Modicon TM3 expansion modules

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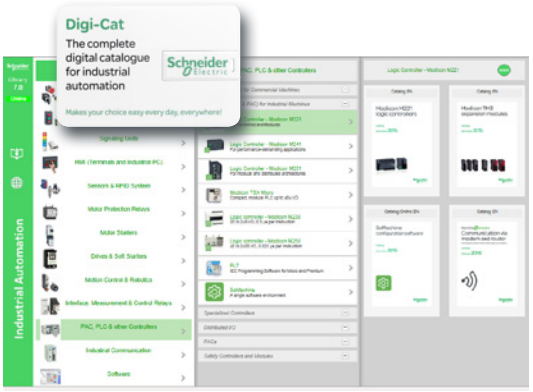

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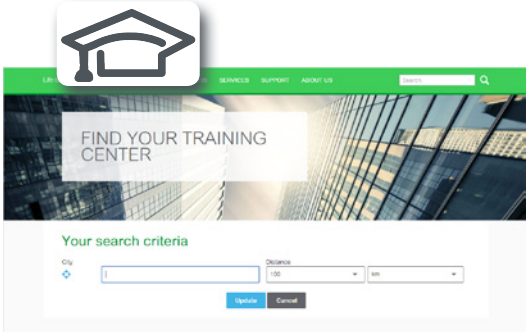

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General contents

Modicon TM3 expansion modules

Expansion modules
Modicon TM3 expansion modules
Presentation of the range

Compatibility of offers

Modicon TM3 expansion modules

- Modicon M221 logic controllers
- Modicon M221 Book logic controllers
- Modicon M241 logic controllers
- Modicon M251 logic controllers
- SoMachine Basic software
- SoMachine software
- Modicon TM2 expansion modules

Digital I/O modules

Analog I/O modules

Expert I/O modules

Functional Safety modules

Bus expansion modules

Presentation

The Modicon TM3 expansion module offer provides an opportunity to enhance the capabilities of Modicon M221, M241 and M251 logic controllers:

- Digital I/O modules which can be used to create configurations with up to 488 digital I/O (according to the controller). These modules are available with the same connections as the controllers.
- Analog I/O modules which can be used to create configurations with up to 114 analog I/O (according to the controller) and are designed to receive, amongst other things, position, temperature or speed sensor signals. They are also capable of controlling variable speed drives or any device equipped with a current or voltage input.
- Expert modules for control of TeSys motor starters which simplify wiring up the control section due to connection with RJ45 cables.
- Functional Safety modules which simplify wiring and can be configured in the SoMachine and/or SoMachine Basic softwares.

In addition, the TM3 expansion system is flexible due to the possibility of remotely locating some of the TM3 modules in the enclosure or another cabinet (up to 5 meters (*16.404 ft.*) away, using 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 the model of controller can be revised without changing expansion module.

Modicon TM3 range		See page
Digital I/O modules	◻ modules with 8 to 32 inputs/outputs: - 24 V or 120 V ⎓ 50/60 Hz inputs - relay or transistor outputs	6
Analog I/O modules	◻ modules with 2 to 8 inputs/outputs: - current/voltage or temperature inputs - current/voltage outputs	10
Expert module	◻ module for control of one to four TeSys motor starters	14
Functional Safety modules	◻ modules designed using **Preventa** technology for integral machine safety: - control of emergency stops - control of switches - control of light curtains - control of pressure-sensitive mats or edges	16
Bus expansion system	◻ transmitter module ◻ receiver module ◻ bus expansion cable	18

Specific features

Modicon TM3 expansion modules have been designed with a simple interlocking assembly mechanism. A bus expansion connector is used to distribute data and the power supply when assembling the Modicon TM3 expansion modules with logic controllers.

Connections

A wide choice of connections is available depending on the model of Modicon TM3 module:

- ◻ removable screw terminal blocks *(1)*
- ◻ removable spring terminal blocks *(1)*
- ◻ HE 10 connector, to be used with HE 10 cables/bare wires or HE 10/HE 10 and Telefast sub-bases *(2)*

The connectors (screw terminal blocks, spring terminal blocks, HE 10 connector, RJ 45) are located on the front of the TM3 expansion modules and are therefore accessible.

(1) The terminal blocks are supplied with Modicon TM3 expansion modules.
(2) Telefast Modicon ABE7 pre-wired system to be ordered separately (see on our website www.schneider-electric.com).

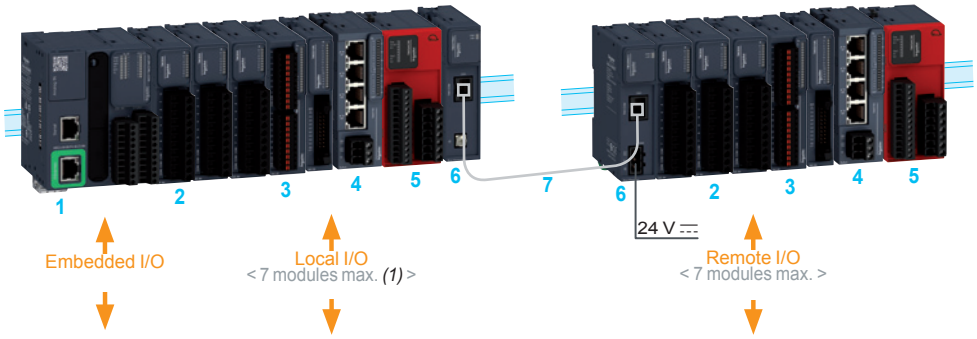
Expansion modules
Modicon TM3 expansion modules
Bus expansion system

Presentation

Modicon TM3 bus expansion system

A PLC configuration consists of a controller with its embedded input and output channels, used in conjunction with local or remote expansion modules which are used to increase the number of channels and/or functions.

- Expansion modules are connected directly by simple interlocking with the controller (local I/O) or remotely (remote I/O) with a TM3 bus expansion cable, up to 5 meters (*16.404 ft.*) max.
- The bus expansion connector, located on the side of the controllers and on each side of the Modicon TM3 expansion modules, transmits and synchronizes data.



1 Logic controller (M221, M221 Book, M241, M251).
2 Modicon TM3 digital I/O modules.
3 Modicon TM3 analog I/O modules.
4 Modicon TM3 expert module: control of TeSys motor-starters.
5 Modicon TM3 functional safety modules.
6 Modicon TM3 bus expansion modules (transmitter and receiver).
7 TM3 bus expansion cable.

■ Local I/O

Maximum configuration: 7 Modicon TM3 expansion modules associated with an M2●● logic controller.

Depending on the expansion module references, there may be fewer than 7 (see page 6).

■ Remote I/O

Maximum configuration: 14 Modicon TM3 expansion modules (7 local modules + 7 remote modules) with the Modicon TM3 bus expansion system (transmitter module and receiver module).

