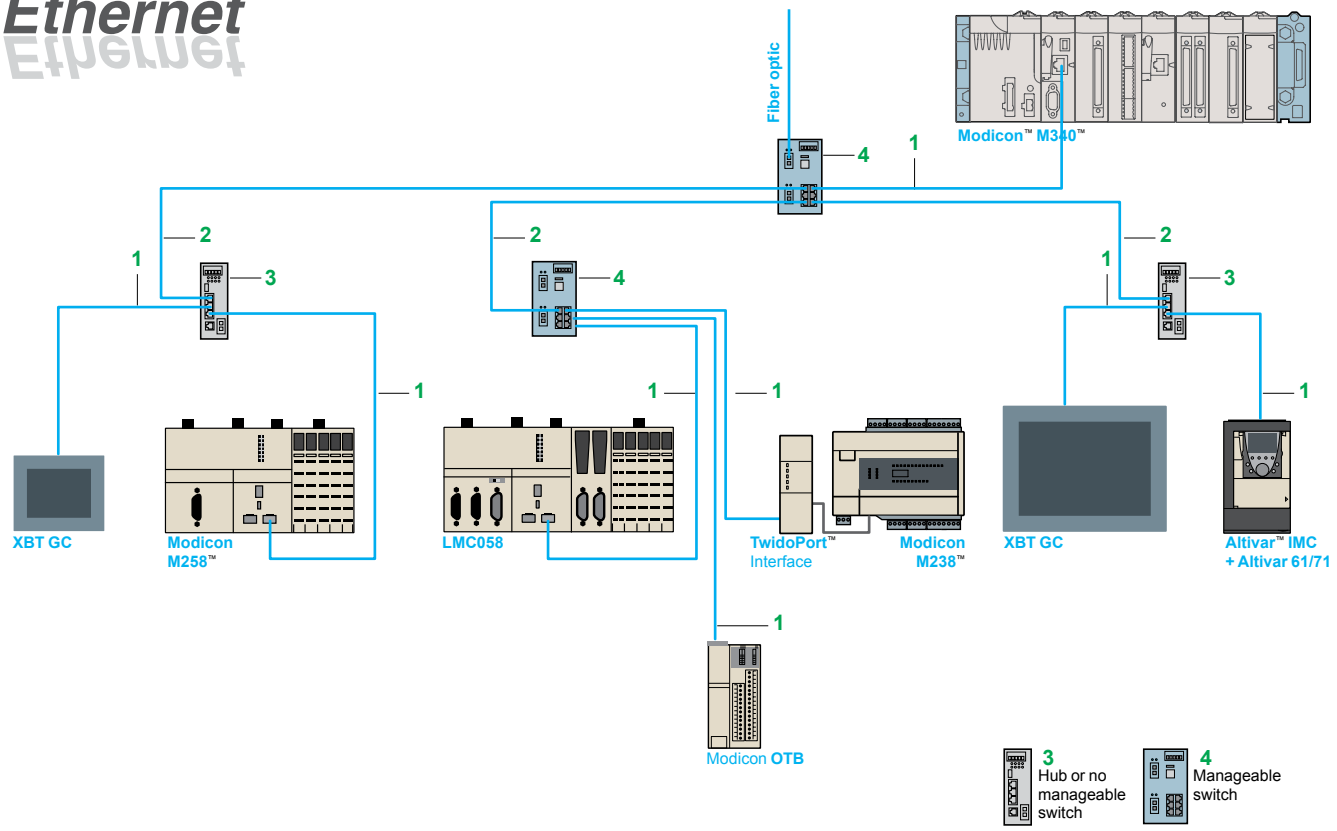
(see page 4/30)

(1) Standard environment: no particular environmental constraints, operating temperature between + 5°C and + 60°C, and in mounted installations.
Harsh environment: resistance to hydrocarbons, industrial oils, detergents, solder splashes, relative humidity up to 100%, saline atmosphere, significant temperature variations, operating temperature between - 10°C and + 70°C, or in mobile installations.
(2) Cordset equipped with a line terminator.
(3) For **Altivar 71H●●●M3**, **Altivar 71HD11M3X**, **HD15M3X**, **Altivar 71H075N4** *to* **HD18N4** *drives, this connector can be replaced by the* **TSX CAN KCDF 180T** *connector.*

MachineStruxure™
Communication
Modbus™/TCP network
for hardware control platforms

Ethernet

Modbus™/TCP or EtherNet/IP™ network architecture



References *(1)*

Shielded copper connection cables

ConneXium™ shielded copper connection cables are available in two versions to comply with the different standards and approvals in force:

■ **Shielded twisted pair copper cables to standard EIA/TIA 568**

These cables conform to:
- standard EIA/TIA 568, category CAT 5E,
- standard IEC 11801/EN 50173, class D.

Their flame resistance conforms to:
- NFC 32070# classification C2
- standards IEC 322/1,
- Low Smoke Zero Halogen (LSZH).

■ **Shielded twisted pair copper cables, UL and CSA 22.1 approved**

These cables conform to:
- standards UL and CSA 22.1.

Their flame resistance conforms to NFPA 70.

"Do It Yourself" cable and connectors

The ConneXium "Do It Yourself" range allows the user to make up Ethernet copper cables on site and to the required length. They are designed for cabling Ethernet 10/100 Mbit/s networks. The maximum length of cables made up in this way is 80 m. They can be assembled quickly using a knife and cutting pliers (no special tools are required).

Description	Specifications	Length	Reference	Weight kg
Ethernet copper cable 2 shielded twisted pairs 24 AWG	Conforming to the above-mentioned standards and approvals	300 m	**TCS ECN 300R2**	–
RJ 45 connector	Conforming to EIA/TIA-568-D	–	**TCS EK3 MDS**	–
M12 connector	Conforming to IEC 60176-2-101	–	**TCS EK1 MDRS**	–

(1) For other versions (fiber optic, switches): please consult our "Machines and Installations with Industrial Communications" catalog.

490 NT● 000 ●●

TCS ESU 043F1N0

TCS ESM 043F2C●0

499 NMS/NSS 251 02

TCS ESM 083F2C●0

TCS ESU 051 F0

References (continued)

Shielded twisted pair cables to standard EIA/TIA568

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	2 x RJ45 connectors For connection to terminal equipment (DTE)	1	2 m	**490 NTW 000 02**	–
			5 m	**490 NTW 000 05**	–
			12 m	**490 NTW 000 12**	–
			40 m	**490 NTW 000 40**	–
			80 m	**490 NTW 000 80**	
Crossover cables	2 x RJ45 connectors For connection between hubs, switches and transceivers	2	5 m	**490 NTC 000 05**	–
			15 m	**490 NTC 000 15**	–
			40 m	**490 NTC 000 40**	–
			80 m	**490 NTC 000 80**	–

Shielded twisted pair cables, UL and CSA 22.1 approved

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	2 x RJ45 connectors For connection to terminal equipment (DTE)	1	2 m	**490 NTW 000 02U**	–
			5 m	**490 NTW 000 05U**	–
			12 m	**490 NTW 000 12U**	–
			40 m	**490 NTW 000 40U**	–
			80 m	**490 NTW 000 80U**	–
Crossover cables	2 x RJ45 connectors For connection between hubs, switches and transceivers	2	5 m	**490 NTC 000 05U**	–
			40 m	**490 NTC 000 40U**	–
			80 m	**490 NTC 000 80U**	–

Shielded twisted pair cable for IP 67 switch

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	1 x IP 67 4-way M12 connector and 1 x RJ45 connector	–	1 m	**TCS ECL 1M3M 1S2**	–
			3 m	**TCS ECL 1M3M 3S2**	–
			5 m	**TCS ECL 1M3M 5S2**	–
			10 m	**TCS ECL 1M3M 10S2**	–
			25 m	**TCS ECL 1M3M 25S2**	–
			40 m	**TCS ECL 1M3M 40S2**	–

ConneXium™ hub

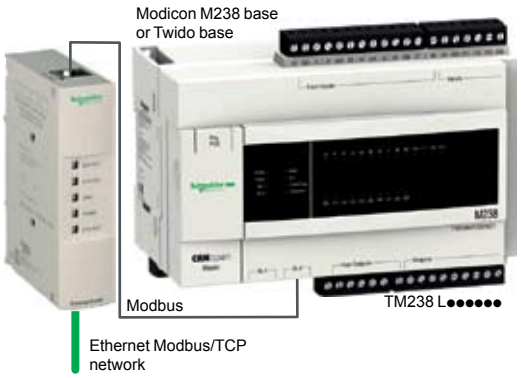
Description	Number of ports		Item	Reference	Weight kg
	Copper cable	Fiber optic			
Twisted pair hub 10BASE-T copper ports, RJ45 shielded connectors	4	–	3	**499 NEH 104 10**	0.530

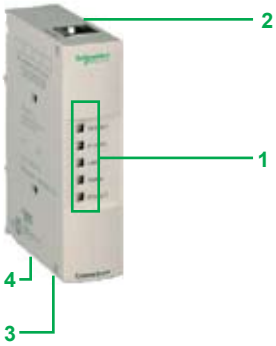
ConneXium switches

Description	Number of ports		Item	Manag -eable	Reference	Weight kg
	Copper cable	Fiber optic				
Optimized twisted pair switch 10BASE-T/100BASE-TX copper ports, RJ45 shielded connectors 100BASE-FX optic port, SC connectors	3	–	3	No	**TCS ESU 033FN0**	0.113
	5	–	3	No	**TCS ESU 053FN0**	0.113
Twisted pair switches 0BASE-T/100BASE-TX copper ports, RJ45 shielded connectors	8	–	3	No	**499 NES 181 00**	0.230
	8	–	4	Yes	**TCS ESM083F23F0**	0.410
Twisted pair and fiber optic switches 10BASE-T/100BASE-TX copper ports, RJ45 shielded connectors. 100BASE-FX optic ports, SC connectors	3	1, multimode	4	Yes	**TCS ESM043F1CU0**	0.400
	2	2, multimode	4	Yes	**TCS ESM043F2CU0**	0.400
	3	1, single-mode	4	Yes	**TCS ESM043F1CS0**	0.400
	2	2, single-mode	4	Yes	**TCS ESM043F2CS0**	0.400
	4	1, multimode	3	No	**499 NMS 251 01**	0.330
	3	2, multimode	3	No	**499 NMS 251 02**	0.335
	4	1, single-mode	3	No	**499 NSS 251 01**	0.330
	3	2, single-mode	3	No	**499 NSS 251 02**	0.335
	7	1, multimode	4	Yes	**TCS ESM083F1CU0**	0.410
	6	2, multimode	4	Yes	**TCS ESM083F2CU0**	0.410
	7	1, single-mode	4	Yes	**TCS ESM083F1CS0**	0.410
	6	2, single-mode	4	Yes	**TCS ESM083F2CS0**	0.410
IP 67 twisted pair switch *(1)* 10BASE-T/100BASE-TX copper ports, shielded M12 connectors (type D)	5	–	–	No	**TCS ESU 051 F0**	0.210

(1) Require special cables with M12 connectors for their ⎓ 24 V supply: **XZC P1●64L●.**

MachineStruxure™
Communication
Modbus™/TCP network: TwidoPort™ interface module for Modicon™ M238™ logic controller





Introduction

TwidoPort™ module **499 TWD 01100** is an Ethernet interface that is easy to use and dedicated to Modicon™ M238™ logic controllers and Twido compact or modular programmable controllers. It allows integration of these controllers into an Ethernet network as a passive device (slave).
The TwidoPort module is ready-to-use. When connected to the integrated RS 485 serial port, it acts as a gateway between the Ethernet network and the controller's Modbus™ serial link port.

The main features of the TwidoPort module include:
- Connects to the RS 485 of the Modicon M238 controller (marked SL1 or SL2 depending on model) or the RS 485 port of the Twido controller; no external auxiliary supply is necessary.
- Ethernet configuration:
  - takes the Ethernet configuration from the Twido application configuration (normal mode),
  - supports manual configuration using Telnet.
- Provides Ethernet statistics via a Telnet session.

Description

The TwidoPort **499 TWD 01100** interface module includes:
1. Five pilot lights indicating the status of the interface and of the TwidoPort module links.
2. RJ45 type connector for connection of the power supply and of the link to the controller's integrated RS 485 port. This connection is made using connection cable TWD XCA RJP03P supplied with the TwidoPort interface module in case of the Twido controller.
3. RJ45 connector (accessed through the bottom of the module) for connection to the Ethernet TCP/IP network.
4. Mounting screw (accessed through the bottom of the module).

The TwidoPort interface module can be mounted as standard on a symmetrical DIN rail. The mounting kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting (2 x Ø 4.3 holes).

Note:
To be ordered separately:
Modbus connection cordset XBT Z9980 (length 2.5 m), for connecting to the Modicon M238 controller.

MachineStruxure™
Communication
Modbus™/TCP network: TwidoPort™ interface module for Modicon™ M238™ logic controller

499 TWD 01100

References

Description	Controller bases	Function	Reference	Weight kg
TwidoPort™ interface module	Modicon™ M238™ 24 I/O Twido™ compact 10/16/24/40 I/O Twido modular 20/40 I/O	10/100 Mbit/s Auto MDIX function Connection cordset to Twido base controller TWD XCA RJP03P included (length 0.3 m)	**499 TWD 01100**	0.200

Description	Use	Length	Reference	Weight kg
Modbus™ RS 485 cordsets	Connection to Modicon M238 Equiped with 2 RJ45 connectors	2.5 m	**XBT Z9980**	0.100

Machine Struxure™

chapter 5

SoMachine™ software suite

Contents ***chapter 5***

SoMachine software suite

5

MachineStruxure™

SoMachine™ software suite

Simplified machine programming and commissioning

SoMachine software platform

Introduction

SoMachine™ is the flexible OEM solution software for developing, configuring and commissioning an entire machine in a single software environment…including logic, motion control, HMI and network automation functions.

SoMachine allows you to program and commission all the elements in Schneider Electric's Flexible and Scalable Control Platform – the comprehensive, solution-oriented offer for OEMs – that helps you achieve the optimum control solution for each machine's requirements.

These Schneider Electric Flexible and Scalable Control platforms include:

Controllers:

- HMI controllers: XBT GC, XBT GT/GK CANopen™,
- Logic controllers: Modicon™ M238™, Modicon M258™,
- Motion controller: Modicon LMC 058,
- Integrated controller card: Altivar™ IMC,
- Modicon TM2, Modicon TM5 and Modicon TM7 offers

HMI:

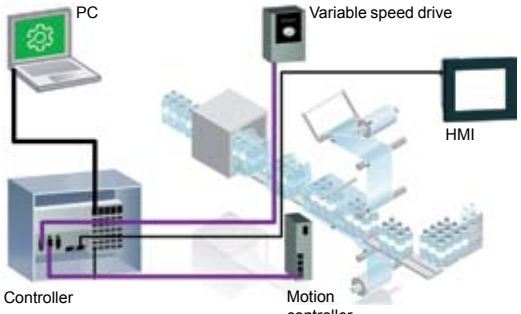
- HMI Magelis™ graphic panels: XBT GT, XBT GK.

SoMachine is a robust, efficient, and open software solution integrating Vijeo™ Designer™. It also integrates the configuring and commissioning tool for motion control devices.
SoMachine features all IEC 61131-3 languages, integrated field bus configurators, expert diagnostics and debugging, as well as outstanding capabilities for maintenance and visualization.

SoMachine easily integrates tested, validated, documented and supported expert application libraries, dedicated to applications in Packaging, Hoisting and Conveying.

SoMachine provides you with:

- One software package
- One project file
- One cable connection
- One download operation



Software solution

Visual graphic user interface

Navigation within SoMachine is intuitive and highly visual. Introduction is optimized, in that selecting the development stage of the desired project makes the appropriate tools available. The user interface helps ensure that nothing is overlooked, and suggests the tasks to be performed throughout the project development cycle. The workspace has been streamlined, so that only information that is necessary and relevant to the current task is featured.

Learning center

From the home menu, the learning center provides several tools to help you get started with SoMachine. An animated file explains the SoMachine interface and concept. An e-learning program runs a self-training module about SoMachine. A third section shows several documented examples of simple coding with SoMachine.

Project management

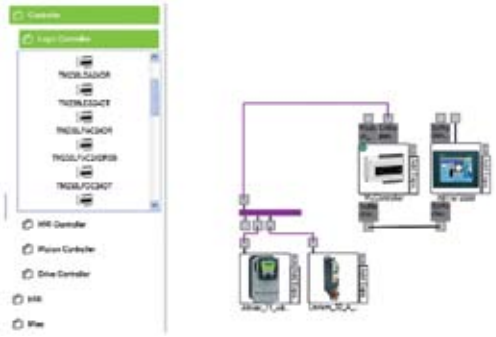
Project management

The implemented project management principle allows you to browse quickly through the existing projects – finding relevant information without the need to open files before selection.
The user can create a new project in several different ways: (1) using Tested Validated and Documented Architectures, (2) using the provided examples, (3) using an existing project or (4) starting with an empty project. There is also quick access to the most recently-used projects.

