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Main features (1)

Processing power

- Execution speed: 0.2 µs/Boolean instruction
- Program: 10 K list instructions
- Number of words: 8,000%MW
- Number of internal bits: 1024%M
- Retain memory: 3,000 words (%MW0 to %MW2999)
- Application structure:
 - master task: 1 task configurable as freewheeling or cyclic
 - auxiliary task: 1 task configurable as timer cycle interrupt
 - interrupt task: 4 external tasks tripped by fast inputs and 4 high-speed counters

Supply characteristics

- Two power supplies are available (depending on the model):
24 V $\overline{\text{---}}$ or 100...220 V $\sim$
- Voltage limit (ripple included): 20.4...28.8 V $\overline{\text{---}}$ /85...264 V $\sim$ (50/60Hz)
- Max. consumption:
 - 61-74 VA for AC power supply
 - 18 W for DC power supply

Connection of the embedded I/O

On removable screw terminal blocks at intervals of 5.08 mm / 0.2 in.; 24 V DC sensor power output provided by the controller (TM200C●●R models only):

- 250 mA for 16 and 24 I/O
- 300 mA for 32, 40 and 60 I/O

Environmental characteristics

- Degree of protection: IP 20 with protective cover in place
- Ambient operating temperature: 0...55 °C/32... 131 °F
- Storage temperature: -25...70 °C/-13... 158 °F
- Relative humidity: 5...95% (non-condensing)
- Operating altitude: 0...2,000 m/ 0... 6,560 ft
- Storage altitude: 0...3,000 m/ 0...9,843 ft
- Vibration resistance: IEC/EN 61131-2 panel mounting or mounted on a top hat section rail (DIN rail)

Product certification and conformity to standards

- CE certification
- Conformity to the main national and international standards concerning electronic industrial control devices (IEC/EN 61131-2, UL 508, and IEC/EN 61010-2-201)

Embedded communication

M200 logic controllers have 3 types of integrated communication port:

- Ethernet (depending on the model)
- RS 485 embedded serial link
- Mini-USB programming port

Communication on Ethernet network

TM200CE●●● controllers have an embedded RJ 45 Ethernet port (10/100 Mbps, MDI/MDIX) with Modbus TCP (8 servers/1 client).
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.

- The Ethernet port also offers application uploading, updating, and debugging functions when the controller is supplied with power.
- The integrity of applications is maintained by cybersecurity functions.
- A firewall allows each communication protocol to be locked.

Serial links

Each TM200C●●● controller has an embedded RS 485 serial link. This serial link also provides the functionality for loading, updating and development when the controller is powered up. The two main commercially-available protocols are embedded in this link:

- Modbus ASCII/RTU Master or Slave
- Character string (ASCII)



Modicon M221	
Reference	Description
TM200C16R	CONTR. M200 16I O 220VAC RELAY
TM200C16T	CONTR. M200 16I O 24VDC TR.SOURCE
TM200C16U	CONTR. M200 16I O 24VDC TR.SINK
TM200C24R	CONTR. M200 24I O 220VAC RELAY
TM200C24T	CONTR. M200 24I O 24VDC TR.SOURCE
TM200C24U	CONTR. M200 24I O 24VDC TR.SINK
TM200C40R	CONTR. M200 40I O 220VAC RELAY
TM200C40T	CONTR. M200 40I O 24VDC TR.SOURCE
TM200C40U	CONTR. M200 40I O 24VDC TR.SINK
TM200C60R	CONTR. M200 60I O 220VAC RELAY
TM200CE24R	CONTR. M200 24I O 220VAC RELAY ETH
TM200CE24T	CONTR. M200 24I O 24VDC TR.SOURCE ETH
TM200CE24U	CONTR. M200 24I O 24VDC TR.SINK ETH
TM200CE40R	CONTR. M200 40I O 220VAC RELAY ETH
TM200CE40T	CONTR. M200 40I O 24VDC TR.SOURCE ETH
TM200CE40U	Controller M200 40 IO transistor SINK+ Ethernet



