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Modicon M171/M172 logic controllers, and software

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Machine builders are constantly looking for new ways to design and build more innovative machines in less time and at lower costs. MachineStruxure™ can help.

The NEXT generation of MachineStruxure™ is a complete machine automation solution that provides flexible and scalable machine control, ready-to-use architectures, efficient engineering solutions, and comprehensive customization and engineering support services. It can help to meet your challenges for improved efficiency and greater productivity, as well as allow to deliver higher added value to your customers throughout the entire machine life cycle.

Ready-to-use architectures and function blocks

- Tested, Validated, and Documented Architectures (TVDAs) are just one of the ways we help to reduce design time.
- Whether machines are simple or complex, Application Function Blocks (AFBs) make system design fast and easy.

Modicon M171/M172 is part of MachineStruxure

HVAC/Chiller/Modbus SL/Modicon M172 performance logic controller

Solution breakdown

1. Compact NSX circuit breaker
2. iEM3000 Energy Meter
3. TeSys D contactor
4. C60L-MA modular circuit breaker
5. Phaseo switch mode power supply
6. C60L-DC DC circuit breaker
7. Modicon M172 performance logic controller
8. Modicon M171 remote display
9. Harmony XALK Emergency stop push button
10. TeSys GV2L magnetic circuit breaker
11. TeSys D contactor
12. Altivar 212 variable speed drive, for 0.75 to 75 kW (1.0 to 100 hp) motors
13. Modicon M171 electronic expansion valve driver
14. Modicon TM1S humidity and temperature probes
15. OsiSense XMLP pressure sensors
16. Electronic expansion valve
17. Altistart 01 soft starter
18. Harmony XB4/XB5 control & signaling units
Improve efficiency

Flexible and scalable performance

Whether you focus on chillers, Air Handling Units for commercial buildings, residential, or industrial applications...
With the range of Modicon M171/M172 logic controllers, the next generation of MachineStruxure™ is now better positioned than ever. Multiple BMS (Building Management System) connectivity, embedded or in option, and an embedded web server enable ease in remote control; while a unique software environment supports the development of algorithms and functions that can be used on all platforms.

Modicon™ M171 optimized logic controller for simple and compact machines is one of the smallest programmable controllers on the market. Available also for flush mounting, it requires minimal installation time and offers tremendous versatility.

Modicon™ M171 performance logic controller for complex and BMS connectable machines can be adapted to virtually any application.

Modicon™ M172 performance logic controller for large and connected machines with more scalability and connectivity.

Performance and connectivity

> Modicon™ M171 optimized logic controller
> Modicon™ M171 performance logic controller
> Modicon™ M172 performance logic controller
General presentation
(continued)

Modicon M171/M172 logic controllers
Increase profitability
Reduce time-to-market

Increase profitability

Everything needed is embedded

The high degree of flexibility makes it very easy to install additional modules and still keep everything in just one configuration:

- Remote displays
- Expansion modules
- Communication modules
- Wall thermostats
- Wide range of humidity and temperature probes

Remote displays

Expansion modules

Communication modules

Wall thermostat

Humidity and temperature probes

Reduce time-to-market

Intuitive automation with SoMachine HVAC

SoMachine™ HVAC is the universal programming software for machines automated by Modicon M171/M172 logic controllers.

Simplified navigation that requires only a few clicks delivers a more efficient engineering process.

SoMachine HVAC simplifies every step in machine design and commissioning
Simplify integration and maintenance

Connected everywhere
Integration into machines and management systems has never been easier – many needed connectivity features are embedded in the offer:
- Modbus RTU
- BACnet/IP and MS/TP (B-AAC profile)
- Modbus TCP with Webvisu embedded
- ASCII support for GSM Modem
- Profibus
- CAN
- LonWorks (FFT-10)

Customization and services
Our experts help you every step of the way, from perfecting machine design to on-site services of the finished machine. Global support, 24/7 hotline services, and replacement parts centers around the world enable you to deliver superior customer support and satisfaction.
Presentation

Modicon M171/M172 logic controllers
General presentation

The Modicon M171/M172 logic controller range has been developed to manage digital and analog inputs and outputs, to offer numerous possibilities for connection to different Building Management System communication networks.

Modicon M171/M172 range

The range of Modicon M171/M172 comprises 21 logic controllers, programmable with SoMachine HVAC software, and is divided into 3 types: M171 optimized logic controllers, M171 performance logic controllers and M172 performance logic controllers.

- M171 optimized logic controllers are suitable for customized applications designed to control simple and compact machines:
  - Air/water-cooled chiller
  - Rooftop unit
  - Heat pump
  - Compressor rack
  - Ventilation unit

- M171 performance logic controllers type are suitable for customized applications designed to control complex and BMS connectable machines:
  - Air/water-cooled chiller
  - Rooftop unit
  - Heat pump
  - Precision air conditioner
  - Booster station
  - Compressor rack
  - Heat recovery unit

- M172 performance logic controllers increase the scalability and the connectivity achieved by M171 performance controllers. They control the same type of applications as the Modicon M171 performance do, and embed more universality and connectivity.

System components

The offer range comprises:

- 21 logic controllers:
  - 10 M171 optimized logic controllers,
  - 5 M171 performance logic controllers
  - 6 M172 performance logic controllers

The Modicon M171/M172 logic controllers are available with or without embedded display. See pages 12, 16 and 18.

- 5 I/O expansion module types (mixed digital and analog):
  - 2 TM171EP for M171 and M172 performance logic controllers
  - 3 TM171EO for M171 optimized logic controllers. See page 20.

- 5 remote displays (LED or LCD technology):
  - 1 TM171DGRP for M171 and M172 performance logic controllers
  - 4 TM171D for M171 optimized logic controllers. See pages 14, 17 and 19.

- 8 TM171A communication modules (BMS fieldbus interfaces) to provide to the M171 and M172 performance logic controllers a connection to:
  - BACnet MS/TP (B-AAC profile) or IP
  - Modbus SL (Serial Link)
  - Modbus TCP
  - LonWorks (FFT-10)
  - Profinet
  - CAN bus
  - etc, see page 21.

- 3 TM171VEV electronic expansion valve drivers compatible with the entire Modicon M171/M172 logic controller range and also with third party controllers and electronic expansion valves. See page 24

- 23 specific measurement accessories: TM1S humidity and temperature probes. See page 26.

- Adapted connection accessories: I/O connectors and cables. See pages 15 and 21.


- Programming accessories. See page 27.
General presentation (continued)

Configuration software

Modicon M171/M172 logic controllers are supported by a completely intuitive software package SoMachine HVAC (see page 26).

