

Modicon M251 logic controllers

Catalog

December 2015



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Applications	Controlling modular machines on distributed architectures	
		
Supply voltage	24 V \overline{DC}	
I/O extension	<ul style="list-style-type: none"> <input type="checkbox"/> 7 Modicon TM3 expansion modules <input type="checkbox"/> 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver) <input type="checkbox"/> Possible use of Modicon TM2 expansion modules with restrictions 	
Embedded communication	Ethernet link	<ul style="list-style-type: none"> ■ Ethernet 1: 2 ports connected by a switch, "Machine" or "Factory" network (2 RJ 45 connectors) ■ Ethernet 2: 1 "fieldbus" Ethernet port (1 RJ 45 connector with Industrial Ethernet manager service (EtherNet/IP and Modbus TCP)) <p>Modbus TCP (client & server), slave Modbus TCP, DHCP Client dynamic configuration, programming, downloading, monitoring. Firmware update, data exchange - NGVL and IEC VAR ACCESS, Web server, target EtherNet/IP, originator EtherNet/IP (Ethernet port 2). MIB2 SNMP network management, FTP file transfer.</p>
	CANopen	–
	Serial link	<ul style="list-style-type: none"> ■ 1 serial link port (RJ 45 connector) RS 232/RS 485 with +5 V supply
Options	Communication modules	<ul style="list-style-type: none"> ■ 1 Ethernet port module with switch function (4 embedded ports) ■ 1 module for slave Profibus DP link
Mounting	Mounting on \perp symmetrical rail or panel	
Software programming	With SoMachine software (Please consult on our website: www.schneider-electric.com)	
Controller type	TM251MESE	
Pages	11	

Applications	Controlling modular machines on distributed architectures	
		
Supply voltage	24 V \overline{DC}	
I/O extension	<ul style="list-style-type: none"> <input type="checkbox"/> 7 Modicon TM3 expansion modules <input type="checkbox"/> 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver) <input type="checkbox"/> Possible use of Modicon TM2 expansion modules with restrictions 	
Embedded communication	Ethernet link	<ul style="list-style-type: none"> ■ Ethernet: 2 ports connected by a switch, "Machine" or "Factory" network (2 RJ 45 connectors) <p>Modbus TCP (client & server), slave Modbus TCP, DHCP Client dynamic configuration, programming, downloading, monitoring. Firmware update, data exchange - NGVL and IEC VAR ACCESS, Web server, target EtherNet/IP. MIB2 SNMP network management, FTP file transfer.</p>
	CANopen	<ul style="list-style-type: none"> ■ 1 master CANopen port (1 x 9-way SUB-D connector)
	Serial link	<ul style="list-style-type: none"> ■ 1 serial link port (RJ 45 connector) RS 232/RS 485 with +5 V supply
Options	Communication modules	<ul style="list-style-type: none"> ■ 1 Ethernet port module with switch function (4 embedded ports) ■ 1 module for slave Profibus DP link
Mounting	Mounting on \perp symmetrical rail or panel	
Software programming	With SoMachine software (Please consult on our website: www.schneider-electric.com)	
Controller type	TM251MESB	
Pages	11	

Compatibility of offers

Modicon M251 logic controllers

- > Modicon TM3 expansion modules
- > Modicon TM2 expansion modules
- > TM4 communication modules
- > SoMachine software



TM251MESE



TM251MESC



Example of a QRcode:
QRcode for access to the TM251MESC logic controller technical documentation



SoMachine software

Presentation

Applications

Modicon M251 controllers offer an innovative, high-performance solution in the field of modular machines and distributed architectures.

Thanks to their compact dimensions, they can optimize the size of wall-mounted and floor-standing control system enclosures.

Since Modicon M251 controllers have no embedded I/O, field devices such as variable speed drives and remote I/O are connected on either the CanOpen bus or the Ethernet network.

Modicon M251 controllers have an embedded Ethernet port offering FTP and web server services, meaning they can easily be integrated in control system architectures, for remote monitoring and maintenance of machines by means of applications for smartphones, tablets and PCs.

The wealth of embedded functions minimizes the cost of the machine:

- Functions embedded in the controller: Modbus serial link, USB port dedicated to programming, CANopen fieldbus for distributed architectures and advanced position control functions (PLCopen libraries).
- Functions embedded in Modicon TM3 extensions: functional safety modules, motor-starter control module and remote expansion system.
- Functions embedded in Modicon TM4 communication modules.

The processing power and the memory size of M251 controllers are ideal for targeting high-performance applications.

SoMachine's programming software is powerful and intuitive, making it quick to create applications. Existing applications can easily be retrieved from the Modicon M221, M238 and M258 ranges, maximizing use of the investment already made.

Main functions

- Both Modicon M251 logic controllers come in an identical format (w x h x d): 54 x 90 x 95 mm (2.13 x 3.54 x 3.74 in).
- Modicon M251 controllers have no embedded I/O but can be combined with Modicon TM3 expansion modules.
- Each M251 controller has a Run/Stop switch.
- Each M251 controller has a slot for an industrial SD (Secure Digital) memory card.
- Each M251 controller has a QR code for direct access to its technical documentation.

Embedded communication

M251 logic controllers have up to 5 embedded communication ports.

- Embedded in the **TM251MESE** controller are:
 - an "Ethernet 1" network (1) with 2 RJ 45 ports connected by an internal switch, this network being mainly for communication between machines or to your factory network
 - an "Ethernet 2" network (1) with an RJ 45 port, optimized for connecting field devices (variable speed drives, distributed I/O, etc.) by means of the Ethernet I/O scanning service (Industrial Ethernet Manager). This port can also be connected to a factory network
- Embedded in the **TM251MESC** controller are:
 - an "Ethernet" network (1) with 2 RJ 45 ports connected by an internal switch, this network being more specifically dedicated to communication between machines or to your factory network
 - a master CANopen port for connecting field devices (variable speed drives, distributed I/O, etc.)
- In addition, both these M251 logic controllers incorporate:
 - a serial link port
 - a programming port

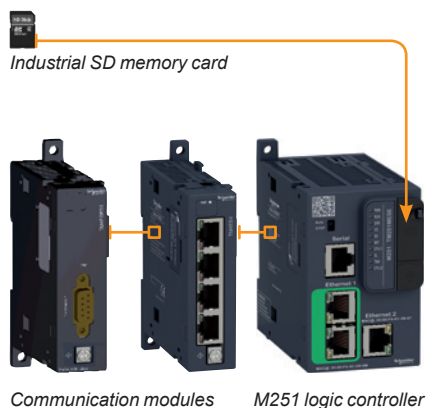
(1) Ethernet with embedded Web server function.

Processing power

- Execution speed: 22 ns/Boolean instructions
- Program: 128 Boolean Kinstructions
- DualCore processor
- RAM: 64 MB. Flash memory: 128 MB

Programming

Modicon M251 logic controllers are programmed with the SoMachine software, Please consult on our website: www.schneider-electric.com



Options for Modicon M251 controllers

Memory card

The **TMASD1** industrial SD memory card, with 512 MB capacity, is available for:

- application backup
- program transfer
- data logging
- firmware updating

Communication modules (1)

2 communication module models are available:

- The **TM4ES4** Ethernet switch module
- The **TM4PDPS1** Profibus DP slave module

Modicon TM4 communication modules are assembled by simple interlocking on the left-hand side of the controllers and a bus expansion connector is used to distribute data and the power supply.

Up to 3 communication modules can be added on the left of M251 logic controllers.

See page 12.

■ Ethernet switch module

- The **TM4ES4** module is a 4-port Ethernet interface (10/100 Mbps, MDI/MDIX).
- Clipped onto the left-hand side of a Modicon M251 controller, it consists of an autonomous switch with 4 ports supplied by the Modicon M251 controller.

■ PROFIBUS DP slave module

- The **TM4PDPS1** communication module can be used to configure a Master connection on the PROFIBUS DP bus.

(1) For the rules for combining Modicon TM4 communication modules and Modicon M251 logic controllers, see page 12.



Communication via modem and router

The communication via modem and router offer is dedicated to the following applications:

- Synchronization between remote machines; direct data exchange between controllers
- Remote maintenance; access to the controller via the SoMachine programming software
- Remote control and monitoring of machines; receipt of information and sending commands on a GSM phone

This offer comprises 2 **Schneider Electric** modems (PSTN modem, GSM modem) and a VPN router made by **eWon**.

Modems, router and connection cables (see page 24).

Modicon M251 logic controllers

I/O extensions with Modicon TM3 expansion modules

I/O extensions with Modicon TM3 modules

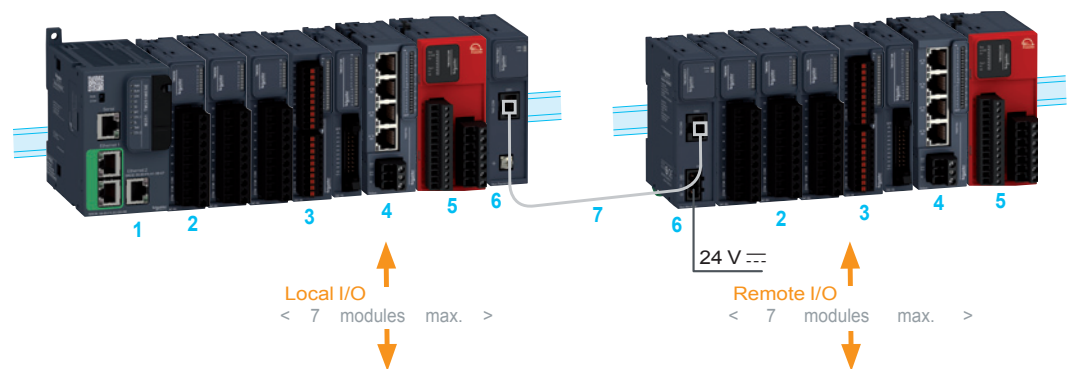
Modicon TM3 expansion modules

Modicon M251 logic controllers have no embedded I/O, yet can still take Modicon TM3 expansion modules for connecting sensors and actuators locally:

- digital I/O modules for creating configurations with up to 488 digital I/O
- analog I/O modules for creating configurations with up to 114 analog I/O, to receive the signals from, for example, position, temperature, and speed sensors which are also capable of controlling variable speed drives or any other device with a current or voltage input
- expert modules for controlling TeSys motor-starters, connected with RJ 45 cordsets to simplify wiring the control section
- functional safety modules that simplify the wiring and can be configured in the SoMachine software

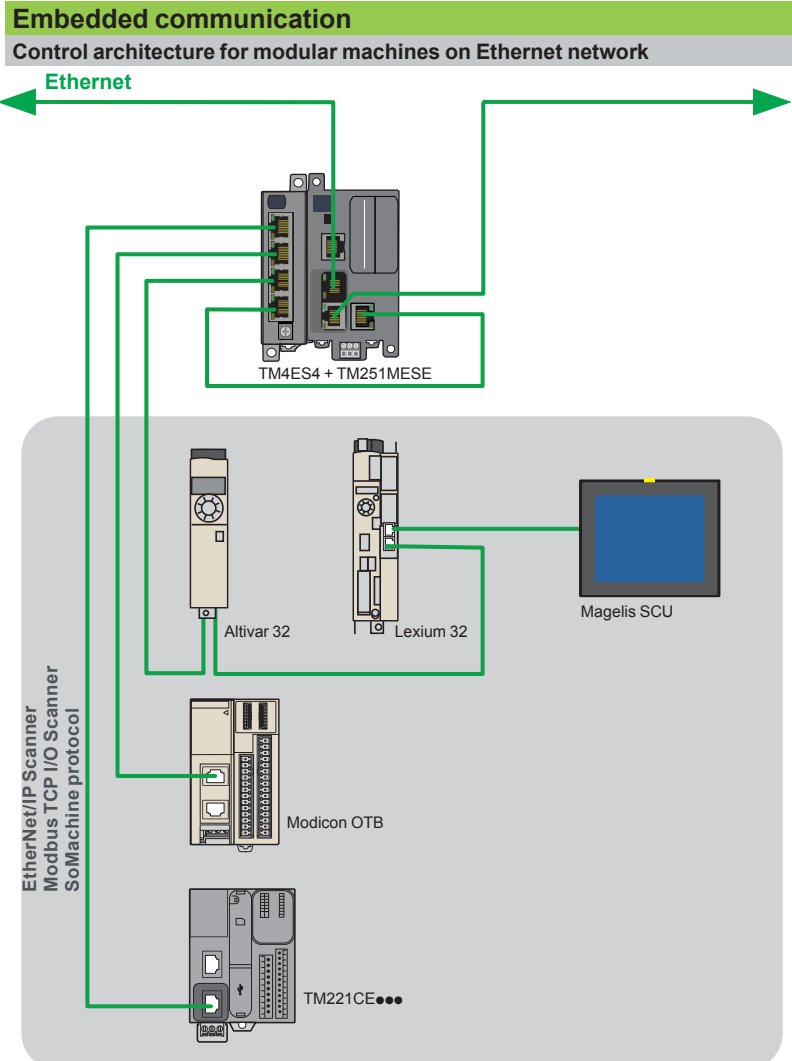
In addition, the Modicon TM3 expansion system is flexible due to the possibility of remotely locating some of the Modicon TM3 modules in the floor standing enclosure or another wall-mounted enclosure, up to 5 meters (16.404 ft.) away, thanks to the use of a bus expansion system.

The Modicon TM3 expansion system is common to the whole range of Modicon M221, M241 and M251 logic controllers, meaning that applications can be upgraded without changing extension.



- 1 M251 logic controller.
- 2 Modicon TM3 digital I/O modules.
- 3 Modicon TM3 analog I/O modules (1).
- 4 Modicon TM3 expert module: for controlling TeSys motor-starters.
- 5 Modicon TM3 functional safety modules.
- 6 Modicon TM3 bus expansion modules (transmitter and receiver).
- 7 Modicon TM3 bus expansion cordset.

(1) Compatibility of expansion module offers: most Modicon TM2 expansion modules can be used with M251 logic controllers. Nonetheless, inserting a Modicon TM2 expansion module in a configuration can increase the expansion module execution times by as much as a few milliseconds. The compatibility of Modicon TM2 expansion modules with M251 logic controllers is described in detail on page 26.



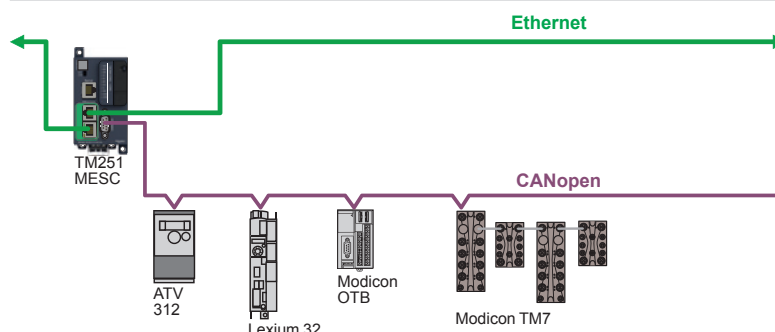
M251 controllers have 2 embedded Ethernet ports connected by an RJ 45 switch (10/100 Mbps, MDI/MDIX) with the Modbus TCP, EtherNet/IP, UDP, TCP, SNMP and SoMachine on Ethernet protocols. These ports are mainly for communication between machines or to your factory network. These ports are marked “Ethernet” or “Ethernet 1”.

- M251 controllers each have an embedded web server and FTP server. As well as the default address based on the MAC address, a controller IP address can be assigned via a DHCP server or via a BOOTP server.
- Ethernet ports also offer the same upload/download, update and debug functions as the programming port (USB mini-B) when the controller is supplied with power.
- A firewall can be used to filter the IP addresses that are authorized to access the controller and lock each communication protocol.
- **TM251MESE** controllers have, in addition to the two “Ethernet and Ethernet 1” ports, an RJ 45 “Ethernet 2” optimized Ethernet port for connecting field devices (variable speed drives, distributed I/O, etc.), with services such as EtherNet/IP scanner, Modbus TCP I/O scanner, Ethernet Modbus TCP (Client/Server), EtherNet/IP (originator and target), UDP, TCP, SNMP and SoMachine.
 - EtherNet/IP scanner can be used to connect up to 16 slave devices controlled by the controller in 10 ms (1024 input words + 1024 output words).
 - Modbus TCP I/O scanner can be used to connect up to 64 slave devices controlled by the controller in 64 ms.

Cordsets and connection accessories for Industrial Ethernet network (see page 18).

Embedded communication (continued)

Control architecture for modular machines on CANopen bus



TM251MESC controllers have an embedded master CANopen port.

- The link can be configured between 20 Kbps and 1 Mbps and supports up to 63 slaves with 252 TPDOs (1008 words) and 252 RPDOs (1008 words).
- CANopen-based architectures 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, servo drives, etc.
- The CANopen configurator is embedded in the SoMachine software and can also be used to import standard description files in EDS format.

[Cordsets and connection accessories for CANopen \(see page 16\).](#)

Serial link

Each M251 controller has an embedded serial link that can be configured as RS 232 or RS 485.

In addition, a 5 V/200 mA power supply is available on the RJ 45 connector, allowing use of a Magelis **XBTN** or **XBTRT** HMI or the Bluetooth®

TCSWAAC13FB communication adapter, or other devices.

This link incorporates the two most commonly used protocols on the market:

- Modbus ASCII/RTU Master or Slave
- ASCII character string

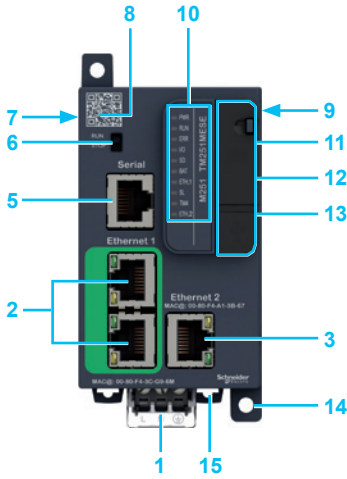
[Connection cables and accessories for serial link \(see page 14\).](#)

Programming port with power off charging function

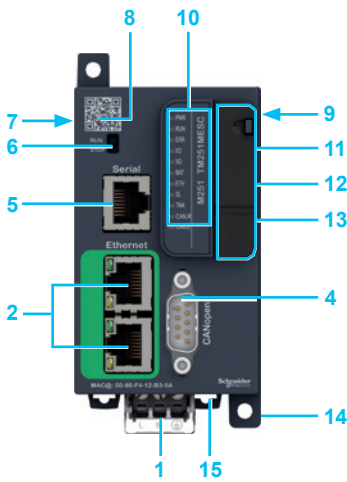
The programming port, equipped with a USB mini-B connector, is embedded in each M251 controller; it is dedicated to communication with a PC equipped with SoMachine for:

- programming
- debugging
- maintenance

In addition, it offers the ability to load an application program or update the firmware without the controller being powered by another source.



TM251MESE controller



TM251MESC controller

Description

M251 controllers

- 1 Removable screw terminal block, 3 terminals for connecting the 24 V $\bar{\bar{}}$ power supply.
 - 2 Two RJ 45 connectors connected by an internal switch for “Machine” or “Factory” Ethernet network, with exchange and activity speed LED indicator.
 - 3 On **TM251MESE** controller: RJ 45 connector for “fieldbus” Ethernet 2 network, with exchange and activity speed LED indicator.
 - 4 On **TM251MESC** controller: a connector for linking to the CANopen bus (9-way SUB-D).
 - 5 SL serial link port (RS 232 or RS 485): RJ 45 connector.
 - 6 Run/Stop switch.
 - 7 TM4 bus connector: communication bus for connecting to the TM4... communication modules.
 - 8 QR code for access to the controller technical documentation.
 - 9 Modicon TM3 bus connector for linking to a Modicon TM3 expansion module.
 - 10 LED display block showing: the status of the controller and its components (battery, industrial SD memory card), the status of the embedded communication ports (Ethernet 1 and 2, CANopen, serial link).
- Behind the removable cover 11, 12, 13**
- 11 Slot for the industrial SD memory card.
 - 12 Backup battery slot.
 - 13 Mini-B USB connector for a programming terminal.
 - 14 Lugs for screw mounting on panel.
 - 15 Locking clip on $\bar{\bar{}}$ symmetrical rail.