MachineStruxure™

SoMachine™ software suite

Simplified machine programming and commissioning



Configuration

Project properties

For each project, the user has the option to define additional information, through simple forms. It's also possible to attach documents, a customer picture and a configuration picture.

Configuration

From the graphic user interface, the user can easily build his architecture and configure the devices of the architecture.

Description of the architecture

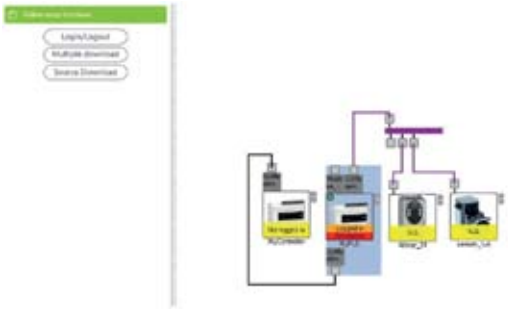
A graphic editor can be used to assemble the various elements easily by a simple drag and drop. A devices catalog is displayed on the left of the screen. It is split into several sections: controllers, HMI, miscellaneous and search.

Configuration of the device

Directly from the topologic view of the user interface, a simple click drives the user to the configuration screen of the selected device.

Programming and debugging

Programming is an essential step, and the user can carefully design it to be as efficient as possible. Advanced control and HMI functions meet the needs of an OEM engineer, in creating the control and visualization system. Powerful tools allow debugging and functional tests such as simulation, step-by-step execution, break points and trace.



Commissioning

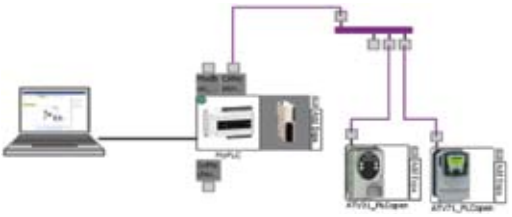
Commissioning

For an easy and fast diagnostic, the menu commissioning allows the user to check the online state of his architecture.Through the topologic view of the configuration, the devices display if you are logged in or not, and if the devices are in run or stop mode.

Documentation

Because a printed file of the project is an important element, it is possible to build and customize the project report by:

- selecting the items to be included in the report,
- organizing the sections,
- defining the page layout
- and then launching the printing.



Transparency

Transparency

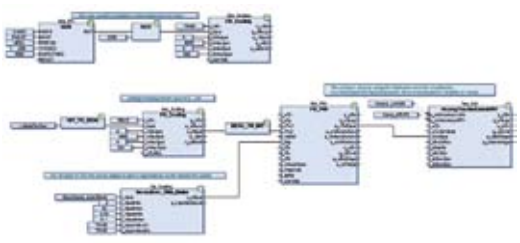
SoMachine™ supports Device Type manager (DTM) because it is a field device tool (FDT) container. With DTM's representing a field device in SoMachine, direct communications are possible to every single device via SoMachine, the controller and the field bus CANopen™. This eliminates the need for individual cable connections to each device for configuration. From the SoMachine unique environment, the remote devices can be set-up off-line and tuned on-line.

Dedicated OEM application libraries (AFB libraries)

SoMachine can be extended through its solution extension DVD. It integrates tested, validated, documented and supported expert application libraries dedicated to many OEM applications. Their simple configuration speeds up design, commissioning, installation and troubleshooting.

These libraries cover the following applications:

- Packaging
- Hoisting
- Conveying



Application Function Blocks

Tested, Validated and Documented Architectures (TVDA)

SoMachine provides a variety of tested, proven projects with ready-to-use architectures you can adapt to individual requirements. Some of them are generic TVDAs, based on the controller's configuration. The solution extension DVD brings specific application, solutions-oriented TVDAs to SoMachine.

SoMachine™ specifications

Overview

IEC 61131-3 programming languages	■ IL (Instruction List) ■ LD (Ladder Diagram) ■ SFC (Sequential Function Chart) ■ ST (Structured Text) ■ FBD (Function Block Diagram) ■ CFC (Continous Function Chart)
Controller programming services	■ Multi-tasking: Mast, Fast, Event ■ Functions (Func) and Function Blocks (FBs) ■ Data Unit Type (DUTs) ■ On-line changes ■ Watch windows ■ Graphical monitoring of variables (trace) ■ Breakpoints, step-by-step execution ■ Simulation ■ Visualization for application and machine set-up
HMI-based services	■ Graphics libraries containing more than 4000 2D and 3D objects. ■ Simple drawing objects (points, lines, rectangles, ellipses) ■ Preconfigured objects (buttons, switches, bar graphs) ■ Recipes (32 groups of 256 recipes with max. 1024 ingredients) ■ Action tables ■ Alarms ■ Printing ■ Java scripts ■ Multimedia file support: wav, png, jpg, emf, bmp ■ Variable trending
Motion services	■ Embeded devices configuration and commissioning ■ CAM profile editor ■ Sample application trace ■ Motion and drive function blocks libraries for inverters, servos and steppers ■ Visualization screens
Global services	■ User access and profile ■ Project documentation printing ■ Project comparison (control) ■ Variable sharing based on publish/subscribe mechanism ■ Library version management
Integrated fieldbus configurators	■ Control network: □ Modbus™ Serial Line □ Modbus TCP ■ Field bus: □ CANopen™ □ CANmotion™ □ AS-interface™ ■ Connectivity: □ Profibus™ DP □ EtherNet/IP™
Expert and solutions libraries	■ PLCopen function blocks for Motion control □ Example: MC_MoveAbsolute, MC_CamIn, ServoDrive ■ Packaging function blocks □ Example: Analog film tension control, rotary knife, lateral film position control ■ Conveying function blocks □ Example: tracking, turntable, conveyor ■ Hoisting function blocks □ Example: anti-sway, anti-crab, hoisting position synchronization

MachineStruxure™
SoMachine™ software suite
Simplified machine programming and commissioning

Product offer

SoMachine™ software is delivered on a DVD. It is product-oriented software that includes all SoMachine features related to generic hardware (Modicon™ M238™, Modicon M258™, Modicon LMC058, XBT GC), as well as generic TVDAs.

The solution features are added to SoMachine by installing its solution extension DVD. This DVD includes all SoMachine solutions hardware, plus all the dedicated application libraries and TVDAs.

References

- SoMachine is available in 6 languages:
  - English
  - French
  - German
  - Italian
  - Spanish
  - Simplified Chinese.

- System Requirements:
  - Processor: Pentium 3 - 1.2 GHz or higher
  - RAM Memory: 2 GByte; recommended: 3 GByte
  - Hard Disk: 3.5 GB, recommended: 4 GB
  - OS: Microsoft Windows® XP Professional, Windows® 7 32 bits
  - Drive: DVD reader
  - Display: 1024 × 786 pixel resolution or higher
  - Peripherals: a Mouse or compatible pointing device
  - Peripherals: USB interface
  - Web Access: Web registration requires Internet access

- Documentation is supplied in electronic format, with complete on-line help, plus a pdf version.

SoMachine software for generic controllers

Supported controllers	TVDA	No. of license	Reference	Weight kg
■ M238 ■ M258 ■ LMC058 ■ XBT GC ■ XBT GT/GK with control function	□ Optimized HW XBT GC □ Optimized HW M238 □ Optimized CANopen™ M238 □ Optimized AS-Interface™ M238 □ Optimized CANopen XBT GC/GT/GK □ Performance HW M258 □ Performance CANopen M258 □ Performance CANmotion™ LMC058	1 (Single)	**MSD CHLLMUV30S0**	–
		10 (Team)	**MSD CHLLMTV30S0**	–

SoMachine solution extension for Solution controllers *(1)*

Added controllers	Added TVDA	Added libraries	No. of license	Reference	Weight kg
■ M238S ■ M258S ■ LMC058S ■ XBT GC with CANopen module type S ■ XBT GT/GK with control function type S ■ Altivar™ IMC	□ Optimized CANopen Altivar IMC □ Performance CANmotion LMC058 □ Hoisting Optimized CANopen M238 □ Conveying Performance CANmotion LMC058	Hoisting Conveying Packaging	1 (Single)	**MSD CHLLMUV30S0**	–
			10 (Team)	**MSD CHLLMTV30S0**	–

(1) For this offer, please contact Schneider Electric.

SoMachine software compatibility and controllers

Product type	Version
Logic controller Modicon M238	≥ V1.0
HMI controller XBT GC	≥ V1.0
Logic controller Modicon M238S	≥ V2.0
Logic controller Modicon M258	≥ V2.0
Logic controller Modicon M258S	≥ V2.0
Modicon LMC058 motion controller	≥ V2.0
Modicon LMC058S motion controller	≥ V2.0
HMI controller XBT GT/GK with control function type S, XBT GC with CANopen module type S	≥ V2.0
Altivar IMC integrated controller card	≥ V2.0
TM5 CANopen Interface	≥ V3.0
TM7 CANopen Interface block	≥ V3.0

Machine Structure™

chapter 6

Machine safety solutions

Contents ***chapter 6***

Machine safety solutions

6

Improving productivity while simplifying machine safety

Using Schneider Electric certified "Safety chain solutions" can help you reduce your machine design time, and simplify the determination of safety integrity (SIL) and performance (PL) levels

The concept:

> Combining integrated products to address a safety function, that includes: a TÜV approved principle wiring diagram, and the corresponding safety level calculation

Safety chain solutions include:

> Layout of solution indicating performance level (PL) and safety integrity level (SIL)
> Bill of materials and the system description file
> Example description of the PL and SIL calculation for the safety function
> Safety conceptual principle diagram
> Certification of all the product combinations from an appropriate standards organization

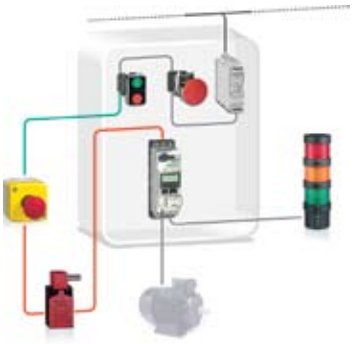
Approved

> Safety chain solutions to achieve the safety level required

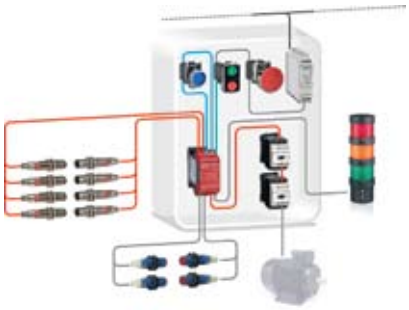
Machine Safety Expertise...

> Worldwide support and assistance – to help you implement machine safety solutions that meet or exceed the latest legislation…and comply with new functional machine safety standards

Motor starter (PL c, SIL 1)

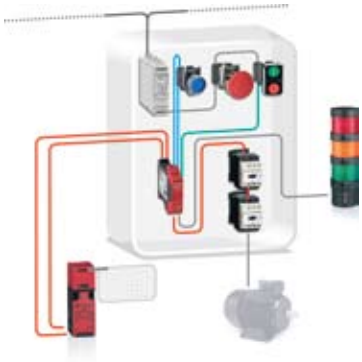


Light curtain (PL c, SIL 1)



Safe stop 0 (PL d, SIL 2)

Safe stop 0 (PL e, SIL 3) High performance



Safe stop 1 (PL d, SIL 2) Variable speed drive

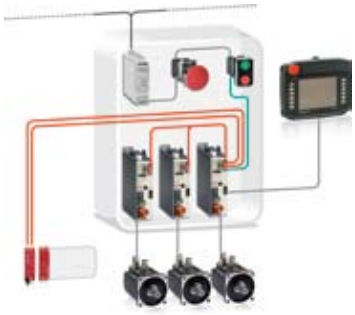
Safe stop 1 (PL e, SIL 3) High performance

Certified safety chain solutions provided by an automation leader– Schneider Electric:

- reducing costs by reducing external safety engineering
- reducing design time using Schneider Electric calculations of safety levels for each safety function

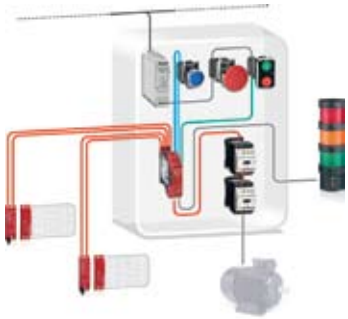
Safe stop 1 (PL e, SIL 3) Servo drive

Safe stop 2 (PL e, SIL 3) Servo-enhanced safety



Safety Mat (PL d, SIL 2)

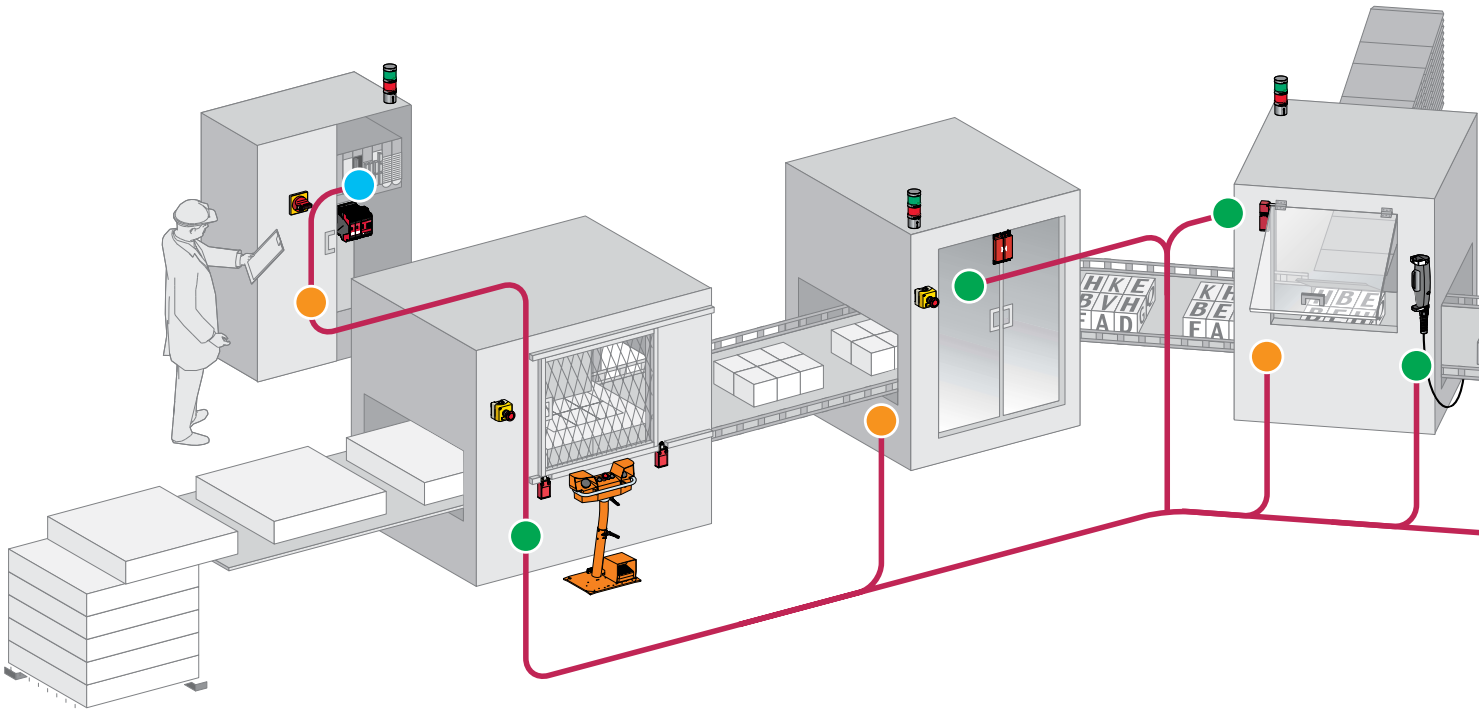
Magnetic switches (PL e, SIL 3)



Zero speed detection (PL e, SIL 3)

Multifunction (PL e, SIL 3)

Save time and money with our Preventa™ machine safety solutions offer



Safe signal transmission

Protective guard devices

Acquiring information…

- Protective guard devices used as part of safeguarding systems to control access, under specific conditions of reduced risk.
- Light curtains and safety mats to detect approach to dangerous and limited areas.
- Two hand control stations and enabling switches for starting and enabling of dangerous movements.
- Generic protective measures - Emergency stop.

Monitoring and processing…

- Safety relay modules with specific safety functions – to monitor input signals from safety devices, and to interface with contactors and drives – by switching off output safety contacts.
- Safety Controller: configurable safety device capable of centralizing a range of safety monitoring functions.
- Safety PLCs: programmable electronic systems to carry out safety or non-safety related tasks for machinery and equipment.
- "As-interface safety at work": safety field bus network certified to work with safety devices to provide safety functions.