- SoMachine HVAC uses 5 languages compliance IEC 61131-3.
- This software follows a simple drag and drop function block approach to configuration and is completed with a library of Application Function Blocks (AFBs) and logic functions.
- This software runs with 5 programming languages.
- Examples:
  - ST language
  - FBD language
  - LD language
  - IL language
  - SFC language

Available resources on logic controllers for IEC programming

<table>
<thead>
<tr>
<th>Logic controller type</th>
<th>M171 optimized</th>
<th>M171 performance</th>
<th>M172 performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>14.7 MHz</td>
<td>72 MHz, 32 MB RAM</td>
<td>120 MHz, 32 MB RAM</td>
</tr>
<tr>
<td>Available memory for application</td>
<td>188 kB</td>
<td>1.0 MB</td>
<td>1.0 MB</td>
</tr>
<tr>
<td>Available memory for user interface</td>
<td>–</td>
<td>1.5 MB</td>
<td>1.5 MB</td>
</tr>
<tr>
<td>Flash memory data</td>
<td>–</td>
<td>126 MB</td>
<td>5 MB</td>
</tr>
<tr>
<td>RAM memory (automatic mapping)</td>
<td>2048 B (1024 word)</td>
<td>512 kB (256000 word)</td>
<td>512 kB (256000 word)</td>
</tr>
<tr>
<td>RAM memory (Modbus mapping)</td>
<td>1024 B (512 word)</td>
<td>10 kB (5000 word)</td>
<td>10 kB (5000 word)</td>
</tr>
<tr>
<td>EEPROM variables</td>
<td>1024 B (512 word)</td>
<td>28 kB (14000 word)</td>
<td>28 kB (14000 word)</td>
</tr>
</tbody>
</table>

Ethernet connection

Ethernet access is available on performance logic controllers:

- Ethernet access is optional with M171 performance logic controllers by means of a communication module
- Ethernet access is embedded with M172 performance logic controllers.

Ethernet access enables several functions to M171 and M172 performance logic controllers, such as:
- Text e-mail (via NMTP server)
- TFTP transfer protocol (for M171 performance only)
- DNS
- Program transfers (upload/download)
- Online debugging
- Firmware updates
- Parameter management
- File management (virtual FTP)
- Bridge: specific function allowing PLCs to be configured via the performance logic controllers, on Modbus
- WebVisu
Presentation (continued)

**Modicon M171/M172 logic controllers**

**General presentation**

**Modicon M171 optimized logic controllers for simple and compact machines**

- **Ethernet (Modbus TCP, BACnet/IP, Web Visu)**
- **Modbus SL**
- **LAN expansion bus**

1. **M171 performance** logic controller, see page 16
2. **M171 optimized** logic controller - flush mounting, see page 12
3. I/O expansion module TM171EO, see page 20
4. Remote display TM171DLCD, see page 14
5. Wall thermostat TM171D WAL, see page 14
6. Altivar 212 Variable speed drive (1)
7. Temperature probes TM1ST, see page 25
8. Humidity probes TM1SH, see page 25

**Modicon M171 performance logic controllers for complex and BMS connectable machines**

- **Ethernet (Modbus TCP, BACnet/IP, Web Visu)**
- **BACnet MS/TP (B-AAC profile)**
- **Profibus**
- **LonWorks (FFT-10)**
- **CAN (binding)**
- **RS 485/RS 232**
- **Modbus SL**
- **CAN expansion bus**

1. **M171 performance** logic controller, see page 16
2. Modem
3. HMI Magelis STO/STU (1)
4. Communication module, see page 22
5. I/O expansion module TM171EP, see page 20
6. Remote display TM171DGRPP, see page 17
7. Altivar 32 Variable speed drive (1)
8. Altivar 212 Variable speed drive (1)
9. Electronic expansion valve driver TM171VEV, see page 24
10. Energy Meter iEm 3000 (1)
11. Temperature probes TM1ST, see page 25
12. XMLP pressure transmitters (2)
13. Humidity probes TM1SH, see page 25
14. TeSys D contactor (1)

(1) Schneider Electric offer: please consult our web site: www.schneider-electric.com
(2) Partner offer: please consult on the web site www.tesensors.com/global
General presentation (continued)

M172 performance logic controllers for large and connected machines

1. **M172 performance** logic controller, see page 18
2. Modem
3. spaceLYnk gateway (1)
4. HMI Magelis STO/STU (1)
5. Communication module TM171ALON, see page 22
6. I/O expansion module TM171EP, see page 20
7. Remote display TM171DGRP, see page 17
8. Altivar 32 Variable speed drive (1)
9. Altivar 212 Variable speed drive (1)
10. Electronic expansion valve driver TM171VEV, see page 24
11. Energy Meter iEm 3000 (1)
12. Room controller SE8000 (1)
13. Temperature probes TM1ST, see page 25
14. XMLP pressure transmitters (2)
15. Humidity probes TM1SH, see page 25
16. TeSys D contactor (1)

(1) Schneider Electric offer: please consult our web site: www.schneider-electric.com
(2) Partner offer: please consult on the web site www.tesensors.com/global
Modicon M171/M172 logic controllers

Selection guide

Modicon M171 optimized, Modicon M171 performance, and Modicon M172 performance logic controllers

Applications

- M171 optimized logic controllers for simple and compact machines
  - Air/water-cooled chiller
  - Rooftop unit
  - Heat pump
  - Compressor rack
  - Ventilation unit

- M172 performance logic controllers for large and connected machines
  - Air/water-cooled chiller
  - Rooftop unit
  - Heat pump
  - Precision air conditioner
  - Booster station
  - Compressor rack
  - Heat recovery unit

M171 performance logic controllers for complex and BMS connectable machines

- Air/water-cooled chiller
- Rooftop unit
- Heat pump
- Precision air conditioner
- Booster station
- Compressor rack
- Heat recovery unit

Programming software

SiMachine HVAC V1.0 or higher

Maximum number of I/O with expansion modules

<table>
<thead>
<tr>
<th>Generic programmable</th>
<th>Digital input</th>
<th>Analog input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs</td>
<td>6 digital inputs</td>
<td>5 configurable analog inputs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Generic programmable</th>
<th>Digital output</th>
<th>Analog output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs</td>
<td>6 digital outputs</td>
<td>5 analog outputs</td>
</tr>
</tbody>
</table>

Communication

- Embedded communication port
  - 1 wired connector for LAN expansion bus
  - 1 wired connector for Modbus SL master/slave for TM171/172

- Optional communication
  - None except with a gateway

USB port

- No (program can be downloaded with the TM171ANFK programming stick and TM171ADM programming cable)

Services

- Remote download through Modbus SL

Power supply

- ~12-24 V or ~24 V for all, ~12-24 V for TM171OEM22S, ~100...240 V, isolated

Display

- Built-in
- Yes, on TM171OEM22S
- Yes, on TM171OEM14R
- Yes, with TM171LD, TM171LCD, and TM171DUAL2 displays
- Or with HMI Magella offer, Please consult on our web site www.schneider-electric.com

Mounting

- 35 mm/7.38 in. (rail)
- Flush mounting

Product certifications

- CE, cULus, CSA, EAC

Logic controller reference

- TM171OEM22S
- TM171OEM23R
- TM171OEM24R
- TM171OEM14R

Page

12 and 13

Notes:

1) On the same port at the same time.

More technical information on www.schneider-electric.com
Presentation, description

Modicon M171/M172 logic controllers
M171 optimized logic controllers

Presentation

The M171 optimized logic controllers comprise 10 models that can be used to control from 14 up to 22 embedded I/Os (digital and analog).

- 2 types of power supply are available:
  - \(~100-240\) V
  - \(~12-24\) V or \(\cong\) 24 V

- 2 types of housing:
  - with built-in display
  - with remote display that can be added through the LAN expansion bus.

- 2 types of mounting:
  - Flush mounting: controllers to be mounted on a cabinet door
  - 35 mm/1.38 in. \(\times\) 5 rail mounting: controllers to be mounted inside a cabinet

- Optimized logic controllers embed up to 2 communication ports (depending on the model):
  - 1 optional Modbus SL bus
  - 1 LAN expansion bus

- The M171 optimized logic controllers are certified CE, cURus, CSA, EAC.