The transmitter and receiver bus expansion modules can be used to:

- increase from 7 to 14 the number of expansion modules that can be connected to an M2●● logic controller
- locate Modicon TM3 expansion modules remotely, up to 5 meters (*16.404 ft.*) away

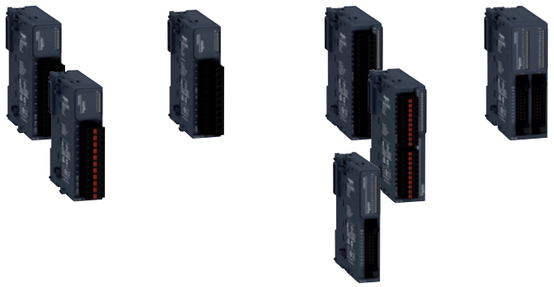
The transmitter and receiver modules are physically linked by a **VDIP184546●●●** bus expansion cable, or any other Cat 5E, F/UT cable.

Mounting

- Modicon TM3 expansion modules are mounted on a ⊥⌐ symmetrical rail. They have a locking clip on the top of their casing.
- For plate or panel mounting, use the **TMAM2** kit.

(1) Depending on type of TM3 module used (see page 5).

Expansion modules
Modicon TM3 digital I/O modules

Applications	Expansion module type	Digital inputs				Digital outputs								Digital inputs/ outputs	
	Compatibility	■ Modicon M221 and Modicon M221 Book logic controllers ■ Modicon M241 logic controllers ■ Modicon M251 logic controllers													
															
Inputs	Number and type of inputs	8 logic inputs	8 logic inputs	16 logic inputs	32 logic inputs	–	–	–	–	–	–	–	–	4 logic inputs	16 logic inputs
	Rated voltage	24 V ⎓	120 V ∿	24 V ⎓	24 V ⎓	–	–	–	–	–	–	–	–	24 V ⎓	24 V ⎓
	Input type	Type 1 (IEC 61131-2, Edition 3)				–	–	–	–	–	–	–	–	Type 1 (IEC 61131-2, Edition 3)	
	Input logic	sink/source	–	sink/source	sink/source	–	–	–	–	–	–	–	–	sink/source	sink/source
Outputs	No. and type of outputs	–	–	–	–	8 relay outputs	8 transistor outputs	8 transistor outputs	16 relay outputs	16 transistor outputs	16 transistor outputs	32 transistor outputs	32 transistor outputs	4 relay outputs	8 relay outputs
	Rated voltage					**24 V** ⎓/ 240 V ∿	24 V ⎓	24 V ⎓	**24 V** ⎓/ 240 V ∿	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓	**24 V** ⎓/ 240 V ∿	**24 V** ⎓/ 240 V ∿
	Type of contact	–	–	–	–	1 N/O contact	–	–	1 N/O contact	–	–	–	–	1 N/O contact	1 N/O contact
	Logic	–	–	–	–	–	Source	Sink	–	Source	Sink	Source	Sink	–	–
	Max. output current □ Per output	–	–	–	–	2 A	0.5 A	0.5 A	2 A	0.5 A for TM3DQ16T and TM3DQ16TG 0.1 A for TM3DQ16TK	0.5A for TM3DQ16U and TM3DQ16UG 0.1 A for TM3DQ16UK	0.1 A	0.1 A	2 A	2 A
	□ Per group of channels	–	–	–	–	7 A	4 A	4 A	8 A	4 A for TM3DQ16T and TM3DQ16TG 2 A for TM3DQ16TK	2 A	2 A	2 A	7 A	7 A
Supply voltage		Power supplied by the controller via the bus expansion connector													
Format (w x h x d)	mm (*in.*)	23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)*	23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)*	TM3DI16, TM3DI16G: 23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)* TM3DI16K: 17.6 x 90 x 70 *(0.69 x 3.54 x 2.76)*	30.2 x 90 x 70 *(1.19 x 3.54 x 2.76)*	23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)*				TM3DQ16T, TM3DQ16TG, TM3DQ16U, TM3DQ16UG: 23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)* TM3DQ16TK, TM3DQ16UK: 17.6 x 90 x 70 *(0.69 x 3.54 x 2.76)*		30.2 x 90 x 70 *(1.19 x 3.54 x 2.76)*		23.6 x 90 x 70 *(0.93 x3.54 x2.76)*	39.1 x 90 x 70 *(1.53 x 3.54 x 2.76)*
Mounting		Mounting on ⊥ symmetrical rail or panel with specific mounting kit TMAM2													
	Channels connected:														
Module type	with removable screw terminal blocks with a thread of 5.08 mm *(0.2 in.)*	**TM3DI8**	**TM3DI8A**	–	–	**TM3DQ8R**	**TM3DQ8T**	**TM3DQ8U**	–	–	–	–	–	**TM3DM8R**	–
	with removable screw terminal blocks with a thread of 3.81 mm *(3.81 mm.)*	–	–	**TM3DI16**	–	–	–	–	**TM3DQ16R**	**TM3DQ16T**	**TM3DQ16U**	–	–	–	**TM3DM24R**
	with removable spring terminal blocks with a thread of 5.08 mm *(0.2 in.)*	**TM3DI8G**	–	–	–	**TM3DQ8RG**	**TM3DQ8TG**	**TM3DQ8UG**	–	–	–	–	–	**TM3DM8RG**	–
	with removable spring terminal blocks with a thread of 3.81 mm *(3.81 mm.)*	–	–	**TM3DI16G**	–	–	–	–	**TM3DQ16RG**	**TM3DQ16TG**	**TM3DQ16UG**	–	–	–	**TM3DM24RG**
	with HE 10 connectors *(1)*	–	–	**TM3DI16K**	**TM3DI32K**	–	–	–	–	**TM3DQ16TK**	**TM3DQ16UK**	**TM3DQ32TK** *(1)*	**TM3DQ32UK** *(1)*	–	–
Page		7				7									

(1) Compatible with the Telefast Modicon ABE7 pre-wired system (see on our website www.schneider-electric.com).

More technical information on www.schneider-electric.com

Expansion modules
Modicon TM3 digital I/O modules

Presentation

The Modicon TM3 digital I/O module offer consists of 27 input modules, output modules and mixed input/output modules. These digital I/O modules complement the embedded I/O on Modicon M221, M221 Book, M241 and M251 logic controllers.

Breakdown of the offer

Digital I/O modules

- with 8, 16 or 32 x 24 V ⎓ inputs
- with 8 x 120 V ∿ inputs
- with 8 or 16 relay outputs
- with 8, 16 or 32 source transistor 24 V ⎓ outputs
- with 8, 16 or 32 source transistor 24 V ⎓ outputs
- with 4 x 24 V ⎓ inputs and 4 relay outputs
- with 16 transistor 24 V ⎓ inputs and 8 relay outputs

Connections

Thanks to a wide choice of modules, it is possible to create homogenous configurations in terms of connections:

- Screw-type connectors with a thread of 5.08 mm (*0.2 in.*) for ease of wiring: identical to the connectors on M221 and M241 logic controllers.
- Screw-type or spring-type connectors with a thread of 3.81 mm (*0.15 in.*) for compact dimensions: identical to the connectors on **TM221M16●●** and **TM221ME16●●** controllers.
- HE10 type connectors that can minimize wiring costs thanks to the Telefast pre-wired system: identical to the connectors on **TM221M32TK** and **TM221ME32TK** controllers.