16 I/O channels 24 I/O channels



40 I/O channels
Modicon M221 logic controllers (standard format)



16 I/O channels 32 I/O channels
Modicon M221 Book logic controllers

Presentation

Applications

- Modicon **M221** and **M221 Book** logic controllers are designed for simple machines. They can optimize the size of wall-mounted and floor-standing control system enclosures due to their compact dimensions.
- The controllers are available in 2 formats:
 - Modicon **M221** controllers (TM221C●●● references) offer excellent connection capacity and customization options without increasing the controller size, using I/O, communication, or application cartridges.
 - Modicon **M221 Book** controllers (TM221M●●● references) offer very small dimensions and a wide choice of connections.
 - M221 and M221 Book controllers have an embedded Ethernet port meaning they can be easily integrated in control system architectures, for remote control and maintenance of machines using applications for smartphones, tablets, and PCs.
 - The wealth of functions embedded in M221 and M221 Book controllers minimizes the cost of the machine:
 - Functions embedded in the controller: Modbus serial link, USB port dedicated to programming, and simple position control functions (high speed counters and pulse train outputs trapezoidal and S-curve profile)
 - Functions embedded in Modicon TM3 extensions: functional safety modules, motor-starter control module, and remote expansion system
 - Functions embedded in the dedicated display unit
 - The application is created quickly thanks to the intuitive nature of the EcoStruxure Machine Expert - Basic programming software, which also has embedded configuration of the display unit and extensions, including the functional safety modules.

Main functions

Modicon TM221C●●●	Modicon TM221M●●● (Book format)
w x h x d (mm/in.)	
☐ 16 I/O: 95 x 90 x 70 / 3.74 x 3.54 x 2.75	☐ 16 I/O: 70 x 90 x 70 / 2.75 x 3.54 x 2.75
☐ 24 I/O: 110 x 90 x 70 / 4.33 x 3.54 x 2.75	☐ 32 I/O: 70 x 90 x 70 / 2.75 x 3.54 x 2.75
☐ 40 I/O: 163 x 90 x 70 / 6.41 x 3.54 x 2.75	
Supply voltage	
24 V $\overline{\text{---}}$ or 100..240 V $\sim$ 50/60 Hz	24 V $\overline{\text{---}}$
Connection of the embedded I/O	
On removable screw or spring terminal blocks at intervals of 5.08 mm (0.20 in.) 24 V/0.25 A power supply provided by the controller for sensor inputs on TM221C●●R models	16 I/O: On removable screw or spring terminal blocks at intervals of 3.81 mm (0.15 in.) 32 I/O: On HE10 connectors with HE 10 cables/bare wires or Modicon ABE7 Telefast connection sub-bases (1)
Analog inputs	
2 embedded inputs on each TM221M●●● and TM221C●●● controller	
Embedded Ethernet communication	
Yes on TM221CE●●	Yes on TM221ME●●
Serial link	
1 embedded link	1 or 2 embedded links
Cartridges	
1 slot for 1 or 2 cartridges: ☐ I/O cartridge (analog inputs or outputs, temperature inputs) ☐ communication cartridge (serial link) or application cartridges (hoisting, conveying, and packaging)	—

Hardware characteristics

- M221 and M221 Book controllers each have an embedded:
- Run/Stop switch
 - slot for an industrial SD memory card
 - QR code for direct access to its technical documentation
- (1) Modicon ABE7 Telefast pre-wired system to be ordered separately. Refer to the catalog ref. [DIA3ED2160602EN](#) or our website [www.schneider-electric.com](#)



Connection Accessories - Bare-cable Connectors	
Reference	Description
TM221C16R	CONTROLLER M221-16IO Relay ComPacT
TM221C16T	CONTROLLER M221-16IO Tr.PNP ComPacT
TM221C24R	CONTROLLER M221-24IO Relay ComPacT
TM221C24T	CONTROLLER M221-24IO Tr.PNP ComPacT
TM221C40R	CONTROLLER M221-40IO Relay ComPacT
TM221C40T	CONTROLLER M221-40IO Tr.PNP ComPacT
TM221M16R	CONTROLLER M221-16IO RELAY MODULAR
TM221M16RG	CONTROLLER M221-16IO RELAY SPRING MOD
TM221M16T	CONTROLLER M221-16IO TR.PNP MODULAR
TM221M16TG	CONTROLLER M221-16IO TR.PNP MOD SPRING
TM221M32TK	CONTROLLER M221-32IO TR.PNP MODULAR
TM221CE24T	CONTROLLER M221-24IO Tr.PNP Ethernet Com
TM221CE40R	CONTROLLER M221-40IO Relay Ethernet Com.
TM221CE40T	CONTROLLER M221-40IO Tr.PNP Ethernet Com
TM221ME16R	CONTROLLER M221-16IO RELAY ETHERNET MOD
TM221ME16RG	CONTROLLER M221-16IO RELAY ETH SPR MOD
TM221ME16T	CONTROLLER M221-16IO TR.PNP ETH MODULAR
TM221ME16TG	CONTROLLER M221-16IO TR.PNP ETH SPR MOD
TM221ME32TK	CONTROLLER M221-32IO TR.PNP ETH MODULAR