Description

35 mm/1.38 in. \(\times\) 5 rail mounting optimized controllers

TM171O•14R optimized logic controllers (1)

1 Display
2 4 navigation keys for setting controller parameters
3 Programming port (TTL)
4 Removable terminal block for RS 485 serial port (TM171O•M14R)
5 Wired connector for LAN expansion bus
6 Mounting clip for 35 mm/1.38 in. \(\times\) 5 rail mounting
7 Removable terminal block for digital outputs
8 Removable terminal block for \(\sim 100\ldots240\) V power supply
9 Removable terminal block for I/Os

TM171O•22R• optimized logic controllers (1)

1 Display
2 4 navigation keys for setting controller parameters
3 Programming port (TTL)
4 Wired connector for RS 485 serial port (TM171O•M14R)
5 Mounting clip for 35 mm/1.38 in. \(\times\) 5 rail mounting
6 Removable terminal block for outputs
7 Wired connector for \(\sim 12-24\) V or \(\cong\) 24 V power supply, and for low voltage I/Os
8 Wired connector for analog output
9 Wired connector for LAN expansion bus

Flush mounting controllers

TM171OF•22R• optimized logic controllers (1)

1 Display
2 4 navigation keys for setting controller parameters
3 Wired connector for RS 485 serial port (TM171OF•M22R)
4 Wired connector for analog outputs
5 Wired connector for LAN expansion bus
6 Programming port (TTL)

(1) Connectors to be ordered separately, see page 15.
## M171 optimized logic controllers

### Power supply: ~100-240 V

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Outputs</th>
<th>Display</th>
<th>Embedded communication</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>2 digital inputs: 2 open collector or digital inputs (1) 5 configurable analog inputs: 2 NTC, PT1000, or digital inputs 2-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs 1 NTC, PT1000, 20 mA, 4-20 mA, 10-1 V, 0-5 V, 0-1 V, or digital inputs</td>
<td>4 digital outputs: 3 SPST (2 A, ~230 V) with the same common 1 SPDT (2 A, ~230 V) 5 analog outputs: 2 open collector (1) for 12 V PWM/PPM or digital inputs 2x 0-10 V 1x 0-20 mA</td>
<td>Remote display (optional)</td>
<td>1 wired connector for Modbus SL (master/slave) 1 wired connector for LAN expansion bus</td>
<td>TM171OBM14R</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td></td>
<td>Built-in display</td>
<td>1 wired connector for LAN expansion bus</td>
<td>TM171OD14R</td>
<td>0.190/0.420</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power supply: ~12-24 V or 24 V (2)

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Outputs</th>
<th>Display</th>
<th>Embedded communication</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>6 digital inputs: 6 volt-free in 1 group 5 configurable analog inputs: 3 NTC or digital inputs 2 NTC, 0-20 mA, 4-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs</td>
<td>6 digital outputs: 3 SPST (2 A, ~230 V) with the same common 2 SPST (2 A, ~230 V) with independent common 1 open collector 5 analog outputs: 2 open collector for 12 V PWM/PPM 3x 0-10 V</td>
<td>Remote display (optional)</td>
<td>1 wired connector for LAN expansion bus</td>
<td>TM171OB22R</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td></td>
<td>Built-in display</td>
<td>1 wired connector for LAN expansion bus</td>
<td>TM171ODM22R</td>
<td>0.190/0.420</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Flush mounting optimized controllers

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Outputs</th>
<th>Display</th>
<th>Embedded communication</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>6 digital inputs: 6 volt-free in 1 group 5 configurable analog inputs: 3 NTC or digital input 2 NTC, 0-20 mA, 4-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs</td>
<td>6 digital outputs: 3 SPST (2 A, ~230 V) with the same common 2 SPST (2 A, ~230 V) with independent common 1 open collector 5 analog outputs: 2 open collector for 12 V PWM/PPM 3x 0-10 V</td>
<td>Built-in display</td>
<td>1 wired connector for LAN expansion bus</td>
<td>TM171OF22R</td>
<td>0.164/0.360</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Outputs</th>
<th>Display</th>
<th>Embedded communication</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>6 digital inputs: 6 volt-free in 1 group 5 configurable analog inputs: 3 NTC or digital input 2 NTC, 0-20 mA, 4-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs</td>
<td>6 digital outputs: 3 SPST (2 A, ~230 V) with the same common 2 SPST (2 A, ~230 V) with independent common 1 open collector 5 analog outputs: 2 open collector for 12 V PWM/PPM 3x 0-10 V</td>
<td>1 wired connector for Modbus SL (master/slave) 1 wired connector for LAN expansion bus</td>
<td>TM171OFM22R</td>
<td>0.164/0.360</td>
<td></td>
</tr>
</tbody>
</table>

### Remote display for M171 optimized logic controllers

Remote displays see page 15
Wall thermostats see page 15

### Connection accessories for M171 optimized logic controllers

See page 15

(1) The 2 I/Os are the same. On the same channel: 2 digital inputs or 2 analog outputs (depending on the configuration).
(2) Except for for TM171ODM22S: ~12-24 V
**Remote display for M171 optimized logic controllers**

The two available remote displays for the M171 optimized logic controllers offer, are distinguished by technology and mounting.

- **Technology:** LED display or LCD display
- **Mounting:** flush mounting – can be mounted on a cabinet door

The remote displays are connected to the LAN expansion bus which provides the power supply.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote displays</td>
<td>With realtime clock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>LED display</em></td>
<td>4 digits, 7 segments</td>
<td>TM171DLED</td>
<td>0.042/0.090</td>
</tr>
<tr>
<td></td>
<td>Keyboard: 4 buttons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication port: 1 for LAN expansion bus – with wired connector (1) or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>screw terminal blocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*LCD display (with</td>
<td>segments)*</td>
<td>TM171DLCD2U</td>
<td>0.170/0.370</td>
</tr>
<tr>
<td></td>
<td>Keyboard: 7 buttons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication port: 1 for LAN expansion bus – with screw terminal blocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 analog inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 NTC or digital input</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 NTC or 4-20 mA or digital input</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Wall thermostats for M171 optimized logic controllers**

The two types of electronic wall thermostats available for the M171 optimized logic controllers offer are delivered with or without backlight.

The wall thermostats have a realtime clock.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall thermostats</td>
<td>Without backlight</td>
<td>TM171DWAL2U</td>
<td>0.143/0.320</td>
</tr>
<tr>
<td></td>
<td>With backlight</td>
<td>TM171DWAL2L</td>
<td>0.143/0.320</td>
</tr>
</tbody>
</table>

(1) Supplied with LAN expansion bus connector TM171ACB4OLAN
## Modicon M171/M172 logic controllers
### M171 optimized logic controllers
### Connection accessories

### Connection accessories for M171 optimized logic controllers

<table>
<thead>
<tr>
<th>Type</th>
<th>Item</th>
<th>Description</th>
<th>Cable length (m/ft.)</th>
<th>Unit reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage connector</td>
<td>1</td>
<td>Screw terminal block and a cordset equipped with a 20-pin connector on one end</td>
<td>1/3.3</td>
<td>TM171ACB4O11M</td>
<td>0.575/1.270</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2/6.6</td>
<td>TM171ACB4O2M</td>
<td>1.120/2.470</td>
</tr>
<tr>
<td>analog output connector</td>
<td>2</td>
<td>Cordset equipped with a 4-pin connector on one end</td>
<td>1/3.3</td>
<td>TM171ACB4OA01M</td>
<td>0.075/0.170</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2/6.6</td>
<td>TM171ACB4OA02M</td>
<td>0.125/0.280</td>
</tr>
<tr>
<td>Modbus SL connector</td>
<td>3</td>
<td>Cordset equipped with a 3-pin connector on one end</td>
<td>1/3.3</td>
<td>TM171ACB4ORS485</td>
<td>0.052/0.110</td>
</tr>
<tr>
<td>LAN expansion bus connector</td>
<td>4</td>
<td>Cordset equipped with a 3-pin connector at each end</td>
<td>2/6.6</td>
<td>TM171ACB4OLAN</td>
<td>0.060/0.130</td>
</tr>
</tbody>
</table>

(1) Minimum set for operating controllers.

