EcoStruxure™ Innovation At Every Level **Machine**

Modicon M171/M172 logic controllers for HVAC solutions

Catalog

March 2018

Schneider Electric

Modicon M171/M172 logic controllers for HVAC solutions

General contents

Chapter 1
General presentation

Technical data relating to products listed in this chapter is available online at www.schneider-electric.com/modicon-m171-m172

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General presentation

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EcoStruxure™ Machine

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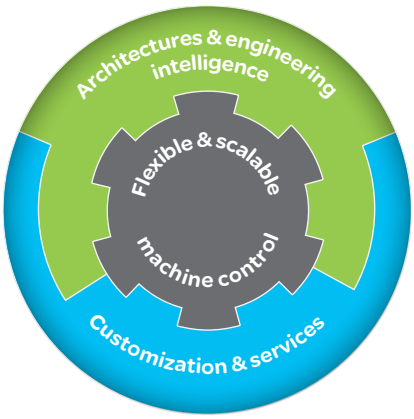
Automation solutions at your service



Hardware, software, and an extensive array of HVAC specific know-how and services: EcoStruxure™ Machine integrates it all in a single solution

Improve your HVAC system and business performance

Challenges

Whatever your area of focus in fluid systems - chillers, heat pumps, Air Handling Units, etc. for residential, building, or industrial applications - Schneider Electric has the right solution for you.

To keep your customers satisfied, you need to offer machines with intuitive automation, flexible and scalable performance, all-embedded functionality, and to be connected everywhere to the machines.

Your customers also expect a seamless integration into their Building Management Systems and the best service, anytime and anywhere in the world. Now more than ever, your choice of control solutions is key to distinguish yourself at every stage of the process, from design and development to implementation and machine maintenance.

Ready-to-use architectures and function blocks

Tested, Validated, and Documented Architectures (TVDAs) help reduce design time. They include system user guides, CAD files, and dedicated HVAC Application Functions Blocks (AFBs) that make system design fast and easy.

Flexible and scalable machine control platforms

Scalable drive, HMI, logic, and motion controllers provide the foundation for a wide range of machine applications. Advanced drive technology and on-board energy efficiency solutions help you quickly design a cost-optimized system.

Maximize your business and machine performance

With EcoStruxure™ Machine, you can maximize performance throughout the machine's entire life cycle.
EcoStruxure Machine helps you to build **Flexible**, **Connected**, **Efficient**, **Safe**, and **Sustainable** solutions.
EcoStruxure Machine helps you to optimize business performance and increase profitability.

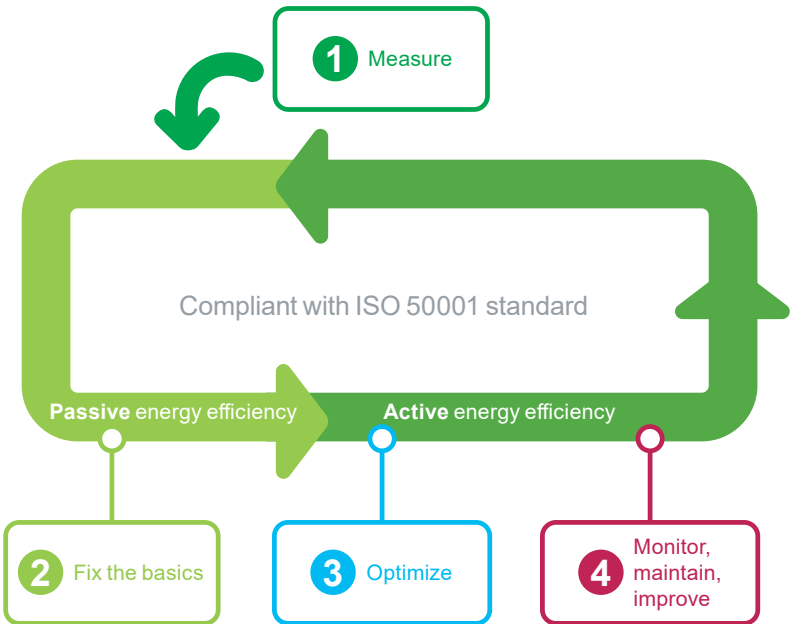
General presentation
Design Smart HVAC machines

Four energy efficiency principles

Improve your machines energy consumption

HVAC machines can represent up to 40% of the overall energy consumption of buildings and facilities. Schneider Electric offers smart strategies to improve machine energy consumption according to four energy efficiency principles:

1 Measure the energy consumption of your machine to identify potential savings.
2 Fix the basics and reduce energy consumption by selecting the right devices.
3 Optimize your machine's energy consumption with dedicated Energy Efficiency function blocks.
4 Monitor electrical energy consumption to maintain and improve machine efficiency.



Your benefits

> Increased visibility of your machines' energy consumption
> Detection of "over-sized" equipment that consumes more energy
> Possible marketing argument to your customers with real evidence of energy savings

Your customers' benefits

> Significant reductions in energy bills
> Improved preventive maintenance for machines
> Increased lifespan for motors and electronic equipment

General presentation
Service & support

1

Service and support behind you every step of the way

Design

Stage in the product life cycle: Design
What we can bring you at this stage...

We find the optimum solution for your needs
> Based on your needs, our Solution Architecture Experts and Application Design Experts (SAE/ADE) work out innovative technical solutions including:
  > Co-engineering
  > Tests
  > Validation

We understand your challenges
> Consulting
> Audits

We execute the solution with a comprehensive service agreement
> Our solution design and delivery centers (Flex Centers) are committed to quality and results and provide tests, validation, and commissioning

We improve your team's competencies
> In-class and on-site training

Build

Stage in the product life cycle: Build
What we can bring you at this stage...

We take care of the delivery of your solution
> Availability of components through a large worldwide network of distributors
> Collaboration, management, and delivery through local partners
> With Schneider Electric as your turnkey solution partner, your solutions will include:
  > Project management and responsibility
  > Engineered systems
  > Third-party components management
  > Customizations and adaptations

We provide on-site services and support
> Secondment of qualified personnel to deliver on-site engineering and technical services

We improve your service team's competencies
> Service and commissioning training
> Supply chain optimization

Service and support behind you every step of the way

Operate

Stage in the product life cycle: Operate
What we can bring you at this stage...

We provide international sales and after-sales services for you and your customers
> Maintenance contracts
> Spare parts and repairs
> Just-in-time delivery
> Return of goods
> Service expertise
> Diagnosis and repair
> Environmental measurements (EMC, fieldbus, thermography, power quality analyses, etc.)
> Customer International Support (CIS) as a single point of contact
> A network of dedicated local country experts
> Web-based collaborative platform for efficient communication

We improve your customers' competencies
> In-class customer training and on-site training
> Customer service and commissioning training

Improve

Stage in the product life cycle: Improve
What we can bring you at this stage...

We improve your HVAC machine ranges
> Consulting

We improve your customers' HVAC machines in their production line
> Audits
> Training
> Migration and upgrade
> Services expertise:
  > Consultancy
  > Retrofitting

Contact your HVAC experts at your Customer Care Centre at www.schneider-electric.com

Chapter 2
Solutions overview

Technical data relating to products listed in this chapter is available online at
www.schneider-electric.com/hvacmachines

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Application solutions for HVAC

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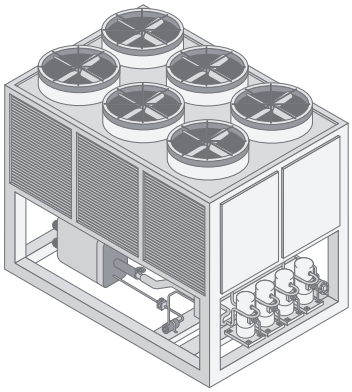
Application solutions for HVAC
Air/Water cooled chillers

Air/Water cooled chillers: Flexible solution (incorporating TVDA)



Challenges

> Your business is producing air-cooled and water-cooled chillers. Your machine development efforts involve both mechanical aspects and control requirements. You need a flexible control system that is compatible with the various types of machine you build. Connectivity with higher-level systems and the ability to adapt the control application to future requirements is a must.

> Time-to-market is key. You are looking for a supplier who offers smart solutions that optimize installation and commissioning time, and who has a high level of expertise in HVAC machine control.

> You also need comprehensive worldwide technical support for your machine control system throughout the entire machine lifecycle, from development to regular operation.

Solution

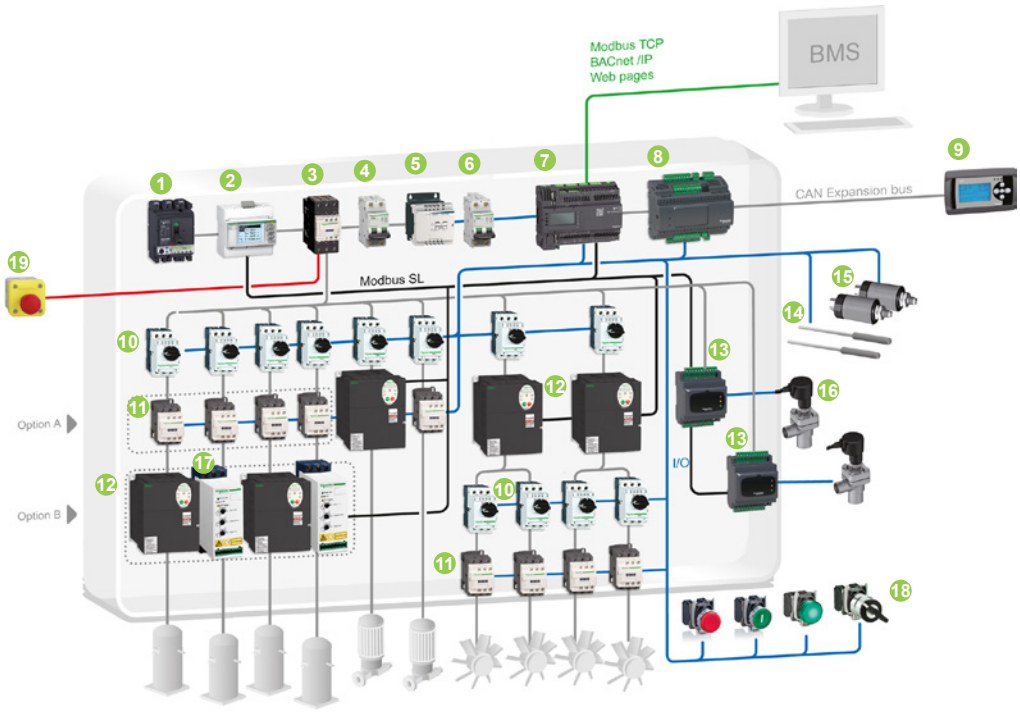
> Schneider Electric offers flexible Tested, Validated, and Documented Architectures (TVDA) designed specifically for air-cooled and water-cooled chillers. This is a flexible solution for all types of chiller that can be customized to your specific machine applications, with pre-designed control functions.

> The solution combines a logic controller, an operating panel, a motor starter, a circuit breaker, and a variable speed drive controlled via Modbus SL fieldbus. Optional I/O modules provide a high level of flexibility to optimize your control system.

> Schneider Electric also provides related functions to support your engineering efforts, and can quickly implement a large assortment of machine subfunctions. Dedicated energy efficiency functions deliver innovative solutions to enhance energy efficiency.

> Connectivity to various BMS networks is provided through optional communication modules (BACnet MS/TP, BACnet IP, Modbus TCP, and others).

Architecture



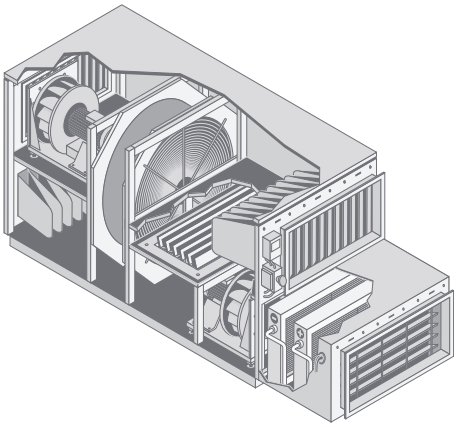
HVAC/Chiller/Modbus SL/Modicon M172 performance logic controller

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 M172** I/O module
9 **Modicon M171** remote display
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 **Telemecanique XMLP** pressure transmitters
16 Electronic expansion valve
17 **Altistart 01** soft starter
18 **Harmony XB4/XB5** signaling units
19 **Harmony XALK** Emergency stop push button

Solutions overview
Application solutions for HVAC
Air Handling Units

Air Handling Units: Flexible solution (incorporating TVDA)



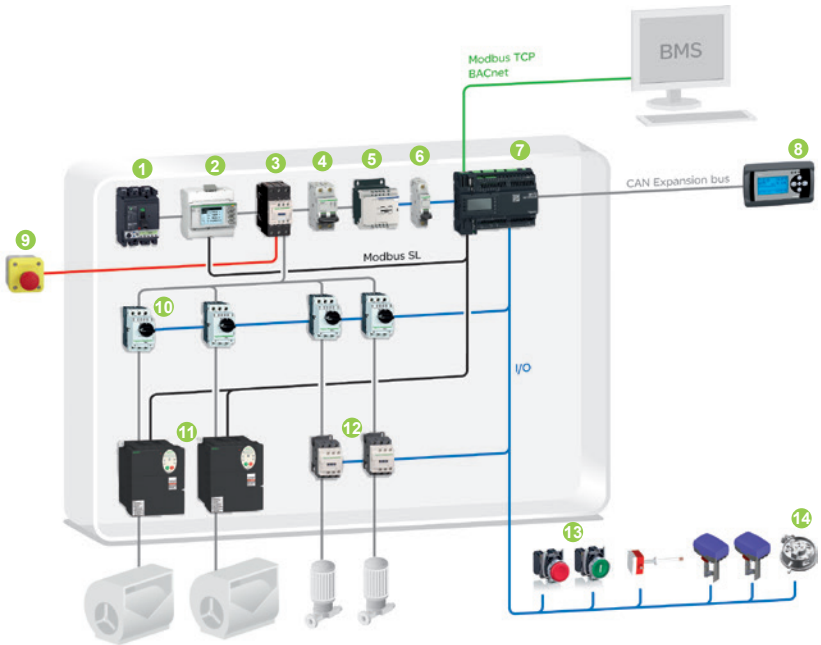
Challenges

> Your business is producing Air Handling Units (AHUs). Your machine development efforts involve both mechanical aspects and control requirements. You need a flexible control system that is compatible with the various types of machine you build. Connectivity with higher-level systems, the ability to integrate mobile machine access, and the adaptability of the control application to future requirements is a must.
> Time-to-market is key. You are looking for a supplier who offers smart solutions that optimize installation and commissioning time, and who has a high level of expertise in HVAC machine control.
> You also need comprehensive worldwide technical support for your machine control system throughout the entire machine lifecycle, from development to regular operation.

Solution

> Schneider Electric offers flexible Tested, Validated, and Documented Architectures (TVDA) designed specifically for Air Handling Units (AHU). This is a flexible solution for all types of AHU that can be customized to your specific machine applications, with pre-designed control functions.
> Schneider Electric offers a flexible, fully-tested, complete control system designed specifically for Air Handling Units. This is an optimized solution for AHUs that can be customized to your specific machine applications, with pre-designed control functions.
> The solution combines a controller, an operating panel, a motor starter, a circuit breaker, and a variable speed drive controlled via Modbus SL field bus. Optional I/O modules provide a high level of flexibility for optimizing your control system.
> Schneider Electric also provides related functions to support your engineering efforts and quickly implement a large assortment of machine subfunctions. Dedicated energy efficiency functions deliver innovative solutions to enhance energy efficiency.
> Connectivity to various BMS networks is provided through native Modbus SL connectivity and optional communication modules (BACnet MS/TP, BACnet/IP , Modbus TCP, and others).

Architecture



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

Solution breakdown

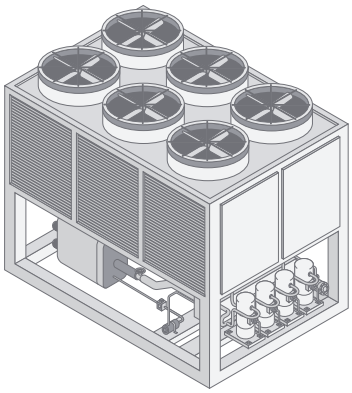
1 **Compact NSX** circuit breaker
2 **iEM3000** energy meter
3 **TeSys D** contactor
4 **C60L-MA** modular circuit breaker
5 **Phaseo** switch mode power supply
6 **C60L-DC** DC circuit breaker
7 **Modicon M172** performance logic controller
8 **Modicon M171** remote display
9 **Harmony XALK** Emergency stop push button
10 **TeSys GV2L** magnetic circuit breaker
11 **Altivar 212** variable speed drive, for 0.75 to 75 kW *(1.0 to 100 hp)* motors
12 **TeSys D** contactor
13 **Harmony XB4/XB5** control & signaling units
14 Differential pressure switch

Solutions overview

Application solutions for HVAC

Air/water cooled chillers, chillers, rooftop units, Air Handling Units, HVAC machines

Customized solution



Challenges

> You need to reduce the overall cost of your machine control panels, and achieve optimal sizing of all electrical components. Building control panels is not part of your core business.
> You want to reduce the cost of your stock of electrical components.
> You are looking for expertise in the engineering, design, and manufacture of control solutions. You expect fully customizable turnkey control panel solutions with a minimum number of component suppliers.

Solution

> Schneider Electric provides manufacturers of HVAC machines with fully customizable turnkey control panel solutions. We deliver solutions quickly and offer a complete logistical management service.
> Our experts will design your specific control panel based upon your specifications, and optimize it in terms of size and components.
> In order to optimize the energy consumption of your HVAC machine, our experts provide the right solution to build an energy efficient machine.
> Based upon your needs, we can design your control solution in compliance with national standards in the countries where your machine is delivered.

Benefits

The main advantages offered by our customized solutions are:

Expertise in panel building and HVAC control

> Our experts have a high level of expertise in control panel design and HVAC control solutions.

A turnkey solution

> A control panel solution for a pre-assembled solution based upon your specific needs.

Increased profitability

> Optimized and standardized “repetitive” solutions for highly cost-efficient control panels.

Worldwide compliance

> We design your electrical cabinet in compliance with national standards, wherever you deliver.

Flexibility and openness

> Large choice of system configuration options. Features can be added to your machines as needed. Expert support for system adaptations.

A single supplier

> Complete control system architecture, including all installation components, completely assembled and delivered by a single supplier.
> A single provider of solutions, from machine controls and building management systems to large automation and management installations.

Your automation partner

> Our experts, our application centers, and our worldwide service provide you with comprehensive support throughout the entire machine lifecycle.

Application Function Blocks

Schneider Electric has also developed a user-friendly tool for customers to design their control systems quickly and efficiently themselves. A set of Application Function Blocks (AFBs) is included in **EcoStruxure Machine Expert - HVAC** software to help, for example:

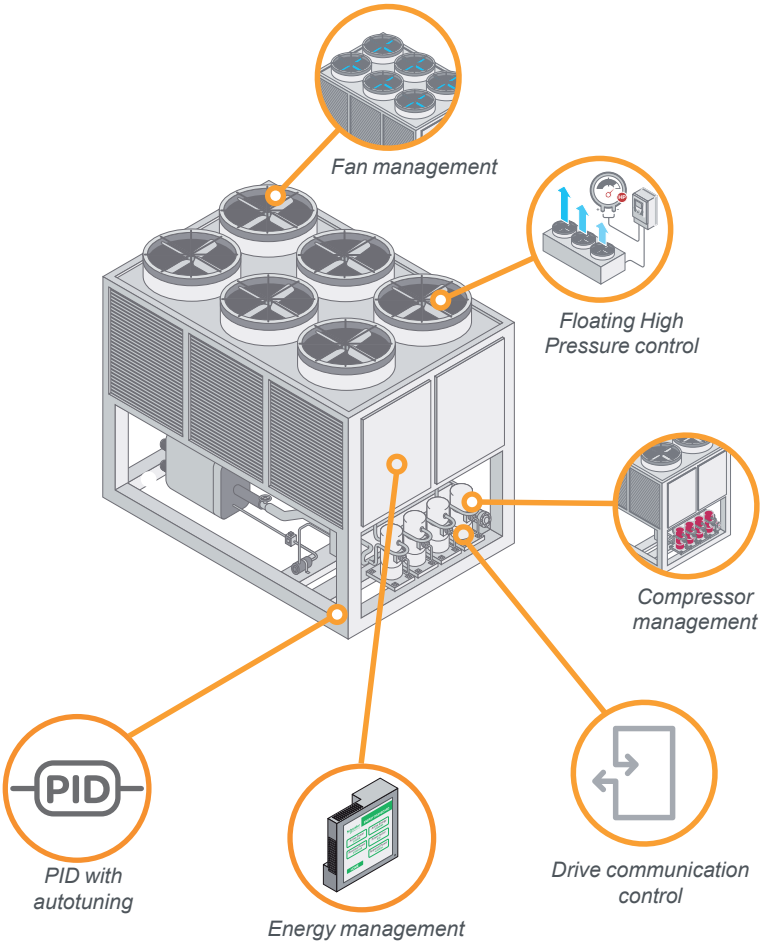
> to reduce the development time for new machines
> to manage your compressors or fans efficiently with a variable speed drive
> to include floating High Pressure control
> to control Schneider Electric variable speed drives via Modbus serial line

These AFBs have been created to help you reduce your development times and improve the efficiency of your control solutions.

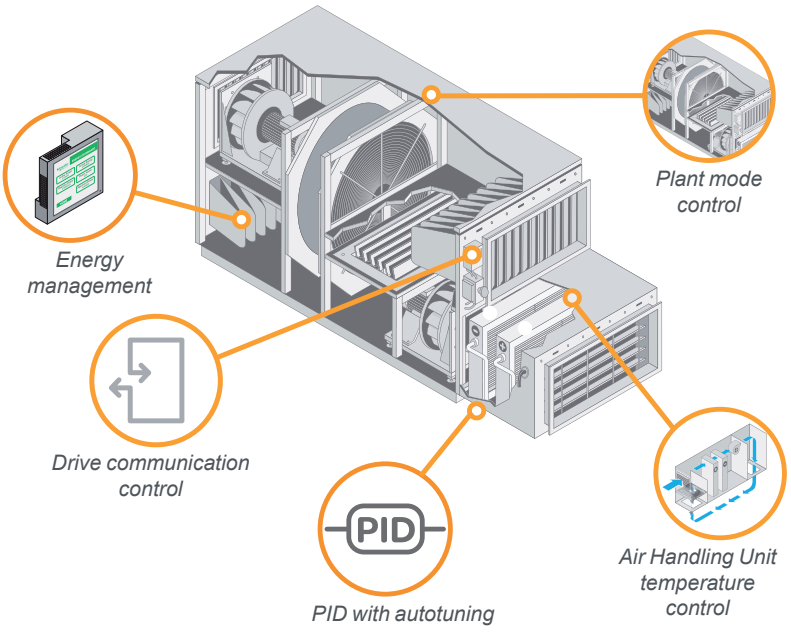
Solutions overview
Application solutions for HVAC
Related functions: Global overview

Global overview of related functions

Related functions for HVAC control solutions involving chillers

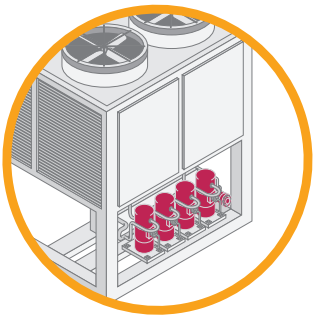


Related functions for HVAC control solutions involving Air Handling Units (AHU)



Solutions overview
Application solutions for HVAC
Related functions: Compressor management

Compressor management



Description

The compressor management function controls a combination of fixed and variable speed compressors to maintain a constant pressure or water temperature in a chiller system.