Light curtains

Safety mats

Two hand control stations and enabling switches

Emergency stop

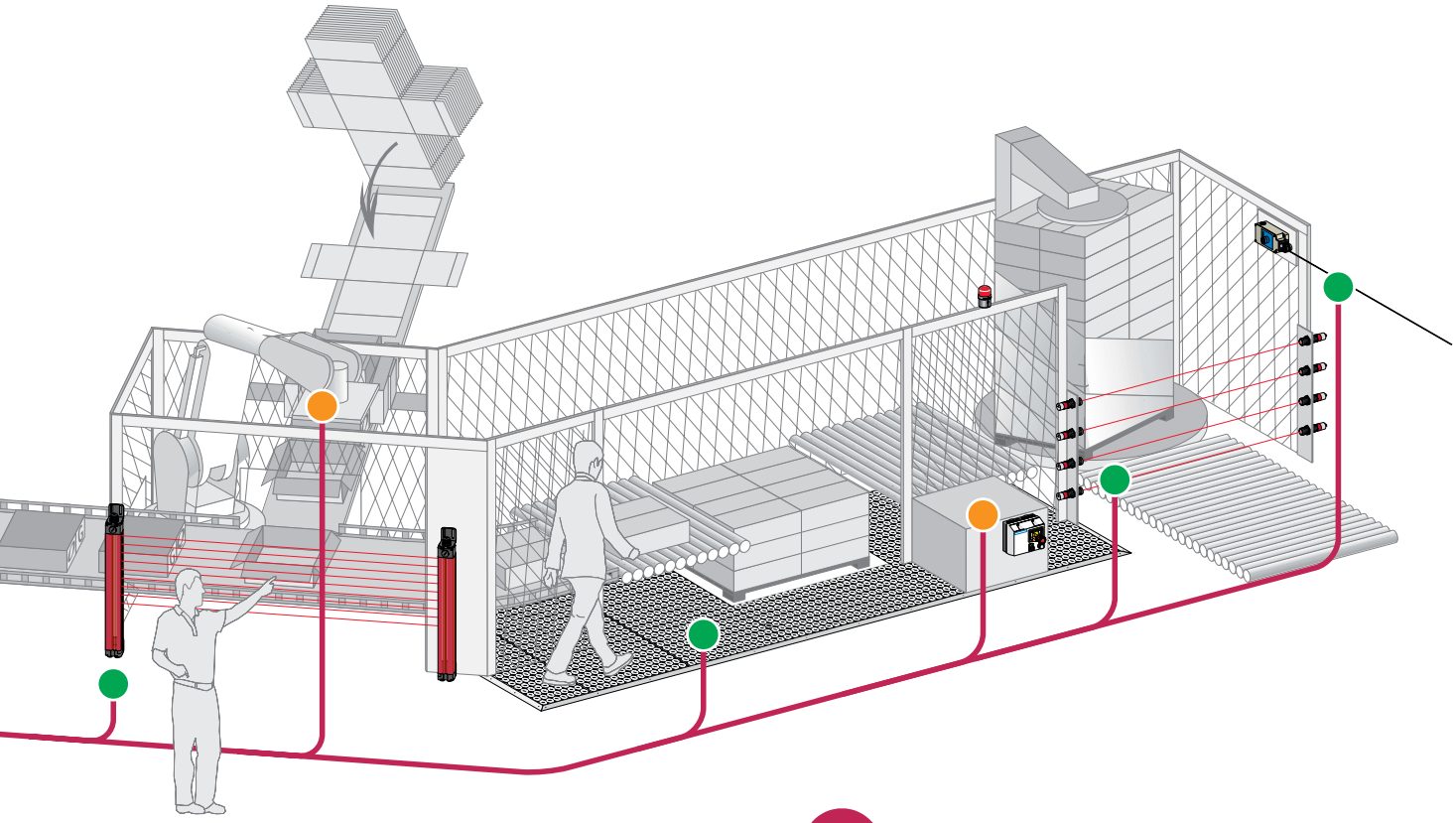
Cable switch

Safety relays

Safety Controller

Safety PLCs

As-interface safety at work



Stopping the machine…

- Contactors to cut-off the electrical power supply to motors – with mechanically linked mirror auxiliary contacts – integrated for feedback loop diagnosis of safety modules.
- Variable speed drives and servo drives with integrated safety functions…control stopping of dangerous movements.
- Rotary switch disconnectors, for equipment isolation from the electrical supply…and for emergency stopping by direct interruption of power supply.

Complete, upgraded safety offer:
With improved safety level

Up to 50% better space optimization
Compact components have smaller footprint

Save up to 30% on installation time
Reduce installation time with quick and easy wiring


Variable speed drives

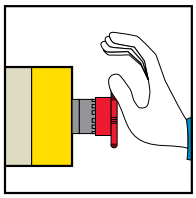
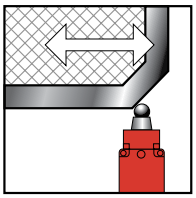
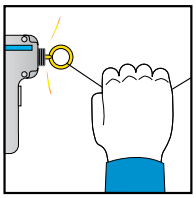

Servo drives


Contactors


Rotary switch disconnectors

MachineStruxure™
Machine safety solutions
Preventa™ safety relay modules

Applications

Modules	**For Emergency stop and switch monitoring**		
			
Maximum achievable safety level	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 (instantaneous safety outputs) and PL d/ Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/ISO 13850, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications	UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
Number of circuits			
Safety	3 NO	3 NO	2 NO instantaneous + 3 NO time delay
Additional	1 solid-state output for signalling to PLC	1 relay output for signalling to PLC	4 solid-state outputs for signalling to PLC
Display	2 LEDs	2 LEDs	4 LEDs
Supply voltage	∿ and 24 V ⎓ 48 V ∿ 115 V ∿ 230 V ∿	∿ and 24 V ⎓	∿ and 24 V ⎓ 115 V ∿ 230 V ∿
Synchronization time between inputs	Unlimited	Unlimited	75 ms (automatic start)
Input channel voltage			
24 V/48 V version	∿ and 24 V ⎓/48 V ∿	24 V ⎓	24 V ⎓/–
24 V/48 V or 110 V/120 V/230 V version	115 V ∿/230 V –	–	48 V ∿/48 V –
Module type	**XPS AC**	**XPS AXE**	**XPS ATE**
Pages	See *"Preventa™ Machine Safety Products"* catalog		

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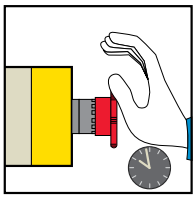
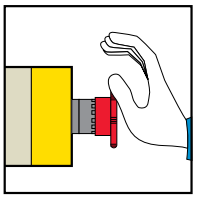
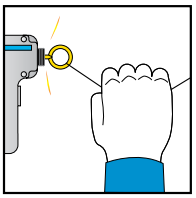
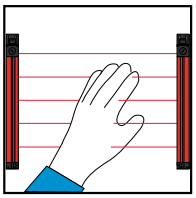
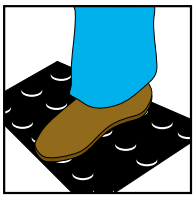
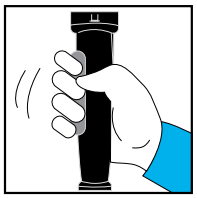
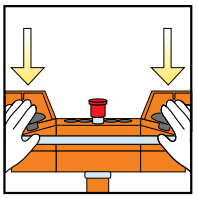






	For Emergency stop and switch monitoring	For Emergency stop, switch or solid-state output safety light curtain monitoring			For Emergency stop, switch, sensing mat/ edges or solid-state output safety light curtain monitoring
					
PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 (instantaneous safety outputs) and PL d/Category 3 (time delay safety outputs) conforming to EN/ISO 13849-1, SILCL 3 (instantaneous safety outputs) and SILCL 2 (time delay safety outputs) conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 1088/ISO 14119	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 61496-1 (type 4)	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, TÜV
3 NO instantaneous + 3 NO time delay	2 NO instantaneous + 1 NO time delay	3 NO		7 NO	3 NO instantaneous
3 solid-state outputs for signalling to PLC	–	–		2 NC + 4 solid-state outputs for signalling to PLC	1 NC + 4 solid-state outputs for signalling to PLC
11 LEDs	3 LEDs	3 LEDs		4 LEDs	4 LEDs
24 V ⎓	24 V ⎓	∿ and 24 V ⎓		∿ and 24 V ⎓ 115 V ∿ and 24 V ⎓ 230 V ∿ and 24 V ⎓	∿ and 24 V ⎓ 48 V ∿ 110 V ∿ and 24 V ⎓ 120 V ∿ and 24 V ⎓ 230 V ∿ and 24 V ⎓
Unlimited or 1.5 s (depending on wiring)	Unlimited	Unlimited			Unlimited or 2 s, 4 s (depending on wiring)
24 V ⎓/–	24 V ⎓/–	⎓ 24 V/–		24 V ⎓/–	24 V ⎓/–
– –	– –	– –		24 V ∿/24 V –	– 24 V ⎓/24 V/24 V
XPS AV	**XPS ABV**	**XPS AF**	**XPS AFL**	**XPS AR**	**XPS AK**

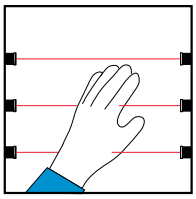
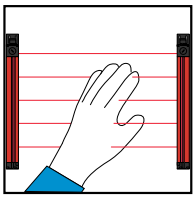
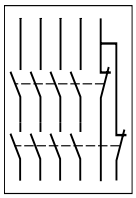
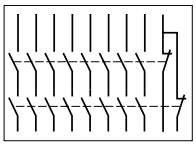
See *"Preventa™ Machine Safety Products"* catalog

Applications





Modules	**For enabling switch monitoring**	**For electrical monitoring of two-hand control stations**	
			
Maximum achievable safety level	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL c/Category 1 conforming to EN/ISO 13849-1	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards	EN/IEC 60204-1, EN 61326, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III A/ISO 13851	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III C/ISO 13851
Product certifications	UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, BG
Number of circuits			
Safety	2 NO	1 NO	2 NO
Additional	2 solid-state outputs for signalling to PLC	1 NC	1 NC
Display	3 LEDs	2 LEDs	3 LEDs
Supply voltage	24 V ⎓	∿ and 24 V ⎓ 115 V ∿ 230 V ∿	∿ and 24 V ⎓ 115 V ∿ 230 V ∿
Synchronization time between inputs	–	500 ms	500 ms
Input channel voltage			
24 V/48 V version	24 V/–	24 V ⎓/–	24 V ⎓
115 V/230 V version	–	24 V ∿/24 V	–
Module type	**XPS VC**	**XPS BA**	**XPS BCE**
Pages	See *"Preventa™ Machine Safety Products"* catalog		

	For control of 1 to 4 single-beam photo-electric sensors XU2 S (transmitter-receiver pair)	For monitoring type 2 and type 4 light curtains Compact and slim ranges	For extending the number of safety contacts	
				
PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL c/Category 2 conforming to EN/ISO 13849-1, SILCL 1 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 (when connected to the appropriate module)	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061 (when connected to the appropriate module)
EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1, EN 574 type III C/ISO 13851	EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 61496-1, EN/IEC 61496-2, EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV	UL, CSA, IFA	UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
2 NO	2 NO	2 solid-state	4 NO	8 NO
2 solid-state outputs for signalling to PLC	4 solid-state PNP NO outputs for signalling to PLC	1 PNP + 1 NPN output for signalling to PLC	2 NC	1 NC
3 LEDs	4 LEDs	14 LEDs + 2-digit display	2 LEDs	3 LEDs
24 V ⎓	24 V ⎓	24 V ⎓	∿ and 24 V ⎓	∿ and 24 V ⎓ 115 V ∿ 230 V ∿
500 ms	–	3 s or infinite	–	–
24 V ⎓/–	–	–	–	–
–	–	–	–	–
XPS BF	**XPS CM**	**XPS LCM**	**XPS ECME**	**XPS ECPE**

See *"Preventa™ Machine Safety Products"* catalog

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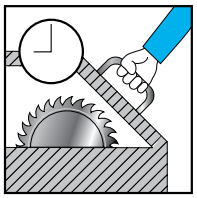
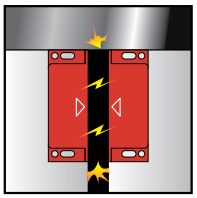
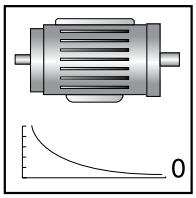
Applications



Modules	**For the monitoring of applications requiring safety time delays**	
		
Maximum achievable safety level	PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061	PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications	UL, CSA, TÜV	UL, CSA, TÜV
Number of circuits		
Safety	1 NO time delayed	1 NO pulse type
Additional	2 NC + 2 solid-state outputs for signalling to PLC	
Display	4 LEDs	
Supply voltage	∼ and 24 V ⎓ 115 V ∼ 230 V ∼	
Synchronization time between inputs	–	–
Module type	**XPS TSA**	**XPS TSW**
Pages	See *"Preventa™ Machine Safety Products"* catalog	





For coded magnetic switch monitoring		For zero speed detection of AC or DC motors which produce a remanent voltage in their windings due to residual magnetism
For 2 max.	**For 6 max.**	
		
PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061	PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 61508 and EN/IEC 62061w
EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3	EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV	UL, CSA, TÜV	UL, CSA, TÜV
2 NO		1 NO + 1 NC
2 solid-state outputs for signalling to PLC		2 solid-state outputs for signalling to PLC
3 LEDs	15 LEDs	4 LEDs
⎓ 24 V		24 V ⎓ 115 V ∿ 230 V ∿
500 ms		–
XPS DMB	**XPS DME**	**XPS VNE**
See *"Preventa™ Machine Safety Products"* catalog		

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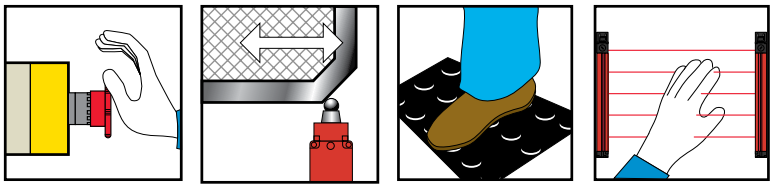
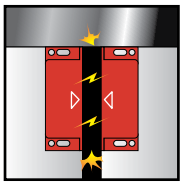
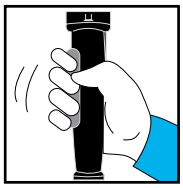
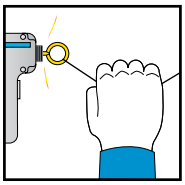
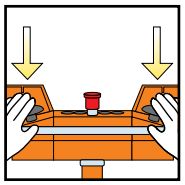
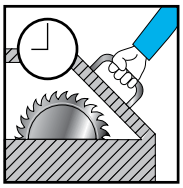
MachineStruxure™
Machine safety solutions
Preventa™ safety controllers

Applications



Modules	**Controllers for monitoring 2 independent safety functions simultaneously. User selection of 2 functions from a choice of 15, programmable from front face of controller.**

Functions	□ Emergency stop monitoring □ Switch monitoring □ Enabling switch monitoring □ Sensing mat or edges monitoring □ Light curtain monitoring, relay output type
Maximum achievable safety level	PL e/Category 4 conforming EN ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
Conformity to standards	EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications	UL, CSA, TÜV
Number of circuits	
Safety	6 NO (3 NO per function)
Additional	3 solid-state outputs for signalling to PLC
Display	12 LEDs
Supply voltage	24 V ⎓
Communication	
CANopen™ bus	–
Profibus™ bus	–
Modbus™ bus	–
Module type	**XPS MP**
Pages	See *"Preventa™ Machine Safety Products"* catalog

Configurable controllers using software, for several independent safety functions: selection of safety functions using configuration software running on Microsoft Windows® (16 or 32 inputs and 8 independent safety outputs)

- Emergency stop monitoring
- Limit switch monitoring
- Two-hand control monitoring
- Safety light curtain monitoring, with or without "muting" function
- Enabling switch monitoring, coded magnetic switch monitoring
- Safety mat monitoring
- Hydraulic press solenoid valve monitoring
- Eccentric press safety stop at top dead center monitoring. Zero speed detection
- Hydraulic press monitoring
- Eccentric press monitoring
- Foot switch monitoring
- Chain shaft breakage monitoring
- Safe tool
- Position selector

PL e/Category 4 conforming EN ISO 13849-1, SILCL 3 conforming to EN/IEC 61508 and EN/IEC 62061
EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 61496-1, EN 574/ISO 13851, EN/IEC 60947-1, EN/IEC 60947-5-1
UL, CSA, TÜV

4 NO (2 NO per function) + 6 solid-state
1 "muting" signalling output
LED display on front face
24 V ⎓

Via SUB-D 9-pin male connector, only on XPS MC16ZC and XPS MC32ZC
Via SUB-D 9-pin female connector, only on XPS MC16ZP and XPS MC32ZP
Via RJ45 connector, on all controllers XPS MC●●Z●

XPS MC

See *"Preventa™ Machine Safety Products"* catalog

MachineStruxure™
Machine safety solutions
Compact Preventa™ safety PLCs

Introduction			**Compact PLCs:** ■ Designed for use with numerous machine safety functions and for the protection of personnel. ■ Designed for use in safety related parts of control systems up to category 4 conforming to EN 60954-1, up to performance level "e" conforming to EN/ISO 13849-1 and up to SIL 3 conforming to EN/IEC 61508.
			 