---


### Connection accessories (1) for M171 optimized logic controller (flush mounting): TM171OF22R, and TM171OFM22R

**Nota:** terminal blocks are supplied with TM171OBM14R, TM171OD14R, and TM171ODM14R.
Presentation

The M171 performance logic controllers comprise 5 models that can be used to control from 3 up to 27 embedded I/Os (digital and analog).

- Power supply: ~24 V or ~48 V
- 2 types of housing:
  - with built-in display
  - without display

Each controller includes a connection (through the CAN expansion bus or through Modbus) for a remote display, available in the catalog.

- 2 types of mounting:
  - 35 mm/1.38 in. rail mounting: controllers to be mounted inside a cabinet
  - Flush mounting: controllers to be mounted on a cabinet door or wall-mounted using the wall support accessory, see page 17.

M171 performance logic controllers embed up to 3 communication ports:

- On 35 mm/1.38 in. rail mounting version:
  - 1 Modbus SL master/slave
  - 2 USB
  - 1 CAN expansion bus
- On flush-mounting version:
  - 1 Modbus SL master/slave
  - 1 Modbus TCP and BACnet IP (B-AAC profile) (WebVisu)
  - 1 CAN expansion bus

M171 performance logic controllers are certified CE, cURus, CSA, EAC

Description

35 mm/1.38 in. rail mounting performance controllers

TM171Pem27 performance logic controllers (1)

1. Connector for removable terminal block for digital inputs
2. Connector for removable terminal block for analog inputs
3. Connector for removable terminal block for Modbus SL
4. Connector for removable terminal block for CAN expansion bus
5. 4-position DIP switches for address selection
6. 5 command keys for setting controller parameters
7. Connector for removable terminal block for power supply (~24 V, ~48 V)
8. Connector for removable terminal block for fast digital input (high speed counter)
9. Connector for removable terminal block for digital outputs
10. Connector for removable terminal block for analog outputs
11. Mounting clips for 35 mm/1.38 in. rail mounting
12. On TM171PDM27: display
   - On TM171PBM27R: 6- and 10-position DIP switches, behind a front panel

Behind the removable protective cover: 13 and 14

13. USB mini-B port to link a PC
14. USB-A port for USB stick
15. Connector for communication modules
16. 3 status LEDs

Flush mounting performance controllers

TM171PFe03R performance logic controllers (2)

1. Display
2. 3 status LEDs
3. 5 command keys for setting controller parameters

On the rear side of the controller

4. Terminal block for power supply (~24 V or ~48 V)
5. Terminal block for CAN expansion bus
6. Terminal block for Modbus SL
7. Terminal block for analog input
8. RJ45 connector for Ethernet
9. Built-in NTC sensor (analog)
10. Built-in humidity sensor (analog) (on TM171PFE03HR)

(1) TM171ASCTB27 removable terminal blocks to be ordered separately (see page 17).
(2) Terminal blocks supplied with flush-mounting version of performance controllers.
### Modicon M171/M172 logic controllers

**M171 performance logic controllers**

**Power supply:** ±24 V, ±48 V

35 mm/1.38 in. rail mounting performance controllers

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Display</th>
<th>Embedded communication port</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>9 digital inputs (8 + 1):  2 groups of 4 digital inputs, 24 V or ±48 V  1 fast digital input or high speed counter, volt-free  6 configurable analog inputs:  2 NTC or digital input  4 NTC, PT1000; 4-20 mA, 0-5 V, 0-10 V, 0-30 kΩ/0-5 kΩ variable resistor, or digital inputs</td>
<td>7 digital outputs:  2 SPDT (8 A, ~230 V) with independent common  5 SPST (5 A, ~230 V) with independent common  5 analog outputs:  3 x 0...+10 V or 4-20 mA  2 x 0...+10 V, or 4-20 mA, or digital output open collector</td>
<td>Remote display (optional)  1 removable connector for Modbus SL (master/slave)  1 removable connector for CAN expansion bus</td>
<td>TM171PBM27R</td>
<td>0.385/0.850</td>
</tr>
</tbody>
</table>

Flush mounting performance controllers (to be used with the wall support accessory – see below)

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Display</th>
<th>Embedded communication port</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3 configurable analog inputs:  1 built-in NTC  1 NTC or digital input  1x 4-20 mA or 0-10 V</td>
<td>–</td>
<td>Built-in display</td>
<td>1 removable connector for Modbus SL (master/slave)  1 removable connector for CAN expansion bus</td>
<td>TM171PFE03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Display</th>
<th>Embedded communication port</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3 configurable analog inputs:  1 built-in NTC  1 NTC or digital input  1 built-in humidity sensor</td>
<td>–</td>
<td>Built-in display</td>
<td>1 removable connector for Modbus SL (master/slave)  1 removable connector for CAN expansion bus  1 RJ45 for Modbus TCP and BACnet/IP</td>
<td>TM171PFE03HR</td>
</tr>
</tbody>
</table>

**Accessories for M171 performance logic controllers**

**To be ordered separately**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Use</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminal blocks</td>
<td>For TM171PBM27R, TM171PDM27R, and TM171PDM27S</td>
<td>TM171ASCTB27</td>
<td>0.100/0.220</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designation</th>
<th>Use</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall support for flush mounting performance logic controllers</td>
<td>For TM171PFE03 and TM171PFE03HR</td>
<td>White: TM171ABKPB  Grey: TM171ABKPG</td>
<td>0.015/0.030  0.015/0.030</td>
</tr>
</tbody>
</table>

**Remote display, HMI**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote display</td>
<td>128 x 64 LCD, with backlight  Use for M171 and M172 performance logic controllers</td>
<td>TM171DGRP</td>
<td>0.197/0.430</td>
</tr>
</tbody>
</table>

HMI Magelis STU/STO  Please consult on our web site [www.schneider-electric.com](http://www.schneider-electric.com)
Presentation

The M172 performance logic controllers comprise 6 models that can be used to control from 28 up to 42 embedded I/Os (digital and analog).

- Power supply: \( \leq 24 \text{ V} \)
- 2 types of housing:
  - with built-in display
  - without display

Each performance controller type TM172P includes a connection (through the CAN expansion bus or through Modbus) for a remote display, available in the catalog.

- 2 types of mounting:
  - 35 mm/1.38 in. \( \times \) r rail mounting: controllers to be mounted inside a cabinet
  - on panel with an accessory: each M172 performance controller can be mounted on a panel with the TM172AP12PM fixing accessory.