Benefits

Performance

- Maintains the required temperature or pressure by controlling:
  - the capacity of the compressors in a system with a variable speed drive
  - or the number of compressors

Response

- Makes the system energy efficient by controlling compressor capacity prior to switching compressors on/off
- Facilitates smooth operation by monitoring compressor availability and changing over to the next available compressor if an error is detected

Operating principle

The main objective of this function block is to perform control and switching of multiple compressors to maintain a pre-defined temperature or pressure in a chiller system. The temperature and pressure are measured through sensors while the setpoints are entered through the HMI. The function uses intelligent algorithms to manage switching by assigning priorities to the compressors based on availability and energy optimization.

Characteristics

Main characteristics:

- Controls scroll, screw, or reciprocating compressors
- Balances operating hours based on first in first out (FIFO), last in first out (LIFO), or runtime algorithms
- Supports minimum on timer, minimum off timer, and minimum cycle timer to help prevent frequent compressor switching
- Supports timers to help prevent frequent compressor switching
- Oil recovery function helps prevent compressor damage during partial load conditions
- Helps eliminate resonance frequencies during compressor operation, thereby helping to increase compressor lifetime and reduce noise
- Supports up to 8 compressors per refrigerant circuit
- Allows variable speed drive regulation
- Supports heating or cooling mode

Typical applications

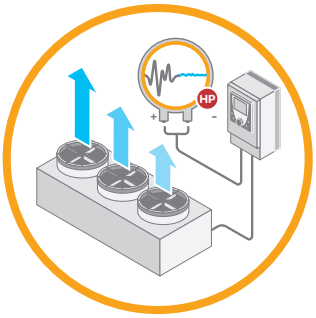
- Air and water cooled chillers
- Heat pumps
- Rooftop units
- Compressor racks

Solutions overview

Application solutions for HVAC

Related functions: Floating High Pressure control with variable speed drives

Floating High Pressure control with variable speed drives



Description

This Application Function Block (AFB) controls the condensing pressure of the air-cooled condenser. It manages the High Pressure setpoint and provides the information to the fan management AFB. The setpoint is defined so as to be able to reduce the energy consumption of the system.

Benefits

Energy performance

> Energy saving of up to 40% by combining variable speed drives with floating High Pressure control

Operating principle

The AFB calculates a High Pressure setpoint based on the outside temperature evolution. The required pressure is controlled by modulating the air flow through fans (on/off and speed control).
3 methods are used to calculate the High Pressure setpoint:

> fixed High Pressure setpoint
> floating High Pressure setpoint with constant offset
> floating High Pressure setpoint with variable offset

Characteristics

This AFB:

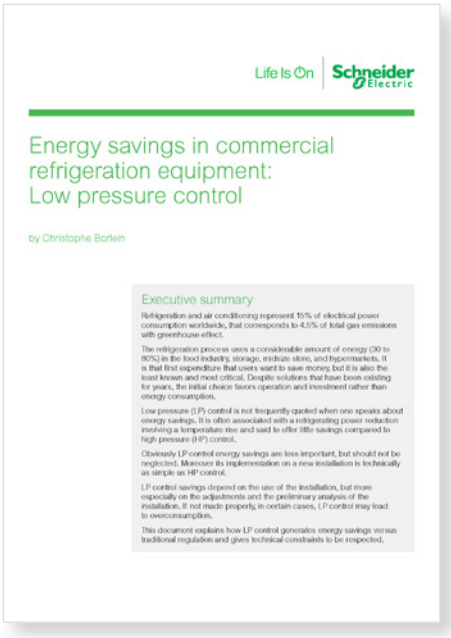
> includes a heat recovery input to allow the High Pressure setpoint to be increased if necessary
> manages the minimum and maximum setpoints
> includes a function to limit setpoint variation
> includes PID control

Typical applications

> Air-cooled condensers

High pressure control white paper

Refrigeration processes use a considerable amount of energy (30 to 80%) in the food industry, storage, grocery stores, and hypermarkets. It is one of the first expenditures where users want to save money, but it is also the least known and most critical. Despite solutions that have been existing for years, the initial choice favors operation and investment rather than energy consumption.
Among solutions to save energy in refrigeration, High Pressure (HP) control is one of the most well-known, if not the best known, for refrigeration equipment. When properly implemented, this solution can help cut electricity bills by more than 30%. However, technology alone is not sufficient to obtain energy savings. It is necessary to properly implement HP control to maximize savings and avoid technical problems.
A white paper has been drawn up by Schneider experts and is available to download from Schneider Electric global website.
It explains how HP control generates energy savings versus regulation with constant HP, and gives technical constraints.


Life Is On Schneider Electric

Energy savings in commercial refrigeration equipment: Low pressure control

by Christophe Borlein

Executive summary

Refrigeration and air conditioning represent 15% of electrical power consumption worldwide, that corresponds to 4.5% of total gas emissions with greenhouse effect.

The refrigeration process uses a considerable amount of energy (30 to 80%) in the food industry, storage, midsize store, and hypermarkets. It is that first expenditure that users want to save money, but it is also the least known and most critical. Despite solutions that have been existing for years, the initial choice favors operation and investment rather than energy consumption.

Low pressure (LP) control is not frequently quoted when one speaks about energy savings. It is often associated with a refrigerating power reduction involving a temperature rise and said to offer little savings compared to high pressure (HP) control.

Obviously LP control energy savings are less important, but should not be neglected. Moreover its implementation on a new installation is technically as simple as HP control.

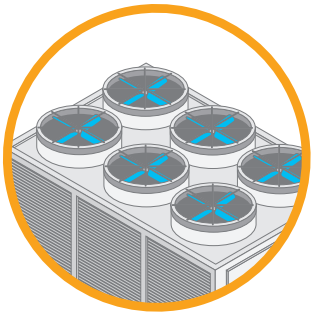
LP control savings depend on the use of the installation, but more especially on the adjustments and the preliminary analysis of the installation. If not made properly, in certain cases, LP control may lead to overconsumption.

This document explains how LP control generates energy savings versus traditional regulation and gives technical constraints to be respected.

White paper by Schneider Electric
To download from the download center on our website.

Solutions overview
Application solutions for HVAC
Related functions: Fan management

Fan management



Description

In order to control the condensing pressure of air-cooled condensers, this function block controls the frequency, starting, and stopping of the fans in a predetermined order to optimize their energy consumption, operating time, and availability.

Benefits

Reliability

> Fans with detected errors are automatically replaced in the sequence by operational fans.
> Fan service life is optimized through operation sequences (FIFO, balancing hours, LIFO).

Performance

> Fan switch-on and operating frequency are optimized in order to reduce the energy consumption of the air-cooled condenser.

Operating principle

Depending on the input, this AFB manages the number of stages of fans to be used. Up to 12 fans per stage can be used, with a maximum of 4 stages. Regulation allows the maximum surface of the condenser to be used in order to reduce the consumption of the fans.

Characteristics

This AFB provides:

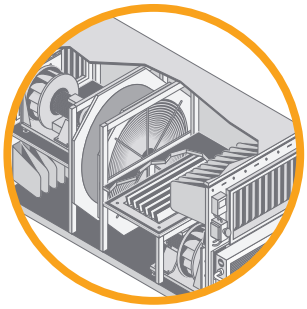
> Linear action between PID and flow
> Management of detected errors and subsequent compensation of fan operation
> Operation with no delay and management of frequencies:
this function increases control stability and reduces the number of fan starts/stops.

Typical applications

> Air-cooled condensers

Solutions overview
Application solutions for HVAC
Related functions: Plant mode control

Plant mode control



Description

This Application Function Block (AFB) determines the operating mode for an Air Handling Unit. Besides monitoring the status of alarms, the AFB also monitors room and outdoor air temperatures to reduce cooling energy needs and improve comfort levels.

Benefits

Monitored operation

> The Air Handling Unit is set to a secure operation mode on detection of a fire alarm, fan alarm, or freeze state alarm
> The night cycle function monitors room temperatures to help protect the building against condensation or other damage due to extreme indoor temperature conditions (too hot or too cold).

Energy optimization

> The night purge function purges and pre-cools the building during unoccupied periods to reduce cooling energy needs (free cooling).
> The night cycle mode maintains a lower room temperature during heating periods and a higher room temperature during cooling periods to reduce the cooling or heating energy needs.

Operating principle

At start-up, the AFB checks the status of the alarms and the various operating modes, then automatically starts or stops the Air Handling Units.

Characteristics

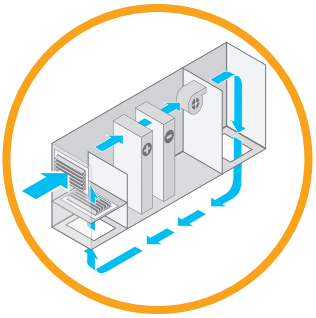
This AFB can be used with all types of Air Handling Units.

Typical applications

> Air Handling Units

Solutions overview
Application solutions for HVAC
Related functions: Air Handling Unit temperature control

Air Handling Unit temperature control



Description

This Application Function Block (AFB) controls the discharge air temperature of Air Handling Units with or without mixing dampers. Heating coil, cooling coil, dampers, and fan speed are modulated in sequence to control the temperature. The function block supports 2 major temperature algorithms: constant discharge air temperature control and return air compensated discharge air temperature control.

Benefits

Energy performance

> The Air Handling Unit air volume is controlled to keep optimum indoor air quality conditions with minimum air volume.
> The economizer control function reduces cooling energy costs by choosing the most economical air for cooling indoor space.
> The summer compensation function reduces cooling energy costs by increasing indoor space temperature in summer seasons.

Comfort

> Optimum comfort is achieved by adjusting the compensated discharge air temperature according to changes in the outdoor air temperature.
> An increased indoor space temperature during summer seasons avoids climate shocks when entering or leaving buildings.
> An increased discharge air temperature during winter seasons increases human comfort by compensating conductive cold from walls during winter seasons.

Operating principle

At startup, the freeze protection and recovery function stops the AHU cycling due to low outdoor air temperature conditions. The AHU can operate in constant discharge air temperature control mode or in a return air compensated discharge air temperature control mode. The temperature is controlled by sequencing the heating coil, damper, cooling coil, and fan speed.

Characteristics

This AFB can be used with all types of Air Handling Units.

Typical applications

> Air Handling Units

Solutions overview
Application solutions for HVAC
Related functions: PID

PID with autotuning

Description

The advanced PID function blocks are optimized for temperature or pressure control in HVAC systems. With the additional PID Autotune function, the control system is capable of analyzing the response time of the control loop and calculating the correct PID parameter settings.

Benefits

Precision

> PID control maintains the required controlled variable through adjustment.
> It minimizes the deviation of the actual process value from the setpoint to optimize system control.

Efficient setup

> Various loop control interactions available to manage different required machine operating modes
> Automatic detection of PID control loop parameter with autotuning

Operating principle

PID control maintains the actual value and adjusts the output value according to deviations in the system's response. The PID function supports automatic and manual operating mode and is capable of monitoring a user-defined deadband on the actual value with alarm indication in case of undershoot or overshoot. The hold and reset commands can also be used to regulate the process.
The PID Autotune function is used to analyze the system response and determine the correct PID parameters.
The PID Autotune and PID Advanced functions interact directly. Depending on the operating mode of the PID Autotune function, it controls the PID Advanced function regulation and provides PID parameters for it.

Characteristics

Main characteristics:

> Operating modes: automatic and manual
> Hold function to help eliminate windup
> Integral anti-windup
> Deadband for more stable control
> Adjustable high or low limits
> Direct and reverse control

Typical applications

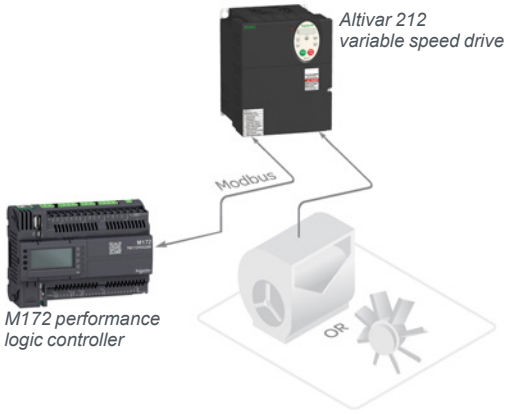
> Air and water cooled chillers
> Heat pumps
> Rooftop units
> Air Handling Units

Solutions overview

Application solutions for HVAC

Related functions: Drive communication control

Drive communication control



Description

These function blocks provide an easy and efficient way to integrate one or several Altivar variable speed drive(s) connected, via Modbus SL fieldbus, in the Modicon M171/M172 system. The function blocks manage communication with the drives and provide control and monitoring capabilities.

Benefits

Easy integration

> Easy and efficient integration of Altivar variable speed drives in the Modicon M171/M172 logic controller offer.

Complete drive control

> Control and monitoring of Altivar variable speed drives on a Modicon M171/M172 logic controller without any additional development.

Operating principle

The drive communication function blocks are designed to control and monitor Altivar variable speed drives connected to a Modicon M171/M172 logic controller via Modbus SL. The function blocks completely manage the Modbus SL communication with the drive and provide direct control of the speed and drive modes. Communication and drive status are monitored permanently and detected faults are indicated on the function block.

Characteristics

These function blocks are designed for the Modicon M171/M172 logic controllers. They can be used with all types of HVAC machine requiring an Altivar variable speed drive to operate e.g. compressors, and fans.
Function blocks are available for Altivar 12, Altivar 212, Altivar 320, and Altivar process ATV600 variable speed drives.

Typical applications

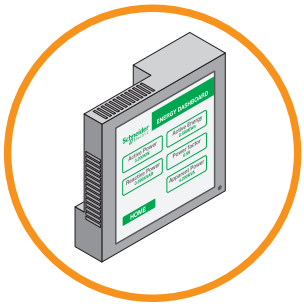
> HVAC machines

Solutions overview

Application solutions for HVAC

Related functions: Energy management

Energy management



Description

The energy management function blocks are designed for applications where the machine energy consumption needs to be metered and energy efficiency information is required. The function blocks provide an easy integration of metering devices into the system and offer calculations methods to determine the machine efficiency, COP, or ESEER *(1)*.

Benefits

Quick and easy integration

- Preprogrammed and fully tested metering functions are provided for a quick and easy integration of energy metering devices and machine efficiency calculation methods.
- The function blocks provide an efficient integration of electrical metering devices either connected via Modbus SL or hardwired by using pulses.
- A thermal energy calculation function block is embedded to determine the produced thermal energy. With dedicated trending and COP *(1)* calculation functions, machine efficiency can be monitored and analyzed in detail.
- The function block allows the cooling capacity to be calculated without adding a flow meter.

Operating principle

A wide range of functions are covered by a comprehensive set of metering function blocks, from retrieving energy information to energy efficiency calculations and trending.

Characteristics

The following function blocks are designed to be used in the Modicon M171/M172 logic controller application:

- Digital input pulse totalizer: counts the digital input pulses from an energy meter
- Converter of totalized pulses from energy meter: converts the digital input pulses into the consumption
- Thermal power calculation: calculates the thermal power, an energy based on the flow (for water chillers)
- Coefficient of performance calculation: calculates the COP based on the consumption and the thermal power
- Energy meter data trend: Trend of consumption data over time

To calculate the thermal energy, a flow meter must be installed in the system and the heat capacity of the medium must be known.

Thanks to a new AFB named “COPMonitor”, which combines six other AFBs, the COP can be calculated without the need for a flow meter. The flow is calculated based on the compressor characteristics and the thermal power produced by the machine is calculated based on the enthalpies of the machine.

Typical applications

- Air and water cooled chillers
- Heat pumps
- Rooftop units
- Compressor racks

(1) COP = Coefficient Of Performance. Efficiency of the chiller or heat pump calculated by the cooling or heating power divided by electrical power consumption.
ESEER = European Seasonal Energy Efficiency Ratio: seasonal efficiency of refrigeration equipment, chillers, and air conditioners calculated by the cooling or heating power divided by the electrical power consumption at different loads.

Chapter 3

Hardware control platforms

Technical data relating to products listed in this chapter is available online at www.schneider-electric.com/m171-m172

Contents

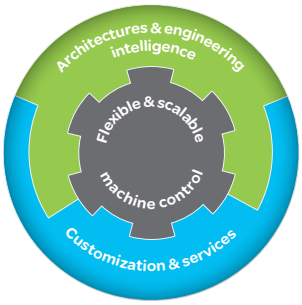
Hardware control platforms

Hardware control platforms

Modicon M171/M172 logic controllers

Maximize business and machine performance with EcoStruxure™ Machine

Maximize business and machine performance with EcoStruxure™ Machine



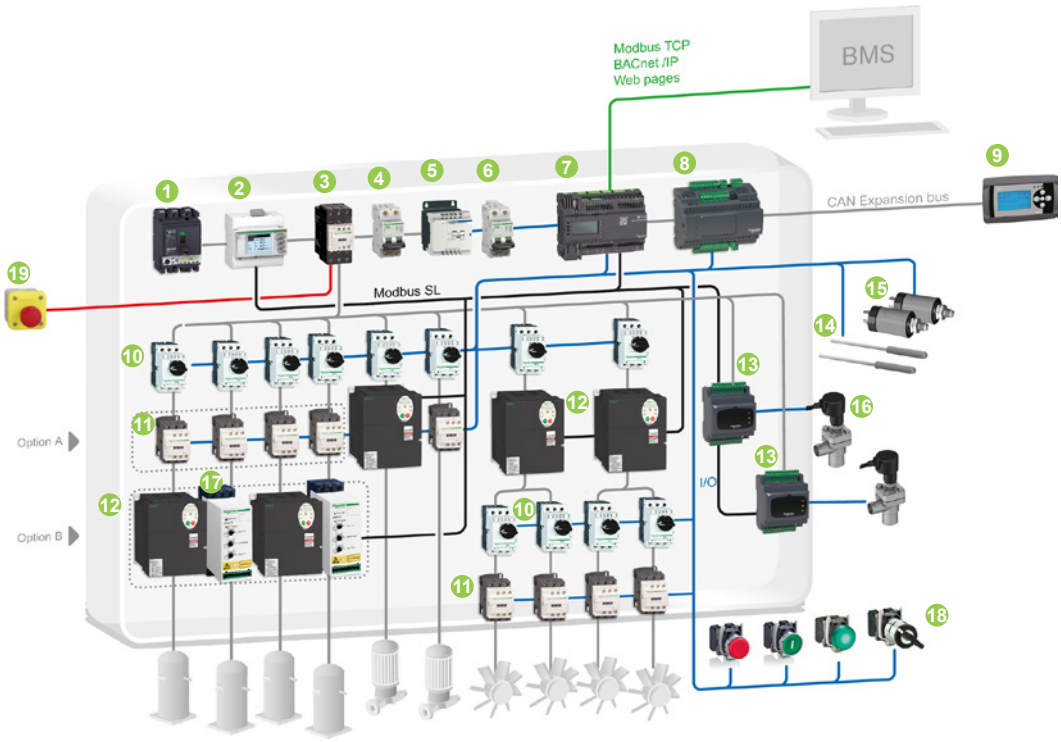
Machine builders are constantly looking for new ways to design and build more innovative machines in less time and at lower cost. EcoStruxure™ Machine can help.

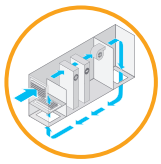
EcoStruxure™ Machine is a complete machine automation solution that provides flexible and scalable machine control, ready-to-use architectures, efficient engineering solutions, and comprehensive customization and engineering support services. It can help meet your challenges for improved efficiency and greater productivity, as well as allowing you 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.

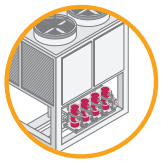
Modicon M171/M172 is part of EcoStruxure Machine



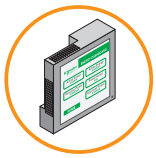


Fan management

Floating High Pressure control



Compressor management



Energy management

Application Function Blocks (AFBs)

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 M172** I/O module
9 **Modicon M171** remote display
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 **Telemecanique sensors: XMLP** pressure transmitters
16 Electronic expansion valve
17 **Altistart 01** soft starter
18 **Harmony XB4/XB5** signaling units
19 **Harmony XALK** Emergency stop push button

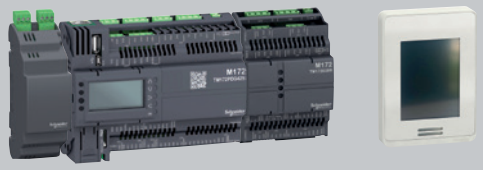
Hardware control platforms
Modicon M171/M172 logic controllers
Flexible

Flexible

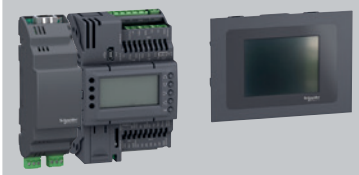
Flexible and scalable performance

Whether you specialize in chillers, Air Handling Units for commercial buildings, residential, or industrial applications, etc.
With the range of Modicon M171/M172 logic controllers, EcoStruxure™ Machine is well positioned.
Multiple BMS (Building Management System) connectivity, embedded or as an option, and an embedded web server make remote control and remote access simple to implement, while a unique software environment supports the development of algorithms and functions that can be used on any platform.

Modicon M172 performance logic controllers



Modicon M172 optimized logic controllers



Modicon M171 optimized logic controllers

Scalability ★

Performance and connectivity

★
- Best-in-Class versatility and compact size
- Best-in-Class performance

- Modicon™ **M172** logic controllers for any size of connectable or connected HVAC machine. With Modicon **M172 optimized**, manage small to large HVAC machines, connectable to BMS or the cloud. Or use Modicon **M172 performance** to have native connectivity for connected HVAC machines.
- 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.