User memory	Application		250 kB
	Data		250 kB
Response time			Depending on size of application
Maximum consumption			8 A
Supply			External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)
Inputs	**Digital**	Number of channels	**24**, configurable, not electrically isolated
		Current at state 0	1.5 mA max. at ⎓ 24 V
		Current at state 1	3.5 mA at ⎓ 24 V 4.5 mA at ⎓ 30 V
Outputs	**Digital**	Number of channels	**24**, configurable, not electrically isolated
		Output current	Channels 1 to 3, 5 to 7, 9 to 11, 13 to 15, 17 to 19, 21 to 23: 0.5 A at 60°C Channels 4, 8, 12, 16, 20 and 24:1 A at 60 °C, 2 A at 50°C
	Line control		**2 x 4**
Input/output connections			Removable screw terminals are provided with all Safety compact PLCs. Reference **XPS MF40●●** is also provided with cage clamp terminal.
Communication on Ethernet network			**By integrated RJ45 switched Ethernet communication ports**
■ **Safe communication** using SafeEthernet protocol			Yes / Yes
■ **Non safe communication** using Modbus™ TCP/IP protocol, server (slave)			No / Yes
Communication on fieldbus			
Non safety using Modbus RTU protocol, slave (RS 485)			No / No
Non safety using Profibus™ DP protocol (V0 slave)			No / No
Safety PLC type			**XPS MF4000** / **XPS MF4002**
Page			See *"Preventa™ Machine Safety Products"* catalog

Compact PLCs:
■ Designed for use with numerous machine safety functions and for the protection of personnel.
■ Designed for use in safety related parts of control systems up to category 4 conforming to EN 60954-1, up to performance level “e” conforming to EN/ISO 13849-1 and up to SIL 3 conforming to EN/IEC 61508.




250 kB			
250 kB			
Depending on size of application			
8 A			
External ⎓ 24 V supply (with separate protection conforming to EN/IEC 60950, SELV (Safety Extra Low Voltage) or PELV (Protection Extra Low Voltage) rated)			
24, configurable, not electrically isolated			
1.5 mA max. at ⎓ 24 V			
3.5 mA at ⎓ 24 V 4.5 mA at ⎓ 30 V			
24, configurable, not electrically isolated			
Channels 1 to 3, 5 to 7, 9 to 11, 13 to 15, 17 to 19, 21 to 23: 0.5 A at 60°C Channels 4, 8, 12, 16, 20 and 24:1 A at 60 °C, 2 A at 50°C			
2 x 4			
Removable screw terminals are provided with all Safety compact PLCs. Reference **XPS MF40●●** is also provided with cage clamp terminal.			
By integrated RJ45 switched Ethernet communication ports			
Yes	Yes	Yes	Yes
No	Yes	No	Yes
Yes	Yes	No	No
No	No	Yes	Yes
XPS MF4020	**XPS MF4022**	**XPS MF4040**	**XPS MF4042**
See *"Preventa™ Machine Safety Products"* catalog			

Machine Structure™

chapter 7

Integrated products/solutions

Integrated products/solutions

MachineStruxure™
Integrated products/solutions
Soft starters for synchronous and asynchronous motors

Application		Soft starter	Soft start/soft stop unit
		For conveyors, conveyor belts, pumps, fans, compressors, automatic doors, small gantries, belt-driven machines	
			
Power range for 50 to 60 Hz (kW) line supply		**0.37 to 11**	**0.75 to 15**
	Single-phase 110 to 230 V (kW)	0.37 to 2.2	–
	Three-phase 200 to 240 V (kW)	–	0.75 to 7.5
	Three-phase 200 to 480 V (kW)	0.37 to 11	–
	Three-phase 208 to 600 V (kW)	–	–
	Three-phase 208 to 690 V (kW)	–	–
	Three-phase 230 to 415 V (kW)	–	–
	Three-phase 230 to 440 V (kW)	–	–
	Three-phase 380 to 415 V (kW)	–	1.5 to 15
Degree of protection		IP 20	
Drive system	Number of controlled phases	1	2
	Type of control	–	–
	Operating cycle	–	
Functions (number)		1 Bypass	
Safety functions	Integrated	–	
	Available as an option	–	
Number of preset speeds		–	
Number of I/O	Analog inputs	–	
	Logic inputs	–	
	Analog outputs	–	
	Logic outputs	–	
	Relay outputs	–	
Communication	Integrated	–	
	Available as an option	–	
Dialog tools		–	
Configuration	Setup software	–	
Standards and certifications		IEC/EN 60947-4-2	
		CE, UL, CSA, C-Tick, CCC	
References		**ATS 01N1●●●●**	**ATS 01N2●●●●**
Catalogs		See *"Soft starters and variable speed drives"* catalog	

Soft start/soft stop unit
For centrifugal pumps, piston pumps, fans, screw compressors, conveyors, agitators, mixers, centrifugal machines

4 to 400
–
–
–
4 to 400
–
–
4 to 355
–
IP 20
3
Configurable voltage ramp
Standard
1 Bypass
–
–
–
1 PTC probe
3
–
–
2 (“N/C”/“N/O”)
Modbus™
–
Remote display terminal (option)
SoMove™
IEC/EN 60947-4-2, EMC class A
CE, UL, CSA, C-Tick, GOST, CCC

ATS 22●●●●

See *“Soft starters and variable speed drives”* catalog

MachineStruxure™

Integrated products/solutions

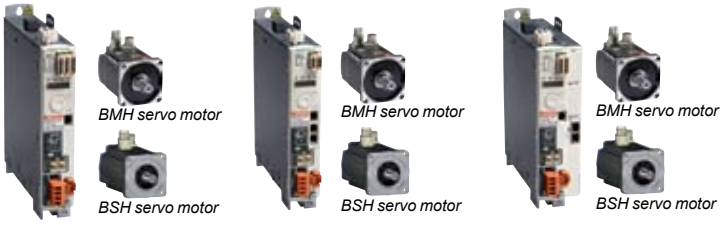
Variable speed drives for asynchronous and synchronous motors

Application			**Variable speed drives**	
			For material handling (small conveyors), packing and packaging (small labeling machines, small bagging machines), suction pumps, centrifugal pumps, circulating pumps, air or smoke extractor fans, plastic film making machines, ovens, boilers	For material handling (small conveyors), hoists, packing and packaging (small labeling machines, small bagging machines), special machines (mixers, kneaders), textile machines, pumps, compressors, fans
				
Power range for 50 to 60 Hz (kW) line supply			**0.18 to 4**	**0.18 to 15**
	Single-phase 100 to 120 V (kW)		0.18 to 0.75	–
	Single-phase 200 to 240 V (kW)		0.18 to 2.2	0.18 to 2.2
	Three-phase 200 to 230 V (kW)		–	–
	Three-phase 200 to 240 V (kW)		0.18 to 4	0.18 to 15
	Three-phase 380 to 480 V (kW)		–	–
	Three-phase 380 to 500 V (kW)		–	0.37 to 15
	Three-phase 500 to 600 V (kW)		–	–
	Three-phase 525 to 600 V (kW)		–	0.75 to 15
	Three-phase 500 to 690 V (kW)		–	–
Degree of protection			IP 20	IP 21
Type of cooling			Heatsink	
Drive system	Output frequency		0.1 to 400 Hz	0.1 to 500 Hz
	Type of control	Asynchronous motor	Standard (voltage/frequency) Performance (sensorless flux vector control) Pump/fan (Kn^2 quadratic ratio)	Standard (voltage/frequency) Performance (sensorless flux vector control) Energy saving ratio
		Synchronous motor	–	
	Transient overtorque		150 to 170% of the nominal motor torque	170 to 200% of the nominal motor torque
Functions (number)			40	50
Safety functions	Integrated		–	–
	Available as an option		–	–
Number of preset speeds			8	16
Number of I/O	Analog inputs		1	3
	Logic inputs		4	6
	Analog outputs		1	1
	Logic outputs		1	–
	Relay outputs		1	2
Communication	Integrated		Modbus™	Modbus and CANopen™
	Available as an option		–	CANopen Daisy Chain, DeviceNet™, Profibus™ DP, Modbus TCP, FIPIO™
	Bluetooth® link		–	–
Options			–	
Dialog tools			IP 54 or IP 65 remote terminal	IP 54 or IP 65 remote terminal IP 54 remote graphic display terminal
Configuration	Setup software		SoMove™	
	Configuration tools		Simple Loader, Multi-Loader	
Standards and certifications			IEC 61800-5-1 IEC 61800-3 (environments 1 and 2, categories C1 to C3)	
			CE, UL, CSA, C-Tick, NOM, GOST	
References			**Altivar™ 12**	**Altivar 312**
Catalogs			See *"Altivar 12 variable speed drives"* catalog	See *"Altivar 312 variable speed drives"*

Variable speed drives without sensor (velocity control)	Variable speed drive
For material handling (conveyors), transfer machines, packaging machines, hoisting, special machines (textile, transfer), wood-working or metal processing machines	For hoisting, material handling, packaging, textile machines, wood-working machines, process machines
	
0.18 to 15	**0.37 to 630**
–	–
0.18 to 2.2	0.37 to 5.5
–	–
–	0.37 to 75
–	0.75 to 500
0.37 to 15	–
–	1.5 to 7.5
–	–
–	1.5 to 630
IP 20	IP 20
Heatsink	Heatsink, base plate or water-cooled circuit
0.1 to 599 Hz	0.1 to 500 Hz across the entire range 0.1 to 599 Hz up to 37 kW at 200 to 240 V ∼ and 380 to 480 V ∼
Voltage/frequency ratios: U/f and 5-point U/f Sensorless flux vector control ratio Kn^2 quadratic ratio (pump/fan) Energy saving ratio	Flux vector control with or without sensor Voltage/frequency ratio (2 or 5 points). ENA System
Ratio for synchronous motor without sensor	Vector control with or without speed feedback
170 to 200% of the nominal motor torque	220% of nominal motor torque for 2 seconds, 170% for 60 seconds
150	> 150
1: STO (Safe Torque Off)	"Power removal" (PWR) safety function
3 : SLS (Safe Limited Speed), SDI (Safe Direction Information), SS1 (Safe Stop 1)	–
–	16
3	2 to 4
6	6 to 20
1 : configurable as voltage (0-10 V) or current (0-20 mA)	1 to 3
1	0 to 8
2	2 to 4
Modbus™, CANopen™	Modbus, CANopen
DeviceNet™, Profibus™ DP V1, EtherNet/IP, Modbus TCP, EtherCat	Modbus TCP Daisy Chain, Modbus/Uni-Telway, EtherNet/IP, DeviceNet, Profibus DP V0 and V1, INTERBUS™, CC-Link
Integrated	–
Filters, braking resistors, line chokes	Altivar™ IMC integrated controller card, interface cards for incremental, resolver, SinCos, SinCos Hiperface®, EnDat® or SSI encoders, I/O extension cards, "Controller Inside" programmable card
IP 54 or IP 55 drive navigator IP 54 or IP 55 remote graphic display terminal	IP 54 or IP 65 remote graphic display terminal
SoMove™	SoMove
Simple Loader, Multi-Loader	Simple Loader, Multi-Loader
IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, category C2), UL508C, EN 954-1 category 3, ISO/EN 13849-1/- 2 category 3 (PL e), IEC 61508 (parts 1 and 2) SIL 3 level, draft standard EN 50495E, IEC 60 721-3-3 classes 3C3 and 3S2	IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, categories C1 to C3), IEC 61000-4-2/4-3/4-4/4-5/4-6/4-11
CE, UL, CSA, C-Tick, NOM, GOST	CE, UL, CSA, DNV, C-Tick, NOM, GOST
Altivar™ 32	**Altivar 71**
See *"Altivar 32 variable speed drives"* catalog	See *"Altivar 71 variable speed drives"* catalog

MachineStruxure™
Integrated products/solutions
Motion control
Lexium™ 32

Application areas	Common		**Printing, material handling, conveying, transfer machines, packaging, textiles**		
	Specific		**Clamping, cutting, cutting to length, flying shear, rotary knife, Pick and Place, winding, marking**		
Technology type			**Lexium™ 32 servo drives with sensor feedback (position control)**		



Power range for 50 to 60 Hz (kW) line supply			0.15 to 7		
	Single-phase 100 to 120 V (kW)		0.15 to 0.8		
	Single-phase 200 to 240 V (kW)		0.3 to 1.6		
	Three-phase 380 to 480 V (kW)		0.4 to 7		
	Three-phase 380 to 500 V (kW)		–		
Drive system	Motor speed		Nominal speed: ■ BMH servo motors: continuous stall torque range between 1.2 to 84 Nm for nominal speeds between 1200 and 5000 rpm ■ BSH servo motors: continuous stall torque range between 0.5 to 33.4 Nm for nominal speeds between 2500 and 6000 rpm		
	Type of control	Asynchronous motor	–		
		Synchronous motor	Synchronous motor with sensor feedback for BMH and BSH servo motors		
	Motor sensor	Integrated	SinCos Hiperface® sensor		
		Available as an option	–		Resolver encoder Analog encoder (motor and machine) Digital encoder (machine only)
	Transient overtorque		–		
	Peak current		Peak current, up to 4 times the drive direct current for 1 second		
Number of functions			–		
Safety functions	Integrated		1: STO (Safe Torque Off)		
	Available as an option		4 : SLS (Safe Limited Speed), SS1 (Safe Stop 1), SS2 (Safe Stop 2), SOS (Safe Operating Stop)		
Number of I/O	Inputs	Analog	2	–	–
		Logic	6	1 capture input	6 (2 of which can be used as a capture input)
	Outputs	Analog	–	–	–
		Logic	5	–	3
	Relay outputs		–	–	–
Communication	Integrated		Modbus	Modbus, CANopen, CANmotion	Modbus
	Available as an option		–	–	CANopen™, CANmotion™, DeviceNet™, EtherNet/IP, Profibus™ DP V1, EtherCat
	Bluetooth® link		Available as an option	Available as an option	Available as an option
Options			SoMove™ setup software Multi-Loader configuration tool IP 54 remote graphic display terminal Filters, braking resistors, line chokes		
Standards and certifications			IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, categories C2 and C3) IEC 61000-4-2/4-3/4-4/4-5, ISO/EN13849-1 (PL e), IEC 61508 SIL 3 level		
			CE, UL, CSA		
References			**LXM 32C**	**LXM 32A**	**LXM 32M**
Catalog			Please consult our website www.schneider-electric.com		

MachineStruxure™
Integrated products/solutions
Motion control
Lexium™ ILA, ILE, ILS integrated drives

Type of application		**Machine auxiliary axes or low-power applications**		
Type of solution		**Integrated drive system in order to optimize the size of the enclosure**		
				
Type of process		Requiring high dynamic performance and precise positioning	Automatic format adjustment	Short distances and precise positioning
Technology type		Integrated drive with servo motor	Integrated drive with DC brushless motor	Integrated drive with 3-phase stepper motor
Main specifications		Compact Optional integrated holding brake	High holding torque with power off Optional integrated planetary gearbox	High torque at low speed
Dynamic response		★★★★	★★	★★★
Precision and stability		★★★★	★★	★★★★
Economy mode		★★★★★	★★★★	★★
Motor inertia		Medium		
Control interfaces	Control signals	I/O		Pulse/direction (P/D) I/O
	Buses and networks	CANopen™, Profibus™ DP, RS 485 serial link, DeviceNet™, EtherCAT, Ethernet/IP, Modbus™ TCP, Ethernet Powerlink		
	Motion bus	–		
Motor-drive combination	Nominal power	150 to 370 W	100 to 350 W	
	Nominal speed	500 to 9000 rpm	1500 to 7000 rpm	0 to 1000 rpm
	Nominal torque	0.26 to 0.78 Nm	0.18 to 0.5 Nm	0.45 to 6 Nm
Drive specifications	Safety function	Safe Torque Off		
	Power section line supply	24-36-48 V ⎓		
	Power supply control – Input voltage	Power supply shared with the power section line supply		
	Power supply control – Input current	Power supply shared with the power section line supply		
Motor specifications	Type of sensor (resolution) *(1)*	Single-turn SinCos encoder (16,384 pulses/rev) Multi-turn SinCos encoder (16,384 pulses/rev x 4096 revolutions)	Absolute encoder (12 to 1380 pulses/rev)	Reference impulse sensor
	Flange size	57	66	57, 85
References		**ILA**	**ILE**	**ILS**
Catalog		Please consult our website www.schneider-electric.com		

(1) Sensor resolution given for the drive-motor combination.