- M172 performance logic controllers embed up to 4 communication ports:
  - 2 for Modbus SL (master/slave) (only 1 master) or 1 for BACnet MS/TP (B-AAC profile)
  - 1 for Modbus TCP and BACnet IP (B-AAC profile) (RJ45)
  - 1 for CAN expansion bus,
  - plus a communication module connector.

- The M172 performance logic controllers are certified CE, cURus, CSA, EAC.

Micro SD card

A slot for a micro SD memory card is available on the front face of each Modicon M172 performance controllers.

The micro SD card is used for:
- Data-logging
- Webserver storage

Description

M172 performance controllers logic controllers (1)

1. RJ45 connector for Modbus TCP and BACnet IP (B-AAC profile)
2. Connector for removable terminal block for digital outputs
3. Connector for removable terminal block for power supply (\( \leq 24 \text{ V} \))
4. Connector for removable terminal block for analog inputs
5. Connector for removable terminal block for digital inputs
6. Connector for removable terminal block for fast digital input (high speed counter)
7. Connector for removable terminal block for analog outputs
8. Connector for removable terminal block for RS485-1 (Modbus SL or BACnet MS/TP)
9. Connector for removable terminal block for RS485-2 (Modbus SL or BACnet MS/TP)
10. Connector for removable terminal block for CAN expansion bus
11. Slot for micro SD card
12. Slot for battery (behind the front flap)
13. On TM172PDC��: Built-in display, 4 status LEDs and 5 command keys for setting controller parameters
   On TM172PBC��: 4 status LEDs and 5 command keys for setting controller parameters, behind a front panel
14. Connector for communication modules
15. USB mini-B port to link a PC
16. USB-A port for USB stick
17. Mounting clips for 35 mm/1.38 in. \( \times \) r rail mounting
18. 2 Slots for the TM172AP12PM fixing accessory

(1) TM172ASCTB28 and TM172ASCTB42 removable terminal blocks to be ordered separately (see page 19).
## M172 performance logic controllers

**Power supply:** ±24 V

35 mm/1.38 in. rail mounting performance controllers, and Panel mounting with accessory

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Display</th>
<th>Embedded communication port</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PBG28R</td>
<td>0.300/ 0.661</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PDG28R</td>
<td>0.300/ 0.661</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PDG28S</td>
<td>0.300/ 0.661</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PBG42R</td>
<td>0.385/ 0.849</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PDG42R</td>
<td>0.385/ 0.849</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TM172PDG42S</td>
<td>0.385/ 0.849</td>
</tr>
</tbody>
</table>

### Accessories for M172 performance logic controllers

To be ordered separately

<table>
<thead>
<tr>
<th>Designation</th>
<th>Use</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminal blocks</td>
<td>For TM172P...28s performance logic controllers</td>
<td>TM172ASCTB28</td>
<td>0.100/ 0.220</td>
</tr>
<tr>
<td>Fixing accessory: 12 clips-on lock for panel mounting</td>
<td>For mounting M172 performance logic controllers on panel</td>
<td>TM172AP12PM</td>
<td>0.050/ 0.110</td>
</tr>
</tbody>
</table>

### Remote display, HMI

<table>
<thead>
<tr>
<th>Type</th>
<th>Use</th>
<th>Description</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote display</td>
<td>For M172 performance logic controllers</td>
<td>128 x 64 LCD, with backlight</td>
<td>TM171DGRP</td>
<td>0.197/ 0.430</td>
</tr>
</tbody>
</table>

HMI Magelis STU/STO

Please consult on our web site www.schneider-electric.com
Presentation

5 I/O expansion modules are available, 2 of which are dedicated to M171 and M172 performance logic controllers, and 3 of which are for M171 optimized logic controllers (see compatibility table below).

- They are used to increase the number of I/Os:
  - up to 44 on M171 optimized logic controllers
  - up to 351 on M171 performance logic controllers
  - up to 366 on M172 performance logic controllers
- Expanded I/O types are digital and analog I/Os
- They are connected:
  - Via the LAN expansion bus on M171 optimized logic controllers
  - Via the CAN expansion bus on M171 and M172 performance logic controllers

Compatibility between logic controllers and I/O expansion modules

<table>
<thead>
<tr>
<th>Logic controller type</th>
<th>Reference</th>
<th>Compatible I/O expansion module (reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M171 optimized</td>
<td>TM171OBM14R</td>
<td>TM171EO14R</td>
</tr>
<tr>
<td></td>
<td>TM171ODM14R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171OB22R</td>
<td>TM171EO15R</td>
</tr>
<tr>
<td></td>
<td>TM171ODM22R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171OBM22R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171OD22R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171ODM22S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171OF22R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171OFM22R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171PDM27R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171PDM27S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171PFE03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM171PFE03HR</td>
<td></td>
</tr>
<tr>
<td>M172 performance</td>
<td>TM172PBG28R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM172PDG28R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM172PDG28S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM172PBG42R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM172PDG42R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM172PDG42S</td>
<td></td>
</tr>
</tbody>
</table>

Description

35 mm/1.38 in. rail mounting I/O expansion modules

TM171EP27R expansion module (1)
1. Connector for removable terminal block for digital inputs
2. Connector for removable terminal block for analog inputs
3. Connector for removable terminal block for Modbus SL
4. Connector for removable terminal block for CAN expansion bus
5. 4-position DIP switches for address selection
6. Connector for removable terminal block for power supply (≤ 24 V, ≥ 48 V)
7. Connector for removable terminal block for fast digital input
8. Connector for removable terminal block for digital outputs
9. Connector for removable terminal block for analog outputs
10. Clip for 35 mm/1.38 in. rail mounting
11. 6- and 10-position DIP switches for address selection
12. 3 status LEDs

TM171EP14R expansion module (1)
1. 4-position DIP switches
2. Connector for removable terminal block for CAN expansion bus
3. Removable terminal block for digital outputs
4. Behind the removable protective cover: Service port (TTL)
5. Connector for low voltage I/Os
6. Clip for 35 mm/1.38 in. rail mounting
7. Connector for removable terminal block for power supply (≤ 24 V)

TM171Eo+xR expansion modules (1)
1. Service port (TTL)
2. Wired connector for removable terminal block for Modbus SL
3. Connector for removable terminal block for digital outputs
4. Wired connector for removable terminal block for power supply (≤ 24 V)
5. Wired connector for low voltage I/Os
6. Clip for 35 mm/1.38 in. rail mounting
7. Wired connector for removable terminal block for analog outputs
8. Wired connector for removable terminal block for LAN expansion bus

(1) Removable terminal blocks to be ordered separately, except for TM171EO14R, see page 21.
Modicon M171/M172 logic controllers
I/O expansion modules