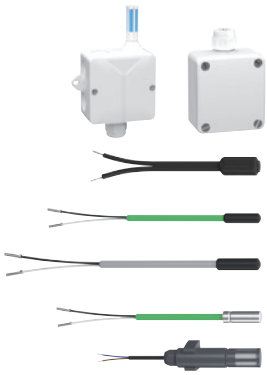
Hardware control platforms
Modicon M171/M172 logic controllers
Efficient

Efficient

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:

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



Humidity and temperature sensors

Logic controllers | *Remote displays* | *Expansion modules*

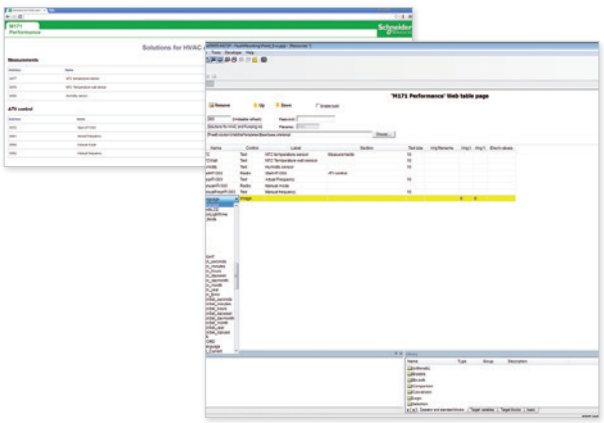
Modicon M171 optimized, for simple and compact machines

Modicon M172, for any size of connectable or connected machine

Communication modules

Intuitive automation with EcoStruxure Machine Expert - HVAC

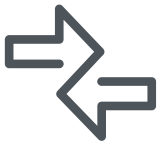
- **EcoStruxure Machine Expert - HVAC** is the universal programming software for machines automated by Modicon M171/M172 logic controllers.
- Simplified navigation that requires only a few clicks delivers a more efficient engineering process.



> **EcoStruxure Machine Expert - HVAC** simplifies each of the steps in machine design and commissioning

Hardware control platforms
Modicon M171/M172 logic controllers
Connected

Connected



Connected everywhere

Depending on your connectivity needs, select the right product

> **M171 optimized** for simple and compact machines
- Modbus RTU
- LAN Expansion Bus

> **M172** for any size of connectable (**M172 optimized**) or connected (**M172 performance**) machine
- Modbus RTU
- Modbus TCP
- BACnet MS/TP (B-AAC Profile certified BTL)
- BACnet /IP (B-AAC Profile certified BTL)
- ASCII support for GSM Modem
- CAN Expansion Bus
- LonWorks (FFT-10)
- Webserver, FTP Client/Server, Email, Proxy management, white list, SNTP

Customization and services

Our experts help you every step of the way, from perfecting machine design to on-site servicing 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

Fully customized solution and co-design with our Application Design Experts (ADE)

> Design an optimized solution for your machine to create added value, with the help of our experienced ADEs

Turnkey control panel

> Engineering expertise for codes and standards compliance

> Custom engineering to provide the optimum solution and meet specific needs

Collaboration from design to commissioning

> Recruited directly from the industries they serve, ADEs collaborate with you from design through to programming, as well as in the commissioning of turnkey installations

Expert support throughout your system's life cycle

> A dedicated team of Schneider Electric application design experts provides worldwide support for your HVAC solution

Hardware control platforms
Modicon M171/M172 logic controllers
Modicon M171/M172 range

HVAC

Heat pump

Chiller

Air handling unit

General presentation

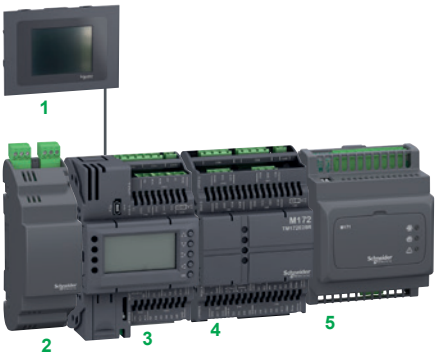
The Modicon M171/M172 logic controller range has been developed to manage digital and analog inputs and outputs for controling HVAC machines and to offer numerous possibilities for connection to different Building Management System communication networks.

Modicon M171/M172 range

- The range of Modicon M171/M172 logic controllers is a consistent offer made up of:
  - several types of controller depending on the requested performance and connectivity
  - a variety of communication modules to connect them to the BMS
  - a choice of expansion modules to increase and adapt the number and type of I/O
  - monochrome and color displays
  - EcoStruxure Machine Expert - HVAC, the dedicated software used to program, commission and debug applications
  - and a set of sensors
- The M171/M172 range is suitable for customized applications designed to control HVAC machines such as:
  - Air/water-cooled chiller
  - Rooftop unit
  - Heat pump
  - Compressor rack
  - Ventilation unit
  - Precision air conditioner
  - Heat recovery unit
  - Air handling unit
- The offer is flexible and scalable, depending on the application requirements. Any existing controller can evolve later as all M171/M172 controllers are programmed with the same EcoStruxure Machine Expert - HVAC software.
  - M171 optimized controllers are designed for simple and compact machines when only Modbus SL is needed with less than 44 I/O.
  - M172 controllers are designed for any size of connectable (M172 optimized) or connected (M172 performance) machines, from 7 to 238 I/O and can be used with expansion modules. M172 performance controllers embed connectivity, and M172 optimized controllers offer optional connectivity.

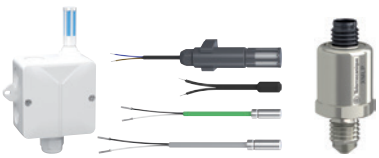
Hardware control platforms
Modicon M171/M172 logic controllers
System components

1 *Remote flush mounting display*
2 *Remote wall mounting display*
3 *M171 optimized logic controller*
4 *I/O expansion module*



1 *Color touch screen display*
2 *Communication module*
3 *M172 optimized logic controller*
4 *I/O expansion module*
5 *Electronic expansion valve driver*

1 *Color touch screen display*
2 *M172 performance logic controller*
3 *I/O expansion module*



Measurement accessories *Pressure transmitters*

General presentation

System components

Each family of M171 and M172 controllers, is available in both an optimized and performance version, and comprises several types of product sorted by function and compatibility.

Modicon M171/M172 logic controllers are available with or without an embedded display, with or without SSE output depending on the base product.
I/O expansion modules are mixed digital and analog I/O types.

M171 optimized logic controllers

- **TM171O●●●●** optimized logic controllers, see page 3/22
  and **TM171EO●●R** I/O expansion modules, see page 3/24
  and **TM171D●●●●** remote displays, see page 3/26

M171 performance logic controllers

- **TM171P●●●●** performance logic controllers, see page 3/28
  and **TM171EP●●R** I/O expansion modules see page 3/30
  and **TM171DGRP** remote displays see page 3/29

M172 optimized and performance logic controllers

- **TM172O●●●●** optimized and **TM172P●●●●** performance logic controllers, see page 3/14
  and **TM172E●●R** I/O expansion module, see page 3/18
  and **TM172DC●●●●** remote color touch screen displays, see page 3/20

Communication modules

- **TM171A●●●●** communication modules (BMS fieldbus interfaces) provide the **TM171P●●●●** performance, **TM172O●●●●** optimized and **TM172P●●●●** performance logic controllers with a connection to:
  - BACnet MS/TP (B-AAC profile) or IP
  - Modbus SL (Serial Link)
  - Modbus TCP
  - LonWorks (FFT-10)
  - Profibus
  - CAN bus
  - Etc. see page 3/32.

Electronic expansion valve drivers

- **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 3/34

Measurement accessories

- Specific measurement accessories **TM1S●●●●**: humidity and temperature probes, see page 3/36.
- Pressure transmitters from our partner Telemecanique sensors, see page 3/38

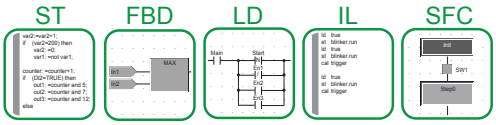
Software

- EcoStruxure Machine Expert - HVAC programming software, and programming accessories, see page 4/2.

Connection accessories

- Adapted connection accessories: I/O connectors and cables, see page 3/27.

3



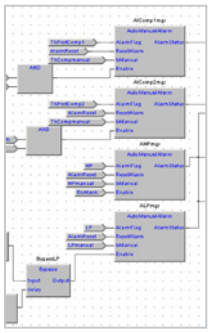
5 languages compliant with IEC 61131-3

General presentation (continued)

Configuration software

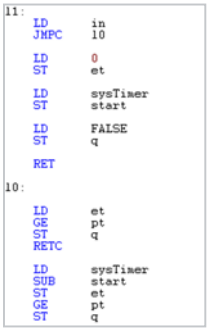
Modicon M171/M172 logic controllers are supported by an intuitive software package: EcoStruxure Machine Expert - HVAC, see page 4/2.
This software follows a simple drag-and-drop function block approach to configuration and is completed with a library of Application Function Blocks (AFBs) and logic functions.
EcoStruxure Machine Expert - HVAC uses five languages compliant with IEC 61131-3.
Examples:

Structured Text language (ST)

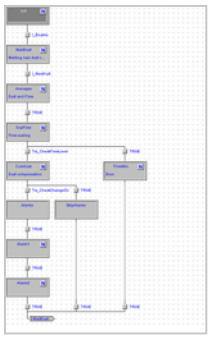


Function Block Diagram language (FBD)

Ladder Diagram language (LD)



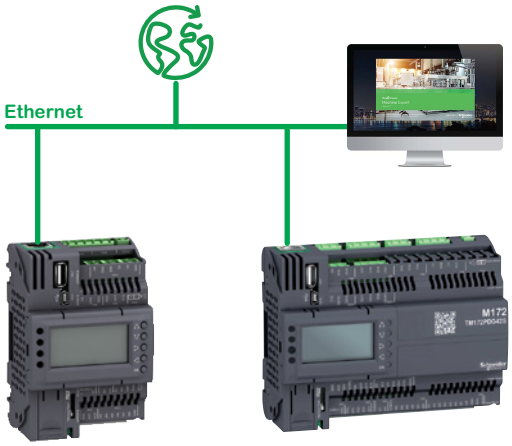
Instruction List language (IL)



Sequential Function Chart language (SFC)

Available resources on logic controllers for IEC programming

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



M172 performance logic controllers linked to Ethernet via the embedded RJ45 ports

M172 optimized logic controller linked to Ethernet via the TM171AETH or TM171AETHRS485 communication module

General presentation (continued)

Ethernet connection

Ethernet access is available on M171/M172 logic controllers:
- embedded in M172 performance logic controllers
- optional with M171 performance and M172 optimized logic controllers by means of a communication module, see page 3/32

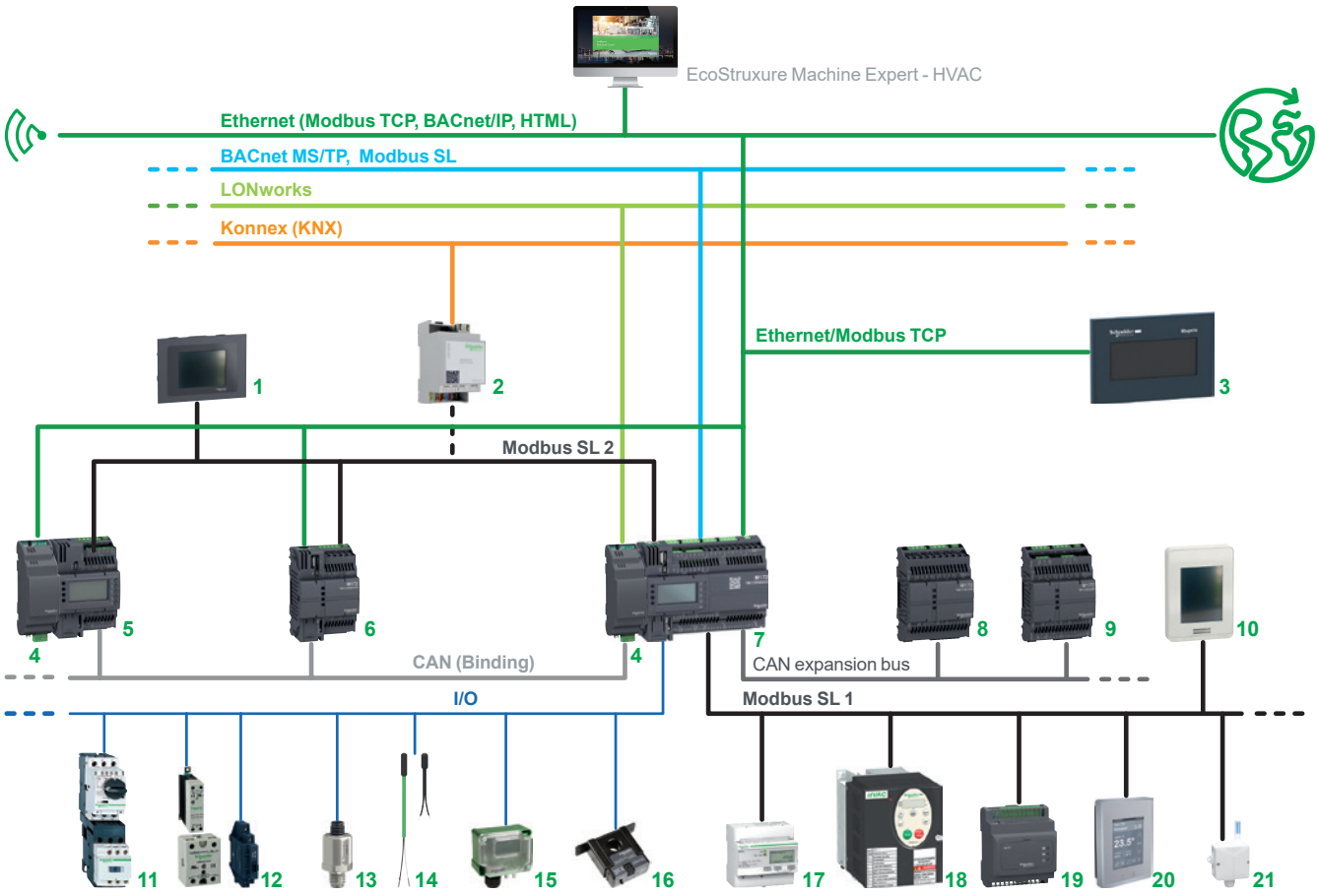
Ethernet access enables several functions such as:
> HTTP Webserver (Webvisu)
> Remote access
- Download program
- Display program download
- Download, upload parameters
- Download firmware
- Debug
- File management

> Bridge: specific function allowing controllers connected in Modbus SL to the same controller to be programmed via Modbus
> FTP client/server

These services are not always available:
> the service can be enabled or disabled via the controller programming
> a white list is used to provide access (no white list defined by default)

General presentation (continued)

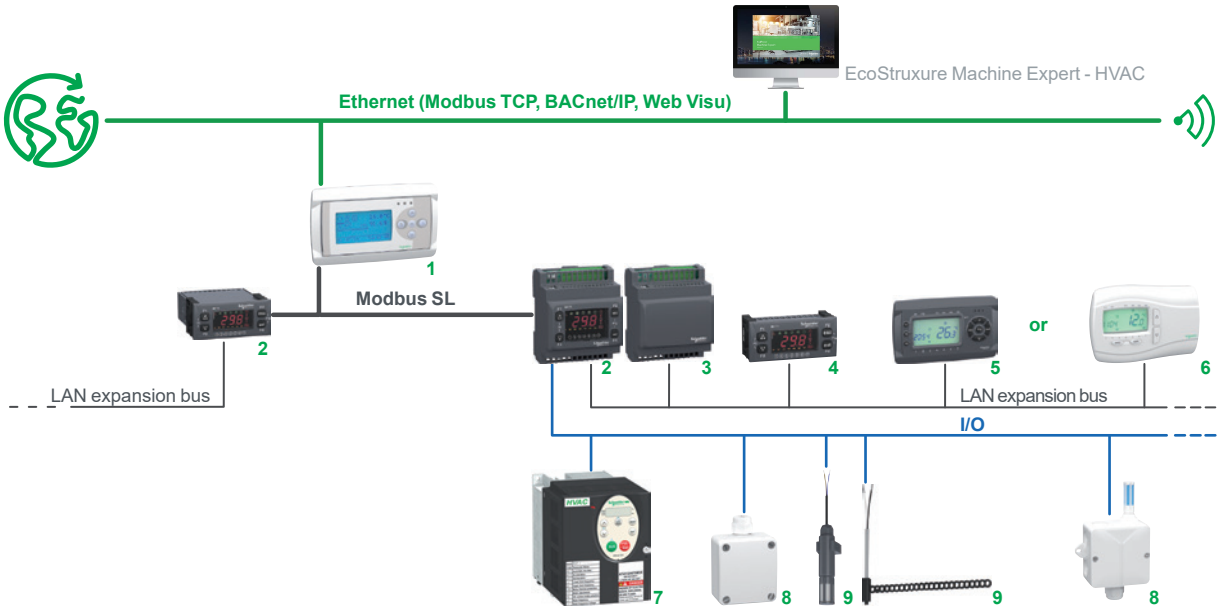
Modicon M172 logic controllers for any size of connectable or connected HVAC machines



1 ***TM172DCLF●*** *flush mounting display, see page 3/21*
2 *spaceLYnk gateway, see page 5/3*
3 *Magelis STO/STU HMI, see page 6/4*
4 ***TM171ALON*** *communication module, see page 3/32*
5 ***TM171OD●●●*** *optimized logic controller (18 I/O in 4 DIN), see page 3/16*
6 ***TM172PB●●●*** *performance logic controller (7 or 18 I/O in 4 DIN), see page 3/17*
7 ***TM172PD●●●*** *performance logic controller (28 or 42 I/O in 8 DIN), see page 3/14*
8 ***TM172E12R*** *I/O expansion module (12 I/O in 4 DIN), see page 3/18*
9 ***TM172E28R*** *I/O expansion module (28 I/O in 4 DIN, see page 3/18*
10 ***TM172DCW●*** *wall mounting remote display, see page 3/20*
11 *TeSys D motor starter, see page 6/12*
12 *Zelio Relay SSR electromechanical relays, solid state relays, see on our website www.schneider-electric.com*
13 *XMLP pressure transmitter, see page 3/38*
14 ***TM1ST●●*** *temperature sensor PT1000 or NTC, see page 3/37*
15 *SPD310 Differential pressure sensor, see on our website www.schneider-electric.com*
16 *H721LC-S6 current transducer, see on our website www.schneider-electric.com*
17 *iEM 3000 energy meter, see page 6/18*
18 *Altivar 212 variable speed drive, see page 6/6*
19 ***TM171VEV●●*** *electronic expansion valve driver, see page 3/34*
20 *SE8000 room controller (thermostat), see page 6/2*
21 ***TM1SH●●*** *humidity sensor, see page 3/37*

General presentation (continued)

Modicon M171 optimized logic controllers for simple and compact machines



1 ***TM171PFE03*** *performance logic controller, see page 3/28*
2 ***TM171OFM22R*** *optimized logic controller - lush mounting, see page 3/22*
3 ***TM171EO●●*** *I/O expansion module, see page 3/24*
4 ***TM171DLED*** *remote display, see page 3/26*
5 ***TM171DLCD*** *remote display, see page 3/26*
6 ***TM171DWAL*** *remote wall mounting display, see page 3/26*
7 *Altivar 212 variable speed drive, see page 6/6*
8 ***TM1ST●●*** *temperature sensor PT1000 or NTC, see page 3/37*
9 ***TM1SH●●*** *humidity sensor, see page 3/37*

Hardware control platforms
Modicon M171/M172 logic controllers

		M172 optimized logic controllers for any size of connectable machines	M172 performance logic controllers for any size of connected machines
Applications		■ Air/water-cooled chiller ■ Rooftop unit ■ Heat pump ■ Precision air conditioner ■ Compressor rack ■ Heat recovery unit	
			
Programming software		EcoStruxure Machine Expert - HVAC V2.4 or higher	EcoStruxure Machine Expert - HVAC V2.4 or higher
Maximum number of I/O with expansion modules		214 (**TM172ODM18R** + 7 **TM172E28R**)	238 (**TM172PDG42R** + 7 **TM172E28R**)
Generic programmable inputs	Digital input	2 digital inputs	2, 8 or 12 digital inputs
	Analog input	8 analog inputs	2, 8 or 12 analog inputs
Generic programmable outputs	Digital output	6 digital outputs	3, 6, 8 or 12 digital outputs
	Analog output	2 analog outputs	0, 2, 4 or 6 analog outputs
Communication	Embedded communication port	■ 2 RS 485, Modbus SL master/slave (only 1 master), 1 BACnet MS/TP (B-AAC profile) ■ 1 CAN expansion bus	■ 2 RS 485, Modbus SL master/slave (only 1 master), 1 BACnet MS/TP (B-AAC profile) ■ 1 RJ45 connector for Modbus TCP master/slave and BACnet IP (B-AAC profile), Ethernet (Webvisu , FTP, etc.) ■ 1 CAN expansion bus
	Optional communication (see page 3/32)	With **TM171A●●●** communication modules: ■ RS 485 (Modbus SL or BACnet MS/TP) ■ CAN bus ■ RS232 ■ LonWorks (FFT-10) ■ Modbus TCP, BACnet /IP, Ethernet	With **TM171A●●●** communication modules: ■ RS 485 (Modbus SL or BACnet MS/TP) ■ CAN bus ■ RS232 ■ LonWorks (FFT-10)
	USB port	Yes : 1 USB-Mini-B	Yes: 1 USB-A and 1 USB-Mini-B
	Services	■ Download the program via USB-A or Modbus SL ■ Optional services depending on the Ethernet communication module	■ Download the program through USB-A or Modbus SL ■ Remote access ■ HTTP Webserver (Webvisu) ■ FTP client/server ■ SNPT
Power supply		24 V ≂	24 V ≂
Display	Built-in	Yes, on **TM172ODM●●●** controllers	Yes, on **TM172PDG●●●** controllers
	Remote	Yes, - with **TM172DCL●●●●** color touch screen displays - with **TM171DGRP** display - with HMI Magelis offer, *see page 6/4*	
Mounting		35 mm/*1.38 in.* ⊔ rail, or on panel with TM172AP12PM mounting accessory	
Product certifications		CE, cURus (UL Recognized), CSA, EAC, RCM, RoHS China, BACnet BTL	
Logic controller reference		**TM172O●M18R**	**TM172P●G07R** **TM172P●G18●** **TM172P●G28●** **TM172P●G42●**
Page		3/16	3/17

(1) On the same port at the same time

		M171 optimized logic controllers for simple and compact machines		M171 performance logic controllers for complex and BMS connectable machines	
Applications		■ Air/water-cooled chiller ■ Rooftop unit ■ Heat pump ■ Compressor rack ■ Ventilation unit		■ Air/water-cooled chiller ■ Rooftop unit ■ Heat pump ■ Precision air conditioner ■ Compressor rack ■ Heat recovery unit	
					