EcoStruxure Machine Expert - Basic software



Please consult catalog Ref. [DIA3ED2181201EN](#)

TMASD1 industrial SD memory card



M221



M221 Book



Analog I/O cartridges



Communication cartridge



Application cartridges



M221

Presentation

Embedded communication

M221 and M221 Book logic controllers have three types of integrated communication port:

- Ethernet
- RS 232/RS 485 serial link
- USB mini-B programming port

Embedded functions

Each Modicon M221 and M221 Book logic controller has the following integrated functions:

- Analog (PID control)
 - Counting: Up to 4 high speed counters (HSC), 100 kHz frequency
- Controllers with transistor logic outputs (source or sink) are equipped with 2 or 4 high speed counters (1) supporting pulse generation functions.

- Position control (PTO), with trapezoidal and S-curve profile able to control either:
 - 2 or 4 axes in pulse direction (P/D) mode
 - 1 or 2 axes in CW/CCW mode

These outputs can be associated with event-triggered inputs to feed back homing and capture information. A "Motiontask" function block (one per axis) associated with a command table can be used to program and preview intuitively all the movements of an axis in the EcoStruxure Machine Expert - Basic software.

- Pulse width modulation (PWM)
- Pulse generator (PLS)
- Frequency generator (FREQGEN)

Processing power

- Execution speed: 0.2 µs/Boolean instruction
- Program: 10 Boolean Kinstructions
- Number of words: 8,000. Number of internal bits: 1,024
- RAM: 640 K (256 K for internal variables and 256 K for application and client data)
- Flash memory: 2 MB (including 256 K for backing up the client application and data in the event of a power outage)

Programming

Modicon M221 and M221 Book logic controllers are programmed using EcoStruxure Machine Expert - Basic software downloadable from our website [www.schneider-electric.com](#)

Options

Memory card

The **TMASD1** industrial SD memory card, with 256 MB capacity, is available for Modicon M221 and M221 Book logic controllers. It is used for:

- backing up and transferring applications
- loading firmware
- duplicating applications between controllers
- data logging

Cartridges

One or two cartridges can be inserted on the front of TM221C●●● controllers without increasing the dimensions.

Three types of cartridge are offered:

- Analog I/O cartridges
 - **TMC2AI2** for 2 analog inputs, which can be configured as voltage or current
 - **TMC2AQ2V** for 2 voltage analog outputs
 - **TMC2AQ2C** for 2 current analog outputs
 - **TMC2TI2** for 2 temperature inputs
 - Communication cartridge
 - **TMC2SL1** providing additional serial link port terminals for connection via a printer, barcode reader, etc.
 - Application cartridges
 - **TMC2HOIS01** for hoisting applications with two dedicated analog inputs for controlling a load cell
 - **TMC2PACK01** for packaging applications with two dedicated analog inputs for controlling the temperature on a packaging machine
 - **TMC2CONV01** for conveyor system applications with a serial link
- Use of an application cartridge provides direct access to application examples via the EcoStruxure Machine Expert - Basic software.

(1) 4 high-speed outputs on TM221C●40U, 2 high-speed outputs on TM221●●16T, TM221C●24T, TM221C●40T, TM221C●16U, TM221C●24U.