I/O expansion modules for Modicon M171 and M172 performance logic controllers

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Compatibility with logic controller</th>
<th>Embedded communication connection</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>4 digital inputs: ~ 24 V or ~ 24V&lt;br&gt;4 analog inputs: (configurable by pair) NTC, PT1000, PTC, 4-20 mA, 0-5 V, 0-10 V, or digital inputs</td>
<td>4 digital outputs: 1 SPDT (5 A, ~ 230 V) with independent common&lt;br&gt;3 SPST (3 A, ~ 230 V) with independent common&lt;br&gt;2 analog outputs: 0-10 V</td>
<td>□ 1 removable connector for CAN expansion bus</td>
<td>TM171P001&lt;br&gt;TM172P001</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td>27</td>
<td>9 digital inputs (8 + 1):&lt;br&gt;2 groups of 4 digital inputs, ~ 24 V or ~ 48 V&lt;br&gt;1 fast digital input or high speed counter, volt-free&lt;br&gt;6 analog inputs: 2 NTC or digital inputs&lt;br&gt;4 NTC, 4-20 mA, 0-10 V, or digital inputs</td>
<td>7 digital outputs: 2 SPDT (8 A, ~ 230 V) with independent common&lt;br&gt;5 SPST (5 A, ~ 230 V) with independent common&lt;br&gt;5 analog outputs: 0-10 V, or 4-20 mA</td>
<td>□ 1 removable connector for CAN expansion bus</td>
<td>TM171P001&lt;br&gt;TM172P001</td>
<td>0.385/0.850</td>
</tr>
</tbody>
</table>

I/O expansion modules for Modicon M171 optimized logic controllers

<table>
<thead>
<tr>
<th>No. of I/Os</th>
<th>Number and type of channels</th>
<th>Compatibility with logic controller</th>
<th>Embedded communication connection</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>2 digital inputs: open collector or digital inputs (1)&lt;br&gt;5 configurable analog inputs:&lt;br&gt;2 NTC, PT1000 or digital inputs&lt;br&gt;2 NTC, 0-20 mA&lt;br&gt;4-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs&lt;br&gt;1 NTC, PT1000, 0-20 mA, 4-20 mA, 0-10 V, 0-5 V, 0-1 V, or digital inputs</td>
<td>4 digital outputs: 3 SPDT (2 A, ~ 230 V) with the same common&lt;br&gt;1 SPDT (2 A, ~ 230 V)</td>
<td>□ 1 wired connector for LAN expansion bus</td>
<td>TM171OBM14R&lt;br&gt;TM171ODM14R</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td>15</td>
<td>6 digital inputs: volt-free&lt;br&gt;3 analog inputs: NTC or digital inputs</td>
<td>4 digital outputs: 3x 2 A, ~ 250 V&lt;br&gt;1 open collector&lt;br&gt;2 analog outputs:&lt;br&gt;open collector (PPM/PWM)</td>
<td>□ 1 wired connector for LAN expansion bus</td>
<td>TM171O15R</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td>22</td>
<td>6 digital inputs: volt-free&lt;br&gt;5 analog inputs:&lt;br&gt;3 NTC or digital inputs&lt;br&gt;2 NTC, 0-20 mA&lt;br&gt;4-20 mA, 0-10 V, or digital inputs</td>
<td>4 digital outputs: 5x 2 A, ~ 250 V&lt;br&gt;1 open collector&lt;br&gt;2 analog outputs:&lt;br&gt;open collector (PPM/PWM)&lt;br&gt;3x 0-10 V</td>
<td>□ 1 wired connector for LAN expansion bus</td>
<td>TM171OE22R</td>
<td>0.190/0.420</td>
</tr>
</tbody>
</table>

Accessories for I/O expansion modules

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
<th>Cable length (m/ft.)</th>
<th>Unit reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessory – To be ordered separately</td>
<td>analog output connector (0-10 V outputs)&lt;br&gt;Sold in lots of 5 (item 1)</td>
<td>Cordset equipped with a 4-pin connector on one end</td>
<td>1/3.3</td>
<td>TM171ACB40AO1M</td>
</tr>
<tr>
<td></td>
<td>Low voltage connector&lt;br&gt;Sold in lots of 5 (item 2)</td>
<td>Screw terminal block and a cordset equipped with a 20-pin connector on one end</td>
<td>1/3.3</td>
<td>TM171ACB40A01M</td>
</tr>
<tr>
<td>Accessory – Supplied with each expansion module</td>
<td>LAN expansion bus connector&lt;br&gt;Sold in lots of 5 (item 3)</td>
<td>Cordset equipped with a 3-pin connector at each end</td>
<td>2/6.6</td>
<td>TM171ACB40LAN</td>
</tr>
<tr>
<td>Accessory – Supplied with TM171EP14R TM171EP27R</td>
<td>Screw terminal blocks (inputs, outputs, and communication bus)&lt;br&gt;14 I/Os – For TM171EP14R&lt;br&gt;27 I/Os – For TM171EP27R</td>
<td></td>
<td>TM171ASCTB14&lt;br&gt;TM171ASCTB27</td>
<td>0.050/0.110&lt;br&gt;0.100/0.220</td>
</tr>
</tbody>
</table>

(1) On the same channel: 2 digital inputs or 2 analog outputs (depending on the configuration).<br>(2) Minimum set for operating controllers.
Presentation

The communication module offer is dedicated to the 35 mm/1.38 in. rail mounting version of M171 performance and M172 performance logic controllers (1). The 8 optional modules provide specific connections:

- To fieldbuses, including:
  - CAN bus
  - Modbus TCP
  - Profinet
  - Modbus SL (RS 485)
  - BACnet MS/TP (B-AAC profile)
  - BACnet IP (B-AAC profile)
  - RS 232 serial link
  - LonWorks (FET-10)
  - Konnex (KNX) via Schneider Electric's spaceLYnk gateway, Please consult on our website www.schneider-electric.com

- To services, including:
  - Ethernet
  - WebVisu and remote download functions

- They are mounted by simple interlocking on the left-hand side of an M171 performance or an M172 performance logic controller (1).

- Only one communication module can be added to a performance logic controller. The communication module is powered by the controller.

- Each communication module has its own type of connector, adapted to the bus or communication network (see details in the reference table, page 23).

Description

35 mm/1.38 in. rail mounting

TM171A I/O communication modules

1 Communication connector (2)
2 Locking device
3 Expansion connector to the performance controller type TM171P or TM172P (1)
4 Clip for 35 mm/1.38 in. rail mounting

(1) Compatibility between M171 and M172 performance logic controllers and communication modules, see table below:

<table>
<thead>
<tr>
<th>Logic controller</th>
<th>Reference</th>
<th>Compatible communication modules</th>
</tr>
</thead>
</table>

(2) Communication connector type depends on communication modules, see detail next page.
### Communication modules

**For M171 and M172 performance logic controllers (35 mm / 1.38 in. rail mounting version)**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Compatibility with logic controller</th>
<th>Fieldbus, services access</th>
<th>Communication port</th>
<th>Reference (1)</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>M171/172 performance</td>
<td>Modbus TCP</td>
<td>CAN</td>
<td>2 screw terminal blocks (1)</td>
<td>TM171ACAN</td>
<td>0.077/0.170</td>
</tr>
<tr>
<td>M171 performance</td>
<td>Modbus TCP, Ethernet, BACnet IP (B-AAC profile), WebVisu and remote download functions</td>
<td>1 RJ45</td>
<td>TM171AETH</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171 performance</td>
<td>Profibus</td>
<td>1 SUB-D 9</td>
<td>TM171APBUS</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171/172 performance</td>
<td>Modbus SL (RS 485)</td>
<td>2 screw terminal blocks (1)</td>
<td>TM171AMB</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171/172 performance</td>
<td>Modbus SL or BACnet MS/TP (B-AAC profile)</td>
<td>2 screw terminal blocks (1)</td>
<td>TM171ARS485</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171/172 performance</td>
<td>RS 232 serial link, Relay output</td>
<td>1 SUB-D 9 for RS 232, 1 screw terminal block for relay output (1)</td>
<td>TM171ARS232</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171 performance</td>
<td>Modbus TCP and BACnet/IP, Modbus SL or BACnet MS/TP (B-AAC profile), WebVisu and remote download functions, Ethernet</td>
<td>1 RJ45 for Ethernet, 2 screw terminal blocks for RS 485 (1)</td>
<td>TM171AETHRS485</td>
<td>0.077/0.170</td>
<td></td>
</tr>
<tr>
<td>M171 performance</td>
<td>LonWorks (FFT-10)</td>
<td>1 screw terminal block for LON bus</td>
<td>TM171ALON</td>
<td>0.077/0.170</td>
<td></td>
</tr>
</tbody>
</table>

(1) Removable terminal blocks supplied with communication modules.
Modicon M171/M172 logic controllers
Electronic expansion valve drivers

**Presentation**

**Electronic expansion valve drivers**

The 3 types of electronic expansion valve drivers are used to control the electronic expansion valve so as to control superheat after the evaporator.