Programming software		EcoStruxure Machine Expert - HVAC V1.0 or higher		EcoStruxure Machine Expert - HVAC V1.0 or higher	
Maximum number of I/O with expansion modules		44	28	351	327
Generic programmable inputs	Digital input	6 digital inputs	2 digital inputs	9 digital inputs	–
	Analog input	5 configurable analog inputs	5 configurable analog inputs	6 configurable analog inputs	3 configurable analog inputs
Generic programmable outputs	Digital output	6 digital outputs	4 digital outputs	7 digital outputs	–
	Analog output	5 analog outputs	5 analog outputs	5 analog outputs	–
Communication	Embedded communication port	■ 1 wired connector for LAN expansion bus ■ 1 wired connector for Modbus SL master/slave for **TM171O●M●●●**		■ 1 CAN expansion bus ■ 1 Modbus SL master/slave	■ 1 CAN expansion bus ■ 1 Modbus SL master/slave or BACnet MS/TP (B-AAC profile) ■ 1 RJ45 connector for Modbus TCP and BACnet IP (B-AAC profile) (WebVisu) *(1)*
	Optional communication (see page 3/32)	None except with a gateway		With **TM171A●●●** communication modules: ■ Modbus TCP (WebVisu) ■ Modbus SL ■ BACnet MS/TP (B-AAC profile, certified BTL) ■ BACnet IP (B-AAC profile, certified BTL) ■ CAN bus ■ RS 232 ■ Profibus ■ LonWorks (FFT-10)	None except with a gateway
	USB port	No (program can be downloaded with the **TM171AMFK** programming stick and **TM171ADMI** programming cable)		Yes: 1 USB-A and 1 USB-Mini-B	No
	Services	Remote download via Modbus SL		■ Remote download ■ File management (virtual FTP) ■ Text e-mail ■ Datalogging	
Power supply		12-24 V ∿ or 24 V ⎓ for all, 12-24 V ∿ for **TM171O●●22S**	100...240 V ∿, isolated	24 V ≂ or 48 V ⎓	
Display	Built-in	Yes, on **TM171OD●22●** controllers	Yes, on **TM171ODM14R** controllers	Yes, on **TM171PDM27●** controllers	Yes
	Remote	Yes, - with **TM171DLED**, **TM171DLCD**, and **TM171DWAL2●** displays - with **TM172DCL●●●●** color touch screen displays - with HMI Magelis offer, *see page 6/4*		Yes, - with **TM171DGRP** display - with **TM172DCL●●●●** color touch screen displays - with HMI Magelis offer, *see page 6/4*	
Mounting		35 mm/*1.38 in.* ⊔ rail	Flush mounting	35 mm/*1.38 in.* ⊔ rail	Flush mounting
Product certifications		CE, cURus (UL Recognized), CSA, EAC, RCM, RoHS China		CE, cURus (UL Recognized), CSA, EAC, RCM, RoHS China	
Logic controller reference		**TM171O●●22●**	**TM171OF22R, TM171OFM22R**	**TM171O●M14R, TM171OD14R**	**TM171PDM27●, TM171PBM27R**	**TM171PFE03●●**
Page		3/23		3/29	

(1) On the same port at the same time

Hardware control platforms
Modicon M171/M172 logic controllers
M172 logic controllers

Presentation

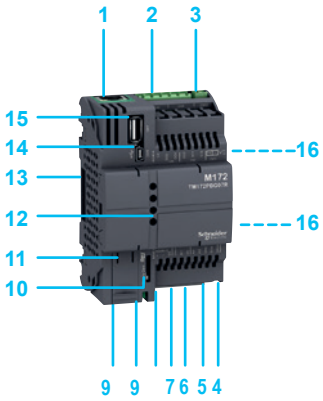
M172 optimized and performance logic controllers

The Modicon M172 logic controllers consist of the M172 optimized and the M172 performance logic controllers, differentiated by the connectivity: embedded on M172 performance, optional on M172 optimized.
M172 controllers embed 7, 18, 28 or 42 I/O, and can be fitted with a display, with relay outputs, and with SSR outputs, depending on the model.

- The M172 logic controller offer comprises:
  - a M172 model to control from 7 up to 18 embedded I/O (digital and analog), in 4 DIN (controller width is 72 mm /*2.83 in.*)
  - and M172 models to control from 28 up to 42 embedded I/O (digital and analog), in 8 DIN (controller width 144 mm /*5.66 in.*)
- Power supply: 24 V ⎓
- Two types of housing:
  - with built-in display
  - without display
- Two types of mounting:
  - On 35 mm/*1.38 in.* ⊔ rail mounting: for M172 controllers to be mounted inside a cabinet
  - On panel with an accessory: for M172 controllers to be mounted on a panel with **TM172AP12PM** fixing accessory
- Communication ports on M172 optimized logic controllers:
  - Two RS 485 for Modbus SL (master/slave) (only 1 master) or 1 for BACnet MS/TP (B-AAC profile, BACnet BTL certified)
  - One for CAN expansion bus
  - Plus one communication module connector
- Communication ports on M172 performance logic controllers: same as M171 optimized, plus one RJ45 for Modbus TCP, BACnet IP (B-AAC profile, BACnet BTL certified) and Ethernet
- M172 logic controllers can be connected to communication modules, offering another connection to a CAN expansion bus, Modbus SL or LonWorks, etc., see page 3/32.
- The M172 logic controllers are certified CE, cURus (UL Recognized), CSA, EAC, RCM, RoHS China, and BACnet BTL certified.
- Micro SD card: a slot for a micro SD memory card is available on the front face of the M172 performance controllers *(1)*.
  The micro SD card is used for:
  - Data logging
  - Webserver storage
- USB programming ports
  - The USB-A port is available on M172 performance logic controllers, used to transfer programs with a memory stick.
  - USB mini B is available on M172 optimized and performance logic controllers, used to connect to a PC for programming, see page 4/3.

(1) M172 optimized logic controllers do not have a slot for a micro SD card (no slot can be added later).

Hardware control platforms
Modicon M171/M172 logic controllers
M172 logic controllers

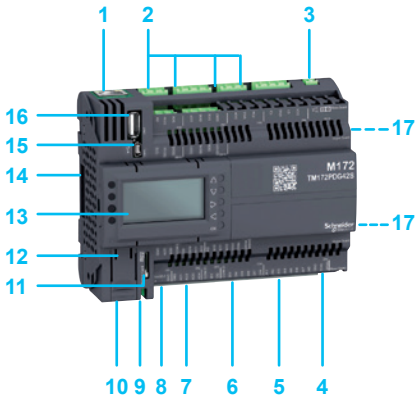


Description

M172 optimized and performance logic controllers

M172 logic controllers with 7 or 18 I/O (in 4 DIN: controller width is 72 mm /*2.83 in.*) *(1)*

1 RJ45 connector for Modbus TCP, BACnet IP (B-AAC profile) and Ethernet (only for M172 performance)
2 Connector for removable terminal block for digital outputs
3 Connector for removable terminal block for power supply (24 V ⎓)
4 Connector for removable terminal block for analog inputs
5 Connector for removable terminal block for digital intputs
6 Connector for removable terminal block for fast digital inputs (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 CAN expansion bus
10 Slot for micro SD card
11 Slot for battery (behind the front flap)
12 On TM17●D●●●: Built-in display, 4 status LEDs and 5 command keys for setting controller parameters
On TM17●B●●●: 4 status LEDs and 5 command keys for setting controller parameters, behind a front panel
13 Connector for communication module
14 USB mini-B port to link a PC
15 USB-A port for USB stick
16 Mounting clips for 35 mm/*1.38 in.* ⊔ rail mounting
17 Two slots for the **TM172AP12PM** fixing accessory



M172 logic controllers with 28 or 42 I/O (in 8 DIN: controller width is 144 mm /*5.66 in.*) *(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 (24 V ⎓)
4 Connector for removable terminal block for analog inputs
5 Connector for removable terminal block for digital intputs
6 Connector for removable terminal block for fast digital inputs (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 **TM172PDG●●●**: Built-in display, 4 status LEDs and 5 command keys for setting controller parameters
On **TM172PBG●●●**: 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 connect a PC
16 USB-A port for USB stick
17 Mounting clips for 35 mm/*1.38 in.* ⊔ rail mounting
18 Two slots for the **TM172AP12PM** fixing accessory

(1) TM172ASCTB●●● removable terminal blocks to be ordered separately, *see page 3/17*.

Hardware control platforms

Modicon M171/M172 logic controllers

M172 optimized logic controllers

TM172OBM18R

TM171ODM18R

References

M172 optimized logic controllers: Power supply: 24 V ≂

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

No. of I/O	Number and type of channels		Embedded communication port	Display	Reference	Weight kg/*lb*
	Inputs	Outputs				
18	**2 digital inputs:** ■ 2 high speed counter (2 kHz), dry contact **8 analog inputs** (configurable in pairs)**:** ■ 8 NTC, or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or hOhm, or daOhm, or digital input	**6 digital outputs:** ■ 1 SPDT relay 1 A ■ 2 SPST 3 A with the same common ■ 1 SPST 3 A ■ 2 SPST 3 A with independent common **2 analog outputs:** ■ 2 x 0-10 V, or 4-20 mA, or PWM (2 kHz, 24 V ⎓)	■ 1 CAN expansion bus ■ 2 RS 485 ■ 1 USB Mini-B ■ 1 Communication module port	Remote display (optional)	**TM172OBM18R**	0.170/ *0.375*
				Built-in display 128x64 LCD with backlight	**TM172ODM18R**	0.195/ *0.430*

Accessories to be ordered separately

I/O screw terminal blocks	See page 3/17
Fixing accessory	See page 3/17

Hardware control platforms
Modicon M171/M172 logic controllers
M172 performance logic controllers


TM172PBG07R

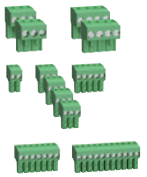

TM172PDG18R

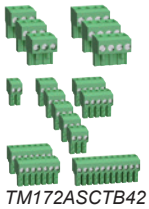

TM172PBG28R


TM172PDG28●


TM172PBG42●


TM172PDG42●


TM172ASCTB28


TM172ASCTB42


TM172AP12PM

References

M172 performance logic controllers: Power supply: 24 V ⎓

35 mm/*1.38 in.* ⊔ rail mounting performance controllers, and panel mounting with accessory

No. of I/O	Number and type of channels		Embedded communication port	Display	Reference	Weight kg/*lb*
	Inputs	Outputs				
7	**2 digital inputs:** ■ 2 high speed counter (2 kHz), dry contact **2 analog inputs** (configurable in pairs)**:** ■ 2 NTC, or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or hOhm, or daOhm, or digital input	**3 digital outputs:** ■ 1 SPDT relay 1 A ■ 2 SPST 3 A with the same common	■ 1 Ethernet ■ 1 Micro SD ■ 1 CAN expansion bus ■ 2 RS 485 ■ 1 USB (type A) ■ 1 USB Mini-B ■ 1 Communication module port ■ 1 µSD Card slot	Remote display (optional)	**TM172PBG07R**	0.175/ *0.386*
				Built-in display 128x64 LCD with backlight	**TM172PDG07R**	0.200/ *0.441*
18	**2 digital inputs:** ■ 2 high speed counters, dry contact **8 analog inputs** (configurable in pairs)**:** ■ 8 NTC, or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or hOhm, or daOhm, or digital input	**6 digital outputs** ■ 1 SPDT relay 1 A ■ 2 SPST 3 A with the same common ■ 1 SPST 3 A ■ 2 SPST 3 A with independent common ■ Optional 2 SSR with independent common for **TM172PDG18S** only **2 Analog outputs:** ■ 2 x 0-10 V, or 4-20 mA, or PWM (2 kHz, 24 V ⎓)	■ 1 Ethernet ■ 1 Micro SD ■ 1 CAN expansion bus ■ 2 RS 485 ■ 1 USB (type A) ■ 1 USB Mini-B ■ 1 Communication module port ■ 1 µSD Card slot	Remote display (optional)	**TM172PBG18R**	0.200/ *0.441*
				Built-in display 128x64 LCD with backlight	**TM172PDG18R**	0.225/ *0.496*
					TM172PDG18S	0.225/ *0.496*
28	**8 digital inputs:** ■ 6 ∿ or 24 V ⎓ ■ 2 high speed counters, dry contact **8 analog inputs,** (configurable in pairs): ■ 8 NTC, or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or digital input	**8 digital outputs:** ■ 1 SPDT Relay 1 A ■ 3 SPST 3 A with the same common ■ 2 SPST 3 A with the same common ■ 2 SPST 3 A with independent common ■ Optional 2 SSR 0.5 A with independent common for **TM172PDG28S** only **4 analog outputs:** ■ 2 x 0-10 V, or 4-20 mA, or PWM (2 kHz, 24 V ⎓) ■ 2 x 0-10 V	■ 1 Ethernet ■ 1 Micro SD ■ 1 CAN expansion bus ■ 2 RS 485 ■ 1 USB (type A) ■ 1 USB Mini-B ■ 1 Communication module port ■ 1 µSD Card slot	Remote display (optional)	**TM172PBG28R**	0.300/ *0.661*
				Built-in display 128x64 LCD with backlight	**TM172PDG28R**	0.300/ *0.661*
					TM172PDG28S	0.300/ *0.661*
42	**12 digital inputs:** ■ 10 ∿ or 24 V ⎓ ■ 2 high speed counter, dry contact **12 analog inputs,** (configurable in pairs): ■ 12 NTC, or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or digital input	**12 digital outputs:** ■ 2 SPDT relay 1 A ■ 3 SPST with the same common ■ 3 SPST with the same common ■ 2 SPST with the same common ■ 2 SPST with independent common ■ Optional 2 SSR with independent common for **TM172PDG42S** only **6 analog outputs:** ■ 2 x 0-10 V, or 4-20 mA, or PWM (2 kHz, 24 V ⎓) ■ 4 x 0-10 V	■ 1 Ethernet ■ 1 Micro SD ■ 1 CAN expansion bus ■ 2 RS 485 ■ 1 USB (type A) ■ 1 USB Mini-B ■ 1 Communication module port ■ 1 µSD Card slot	Remote display (optional)	**TM172PBG42R**	0.385/ *0.849*
				Built-in display 128x64 LCD with backlight	**TM172PDG42R**	0.385/ *0.849*
					TM172PDG42S	0.385/ *0.849*

Accessories to be ordered separately

Designation	Use for	Reference	Weight kg/*lb*
I/O screw terminal blocks	**TM172●●●07R** logic controllers	**TM172ASCTB07**	0.025/ *0.055*
	TM172●●●18● logic controllers	**TM172ASCTB18**	0.040/ *0.088*
	TM172P●●●28● logic controllers	**TM172ASCTB28**	0.100/ *0.220*
	TM172P●●●42● logic controllers	**TM172ASCTB42**	0.150/ *0.331*
Fixing accessory: 12 clip-on locks for panel mounting	For mounting M172 logic controllers and M172 expansion modules on panel	**TM172AP12PM**	0.050/ *0.110*

Hardware control platforms
Modicon M171/M172 logic controllers
I/O expansion modules

Presentation

I/O expansion modules

Two I/O expansion modules are available, dedicated to M172 optimized and M172 performance logic controllers.

- They are used to increase the number of I/O up to 238 on M172 logic controllers.
- Expanded I/O types are digital and analog; the mix between inputs and outputs differs according to the module, making it easier to adapt the configuration to each need.
- They are connected via the CAN expansion bus on M172 logic controllers.
- All M172 logic controllers are compatible with all M172E expansion modules. Legacy TM171EP expansion modules are also compatible with M172.
- The maximum number of expansion modules on the CAN expansion bus is 7, in any combination (if more expansions are needed, please contact our Customer Care Centre).
- The M172E expansion modules are equipped with DIP switches which can be used to set the baud rate, the network address and also to incorporate a 120 ohm terminal resistor.
- The I/O can be configured in pairs, like M172 controllers.

Description

35 mm/*1.38 in.* ⊔ rail mounting I/O expansion modules (panel mounting with accessory)

TM172E12R and **TM172E28R** expansion modules *(1)*
1 Connector for removable terminal block for power supply (24 V ≂)
2 Removable terminal block for digital outputs
3 Connector for removable terminal block for CAN expansion bus
4 DIP switches
5 Clip for 35 mm/*1.38 in.* ⊔ rail mounting
6 Connector for removable terminal block for digital inputs
7 Connector for removable terminal block for analog inputs with 5 V ⎓/24 V ⎓ output power supply

TM172E28R expansion module *(1)*
8 Connector for removable terminal block for analog outputs
9 Two slots for **TM172AP12PM** fixing accessory

(1) Removable terminal blocks to be ordered separately, *see page 3/19*.

TM172E12R

TM172E28R

TM172E●●R

Hardware control platforms
Modicon M171/M172 logic controllers
I/O expansion modules

TM172E12R

TM172E28R

References

35 mm/*1.38 in.* ⊔ rail mounting expansion modules

No. of I/O	Number and type of channels		Compatibility	Embedded communication connection	Reference	Weight kg/*lb*
	Inputs *(1)*	Outputs *(1)*				
12	**2 digital inputs:** ■ 2 high speed counters, dry contact **4 analog inputs:** ■ 4 NTC or PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or hOhm, or daOhm, or digital inputs	**6 digital outputs:** ■ 3 SPST 3 A with the same common ■ 3 SPST 3 A with the same common	M172 logic controllers	■ 1 CAN expansion bus	**TM172E12R**	0.140/ *0.308*
28	**6 digital inputs:** ■ 4 ∿ or 24 V ⎓ ■ 2 high speed counters, dry contact **10 analog inputs**: ■ 10 NTCor PT1000, or PTC, or 0-20 mA, or 4-20 mA, or 0-5 V, or 0-10 V, or hOhm, or daOhm, or digital inputs	**10 digital outputs:** ■ 3 SPST 3 A with the same common ■ 3 SPST 3 A with the same common ■ 2 SPST 3 A with the same common ■ 2 SPST 3 A with the same common **2 analog outputs:** ■ 2 x 0-10 V, or 4-20 mA,or PWM (2 kHz, 24 V ⎓)	M172 logic controllers	■ 1 CAN expansion bus	**TM172E28R**	0.190/ *0.418*

Accessories to be ordered separately

Designation	Compatibility	Reference	Weight kg/*lb*
Screw terminal blocks (inputs, outputs, and communication bus)	**TM172E12R** expansion module	**TM172ASCTB12E**	0.070/ *0.154*
	TM172E28R expansion module	**TM172ASCTB28E**	0.100/ *0.220*
Fixing accessory: 12 clip-on locks for panel mounting	**TM172E●●R** expansion modules	**TM172AP12PM**	0.055/ *0.110*

(1) Removable terminal blocks to be ordered separately.

TM172ASCTB12E

TM172ASCTB28E

TM172AP12PM

Hardware control platforms
Modicon M171/M172 logic controllers
Remote displays

Presentation

Remote color touch screen displays

Five remote color touch screen displays are dedicated to the M172 optimized and M172 performance logic controllers, distinguished by use and type of mounting. These displays can be also used with M171 controllers with Modbus SL or with third-party products equipped via Modbus SL.
They are all programmable with EcoStruxure Machine Expert - HVAC V2.4 or higher.
The remote color touch screen displays have the same firmware, meaning they can be swapped interchangeably.

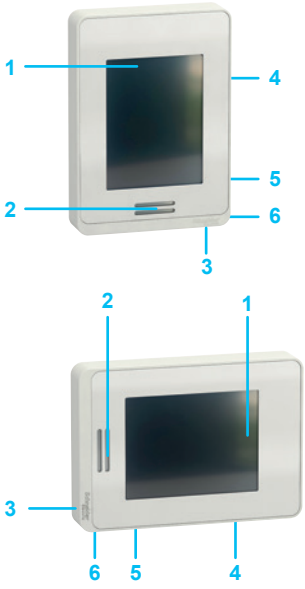
There are two types of remote color touch screen display:

- Three **TM172DCLW●●●** designed for:
  - wall mounting
  - indoor use
  - depending on the reference with temperature, relative humidity and built-in PIR presence sensor
- Two **TM172DCLF●** designed for
  - flush mounting or wall mounting with an accessory
  - indoor or outdoor use
  - white or dark gray housing
  - installing displays on a wall with TM172ABKP●● accessories, useful for a plant room.
- **TM172DCLWT●●●** and **TM172DCLF●** displays can be mounted vertically (portrait) or horizontally (landscape) *(1)*.

- They can be configured for Modbus SL as master or slave, by means of the software.
  - On Modbus SL Slave, up to 8 displays can be installed in the same network.
  - On Modbus SL Master, up to 8 devices can be managed via the display.

Description

TM172DCLWT●●●



TM172DCLWT●●●

1 3.5" color touch screen LCD (320 x 240 pixels)
2 Holes for presence (motion) detection
3 Input connector (USB Micro-B port)
4 Power Supply (24 V ⎓)
5 RS 485 Modbus serial line
6 Holes for temperature and humidity measurement

TM172DCLF●●

TM172DCLF●

1 3.5" color touch screen LCD (320 x 240 pixels)
2 Input connector (USB Micro-B port)
3 Power Supply (24 V ⎓)
5 RS 485 Modbus serial line

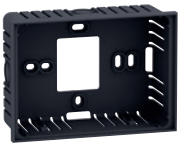
(1) With landscape mounting, temperature and humidity sensors cannot be used as they are not accurate.

Hardware control platforms
Modicon M171/M172 logic controllers
Remote displays


TM172DCLWTHP


TM172DCLFW


TM172DCLFG


TM172ABKPG

References

Remote color touch screen displays

Type	Description	Housing	Built-in sensor for	Reference	Weight kg/*lb*
Remote color touch screen wall mounting displays	■ Power supply: 24 V ⎓ ■ Color touchscreen ■ Size: 3.5“ ■ Resolution: 320 x 240 pixels ■ IP20 ■ Communication port: 1 RS485, Modbus SL with terminal blocks	White	■ Temperature	**TM172DCLWT**	0.340/ *0.749*
			■ Temperature ■ Relative humidity	**TM172DCLWTH**	0.340/ *0.749*
			■ Temperature ■ Relative humidity ■ Presence PIR	**TM172DCLWTHP**	0.340/ *0.749*
Remote color touch screen flush mounting displays	■ Power supply: 24 V ⎓ ■ Color touchscreen ■ Size: 3.5“ ■ Resolution: 320 x 240 pixels ■ IP65 (front face) ■ Communication port: 1 RS485, Modbus SL with terminal blocks	White	–	**TM172DCLFW**	0.205/ *0.452*
		Gray	–	**TM172DCLFG**	0.205/ *0.452*

Accessories to be ordered separately

Type	Use	Reference	Weight kg/*lb*
Mounting accessories *(1)*	White wall support for **TM172DCLFW** display	**TM172ABKPW**	0.060/ *0.132*
	Gray wall support for **TM172DCLFG** display	**TM172ABKPG**	0.060/ *0.132*

(1) With the use of TM172ABKP●● accessories, the degree of protection for the TM172DCLF● displays is IP20.