M241 logic controller with 24 I/O



M241 logic controller with 40 I/O



[DIA3ED2140109EN](#)



[DIA3ED2180701EN](#)



QRcode for access to the TM241CEC24R logic controller technical documentation



EcoStruxure Machine Expert software

Presentation

Applications

Modicon M241 logic controllers are designed for high-performance compact machines incorporating speed and position control functions. They have an embedded Ethernet port offering FTP Client/Server, Web Server and SQL Client and OPC UA 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, Ethernet I/O Scanner, CANopen and SAE J1939 fieldbus for distributed architectures and advanced position control functions (high-speed counters and pulse train outputs for controlling servo motors).
 - Functions embedded in Modicon TM3 extensions (1): 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 M241 controllers are ideal for targeting high-performance applications.
- Its programming software is powerful and intuitive, making it quick to create applications.

Main functions

M241 logic controllers come in 2 formats (w x h x d):

- controllers with 24 I/O: 150 x 90 x 95 mm (5.90 x 3.54 x 3.74 in.)
- controllers with 40 I/O: 190 x 90 x 95 mm (7.48 x 3.54 x 3.74 in.)

- Inputs and outputs embedded in M241 controllers are connected on removable screw terminal blocks, supplied with the controllers.

- A Run/Stop switch is available on every M241 controller.

- A slot for an industrial SD memory card (Secure Digital card) is available on every M241 controller.

A slot integrated in every M241 controller can take up to 2 cartridges of the following types:

- Analog input or output expansion cartridges
- Application cartridges: hoisting or packaging

Every M241 logic controller has a QR code for direct access to its technical documentation.

Embedded communication

M241 logic controllers incorporate up to 5 communication ports:

- Ethernet with embedded Web server function
- CANopen: CANopen (master) and SAE J1939 (Request Manager)
- 2 serial links
- USB mini-B programming port

Embedded functions

- PID control
- 8 high-speed counter (HSC) inputs, 200 kHz frequency and 6 to 8 standard counter inputs, 1 kHz frequency
- 4 high-speed position control outputs, 100 kHz frequency and 4 standard position control outputs, 1 kHz frequency for:
 - pulse train (PTO) P/D, CW and CCW
 - pulse width modulation (PWM)
 - frequency generator (FG)
- 4 PTO/HSC configurable expert channels and up to 14 or 16 single HSC channels depending on the chosen configuration and the controller type (for more details, see the user guide for Modicon M241 logic controllers)

Processing power

- DualCore processor
- RAM: 64 MB
- Flash memory: 128 MB
- Program: 128 K Boolean instructions

Programming

Modicon M241 logic controllers are programmed with EcoStruxure Machine Expert, consult catalog [DIA3ED2180701EN](#).

(1) Consult catalog Ref. [DIA3ED2140109EN](#).
(2) Consult the catalog Ref. [DIA3ED2180701EN](#).



Modicon M241	
Reference	Description
TM241C24R	CONTROLLER M241-24IO Relay
TM241C24T	CONTROLLER M241-24IO Tr.PNP
TM241C24U	CONTROLLER M241-24IO Tr.NPN
TM241C40R	CONTROLLER M241-40IO Relay
TM241C40T	CONTROLLER M241-40IO Tr.PNP
TM241C40U	CONTROLLER M241-40IO Tr.NPN
TM241CE24R	CONTROLLER M241-24IO Relay Ethernet
TM241CE24T	CONTROLLER M241-24IO Tr.PNP Ethernet
TM241CE24U	CONTROLLER M241-24IO Tr.NPN Ethernet
TM241CE40R	CONTROLLER M241-40IO Relay Ethernet
TM241CE40T	CONTROLLER M241-40IO Tr.PNP Ethernet
TM241CE40U	CONTROLLER M241-40IO Tr.NPN Ethernet
TM241CEC24R	CONTROLLER M241-24IO Relay CAN MASTER
TM241CEC24T	CONTROLLER M241-24IO Tr.PNP ETH CAN MAS
TM241CEC24U	CONTROLLER M241-24IO Tr.NPN ETH CAN MAS



Modicon M251	
Reference	Description
TM251MESC	CONTROLLER M251-Ethernet+CAN
TM251MESE	CONTROLLER M251-2xEthernet



Modicon M262	
Reference	Description
TM262L10MESE8T	Logic ctrl M262 5ns/inst Eth.
TM262L20MESE8T	Logic ctrl M262 3ns/inst Eth.
TM262M15MESS8T	Motion ctrl M262 5ns/inst 4 Ax. Eth. S3
TM262M25MESS8T	Motion ctrl M262 3ns/inst 8 Ax. Eth. S3
TM262M35MESS8T	Motion ctrl M262 3ns/inst 24 Ax. Eth. S3