Characteristics of M251 logic controllers

Conformity

■ Certifications

- CE, cULus Listing Mark, C-Tick, EAC, LR (1), ABS (1), DNV and GL.

■ Standards

- IEC/EN 61131-2 (Edition 2 2007), UL 508 (UL 61010-2-201), ANSI/ISA 12.12.01-2007, CSA C22.2 No. 213, No. 142, E61131-2 and IACS E10.

Environment characteristics

- Ambient operating temperature: - 10...+ 55°C (+14...+ 131°F).
- Storage temperature: - 40...+ 70°C (- 40...+ 158°F).
- Relative humidity: 5...95% (non-condensing)

Operating altitude:

- 0...2,000 m (0...6,562 ft.): complete specification for temperature and insulation
- 2,000...4,000 m (6,562...13,123 ft.):
 - temperature derating: + 1°C/400 m (+ 1.8°F/1,312 ft.)
 - insulation losses: 150 V $\bar{\bar{}}$ /1,000 m (150 V $\bar{\bar{}}$ /3,280 ft.)
- Storage altitude: 0...3,000 m (0...9,842 ft)

Immunity to mechanical stress:

- For 1131: 5...8.4 Hz (amplitude 3.5 mm/0.138 in.); 8.4...150 Hz (acceleration 1 g)
- For merchant navy: 5...13.2 Hz (amplitude 1.0 mm/0.039 in.); 13.2...100 Hz (acceleration 0.7 g)

Supply characteristics

- 24 V $\bar{\bar{}}$ power supply
- Voltage limit (including ripple): 19.2...28.8 V $\bar{\bar{}}$
- Immunity to micro-cuts (class PS-2): 10 ms
- Max. consumption: 45 W

(1) LR, ABS marine certifications: pending.

Modicon M251 logic controllers

M251 logic controllers, options, separate parts, programming software, cordsets



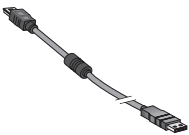
TM251MESE



TM251MESC



TMASD1



TCSXCNAMUM3P

References

Modicon M251 logic controllers (1)

Description	Embedded communication ports				Reference	Weight kg lb
	Ethernet 1 "Machine" or "Factory" (RJ 45)	Ethernet 2 "Fieldbus" (RJ 45)	Master CANopen (9-way SUB-D)	Serial link (RJ 45)		
24 V \square power supply						
M251 logic controllers	2 (connected by a switch)	1	–	1	TM251MESE	0.220 0.485
	2 (connected by a switch)	–	1	1	TM251MESC	0.220 0.485

Options for Modicon M251 logic controllers

Description	Details	Reference	Weight kg lb
Industrial SD memory card	Application backup and program transfer Capacity: 256 MB	TMASD1	0.004 0.009

Replacement parts

Description	Details	Reference	Weight kg lb
Set of power supply terminal blocks	8 removable screw terminal blocks	TMAT2PSET	0.127 0.280
Backup battery	The battery supplied with each controller is not available as a spare part in the Schneider catalog. If a replacement part is needed, only use a Panasonic battery type BR2032.		

Programming software

Description	Used for	Reference
SoMachine software	M251 logic controllers	Please consult on our website: www.schneider-electric.com

Expansion modules

Description	Used for	Reference
Modicon TM3 expansion modules	M251 logic controllers	Please consult on our website: www.schneider-electric.com

Communication modules

Description	Details	Reference
Modicon TM4 communication modules	Ethernet port module, Profibus DP slave module	See page 12

Cordsets

Description	Use from	To	Length	Reference	Weight kg lb
Programming cables	PC USB port	USB mini-B port on M251 controllers	3 m (0.98 ft.)	TCSXCNAMUM3P (3)	0.065 0.143
			1,8 m (5.90 ft.)	BMXXCAUSBH018	0.065 0.143

(1) M251 controllers are supplied with:
 - a removable screw terminal block for connecting the power supply
 - a BR2032 button cell backup battery
 (2) Each M251 logic controller has an embedded USB mini-B programming port.
 (3) Unshielded cable without grounding. To be used only for temporary connections. For permanent connections, use cable reference BMXXCAUSBH018.

Compatibility of offers

Modicon TM4 communication modules

- > Modicon M241 logic controllers
- > Modicon M251 logic controllers



Presentation

Applications

The Modicon TM4 offer enhances the connectivity for Modicon M241 and M251 logic controllers.

Two communication module models are available:

- The **TM4ES4** Ethernet switch module (offering, only on controllers without embedded Ethernet, an Ethernet connection with 4 ports).
- The **TM4PDPS1** Profibus DP slave module.

■ Ethernet switch module

The **TM4ES4** module is a 4-port Ethernet interface (10/100 Mbps, MDI/MDIX) with the following protocols: Modbus TCP (Client/Server), Ethernet IP (adapter), UDP, TCP, SNMP and SoMachine.

- The **TM4ES4** module is ready for use as soon as it is connected to the communication bus of M241 controllers.
- This module is used to add the Ethernet function to TM241C24● and TM241C40● controllers without embedded Ethernet port while offering the additional functionality of an Ethernet switch.
- When connected to logic controllers with embedded Ethernet port type TM241CE24●●●, TM241CE40●●●, or on a TM251MES● controller it is a 4 port stand-alone switch: the communication between the TM4ES4 module and the Modicon M241 and M251 controllers is not done automatically by the bus connector.

■ Profibus DP slave module

The **TM4PDPS1** communication module can be used to configure a slave connection on the Profibus DP bus.

Association rules

Up to 3 communication modules (total) can be added on the left of M241 and M251 logic controllers, in order to increase their possibilities of connection to the Ethernet and Profibus networks.

- On controllers without embedded Ethernet port (TM241C24●●● and TM241C40●●●): it is possible to add one **TM4ES4** module with the Ethernet port function and two **TM4ES4** modules with the switch function while respecting the maximum number of 3 **TM4** modules .
- On controllers with embedded Ethernet port (TM241CE●● and TM251●●●): it is possible to add 3 modules **TM4ES4** with switch function while respecting the number of 3 **TM4** modules.
- **TM4** communication modules are assembled by simple interlocking on the left-hand side of the controllers and a bus expansion connector is used to distribute data and the power supply.

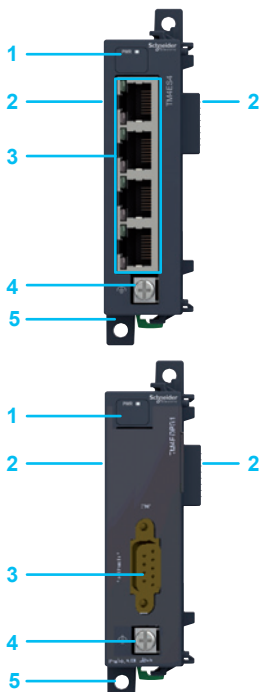
Description

■ TM4ES4 Ethernet switch module

- 1 Power on LED indicator.
- 2 Bus connector (one on each side).
- 3 4 RJ 45 connectors for Ethernet network, with exchange rate and activity LED.
- 4 Screw terminal for the functional earth (FE) connection.
- 5 Locking clip on \perp symmetrical rail.

■ TM4PDPS1 Profibus DP slave module

- 1 Power on LED indicator.
- 2 Bus connector (one on each side).
- 3 9-way SUB-D connector for connection to the Profibus DP bus.
- 4 Screw terminal for the functional earth (FE) connection.
- 5 Locking clip on \perp symmetrical rail.





TM4ES4



TM4PDPS1

References

Options for Modicon M241 and M251 logic controllers

Designation	Description	Reference	Weight kg lb
Communication modules	Multi-port Ethernet interface equipped with four RJ 45 connectors (10/100 Mbps, MDI/MDIX)	TM4ES4 (1)	0.110 0.243
	Slave connection on the Profibus DP bus, equipped with a 9-way SUB-D connector	TM4PDPS1	0.110 0.243

(1) Can be used as an Ethernet port or as a standalone switch according to controller model and configuration.

Modicon M251 logic controllers

Serial links

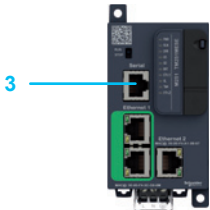
Modbus protocols, character mode

Presentation

RS 232/RS 485 serial links offer a simple solution to the communication needs of machines.

Modbus and ASCII standard communication protocols are used to connect numerous equipment items such as: HMIs, printers, energy meters, variable speed drives, motor starters, remote I/O (RIO), etc.

Description



Modicon **M241** logic controllers have the following on their upper surface:

- 1 A "Serial 1" serial link port with an RJ45 connector delivering a 5 V/200 mA power supply which allows the use of a Magelis HMI, the Bluetooth® communication adaptor or other devices.
- 2 A 2nd "Serial 2" serial link port (with connection on screw terminals).

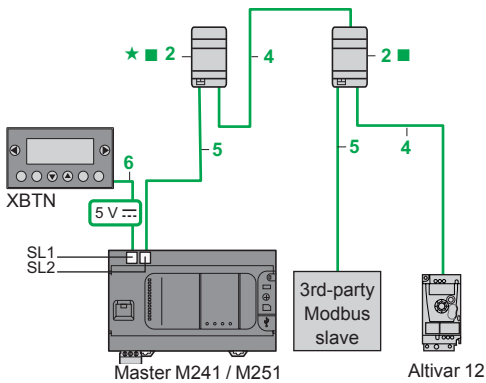
Controller Type	Embedded Ports	
	"Serial 1" port, RJ45 connector	"Serial 2" port, connection on screw terminals
TM241 ●●●●	RS 232/RS 485 with 5V (200 mA) power supply for HMI or Bluetooth communication adaptor (item 1)	RS 485 (item 2)

Modicon **M251** logic controllers have on their front a serial link port with an RJ45 connector delivering a 5 V/200 mA power supply which allows the use of a Magelis HMI, the Bluetooth® communication adaptor or other devices.