Presentation

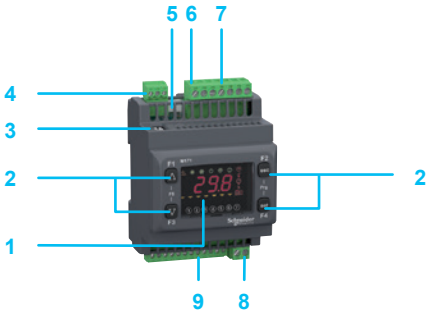
M171 optimized controllers

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

- Two types of power supply are available:
  - 100-240 V ∿
  - 12-24 V ∿ or 24 V ⎓
- Two types of housing:
  - with built-in display
  - with remote display that can be added by means of the LAN expansion bus
- Two types of mounting:
  - Flush mounting: controllers to be mounted on a cabinet door
  - On 35 mm/1.38 in. ⊔ rail mounting: controllers to be mounted inside a cabinet
- Communication ports on M171 optimized logic controllers:
  - One optional Modbus SL bus
  - One LAN expansion bus
- The M171 optimized logic controllers are certified CE, UL (recognized), cURus, CSA, EAC, RCM, RoHS China.

Description

35 mm/*1.38 in.* ⊔ rail mounting M171 optimized controllers



TM171O●14R optimized logic controllers

1 Display
2 Four 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.* ⊔ rail mounting
7 Removable terminal block for digital outputs
8 Removable terminal block for 100…240 V ∿ power supply
9 Removable terminal block for I/O

TM171O●22R● optimized logic controllers *(1)*

1 Display
2 Four 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.* ⊔ rail mounting
6 Removable terminal block for outputs
7 Wired connector for 12-24 V ∿ or 24 V ⎓ power supply, and for low voltage I/O
8 Wired connector for analog output
9 Wired connector for LAN expansion bus

Flush mounting M171 optimized controllers

TM171OF●22R● optimized logic controllers *(1)*

1 Display
2 Four 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 3/25.*

Hardware control platforms
Modicon M171/M172 logic controllers
M171 optimized logic controllers


TM171OBM14R


TM171OD14R


TM171ODM14R


TM171OB22R


TM171OBM22R


TM171OD22R


TM171ODM22R


TM171ODM22S


TM171OF22R


TM171OFM22R

References

M171 optimized logic controllers: Power supply: 100-240 V ∿

35 mm/*1.38 in.* ⊔ rail mounting optimized controllers *(1)*

No. of I/O	Number and type of channels: Inputs	Outputs	Embedded communication	Display	Reference	Weight kg/*lb*
14	**2 digital inputs:** ■ 2 open collector or digital inputs *(2)* **5 configurable analog inputs:** ■ 2 NTC, or PT1000, or digital inputs ■ 2 NTC, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital inputs ■ 1 NTC, or PT1000, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital input	**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 *(2)* for 12 V PWM/PPM or digital inputs ■ 2 x 0-10 V ■ 1 x 4-20 mA	■ 1 RS 485 ■ 1 LAN expansion bus	Remote display (optional)	**TM171OBM14R**	0.190/ *0.420*
			■ 1 LAN expansion bus	Built-in display	**TM171OD14R**	0.190/ *0.420*
			■ 1 RS 485 ■ 1 LAN expansion bus	Built-in display	**TM171ODM14R**	0.190/ *0.420*

M171 optimized logic controllers: Power supply: 12-24 V ∿ or 24 V ⎓ *(3) (4)*

35 mm/*1.38 in.* ⊔ rail mounting optimized controllers

22	**6 digital inputs:** ■ 6 volt-free in 1 group **5 configurable analog inputs:** ■ 3 NTC or digital inputs ■ 2 NTC, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital inputs	**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 ■ 3 x 0-10 V	■ 1 LAN expansion bus	Remote display (optional)	**TM171OB22R**	0.190/ *0.420*
			■ 1 RS 485 ■ 1 LAN expansion bus	Remote display (optional)	**TM171OBM22R**	0.190/ *0.420*
			■ 1 LAN expansion bus	Built-in display	**TM171OD22R**	0.190/ *0.420*
			■ 1 RS 485 ■ 1 LAN expansion bus	Built-in display	**TM171ODM22R**	0.190/ *0.420*
		6 digital outputs: ■ 3 SPST (2 A, 230 V ∿) with the same common ■ 2 SSR (3 A, 230 V ∿) ■ 1 open collector **5 analog outputs:** ■ 2 open collector for 12 V PWM/PPM ■ 3 x 0-10 V	■ 1 RS 485 ■ 1 LAN expansion bus	Built-in display	**TM171ODM22S**	0.190/ *0.420*

Flush mounting optimized controllers

22	**6 digital inputs:** ■ 6 volt-free in 1 group **5 configurable analog inputs:** ■ 3 NTC or digital input ■ 2 NTC, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital inputs	**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 ■ 3 x 0-10 V	■ 1 LAN expansion bus	Built-in display	**TM171OF22R**	0.164/ *0.360*
			■ 1 RS 485 ■ 1 LAN expansion bus	Built-in display	**TM171OFM22R**	0.164/ *0.360*

Remote display for M171 optimized logic controllers

Remote displays	See page 3/26

Accessories for M171 optimized logic controllers

Connectors	Low voltage connector, Analog output connector, Modbus SL connector, LAN expansion bus connector	See page 3/27

*(1) Terminal blocks are supplied with **TM171OBM14R**, **TM171OD14R**, and **TM171ODM14R**.*
(2) Both I/O are the same. On the same channel: 2 digital inputs or 2 analog outputs (depending on the configuration).
*(3) Except for for **TM171ODM22S**: 12-24 V ∿*
(4) Connectors to be ordered separately, see page 3/25.

Presentation

I/O expansion modules

Three I/O expansion modules are available, dedicated to M171 optimized logic controllers.

- They are used to increase the number of I/O up to 44 on M171 optimized logic controllers
- Expanded I/O types are digital and analog
- They are connected via the LAN expansion bus on M171 optimized logic controllers

Compatibility between logic controllers and I/O expansion modules

Logic controller type	Reference	Compatible I/O expansion module (reference)
M171 optimized	**TM171OBM14R, TM171OD14R, TM171ODM14R**	**TM171EO14R**
	TM171OB22R, TM171OBM22R, TM171OD22R, TM171ODM22R, TM171ODM22S, TM171OF22R, TM171OFM22R	**TM171EO15R, TM171EO22R**

Description

TM171EO●●R expansion modules *(1)*

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

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 (12-24 V ∿ or 24 V ⎓),
5 Wired connector for low voltage I/O
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 3/25.*

TM171EO14R

TM171EO15R

TM171EO22R

Connection accessories (2) for expansion modules: TM171EO15R, M171EO22R

References

I/O expansion modules for Modicon M171 optimized logic controllers

35 mm/*1.38 in.* ⊔ rail mounting expansion modules

No. of I/O	Number and type of channels		Compatibility	Embedded communication connection	Reference	Weight kg/*lb*
	Inputs	Outputs				
14	**2 digital inputs:** 2 open collector or digital inputs *(1)* **5 configurable analog inputs:** ■ 2 NTC, PT1000 or digital inputs ■ 2 NTC, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital inputs ■ 1 NTC, or PT1000, or 0-20 mA, or 4-20 mA, or 0-10 V, or 0-5 V, or 0-1 V, or digital input	**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 for 12 V PWM/PPM or digital inputs *(1)* ■ 2 x 0-10 V ■ 1 x 4-20 mA	TM171OBM14R, TM171OD14R, TM171ODM14R	■ 1 LAN expansion bus	**TM171EO14R**	0.190/ *0.420*
15	**6 digital inputs:** volt-free **3 analog inputs:** NTC or digital inputs	**4 digital outputs:** ■ 3 2 A, 250 V ∿ ■ 1 open collector **2 analog outputs:** open collector (PPM/PWM)	TM171OB22R, TM171OBM22R, TM171OD22R, TM171ODM22R, TM171ODM22S, TM171OF22R, TM171OFM22R	■ 1 LAN expansion bus	**TM171EO15R**	0.190/ *0.420*
22	**6 digital inputs:** volt-free **5 analog inputs:** ■ 3 NTC or digital inputs ■ 2 NTC, or 0-20 mA, or 4-20 mA, or 0-10 V, or digital inputs	**6 digital outputs:** ■ 5 2 A, 250 V ∿ ■ 1 open collector **5 analog outputs:** ■ 2 open collector (PPM/PWM) ■ 3 x 0-10 V	TM171OB22R, TM171OBM22R, TM171OD22R, TM171ODM22R, TM171ODM22S, TM171OF22R, TM171OFM22R	■ 1 LAN expansion bus	**TM171EO22R**	0.190/ *0.420*

Accessories for I/O expansion modules

Designation	Description	Cable length (m/*ft.*)	Unit reference	Weight kg/*lb*
Accessories to be ordered separately				
Analog output connector (0-10 V outputs) **Sold in lots of 5 (item 1)**	Cordset equipped with a 4-pin connector at one end	1/*3.3*	**TM171ACB4OAO1M**	0.075/ *0.170*
		2/*6.6*	**TM171ACB4OAO2M**	0.125/ *0.280*
Low voltage connector **Sold in lots of 5 (item 2)**	Screw terminal block and a cordset equipped with a 20-pin connector at one end	1/*3.3*	**TM171ACB4OI1M**	0.575/ *1.270*
		2/ *6.6*	**TM171ACB4OI2M**	1.120/ *2.470*
Accessory – Supplied with each expansion module				
LAN expansion bus connector **Sold in lots of 5 (item 3)**	Cordset equipped with a 3-pin connector at each end	2/*6.6*	**TM171ACB4OLAN**	0.060/ *0.130*

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

Hardware control platforms
Modicon M171/M172 logic controllers
Remote displays

TM171DLED (1)

TM171DLCD2U

TM171DWAL2U

TM171DWAL2L

Presentation

Remote displays for M171 optimized logic controllers

The four available remote displays for the M171 optimized logic controller offer are distinguished by technology and type of mounting.

- Technology: LED display or LCD display, with or without backlight
- Mounting: flush mounting or wall mounting

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

References

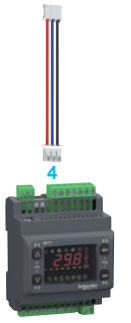
Type	Description	Reference	Weight kg/*lb*
Remote flush mounting displays With realtime clock	■ LED display: 4 digits,7 segments ■ Keyboard: 4 buttons ■ Communication port: 1 for LAN expansion bus – with wired connector *(1)* or screw terminal blocks	**TM171DLED**	0.042/ *0.090*
	■ LCD display (with segments) ■ Keyboard: 7 buttons ■ Flush mounting ■ Communication port: 1 for LAN expansion bus – with screw terminal blocks ■ 2 analog inputs: - 1 NTC or digital input - 1 NTC or 4-20 mA or digital input	**TM171DLCD2U**	0.170/ *0.370*
Remote wall mounting displays With realtime clock	■ Without backlight	**TM171DWAL2U**	0.143/ *0.320*
	■ With backlight	**TM171DWAL2L**	0.143/ *0.320*

*(1) Supplied with LAN expansion bus connector **TM171ACB4OLAN***

Hardware control platforms
Modicon M171/M172 logic controllers
Connection accessories

Connection accessories *(1) for M171 optimized logic controller (rail mounting): TM171OB22R, TM171OBM22R, TM171OD22R, TM171ODM22R and TM171ODM22S*

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



Connection accessories *(1) for M171 optimized logic controller (rail mounting): TM171OBM14R, TM171OD14R, TM171ODM14R*
N.B.*: terminal blocks are supplied with TM171OBM14R, TM171OD14R, and TM171ODM14R*

References

Connection accessories for M171 optimized logic controllers to be ordered separately

Type	Item	Description	Cable length (m/*ft.*)	Unit reference	Weight kg/*lb*
Low voltage connector Sold in lots of 5	1	Screw terminal block and a cordset equipped with a 20-pin connector at one end	1/*3.3*	**TM171ACB4OI1M**	0.575/ *1.270*
			2/*6.6*	**TM171ACB4OI2M**	1.120/ *2.470*
Analog output connector (0-10 V outputs) Sold in lots of 5	2	Cordset equipped with a 4-pin connector at one end	1/*3.3*	**TM171ACB4OAO1M**	0.075/ *0.170*
			2/*6.6*	**TM171ACB4OAO2M**	0.125/ *0.280*
Modbus SL connector Sold in lots of 5	3	Cordset equipped with a 3-pin connector at one end	1/*3.3*	**TM171ACB4ORS485**	0.052/ *0.110*
LAN expansion bus connector Sold in lots of 5	4	Cordset equipped with a 3-pin connector at each end	2/*6.6*	**TM171ACB4OLAN**	0.060/ *0.130*

(1) Minimum set for operating controllers.

Hardware control platforms
Modicon M171/M172 logic controllers
M171 performance logic controllers

Presentation

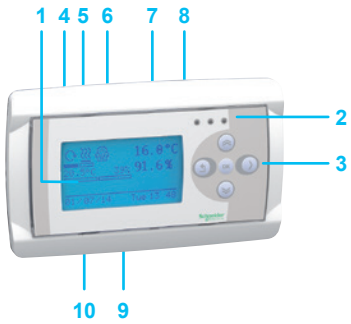
M171 performance logic controllers

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

- Power supply: 24 V ∿ or 48 V ⎓
- Two types of housing:
  - with built-in display
  - without display

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

- Two types of mounting:
  - On 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 bracket accessory, see page 3/29.
- Communication ports on M171 performance logic controllers:
  - One Modbus SL master/slave
  - Two USB
  - One CAN expansion bus
  - On flush mounting version:
  - One Modbus SL master/slave
  - One Modbus TCP and BACnet IP (B-AAC profile) (WebVisu)
  - One CAN expansion bus
- M171 performance logic controllers can be connected to communication modules, adding another connection for the CAN expansion bus, Ethernet network, or Profibus, etc., see page 3/32.
- M171 performance logic controllers are certified CE, cURus (UL Recognized), CSA, EAC, RCM, RoHS China.



Description

35 mm/*1.38 in.* ⊔ rail mounting performance controllers

TM171P●M27● 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 Five 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 inputs (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 connect a PC
14 USB-A port for USB stick
15 Connector for communication module
16 Three status LEDs

Flush mounting performance controllers

TM171PFE03R●●● performance logic controllers *(2)*

1 Display
2 Three status LEDs
3 Five 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 3/29.*
(2) Terminal blocks supplied with flush mounting version of performance controllers.

Hardware control platforms
Modicon M171/M172 logic controllers
M171 performance logic controllers


TM171PBM27R

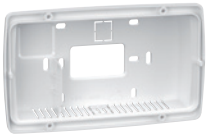

TM171PDM27R


TM171PDM27S


TM171PFE03


TM171PFE03HR


TM171ASCTB27


TM171ABKPB


TM171ABKPG


TM171DGRP

References

M171 performance logic controllers: Power supply: 24 V ⎓, 48 V ⎓

35 mm/*1.38 in.* ⊔ rail mounting performance controllers

No. of I/O	Number and type of channels: Inputs	Number and type of channels: Outputs	Embedded communication port	Display	Reference	Weight kg/*lb*
27	**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 inputs, ■ 4 NTC, or PT1000, or 4-20 mA, or 0-5 V, or 0-10 V, or 0-30 kΩ/0-5 kΩ variable resistor, or digital inputs	**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	■ 1 RS 485 ■ 1 CAN expansion bus	Remote display (optional)	**TM171PBM27R**	0.385/ *0.850*
				Built-in display 128x64 LCD with backlight	**TM171PDM27R**	0.385/ *0.850*
		7 digital outputs: ■ 2 SPDT (8 A, 230 V ∿) with independent common ■ 3 SPST (5 A, 230 V ∿) with independent common ■ 2 SSR (1 A, 230 V ∿) outputs **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	■ 1 RS 485 ■ 1 CAN expansion bus	Built-in display	**TM171PDM27S**	0.385/ *0.850*

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

No. of I/O	Number and type of channels: Inputs	Number and type of channels: Outputs	Embedded communication port	Display	Reference	Weight kg/*lb*
3	**3 configurable analog inputs:** ■ 1 built-in NTC ■ 1 NTC or digital input ■ 1 x 4-20 mA or 0-10 V	–	■ 11 RS 485 ■ 1 CAN expansion bus for CAN expansion bus ■ 1 RJ45	Built-in display	**TM171PFE03**	0.320/ *0.710*
	3 configurable analog inputs: ■ 1 built-in NTC ■ 1 NTC or digital input ■ 1 built-in humidity sensor	–	■ 1 removable connector for Modbus SL (master/slave) ■ 1 removable connector for CAN expansion bus ■ 1 RJ45 for Modbus TCP and BACnet IP (B-AAC profile) and MS/TP (B-AAC profile)	Built-in display	**TM171PFE03HR**	0.350/ *0.770*

Accessories for M171 performance logic controllers to be ordered separately

Designation	Use	Reference	Weight kg/*lb*
Screw terminal blocks	For **TM171PBM27R**, **TM171PDM27R**, and **TM171PDM27S**	**TM171ASCTB27**	0.100/ *0.220*
Wall bracket for flush mounting performance logic controllers	For **TM171PFE03** and **TM171PFE03HR**	**TM171ABKPB**	0.015/ *0.030*
		TM171ABKPG	0.015/ *0.030*

Remote display, HMI

Type	Description	Reference	Weight kg/*lb*
Remote display	128x64 LCD, with backlight Use for **M171 performance** and **M172** logic controllers	**TM171DGRP**	0.197/ *0.430*
HMI Magelis STU/STO	*See page 6/4*		

Hardware control platforms
Modicon M171/M172 logic controllers
I/O Expansion modules

Presentation

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

Two I/O expansion modules are available, dedicated to M171 performance logic controllers, and also compatible with M172 logic controllers.

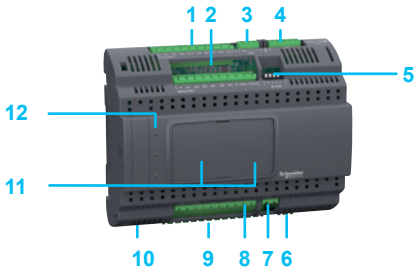
- They are used to increase the number of I/O:
  - up to 351 on M171 performance logic controllers
  - up to 366 on M172 logic controllers
- Expanded I/O types are digital and analog
- They are connected via the CAN expansion bus on M171 performance and M172 logic controllers.

Compatibility between logic controllers and I/O expansion modules

Logic controller type	Reference	Compatible I/O expansion module (reference)
M171 performance	**TM171PBM27R, TM171PDM27R, TM171PDM27S, TM171PFE03, TM171PFE03HR**	**TM171EP14R, TM171EP27R**
M172	**TM172OBM18R, TM172ODM18R, TM172PBG07R, TM172PDG07R, TM172PBG18R, TM172PDG18R, TM172PDG18S, TM172PBG28R, TM172PDG28R, TM172PDG28S, TM172PBG42R, TM172PDG42R, TM172PDG42S**	

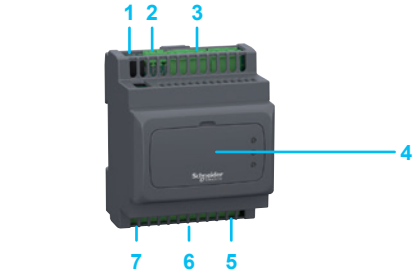
Description

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 inputs
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/O
6 Clip for 35 mm/*1.38 in.* ⊔ rail mounting
7 Connector for removable terminal block for power supply (24 V ∿)

(1) Removable terminal blocks to be ordered separately, *see page 3/31*


TM171EP14R


TM171EP27R

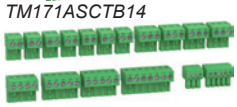
References

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

35 mm/*1.38 in.* ⊔ rail mounting

No. of I/O	Number and type of channels: Inputs	Number and type of channels: Outputs	Compatibility with logic controller	Embedded communication connection	Reference	Weight kg/*lb*
14	**4 digital inputs:** 4 x 24 V ∿ or 24V ⎓ *(1)* **4 analog inputs:** (configurable in pairs) 4 NTC, or PT1000, or PTC, or 4-20 mA, or 0-5 V, or 0-10 V, or digital inputs	**4 digital outputs:** ■ 1 SPDT (5 A, 230 V ∿) with independent common ■ 3 SPST (3 A, 230 V ∿) with independent common **2 analog outputs:** ■ 2 x 0-10 V *(1)*	TM171P●●●● TM172●●●●	■ 1 CAN expansion bus	**TM171EP14R**	0.190/ *0.420*
27	**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 analog inputs:** ■ 2 NTC or digital inputs ■ 4 NTC, or 4-20 mA, or 0-10 V, or digital inputs	**7 digital outputs:** ■ 2 SPDT (8 A, 230 V ∿) with independent common ■ 5 SPST (5 A, 230 V ∿) with independent common **5 analog outputs:** ■ 5 x 0-10 V, or 4-20 mA	TM171P●●●●, TM172●●●●	■ 1 CAN expansion bus	**TM171EP27R**	0.385/ *0.850*

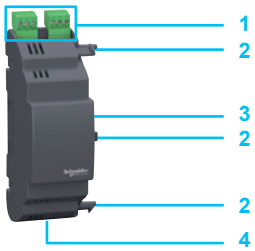

TM171ASCTB14

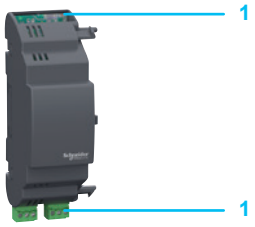

TM171ASCTB27

Accessories for I/O expansion modules to be ordered separately

Designation	Description	Unit reference	Weight kg/*lb*
Screw terminal blocks (inputs, outputs, and communication bus)	14 I/O – For TM171EP14R	**TM171ASCTB14**	0.050/ *0.110*
	27 I/O – For TM171EP27R	**TM171ASCTB27**	0.100/ *0.220*

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





Presentation

Communication modules for M171 performance and M172 logic controllers

The communication module offer is dedicated to M171 performance and M172 logic controllers *(1)*.

The 8 optional modules provide specific connections:

- To fieldbuses, including:
  - CAN bus
  - Modbus TCP
  - Profibus
  - Modbus SL (RS 485)
  - BACnet MS/TP (B-AAC profile)
  - BACnet IP (B-AAC profile)
  - RS 232 serial link
  - LonWorks (FFT-10)
  - Konnex (KNX) via Schneider Electric' spaceLYnk gateway, please consult our website: www.schneider-electric.com
- To services, including:
  - Ethernet
  - WebVisu and remote download functions
- They are mounted by simply interlocking on the left-hand side of M171 performance or M172 logic controllers *(1)*. Only one communication module can be added to a 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 page 3/33.