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MachineStruxure™
Integrated products/solutions
Lexium™ Linear Motion
Linear axes

Axis type		Portal axes	
Movement	Number of directions	1	
	Movement type	Generally horizontal	
	Position of the load	On carriage	
Drive		Toothed belt	Ballscrew
Type of guide		Ball or roller	Ball

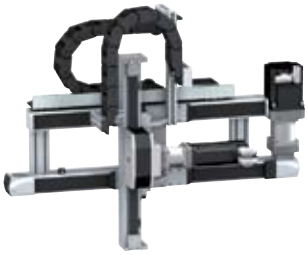
Main specifications	□ High dynamic response □ Long stroke length □ High positioning speed	□ High precision movement (positioning, repeatability, guiding) □ High feed forces □ High rigidity
Dynamic response	★★★★★	★★★
Precision	★★★	★★★★★
Maximum payload	100 kg	100 kg
Maximum driving force	2600 N	4520 N
Maximum speed of movement of the load	8 m/s	1.25 m/s
Maximum working stroke	5500 mm	3000 mm
Repeatability	± 0.05 mm	± 0.02 mm
Options	□ Choice of guide type: Ball (for applications requiring high forces and torques) or roller (simple, cost-effective solution) □ Wide range of sensors for the limit switch function □ Choice of carriage type for adapting to the load □ Option to add carriages □ Anti-corrosion version □ Anti-static belt	□ Choice of pitch □ Protective metal strip □ Wide range of sensors for the limit switch function □ Choice of carriage type for adapting to the load □ Option to add carriages □ Option to add ballscrew supports for longer axes
Reference	**PAS 4●B**	**PAS 4●S**
Page	Please consult our website www.schneider-electric.com	

Linear tables	Cantilever axes with mobile structure on profile	Cantilever axes with mobile structure on parallel rods	Telescopic axes
1			
Generally horizontal	Generally vertical		Generally horizontal
On carriage	On the side of the profile or on the 2 end blocks	On the 2 end blocks	On carriage
Ballscrew	Toothed belt	Toothed belt or rack	Toothed belt
Double, ball	Ball or roller	Ball	
			
□ High precision movement (positioning, repeatability, guiding) □ High feed forces □ High rigidity □ Feed movement without mechanical backlash	□ Long stroke length □ High feed forces □ Option to mount the load on the side of the profile or on the end blocks □ High rigidity	□ Compact □ Mobile structure with light travel weight	□ Long stroke length from a compact unit □ High rigidity □ High dynamic response
★★	★★★★	★★★★	★★★★
★★★★★★	★★★	★★★	★★
150 kg	50 kg	18 kg	35 kg
2580 N	2150 N	705 N	1500 N
1 m/s	3 m/s	3 m/s	3 m/s
1500 mm	1200 mm	500 mm	2400 mm
± 0.02 mm	± 0.05 mm	± 0.05 mm	± 0.1 mm
□ Choice of pitch □ Several different motor mounting options	□ Choice of guide type: Ball (for applications requiring high forces and torques) or roller (simple, cost-effective solution) □ Protective metal strip □ Anti-corrosion version □ Wide range of sensors for the limit switch function □ Anti-static belt	□ Anti-corrosion version □ Anti-static belt	□ Choice of guide type: Ball (for applications requiring high forces and torques) or roller (simple, cost-effective solution) □ Choice of carriage type for adapting to the load
TAS 4	**CAS 4**	**CAS 3**	**CAS 2**
Please consult our website www.schneider-electric.com			

MachineStruxure™
Integrated products/solutions
Lexium™ Linear Motion
Multi-axis systems

Axis type		**Double portal axes**	
Movement	Number of directions	**1**	
	Movement type	**Horizontal: Combination of two parallel axes X and X**	
	Position of the load	**On two parallel carriages**	
Multi-axis system type		**PAS 4●B axes + PAS 4●H support axis (driven by the load)**	**PAS 4●B + PAS 4●B axes (shaft-driven)**
Drive		**Toothed belt on one axis**	**Toothed belt on both axes**
Type of guide		**Ball or roller**	**Ball or roller**

Main specifications		□ Long stroke length □ High dynamic response □ High precision movement (positioning, guiding)	□ High precision movement (positioning, guiding) □ High feed forces
Maximum payload		250 kg	300 kg
Maximum working stroke	**On the X axis**	5500 mm	
	On the Y axis	–	
	On the Z axis	–	
Options		□ Choice of guide type: Ball (for applications requiring high forces and torques) or roller (simple, cost-effective solution) □ Protective metal strip □ Anti-corrosion version □ Anti-static belt □ Wide range of sensors for the limit switch function □ Several different motor mounting options □ Variable distance between the two axes	
Reference		**MAX H**	**MAX S**
Page		Please consult our website www.schneider-electric.com	

Linear positioners	Portal robots	
2		3
Horizontal and vertical: Combination of one X axis and one Z axis	Horizontal: Combination of two perpendicular axes X and Y	Horizontal and vertical: Combination of two perpendicular axes X and Y and one Z axis
On the side or on the end blocks of the Z axis profile	On the Y axis carriage	On the side or on the end blocks of the Z axis profile
□ MAX S + CAS 4 axes □ MAX S + CAS 3 axes	□ MAX S + MAX H axes □ MAX S + PAS 4●B axes	□ MAX S + MAX H + CAS 4 axes □ MAX S + MAX H + CAS 3 axes
Toothed belt on each axis		
Ball or roller		
		
□ Dynamic load positioning	□ Long stroke length on both axes	□ Long stroke length on three axes
50 kg	130 kg	50 kg
5500 mm	5500 mm	5500 mm
–	1500 mm	1500 mm
1200 mm	–	1200 mm
□ Choice of guide type: Ball (for applications requiring high forces and torques) or roller (simple, cost-effective solution) □ Wide range of sensors for the limit switch function		
Supplied as standard: □ Protective metal strip □ Anti-corrosion version □ Anti-static belt		
MAX P	**MAX R●2**	**MAX R●3**
Please consult our website www.schneider-electric.com		

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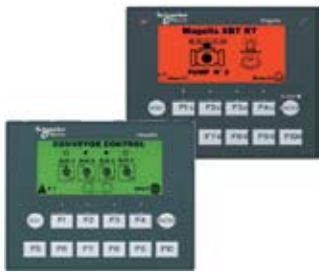
MachineStruxure™
Integrated products/solutions
Operator dialog terminals
Magelis™ Small Panels

Applications		**Display of graphic pages** **Control and configuration of data**		
Type of terminal		**Small Panels with touch screen**		
				
Display	Type	Monochrome LCD STN (200 x 80 pixels), backlit - Green, orange and red or - White, pink and red	Color QVGA TFT LCD (320 x 240 pixels)	
	Capacity	3.4" (monochrome)	3.5" (color)	5.7" (color)
Data entry		Via touch screen		
Memory capacity	Application	16 MB Flash		
	Extension	–		
Functions	Maximum number of pages	Limited by internal FLASH EPROM memory capacity		
	Variables per page	Unlimited		
	Reintroduction of variables	Alphanumeric, bitmap, bar chart, gauge, curves, buttons, LEDs		
	Recipes	32 groups of 64 recipes		
	Curves	Yes, with log		
	Alarm logs	Yes		
	Real-time clock	Access to the PLC real-time clock		
	Alarm relay	–		
	Buzzer	Yes		
Communication	Asynchronous serial link	RS 232C/RS 485		
	Downloadable protocols	Uni-TE™, Modbus™ and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens		
	Printer link	USB for serial or parallel printer		
	USB ports	1 host type A and 1 device type mini B		
	Networks	–	1 Ethernet TCP/IP port (10BASE-T/100BASE-TX)	
Development software		Vijeo™ Designer™ (on Microsoft Windows® XP, Windows Vista® and Windows 7)		
Operating systems		Magelis™		
Type of terminal		**Magelis STO**	**Magelis STU**	
Pages		See *"Magelis™ Human/Machine Interfaces"* catalog		

Display of text messages and/or semi-graphic pages	Display of text messages and/or semi-graphic pages Control and configuration of data	
Small Panels with keypad	**Small Panels with keypad**	**Small Panels with touch screen and keypad**
		
Green backlit monochrome LCD, height 5.5 mm or Green, orange and red backlit monochrome LCD, height 4.34 to 17.36 mm	Green, orange and red backlit monochrome LCD, height 4.34 to 17.36 mm	Green, orange and red backlit monochrome matrix LCD (198 x 80 pixels), height 4 to 16 mm
2 lines of 20 characters or 1 to 4 lines of 5 to 20 characters (monochrome)	1 to 4 lines of 5 to 20 characters (monochrome)	2 to 10 lines of 5 to 33 characters (monochrome)
Via keypad with 8 keys (4 customizable)	Via keypad with ■ 12 function keys or numeric entry (depending on context) ■ 8 service keys	Via keypad with ■ 4 function keys ■ 8 service keys Via touch screen and keypad with ■ 10 function keys ■ 2 service keys
512 KB Flash		512 KB Flash EPROM
–		
128/200 application pages 256 alarm pages	128/200 application pages 256 alarm pages	200 application pages 256 alarm pages
40 to 50		50
Alphanumeric		Alphanumeric, bar chart, buttons, LEDs
–		
Yes		
Yes *(2)*	Yes	
Access to the PLC real-time clock	Access to the PLC real-time clock	
–		
–		Yes *(1)*
RS 232C/RS 485		
Uni-TE™, Modbus™ and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens		
RS 232C serial link *(2)*		
–		
–		
Vijeo™ Designer™ Lite (on Microsoft Windows® 2000, Windows XP or Windows Vista®)		
Magelis™		
XBT N	**XBT R**	**XBT RT**
See *"Magelis™ Human/Machine Interfaces"* catalog		

(1) Only XBT RT511.
(2) Depending on model.

MachineStruxure™
Integrated products/solutions
Operator dialog terminals
Magelis™ GT, GK, GH and GTW Advanced Panels

Applications		**Display of text messages, graphic objects and synoptic views Control and configuration of data**		
Type of terminal		**Touch screen Advanced Panels**		
				
Display	Type	Backlit monochrome (amber or red mode) STN LCD (320 x 240 pixels) or TFT LCD	Backlit monochrome or color STN LCD or backlit color TFT LCD (320 x 240 pixels or 640 x 480 pixels) *(3)*	Backlit color STN LCD or TFT LCD (640 x 480 pixels)
	Capacity	3.8” (monochrome or color)	5.7” (monochrome or color)	7.5” (color)
Data entry		Via touch screen		
	Static function keys	–		
	Dynamic function keys	–		
	Service keys	–		
	Alphanumeric keys	–		
Memory capacity	Application	32 MB Flash EPROM	16 MB Flash EPROM *(3)*	32 MB Flash EPROM
	Expansion	–	By means of 128, 256, 512 MB, 1, 2 or 4 GB CF card (except XBT GT2110)	
Functions	Maximum number of pages	Limited by internal Flash EPROM memory capacity	Limited by capacity of internal Flash EPROM memory or CF card memory	
	Variables per page	Unlimited (8000 variables max.)		
	Reintroduction of variables	Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, LED		
	Recipes	32 groups of 64 recipes comprising 1024 ingredients max.		
	Curves	Yes, with log		
	Alarm logs	Yes		
	Real-time clock	Built-in		
	Discrete I/O	–		1 input (reset) and 3 outputs (alarm, buzzer, run)
	Multimedia I/O	–	*(3)*	1 audio input (microphone), 1 composite video input (digital or analog video camera), 1 audio output (loudspeaker) *(1)*
Communication	Downloadable protocols	Uni-TE™ *(2)*, Modbus™, Modbus TCP/IP *(1)* and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens		
	Asynchronous serial link	RS 232C/485 (COM1)	RS 232C/RS 422/485 (COM1) and RS 485 (COM2)	
	USB ports	1	1 *(3)*	2
	Buses and networks	–	Modbus Plus and FIPway™ with USB gateway, Profibus™ DP and DeviceNet™ with optional card	
		Ethernet TCP/IP (10BASE-T/100BASE-TX) *(1)*		
	Printer link	USB port for parallel printer	RS 232C (COM1) serial link, USB port for parallel printer	
Development software		Vijeo™ Designer™ (36349/11) (on Microsoft Windows® XP, Windows Vista® and Windows 7)		
Operating system		Magelis™ (200 MHz RISC CPU)	Magelis (133 MHz RISC CPU) *(3)*	Magelis (266 MHz RISC CPU)
Type of terminal		**XBT GT11/13**	**XBT GT21/22/23/24/29**	**XBT GT42/43**
Pages		See *"Magelis™ Human/Machine Interfaces"* catalog		

(1) Depending on model.
(2) Uni-TE version V2 for Twido™ controller and TSX Micro/Premium™ platform.
(3) For XBTGT 2430, 32 MB Flash EPROM, 1 sound output, 2 USB ports, 266 MHz RISC CPU
(4) For XBT GT 5430

Display of text messages, graphic objects and synoptic views
Control and configuration of data

Touch screen Advanced Panels

Backlit color STN LCD or TFT LCD (640 x 480 pixels or 800 x 600 pixels) *(4)*	Backlit color TFT LCD (800 x 600 pixels)	Backlit color TFT LCD (1024 x 768 pixels)
10.4" (color)	12.1" (color)	15" (color)
Via touch screen		
–		
–		
–		
–		
32 MB Flash EPROM		
By means of 128, 256, 512 MB, 1, 2 or 4 GB CF card		
Limited by capacity of internal Flash EPROM memory or CF card memory		
Unlimited (8000 variables max.)		
Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, LED		
32 groups of 64 recipes comprising 1024 ingredients max.		
Yes, with log		
Yes		
Built-in		
1 input (reset) and 3 outputs (alarm, buzzer, run)		
1 audio input (microphone), 1 composite video input (digital or analog video camera), 1 audio output (loudspeaker) *(1)*		
Uni-TE™ *(2)*, Modbus™, Modbus TCP/IP *(1)* and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens		
RS 232C/RS 422/485 (COM1) and RS 485 (COM2)		
2		
Modbus Plus with USB gateway		
Ethernet TCP/IP (10BASE-T/100BASE-TX)		
RS 232C (COM1) serial link, USB port for parallel printer		
Vijeo™ Designer™ (36349/11) (on Microsoft Windows® XP, Windows Vista® and Windows 7)		
Magelis™ (266 MHz RISC CPU)		
XBT GT52/53/54	**XBT GT63**	**XBT GT73**
See *"Magelis™ Human/Machine Interfaces"* catalog		

MachineStruxure™
Integrated products/solutions
Operator dialog terminals
Magelis™ GT, GK, GH and GTW Advanced Panels

Applications		**Display of text messages, graphic objects and synoptic views Control and configuration of data**	
Type of terminal		**Advanced Panels with keypad**	
			
Display	Type	Color TFT LCD (320 x 240 pixels) or monochrome STN	Color TFT LCD (640 x 480 pixels)
	Capacity	5.7" (monochrome or color)	10.4" (color)
Data entry		Via keypad and/or touch screen (configurable) and/or by industrial pointer	
	Static function keys	10	12
	Dynamic function keys	14	18
	Service keys	8	
	Alphanumeric keys	12	
Memory capacity	Application	16 MB Flash EPROM	32 MB Flash EPROM
	Expansion	By means of 128, 256, 512 MB, 1, 2 or 4 GB CF card	
Functions	Maximum number of pages	Limited by capacity of internal Flash EPROM memory or CF card memory	
	Variables per page	Unlimited (8000 variables max.)	
	Reintroduction of variables	Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, LED	
	Recipes	32 groups of 64 recipes comprising 1024 ingredients max.	
	Curves	Yes, with log	
	Alarm logs	Yes	
	Real-time clock	Built-in	
	Discrete I/O	–	1 input - 3 outputs
	Multimedia I/O	–	–
Communication	Downloadable protocols	Uni-TE™ (2), Modbus™, Modbus TCP/IP (1) and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens	
	Asynchronous serial link	RS 232C/RS 422/485 (COM1) RS 485 (COM2)	
	USB ports	1	2
	Buses and networks	Modbus Plus, FIPway™ with USB gateway, Profibus™ DP and DeviceNet™ with optional card	
		Ethernet TCP/IP (10BASE-T/100BASE-TX)	
	Printer link	RS 232C (COM1) serial link, USB port for parallel printer	
Development software		Vijeo™ Designer™ (36349/11) (on Microsoft Windows® XP, Windows Vista® and Windows 7)	
Operating system		Magelis™ (266 MHz RISC CPU)	
Type of terminal		**XBT GK 21/23**	**XBT GK 53**
Pages		See *"Magelis™ Human/Machine Interfaces"* catalog	

(1) Depending on model.
(2) Uni-TE version V2 for Twido™ controller and TSX Micro/Premium™ platform.