- They are compatible with each performance or optimized logic controllers.
- They operate independently on measurement accessories such as:
  - NTC or PT1000 probes
  - Pressure transducers
- The 3 available electronic expansion valve drivers are compatible with competing valve brands such as those given in the table below:

<table>
<thead>
<tr>
<th>Electronic expansion valve drivers: Brand (type)</th>
<th>Expansion valves: Brand (type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider Electric (TM171VEVA2, TM171VEVD4, TM171VEVM4)</td>
<td>ELIWELL™ (SXVB)</td>
</tr>
<tr>
<td></td>
<td>ALCO™ (EX4, EX5, EX6, EX7, EX8, EXM246, EXL246)</td>
</tr>
<tr>
<td></td>
<td>DANFOSS™ (ETS50, ETS100)</td>
</tr>
<tr>
<td></td>
<td>SPORLAN™ (SER(I) GU/KB/CD, SER1.5 to 20, SEI 30/50, SEH)</td>
</tr>
<tr>
<td></td>
<td>SANHUA™ (DPF-Q, DPF-T01)</td>
</tr>
</tbody>
</table>

**Description**

- 35 mm/1.38 in. rail mounting
- TM171V electronic expansion valve drivers (1)
  - 1 Output terminal block and power supply connector (12 V)
  - 2 Protective cover
  - 3 status LEDs
- Behind the removable protective cover:
  - 6-position DIP switches
  - 5 Status LED (for operation with TM171AMFK programming stick)
  - 6 LAN serial port for connecting TM171DLED remote display
  - 7 Terminal block for analog/digital inputs
  - 8 Clip for 35 mm/1.38 in. rail mounting
  - 9 TTL programming port

**References**

**Electronic expansion valve drivers**

<table>
<thead>
<tr>
<th>Application</th>
<th>Number and type of channels</th>
<th>Outputs</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator, convert 0-10 V or 4-20 mA in opening position contact</td>
<td>1 analog input: (1) 1x 4-20 mA, 0-5 V, or 0-10 V</td>
<td>1 digital output: (1) 1 open collector (100 mA, 12 V)</td>
<td>TM171VEVA2</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td>Autonomous, wired to manage On/Off contact</td>
<td>2 digital inputs: (2) 2 volt-free</td>
<td>2 digital outputs: (1) 1 open collector (100 mA, 12 V) (2) 1 SPST NO relay contact, 5 A, ~250 V</td>
<td>TM171VEVD4</td>
<td>0.190/0.420</td>
</tr>
<tr>
<td>Autonomous, managed by Modbus (RS 485)</td>
<td>2 digital inputs: (2) 2 volt-free</td>
<td>2 digital outputs: (1) 1 open collector (100 mA, 12 V) (2) 1 SPST NO relay contact, 5 A, ~250 V</td>
<td>TM171VEVM4</td>
<td>0.190/0.420</td>
</tr>
</tbody>
</table>

**Accessories for Electronic expansion valve drivers**

<table>
<thead>
<tr>
<th>Designation</th>
<th>For connecting</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminal block for electronic expansion valve drivers</td>
<td>Power supply, sensor power supply, digital and analog I/O, Modbus link</td>
<td>TM171ASCTBVEV</td>
<td>0.050/0.110</td>
</tr>
</tbody>
</table>

(1) TM171ASCTBVEV screw terminal block to be ordered separately.
(2) 2 PT1000 (-50...+99.9 °C / -58...+211.82 °F)

---

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### Measurement accessories

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
<th>Sold in lots of</th>
<th>Cable length m/ft.</th>
<th>Unit reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Humidity &amp; temperature probe</strong></td>
<td>□ IP 65 &lt;br&gt; □ 4-20 mA &lt;br&gt; □ Wall mounting &lt;br&gt; □ Measuring ranges: 0…100%, -40…60 °C / -40…140 °F</td>
<td>–</td>
<td>–</td>
<td>TM1SH314</td>
<td>0.176/0.390</td>
</tr>
<tr>
<td><strong>Humidity probe</strong></td>
<td>□ IP 65 &lt;br&gt; □ 4-20 mA &lt;br&gt; □ Wall mounting &lt;br&gt; □ Measuring ranges: 0…100%</td>
<td>–</td>
<td>–</td>
<td>TM1SH304</td>
<td>0.170/0.370</td>
</tr>
<tr>
<td><strong>Humidity probe (sensor equipped with a cable)</strong></td>
<td>□ IP 54 &lt;br&gt; □ 4-20 mA &lt;br&gt; □ Measuring ranges: 15…90%</td>
<td>–</td>
<td>3/9.84</td>
<td>TM1SH284</td>
<td>0.138/0.300</td>
</tr>
<tr>
<td><strong>NTC probes (sensor equipped with a cable)</strong></td>
<td>□ IP 67 &lt;br&gt; □ Sensor 6x 15 mm / 0.591 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Grey</td>
<td>8</td>
<td>1.5/4.92</td>
<td>TM1STNTCRN61515</td>
<td>0.104/0.230</td>
</tr>
<tr>
<td></td>
<td>□ FAST IP 67 &lt;br&gt; □ 4x 40 mm / 1.57 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Grey</td>
<td>8</td>
<td>1.5/4.92</td>
<td>TM1STNTCSF44015</td>
<td>0.144/0.320</td>
</tr>
<tr>
<td></td>
<td>□ IP 68 &lt;br&gt; □ 6x 20 mm / 0.79 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Grey</td>
<td>8</td>
<td>1.5/4.92</td>
<td>TM1STNTCSN62015</td>
<td>0.144/0.320</td>
</tr>
<tr>
<td></td>
<td>□ IP 68 &lt;br&gt; □ 6x 20 mm / 0.79 in. &lt;br&gt; □ TPE &lt;br&gt; □ with strap &lt;br&gt; □ Grey</td>
<td>5</td>
<td>3/9.84</td>
<td>TM1STNTCTN62030</td>
<td>0.175/0.390</td>
</tr>
<tr>
<td></td>
<td>□ IP 68 &lt;br&gt; □ 5x 20 mm / 0.79 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Grey</td>
<td>5</td>
<td>3/9.84</td>
<td>TM1STNTCRN52030</td>
<td>0.180/0.400</td>
</tr>
<tr>
<td><strong>NTC probes for air wall mounting</strong></td>
<td>□ Outdoor mounting</td>
<td>–</td>
<td>–</td>
<td>TM1STNTCWN65605</td>
<td>0.050/0.110</td>
</tr>
<tr>
<td></td>
<td>□ Indoor mounting</td>
<td>–</td>
<td>–</td>
<td>TM1STNTCWN75750</td>
<td>0.050/0.110</td>
</tr>
<tr>
<td><strong>PT1000 probes</strong></td>
<td>□ IP 68 &lt;br&gt; □ 6x 20 mm / 0.79 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Green</td>
<td>8</td>
<td>1.5/4.92</td>
<td>TM1STPTTSN62015</td>
<td>0.144/0.320</td>
</tr>
<tr>
<td></td>
<td>□ IP 68 &lt;br&gt; □ 5x 20 mm / 0.79 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Green</td>
<td>5</td>
<td>3/9.84</td>
<td>TM1STPTTSN52030</td>
<td>0.175/0.390</td>
</tr>
<tr>
<td></td>
<td>□ IP 68 &lt;br&gt; □ 5x 20 mm / 0.79 in. &lt;br&gt; □ -50...+110 °C/-122…+230 °F &lt;br&gt; □ Green</td>
<td>5</td>
<td>3/9.84</td>
<td>TM1STPTTSN52050</td>
<td>0.232/0.510</td>
</tr>
</tbody>
</table>
SoMachine HVAC programming software
for Modicon M171/M172 logic controllers