Description

TM171A●●●● I/O communication modules

1 Communication connector *(1)*
2 Locking device
3 Expansion connector to the controller *(2)*
4 Clip for 35 mm/*1.38 in.* ⊔ rail mounting

(1) The communication connector type depends on the communication modules, see page 3/33.
(2) Compatibility between M172 optimized, M172 performance and M171 performance logic controllers and communication modules, see table below:

Compatibility between logic controllers and communication modules

Logic controllers	Communication modules
M172 optimized logic controllers (**TM172O●●●●**)	**TM171ACAN, TM171AMB, TM171ARS485, TM171ARS232, TM171ALON, TM171AETH, TM171AETHRS485, TM171APBUS**
M172 performance logic controllers (**TM172P●●●●**)	**TM171ACAN, TM171AMB, TM171ARS485, TM171ARS232, TM171ALON**
M171 performance logic controllers (**TM171P●●●●**)	**TM171ACAN, TM171AETH, TM171APBUS, TM171AMB, TM171ARS485, TM171ARS232, TM171AETHRS485, TM171ALON**

Hardware control platforms
Modicon M171/M172 logic controllers
Communication modules

References

Communication modules for M171 performance and M172 logic controllers

35 mm/*1.38 in.* ⊔ rail mounting

Fieldbus, services access	Compatibility with logic controller	Communication port	Reference *(1)*	Weight kg/*lb*
 *TM171ACAN*				
■ CAN	M172 optimized, M172 performance, M171 performance	■ 2 screw terminal blocks *(1)*	**TM171ACAN**	0.077/ *0.170*
 *TM171AETH*				
■ Modbus TCP ■ Ethernet ■ BACnet IP (B-AAC profile) ■ WebVisu and remote download functions	M171 performance M172 optimized	■ 1 RJ45	**TM171AETH**	0.077/ *0.170*
 *TM171APBUS*				
■ Profibus	M171 performance M172 optimized	■ 1 SUB-D 9	**TM171APBUS**	0.077/ *0.170*
 *TM171AMB*				
■ Modbus SL (RS 485)	M172 optimized, M172 performance, M171 performance	■ 2 screw terminal blocks *(1)*	**TM171AMB**	0.077/ *0.170*
 *TM171ARS485*				
■ Modbus SL or BACnet MS/TP (B-AAC profile)	M172 optimized, M172 performance, M171 performance	■ 2 screw terminal blocks *(1)*	**TM171ARS485**	0.077/ *0.170*
 *TM171ARS232*				
■ RS 232 serial link ■ Relay output	M172 optimized, M172 performance, M171 performance	■ 1 SUB-D 9 for RS 232 ■ 1 screw terminal block for relay output *(1)*	**TM171ARS232**	0.077/ *0.170*
 *TM171AETHRS485*				
■ Modbus TCP and BACnet/IP ■ Modbus SL or BACnet MS/TP (B-AAC profile) ■ WebVisu and remote download functions ■ Ethernet	M171 performance M172 optimized	■ 1 RJ45 for Ethernet ■ 2 screw terminal blocks for RS 485 *(1)*	**TM171AETHRS485**	0.077/ *0.170*
 *TM171ALON*				
■ LonWorks (FFT-10)	M172 optimized, M172 performance, M171 performance	■ 1 screw terminal block for LON bus	**TM171ALON**	0.077/ *0.170*

(1) Removable terminal blocks supplied with communication modules.

Presentation

Electronic expansion valve drivers

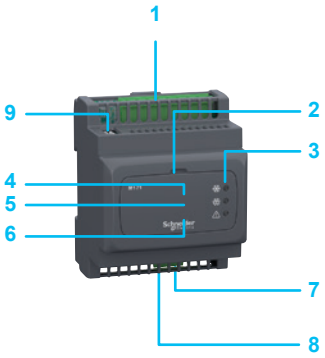
The 3 types of electronic expansion valve drivers are used to control the electronic expansion valve so as to control superheating after the evaporator.

- They are compatible with either 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:

Electronic expansion valve drivers Brand and type	Expansion valves Brand and type
Schneider Electric TM171VEVA2, TM171VEVD4, TM171VEVM4	**ELIWELL™** SXVB
	ALCO™ EX4, EX5, EX6, EX7, EX8 EXM246/EXL246
	DANFOSS™ ETS50, ETS100
	SPORLAN™ SER(I) G, J, K,B, C, D SER1.5 to 20, SEI 30,50, SEH
	SANHUA™ DPF(Q)/DPF(T01)

Description

35 mm/*1.38 in.* ⊔ rail mounting



TM171V●● electronic expansion valve drivers *(1)*
1 Output terminal block and power supply connector (24 V ⎓)
2 Protective cover
3 Three status LEDs
Behind the removable protective cover:
4 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

(1) TM171ASCTBVEV screw terminal block to be ordered separately, *see page 3/35*

Hardware control platforms
Modicon M171/M172 logic controllers
Electronic expansion valve drivers


TM171VEVA2


TM171VEVD4


TM171VEVM4

References

Electronic expansion valve drivers

Application	Number and type of channels		Reference	Weight kg/*lb*
	Inputs	Outputs		
Actuator, convert 0-10 V or 4-20 mA in opening position contact	**1 analog input:** 1 x 4-20 mA, 0-5 V, or 0-10V	**1 digital output:** 1 open collector (100 mA, 12 V ⎓)	**TM171VEVA2**	0.190/ *0.420*
Autonomous, wired to manage On/Off contact	**2 digital inputs:** ■ 2 volt-free **4 analog inputs:** ■ 2 NTC or PT1000, 4-20 mA, 0-5 V, or 0-10 V ■ 2 NTC or PT1000 *(1)*	**2 digital outputs:** ■ 1 open collector (100 mA, 12 V ⎓) ■ 1 SPST NO relay contact, 5 A, 250 V ∿	**TM171VEVD4**	0.190/ *0.420*
Autonomous, managed by Modbus (RS 485)	**2 digital inputs:** ■ 2 volt-free **4 analog inputs:** ■ 2 NTC (-50…+110 °C, -40…+150 °C/ *-58…+203 °F, -40…+302 °F*), PT1000, 4-20 mA, 0-5 V, or 0-10 V *(1)* ■ 2 NTC (-50…+110 °C, -40…+150 °C/ *-58…+203 °F, -40…+302 °F*), or PT1000 *(1)*	**2 digital outputs:** ■ 1 open collector (100 mA, 12 V ⎓) ■ 1 SPST NO relay contact, 5 A, ∿ 250 V	**TM171VEVM4**	0.190/ *0.420*

Accessories for electronic expansion valve drivers to be ordered separately

Designation	For connecting	Reference	Weight kg/*lb*
Screw terminal block for electronic expansion valve drivers	Power supply, sensor power supply, digital and analog I/O, Modbus link	**TM171ASCTBVEV**	0.050/ *0.110*


TM171ASCTBVEV

(1) Two PT1000 (-50…+99.9 ° C/-58… + 211.82 °F).

Hardware control platforms
Modicon M171/M172 logic controllers
Measurement accessories

References

Designation	Use Applications	Description	Cable length m *(ft)*	Unit reference	Sold in lots of *(1)*	Weight kg/ *lb*
Measurement accessories						
Temperature control						
NTC probe 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 68 - Gray - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STNTCRN52015**	8	0.144/*0.320*
				TM1STNTCRN5201P	100	0.144/*0.320*
			3 *(9.84)*	**TM1STNTCRN52030**	5	0.180/*0.400*
				TM1STNTCRN5203P	50	0.180/*0.400*
			5 *(16.40)*	**TM1STNTCRN52050**	4	0.228/*0.500*
				TM1STNTCRN5205P	25	0.228/*0.500*
NTC probes 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 67 - Gray - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STNTCRN61515**	8	0.104/*0.230*
				TM1STNTCRN6151P	100	0.104/*0.230*
			3 *(9.84)*	**TM1STNTCRN61530**	5	0.125/*0.280*
				TM1STNTCRN6153P	50	0.125/*0.280*
			5 *(16.40)*	**TM1STNTCRN61550**	4	0.164/*0.360*
				TM1STNTCRN6155P	25	0.164/*0.360*
NTC probes 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- FAST - IP 67 - Gray - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STNTCSF44015**	8	0.144/*0.320*
				TM1STNTCSF4401P	100	0.144/*0.320*
			3 *(9.84)*	**TM1STNTCSF44030**	5	0.175/*0.390*
				TM1STNTCSF4403P	50	0.175/*0.390*
NTC probes 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 68 - Gray - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STNTCSN62015**	8	0.144/*0.320*
				TM1STNTCSN6201P	100	0.144/*0.320*
			3 *(9.84)*	**TM1STNTCSN62030**	5	0.175/*0.390*
				TM1STNTCSN6203P	50	0.175/*0.390*
			5 *(16.40)*	**TM1STNTCSN62050**	4	0.232/*0.510*
				TM1STNTCSN6205P	25	0.232/*0.510*
NTC probes with a strap 	Pipe ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 68 - Gray - Equipped with 2 conductor cables for controller side - Equipped with strap	1.5 *(4.92)*	**TM1STNTCTN62015**	8	0.152/*0.340*
				TM1STNTCTN6201P	100	0.152/*0.340*
			3 *(9.84)*	**TM1STNTCTN62030**	5	0.180/*0.400*
				TM1STNTCTN6203P	50	0.180/*0.400*
PT1000 probes 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 68 - Green - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STPTTSN62015**	8	0.144/*0.320*
				TM1STPTTSN6201P	100	0.144/*0.320*
			3 *(9.84)*	**TM1STPTTSN62030**	5	0.175/*0.390*
				TM1STPTTSN6203P	50	0.175/*0.390*
			5 *(16.40)*	**TM1STPTTSN62050**	4	0.232/*0.510*
				TM1STPTTSN6205P	25	0.232/*0.510*
PT1000 probes 	Multi-purpose ■ Temperature control: - 50…+110 °C *(-122…+230 °F)*	- IP 68 - Green - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1STPTTSN52015**	8	0.136/*0.300*
				TM1STPTTSN5201P	100	0.136/*0.300*
			3 *(9.84)*	**TM1STPTTSN52030**	5	0.175/*0.390*
				TM1STPTTSN5203P	50	0.175/*0.390*
			5 *(16.40)*	**TM1STPTTSN52050**	4	0.232/*0.510*
				TM1STPTTSN5205P	25	0.232/*0.510*

(1) The given value is the number of products delivered for one ordered reference.

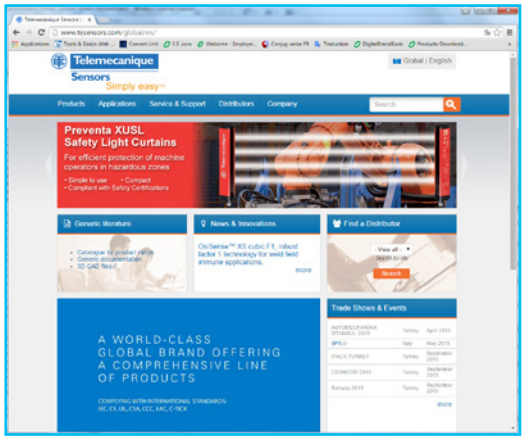
Hardware control platforms
Modicon M171/M172 logic controllers
Measurement accessories

References

Designation	Use Applications	Description	Cable length m *(ft)*	Reference	Weight kg/ *lb*
Measurement accessories					
Temperature control					
NTC probes 	Outside air ■ Temperature measurement	- Outdoor wall mounting	–	**TM1STNTCWN65605**	0.050/ *0.110*
NTC probe 	Inside air (room) ■ Temperature measurement	- Indoor wall mounting	–	**TM1STNTCWN75750**	0.050/ *0.110*
Humidity control					
Humidity probe 	In duct ■ Humidity control: 15…90%	- 4-20 mA - IP 54 - Equipped with 2 conductor cables for controller side	1.5 *(4.92)*	**TM1SH284**	0.138/ *0.300*
Humidity probe 	Multi purpose ■ Humidity control: 0…100%	- 4-20 mA - IP 65 - Wall mounting	–	**TM1SH304**	0.170/ *0.370*
Humidity & temperature control					
Humidity & temperature probe 	Multi-purpose ■ Humidity control: 0…100% ■ Temperature control: - 40…60 °C *(-40...140 °F)*	- 2 x 4-20 mA - IP 65 - Wall mounting	–	**TM1SH314**	0.176/ *0.390*

Hardware control platforms
Modicon M171/M172 logic controllers
Pressure transmitters

XMLP *pressure transmitters*



Discover **XMLP** *offer on the web site:*
http://www.tesensors.com/global
Access to the catalog by product at this URL:
http://www.tesensors.com/global/en/product/catalog/

Presentation

Schneider Electric recommends his partner Telemecanique Sensors, which proposes the range of **XMLP** pressure transmitters.

XMLP pressure transmitters rated greater than or equal to 9 bar or 100 psi

These transmitters integrate a metal pressure measuring cell.
This measuring cell, which is welded directly onto the AISI 316L stainless steel transmitter body, offers the following advantages:
- An all-metal pressure chamber, with no elastomer gasket in contact with the fluid
- Compatibility with a large number of fluids: air, fresh water, hydraulic oils, refrigeration fluids, all fluids or gases compatible with AISI 316L stainless steel

> Pressure transmitters can control fluids ranging in temperature from -30 to120 °C. *(-22 to 248°F)*

General characteristics

> Made of stainless steel, **XMLP** pressure transmitters are compact and rugged.
> Their degree of protection varies according to the type of connector:
- IP 65 for EN 175301-803-A connector versions
- IP 65 and IP 67 for Packard Metri-Pack connector versions
- IP 65, IP 67 and IP 69K for M12 connector versions

> With typical precision better than 0.5% of the rating, **XMLP** transmitters are suitable for industrial applications such as HVAC systems (for ratings greater than or equal to 9 bar or 100 psi only)
> Their power supply *(1)* depends on the type of analogue output:
- 5 V +/- 10% for the 0.5…4.5 V ratiometric output
- 12 or 24 V (nominal), operating from 7 to 33 V for the 4…20 mA output
- 24 V (nominal), operating from 12 to 33 V for the 0…10 V output

Functions

XMLP pressure transmitters have an analogue output which delivers a signal proportional to the measured pressure.
This output can be one of the following types:
- 4…20 mA
- 0…10 V
- 0.5…4.5 V ratiometric

> The pressure ranges available are:

■ vacuum measuring
- -1…0 bar
- -14.5…0 psi

■ pressure measuring
- 0…600 bar
- 0…6,000 psi

■ combined pressure measuring (vacuum and pressure)
- -1…25 bar
- -14.5…60 psi

> The **XMLP** offer is available with four types of electrical connection:
- M12, 4-pin connector
- EN 175301-803-A (ex DIN 43650) connector
- Packard Metri-Pack 150 connector
- 2 m PVC cable

> Several types of fluid connection are available:
- G1/4 A male
- 1/4”-18NPT male
- SAE 7/16-20UNF-2A male
- SAE 7/16-20UNF-2B female (with or without Schrader pin depending on the model)

(1) Use Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV) power supply.

Hardware control platforms

Modicon M171/M172 logic controllers

Variable speed drives

Application	Type of machine controlled	Compressor		
	Number of phases	1	3	
	Type of motor	Asynchronous	Asynchronous and Synchronous	Asynchronous and Synchronous for scroll
Compressor size	0.18 kW *(0.25 HP)*	Altivar 12	Altivar 320	–
	0.37 kW *(0.5 HP)*			–
	0.75 kW *(1 HP)*			Altivar 212
	2.2 kW *(0.25 HP)*			
	4.0 kW *(5 HP)*			
	7.5 kW *(10 HP)*	–		
	15 kW *(20 HP)*	–		
	18.5 kW *(25 HP)*	–		
	22 kW *(30 HP)*	–		
	30 kW *(40 HP)*	–		
	37 kW *(50 HP)*	–		
	45 kW *(60 HP)*	–		
	55 kW *(67 HP)*	–		
	75 kW *(100 HP)*	–	Altivar Process ATV600	
	90 kW *(120 HP)*	–		–
	110 kW *(150 HP)*	–		–
	315 kW *(422 HP)*	–		–
	355 kW *(480 HP)*	–	Altivar Process Drive Systems *(1)*	–
	400 kW *(540 HP)*	–		–
	450 kW *(603 HP)*	–		–
	500 kW *(670 HP)*	–		–
	560 kW *(750 HP)*	–		–
	630 kW *(850 HP)*	–		–
	710 kW *(950 HP)*	–		–
	800 kW *(1100 HP)*	–		–

Compatible range of variable speed drives

Application	Type of machine controlled	Fan	
	Number of phases	1	3
Fan size	0.18 kW *(0.25 HP)*	Altivar 12	–
	0.37 kW *(0.5 HP)*		–
	0.75 kW *(1 HP)*		Altivar 212
	2.2 kW *(0.25 HP)*		
	4.0 kW *(5 HP)*		
	7.5 kW *(10 HP)*	–	
	15 kW *(20 HP)*	–	
	75 kW *(100 HP)*	–	
	> 75 kW *(> 100 HP)*	–	Altivar Process ATV600 and Altivar Process Drive Systems *(1)*

Compatible range of variable speed drives

(1) Altivar Process Drive Systems is a customized offer based on Altivar Process ATV600 products.

Chapter 4

Programming software

Technical data relating to products listed in this chapter is available online at www.schneider-electric.com/m171-m172

Contents

Programming software

4

Programming software
EcoStruxure Machine Expert - HVAC

Presentation

Software solution

EcoStruxure Machine Expert - HVAC programming software is compliant with IEC 61131-3. It can be used to develop, configure, and commission HVAC solution systems.

It includes:

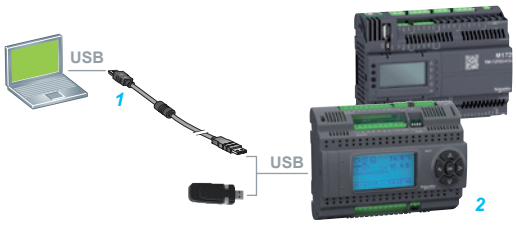
- Programming Modicon M171/M172 logic controllers (performance and optimized) and remote display units
- Setting up expansion buses and networks
- Creating the screen of the displays (built-in and displays of the M171/M172 logic controller offer)
- Configuring BMS communication modules on BACnet MS/TP (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
  - a library of Tested, Validated, and Documented Applications (TVDA)
- Full simulation mode

General characteristics

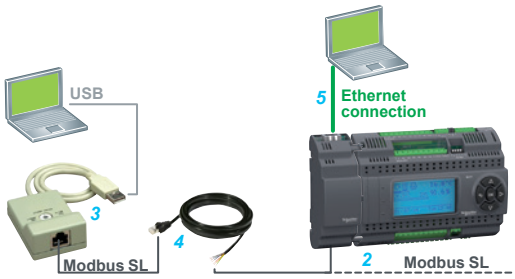
Overview

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, Profibus ■ 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 - Modem ■ Parameter management ■ Status monitoring ■ Field test: - Oscilloscope - Debug window - Export to Excel

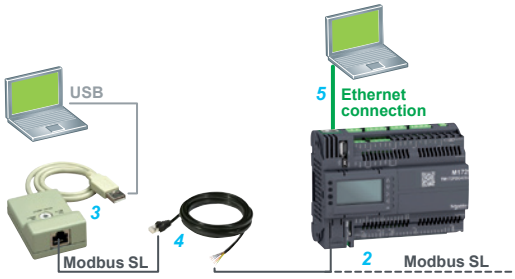
Programming software
EcoStruxure Machine Expert - HVAC



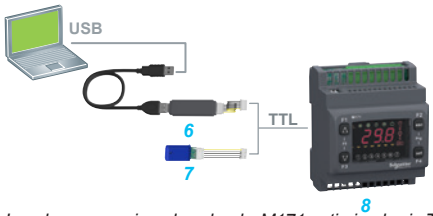
Local programming, download - M171 & M172 performance - through USB port



Remote programming - M171 performance



Remote programming - M172 performance



Local programming, download - M171 optimized - via TTL port

Remote programming - M171 optimized

Product offer

EcoStruxure Machine Expert - HVAC software is supplied on a DVD or can be downloaded from our website www.schneider-electric.com.
The product version concerned offers the EcoStruxure Machine Expert - 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
- Drive: DVD drive
- 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

Programming software

Designation	Application	Reference	Weight kg/*lb*
EcoStruxure Machine Expert - HVAC programming software	**M171 optimized** logic controllers, **M171 performance** logic controllers, **M172 optimized** logic controllers, **M172 performance** logic controllers	**TM171SW**	0.050/ *0.110*

Programming accessories for M171 and M172 performance logic controllers

The USB cable is recommended for local programming.
An Ethernet port is recommended for remote download or remote programming.