Display of text messages, graphic objects and synoptic views Control and configuration of data			
Portable Advanced Panels	**Open touch screen Advanced Panels**		
			
Color TFT LCD (640 x 480 pixels)	Color TFT LCD (800 x 600 pixels)	Color TFT LCD (800 x 600 pixels)	Color TFT LCD (1024 x 768 pixels)
5.7" (color)	8.4" (color)	12" (color)	15" (color)
Via touch screen	Via touch screen		
11	–		
–	–		
–	–		
–	–		
32 MB Flash EPROM	1 GB CF system card included with terminal, expandable to 4 GB	2 GB CF system card included with terminal, expandable to 4 GB	
By means of 128, 256, 512 MB, 1, 2 or 4 GB CF card			
Limited by capacity of internal Flash EPROM memory or CF card memory			
Unlimited (8000 variables max.)			
Alphanumeric, bitmap, bargraph, gauge, tank, tank level indicator, curves, polygon, button, LED			
32 groups of 64 recipes comprising 1024 ingredients max.			
Yes, with log			
Yes			
Built-in			
–			
1 audio output			
Uni-TE™ (2), Modbus™, Modbus TCP/IP and for PLC brands: Mitsubishi, Omron, Rockwell Automation and Siemens	Uni-TE *(2)*, Modbus, Modbus TCP/IP *(1)* and for PLC brands: Mitsubishi, Omron, Allen-Bradley and Siemens		
RS 232C/RS 422-485 (COM1)	RS 232C (COM1) RS 232C (COM2)	RS 232C (COM1)	RS 232C (COM1) RS 232C (COM2)
1	4	4 + 1 front-mounted	
–	Modbus Plus with USB gateway		
1 Ethernet port (10BASE-T/100BASE-TX)	1 TCP/IP Ethernet port (10BASE-T/100BASE-TX) and 1 Ethernet port (10BASE-T/100BASE-TX/1 GB)		
–	RS 232C (COM1 or COM2) serial link, USB port for parallel printer		
Vijeo™ Designer™ (36349/11) (on Microsoft Windows® XP, Windows Vista® and Windows 7)			
Magelis™ (266 MHz RISC CPU)	Windows XP Embedded		
XBT GH 2460	**XBT GTW 450**	**XBT GTW 652**	**HMI GTW 7353**
See *"Magelis™ Human/Machine Interfaces"* catalog			

(1) Depending on model.
(2) Uni-TE version V2 for Twido™ controller and TSX Micro/Premium™ platform.

MachineStruxure™
Integrated products/solutions
Protection components
TeSys™ T Motor Management System

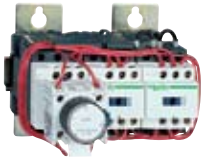
Applications	**Multifunction motor and machine protection**

Device type	**Controllers**				
For network/bus	Modbus™	CANopen™	DeviceNet™	Profibus™ DP	Ethernet TCP/IP
Current range	0.4 to 100 A (with internal current transformer) 100 to 810 A (with external current transformer)				
Control voltage	⎓ 24 V ∿ 100 to 240 V				
Number of I/O	6 inputs 4 outputs				
Measurements	- Current between phases - Ground fault. - Motor temperature.				
Functions	**Protection and monitoring functions:** - thermal overload, - motor temperature monitoring, - phase imbalance and phase failure, - locked rotor, - long starting times, - phase reversal, - ground fault.				
Device type	**LTM R••M••**	**LTM R••C••**	**LTM R••D••**	**LTM R••P••**	**LTM R••E••**
Pages	See *"Control and Protection components"* catalog				

Input extension modules, for all LTM R controllers		**Operator control unit**
–		–
–		–
⎓ 24 V *(1)*	∿ 100 to 240 V *(1)*	Powered via the LTM R controller or via the LTM E extension module.
4 independent inputs		–
Voltage between phases		–
Monitoring functions: - voltage, - power, - Cos φ (power factor)		**Display functions:** - measurements, - faults and alarms, - statistics
LTM EV40BD	**LTM EV40FM**	**LTM CU**
See *"Control and Protection components"* catalog		See *"Control and Protection components"* catalog

(1) Input control voltage. The electronics are powered via the controller.

MachineStruxure™
Integrated products/solutions
TeSys™ motor starters - open version

Applications	**Pre-assembled starters**			
	Small machines starting under full load: D.O.L. starters			**Machines starting under no-load: star-delta starters**
Starter type	**D.O.L. or reversing starters with circuit-breaker**		**D.O.L. starters with fuse protection**	**Soft start units or star-delta starters to be used in association with a circuit-breaker or fuses**
					
Level of service	Type 1 coordination		Type 2 coordination	–	–
Power at 400 V	Up to 5.5 kW	Up to 37 kW		Up to 37 kW	Up to 132 kW
Type of components	**Combination automatic motor starter with overload protection built into the circuit-breaker**			**Fuse carrier + plate-mounted contactor**	**3 contactors (line, star and delta, mounted on plate, rail or chassis)**
Pages	See *"Control and Protection components"* catalog				

Starters for customer assembly

Small machines starting under full load: D.O.L. starters
Machines starting under no-load: star-delta starters

D.O.L. or reversing starters	D.O.L., reversing or star-delta starters with circuit-breakers	D.O.L., reversoing or star-delta starters with fuses	
		     	  	  
Total coordination	Type 1 and type 2 coordination	–	–
Up to 15 kW	Up to 110 kW	Up to 315 kW	Up to 355 kW
Starter-controller	**Thermal magnetic circuit-breaker + contactor(s)**	**Magnetic circuit-breaker + contactor(s) + thermal overload relay**	**Fuse carrier + contactor(s) + thermal overload relay**	**Switch-disconnector-fuse + contactor(s) + thermal overload relay**
See *"Control and Protection components"* catalog				

MachineStruxure™
Integrated products/solutions
TeSys™ protection components
Thermal-magnetic motor circuit-breakers

Applications	**Protection of motors against short-circuits and overloads**			
				
Tripping threshold on short-circuit	13 In			
Standard motor power ratings in AC-3, 415 V	Up to 15 kW		Up to 30 kW	37 kW
Operational current at 415 V	0.1 to 32 A		9 to 65 A	56 to 80 A
Breaking capacity at 415 V (Icu) to IEC 60947-2	10 to 100 kA	35 to 100 kA	50 to 100 kA	15 kA
Door interlock mechanism	Without	With	With	Without
Circuit-breaker type	**GV2 ME**	**GV2 P**	**GV3 P**	**GV3 ME80**
Pages	See *"Control and Protection components"* catalog			

		Protection of motors with high current peak on starting
		
		20 In
7.5 to 110 kW		Up to 11 kW
12 to 220 A		0.25 to 23 A
35 and 36 kA	70 kA	15 to 100 kA
With		With
GV7 RE	**GV7 RS**	**GV2 RT**
See *"Control and Protection components"* catalog		See *"Control and Protection components"* catalog

MachineStruxure™

Integrated products/solutions

Harmony™ control and signalling units: Push buttons, pilot lights, biometric switches, and wireless, batteryless push buttons

Applications		Pilot lights	Push buttons, selector switches and pilot lights			Biometric switches
						
Description of range		■ LED pilot lights	■ Push buttons ■ Multiple-headed push buttons ■ Emergency Stop buttons ■ Emergency switching off push buttons ■ Selector switches and key switches ■ Illuminated push buttons ■ Pilot lights			Fingerprint readers biometric switches 24V ⎓
Features	Products	Monolithic, compact, low consumption	Complete units or sub-assemblies (body + head)			Monolithic
	Bezel	Double insulated		Metal, chromium plated or black	Double insulated	Double insulated, dark gray
	Shape of head	Circular	Circular, square or rectangular	Circular	Circular or square	–
Drilling or cut-out for mounting		Ø 8 and Ø 12	Ø 16	Ø 22		
Degree of protection	Conforming to IEC 60529	IP 40 IP 65 with seal	IP 65	IP 66 IP 69K *(2)*		IP 65
Cabling		Tags for 2.8 x 0.5 mm connectors, or threaded connector	Faston connectors Solder pins for printed circuit boards	Spring clamp terminal connections Screw clamp terminal connections Faston connectors Connector With adaptor for printed circuit board		Cable or connectors
Mounting	Panel thickness	1 to 8 mm	1 to 6 mm			
Type references		**XVL A**	**XB6**	**XB4**	**XB5**	**XB5 S**
Pages		Please consult our website www.schneider-electric.com				

(1) Wireless and batteryless push button and receiver ready-paired at the factory. (2) Some part numbers include 69K as well.

Wireless and batteryless push buttons	Push buttons, selector switches and pilot lights *(1)*	Joystick controllers			Push buttons, selector switches and pilot lights	Cam switches
						
Wireless and batteryless and push buttons 24 V ⎓ or 24 to 240 V ∿ / ⎓	■ Push buttons ■ Emergency switching off push buttons ■ Selector switches and key switches ■ Illuminated push buttons ■ Pilot lights	■ 2 or 4 direction ■ Stay put or spring return			■ Push buttons ■ Emergency Stop buttons ■ Emergency switching off push buttons ■ Selector switches and key switches ■ Illuminated push buttons ■ Pilot lights	■ Switches ■ Stepping switches ■ Reversing and changeover switches ■ Ammeter switches ■ Voltmeter switches ■ Reversing switches ■ Star-delta and reversing star-delta switches ■ Pole change switches
Ready-to-use packs *(1)* and «components» range	Monolithic	Complete units or sub-assemblies (body + head with lever)			Complete units or sub-assemblies (body + head)	Complete units or sub-assemblies (body + front panel + head)
Metal, chromium plated or double insulated, black	Double insulated, black	Metal, chromium plated		Double insulated, black	Metal, chromium plated or double insulated, black	
Transmitter with circular head	Circular	Circular			Hexagonal	Square
Ø 22					Ø 30	Ø 16 or Ø 22: series K10 Ø 22 and multimounting: series K1/K2 4 holes, 48 or 68 centers: series K30 to K150
IP 65	IP 65 (push buttons, pilot lights, selector switches) IP 54 (Emergency switching off push buttons)	IP 65	IP 66	IP 65	IP 65	IP 65: series K2 IP 40: series K30 to K150
Wireless (transmitter) Through cable (receiver)	Screw and captive clamp terminal connections Forked U type tag connections Faston clip connections (pilot lights)	Screw and captive clamp terminal connections				
1 to 6 mm						0.5 to 6 mm (depending on model)
XB5 R, XB4 R	**XB7**	**XD4 PA**	**XD2 GA**	**XD5 PA**	**9001 K, 9001 SK**	**K2, K30, K50, K63, K115, K150**

Please consult our website www.schneider-electric.com

(1) Available Q1 2012.

MachineStruxure™
Integrated products/solutions
Harmony™ control stations and enclosures

Type of applications	**All applications**			
Enclosures	**Plastic**			**Glass-reinforced polyester**
	Complete stations and separate components for customer assembly			**Empty insulated enclosures**
				
Main feature	Pre-drilled control stations			Pre-drilled or undrilled enclosures
Associated control and signalling units	Harmony™ XB5 with plastic bezel		Harmony XB7, monolithic, plastic	Harmony XB4 with metal bezel Harmony XB5 with plastic bezel
Number of cut-outs for Ø 22 control and signalling units	1, 2, 3, 4 or 5	1, 2 or 3 (complete stations) 1, 2, 3, 4 or 5 (empty enclosures)	1, 2 or 3	1, 2, 4, 8 or 16
Material	Polycarbonate		ABS	Glass-reinforced polyester
Color	Yellow lid Light gray base	Dark gray lid Light gray base	Light gray or yellow lid Light gray base	Colored gray throughout
Degree of protection	IP 66		IP 54	IP 65
Function	Emergency Stop	Start or Stop Start-Stop with pilot light Movement control	According to equipment fitted: □ Start or Stop □ Start-Stop with pilot light □ Movement control □ Emergency stop	
Cable entries	Knock-outs			Tapped for cable gland
Type references	**XAL K**	**XAL D**	**XAL E**	**XAP A**
Page(s)	Please consult our website www.schneider-electric.com			

			Specific applications	
Metal		**Metal front plate, insulated protective rear cover**	**Plastic**	**Metal**
Empty enclosures		**Empty, flush mounting enclosures: front plate + rear cover**	**Control stations for severe environments**	**Key operated control stations**
			 	
Pre-drilled enclosures	Pre-drilled or undrilled enclosures	Pre-drilled front plates and rear covers	Pre-drilled empty control stations	Fitted stations
Harmony™ XB4 with metal bezel Harmony XB5 with plastic bezel			Harmony XB5 with plastic bezel	With key lock
8, 16, 24, 30 or 40	1, 2, 3, 4, 6, 8 or 12	1, 2, 3, 4 or 5	1, 2, 3, 4 or 5	–
Aluminium alloy or sheet steel	Zinc or aluminium alloy	Front plate: brushed aluminium Rear cover:polystyrene	Mineral reinforced polyamide	Zinc alloy
Blue lid and base	**XAP M**: Blue lid Blue base **XAP J:** Yellow lid Blue base	Unpainted aluminium	Black lid Black base	Gray
IP 54	IP 65		IP 66 IP 69K	IP 54
According to equipment fitted: □ Start or Stop □ Start-Stop with pilot light □ Movement control □ Emergency stop				Start-Stop
Drilled		Knock-outs	ISO 20	Tapped for cable gland
XB2 SL	**XAP M, XAP J**	**XAP E**	**XAL G**	**XAP S**
Please consult our website www.schneider-electric.com				

MachineStruxure™
Integrated products/solutions
Phaseo™ power supplies
Regulated switch mode power supplies

Power supplies		Regulated switch mode power supplies **ABL 8MEM, ABL 7RM: 7 to 60 W - Rail mounting** **ABL 8REM, ABL 7RP: 60 to 144 W - Rail mounting**			
					
Nominal input voltage		∿ 100 to 240 V ⎓ 120 to 250 V			
Connection to worldwide line supplies	United States - 120 V (phase-to-neutral) - 240 V (phase-to-phase)	Single-phase (N-L1) connection or 2-phase (L1-L2) connection			
	Europe - 230 V (phase-to-neutral) - 400 V (phase-to-phase)	Single-phase (N-L1) connection			
	United States - 277 V (phase-to-neutral) - 480 V (phase-to-phase)	–			
Undervoltage control		Yes			
Protection against overloads and short-circuits		Yes, voltage detection. Automatic reset on elimination of the fault			
Diagnostics relay		–			
Power reserve (Boost)		1.25 to 1.4 In for 1 minute, depending on model (for ABL 8MEM)			No
Output voltage		⎓ 5 V	⎓ 12 V	⎓ 24 V	⎓ 48 V
Output current	0.3 A			**ABL 8MEM24003**	
	0.6 A			**ABL 8MEM24006**	
	1.2 A			**ABL 8MEM24012**	
	2 A		**ABL 8MEM12020**		
	2.5 A			**ABL 7RM24025**	**ABL 7RP4803**
	3 A			**ABL 8REM24030**	
	4 A	**ABL 8MEM05040**			
	5 A		**ABL 7RP1205**	**ABL 8REM24050**	
	6 A				
	10 A				
	20 A				
	40 A				
Pages		See *"Phaseo power supplies ABL1, ABL7 and ABL8"* catalog			

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Regulated switch mode			
Phaseo Universal range industrial power supplies		**ABL8DCC Function modules: Converter modules ⎓ 24 V/⎓ 5-12 V**	
			
100 to 120 V ∿ and 200 to 500 V ∿ *(1)*	380 to 500 V ∿	24 V ⎓	
Single-phase (N-L1) or 2-phase (L1-L2) connection	–	–	
	3-phase (L1-L2-L3) connection	–	
	3-phase (L1-L2-L3) connection	–	
Yes		–	
Yes, current limitation or undervoltage detection		Yes, current limitation	
Yes, depending on model			
1.5 In for 4 seconds		No	
24 V ⎓		5 V ⎓	7 to 12 V ⎓
			ABL8DCC12020 *(2)*
ABL8RPS24030			
ABL8RPS24050			
		ABL8DCC05060 *(2)*	
ABL8RPS24100			
ABL8RPM24200	**ABL8WPS24200**		
	ABL8WPS24400		
See *"Phaseo power supplies ABL1, ABL7 and ABL8"* catalog			

(1) Except **ABL8RPM24200**. ∿ 100 to 120 V and ∿ 200 to 240 V.
(2) ⎓/⎓ converter module, requires to be associated with ABL8RP/ABL8WP power supply.