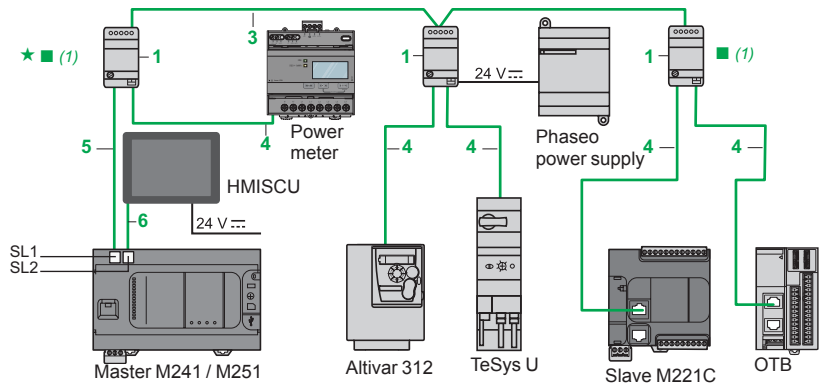
- 3 A serial link port (RJ 45 connector (RS 232 or RS 485)).

Modbus serial link wiring system

Non-isolated bus



Isolated bus (recommended for bus > 10 m (32.808 ft))



- Total length of cables between M241/M251 and ATV12: ≤ 30 m (98.425 ft)
- Length of cable 4: ≤ 10 m (32.808 ft)
- ★ Line polarization active. ■ Line termination

- Total length of cables between isolation boxes 1: ≤ 1000 m (3280.840 ft)
- Length of drop cables 4 or 5: ≤ 10 m (32.808 ft)
- ★ Line polarization active. ■ Line termination
- (1) Box powered by the logic controller.

References



TWDXCAISO TWDXCAT3RJ

Tap-off and adaptor components for RS 485 serial link

Designation	Description	Item	Length	Unit reference	Weight kg lb
T-junction and isolation box Screw terminals for trunk cable 2 x RJ45 for tap-off	<input type="checkbox"/> Isolation of the RS 485 link (1) <input type="checkbox"/> Line termination (RC 120 Ω, 1nF) <input type="checkbox"/> Line pre-polarization (2 R 620 Ω) <input type="checkbox"/> 24 V power supply (screw terminals) or 5 V power supply (via RJ45) <input type="checkbox"/> Mounting on 35 mm (1.378 in.)	1	—	TWDXCAISO	0.100 0.220
T-junction box 1 x RJ45 for trunk cable 2 x RJ45 for tap-off	<input type="checkbox"/> Line termination (RC 120 Ω, 1nF) <input type="checkbox"/> Line pre-polarization (2 R 620 Ω) <input type="checkbox"/> Mounting on 35 mm (1.378 in.)	2	—	TWDXCAT3RJ	0.080 0.176

(1) Line isolation recommended for line distances > 10 m (32.808 ft).



LU9GC3



TSXSCA50



XGSZ24

References (continued)

Designation	Description	Item	Length	Reference	Weight kg lb
Tap-off and adaptor components for RS 485 serial link					
Modbus splitter box	<input type="checkbox"/> Mounting on 35 mm (1.378 in.) \perp , on plate or panel	–	–	LU9GC3	0.500 1.102
Screw terminals for trunk cable					
10 x RJ45 for tap-off					
T-junctions	1 integrated cable with RJ45 connector for tap-off	–	0.3 m 0.984 ft	VW3A8306TF03	–
2 x RJ45 for trunk cable	dedicated to Altivar variable speed drive		1 m 3.281 ft	VW3A8306TF10	–
Passive T-junction box	<input type="checkbox"/> 1-channel line extension and tap-off on screw terminals <input type="checkbox"/> Line termination	–	–	TSXSCA50	0.520 1.146
RS 232C/RS 485 line converter	<input type="checkbox"/> Max. data rate 19.2 Kbps, No modem signals <input type="checkbox"/> 24 V $\overline{\text{---}}$ /20 mA power supply <input type="checkbox"/> Mounting on 35 mm (1.378 in.)	–	–	XGSZ24	0.100 0.220
Cables and cordsets for RS 232 serial link					
RS 485 double shielded twisted pair trunk cables	Modbus serial link, supplied without connector	3	100 m 328.084 ft	TSXCSA100	5.680 11.023
			200 m 656.168 ft	TSXCSA200	10.920 24.074
			500 m 1640.420 ft	TSXCSA500	30.000 66.139
Modbus RS 485 cordsets	2 x RJ45 connectors	4	0.3 m 0.984 ft	VW3A8306R03	0.030 0.066
			1 m 3.281 ft	VW3A8306R10	0.050 0.110
			3 m 9.843 ft	VW3A8306R30	0.150 0.331
	1 x RJ 45 connector and 1 end with flying leads	5	1 m 3.281 ft	TWDXCAFJ010	0.060 0.132
			3 m 9.843 ft	VW3A8306D30	0.150 0.331
Cordsets: used from M241 (SL1), M251 controllers to Magelis HMI	2 x RJ45 connectors Compatible with: <input type="checkbox"/> Com Port 1 on XBTN200/N400/R400/RT500 (1) <input type="checkbox"/> Com Port 1 on XBTRT511 and HMISTO/STU/SCU <input type="checkbox"/> Com Port 2 on XBTGT2●●0...7●●0 and HMIGTO	6	2.5 m 8.202 ft	XBZT9980	0.230 0.507
	1 x RJ45 connector and 1 x 25-way SUB-D connector Compatible with: <input type="checkbox"/> Com Port 1 on XBTN410/N410 and XBTR410/R411	–	2.5 m 8.202 ft	XBZT9982	–
	1 x RJ45 connector and 1 x 9-way SUB-D connector Compatible with: <input type="checkbox"/> Com Port 1 on XBTGT2●●0...7●●0	–	2.5 m 8.202 ft	XBZT9938	0.210 0.463
	1 x RJ45 connector and 1 x 9-way SUB-D connector Compatible with: <input type="checkbox"/> Com Port 1 on XBTGT2●●0...7●●0	–	2.5 m 8.202 ft	XBZT9008	–
Cordsets: used from M241 (SL2) controllers to Magelis HMI	1 x RJ45 connector and stripped wires Compatible with: <input type="checkbox"/> Com Port 1 on XBTRT511 and HMISTO/STU/SCU <input type="checkbox"/> Com Port 2 on XBTGT2●●0...7●●0 and HMIGTO	–	3 m 9.843 ft	VW3A8306D30	0.150 0.331
Line end adapter Sold in packs of 2	For RJ45 connector R = 120 Ω , C = 1 nf	–	–	VW3A8306RC	0.200 0.441
Cordsets for RS 232 serial link					
Cordset for DTE terminal (printer) (2)	Serial link for Data Terminal Equipment (DTE) 1 x RJ45 connector and 1 x 9-way female SUB-D connector	–	3 m 9.843 ft	TCSMCN3M4F3C2	0.150 0.331
Cordset for DCE terminal (modem, converter)	Serial link for point to point device (DCE) 1 x RJ45 connector and 1 x 9-way male SUB-D connector	–	3 m 9.843 ft	TCSMCN3M4M3S2	0.150 0.331

(1) If the terminal is equipped with a 25-way SUB-D connector, you will also need to order the **TSXCTC07** 25-way female / 9-way male SUB-D adaptor.

(2) Can only be connected to the controller SL or SL1 ports in order to supply the Magelis terminal with power.

Presentation

Schneider Electric has selected CANopen for its machines and installations because of its wealth of functions and its resulting benefits in the automation world. This decision was based on the general acceptance of CANopen, and the fact that CANopen products are increasingly used in control system architectures. CANopen is an open network supported by more than 400 companies worldwide, and promoted by CAN in Automation (CiA).

CANopen conforms to standards EN 50325-4 and ISO 15745-2.

Schneider Electric is heavily involved in working groups, which are important for machine and installation architectures, systems and products.

- The bus uses a double shielded twisted pair on which, with Modicon M241 and Modicon M251 logic controllers, a maximum of 63 devices are connected by daisy-chaining or by tap junctions.
- Each end of the bus must be fitted with a line terminator. On M241 controllers, this line terminator is already integrated on the master side and can be disconnected using a switch located next to the CAN connector.

CANopen port on M241 and M251 controllers

Type	M241: screw terminals M251: 9-way SUB-D							
Standards	DS 301 V4.02, DR 303-1							
Class	M10							
Data rate								
Max. length (m / ft.)	20/ 65.62	40/ 131.23	100/ 328.08	250/ 820.21	500/ 1640.42	1000/ 3280.84	2500/ 8202.1	5000/ 16404.2
Data rate (Kbps)	1000	800	500	250	125	50	20	10
Number of slaves	63 slaves max. with limit of: 252 RPDOs and 252 TPDOs							

Description

CANopen port on M241 and M251 controllers

The underside of Modicon **TM241CEC●●●** logic controllers has:

- 1 a connector for linking to the CANopen bus (screw terminals).
- 2 a CANopen line termination switch.

The front of the Modicon **TM251MESC** logic controller has:

- 3 a connector for linking to the CANopen bus (9-way SUB-D).