Description	Characteristics and use	Length m/*ft.*	Reference	Weight kg/*lb*
Programming via USB port				
Programming cables *(1)*	From the PC USB-A port to the USB mini-B port on M171 *(2)* and M172 performance logic controllers *(2)*	3/*0.98*	**TCSXCNAMUM3P** *(1)*	0.065/ *0.143*
		1.8/*5.90*	**BMXXCAUSBH018**	0.065/ *0.143*
Programming via Modbus SL and/or Ethernet				
USB to RS485 converter *(3)*	To be used on M171 *(2)* and M172 performance logic controllers *(2)* Equipped with 1 RJ45 connector at the controller end and 1 USB-A connector at the PC end	0.4/*1.31*	**TSXCUSB485**	0.144/ *0.320*
Connection cable for Modbus serial link *(4)*	Equipped with 1 RJ45 connector at one end and flying leads at the other end	3/*9.84*	**VW3A8306D30**	0.250/ *0.550*
Ethernet connection cable				
Ethernet ConneXium cable - shielded twisted pair straight cord *(5)* CE compatible	For connection to terminal devices (DTE) Equipped with 1 RJ45 connector at each end	2/*6.56* *(2)*	**490NTW00002**	–

(1) Unshielded cable without grounding. To be used only for temporary connections. For permanent connections, use the reference ***BMXXCAUSBH018****.*
(2) Other lengths available: 5 m/16.40 ft, 12 m/39.37 ft, 40 m/131.23 ft, and 80 m/262.47 ft, *see page 5/4**.*

Programming accessories for M171 optimized logic controllers

Programming via TTL programming port

Description	Characteristics and use	Reference	Weight kg/*lb*
Programming cable *(6)*	To be used between a PC and the TTL programming port of M171 optimized logic controllers *(8)*	**TM171ADMI**	0.157/ *0.350*
Programming stick *(7)*	To be used to transfer parameters from one M171 optimized logic controller *(8)* to another, or to download the program	**TM171AMFK**	0.010/ *0.020*
Programming via USB port			
USB to RS485 converter *(3)*		See above	
Connection cable for Modbus serial link *(4)*		See above	

Chapter 5
Connectivity

Technical data relating to products listed in this chapter is available online at www.schneider-electric.com

Contents

Connectivity

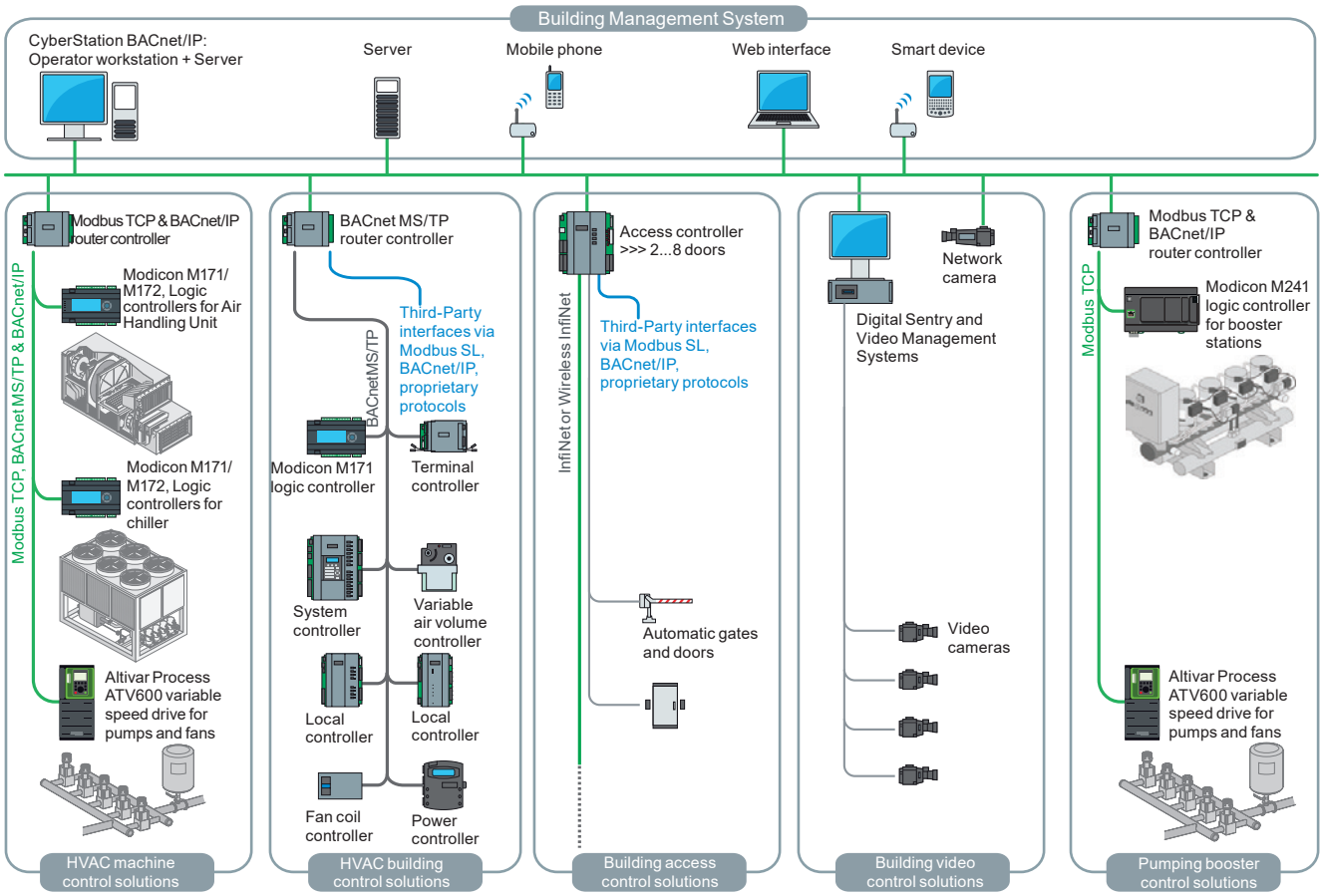
5

Connectivity
EcoStruxure™ Machine architectures

EcoStruxure™ Machine architectures

Easy integration into Building Management System (BMS)

Your customers demand comprehensive solutions that include enterprise-wide management of power, IT, HVAC, and security and with a level of efficiency that includes system dynamics across segments, platforms, and providers. That's why EcoStruxure™ Machine architectures can be easily integrated.

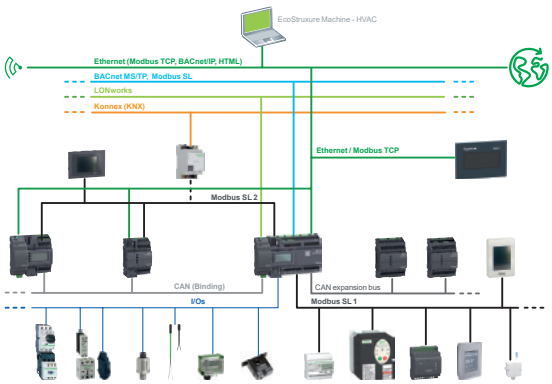


Your benefits

- Modicon M171/M172 makes it easy to integrate your machines into your customers' BMS architectures
- Compliance with open BMS standards:
  - BACnet/IP, BACnet MS/TP (B-AAC profile), Modbus TCP, Modbus RTU, and LonWorks
  - BACnet/IP & Modbus TCP Ethernet modules offering easy maintenance through embedded data logging, text e-mail, and web server
- Maintenance and monitoring efficiency
  - Provided on Ethernet modules, offering embedded data logging, e-mail notification, and web server capabilities
- Late-point configuration with Modicon M171/M172 interchangeable communication plug-in

Connectivity
spaceLYnk gateway, Universal automation WiFi interface

spaceLYnk gateway



Presentation

spaceLYnk is designed to build a complete Building Automation Solutions for commercial segments :

- Complete Building Automation solution for Small and Medium building with a complete architecture including Light and Room Control (KNX, DALI Control), Metering (Modbus offer, Smartlink RTU and IP), and boiler management (SSL)
- Complete Building Automation solution for Large Building with a complete architecture managed by SBO (BMS from Schneider Electric) and including Light and Room Control (KNX, DALI Control) and Metering (Modbus offer, Smartlink RTU and IP)

spaceLYnk is compliance with the Modicon M171/M172 logic controller and allows to add KNX to the embedded protocols

spaceLYnk can be used in several ways:

- As a gateway to translate and enable communication between different products
- As an aggregator to stock, analyze, and send the data (.csv file for example)
- As an user interface to display relevant informations on mobile devices
- As an event controler that sends email in case of issues

Applications

- Cross-standard gateway between KNX and Modbus RTU/TCP
- Logical functions
- WEB SCADA visualization for PC and touch-devices
- BACnet Server (500 points)
- Integration with third party devices over RS 232 (IR, AV)
- Scheduling
- Camera streaming
- Data logger with trends

Technical feature

- Supply voltage: 24 V DC
- Interface: 1x KNX, 1x10BaseT/100BaseTX, 1x RS 485, 1x RS 232, 1x USB2.0

References

Designation	Communication port protocol	Reference
spaceLYnk logic controller	■ BACnet ■ Modbus ■ IP (Internet Protocol) ■ KNX	 **LSS100200**

Universal automation WiFi Interface

Presentation

The universal automation Wifi interface TCSEGWB13FA0 is a communication accessory, giving a wireless access point to several equipment as PC, PLC, Variable speed drive, Smart phone, Tablet, and Phablet.

References

Designation	Description	Reference
universal automation Wifi Interface - IP20 - with RJ45 and USB connectors	■ For connection of WiFi equipment (PC, tablet, smartphone, etc.) ■ Powered by internal rechargeable battery ■ Provided with : USB cable, Battery, Quick start guide, Power adaptor, and Ethernet cable (RJ45/RJ45)	 **TCSEGWB13FA0**

Connectivity
ConneXium - Connecting Ethernet devices: Shielded copper connection cables

Shielded copper connection cables

Presentation

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

- **EIA/TIA 568 shielded twisted pair cables for CE market**

These cables conform to:
- EIA/TIA-568 standard, category CAT 5E
- IEC 11801/EN 50173-1 standard, class D

Their fire resistance conforms to:
- NF C32-070 standard, class C2
- IEC 322/1 standards
- Low Smoke Zero Halogen (LSZH)

- **EIA/TIA 568 shielded twisted pair cables for UL market**

These cables are:
- CEC type FT-1
- NEC type CM

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

490NTW000●●

TCSEC●3M3M●●S4

References

EIA/TIA 568 shielded twisted pair cables for CE market

Description	End fittings	Type	Length m *(ft.)*	Reference	Weight kg
Straight-through copper cables CE compatible	2 RJ 45 connectors For connection to terminal devices (DTE)	standard	2 *(6.56)*	**490NTW00002**	–
			5 *(16.40)*	**490NTW00005**	–
			12 *(39.37)*	**490NTW00012**	–
			40 *(131.23)*	**490NTW00040**	–
			80 *(262.47)*	**490NTW00080**	–
		ruggedised	1 *(3.28)*	**TCSECE3M3M1S4**	–
			2 *(6.56)*	**TCSECE3M3M2S4**	–
			3 *(9.84)*	**TCSECE3M3M3S4**	–
			5 *(16.40)*	**TCSECE3M3M5S4**	–
			10 *(32.81)*	**TCSECE3M3M10S4**	–

Shielded twisted pair cables for UL market

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

Do it Yourself copper cable and connectors

The **ConneXium** "Do it Yourself" offer consists of 2 connector references (M12 and RJ 45) and 1 cable reference - 300 m *(984.252 ft)* reel - enabling Ethernet 10/100 Mbps network cables to be made up in situ. The maximum length of cables made up in this way is 80 m *(262.467 ft.)*. They are assembled using only a knife and wire cutters (no special tool is required).

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

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

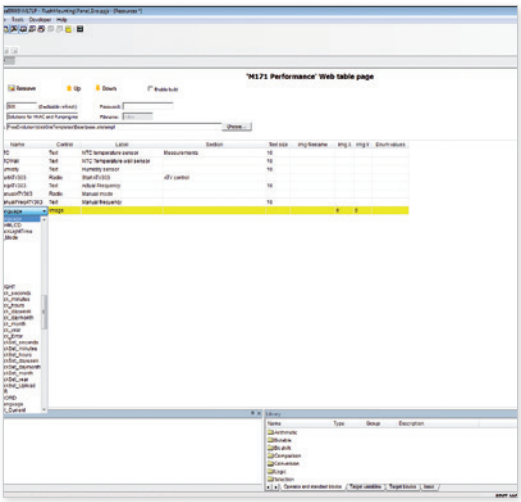
TCSESU053FN0

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

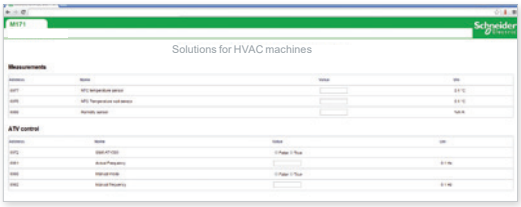
*Other wiring components are available, please consult the **ConneXium** offer on our website www.schneider-electric.com*

Connectivity
WebVisu (Web servers),
EcoStruxure™ Building application

WebVisu



Web page creation with EcoStruxure Machine Expert - HVAC software



Result - Web page in classic browser

WebVisu is embedded to simplify the web page creation and to create directly your page in EcoStruxure Machine Expert - HVAC

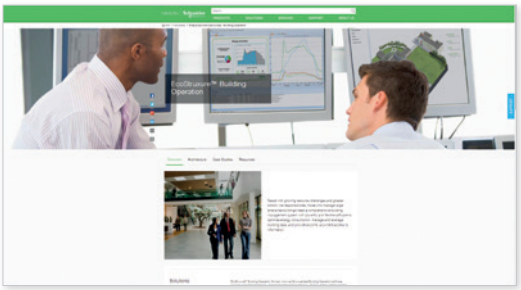
EcoStruxure Machine Expert - HVAC programming software is used to create in the webserver customized pages for viewing and monitoring devices.
These pages can also be accessed on any mobile device such as a tablet or smart phone with any operating system (iOS, Android, Windows).

External **HTML5 tool** can be also used to customize the pages with your logo and your company look and feel.
WebVisu (Web server) can allow to reduce solution cost !

How many time are you using an HMI for commissioning ?
if not more than twice a year, you can replace the HMI with a webserver and a WiFi access point (Universal automation WiFi interface), allows you more features by using your smart phone to set, to check or to maintain the machine.

WebVisu is not displaying only ready values, you can write parameters or start/stop a device.
During maintenance, start and stop a device (fan, compressor, coil,...) with a smart phone allows to stay close to this device. Maintenance is quicker and more efficient.

EcoStruxure™ Building application



Discover EcoStruxure Building Operation on our web site

Start small and grow, and build on what you own

EcoStruxure™ Building applications allow you to add additional applications incrementally, while a 'plug and play' design helps to ensure the applications will connect seamlessly. Additionally, open standards mean EcoStruxure Building applications will work with virtually any software, hardware, or system that you are already using, so there is no need to start over.

EcoStruxure™ Building Operation

Solutions
EcoStruxure Building Operation software provides integrated monitoring, control and management of energy, HVAC systems, lighting and fire safety systems. It is a centralized system with scalability from a single building to a global enterprise

Benefits
- Save personnel time and resources
- Simplify day-to-day operations
- Turn data into actionable information
- Monitor your entire enterprise through a single, robust and user-friendly interface
- Gain additional insight with EcoStruxure™ Energy Expert

Differentiation
- Centralized system with distributed intelligence
- Advanced user features to meet specific needs, roles and preferences
- Easy-to-use; robust functionality leveraging existing investments
- Part of an integrated enterprise to optimize efficiency across multiple domains of your business

Chapter 6

Related products

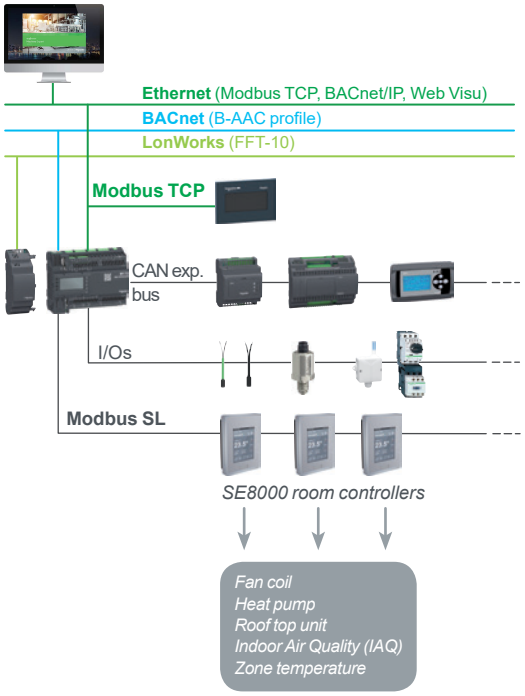
Technical data relating to products listed in this chapter is available online at www.schneider-electric.com

Contents

Related products

Related products
SE8000 room controllers

Presentation



The SE8000 Series is a sophisticated addition to the Schneider Electric product portfolio of room controllers. With rich, customizable features, the SE8000 enables significant energy savings with accurate temperature control in any space, and can be easily integrated into most Building Management Systems (BMS).
Designed for new construction and retrofit projects, the SE8000 decreases project delivery costs by reducing installation, configuration and commissioning time.
No complex software or tools are required to customize functionality in order to meet your applications requirements. The SE8000 provides the advanced features and monitoring functions required by modern building automation systems, in a simple and compact enclosure.

Common features
- Customizable colour digital touch screen interface
- Configurable sequence of operations
- Proportional integral control of HVAC equipment
- BACnet MS/TP (BTL certified) and Modbus RTU (slave) integration
- Each model supports over 100 configurable points/parameters
- Scheduler
- Upload custom standby screen images to higlight the brand or logo of your customers
- Programmable with Lua4RC to modify control sequences or override inputs and outputs
- Multi-language support (user interface): English, French, Spanish, Chinese, Russian, Arabic, Czech, Danish, Dutch, Finnish, German, Hungarian, Indonesian, Italian, Norwegian, Polish, Portuguese, Slovak, Swedish, and Turkish

Options
- Different models address different types of HVAC equipment (fan coil units, roof top units, heat pumps, indoor air quality applications, and zone temperature control applications). This includes extra inputs to integrate remote temperature, humidity, and CO^2 sensors, depending on the SE8000 model and application
- Optional on-board relative humidity sensor with dehumidification control sequence
- Optional on-board PIR motion sensor with occupancy-based control sequence (modes: occupied, standby, unoccupied)

Uploader SE8000
- The Firmware of the SE8000 can be ugraded using the Uploader SE8000. This free downloadable tool also enables the upload of standby screen images and scripts

6

Panorama

Series	SER8300 with SC3000 relay pack	SE8300	SE8600
			

Application	Line voltage fan coil units	Low voltage fan coil units	Rooftop units, heat pumps and indoor air quality
Description	◻ Requires SC3000 relay pack ◻ Fan speed and sequence of operation ◻ Two pipes ◻ Four pipes	◻ Fan speed and sequence of operation ◻ Two pipes ◻ Four pipes **Mixed voltage fan coil units** ◻ Requires SC1300/SC2300 relay pack **Zone control** ◻ Cooling only VVT zone with reheat ◻ Fin-tube radiators ◻ Cabinet heaters ◻ Radiant panel heaters ◻ Electric re-heat zones ◻ Pressure dependent VAV system ◻ Terminal reheat	◻ Economizer ◻ CO2 sensor input ◻ Fresh Air Station input **Configurable stages** ◻ 1 heat/1 cool ◻ 2 heat/2 cool ◻ Modulation heat/2 cool ◻ 3 heat/2 cool
Voltage	**SER8000**:6.5 - 28 VDC or 20 - 28 VAC, 50/60Hz / 2.4 W Min. **SC3000**: 90-277 VAC universal, 50/60Hz	6.5 - 28 VDC or 20 - 28 VAC, 50/60Hz / 4 VA + Output Load (64 VA Max.)	28 VDC or 20 - 28 VAC, 50/60Hz / 4 VA + Output Load (64 VA Max.)
Communication	◻ Modbus SL ◻ BACnet MS/TP	◻ Modbus SL ◻ BACnet MS/TP	◻ Modbus SL ◻ BACnet MS/TP

More information on Room controllers,Please visit our web site:
https://ecobuilding.schneider-electric.com/room-controllers

Related products
SE8000 room controllers

SE8000 room controllers - References

Description	RH sensor & control	PIR motion sensor	Fascia and Casing color	Reference
Line voltage fan coil controller	–	–	Silver	**SER8300A0B00**
	☑	–	Silver	**SER8350A0B00**
	–	☑	Silver	**SER8300A5B00**
	☑	☑	Silver	**SER8350A5B00**
	–	–	White	**SER8300A0B11**
	☑	–	White	**SER8350A0B11**
	–	☑	White	**SER8300A5B11**
	☑	☑	White	**SER8350A5B11**
Low voltage fan coil controller	–	–	Silver	**SE8300U0B00**
	☑	–	Silver	**SE8350U0B00**
	–	☑	Silver	**SE8300U5B00**
	☑	☑	Silver	**SE8350U5B00**
	–	–	White	**SE8300U0B11**
	☑	–	White	**SE8350U0B11**
	–	☑	White	**SE8300U5B11**
	☑	☑	White	**SE8350U5B11**
Heat pump & indoor air quality controller	–	–	Silver	**SE8600U0B00**
	☑	–	Silver	**SE8650U0B00**
	–	☑	Silver	**SE8600U5B00**
	☑	☑	Silver	**SE8650U5B00**
	–	–	White	**SE8600U0B11**
	☑	–	White	**SE8650U0B11**
	–	☑	White	**SE8600U5B11**
	☑	☑	White	**SE8650U5B11**

Dimensions

Height: 120 mm *(4.72 in)*, Width: 86 mm *(3.38 in)*, Depth: 25 mm *(1 in)*

SC3000 relay packs - References

The SC3000 relay pack is part of a two component retrofit option for line-voltage fan coil units. The relay pack is combined with SER8300 room controllers.
The SC3000 relay pack features an onboard universal voltage power supply and line-voltage relays which directly drive fractional horsepower fan motors and valves. This eliminates the need to install and wire costly pilot relays and transformers. No previous building automation training is required for the installation and commissioning process.

Applications	Fan control	Monitoring inputs	Control types	Reference
2 pipes **2 pipes with reheat** **4 pipes**	Up to 3 speed	None	On-Off line switched valve output control □ 1 heat / cool output □ 1 cool output □ 3 fan outputs	**SC3500E5045**
		4 FCU remote inputs	On-Off line switched valve output control □ 1 heat / cool output □ 1 cool output □ 3 fan outputs	**SC3504E5045**
			On-Off line switched valve output control □ 1 heat / cool output □ 1 cool output □ 3 fan outputs □ Occupancy output (7VDC)	**SC3514E5045** (with occupancy output)
2 pipes **2 pipes with modulating pulsed reheat**	Up to 3 speed	None	On-Off line switched valve output control □ 1 heat / cool output □ 1 Modulating pulsed Vdc output for SSR electric reheat control □ 3 fan outputs	**SC3400E5045**
		4 FCU remote inputs	On-Off line switched valve output control □ 1 heat / cool output □ 1 Modulating pulsed Vdc output for SSR electric reheat control □ 3 fan outputs	**SC3404E5045**
Slave fan control only	Up to 3 speed	None	Slave fan control only 3 fan outputs	**SC3300E5045** **(slave fan unit)**

Dimensions

Height: 122 m m *(4.80 in)*, Width: 80 mm *(3.15 in)*, Depth: 33 mm *(1.30 in)*

More information on Room controllers, Please visit our web site: https://ecobuilding.schneider-electric.com/room-controllers

Related products

Operator dialog terminals: Magelis™ Small panels

Applications		**Display of graphic pages**	
Type of terminal		**Small Panels with touch screen**	
			
Display	Type	Color QVGA TFT LCD (320 x 240 pixels)	
	Capacity	3.5" color	5.7" color
Data entry		Via touch screen	
Memory capacity	Application	32 MB Flash	
	Expansion	–	
Functions	Maximum number of pages	Limited by internal FLASH EPROM memory capacity	
	Variables per page	Unlimited	
	Representation of variables	Alphanumeric, bitmap, bargraph, gauge, curves, buttons, LEDs	
	Recipes	32 groups of 64 recipes	
	Curves	Yes, with log	
	Alarm logs	Yes	
	Real-time clock	Access to the PLC real-time clock	
	Alarm relay	–	
	Buzzer	Yes	
Communication	Asynchronous serial link	RS-232C/RS-485	
	Downloadable protocols	Uni-TE, Modbus and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens	
	Printer link	USB for serial or parallel printer	
	USB ports	1 host Type A and 1 device Type mini-B	
	Networks	1 Ethernet TCP/IP port (10BASE-T/100BASE-TX)	
Development software		Vijeo Designer (on Windows XP Professional and Windows 7 Business 32-bit and 64-bit)	
Operating system		Magelis	
References		**HMISTU655** **HMISTU655W**	**HMISTU855** **HMISTU855W**
Catalog number		**DIA5ED2130607EN**	

(1) Only HMISTO511/512.
(2) Only HMISTO501.
(3) Only HMISTO531/532.