MachineStruxure™
Integrated products/solutions
Spacial application wall-mounting enclosures

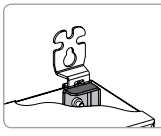
Specifications					Basic enclosures					
					Empty application enclosures				19″ enclosure with glazed door (2)	
Dimensions			Nº of doors	IP	Steel industrial boxes, IP 66 Spacial S57	S3DB terminal enclosures (1)	FL terminal enclosures (1)	S3DM modular enclosures with glazed door (1)	VDM steel enclosures with 19″ swing rack	Number of U
H	W	D								
200	300	150	1	66	NSYSBS302015					
250	300	150	1	66		NSYS3DB25315				
250	400	150	1	66		NSYS3DB25415				
250	500	150	1	66		NSYS3DB25515				
300	300	150	1	66	NSYSBS303015	NSYS3DB3315				
300	300	170	1	66			NSYS3DBFL3317			
300	400	150	1	66	NSYSBS403015	NSYS3DB3415				
300	400	170	1	66			NSYS3DBFL3417			
300	500	150	1	66		NSYS3DB3515				
300	500	200	1	66	NSYSBS503020					
300	600	150	1	66		NSYS3DB3615				
300	600	400	1	66					NSYVDM4U4P	4
300	600	500	1	66						
400	300	150	1	66		NSYS3DB4315		NSYS3DM4315T		
400	300	170	1	66			NSYS3DBFL4317			
400	600	400	1	66					NSYVDM7U4P	7
400	600	500	1	66						
400	800	150	1	66		NSYS3DB4815				
500	400	150	1	66		NSYS3DB5415		NSYS3DM5415T		
500	600	400	1	66					NSYVDM9U4P	9
500	600	500	1	66						
600	400	150	1	66		NSYS3DB6415		NSYS3DM6415T		
600	600	150	1	66				NSYS3DM6615T		
700	500	150	1	66						
700	500	150	1	66				NSYS3DM7515T		
700	600	400	1	66					NSYVDM13U4P	13
700	600	500	1	66						
800	600	150	1	66						
800	600	150	1	66				NSYS3DM8615T		
800	600	400	1	66					NSYVDM16U4P	16
800	600	500	1	66						
1000	600	150	1	66				NSYS3DM10615T		
1000	800	150	1	66				NSYS3DM10815T		

(1) Empty enclosure.

Wall-mounting brackets

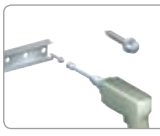
Steel: **NSYAEFPFSC**

Stainless steel: **NSYAEFPFXSC**



Reinforcement for heavy loads

NSYAEFAHLBSC



Self-tapping screw

NSYS13M5HS

Specific

Do you need other dimensionsor require a special color or cut-outs? All of these enclosures can be customized. Contact your local Schneider Electric representative. See more information on www.schneider-electric.com

Cable gland






Basic enclosures				Accessories					
19″ enclosure with glazed door (2)				Modular mounting chassis (metallic)	N° of modules	DIN rail support and DIN rail	Plain mounting plate	Telequick mounting plate	Aluminium vertical rails
1-body 19″ mounted rack	Number of U	2 parts with 19″ mounted rack	Number of U						
						NSYAMRD2030	NSYMM32		
						NSYAMRD2530	NSYMM3025		
						NSYAMRD2540	NSYMM2540		
						NSYAMRD2550	NSYMM2550		
						NSYAMRD3030	NSYMM33	NSYMR33	NSYMDVR3
						NSYAMRD3030	NSYMM33	NSYMR33	
						NSYAMRD3040	NSYMM43	NSYMR34	NSYMDVR3
						NSYAMRD3040	NSYMM43	NSYMR34	
						NSYAMRD3050	NSYMM53		NSYMDVR3
						NSYAMRD3050	NSYMM53		NSYMDVR3
						NSYAMRD36	NSYMM36		NSYMDVR3
NSYVDM5U4F	5	NSYVD2M5U4	5			NSYAMRD36	NSYMM36		NSYMDVR3
		NSYVD2M5U5	5			NSYAMRD36	NSYMM36		NSYMDVR3
				NSYDLM24	24	NSYAMRD43	NSYMM43	NSYMR43	NSYMDVR4
						NSYAMRD43	NSYMM43	NSYMR43	
NSYVDM8U4F	8	NSYVD2M8U4	8				NSYMM64	NSYMR46	NSYMDVR4
		NSYVD2M8U5	8			NSYAMRD48	NSYMM64	NSYMR46	NSYMDVR4
						NSYAMRD54	NSYMM48		NSYMDVR4
				NSYDLM48	48		NSYMM54	NSYMR54	NSYMDVR5
NSYVDM10U4F	10	NSYVD2M10U4	10				NSYMM65		NSYMDVR5
		NSYVD2M10U5	10				NSYMM65		NSYMDVR5
				NSYDLM48P	48	NSYAMRD64	NSYMM64	NSYMR64	NSYMDVR6
				NSYDLM84P	84		NSYMM66	NSYMR66	NSYMDVR6
				NSYDLM66	66		NSYMM75	NSYMR75	NSYMDVR7
				NSYDLM88	88		NSYMM75	NSYMR75	NSYMDVR7
NSYVDM14U4F	14	NSYVD2M14U4	14						NSYMDVR7
		NSYVD2M14U5	14						NSYMDVR7
				NSYDLM84/ NSYDLM112			NSYMM86	NSYMR86	NSYMDVR8
				NSYDLM84/ NSYDLM112			NSYMM86	NSYMR86	NSYMDVR8
NSYVDM17U4F	17	NSYVD2M17U4	17				NSYMM86	NSYMR86	NSYMDVR8
		NSYVD2M17U5	17				NSYMM86	NSYMR86	NSYMDVR8
				NSYDLM168/ NSYDLM240			NSYMM106	NSYMR106	NSYMDVR10
				NSYDLM168/ NSYDLM240			NSYMM108	NSYMR108	NSYMDVR10

(2) Plain door, please consult us.


Other cable entries

Clip-on nuts

For more accessories, see Schneider Electric Universal Enclosures Catalog (Document No. 9993CT0901R03/10).

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	Basic Monitoring	Advanced Monitoring
		
Name	AMP / VLT	DM6000 / DM6200
Function	Ammeter, Voltmeter	Digital panel Meter
Panel instrumentation	I / U	I, V, F, PF
	• Ease of reading • Supply of essential parameters • Single-phase	• All in one informations • 3 phase U & I • Panel Front

Common accessories

		
Name	CT	CMA / CMV
Function	Current Transformers	Ammeter & Voltmeter selector

Power & Energy Monitoring	Energy Management & Control	Monitoring software
		
PM9 / PM700 PM1000 / PM1200	PM750 / PM820	PowerView
Power Meter	Power Meter	Power Monitoring
I, U, F, P, Q, S, PF, E	I, U, F, P, Q, S, PF, E, THD, Min/Max, I/O, alarm (PM750 only) and remote monitoring	• Real time viewing of data • Historical tabular data into Microsoft Excel • Historical trending • Reporting
• 3 phase U & I • Counting of energy • Backup	• 3 phase U & I • Counting of energy • Communication towards supervision • Remote monitoring (control, load-shedding-relestage, delestage-relestage, alarms and alert)	Remote Monitoring • Software for data visualization and reporting

Machine Structure™

chapter 8

Appendices

Contents ***chapter 8***

Appendices

8

Inductive proximity sensors			Logic controller		I/O extension modules
			TM238 LDD24DT, TM238 LDA24DR, TM238 LFDC24DT, TM238 LFAC24DR		TM2 DDI8DT
			6 standard inputs	8 HSC inputs	8 inputs
			24 VCC Sink/Source	24 VCC Sink	24 VCC Sink/Source
			Type 1	Type 1	Type 1
2 wires	~	XS1●●BLFA			
		XS7/8 C40FP			
	⎓	XS7 J/F			
		XS7 C/D/E			
		XS5 D/C A/B			
		XS7 T4DA			
	~/ ⎓	XS8 C/D/E			
		XS1/2 M●●M			
		XS6●●B1/B4M			
		XS2●●S/AMA			
		XS4 230			
		XSAV●V1●801			
		XS7/8 C40M			
		XS7/8G12MA			
3 wires	PNP	XS8 C/D/E A1P			
		XS7 C/D/E/J/F A1P			
		XS1 P 349			
		XS5 B1P			
		XS4 P 340			
		XS2●●S/AAP●			
		XS1/2 N06 P			
		XS1/2 L/N 04/05 P			
		XS6●●B1/4P			
		XS4 P 370			
		XS6 B2P			
		XS1/2●●A/BLP			
		XS1/208A/BLP			
		XS1 M18PAS4/20			
		XSAV1●373			
		XS7/8 G12P 140			
4 wires NO + NC	PNP	XS7/8 G12P 440			
		XS7/8 C40P 440/9			
		XS1/2 L/M/N P 410			
3 wires	NPN	XS8 C/D/E A1N			
		XS7 C/D/E/J/F A1N			
		XS1 N 349			
		XS5 B1N			
		XS4 N 340			
		XS2●●S/AAN●			
		XS1/2 N06 N			
		XS1/2 L/N 04/05 N			
		XS6●●B1/4N			
		XS4 N 370			
		XS6 B2N			
		XS1/2●●A/BLN			
		XS1/208A/BLN			
		XS7/8 G12N 140			
4 wires NO + NC	NPN	XS7/8 G12N 440			
		XS7/8 C40N 440/9			
		XS1/2 L/M/N N 410			
4 wires prog. NO/NC	PNP + NPN	XS1/2 M ●●KP			
	PNP + NPN Factor 1	XS KP M40			

Compatible

Non compatible

I/O extension modules						Counter modules
TM2 DAI8DT	**TM2 DDI16DT**	**TM2 DDI16DK**	**TM2 DDI32DK**	**TM2 DMM8DRT**	**TM2 DMM24DRF**	**TM200 HSC 206DT/DF**
8 inputs	16 inputs	16 HE10 inputs	32 HE10 inputs	4 inputs	16 spring terminal inputs	3 fast inputs
120 VAC	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink
Type 1	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1

Photo-electric sensors			Logic controller		I/O extension modules
			TM238 LDD24DT, TM238 LDA24DR, TM238 LFDC24DT, TM238 LFAC24DR		TM2 DDI8DT
			6 standard inputs	8 HSC inputs	8 inputs
			24 VCC Sink/Source	24 VCC Sink	24 VCC Sink/Source
			Type 1	Type 1	Type 1
2 wires solid-state output	~/ ⎓	XULA			
		XU2/5/8/9M			
3 wires	PNP	XUB0/1/2/4/5/9/ P S			
		XUM 1/5/6/9 P			
		XUK 1/2/5/9 P			
		XUX 1/2/5/9 P			
		XUB0/1/2/4/5/9/ P S			
		XUM2 P			
		XUM●A●PCN●●			
		XUM●B●●PN●●			
		XUM0 P			
		XUD A●P			
		XULH			
		XUAH			
		XUBT P			
		XU1/9/5N18P●			
		XU2P●●DL			
		XU2N18P●			
		XUVH			
		XUKC1P			
		XURC3/4P			
		XUKR1P			
		XU5M18U1			
		XUY LCCLAR●●P			
		XUY B/P ●●CO P			
3 wires	NPN	XUB0/1/2/4/5/9/ N S			
		XUM1/5/6/9 N			
		XUK1/2/5/9 N			
		XUX1/2/5/9 N			
		XUM2 N			
		XUM●A●NCN●●			
		XUM●B●●N N●●			
		XUM0 N			
		XUD A●N			
		XULJ			
		XUAJ			
		XUBT N			
		XU1/9/5N18N●			
		XU2N18N●			
		XUVJ			
		XUKC1N			
		XURC3/4N			
		XUKR1N			
		XUY LCCLAR●●N			
		XUY B/P ●●CO N			
3 wires	PNP/NPN	XUC9/8AK			
		XUK8AK			
		XUC2AK			
		XUK0AKS			
		XUX0AKS			
		XUKT1K			
		XURU1			
		XURK0			
		XURK1			
		XUY PS			
		XUY P 952/4 S			
4 wires	PNP + NPN	XUMW1K			
		XUY FAL/P/V			
		XUY F			
		XUVF 30/60			
		XUV/Y F 120/180/250			
		XUVK			

Compatible

Non compatible

I/O extension modules						Counter modules
TM2 DAI8DT	**TM2 DDI16DT**	**TM2 DDI16DK**	**TM2 DDI32DK**	**TM2 DMM8DRT**	**TM2 DMM24DRF**	**TM200 HSC 206DT/DF**
8 inputs	16 inputs	16 HE10 inputs	32 HE10 inputs	4 inputs	16 spring terminal inputs	3 fast inputs
120 VAC	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink
Type 1	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1

Rotary encoders			Logic controller		I/O extension modules
			TM238 LDD24DT, TM238 LDA24DR, TM238 LFDC24DT, TM238 LFAC24DR		TM2 DDI8DT
			6 standard inputs	8 HSC inputs	8 inputs
			24 VCC Sink/Source	24 VCC Sink	24 VCC Sink/Source
			Type 1	Type 1	Type 1
Incremental encoders	5V, RS 422	**XCC 14●●●●●R**		RS 422 (5 V)	
	Push/pull 11 to 30 V	**XCC 14●●●●●K**			
	5V, RS 422	**XCC 19●●●●●RN**		RS 422 (5 V)	
	Push/pull 11 to 30 V	**XCC 19●●●●●KN**			
	5V, RS 422	**XCC 15●●●●●X**		RS 422 (5 V)	
	Push/pull 11 to 30 V	**XCC 15●●●●●Y**			
	5V, RS 422	**XCC 15●●●●M●●●X**		RS 422 (5 V)	
	Push/pull 11 to 30V	**XCC 15●●●●M●●●Y**			
Absolute encoders	Push/pull 11 to 30 V	**XCC 25●●●●KB (N) / KG (N)**			
	SSI output without parity, clock 13 or 25 bits	**XCC 25●●●●SB (N) / SG (N)**		SSI	
	Push/pull 11 to 30 V	**XCC 29●●●●KB (N) / KG (N)**			
	SSI output without parity, clock 13 or 25 bits	**XCC 29●●●●SB (N) / SG (N)**		SSI	
	SSI output without parity, clock 13 or 25 bits	**XCC 35●●●●SB (N) / SG (N)**		SSI	
		XCC 39●●●●SB (N) / SG (N)		SSI	
	11 to 30 V, CanOpen™	**XCC 35●●●●CB**		(CanOpen)	
	11 to 30 V, Profibus™	**XCC 35●●●●FB**		(Profibus)	

Compatible

Non compatible

Compatible with ⎓ 100 Hz max. frequency

I/O extension modules						Counter modules
TM2 DAI8DT	**TM2 DDI16DT**	**TM2 DDI16DK**	**TM2 DDI32DK**	**TM2 DMM8DRT**	**TM2 DMM24DRF**	**TM200 HSC 206DT/DF**
8 inputs	16 inputs	16 HE10 inputs	32 HE10 inputs	4 inputs	16 spring terminal inputs	3 high-speed inputs
120 VAC	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink/Source	24 VCC Sink
Type 1	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1
						RS 422 (5 V)
						RS 422 (5 V)
						RS 422 (5 V)
						RS 422 (5 V)
						SSI
						SSI
						SSI
						SSI
						(CanOpen™)
						(Profibus™)

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Photo-electric sensors				Digital input electronic modules 24 V DC: 2, 4, 6 or 12 inputs, type 1 Sink	Digital input/output electronic modules 24 V DC: 8 inputs type 1 Sink and 4 transistor outputs
Type			**Reference**	**TM5 SDI2D, TM5 SDI4D, TM5 SDI6D, TM5 SDI12D**	**TM5 SDM12DT**
General purpose					
Design Ø 18	metal	3 wire, PNP 24 V	XUB 0/1/2/4/5/9 B●P●●●	■	■
		3 wire, NPN 24 V	XUB 0/1/2/4/5/9 B●N●●●		
	Plastic	3 wire, PNP 24 V	XUB 0/1/2/4/5/9 A●P●●●	■	■
		3 wire, NPN 24 V	XUB 0/1/2/4/5/9 A●N●●●		
Design	Miniature	3 wire, PNP 24 V	XUM 0/2/5/9 AP●●●●	■	■
		3 wire, NPN 24 V	XUM 0/2/5/9 AN●●●●		
	Compact 50 x 50	3 wire, PNP 24 V	XUK 1/2/5/8/9 AP●●●	■	■
		3 wire, NPN 24 V	XUK 1/2/5/8/9 AN●●●		
		3 wire, progammable PNP/NPN DC	XUK 0 AK●●●	■	■
		5 wire, progammable AC/DC	XUK 0/1/2/5/8/9 AR		
	Compact 92 x 71	3 wire, progammable PNP/NPN DC	XUX 0/1/2/5/8/9 AK	■	■
		5 wire, progammable AC/DC	XUX 0/1/2/5/8/9 AR		
Application					
Material Handling	Optical fork	3 wire, PNP 24 V	XUV R●●●●P●●	■	■
		3 wire, NPN 24 V	XUV R●●●●N●●		
		3 wire, PNP 24 V	XUV A●●●●P●●	■	■
		3 wire, NPN 24 V	XUV A●●●●N●●		
		4 wire, PNP or NPN 24 V	XUY F●●●●●	■	■
		4 wire, PNP or NPN 24 V	XUV U06●●●	■	■
		4 wire, PNP or NPN 24 V	XUV K ●●●	■	■
		3 wire, PNP 24 V	XUV H●●●	■	■
		3 wire, NPN 24 V	XUV J●●●		
		4 wire, PNP or NPN 24 V	XUV F●●●	■	■
Packaging	Fiber	4 wire, PNP or NPN 24 V	XUY DCF●●●	■	■
	Compact	4 wire, PNP or NPN 24 V	XUR K	■	■
	M18, threaded	3 wire, PNP 24 V	XU5M18U1D	■	■
	Fiber	4 wire, PNP or NPN 24 V	XUY AFL●●●	■	■
	M18, threaded	3 wire, PNP 24 V	XUB T●P●●●	■	■
		3 wire, NPN 24 V	XUB T●N●●●		
	Compact	4 wire, PNP or NPN 24 V	XUK T●●●	■	■
		3 wire, PNP 24 V	XUK C1N●●●	■	■
		3 wire, NPN 24 V	XUK C1P●●●		
		3 wire, PNP 24 V	XUR C3P●●●	■	■
		3 wire, NPN 24 V	XUR C3N●●●		
		4 wire, PNP or NPN 24 V	XUM W●●●	■	■
	M18, threaded	3 wire, PNP 24 V	XUB 0SP●●●	■	■
		3 wire, NPN 24 V	XUB 0SN●●●		
		3 wire, PNP 24 V	XU●N18P●●●	■	■
		3 wire, NPN 24 V	XU●N18N●●●		
	M8, threaded	3 wire, PNP 24 V	XUA H●●●	■	■
		3 wire, NPN 24 V	XUA J●●●		
	Miniature	3 wire, PNP 24 V	XUY P●●●●P●●	■	■
		3 wire, NPN 24 V	XUY P●●●●N●●		
		3 wire, PNP 24 V	XUM 2/5/9 BP●●●	■	■
		3 wire, NPN 24 V	XUM 2/5/9 BN●●●		
		3 wire, PNP 24 V	XUY●●●929●●	■	■
Hoisting	M 18, threaded	3 wire, PNP 24 V	XUB LBP●●●	■	■
		3 wire, NPN 24 V	XUB LBN●●●		
	Compact	2 wire 4 to 20 mA ; 3 wire 0 to 10V	XUJ K803538		
	M18, threaded	2 wire 4 to 20 mA	XU5 M18AB20D		
		PNP, 2 wire 4 to 20 mA	XU2 M18AB20D	■	■
	Compact	PNP, 2 wire 4 to 20 mA	XUY P●●●925	■	■
		4 wire, PNP or NPN 24 V	XUY PS●●●	■	■
	Fiber	3 wire, PNP 24 V	XUD A●P●●●	■	■
		3 wire, NPN 24 V	XUD A●N●●●		
		4 wire, PNP or NPN 24 V	XUY AF●●●	■	■
	other formats	3 wire, progammable PNP/NPN DC	XUC 2/8/9 AK●●●	■	■
		5 wire, progammable AC/DC	XUC 2/8/9 ARC●●●		
		3 wire, PNP 24 V	XUL H●●●	■	■
		3 wire, NPN 24 V	XUL J●●●		
		2 wire, AC	XUL A●●●		
		5 wire, progammable AC/DC	XUL M●●●		
		3 wire, progammable PNP/NPN DC	XUY B●●●S	■	■
		5 wire, progammable AC/DC	XUY B●●●R		
	M18, threaded	2 wire, AC DC	XU 5/8/9 M18MA●●●	■	■