Presentation

Software solution
SoMachine HVAC programming software is compliant with IEC 61131-3. It can be used to develop, configure, and commission entire HVAC or Pumping solution systems.

It includes:
- Programming Modicon M171/M172 logic controllers (performance and optimized) and remote display units
- Setting up expansion buses and networks
- Creating the screen of the displays (built-in and displays of the M171/M172 logic controller offer)
- Configuring BMS communication modules on BACnet MS/TP (B-AAC profile), Modbus SL, Modbus TCP, BACnet MS/TP, BACnet IP (B-AAC profile), and LonWorks (FFT-10)
- Dedicated libraries such as:
  - a library of application function blocks (1)
  - a library of Tested, Validated, and Documented Applications (TVDA)
- Full simulation mode

General characteristics

Overview

Programming languages
- ST (Structured Text)
- FBD (Function Block Diagram)
- LD (Ladder)
- IL (Instruction List)
- SFC (Sequential Function Chart)

Applications
- Graphical and text-based languages:
  - Adaptation to each developer background
  - Library management
  - Code debugging
  - Parameter definition
  - Simulation mode
  - Advanced programming:
    - Vectors
    - Pointers

System solutions management
- Multi-target project
- Management of Modbus data
- Data exchange between several Modicon M171/M172 performance logic controllers

Graphical user interface
- Graphic display:
  - Multipage
  - Buttons
  - Edit box
  - Static text
  - Images
  - Animations
  - Bars
  - Lists of data (parameters/variables/alarms)
  - Configurable buttons
  - Multilanguage
  - Automatic documentation

Communication bus configurators
- Control networks: Modbus TCP, Modbus SL, Profinet
- Expansion bus fieldbus: CAN expansion bus
- BMS connectivity: BACnet MS/TP (B-AAC profile), BACnet IP (B-AAC profile), LonWorks (FFT-10)

Advanced simulation options
- Full simulation
- I/O emulation
- HMI
- IEC code
- Live debug
- Triggers
- Oscilloscope

Advanced debugging and simulation options
- Remote control/download:
  - Modbus SL & TCP
  - CAN
  - Modbus
  - Parameter management
  - Status monitoring
  - Field test:
    - Oscilloscope
    - Debug window
    - Export to Excel

(1) For more information about Application Function Blocks, see chapter 2.
SoMachine HVAC programming software
for Modicon M171/M172 logic controllers

Product offer
SoMachine HVAC software is supplied on a DVD or can be downloaded from our web site: www.schneider-electric.com > Solutions > Systems > Machine Control > HVAC control.
The product version concerned offers the SoMachine HVAC functions associated with logic controllers.

References
System configuration:
- Processor: Pentium 1.6 GHz or higher
- RAM: 1 GB; 2 GB recommended
- Hard disk: 500 MB minimum
- OS: 32-bit Windows; XP Pro SP3 or Windows 7 (32-bit or 64-bit) or Windows 8
- Display: SVGA video card; 800×600, 128 MB; 1024×768, 256 MB recommended
- Peripheral device: A mouse or compatible pointing device
- Peripheral device: USB interface

SoMachine HVAC programming software

<table>
<thead>
<tr>
<th>Application</th>
<th>Reference</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>M171 optimized logic controllers, M171 performance logic controllers, and M172 performance logic controllers</td>
<td>TM171SW</td>
<td>0.050/0.110</td>
</tr>
</tbody>
</table>

Programming accessories for M171 and M172 performance logic controllers
- The USB cable is recommended for local programming.
- Ethernet port is recommended for remote download or remote programming.

<table>
<thead>
<tr>
<th>Description</th>
<th>Characteristics and use</th>
<th>Length m/ft.</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming through USB port</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming cables (1)</td>
<td>From the PC USB-A port to the USB mini-B port on M171 (2) and M172 performance logic controllers (2)</td>
<td>3/0.98</td>
<td>TCSXCNAMUM3P (1)</td>
<td>0.065/0.143</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.8/5.90</td>
<td>BMXXCAUSBH018</td>
<td>0.065/0.143</td>
</tr>
<tr>
<td>Programming through Modbus SL and/or Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB to RS485 converter (3)</td>
<td>To be used on M171 (2) and M172 performance logic controllers (3)</td>
<td>0.4/1.31</td>
<td>TSXCUSB485</td>
<td>0.144/0.320</td>
</tr>
<tr>
<td>Connection cable for Modbus serial link (4)</td>
<td>Equipped with 1 RJ45 connector at one end and flying leads at the other end</td>
<td>3/9.84</td>
<td>VW3A8306D30</td>
<td>0.250/0.550</td>
</tr>
<tr>
<td>Ethernet connection cable</td>
<td>For connection to terminal devices (DTE)</td>
<td>2/6.56</td>
<td>490NTW00002 (2)</td>
<td>–</td>
</tr>
</tbody>
</table>

(1) Unshielded cable without grounding. To be used only for temporary connections. For permanent connections, use the reference BMXXCAUSBH018.
(2) Other length available: 5 m/16.40 ft, 12 m/39.37 ft, 40 m/131.23 ft, and 80 m/262.47 ft

Programming accessories for M171 optimized logic controllers

<table>
<thead>
<tr>
<th>Description</th>
<th>Characteristics and use</th>
<th>Reference</th>
<th>Weight kg/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming through TTL programming port</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming cable (6)</td>
<td>To be used between a PC and the TTL programming port of M171 optimized logic controllers (6)</td>
<td>TM171ADM1</td>
<td>0.157/0.350</td>
</tr>
<tr>
<td>Programming stick (7)</td>
<td>To be used to transfer parameters from one M171 optimized logic controller (3) to another, or to download the program</td>
<td>TM171AMFK</td>
<td>0.010/0.020</td>
</tr>
<tr>
<td>Programming through USB port</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB to RS485 converter (3)</td>
<td>See above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection cable for Modbus serial link (4)</td>
<td>See above</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Modicon M171/M172, logic controllers and software

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