Configuration

- Local I/O *(1)*: up to 7 I/O modules can be attached to the controller while complying with the restrictions indicated in the table below.
- Remote I/O *(1)* with TM3 bus expansion system: 7 additional I/O modules can be used without restriction. These modules are attached to a **TM3XREC1** receiver module.

Logic controllers		Number of Modicon TM3 expansion modules attached to the controller						
		1	2	3	4	5	6	7
M221, M221 Book	TM221C(E)16R							
	TM221C(E)16T, TM221C(E)16U							
	TM221C(E)24R							
	TM221C(E)24T, TM221C(E)24U							
	TM221C(E)40R							
	TM221C(E)40T, TM221C(E)40U							
	TM221M(E)16R(G)							
	TM221M(E)16T(G), TM221M(E)32TK							
M241, M251	TM241●●●●, TM251●●●●							

Possible regardless of the TM3 module references

Possible regardless of the TM3 module references but without a TM3DQ16R module in the configuration

Possible for some configurations, to be checked in SoMachine Basic or by calculating the total consumption *(1)*

Impossible, use a TM3XTRA1 module + a TM3REC1 module

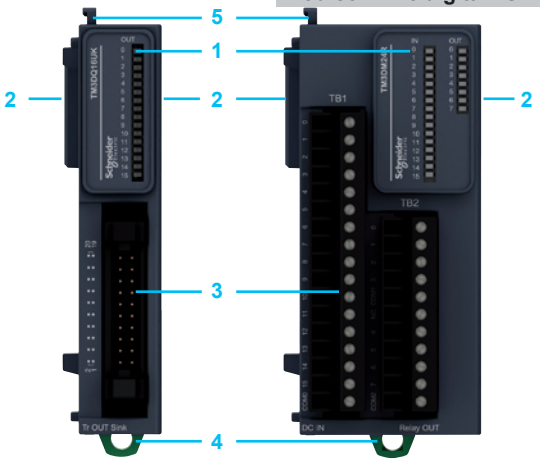
1) TM3 expansion modules are powered by logic controllers via the bus connector on the side of the products. This connector delivers 2 voltages, 5 V and 24 V. You should therefore calculate the total TM3 expansion module consumption and check that it is definitely compatible with the maximum current 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.

Mounting

- Digital I/O modules are mounted on a ⎍ symmetrical rail.
- For plate or panel mounting, use the **TMAM2** kit.

Description

Modicon TM3 digital I/O modules



1. LED display block for the module channels and diagnostics
2. TM3 bus connectors (one on each side). These are designed to provide continuity of the link between connected modules.
3. Input or output channel terminal blocks (depending on model: screw terminal blocks, spring terminal blocks or HE 10 connector).
4. Clip for locking on ⎍ symmetrical rail.
5. Adjacent module locking catch.

Expansion modules
Modicon TM3 digital I/O modules


TM3DI8


TM3DI8G


TM3DI8A


TM3DI32K


TM3DQ16U


TM3DQ16UG


TM3DQ16UK


TM3DQ32TK


TM3DQ32UK


TM3DM24R


TM3DM24RG

References

Modicon TM3 digital input modules

Number of logic inputs	Input type	Term. block for input conn. (1) Thread (mm/in.)	References	Weight kg lb
8 inputs	sink/source 24 V ⎓	screw 5.08/0.2	**TM3DI8**	0.110 0.243
		spring 5.08/0.2	**TM3DI8G**	0.095 0.209
	120 V ∿	screw 5.08/0.2	**TM3DI8A**	0.110 0.243
16 inputs	sink/source 24 V ⎓	screw 3.81/0.15	**TM3DI16**	0.105 0.231
		spring 3.81/0.15	**TM3DI16G**	0.095 0.209
		HE 10 connector –	**TM3DI16K** (2)	0.075 0.165
32 inputs	sink/source 24 V ⎓	HE 10 connector –	**TM3DI32K** (2)	0.110 0.243

Modicon TM3 digital output modules

Number of logic outputs	Output type	Output current	Term. block for output conn. (1) Thread (mm/in.)	References	Weight kg lb
8 outputs	Relay	2 A	screw 5.08/0.2	**TM3DQ8R**	0.130 0.287
			spring 5.08/0.2	**TM3DQ8RG**	0.115 0.254
	Transistor, source	0.5 A	screw 5.08/0.2	**TM3DQ8T**	0.110 0.243
			spring 5.08/0.2	**TM3DQ8TG**	0.095 0.209
	Transistor, sink	0.5 A	screw 5.08/0.2	**TM3DQ8U**	0.110 0.243
			spring 5.08/0.2	**TM3DQ8UG**	0.095 0.209
16 outputs	Relay	2 A	screw 3.81/0.15	**TM3DQ16R**	0.140 0.309
			spring 3.81/0.15	**TM3DQ16RG**	0.130 0.287
	Transistor, source	0.5 A	screw 3.81/0.15	**TM3DQ16T**	0.105 0.231
			spring 3.81/0.15	**TM3DQ16TG**	0.095 0.209
		0.1 A	HE 10 connector –	**TM3DQ16TK** (2)	0.075 0.165
	Transistor, sink	0.5 A	screw 3.81/0.15	**TM3DQ16U**	0.105 0.231
			spring 3.81/0.15	**TM3DQ16UG**	0.095 0.209
		0.1 A	HE 10 connector –	**TM3DQ16UK** (2)	0.075 0.165
32 outputs	Transistor, source	0.1 A	HE 10 connector –	**TM3DQ32TK** (2)	0.115 0.254
	Transistor, sink	0.1 A	HE 10 connector –	**TM3DQ32UK** (2)	0.115 0.254

Modicon TM3 digital mixed I/O modules

No. of logic I/O	Number and type of inputs	Number and type of outputs	Term. block for input/output conn. (1) Thread (mm/in.)	References	Weight kg lb
8 inputs/outputs	4 sink/source 24 V ⎓ inputs	4 relay outputs, 2 A	screw 5.08/0.2	**TM3DM8R**	0.120 0.265
			spring 5.08/0.2	**TM3DM8RG**	0.100 0.220
24 inputs/outputs	16 sink/source 24 V ⎓ inputs	8 relay outputs, 2 A	screw 3.81/0.15	**TM3DM24R**	0.165 0.364
			spring 3.81/0.15	**TM3DM24RG**	0.155 0.342

Separate parts

Designation	Description	Reference	Weight kg lb
Mounting kit Sold in lots of 10	For plate or panel mounting of digital I/O modules	**TMAM2**	0.065 0.143
Set of terminal blocks for connecting the I/O	4 x 10-way and 4 x 11-way removable terminal blocks with screw terminals for TM3DI16, TM3DQ16R, TM3DQ16T and TM3DQ16U modules	**TMAT2MSET**	0.127 0.280
	4 x 10-way and 4 x 11-way removable terminal blocks with spring terminals for TM3DI16G, TM3DQ16RG, TM3DQ16TG and TM3DQ16UG modules	**TMAT2MSETG**	0.127 0.280

(1) Removable screw or spring-type terminal blocks, supplied.
(2) Modules compatible with the Telefast Modicon ABE7 pre-wired system (on our website www.schneider-electric.com).