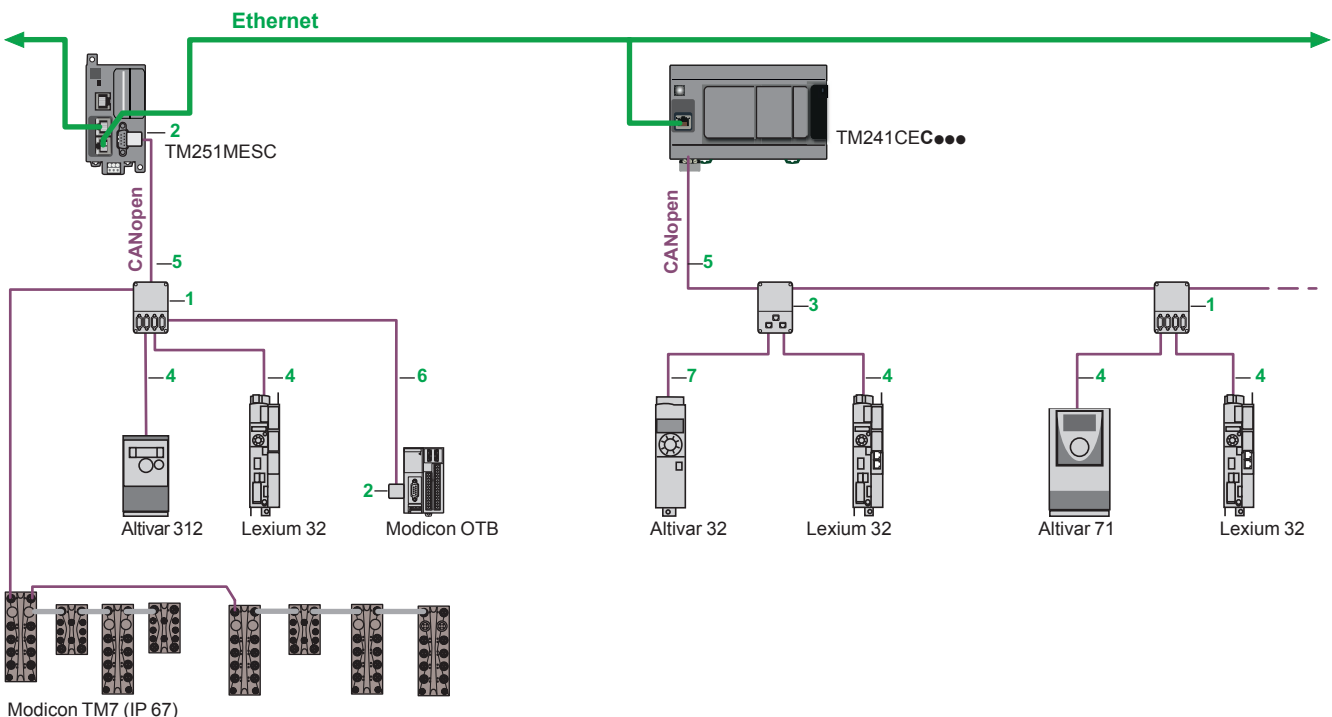


TM241CEC●●● controllers



TM251MESC controller

CANopen connection architecture



References

CANopen standard taps and connectors

Designation	Description	Item	Lgth. mm / ft	Unit reference	Weight kg / lb
IP20 CANopen tap junction	Line termination : 4 SUB-D ports. Screw terminals for connecting the trunk cables	1	–	TSXCANTDM4	0.196 / 0.432
IP 20 CANopen connectors 9-way female SUB-D Line end adapter switch	Right-angle	2	–	TSXCANKCDF90T	0.046 / 0.101
	Straight (for connection to the Altivar IMC integrated controller card)	2	–	TSXCANKCDF180T	0.049 / 0.108
	Right-angle with 9-way SUB-D for connecting a PC or diagnostic tool	2	–	TSXCANKCDF90TP	0.051 / 0.112
IP 20 CANopen tap junction for Altivar and Lexium 32	2 RJ45 ports	3	–	VW3CANTAP2	0.250 / 0.551
Daisy chain taps	Equipped with: <input type="checkbox"/> 2 sets of spring terminals for daisy chain connection of the CANopen bus <input type="checkbox"/> 1 preassembled cordset with RJ45 connector for connecting the drive	–	0.6 / 1.97	TCSCTN026M16M	–
	Equipped with: <input type="checkbox"/> 2 RJ45 connectors for daisy chain connection of the CANopen bus <input type="checkbox"/> 1 preassembled cordset with RJ45 connector for connecting the drive	–	0.3 / 0.98	TCSCTN023F13M03	–
CANopen line terminators	For RJ45 connector Sold in lots of 2	–	–	TCSCAR013M120	–
	For screw terminal connector Sold in lots of 2	–	–	TCSCAR01NM120	–



TSXCANTDM4



VW3CANTAP2



TSXCANKCDF90T



TSXCANKCDF180T



TSXCANKCDF90TP



TCSCAR013M120



VW3CANA71

IP 20 standard cables and preassembled cordsets

Designation	Description	Item	Length	Unit reference	Weight kg / lb	
CANopen cables (2 x AWG 22 2 x AWG 24)	For standard environment (1), CE marking: Low smoke. Zero halogen. Non flame propagating (IEC 60332-1)	5	50 / 164.042	TSXCANCA50	4.930 / 10.869	
			100 / 328.08	TSXCANCA100	8.800 / 19.401	
			300 / 984.25	TSXCANCA300	24.560 / 54.146	
	For standard environment (1), UL certification, CE marking: Flame-retardant (IEC 60332-2)	5	50 / 164.04	TSXCANCB50	3.580 / 7.893	
			100 / 328.08	TSXCANCB100	7.840 / 17.284	
			300 / 984.25	TSXCANCB300	21.870 / 48.215	
	For harsh environment (1) or mobile installation, CE marking: Low smoke. Zero halogen. Non flame propagating (IEC 60332-1). Oil-resistant	5	50 / 164.04	TSXCANCD50	3.510 / 7.738	
			100 / 328.08	TSXCANCD100	7.770 / 17.130	
			300 / 984.25	TSXCANCD300	21.700 / 47.840	
CANopen preassembled cordsets	Cordsets with one 9-way female SUB-D connector at each end	For standard environment (1), CE marking: Low smoke. Zero halogen. Non flame propagating (IEC 60332-1)	6	0.3 / 0.98	TSXCANCADD03	0.091 / 0.201
				1 / 3.28	TSXCANCADD1	0.143 / 0.315
		For standard environment (1), UL certification, CE marking: Flame-retardant (IEC 60332-2)	6	0.3 / 0.98	TSXCANCBDD03	0.086 / 0.190
				1 / 3.28	TSXCANCBDD1	0.131 / 0.289
				3 / 9.84	TSXCANCBDD3	0.268 / 0.591
	Cordsets with one 9-way female SUB-D connector and one RJ45 connector		5 / 16.40	TSXCANCBDD5	0.400 / 0.882	
		4	0.5 / 1.64	TCSCCN4F3M05T	0.100 / 0.220	
			1 / 3.28	TCSCCN4F3M1T	0.100 / 0.220	
			3 / 9.843	VW3M3805R010 (2)	0.100 / 0.220	
			1 / 3.281	VW3M3805R030 (2)	0.300 / 0.661	
	Cordsets with two 9-way SUB-D connectors, one male and one female		3 / 9.84	TCSCCN4F3M3T	0.160 / 0.353	
		–	0.5 / 1.64	TLACDCBA005	0.100 / 0.220	
			1.5 / 4.92	TLACDCBA015	0.120 / 0.265	
			3 / 9.84	TLACDCBA030	0.190 / 0.419	
			5 / 16.40	TLACDCBA050	0.350 / 0.772	
Preassembled cordsets with one RJ 45 connector at each end	7	0.3 / 0.984	VW3CANCARR03	0.100 / 0.220		
		1 / 3.281	VW3CANCARR1	0.100 / 0.220		
Adapter for Altivar 71 speed drive	One RJ45 connector at each end	–	–	VW3CANA71	0.100 / 0.220	

Taps and IP 67 accessories

Please consult the **Modicon TM7** offer: interface blocks (IP 67) for distributed I/O on the CANopen bus [Please consult on our website www.schneider-electric.com](http://www.schneider-electric.com)

(1) Standard environment: no particular environmental constraints, operating temperature between + 5°C and + 60°C (+ 41°F and + 140°F), and in fixed 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 (+ 14°F and + 158°F), or in mobile installations.

(2) Cordset equipped with a line terminator.

General

Industrial Ethernet is the term used to refer to industrial communication protocols using Ethernet standard physical layers such as:

- EtherNet/IP
- Modbus TCP
- TCP and UDP

On an Ethernet Industrial network, it is possible to connect:

- industrial products (industrial communication protocols) such as controllers, variable speed drives, robots, etc.
- products using TCP/UDP-based proprietary protocols

In addition, it is possible to use different Ethernet Industrial protocols on the same network simultaneously.

The EtherNet/IP protocol

EtherNet/IP is an industrial communication protocol based on CIP (Common Industrial Protocol), owned and managed by the ODVA, an independent standards organization (www.odva.org).

EtherNet/IP is the result of implementing CIP protocol on standard Ethernet. EtherNet/IP operates on the same device and the same infrastructure as Modbus TCP, and both protocols can be activated simultaneously on the network at any time. EtherNet/IP is a robust protocol for use with sophisticated devices such as cameras, robots, etc.

Advanced services and outstanding performance

EtherNet/IP is object-oriented. In each EtherNet/IP device, the data is arranged as objects and each device can be associated with several types of object depending on its intended use. Integration of devices is made easy thanks to predefined and standard objects.

The EtherNet/IP protocol uses an Originator/Target architecture for data exchanges.

The Modbus TCP protocol

Modbus has been the industry communication standard since 1979. During the internet revolution, Modbus was combined with Ethernet to form Modbus TCP, a completely open Ethernet protocol.

Modbus TCP, simple and open

The Modbus application layer is simple and universally familiar with its 9 million installed connections.

- Thousands of manufacturers have already implemented this protocol. Many have already developed a Modbus TCP connection and numerous products are currently available.
- The simplicity of Modbus TCP enables any fieldbus device, such as an I/O module, to communicate on Ethernet without the need for a powerful microprocessor or a lot of internal memory.

Modbus TCP, a standard

- The application protocol is identical on Modbus serial link and Modbus TCP; messages can be routed from one network to the other without converting the protocol.
- Since Modbus operates on the TCP/IP higher layer, users benefit from IP routing, thus enabling devices located anywhere in the world to communicate without worrying about the distance between them. Modbus and Modbus TCP are recognized as a fieldbus by the international standard IEC/EN 61158. They also comply with the "national Chinese standard" managed by ITEI.

The Modbus TCP protocol uses a client/server architecture for data exchanges.

Modicon M221, M241 and M251 logic controllers

The embedded Ethernet communication ports in Modicon M221, M241 or M251 logic controllers and in the Modicon TM4ES4 communication module optimize integration in factory network architectures.

Modicon M221, M241 and M251 controllers can easily be integrated in typical architectures:

- machine to devices (variable speed drives, remote I/O modules, operator dialogue terminals) with the I/O Scanner function
- machine to machine with the NGVL function
- machine to supervision with the Modbus Client/Server function and EtherNet/IP adapter

Ethernet also brings transparency to the factory, in particular - thanks to the firewall functions - making it possible from any point on the network to safely:

- program, monitor a controller or download an application
- access device parameters (variable speed drives for example)

A simple web browser can be used to access machines anytime anywhere, using a tablet or smartphone, for example, using the web servers embedded in Modicon M241 and M251 controllers.