■ Compatible
Non compatible

Digital input electronic modules 240 V ACDC: 2 or 4 inputs type 1	Digital input electronic module 120 V ACDC: 6 inputs type 1	Analog input electronic module: 2 or 4 Voltage/current inputs (12 or 15 bits)	Counter electronic modules type 1 sink
TM5 SDI2A, TM5 SDI4A	TM5 SDI6U	TM5 SAI2L, TM5 SAI2H, TM5 SAI4L, TM5 SAI4H	TM5 SDI2DF

Proximity Sensors				**Digital input electronic modules 24 V DC: 2, 4, 6 or 12 inputs, type 1 Sink**
Type			**Reference**	**TM5 SDI2D, TM5 SDI4D, TM5 SDI6D, TM5 SDI12D**
General purpose				
cylindrical, flush, sensing distance, standard, barel short	Ø 6,5 plain short	3 wire, PNP 24V	XS5 06/08/12/18/30 B1P●●●	■
	M8, M12, M18, M30	3 wire, NPN 24V	XS5 06/08/12/18/30 B1N●●●	
	Threaded short	2 wire, DC 24V	XS5 06/08/12/18/30 BS●●●●	■
Cylindrical,flush, sensing distance standard, barel long	M8, M12, M18, M30,	3 wire, PNP 24V-48V	XS5 08/12/18/30 BLP●●●	■
	Threaded long	3 wire, NPN 24V-48V	XS5 08/12/18/30 BLN●●●	
		2 wire, DC 24V-48V	XS5 08/12/18/30B1 D/C●●●	■
	M12, M18, M30, threaded long	2 wire, AC DC	XS5 12/18/30 B1M●●●	■
Cylindrical, flush, sensing distance extending, barel short	Ø 6,5 plain short	3 wire, PNP 24V	XS1 06/08/12/18/30 B3P●●●	■
	M8, M12, M18, M30	3 wire, NPN 24V	XS1 06/08/12/18/30 B3N●●●	
	Threaded short	2 wire, DC 24V	XS6 06/08/12/18/30 B3C●●●	■
Cylindrical, flush, sensing distance extending, barel long	M8, M12, M18, M30,	3 wire, PNP 24V-48V	XS6 08/12/18/30 B1P●●●	■
	Threaded long	3 wire, NPN 24V-48V	XS6 08/12/18/30 B1N●●●	
		2 wire, DC 24V-48V	XS6 08/12/18/30 B1D●●●	■
	M12, M18, M30, threaded long	2 wire, AC DC	XS6 12/18/30 B1M●●●	■
Cylindrical, non flush, sensing distance extending, barel long	M12, M18, M30,	3 wire, PNP 24V-48V	XS6 12/18/30 B4P●●●	■
	Threaded long	3 wire, NPN 24V-48V	XS6 12/18/30 B4N●●●	
	M12, M18, M30, threaded long	2 wire, AC DC	XS6 12/18/30 B4M●●●	■
Format flat, flush, sensing distance standard	Format J 8x22x8, F 15x22x8	3 wire, PNP 24V	XS7 J/F/C/D/E 1A1P●●●	■
	Format E 26x26x13, C 40x40x15	3 wire, NPN 24V	XS7 J/F/C/D/E 1A1N●●●	
	Format D 80x80x26	2 wire, DC 24V	XS7 J/F/C/D/E 1A1D●●●	■
Format 40X40X117 plastic, with turret head: 5 positions	NO + NC	4 wire, PNP 24V-48V	XS7/XS8 C40PC44●	■
		4 wire, NPN 24V-48V	XS7/XS8 C40NC44●	
	NO/NC programmable	2 wire, DC 24V-48V	XS7/XS8 C40D●●●●●	■
		2 wire, AC	XS7/XS8 C40F●●●●●	
		2 wire, AC DC	XS7/XS8 C40M●●●●●	■
Format flat, flush, sensing distance extending	Format E 26x26x13	3 wire, PNP 24V	XS8 E/C/D 1A1P●●●	■
	Format C 40x40x15	3 wire, NPN 24V	XS8 E/C/D 1A1N●●●	
	Format D 80x80x26	2 wire, AC DC	XS8 E/C/D 1A1M●●●	■
Cylindrical multitension	M12, M18, M30, threaded	2 wire, AC DC	XS1/2 M12M●250	■
Cylindrical metal, 4 wire	Ø 6,5 plain short	4 wire, PNP 24V	XS1 L06/M08/M12/M18/M30 PC410	■
	M8, M12, M18, M30 threaded	4 wire, NPN 24V	XS1 L06/M08/M12/M18/M30 NC410	■
Cylindrical metal 4 wire PNP+NPN	M12, M18, M30, threaded	4 wire, PNP+NPN, programmable 24V	XS1/2/4 M12/18/30 KP340●	■
Cylindrical plastic non flush, sensing distance standard	M8, M12, M18, M30,	3 wire, PNP 24V	XS4 P08/12/18/30 P●340●	■
	Threaded	3 wire, PNP 24V-48V	XS4 P08/12/18/30 P●370●	■
		3 wire, NPN 24V	XS4 P08/12/18/30 N●340●	
		3 wire, NPN 24V-48V	XS4 P08/12/18/30 N●370●	
		2 wire, AC DC	XS4 P08/12/18/30 M●230●●●	■
Cylindrical basic flush ; non flush sensing distance standard, plastic ; metal	Ø 6,5 plain	3 wire, PNP 24V	XS1/206BLP●●●	■
		3 wire, NPN 24V	XS1/206BLN●●●	
	M8, M12, M18, M30 threaded	3 wire, PNP 24V	XS1/2 08/12/18/30 A/BLP●●●	■
		3 wire, NPN 24V	XS1/2 08/12/18/30 A/BLN●●●	
Cylindrical, quasi flush, sensing distance extending	Ø 6,5 plain	3 wire, PNP 24V	XS1L06P●349●	■
		3 wire, NPN 24V	XS1L06N●349●	
	M8, M12, M18, M30 threaded	3 wire, PNP 24V	XS1N 08/12/18/30 P●349●	■
		3 wire, NPN 24V	XS1N 08/12/18/30 N●349●	
Cylindrical, miniature	Ø 4 plain	3 wire, PNP 24V	XS1L04P●31●●	■
		3 wire, NPN 24V	XS1L04N●31●●	
	M5, threaded	3 wire, PNP 24V	XS1N05P●31●●	■
		3 wire, NPN 24V	XS1N05N●31●●	
	Ø 6,5 plain	3 wire, PNP 24V	XS2L06P●340●	■
		3 wire, NPN 24V	XS2L06N●340●	
Applications				
Cylindrical, sensing distance adjustable, control rotation	M12, M18, M30, threaded	3 wire, PNP 24V	XS612B2P●●●	■
		3 wire, NPN 24V	XS612B2N●●●	
	M18, threaded	3 wire, PNP 24V-48V	XSAV11/2373	■
		2 wire, AC DC	XSAV11/2801	■
	Format E 26x26x13	3 wire, PNP 24V	XS9●11RP●●●●	■
	Format C 40x40x15	2 wire, AC DC	XS9●11RM●●●●	■
Analog output	M12, M18, M30, threaded	2 wire 4 to 20mA ; 3 wire 0 to 10V	XS●12AB●●●●	
	Block format	2 wire 4 to 20mA ; 3 wire 0 to 10V	XS9●111A●●●●	
Food and beverage	Cylindrical threaded metal	3 wire, PNP 24V	XS2●●SAP●●●	■
		3 wire, NPN 24V	XS2●●SAN●●●	
		2 wire, AC DC	XS2●●SAMA●●●	■
	Cylindrical threaded plastic	3 wire, PNP 24V-48V	XS2●●AAP●●●	■
		3 wire, NPN 24V	XS2●●AAN●●●	
		2 wire, AC DC	XS2●●AAMA●●●	■
Factor 1	Cylindrical threaded metal	4 wire, PNP+NPN 24V	XS1M●●KPM40	■
	Forme C, 40x117x41	4 wire, PNP+NPN 24V	XS7C40KPM40	■
	Cylindrical threaded metal	3 wire, PNP 24V	XS1M18PAS●●	■
Packaging	Format 12x26x40	3 wire, PNP 24V	XS7G12P●140	■
		3 wire, NPN 24V	XS7G12N●140	
		4 wire, PNP 24V-48V	XS7G12P●440	■
		4 wire, NPN 24V-48V	XS7G12N●440	
		2 wire, AC DC	XS7G12M●230	■
Material handling	Format C 40x40x40	2 wire, DC 24V-48V	XS7T4DA●●●	■
		4 wire, PNP 24V-48V	XS7T4PC●●●	■
		4 wire, NPN 24V-48V	XS7T4NC●●●	
	Format D 80x80x26	2 wire, DC 24V-48V	XS7D1●●●●	■
Welding	Cylindrical metal	3 wire, PNP 24V	XS1M●●PAW●●	■
		2 wire, DC 24V-48V	XSLC●●●	■

■ Compatible
Non compatible

Digital input/output electronic modules 24 V DC: 8 inputs type 1 Sink and 4 transistor outputs	Digital input electronic modules 240 V ACDC: 2 or 4 inputs type 1	Digital input electronic module 120 V ACDC: 6 inputs type 1	Analog input electronic module: 2 or 4 Voltage/ current inputs (12 or 15 bits)	Counter electronic modules type 1 sink
TM5 SDM12DT	TM5 SDI2A, TM5 SDI4A	TM5 SDI6U	TM5 SAI2L, TM5 SAI2H, TM5 SAI4L, TM5 SAI4H	TM5 SDI2DF

Rotary encoders			Counter electronic modules		
			50 Hz Type 1 sink	100 Hz 1 voie	100 Hz 2 voies
Type		**Reference**	**TM5 SDI2DF**	**TM5 SE1ICO1024**	**TM5 SE2ICO1024**
Incremental encoders	5V RS422. 4.5 to 5.5 V	XCC 14●●●●●R			
	Push-pull. 11 to 30 V	XCC 14●●●●●K			
	5V RS422. 4.5 to 5.5 V	XCC 19●●●●●RN			
	Push-pull. 11 to 30 V	XCC 19●●●●●KN			
	5V. RS422. 4.75 to 30 V	XCC 15●●●●●X			
	Push-pull. 5 to 30 V	XCC 15●●●●●Y			
	5V. RS422. 4.75 to 30 V	XCC 15●●●●M●●●X			
	Push-pull. 5 to 30 V	XCC 15●●●●M●●●Y			

Compatible
Non compatible

MachineStruxure™
Appendices
Product reference index

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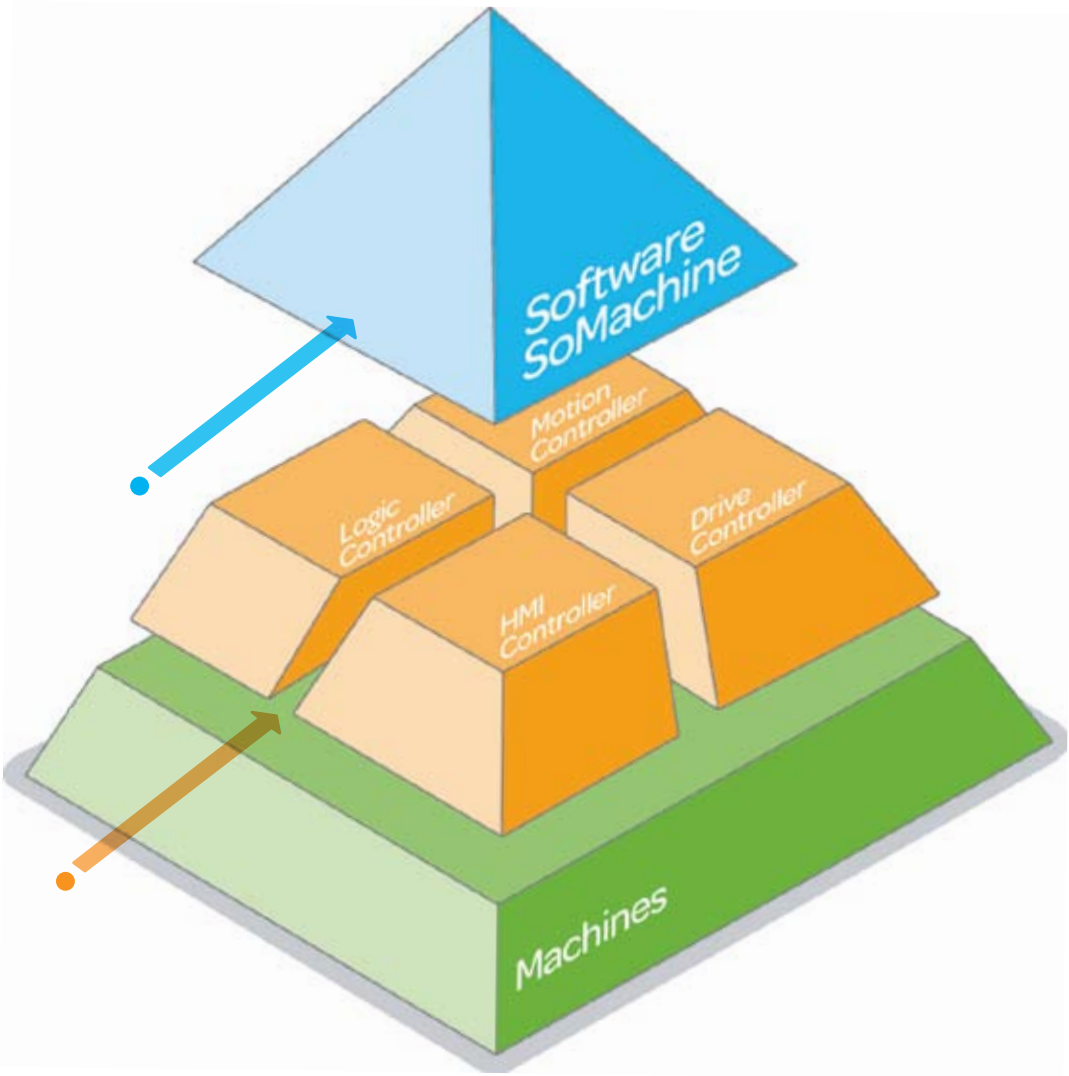
MachineStruxure™
Appendices
Product reference index

The Flexible Machine Control approach... a key part of Machine Struxure™ solutions.



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