Modicon TM3	
TM3AI2H	MODULE TM3-2 ANALOG INPUTS HIGH RES.
TM3AI2HG	MODULE TM3-2 ANALOG IN HIGH RES. SPRING
TM3AI4	MODULE TM3-4 ANALOG INPUTS
TM3AI4G	MODULE TM3-4 ANALOG INPUTS SPRING
TM3AI8	MODULE TM3-8 ANALOG INPUTS
TM3AI8G	MODULE TM3-8 ANALOG INPUTS SPRING
TM3AM6	Module TM3 - 4 AI 2 AO
TM3AM6G	TM3: 4 Ana IN & 2 Ana OUT Spring Term
TM3AQ2	MODULE TM3-2 ANALOG OUTPUTS
TM3AQ2G	MODULE TM3-2 ANALOG OUTPUTS SPRING
TM3AQ4	MODULE TM3-4 ANALOG OUTPUTS
TM3AQ4G	MODULE TM3-4 ANALOG OUTPUTS SPRING
TM3DI16	MODULE TM3-16 INPUTS
TM3DI16G	MODULE TM3-16 INPUTS SPRING
TM3DI16K	MODULE TM3-16 INPUTS HE10
TM3DI32K	MODULE TM3-32 INPUTS HE10
TM3DI8	MODULE TM3-8 INPUTS
TM3DI8A	MODULE TM3-8 INPUTS 120VAC
TM3DI8G	MODULE TM3-8 INPUTS SPRING
TM3TI4	MODULE TM3-4 INPUTS TEMPERATURE
TM3TI4G	MODULE TM3-4 INPUTS TEMPERATURE SPRING
TM3DM24R	MODULE TM3-24 IO RELAYS
TM3DM24RG	MODULE TM3-24 IO RELAYS SPRING
TM3DM8R	MODULE TM3-8 IO RELAYS
TM3DM8RG	MODULE TM3-8 IO RELAYS SPRING
TM3DQ16R	MODULE TM3-16 OUT RELAYS
TM3DQ16RG	MODULE TM3-16 OUT RELAYS SPRING
TM3DQ16T	MODULE TM3-16 OUT TR.PNP
TM3DQ16TG	MODULE TM3-16 OUT TR.PNP SPRING
TM3DQ16TK	MODULE TM3-16 OUT TR.PNP HE10
TM3DQ16U	MODULE TM3-16 OUT TR.NPN
TM3DQ16UG	MODULE TM3-16 OUT TR.NPN SPRING
TM3DQ16UK	MODULE TM3-16 OUT TR.NPN HE10
TM3DQ32TK	MODULE TM3-32 OUT TR.PNP HE10
TM3DQ32UK	MODULE TM3-32 OUT TR.NPN HE10
TM3DQ8RG	MODULE TM3-8 OUT RELAYS SPRING
TM3DQ8T	MODULE TM3-8 OUT TR.PNP
TM3DQ8TG	MODULE TM3-8 OUT TR.PNP SPRING
TM3DQ8U	MODULE TM3-8 OUT TR.NPN
TM3DQ8UG	MODULE TM3-8 OUT TR.NPN SPRING



TM3SAC5R	SAFETY MODULE FOR PLC TM2XX, 1 FUNCTION,
TM3SAC5RG	SAFETY MODULE FOR PLC TM2XX, 1 FUNCTION,
TM3SAF5R	SAFETY MODULE FOR PLC TM2XX, 1 FUNCTION,
TM3SAF5RG	SAFETY MODULE FOR PLC TM2XX, 1 FUNCTION,
TM3SAFL5R	SAFETY MODULE FOR PLC TM2XX, 2 FUNCTIONS
TM3SAFL5RG	SAFETY MODULE FOR PLC TM2XX, 2 FUNCTIONS
TM3SAK6R	SAFETY MODULE FOR PLC TM2XX, 3 FUNCTIONS
TM3SAK6RG	SAFETY MODULE FOR PLC TM2XX, 3 FUNCTIONS
TM3BCEIP	Ethernet TM3 Bus Coupler Module



Human Machine Interface