Safety can be enhanced by the use of VPN modems; refer to our Partner program on our website www.schneider-electric.com > Products and Services > Automation and Control > Collaborative Automation Partner Program.

Main devices supported

Device	Protocols supported			Tools for integration in the SoMachine software (1)
	TCP/UDP	Modbus TCP	EtherNet/IP	
Altivar 32	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, DTM, TVDA
Altivar 71	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, DTM, TVDA
Lexium 32 M	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, DTM, TVDA
Lexium ILA	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, libraries, TVDA
Lexium ILE	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, libraries, TVDA
Lexium ILS	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FDR, libraries, TVDA
OsiSense XG	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TVDA
OsiSense XUW	-	-	<input checked="" type="checkbox"/>	TVDA
Modicon OTB1EODM9LP	-	<input checked="" type="checkbox"/>	-	Libraries
Preventa XPSMCM	-	(2)	<input checked="" type="checkbox"/>	TVDA for EtherNet/IP
Harmony XB4R, XB5R	-	<input checked="" type="checkbox"/>	-	DTM, libraries
Modicon M221, M241, M251	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	User parameters (only for EtherNet/IP), libraries
Device supplied with EDS file (1)	-	-	<input checked="" type="checkbox"/>	User parameters
Generic device	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	User parameters (only for EtherNet/IP), libraries

Web servers

Preconfigured Web server

Using a simple web browser available on PC, smartphone or tablet, this server authorizes the following "ready-to-use" functions:

- With no prior programming
 - Display of the I/O states
 - Controller diagnostics, and of its expansion and communication modules
 - Communication port diagnostics
 - I/O Scanner function diagnostics
 - Maintenance and configuration functions (EtherNet/IP, firewall, etc.)
- After configuration
 - Viewing data values
 - Viewing the evolution of these data values over time (oscilloscope function)

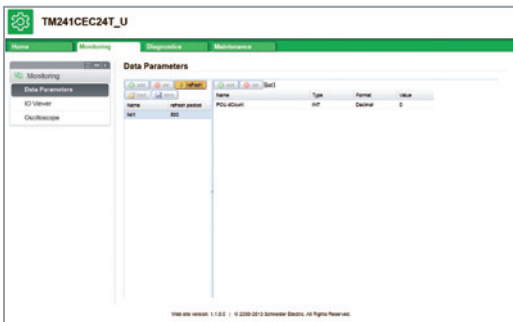
Viewer Web server

The SoMachine programming software is used to create customized pages for viewing and monitoring devices. These pages can also be accessed on any mobile device such as a tablet or smartphone with any operating system (iOS, Android, Windows).

(1) SoMachine configuration software: please consult our catalog [DIA3ED2140110EN.pdf](#) or our website www.schneider-electric.com

- FDR: Fast Device Replacement
- DTM: Device Type Manager
- TVDA: Tested Validated Documented Architectures

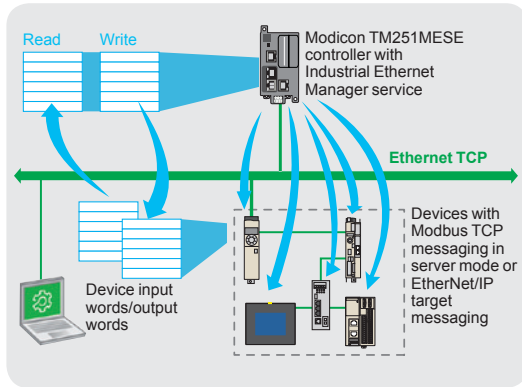
(2) Integration as a generic device.



Preconfigured Web server



Viewer Web server



I/O scanning (Industrial Ethernet Manager)

Description of Ethernet services

Network Global Variable List (NGVL)

The NGVL protocol allows a controller to share data with other controllers on a local Ethernet network (LAN) or subscribe to data published by other controllers that support the NGVL protocol and thus allowing, for example synchronization between control platforms.

I/O Scanning (Industrial Ethernet Manager)

The Industrial Ethernet Manager service is used to manage the exchange of remote I/O states on the Ethernet network after a simple configuration operation, with no need for special programming.

I/O scanning is performed transparently by means of read/write requests in accordance with the Modbus TCP or EtherNet/IP protocol, this is called Scanner Manager on Modbus TCP or Scanner Manager on EtherNet/IP.

Slave Modbus TCP

This function can be used to create a dedicated I/O table in the controller, which can be accessed via the Modbus TCP protocol and by a controller with the Modbus TCP I/O Scanner function.

Fast Device Replacement (FDR)

This service uses standard address management technologies (BOOTP, DHCP) and the TFTP (Trivial File Transfer Protocol) file management service, in order to simplify maintenance of Ethernet products.

The FDR service is used to replace a device with a new one; the device is detected, reconfigured and automatically rebooted by the system.

Access to files via FTP (File Transfer Protocol)

This service provides access to the controller files from, for example, a PC (FTP client) and is used to exchange files such as application programs, data, etc.

This service can be accessed even if the controller has no application program in its memory.

Dynamic Host Configuration Protocol (DHCP)

This protocol can be used to assign an address to a controller (client DHCP/BOOTP) automatically. This address can be:

- fixed and determined either in the SoMachine software or included in a post-configuration file
- assigned by a controller with the DHCP server or BOOTP server function (such as the **TM251MESE** logic controller)

SNMP (Simple Network Management Protocol)

From a network management station, the SNMP protocol is used to monitor and control the Ethernet architecture components, meaning problems are diagnosed quickly.

The SNMP protocol is used to access configuration and management objects that are contained in the device MIBs (Management Information Bases).

Modicon M241 and M251 controllers support the "MIB 2 Standard" SNMP network management interface. This interface accesses a first level of network management; it enables the manager to identify the devices making up the architecture and retrieve general information about configuration and operation of the Ethernet Modbus TCP interfaces.

IP address filter (Whitelisting)

IP addresses that are authorized to access the controller can be loaded in the controller from either an SD card or an FTP client.

Locking communication protocols

Not only SoMachine, NetManage (1), SNMP communication protocols but also Modbus, WEB and FTP servers can be locked individually in the SoMachine software.

EtherNet/IP target

This function can be used to create a dedicated I/O table in the controller, that can be accessed via the EtherNet/IP protocol and by a controller with the EtherNet/IP originator function. EtherNet/IP target acts in the same way for EtherNet/IP as a Modbus TCP slave.

EtherNet/IP originator

Controllers with this function trigger exchanges with devices featuring the Ethernet/IP target function. EtherNet/IP originator acts in the same way for EtherNet/IP as a Modbus TCP master.

(1) The NetManage function can automatically detect which controllers are present on the network. It also offers the option of straightforward connection to any controller present on the network in order to identify it physically by means of a visual or audible message and modify its parameters or manage the resident application.

Transparent Ready class and Functions

	Logic controllers, Ethernet switch module			
	TM221ME●●●/TM221CE●●●	TM241CE●●●, TM4ES4	TM251MES C	TM251MESE
Transparent Ready class	A10	B20		
Internet protocol version	IPV4			
Ethernet services				
Programming, downloading, monitoring				
Firmware update	–			
Modbus TCP/IP (client & server)				
Modbus TCP slave				
EtherNet/IP target				
EtherNet/IP originator	–	–	–	
Data exchange – NVGL and IEC VAR ACCESS	–			
Web server	–			
SNMP network management MIB2	–			
Scanner Manager on Modbus TCP	–	–	–	Ethernet port 2
Scanner Manager on EtherNet/IP	–	–	–	Ethernet port 2
FTP file transfer	–			
DHCP Client dynamic configuration				Ethernet port 1
DHCP Server dynamic configuration	–	–	–	Ethernet port 2
FDR faulty device replacement	–	–	–	
SMS	(1)			
Security functions				
IP address filter (Whitelisting)	–			
Locking communication protocols				
Locking IP address routing	–			

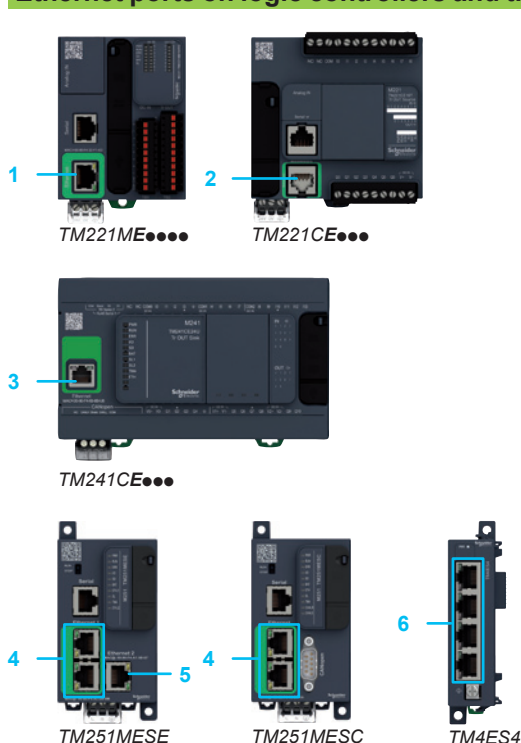
(1) With dedicated function block in the SoMachine Basic software.

Modicon M251 controller network characteristics

Topology	Daisy chain and star using switches
Bandwidth	10/100 Mbps
EtherNet/IP scanner performance	Up to 16 slave devices controlled by the controller in 10 ms
Ethernet Modbus TCP scanner performance	Up to 64 slave devices controlled by the controller in 64 ms

Note: When EtherNet/IP and Modbus TCP devices are controlled on the same network simultaneously (Ethernet 2 connector), 16 devices maximum can be controlled (EtherNet/IP + Modbus TCP).

Ethernet ports on logic controllers and the Ethernet switch module



M221 logic controllers

- 1 On **TM221ME●●●** controllers: RJ 45 connector for Ethernet network, with exchange speed and activity LED indicator.
- 2 On **TM221CE●●●** controllers: RJ 45 connector for Ethernet network, with exchange speed and activity LED indicator.