Expansion modules
Modicon TM3 analog I/O modules

Applications	**Type of expansion module**	**Analog inputs**				**Analog inputs**	**Analog outputs**		**Analog inputs/outputs**	
	Compatibility	■ Modicon M221 and M221 Book logic controllers ■ Modicon M241 logic controllers ■ Modicon M251 logic controllers								
										
Inputs	Number	**2 inputs**	**4 inputs**	**4 inputs**	**8 inputs**	**8 inputs**	–	–	**2 inputs**	**4 inputs**
	Type	**Voltage/current**	**Voltage/current**	**Temperature or voltage/ current**	**Voltage/current**	**Temperature**	–	–	**Temperature or voltage/current**	**Voltage/current**
	Range	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	Thermocouples (J, K, R, S, B, T, N, E, C) Temperature probes (RTDs): (Ni100, Ni1000, PT100, PT1000) - 10…+ 10 VDC, 0…+ 10 VDC / 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	Thermocouples (J, K, R, S, B, T, N, E, C) NTC and PTC thermistors	–	–	Thermocouples (J, K, R, S, B, T, N, E, C) Temperature probes (RTDs): (Ni100, Ni1000, PT100, PT1000) - 10…+ 10 VDC, 0…+ 10 VDC / 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA
	Resolution	16 bits or 15 bits + sign	12 bits or 11 bits + sign	16 bits or 15 bits + sign	12 bits or 11 bits + sign	16 bits or 15 bits + sign	–	–	16 bits or 15 bits + sign	12 bits or 11 bits + sign
	Read time	1 or 10 ms (configurable)	1 or 10 ms (configurable)	100 ms per channel for temperature signals. 1 or 10 ms (configurable) for voltage/current signals	1 or 10 ms (configurable)	100 ms per channel	–	–	100 ms per channel for temperature signals. 1 or 10 ms (configurable) for voltage/ current signals	1 or 10 ms (configurable)
Outputs	Number	–	–	–	–	–	**2 outputs**	**4 outputs**	**1 output**	**2 outputs**
	Type	–	–	–	–	–	**Voltage/current**	**Voltage/current**	**Voltage/current**	**Voltage/current**
	Range	–	–	–	–	–	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA
	Resolution	–	–	–	–	–	12 bits or 11 bits + sign	12 bits or 11 bits + sign	12 bits or 11 bits + sign	12 bits or 11 bits + sign
	Transfer time	–	–	–	–	–	1 or 10 ms (configurable)	1 or 10 ms (configurable)	1 or 10 ms (configurable)	1 or 10 ms (configurable)
Supply voltage		With a 24 V ⎓ external power supply				With a 24 V ⎓ external power supply				
Format (w x h x d) mm (*in.*)		23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)*				23.6 x 90 x 70 *(0.93 x 3.54 x 2.76)*				
Mounting		Mounting on ⊥ symmetrical rail or panel with specific mounting kit TMAM2				Mounting on ⊥ symmetrical rail or panel with specific mounting kit TMAM2				
Type of module	Channel connection:									
	via removable screw terminal blocks at intervals of 5.08 *(0.2 in.)*	**TM3AI2H**	–	–	–	–	**TM3AQ2**	**TM3AQ4**	**TM3TM3**	–
	via removable screw terminal blocks at intervals of 3.81 *(0.15 in.)*	–	**TM3AI4**	**TM3TI4**	**TM3AI8**	**TM3TI8T**	–	–	–	**TM3AM6**
	via removable spring terminal blocks at intervals of 5.08 *(0.2 in.)*	**TM3AI2HG**	–	–	–	–	**TM3AQ2G**	**TM3AQ4G**	**TM3TM3G**	–
	via removable spring terminal blocks at intervals of 3.81 *(0.15 in.)*	–	**TM3AI4G**	**TM3TI4G**	**TM3AI8G**	**TM3TI8TG**	–	–	–	**TM3AM6G**
Page		11				11				

Expansion modules
Modicon TM3 analog I/O modules

Presentation

The Modicon TM3 analog I/O module offer consists of 18 input, output and mixed input/output modules. The input modules acquire various analog values encountered in industrial applications.
These I/O modules complement the embedded I/O in Modicon M221, M221 Book and M241 logic controllers.

- TM3AI●● and TM3TI●● analog input modules are used to acquire various analog values (voltage, current or temperature) encountered in industrial applications.
- TM3AQ●● analog output modules are used to control preactuators in physical units, such as variable speed drives or valves and applications where process control is required.
- TM3TM●● and TM3AM●● mixed modules combine voltage/current or temperature analog inputs as well as one or two voltage/current outputs in the same case.
- When the controller stops, the outputs of each TM3 analog modules can be configured to fall back (hold the last value or a specified value). This function, when set to “hold”, is useful when debugging the application or when a fault occurs, in order not to disturb the process being controlled.

Breakdown of the offer

Analog I/O modules Modules with 2 to 8 analog I/O:
- voltage/current or temperature inputs
- voltage/current outputs

Format

A single format: 23.6 x 90 x 70 *(0.93 x 3.54 x 2.76 in.)*.

Connection

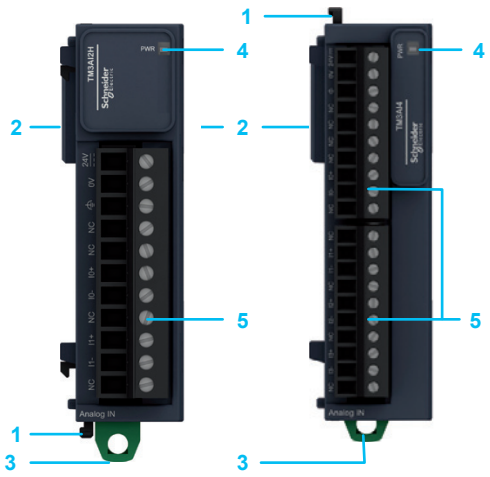
With a wide selection of modules, uniform configurations can be created in terms of connectors:
- Screw-type or spring-type connectors at intervals of 5.08 (*0.2 in.)* for ease of wiring: identical to the connectors on Modicon M221 (TM221C●●●●) and Modicon M241 (TM241C●●●●) logic controllers.
- Screw-type or spring-type connectors at intervals of 3.81 (*0.15 in.)* for compact dimensions: identical to the connectors on Modicon M221 Book (TM221M16●● and TM221ME16●●) logic controllers.

Configuration

- Analog I/O modules connect to Modicon M221 and M221 Book, M241 and M251 logic controllers according to the general rules for the Modicon TM3 system: 7 modules max. and 14 modules max. with use of Modicon TM3 bus expansion system (transmitter and receiver).
- An external 24 V ⎓ power supply is required for each Modicon TM3 analog module.
- The I/O modules are designed with isolation by an optocoupler between the internal electronics and the I/O channels.