M241 logic controllers

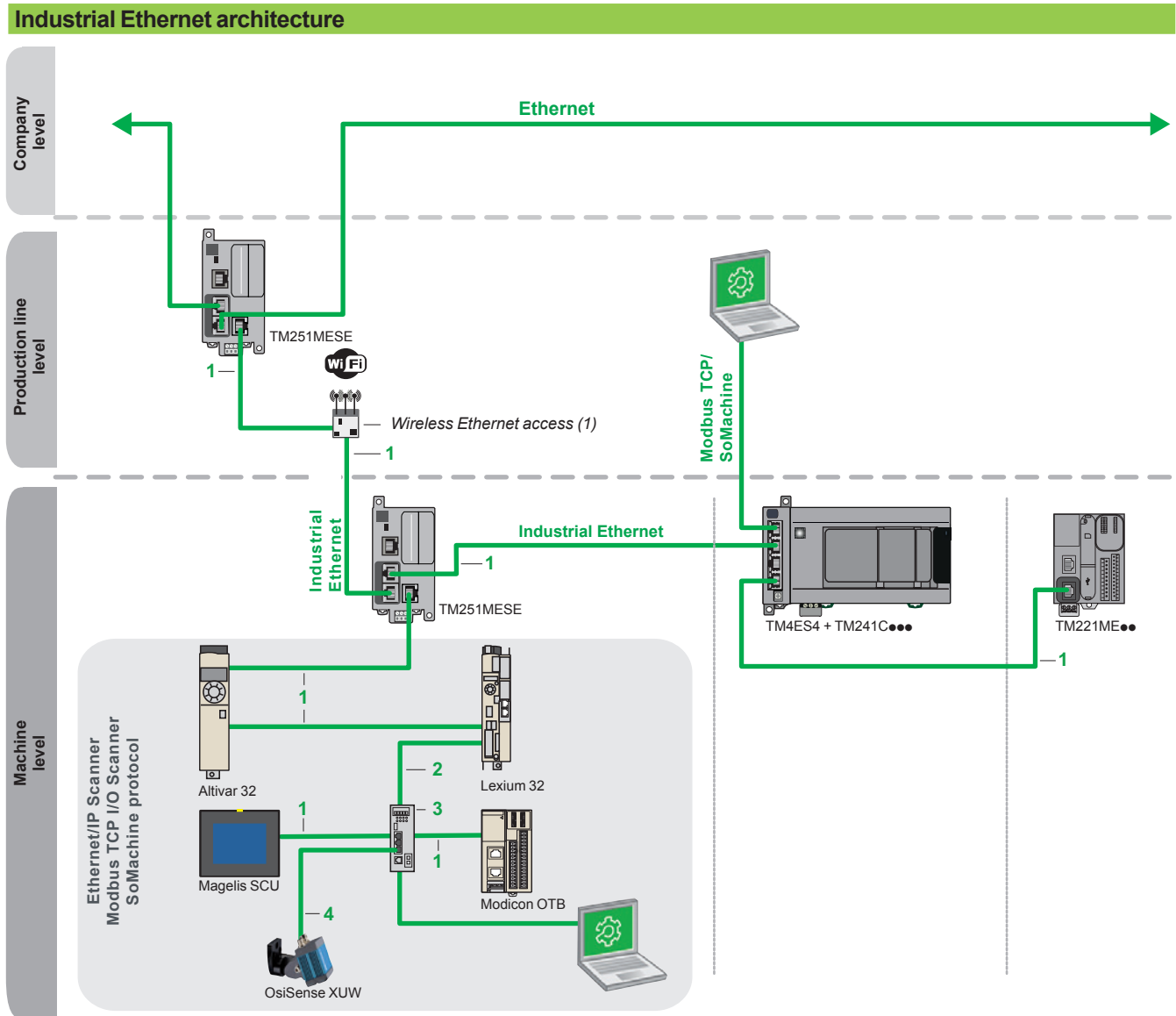
- 3 On **TM241CE●●●** controllers: RJ 45 connector for Ethernet network, with exchange speed and activity LED indicator.

M251 logic controllers

- 4 On **TM251MESE** and **TM251MES C** controllers: 2 connectors connected by an RJ 45 internal switch for "Machine or Factory" Ethernet network, with exchange speed and activity LED indicator.
- 5 On **TM251MESE** controller: RJ 45 connector for "fieldbus" Ethernet network with exchange speed and activity LED indicator. This port can be used with the Industrial Ethernet Manager function.

TM4ES4 Ethernet switch communication module

- 6 4 type RJ 45 connectors for Ethernet network with exchange speed and activity LED indicator.



NB: The ports on M251 controllers and the TM4ES4 communication module cannot be used to create redundant architectures.

(1) Wireless Ethernet access, see our partner program.

Items 1, 2 and 3: see references on next page.

Item 4: Ethernet jumper cables XGSZ●2E45●● (M12 straight/RJ 45, shielded cable, straight cabling) for OsiSense XUW vision sensors. More information on our partner website www.tesensors.com

Shielded copper connection cables

ConneXium shielded connection cables are available in two versions to meet the requirements of the various current standards and approvals:

■ EIA/TIA 568 shielded twisted pair cables for CE market

These cables conform to:

- EIA/TIA-568 standard, category CAT 5E
- IEC 11801/EN 50173-1 standard, class D

Their fire resistance conforms to:

- NF C32-070 standard, class C2
- IEC 322/1 standards
- Low Smoke Zero Halogen (LSZH)

■ EIA/TIA 568 shielded twisted pair cables for UL market

These cables are:

- CEC type FT-1
- NEC type CM

A new range of ConneXium fully shielded preassembled cables has been specially designed for use in harsh industrial environments. These cables combine a category 5E shielded cable and RJ 45 connectors reinforced with a metal profile.

References

EIA/TIA 568 shielded twisted pair cables for C€ market

Description	End fittings	Item	Type	Length m (ft.)	Reference	Weight kg
Straight-through copper cables, C€ compatible	2 RJ 45 connectors For connection to terminal devices (DTE)	1	standard	2 (6.56)	490NTW00002	–
				5 (16.41)	490NTW00005	–
				12 (39.37)	490NTW00012	–
				40 (131.23)	490NTW00040	–
				80 (262.467)	490NTW00080	–
	1	ruggedized	1 (3.28)	TCSECE3M3M1S4	–	
			2 (6.56)	TCSECE3M3M2S4	–	
			3 (9.84)	TCSECE3M3M3S4	–	
			5 (16.40)	TCSECE3M3M5S4	–	
			10 (32.81)	TCSECE3M3M10S4	–	



TCSEC●3M3M●●S4

Shielded twisted pair cables for UL market

Description	End fittings	Item	Type	Length m (ft.)	Reference	Weight kg
Straight-through copper cables, UL compatible	2 RJ 45 connectors For connection to terminal devices (DTE)	1	standard	2 (6.56)	490NTW00002U	–
				5 (16.40)	490NTW00005U	–
				12 (39.37)	490NTW00012U	–
				40 (131.23)	490NTW00040U	–
				80 (262.47)	490NTW00080U	–
	1	ruggedized	1 (3.28)	TCSECU3M3M1S4	–	
			2 (6.56)	TCSECU3M3M2S4	–	
			3 (9.84)	TCSECU3M3M3S4	–	
			5 (16.40)	TCSECU3M3M5S4	–	
			10 (32.81)	TCSECU3M3M10S4	–	

Do it Yourself copper cable and connectors

The **ConneXium** “Do it Yourself” offer consists of 2 connector references (M12 and RJ 45) and 1 cable reference - 300 m (984.25 ft) reel - enabling Ethernet 10/100 Mbps network cables to be made up in situ. The maximum length of cables made up in this way is 80 m (262.47 ft.). They are assembled using only a knife and wire cutters (no special tool is required).

Description	Characteristics	Item	Length m (ft.)	Reference	Weight kg
Ethernet copper cable 2 shielded twisted pairs 24 AWG	Conforms to the standards and approval listed above	2	300 (984.25)	TCSECN300R2	–
RJ 45 connector	Conforms to EIA/TIA-568-D	2	–	TCSEK3MDS	–

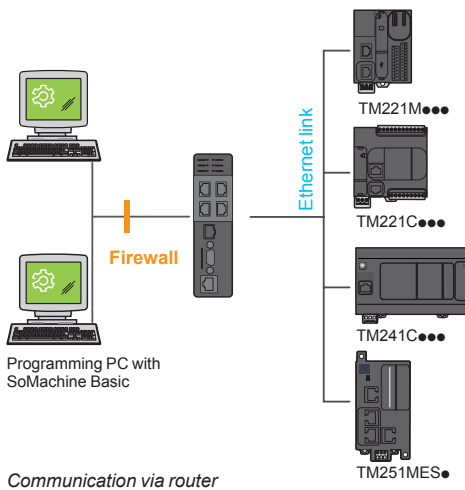
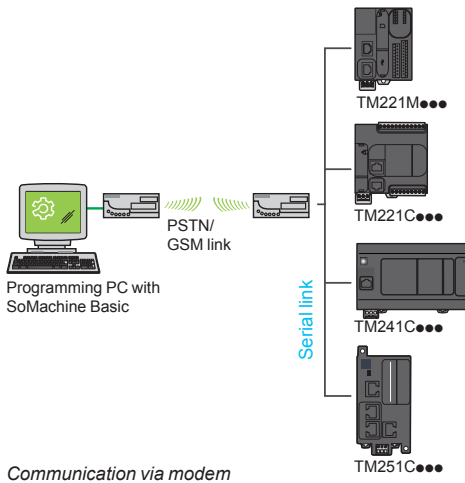


TCSESU053FN0

ConneXium unmanaged switches, 3, 4 and 5 ports, twisted pair and optical fiber

Description	Interfaces	Item	Reference	Weight kg lb
ConneXium unmanaged switches	3 x 10BASE-T/100BASE-TX ports (copper cable), RJ 45 shielded connectors	3	TCSESU033FN0	0.113 0.249
	■ 4 x 10BASE-T/100BASE-TX ports (copper cable), RJ 45 shielded connectors ■ 1 x 100BASE-FX port (multimode fiber), duplex SC connector	3	TCSESU043F1N0	0.120 0.265
	5 x 10BASE-T/100BASE-TX ports (copper cable), RJ 45 shielded connectors	3	TCSESU053FN0	0.113 0.249

Other wiring components are available, please consult the **ConneXium** offer on our website www.schneider-electric.com



Presentation

The communication via modems and routers offer is dedicated to the following applications:

- Synchronization between remote machines; direct data exchange between controllers.
- Remote maintenance; access to the controller via the programming software (SoMachine or SoMachine Basic).
- Remote control and monitoring of machines; receipt of information and sending commands on GSM phone.