Mounting

- The analog modules are mounted on a ⊔ symmetrical rail.
- For plate or panel mounting, use the **TMAM2** kit.
- The **TM2XMTGB** grounding plate simplifies connection of the analog sensor and actuator cable shielding (shielding to be connected to the device's functional ground).



TM3AI2H, TM3AQ2, TM3AQ4, TM3TM3

TM3AI4, TM3TI4, TM3AI8, TM3TI8T, TM3AM6

Description

Modicon TM3 analog modules

1 Locking latch for the adjacent module.
2 TM3 bus connectors (one on each side). These are designed to provide continuity of the link between connected modules.
3 Clip for locking on ⊔ symmetrical rail.
4 Module “Power on” LED.
5 Removable spring or screw terminal blocks (depending on the model) for connecting the analog channels and the 24 V power supply.

Expansion modules
Modicon TM3 analog I/O modules


TM3AI2H TM3AI4


TM3TI4 TM3AI8


TM3TI8T


TM3AQ2 TM3AQ4


TM3TM3 TM3AM6


TM200RSRCEMC


TM2XMTGB

References

Modicon TM3 analog I/O modules

Number and type of channels	Input range	Output range	Resolution	Term. block for input conn. *(1)* Thread *(mm /in.)*	Reference	Weight kg *lb*
2 voltage/current inputs	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	–	16 bits or 15 bits + sign	Screw 5.08/*0.2*	**TM3AI2H**	0.115 *0.254*
				Spring 5.08/*0.2*	**TM3AI2HG**	0.100 *0.220*
4 voltage/current inputs	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	–	12 bits or 11 bits + sign	Screw 3.81/*0.15*	**TM3AI4**	0.110 *0.243*
				Spring 3.81/*0.15*	**TM3AI4G**	0.100 *0.220*
4 temperature or voltage/current inputs *(2)*	□ Thermocouples *(3)* (J, K, R, S, B, T, N, E, C) □ Temperature probes (RTD) (Ni100, Ni1000, PT100, PT1000) □ - 10…+ 10 VDC, 0…+ 10 VDC) /0…20 mA, 4…20 mA)	–	16 bits or 15 bits + sign	Screw 3.81/*0.15*	**TM3TI4**	0.110 *0.243*
				Spring 3.81/*0.15*	**TM3TI4G**	0.100 *0.220*
8 voltage/current inputs	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	–	12 bits or 11 bits + sign	Screw 3.81/*0.15*	**TM3AI8**	0.110 *0.243*
				Spring 3.81/*0.15*	**TM3AI8G**	0.100 *0.220*
8 temperature inputs	□ Thermocouples *(3)* (J, K, R, S, B, T, N, E, C) □ NTC and PTC thermistors	–	16 bits or 15 bits + sign	Screw 3.81/*0.15*	**TM3TI8T**	0.110 *0.243*
				Spring 3.81/*0.15*	**TM3TI8TG**	0.100 *0.220*

Modicon TM3 analog output modules

2 voltage/current outputs	–	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	12 bits or 11 bits + sign	Screw 5.08/*0.2*	**TM3AQ2**	0.115 *0.254*
				Spring 5.08/*0.2*	**TM3AQ2G**	0.100 *0.220*
4 **voltage/current outputs**	–	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	12 bits or 11 bits + sign	Screw 5.08/*0.2*	**TM3AQ4**	0.115 *0.254*
				Spring 5.08/*0.2*	**TM3AQ4G**	0.100 *0.220*

Modicon TM3 analog mixed I/O modules

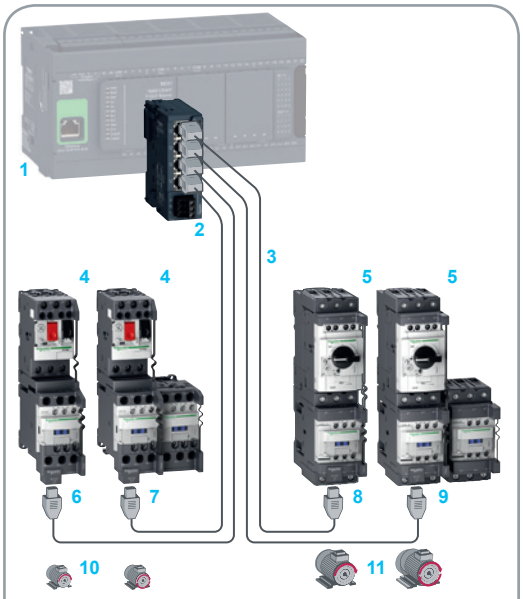
2 temperature or voltage/current inputs *(2)* **and 1 voltage/current output**	□ Thermocouples *(3)* (J, K, R, S, B, T, N, E, C) □ Temperature probes (RTDs) (Ni100, Ni1000, PT100, PT1000) □ - 10…+ 10 VDC, 0…+ 10 VDC) /0…20 mA, 4…20 mA)	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	16 bits or 15 bits + sign (for E) 12 bits or 11 bits + sign (for S)	Screw 5.08/*0.2*	**TM3TM3**	0.115 *0.254*
				Spring 5.08/*0.2*	**TM3TM3G**	0.100 *0.220*
4 voltage/current inputs and 2 voltage/current outputs	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	- 10…+ 10 VDC, 0…+ 10 VDC/ 0…20 mA, 4…20 mA	12 bits or 11 bits + sign (for I and O)	Screw 3.81/*0.15*	**TM3AM6**	0.110 *0.243*
				Spring 3.81/*0.15*	**TM3AM6G**	0.100 *0.220*

Separate parts

Designation	Description	Unit reference	Weight kg *lb*
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 (FG)	**TM2XMTGB**	0.045 *0.099*
Shielding connection clamps Sold in lots of 25	Assembly and grounding of the cable shielding. Pack of 25 clamps including 20 for Ø 4.8 mm cable *(0.189 in.)* and 5 for Ø 7.9 mm *(0.311 in.) cable*	**TM200RSRCEMC**	–
Mounting kit Sold in lots of 10	For mounting the analog I/O modules on a plate or panel	**TMAM2**	0.065 *0.143*
Set of I/O terminal blocks	4 terminal blocks with 10 pins and 4 terminal blocks with 11 removable screw terminal pins for TM3AI4, TM3TI4, TM3AI8, TM3TI8, TM3AM6 modules	**TMAT2MSET**	0.127 *0.280*
	4 terminal blocks with 10 pins and 4 terminal blocks with 11 removable spring terminal pins for TM3AI4G, TM3TI4G, TM3AI8G, TM3TI8G, TM3AM6G modules	**TMAT2MSETG**	0.127 *0.280*

(1) Removable screw terminal blocks supplied with each module.
(2) Each input can be configured independently for temperature or voltage/current.
(3) Only use isolated thermocouples.