This offer comprises 2 Schneider Electric modems (PSTN and GSM) and a VPN router made by Ewon®. Setting up this router requires installation of two configuration software programs.

PSTN and GSM modems

Both these modems can either be used on the machine or connected to the PC if it does not have a modem. On the machine side, they are then connected to the logic controller SL or SL1 serial port (1). On the PC side, they use a USB port.

VPN router

The eWON Cosy is an industrial VPN router designed to offer easy remote access, via the Internet.

On the machine side, it is connected to the controller Ethernet port. The router establishes a secure VPN connection via the plant LAN. This is an outgoing connection compatible with the firewalls. Remote users can only access the machine's LAN, not the customer's LAN.

(1) Modems cannot be connected to either the logic controller SL2 port or the **TMC2SL1** cartridge.

Applications

	Modems		Router
	SR2MOD01	SR2MOD03	Ewon Cosy 141
Type of connection between logic controller and modem/router	Serial link	Serial link	Ethernet
Remote maintenance	<input type="checkbox"/> Monitoring via the protocol for programming and writing variables (1) <input type="checkbox"/> Application transfer/download <input type="checkbox"/> Online program modification (writing code)	M221, M221 Book (2)	M221, M221 Book, M241, M251
Remote data logging	File reading/writing	–	M241, M251
Synchronization between machines	Modbus exchanges	M221, M221 Book, M241, M251	–
Remote control	Receipt/sending of "SMS"	–	M221, M221 Book, M241, M251 (3)
	Viewer Web server (HTTP)	–	M241, M251
	OPC communication (4) (on Modbus protocol)	M221, M221 Book, M241, M251	–

Logic controller supporting the application

(1) Including Run/stop, Init.

(2) Modbus ASCII.

(3) Function blocks in SoMachine and SoMachine Basic programming software.

(4) The OPC (Object Linking and Embedding for Process Control) standard defines communication between Windows applications and the hardware/software used regularly in the field of process control (e.g.: controllers). The OPC standard describes a coherent and universal way of accessing field data in the factory devices.



SR2MOD01



SR2MOD03



Ewon Cosy 141



TSXCUSB232

Modems

Designation	Composition	Reference	Weight kg/lb
PSTN modem	<ul style="list-style-type: none"> ■ SIXNET VT-MODEM-5-WW type ■ Supplied with a telephone cable (2 m/6.562 ft long) ■ Supply voltage: 12...24 V ~ 	SR2MOD01	0.265 0.584
GSM modem	<ul style="list-style-type: none"> ■ Quad band type 900/1800 MHz, 850/1900 MHz ■ Supplied with: <ul style="list-style-type: none"> □ a power supply cable (1.5 m/4.921 ft long) □ a magnetic GSM 4-band aerial SMA-M with 2.5 m (8.202 ft) long cable ■ Mounted on 5 panel or rail ■ Supply voltage: 12...24 V ~ 	SR2MOD03	0.335 0.739

Connection components for modem link

Designation	For use Composition	Reference	Weight kg/lb
Connecting cables	<ul style="list-style-type: none"> ■ Between modem and M221, M221 Book, M241 and M251 logic controllers ■ Equipped with an RJ 45 connector and a 9-way male SUB-D connector, 3 m (9.843 ft) long Cable type: 4-wire: RX, TX, RTS, CTS 	TCSMCN3M4M3S2	0.150 0.331
	<ul style="list-style-type: none"> ■ Between Modem and PC ■ Equipped with 2 x 9-way male SUB-D connectors, 1.8 m (5.906 ft) long 	SR1CBL03	0.110 0.243
USB-RS232 converter	<ul style="list-style-type: none"> ■ For PC not equipped with a 9-way SUB-D connector ■ Equipped with a USB connector and a 9-way SUB-D connector, cable length: 0.4 m (1.31 ft) 	TSXCUSB232	0.145 0.320

Router

Designation	Composition	Reference
Ewon Cosy 141 (partner offer)	<ul style="list-style-type: none"> ■ VPN internet ■ 4 x Ethernet LAN 10/100 MB switch, 1 x Ethernet WAN 10/100 MB, 1 x RS 232/485 9-way SUB-D ■ Supply voltage: 12...24 V ~ ■ Mounted on rail 	Visit our partner's website http://www.ewon.biz/en/home.html

Connection components for router link

For connecting the router and logic controller, use Ethernet cables type 490NTW●●●● and TCSEC●●●● (see page 23).

Programming software

Designation	Compatibility with logic controllers	Reference
SoMachine Basic	M221 and M221 Book	Please consult our website: www.schneider-electric.com
SoMachine	M241 and M251	Please consult our website: www.schneider-electric.com

Modicon M251 logic controllers

Compatibility of Modicon TM2 expansion modules with Modicon M221, M221 Book, M241 and M251 logic controllers

Compatibility					
Modicon TM2 expansion modules		Logic controllers			
		M221	M221 Book	M241	M251
Digital modules	TM2DDI8DT				
	TM2DDI16DT				
	TM2DDI16DK				
	TM2DDI32DK				
	TM2DAI8DT				
	TM2DDO8UT				
	TM2DDO8TT				
	TM2DDO16UK				
	TM2DDO16TK				
	TM2DDO32UK				
	TM2DDO32TK				
	TM2DRA8RT				
	TM2DRA16RT				
	TM2DMM8DRT				
	TM2DMM24DRF				
Analog modules	TM2AMI2HT				
	TM2AMI2LT				
	TM2AMI4LT				
	TM2AMI8HT				
	TM2ARI8LRJ				
	TM2ARI8LT				
	TM2ARI8HT				
	TM2AMO1HT				
	TM2AVO2HT				
	TM2AMM3HT				
	TM2ALM3LT				
	TM2AMM6HT				
Expert modules (counter modules)	TM200HSC206DT				
	TM200HSC206DF				

Compatible

Not compatible

Note: The TWD●●●●● range of expansion and communication modules is not compatible with the Modicon M221/M221 Book/M241/M251 logic controller offer.

Configuration

- Modicon TM3 expansion modules are powered by logic controllers via the bus connector on the side of the products. This connector delivers 2 voltages, 5 V and 24 V. For the Modicon M221 and M221 Book logic controllers, you should therefore calculate the total TM3 expansion module consumption and check that it is definitely compatible with the maximum current delivered by the controller. This information is available on each product data sheet or in the hardware reference guide. This can be checked very quickly in the SoMachine Basic programming software setup page.
- For Modicon M241 and M251 logic controllers, up to 7 TM2 expansion modules can be attached regardless of these module references.

4		TSXCANCADD1	17
490NTW00002	23	TSXCANCADD3	17
490NTW00002U	23	TSXCANCADD5	17
490NTW00005	23	TSXCANCB100	17
490NTW00005U	23	TSXCANCB300	17
490NTW00012	23	TSXCANCB50	17
490NTW00012U	23	TSXCANCBDD03	17
490NTW00040	23	TSXCANCBDD1	17
490NTW00040U	23	TSXCANCBDD3	17
490NTW00080	23	TSXCANCBDD5	17
490NTW00080U	23	TSXCANCD100	17
		TSXCANCD300	17
		TSXCANCD50	17
B		TSXCANKCDF180T	17
BMXCAUSBH018	11	TSXCANKCDF90T	17
		TSXCANKCDF90TP	17
L		TSXCANTDM4	17
LU9GC3	15	TSXCSA100	15
		TSXCSA200	15
S		TSXCSA500	15
SR1CBL03	25	TSXCUSB232	25
SR2MOD01	25	TSXSCA50	15
SR2MOD03	25	TWDXCAFJ010	15
		TWDXCAISO	14
T		TWDXCAT3RJ	14
TCSCAR013M120	17		
TCSCAR01NM120	17	V	
TCSCCN4F3M05T	17	VW3A8306D30	15
TCSCCN4F3M1T	17	VW3A8306R03	15
TCSCCN4F3M3T	17	VW3A8306R10	15
TCSCTN023F13M03	17	VW3A8306R30	15
TCSCTN026M16M	17	VW3A8306RC	15
TCSECE3M3M10S4	23	VW3A8306TF03	15
TCSECE3M3M1S4	23	VW3A8306TF10	15
TCSECE3M3M2S4	23	VW3CANA71	17
TCSECE3M3M3S4	23	VW3CANCARR03	17
TCSECE3M3M5S4	23	VW3CANCARR1	17
TCSECN300R2	23	VW3CANTAP2	17
TCSECU3M3M10S4	23	VW3M3805R010	17
TCSECU3M3M1S4	23	VW3M3805R030	17
TCSECU3M3M2S4	23		
TCSECU3M3M3S4	23	X	
TCSECU3M3M5S4	23	XBTZ9008	15
TCSEK3MDS	23	XBTZ938	15
TCSESU033FN0	23	XBTZ9980	15
TCSESU043F1N0	23	XBTZ9982	15
TCSESU053FN0	23	XGSZ24	15
TCSMCN3M4F3C2	15		
TCSMCN3M4M3S2	15		
	25		
TCSXCNAMUM3P	11		
TLACDCBA005	17		
TLACDCBA015	17		
TLACDCBA030	17		
TLACDCBA050	17		
TM251MESC	11		
TM251MESE	11		
TM4ES4	13		
TM4PDPS1	13		
TMASD1	11		
TMAT2PSET	11		
TSXCANCA100	17		
TSXCANCA300	17		
TSXCANCA50	17		
TSXCANCADD03	17		

The Next Generation



www.schneider-electric.com/msx

Schneider Electric Industries SAS

Head Office
35, rue Joseph Monier
F-92500 Rueil-Malmaison
France

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