Expansion modules
Modicon TM3 expert module
for TeSys motor starter applications



1 *Modicon M221, M221 book, M241, M251 logic controllers*
2 *Modicon TM3XTYS4 expert Module (provides the 24 V ⎓ control voltage to the TeSys motor starter coil)*
3 *RJ45 cables LU9R●●*
4 *D.O.L. or reversing starters GV2ME●● + LC1D●●●●*
5 *D.O.L. or reversing starters GV3P●● + LC1D●●●●*
6 *Adaptor LAD5C11*
7 *Adaptor LAD5C12*
8 *Adaptor LAD5C3*
9 *Adaptor LAD5C32*
10 *Medium power motor up to 15 kW*
11 *Medium power motor up to 30 kW*
Non reversing control
Reversing

Presentation

The **TM3XTYS4** expert module is a pre-wired interface for use with Modicon M221, M241 and M251 logic controllers, designed to monitor and control up to four motor starters.
The **TM3XTYS4** expert module is a component of TeSys Solink system that allows a simple, fast and error free wiring of the motor starter.

Controlling motor starters with the TM3XTYS4 expert module

Each of the four channels on the **TM3XTYS4** expert module has:
■ Two outputs for the command of the motor starter:
□ direction 1 command
□ direction 2 command, if reversing starter.
■ Three inputs for the motor starter status:
□ Ready
□ Run
□ Fault
The inputs are connected in series with the motor starter auxiliary contacts.

Connections

□ The **TM3XTYS4** Expert module is equipped with four RJ 45 connectors for connection to the motor starters.
□ **LU9R●●●** type cordsets are dedicated to the connection of TeSys motor starter and equipped with an RJ 45 connector at each end.

Configuration

□ The expert module is connected directly to the logic controllers on the TM3 bus connector or to the bus expansion system (receiver module).
□ One or more expert modules can be connected to M221, M221 Book, M241 and M251 logic controllers according to the general rules for the TM3 system:
7 modules max. and 14 modules max. with the use of Modicon TM3 bus expansion system (transmitter and receiver).

Mounting

□ The **TM3XTYS4** expert module is mounted on a ⊥ symmetrical rail.
□ For plate or panel mounting, use the **TMAM2** kit.

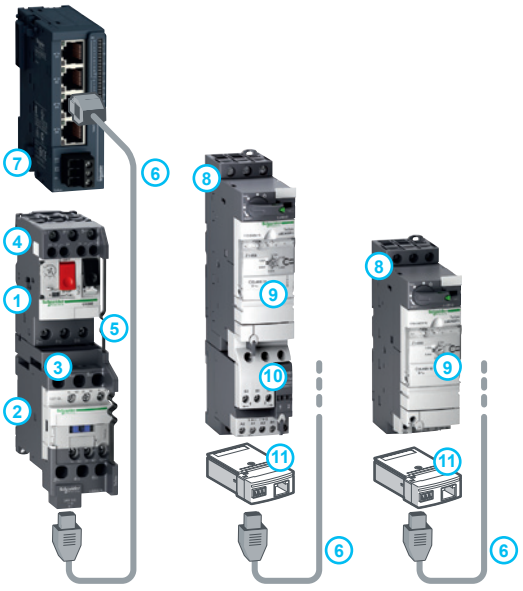
Format

A single format: 23.6 x 90 x 70 mm *(0.93 x 3.54 x 2.76 in.)*.

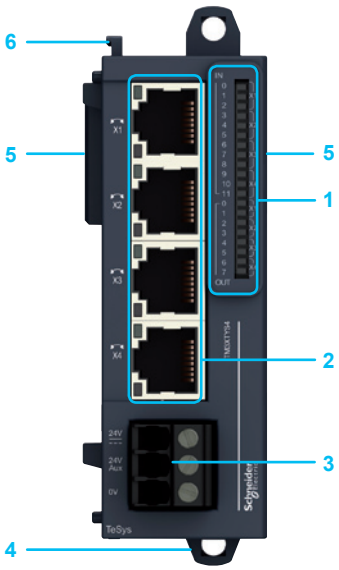
TeSys motor starter applications examples

	Direct Up to 15 kW / 400 V	From 18.5 to 30 kW / 400 V	**Reversing** Up to 15 kW / 400 V	From 18.5 to 30 kW / 400 V
TeSys D				
1 Motor circuit breaker	**GV2ME●●** or **GV2P●●**	**GV3P●●**	**GV2ME●●** or **GV2P●●**	**GV3P●●**
2 Contactor 24 V ⎓	**LC1D09BL** to **LC1D32BL** **LC1D09BD** to **LC1D32BD**	**LC1D40ABD** to **LC1D65ABD**	**LC2D09BL** to **LC2D32BL** **LC2D09BD** to **LC2D32BD**	**LC2D40BD** to **LC1D65BD**
3 Combination block	**GV2AF3**	**–**	**GV2AF3**	**–**
4 Auxilliary contact	**GVAE20**	**GVAE20**	**GVAE20**	**GVAE20**
5 Connection module	**LAD5C11**	**LAD5C31**	**LAD5C12**	**LAD5C32**
Connection cable				
6 Length of 0.3 m	**LU9R03**			
6 Length of 1 m	**LU9R10**			
6 Length of 3 m	**LU9R30**			
Modicon TM3 module				
7 Modicon TM3	**TM3XTYS4**			
TeSys U				
8 Power base	**LUB120 or LUB320**		**LU2B12BL or LU2B32BL**	
9 Control unit 24 V ⎓	**LUCA/LUCB/LUCC/LUCD●●BL**		**LUCA/LUCB/LUCC/LUCD●●BL**	
10 Terminal blocks	**LU9BN11C**		**LU9MRC**	
11 Parallel wiring module	**LUFC00**		**LUFC00**	

For further information about **TeSys motor starter applications**, please consult our website www.schneider-electric.com.



Expansion modules
Modicon TM3 expert module
for TeSys motor starter applications



Description

TM3XTYS4 expert module

1 Block with 20 LEDs displaying the status of the 12 input channels and 8 output channels.
2 Four RJ 45 connectors for cordsets connecting to the motor starters.
3 Screw terminal block for connecting the 24 V ⎓ power supply for the inputs and starter coils.
4 ⊔ symmetrical rail locking clip.
5 TM3 bus connectors (one on each side). These are designed to provide continuity of the link between connected modules.
6 Adjacent module locking latch.

TM3XTYS4

References

Expert module *(1)*

Designation	Number and type of channels	Reference	Weight kg *lb*
Expert modules for control of TeSys motor starters 24 V ⎓ power supply (1.2 A)	4 motor starters	**TM3XTYS4**	0.115 *0.254*

Separate parts

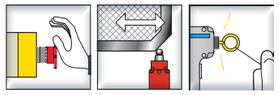
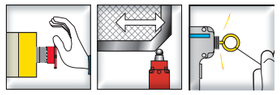
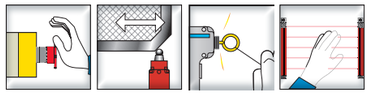
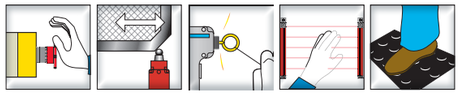
Designation	Description	Reference	Weight kg *lb*
Mounting kit Sold in lots of 10	For plate or panel mounting of expert modules	**TMAM2**	0.065 *0.143*

*(1) The **TM3XTYS4** module is supplied with a screw removable terminal block for connecting the power supply.*

Expansion modules

Modicon TM3 functional safety modules

*(Powered by **Preventa** technology)*

Safety application		 **Control of Emergency stop and switches**	 **Control of Emergency stop and switches**	 **Control of Emergency stop, switches, solid-state output safety light curtains and sensors with PNP+PNP outputs**	 **Control of Emergency stop, switches, pressure-sensitive mats and edges, solid-state output safety light curtains and sensors with PNP+PNP or PNP+NPN outputs**
Compatibility		■ Modicon M221 and Modicon M221 Book logic controllers ■ Modicon M241 logic controllers ■ Modicon M251 logic controllers		■ Modicon M221 and Modicon M221 Book logic controllers ■ Modicon M241 logic controllers ■ Modicon M251 logic controllers	
					
Maximum achievable safety level		PL d/Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 62061	PL d/Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 62061
Standards (product)		EN/IEC 60947-1 EN/IEC 60947-5-1	EN/IEC 60947-1 EN/IEC 60947-5-1	EN/IEC 60947-1 EN/IEC 60947-5-1	EN/IEC 60947-1 EN/IEC 60947-5-1
Standards (machine assembly)	Emergency stop circuits	EN/IEC 60204-1 EN/ISO 13850	EN/IEC 60204-1 EN/ISO 13850	EN/IEC 60204-1 EN/ISO 13850	EN/IEC 60204-1 EN/ISO 13850
	Switches in protective devices	EN/ISO 14119	EN/ISO 14119	EN/ISO 14119	EN/ISO 14119
	Type 4 light curtains equipped with solid-state safety outputs with test function	–	–	Also designed for use with equipment conforming to EN/IEC 61496-1 up to type 4	Also designed for use with equipment conforming to EN/IEC 61496-1 up to type 4
	4-wire pressure-sensitive mats or edges	–	–	–	Also designed for use with equipment conforming to standard EN 1760-1
Product certifications		UL, CSA, TÜV, EAC, RCM	UL, CSA, TÜV, EAC, RCM	UL, CSA, TÜV, EAC, RCM	UL, CSA, TÜV, EAC, RCM
Safety circuits	Number	3 NO	3 NO	3 NO	3 NO
	Type	Instantaneous opening relay	Instantaneous opening relay	Instantaneous opening relay	Instantaneous opening relay
Module fuse protection		Internal, electronic	Internal, electronic	Internal, electronic	Internal, electronic
LEDs		6 LEDs	8 LEDs	8 LEDs	8 LEDs
Power supply		24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
Synchronization time between inputs		Unlimited	Unlimited	Unlimited	Unlimited/ON configured in software. If ON then 2 or 4 s depending on wiring.
Input channel voltage		24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
	Channels and power supply connected:				
Safety module type	with removable screw terminal blocks	**TM3SAC5R**	**TM3SAF5R**	**TM3SAFL5R**	**TM3SAK6R**
	with removable spring terminal blocks	**TM3SAC5RG**	**TM3SAF5RG**	**TM3SAFL5RG**	**TM3SAK6RG**
Page		17		17	

Expansion modules
Modicon TM3 functional safety modules
*(Powered by **Preventa** technology)*

Presentation

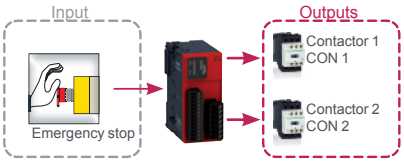
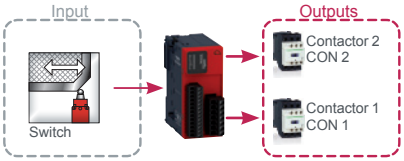
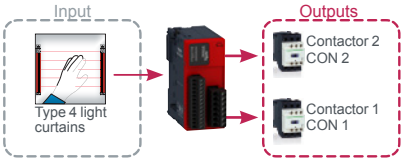
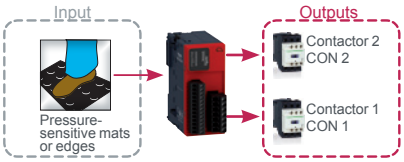
Modicon TM3 functional safety modules are designed using Preventa technology. They can be used to incorporate machine safety into the overall machine control.

Data acquisition: control of safety products

- Emergency stop button: complementary protection measures
- Monitoring devices used in protective systems to control access to hazardous areas
- Light curtains and safety mats to detect intrusion into hazardous areas

Monitoring and processing

- Modicon TM3 functional safety modules control the input signals from monitoring devices and act as an interface with contactors and variable speed drives, causing the machine to stop.
- Modicon TM3 functional safety modules complement the embedded I/O on M221, M221 Book, M241 and M251 logic controllers.

Modicon TM3 functional safety modules	Safety system/Performance level reached
For control of emergency stops	Category 4 architecture / PL e, SIL3 
For control of switches	Category 4 architecture / PL e, SIL3 
For control of type 4 light curtains	Category 4 architecture / PL e, SIL3 
For control of pressure-sensitive mats or edges	Category 4 architecture / PL e, SIL3 

- The safety outputs available on the 4 modules are relay type, guided by microprocessor technology.
- Diagnostic utilities use LEDs, found on the module front face. They provide information on the monitoring circuit status.
- The diagnostic information is shared via the TM3 bus.
- The Start button monitoring function is configurable depending on the wiring.

Connections

Equipped, depending on the model, with removable screw or spring-type terminals for connecting the safety channels.

Configuration

Modicon TM3 functional safety modules connect to M221, M221 Book, M241 and M251 logic controllers according to the general rules for the TM3 system: 7 modules max. and 14 modules max. with the use of Modicon TM3 bus expansion system (transmitter and receiver).

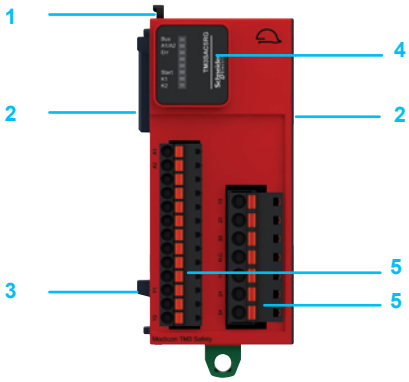
Mounting

- Modicon TM3 functional safety modules are mounted on a ⊔ symmetrical rail.
- For plate or panel mounting, use the **TMAM2** kit.

Expansion modules

Modicon TM3 functional safety modules

*(Powered by **Preventa** technology)*



Description

Modicon TM3 functional safety modules

1 Adjacent module locking latch.
2 TM3 bus connectors (one on each side). These are designed to provide continuity of the link between connected modules.
3 ⊔ symmetrical rail locking clip.
4 Display block (6 or 8 *(1)* LEDs - green, red) for the module channels and diagnostics.
5 Removable spring or screw-type terminal blocks (depending on the model) for connecting the safety channels and the power supply.


TM3SAC5R


TM3SAC5RG


TM3SAF5R


TM3SAF5RG


TM3SAFL5R


TM3SAFL5RG


TM3SAK6R


TM3SAK6RG

References

Designation	Maximum achievable safety level	Term. block for input conn. *(2)*	Reference	Weight kg lb
24 V ⎓ power supply				
Functional Safety modules for control of □ emergency stops □ switches	PL d/Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 62061	screw	**TM3SAC5R**	0.190 *0.420*
		spring	**TM3SAC5RG**	0.190 *0.420*
Functional Safety modules for control of □ emergency stops □ switches	PL e/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 62061	screw	**TM3SAF5R**	0.190 *0.420*
		spring	**TM3SAF5RG**	0.190 *0.420*
Functional Safety modules for control of □ emergency stops □ switches □ safety light curtains with solid-state outputs	PL d/Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 62061	screw	**TM3SAFL5R**	0.190 *0.420*
		spring	**TM3SAFL5RG**	0.190 *0.420*
Functional Safety modules for control of □ emergency stops □ switches □ safety light curtains with solid-state outputs □ pressure-sensitive mats or edges	PL e/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 62061	screw	**TM3SAK6R**	0.190 *0.420*
		spring	**TM3SAK6RG**	0.190 *0.420*

Separate parts

Designation	Description	Reference	Weight kg lb
Mounting kit Sold in lots of 10	For mounting Functional Safety modules on a plate or panel	**TMAM2**	0.065 *0.143*

(1) Depending on model.
(2)Removable terminal blocks equipped with screw terminals or spring terminals, supplied with the safety module.

Expansion modules
Modicon TM3 bus expansion system
Transmitter module and receiver module

Presentation

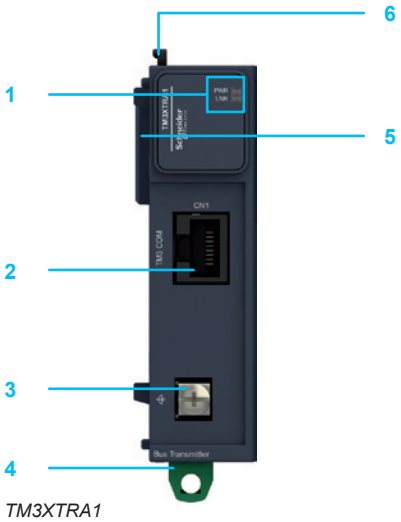
Modicon TM3 transmitter and receiver modules can be used to:
- increase from 7 to 14 the number of TM3 I/O expansion modules that can be connected to an M2●● logic controller *(1)*
- locate Modicon TM3 expansion modules remotely, up to 5 m (*16.404 ft.*) away

The transmitter and receiver modules are physically linked by a **VDIP184546●●●** bus expansion cable, or any other shielded cable Cat 5E, F/UT.

Mounting

- TM3 bus expansion modules are mounted on a ⊔ symmetrical rail.
- For plate or panel mounting, use the **TMAM2** kit.

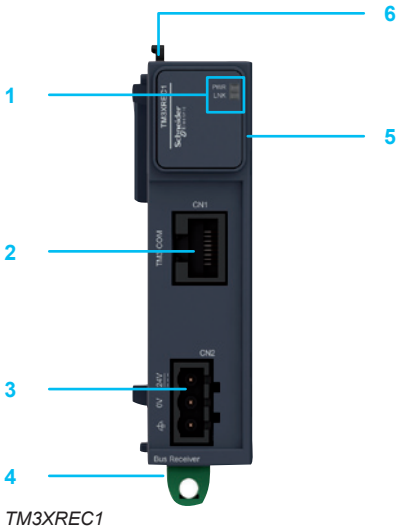
Description



TM3XTRA1

TM3XTRA1 transmitter module

1 Block with 2 LEDs displaying the communication status and power supply status.
2 RJ 45 connector for connecting the **VDIP184546●●●** bus expansion cable, or any other shielded cable Cat 5E, F/UT.
3 Screw terminal for the functional ground (FG) connection.
4 ⊔ symmetrical rail locking clip.
5 TM3 bus connector providing continuity of the link with the connected module.
6 Adjacent module locking latch.



TM3XREC1

TM3XREC1 receiver module

1 Block with 2 LEDs displaying the communication status and power supply status.
2 RJ 45 connector for connecting the **VDIP184546●●●** bus expansion cable, or any other shielded cable Cat 5E, F/UT.
3 Screw terminal block for connecting the power supply.
4 ⊔ symmetrical rail locking clip.
5 TM3 bus connector providing continuity of the link with the connected module.
6 Adjacent module locking latch.

(1) It is not possible to use the bus expansion system Modicon TM3 if one or more Modicon TM2 expansion modules are used in the configuration.

Expansion modules
Modicon TM3 bus expansion system
Transmitter module and receiver module


TM3XTRA1


TM3XREC1

References

Modicon TM3 bus expansion system

Designation	Characteristics	Reference	Weight kg *lb*
Transmitter module	Data transmission module Power supply: using the TM3 bus	**TM3XTRA1**	0.065 *0.143*
Receiver module	Data reception module Power supply: 24 V ⎓ (with external power supply)	**TM3XREC1** *(1)*	0.075 *0.165*

Accessory for transmitter module

Designation	Characteristics	Length m *(ft.)*	Reference	Weight kg *lb*
Functional ground cable	Functional ground for the TM3XTRA1 transmitter module	0.12 *(0.39)*	Cable supplied with the TM3XTRA1 transmitter module	

Cordsets for CE market

Designation	Used for	Length m *(ft.)*	Reference	Weight kg *lb*
Shielded category 5E TM3 bus expansion cordsets	TM3 bus expansion by linking transmitter and receiver modules Equipped with an RJ 45 connector at each end	0.5 *(1.64)*	**VDIP184546005**	–
		1 *(3.28)*	**VDIP184546010**	–
		2 *(6.56)*	**VDIP184546020**	–
		3 *(9.84)*	**VDIP184546030**	–
		5 *(16.40)*	**VDIP184546050**	–

Cordsets for UL market

Designation	Used for	Length m *(ft.)*	Reference	Weight kg *lb*
Shielded twisted pair TM3 bus expansion cordsets, UL compatible	TM3 bus expansion by linking transmitter and receiver modules Equipped with an RJ 45 connector at each end	2 *(6.56)*	**490NTW00002U**	–
		5 *(16.40)*	**490NTW00005U**	–

Spare parts

Designation	Description	Unit reference	Weight kg *lb*
Mounting kit Sold in lots of 10	For mounting bus expansion modules on a plate or panel	**TMAM2**	0.065 *0.143*
Set of terminal blocks for connecting the power supply	8 removable terminal blocks with screw terminals	**TMAT2PSET**	0.127 *0.280*

(1) The TM3XREC1 module is supplied with a removable screw terminal block for connecting the power supply.

Expansion modules
Modicon TM3 expansion modules
Product reference index

The Next Generation

Schneider Electric Industries SAS

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

www.schneider-electric.com/msx

Design: Schneider Electric
Photos: Schneider Electric

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