Display of graphic pages			
Small Panels with touch screen			
			
Display	Type	Monochrome STN LCD (200 x 80 pixels),backlit - Green, orange and red, or - White, pink and red	Color TFT LCD (480 x 272 pixels)
	Capacity	3.4" monochrome	4.3" color
Data entry		Via touch screen	
Memory capacity	Application	16 MB Flash	26 MB Flash
	Expansion	–	
Functions	Maximum number of pages	Limited by internal FLASH EPROM memory capacity	
	Variables per page	Unlimited	
	Representation of variables	Alphanumeric, bitmap, bargraph, gauge, curves, buttons, LEDs	
	Recipes	32 groups of 64 recipes	
	Curves	Yes, with log	
	Alarm logs	Yes	
	Real-time clock	Access to the PLC real-time clock	Option: RTC battery set
	Alarm relay	–	
	Buzzer	Yes	
Communication	Asynchronous serial link	RS-232C/RS-485 *(1)* RS-232C using Zelio protocol *(2)*	
	Downloadable protocols	Uni-TE, Modbus and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens	
	Printer link	USB for serial or parallel printer	
	USB ports	1 host Type A and 1 device Type mini-B	
	Networks	1 Ethernet TCP/IP port (10BASE-T/100BASE-TX) *(3)*	
Development software		Vijeo Designer (on Windows XP Professional and Windows 7 Business 32-bit and 64-bit)	Vijeo XD (on Windows 7 and Windows 8)
Operating system		Magelis	
References		**HMISTO511** **HMISTO531** **HMISTO512** **HMISTO532** **HMISTO501**	**HMISTO705** **HMISTO715** **HMISTO735**
Catalog number		**DIA5ED2130607EN**	

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More information on dialog terminals, Please visit our web site www.schneider-electric.com to download the catalog.

Related products

Variable speed drives for asynchronous and synchronous motors

Application		Drives for commercial equipment from 0.18 to 4 kW ■ For suction pumps, centrifugal pumps, circulating pumps ■ For air or smoke extractor fans ■ For material handling, packing and packaging machines, ovens, boilers, etc.	Dedicated HVAC drives for 0.75 to 75 kW motors ■ For HVAC applications ■ For fans ■ For pumps
			
Power range for 50…60 Hz (kW/*HP*) line supply		**0.18…4/*0.25...5***	**0.75…75/*1...100***
	Single-phase 100…120 V (kW/*HP*)	0.18…0.75/*0.25...1*	–
	Single-phase 200…240 V (kW/*HP*)	0.18…2.2/*0.25...3*	–
	Three-phase 200…240 V (kW/*HP*)	0.18…4/*0.25...5*	0.75…30/*1...40*
	Three-phase 380...415 V (kW/*HP*)	–	–
	Three-phase 380...440 V (kW/*HP*)	–	–
	Three-phase 380…480 V (kW/*HP*)	–	0.75…75/*1...100*
	Three-phase 380…500 V (kW/*HP*)	–	–
	Three-phase 525…600 V (kW/*HP*)	–	–
Degree of protection		IP 20	IP 21
Type of cooling		Heatsink or base plate	Heatsink
Drive system	Output frequency	0.1…400 Hz	0.5…200 Hz
	Type of control – Asynchronous motor	■ Standard (voltage/frequency), ■ Performance (sensorless flux vector control), ■ Pump/fan (Kn^2 quadratic ratio)	■ Sensorless flux vector control, ■ Voltage/frequency ratio (2 points), ■ Energy saving ratio
	Synchronous motor	–	–
	Transient overtorque	150…170% of the nominal motor torque	120% of the nominal motor torque
Functions (number)		40	50
Safety functions	Integrated	–	–
	Available as an option	–	–
Number of preset speeds		8	7
Number of I/O	Analog inputs	1	2
	Logic inputs	4	3
	Analog outputs	1	1
	Logic outputs	1	–
	Relay outputs	1	2
Communication	Integrated	Modbus	Modbus, METASYS N2, APOGEE FLN, BACnet
	Available as an option	–	LonWorks
Dialog tools		IP 54 or IP 65 remote terminal	IP 54 or IP 65 remote graphic display terminal
Configuration	Setup software	SoMove software	PCSoft for Altivar 212
	Configuration tools	Simple Loader, Multi-Loader *(1)*	Multi-Loader *(1)*
Standards and certifications		IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, categories C1 to C3)	IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, categories C1 with option to C3)
		CE, UL, CSA, C-Tick, NOM, GOST	EN 55011: Group 1, class A and class B with option card. CE, UL, CSA, C-Tick, NOM
Variable speed drive range		**Altivar 12**	**Altivar 212**
Catalog number		**DIA2ED2130101EN**	**DIA2ED2101102EN**

Application		Variable speed drives designed for Original Equipment Manufacturers (OEMs) ■ For simple and advanced machines	Ready-to-order drives and custom engineered drives focused on fluids management processing and energy saving ■ For pumps, suction, dosing, odour control ■ For ventilation, aeration and sludge removal ■ For drying fan
			
Power range for 50…60 Hz (kW/*HP*) line supply		**0.18…15/*0.25... 20***	**0.75...315/*1...500***
	Single-phase 100…120 V (kW/*HP*)	0.18...2.2/*0.25...3* (ATV320●●●●●C), 0.18...2.2/*0.25...3* (ATV320●●●●●B)	–
	Single-phase 200…240 V (kW/*HP*)	–	–
	Three-phase 200…240 V (kW/*HP*)	0.18…15/*0.25…20* (ATV320●●●●●C),	0.75...75/*1...100*
	Three-phase 380...415 V (kW/*HP*)	–	90…800/ *120.69… 1072.8*
	Three-phase 380...440 V (kW/*HP*)	–	110...315/*150...500*
	Three-phase 380…480 V (kW/*HP*)	–	0.75...90/*1...125 or* 0.75...315/*1...500*
	Three-phase 380…500 V (kW/*HP*)	0.37…4/*0.5…5* (ATV320●●●●●C), 0.37…15/*0.5…20* (ATV320●●●●●B)	–
	Three-phase 525…600 V (kW/*HP*)	0.75…15/*1…20* (ATV320●●●●●C)	–
Degree of protection		IP20	IP 21/UL Type 1 and IP 55
Type of cooling		Fan	Fan (wall mounting drives) / System with two separate air flows (floor standing drives)
Drive system	Output frequency	0.1…599 Hz	0.1...500 Hz
	Type of control – Asynchronous motor	■ U/F ratio (2 points, 5 points, energy saving, quadratic), ■ Flux vector control without sensor (Standard and Energy saving)	■ Standard constant torque, ■ Variable standard torque, ■ Optimized torque mode
	Synchronous motor	Vector control without sensor	Permanent magnet motor
	Transient overtorque	–	–
Functions (number)		–	11
Safety functions	Integrated	5: STO (Safe Torque Off), up to SIL3 / PLe, SLS (Safely-Limited Speed), SS1 (Safe Stop 1), SMS (Safe Maximum Speed), GDL (Guard Door Lock)	2: STO (Safe Torque Off)
	Available as an option	–	–
Number of preset speeds		16	16
Number of I/O	Analog inputs	3	3 Configurable
	Logic inputs	6	6
	Analog outputs	1	2: Configurable as voltage
	Logic outputs	1	–
	Relay outputs	2	3 (optional)
Communication	Integrated	CANopen and Modbus Serial line	Ethernet, Modbus/TCP, Modbus serial link
	Available as an option	Ethernet IP and Modbus TCP, CANopen RJ45 Daisy Chain, PROFINET, Profibus DP V1, EtherCAT, and DeviceNet	EtherNet/IP and Modbus/TCP, ProfiNet, CANopen , Profibus DP V1, and DeviceNet
Dialog tools		IP 65 remote graphic display terminal	IP 65 remote graphic display terminal
Configuration	Setup software	SoMove software	SoMove software
	Configuration tools	Multi-Loader *(1)*	Multi-Loader *(1)*
Standards and certifications		IEC 61800-5-1, IEC 61800-3 (environments 1 and 2, category C2), UL 508C, EN 954-1 category 3, ISO/EN 13849-1/- 2 category 3 (PL e), IEC 61508 (parts 1 & 2) SIL 2 level, draft standard EN 50495E IEC 60721-3-3, classes 3C3 and 3S2	EN/IEC 61800-3, EN/IEC 61800-3 environment 1 category C2, EN/IEC 61800-3 environment 2 category C3, EN/IEC 61800-5-1, IEC 61000-3-12, IEC 60721-3, IEC 61508
		CE, UL, CSA, RCM, EAC, ATEX	ATEX INERIS, DNV-GL, ATEX zone 2/22, TÜV, REACH, CSA, UL 508C
Variable speed drive range		**Altivar Machine ATV320**	**Altivar Process ATV600**
Catalog number		**DIA2ED2160311EN**	**DIA2ED2140502EN**

(1) The Simple Loader tool enables one powered-up drive's configuration to be duplicated on another powered-up drive.
The Multi-Loader tool enables configurations from a PC or drive to be copied and duplicated on another drive; the drives do not need to be powered up.

More information on Variable speed drives, Please visit our web site www.schneider-electric.com to download the catalog.

Related products
Soft starters for asynchronous and synchronous motors

Application		Soft starter	Soft start/soft stop unit	Soft start/soft stop unit
		For conveyors, conveyor belts, pumps, fans, compressors, automatic doors, small gantries, belt-driven machines, etc.		For centrifugal pumps, piston pumps, fans, screw compressors, conveyors, agitators, mixers, centrifugal machines, etc.
				
Power range for 50…60 Hz (kW/Hp) line supply		**0.37…11/ *0.5...15***	**0.75…15/ *1...20***	**4…400/*5...536***
	Single-phase 110…230 V (kW/*HP*)	0.37…2.2/ 0.5…3	–	–
	Three-phase 200…240 V (kW/*HP*)	–	0.75…7.5 / *1...10*	–
	Three-phase 200…480 V (kW/*HP*)	0.37…11/ *0.5...15*	–	–
	Three-phase 208…600 V (kW/*HP*)	–	–	4…400/ *5...536*
	Three-phase 208…690 V (kW/*HP*)	–	–	–
	Three-phase 230…415 V (kW/*HP*)	–	–	–
	Three-phase 230…440 V (kW/*HP*)	–	–	4…355/*5...476*
	Three-phase 380…415 V (kW/*HP*)	–	1.5…15/ *2..20*	–
Degree of protection		IP 20		
Drive system	Number of controlled phases	1	2	3
	Type of control	–	–	Configurable voltage ramp
	Operating cycle	–		Standard
Functions (number)		1 Bypass (integrated)		
Safety functions	Integrated	–		
	Available as an option	–		
Number of preset speeds		–		
Number of I/O	Analog inputs	–		1 PTC probe
	Logic inputs	–		3
	Analog outputs	–		–
	Logic outputs	–		–
	Relay outputs	–		2 (CO)
Communication	Integrated	–		Modbus
	Available as an option	–		–
Dialog tools		–		Remote display terminal (option)
Configuration	Setup software	–		SoMove
Standards		IEC/EN 60947-4-2		IEC/EN 60947-4-2, EMC class A
Certifications		CE, UL, CSA, C-Tick, CCC		CE, UL, CSA, C-Tick, GOST, CCC
Type of soft starter		**ATS01N1**	**ATS01N2**	**ATS22**
Catalog number		**DIA2ED2140603EN**	**DIA2ED2140606EN**	**DIA2ED2140604EN**

More information on Soft starters, Please visit our web site www.schneider-electric.com to download the catalog.

Related products
Control panel technical guide

Control panel technical guide for HVAC & R equipment

The guide that can help you optimize your motor starter solutions

Why this guide?
This technical guide has been specially designed to assist customers in the selection of the appropriate contactor-based motor starter solutions for their installation of HVAC & R equipment.
2 kind of solutions are involved:
> “standard” solutions for general purpose applications
> “HVAC & R adapted” solutions for definite purpose applications
Each solution of this guide combines:
> thermal magnetic protection
> control by contactors

For which applications?
This 24-page guide is intended for 3 types of application:
> compressors
> fans
> pumps

How can we help you?
This guide includes a table containing information on how to:
> Select your HVAC & R machine
> Find the motors that should be embedded
> Access the corresponding motor starters selection pages

Availability of How to select the appropriate motor starter for your HVAC & R equipment: you will find this document (n° CPTG007_EN) in PDF format available to download from our website www.schneider-electric.com

Related products
Regulated switch mode power supplies and function modules

Applications	Regulated switch mode power supplies		Function modules *Only compatible with Phaseo ABL8RP/ABL8WPS (Universal) power supplies*			
	ABL8MEM/ABL7RM (Modular): 7 to 60 W - Mounting on rail **ABL8REM/ABL7RP (Optimum): 60 to 144 W - Mounting on rail**	**ABL8RP/ABL8WP (Universal): 72 to 960 W - Wide input voltage range. Mounting on rail**	**ABL8DCC: converter modules ⎓ 24 V/⎓ 5-12 V**	**ABL8B: solutions to microbreaks and power outages**	**ABL8RED24400 : redundancy solution**	**ABL8PRP24100: solution for discriminating protection of the application**
						
Input voltage	100...240 V ∼ 120...250 V ⎓	100...120 V ∼ and 200...500 V ∼ *(3)*	380...500 V ∼	24 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
Connection to world-wide line supplies United States - 120 V (in phase-to-neutral) - 240 V (in phase-to-phase)	Single-phase (N-L1) or 2-phase (L1-L2) connection	Single-phase (N-L1) or 2-phase (L1-L2) connection	–	–	–	–
Europe - 230 V (in phase-to-neutral) - 400 V (in phase-to-phase)	Single-phase (N-L1) connection		3-phase (L1-L2-L3) connection	–	–	–	–
United States - 277 V (in phase-to-neutral) - 480 V (in phase-to-phase)	–		3-phase (L1-L2-L3) connection	–	–	–	–
Certifications	CE marking, UL (508), CSA (60950-1), EAC, RCM, TÜV, KC *(1)*	CE marking, UL (508), CSA (60950-1), CB Scheme, EAC, RCM, TÜV, KC *(1)*	CE marking, UL (508), CSA (60950-1), EAC, RCM *(1)*			
Conformity to standards	EN 60950-1, EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 61000-6-3, EN 55022, EN 55024 *(2)*	EN 60950-1, EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 61000-6-3, EN 55022, EN 55024 *(2)*	EN 60950-1, EN 61000-6-2, EN 61000-6-3, EN 55022, EN 55024 *(2)*			
IEC/EN 61000-3-2 conformity	Yes for ABL7RP, not for ABL8REM and not applicable for ABL8MEM and ABL7RM	Yes	–	–	–	–
Protection against undervoltage	Yes	Yes	–	–	–	–
Protection against overloads and short-circuits	Yes, voltage detection. Automatic restart on elimination on the fault	Yes, current limitation or undervoltage detection	Yes, current limitation	–	–	–
Diagnostic relay	–	Yes, depending on model	Yes, depending on model	Yes	Yes	–
Compatibility with function modules	–	Yes with buffer module, battery and battery control modules, redundancy module and discriminating downstream protection module	Yes with buffer module, battery and battery control modules, redundancy module and discriminating downstream protection module	–	–	–
with power supplies	–	–	ABL8RP/ABL8WP (Universal)			
Power reserve (Boost)	1,25 to 1,4 In during 1 minute, depending on model (with ABL8MEM) — No	1,5 In during 4 secondes	No	–	–	–

power supplies references	Output voltage											
	5 V ⎓	12 V ⎓	24 V ⎓	48 V ⎓	24 V ⎓	5 V ⎓	7...12 V ⎓	24 V ⎓	24 V ⎓	24 V ⎓
Output current										
0.3 A			ABL8MEM24003							
0.6 A			ABL8MEM24006							
1.2 A			ABL8MEM24012							
2 A		ABL8MEM12020					ABL8DCC12020			
2.5 A			ABL7RM24025	ABL7RP4803						
3 A			ABL8REM24030		ABL8RPS24030					
4 A	ABL8MEM05040									
5 A		ABL7RP1205	ABL8REM24050		ABL8RPS24050					
6 A						ABL8DCC05060				
10 A					ABL8RPS24100					ABL8PRP24100
20 A					ABL8RPM24200	ABL8WPS24200			ABL8BBU24200	ABL8RED24400	
40 A						ABL8WPS24400			ABL8BUF24400 ABL8BBU24400	2x ABL8RED24400	
Catalog number	DIA3ED2170401EN				DIA3ED2170401EN					

(1) Please consult detail on certifications for each reference in the individual data sheet, see on our web site www.schneider-electric.com
(2) Please consult detail on conformity to standards for each reference in the individual data sheet, see on our web site www.schneider-electric.com
(3) Except **ABL8RPM24200**. ∼ 100...120 V and ∼ 200...240 V.

More information on Phaseo power supplies, Please visit our web site www.schneider-electric.com to download the catalog.

Related products

Motor starter solutions with 1, 2, or 3 products

	1-product solution	2-product solution	3-product solution
Advantages	■ Simple manual motor starter ■ Fast wiring ■ Compact size	■ Conventional solution for pushbutton or automated motor control ■ Easy maintenance (contactor replacement) ■ Broad offer (e.g. connections, motor rating, etc.)	■ Advanced motor protection provided by dedicated components ■ Easy maintenance (selective replacement) ■ Broad offer (e.g. protection type, etc.)
Separate components	**Motor circuit breaker** Up to 115 kW: GV2 / GV3 / GV4 / GV7	**Motor circuit breaker** GV2 and Compact NSX / GV3 / **GV4** / GV7 **+ Contactor** Up to 110 kW: LC1K / LC1 D / LC1 D / LC1F and LC1B	**Magnetic circuit breaker** GV2 / GV3 / **GV4** / Compact NSX **+ Contactor** LC1K / LC1 D / LC1 D / LC1F and LC1B **+ Thermal relay** — **Controller** LRD / LTM / LTM / LUTM Up to 110 kW: LR2K **Fused disconnect switch** GS2 **+ Contactor** LC1K / LC1 D / LC1F and LC1B **+ Thermal relay** — **Controller** LRD / LTM / LUTM Up to 560 kW: LR2K
Pre-assembled: Ready to incorporate in the panel	-	**Pre-assembled:** Ready to incorporate Pre-assembled motor circuit breaker + contactor Up to 15 kW: GV2ME●●K1●● or GV2DP	-
Enclosed: Ready to mount on the machine	**Enclosed:** Ready to mount V●F / VCFN / V●FY — Up to 45 kW GV2MC / GV2MP / GV2PC / GV3PC — Up to 30 kW	**Enclosed:** Ready to mount GV2ME / LE1M — Up to 37 kW LE1D	**All in one:** TeSys U Up to 33 kW: LUB12, LUB32 **Basic to extended functionalities** ● Short circuit, overload protection ● Overload indication and alerts ● Status, remote control via communication bus **Advantages** ● Fast wiring ● Compact motor starter ● Flexibility: last minute customization ● Electrical coordination

More information on Motor starter solutions, Please visit our web site www.schneider-electric.com

Compliant standards

Legends

Switch-disconnector — *Thermal relay* — *Circuit breaker with short-circuit protection* — *Fuse switch-disconnector* — *Circuit breaker with short-circuit and overload protection* — *Relay, contactor*

Related products
Short-circuit and overload protection

Applications		**DC circuit protection and disconnection: DC power supplies, generators, batteries, etc.**		**AC circuit protection and disconnection of machines, lectrical distribution in buildings**		**Protection and disconnection of electrical circuits**	**Protection of operators against electrical shocks in event of direct or indirect contact with live equipment**	**Protection of operators against electrical shocks in event of direct or indirect contact with live equipment**	**Protection of operators against electrical shocks in event of direct or indirect contact with live equipment**	**Protection of sensitive equipment against voltage surges due to lightning, high power switching, etc.**
								 	
Description		Miniature circuit breaker	Miniature circuit breaker	Miniature circuit breaker	Miniature circuit breaker	Fuse holder	RCBO (3)	RCBO (3)	RCCB (4)	Surge arrester
Characteristics	**Voltage**	60 V DC/pole	250 V DC/pole	230/400 V AC		500 V AC	690 V AC	230/400 V AC		
	Number of poles	1 or 2		1, 2, 3, and 4		–		1P+N	2, 3, and 4P	
	Nominal current (A)	1 to 63			63 to 125	25	32	50	25	6 to 32		25 to 63	–
						8 x 32 mm (*0.32 x 1.26 in.*)	10 x 38 mm (*0.39 x 1.5 in.*)	14 x 51 mm (*0.5 x 2 in.*)	22 x 58 mm (*0.87 x 2.28 in.*)				
	Breaking capacity (kA)	6		10		20	120			–	–	–	20
	Load type/Tripping curve *(1)*	B, C, D	C	B, C, D		–				C class A 30 or 300 mA		C class A 30 or 300 mA	Type 2
	Width	18 mm (*0.71 in.*)/pole			27 mm (*1.07 in.*)/ pole	–				36 mm (*1.42 in.*)	27 to 63 mm (*1.06 x 2.48 in.*)	36 to 72 mm (*1.42 x 2.84 in.*)	72 to 120 mm (*2.84 x 4.72 in.*)
Product reference	**IEC**	**Acti 9 iC60N**	**Acti 9 C60H-DC**	**Acti 9 iC60N**	**Acti 9 C120N**	**–**		**Acti 9 DPN Vigi**	**Acti 9 Vigi iC60 blocks (2)**	**Acti 9 RCCB ID**	**Quick PRD 20r**
	IEC/UL	**Multi 9 C60N**	**Multi 9 C60H-DC**	**Multi 9 C60N**	**–**	**TeSys DF8**	**TeSys DF10**	**TeSys DF14**	**TeSys DF22**	**–**	**–**	**Multi9 GFP**	**–**

(1) Tripping curve:
B (3 In < Im < 5 In) standard
C (5 In < Im < 10 In) inrush current
D (10 In < Im < 14 In) electronics or long cable length

More information on Short-circuit and overload protection, Please visit our web site www.schneider-electric.com

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Related products
Incoming protection and switching

Applications	On-load switching of motors, resistive and inductive loads	Control and disconnection of electrical distribution circuits	Protection and switching of motors	Protection in industrial and tertiary applications	Feeder protection and circuit disconnection for multistandard motor circuit design	Power circuit protection and disconnection in industrial, infrastructure, and building applications	Feeder protection and circuit disconnect solutions, when a Multistandard approach for one global design machines is needed
							
Description	Switch disconnectors Rotary switch with fully visible breaking	Switch disconnectors	Fuse switch disconnector	Circuit breakers	Molded case circuit breakers with optional embedded communication and metering possibilities		Molded-case circuit breaker solution in a compact frame size
Isolation and disconnection	☑	☑	☑	☑	☑	☑	☑
Protection	–	–	☑	☑	☑	☑	☑
Characteristics Rated operational current (A)	12 to 175 A	40 to 2,500 A	32 to 1,250 A	10 to 125 A	15 to 600 A	16 to 3,200 A	15 to 125 A
Number of poles	3 to 6 poles	3 and 4 poles	3 and 4 poles				1, 2, 3 and 4 poles
Short-circuit making capacity (kA)	0.5 to 3 kA at 400 V Icm	50 to 220 kA at 400 V Icm	5 to 90 kA at 400 V Icm	10 to 50 kA at 400 V Icm	18 to 65 kA at 400 V Icm	25 to 150 kA at 400 V Icm	18, 35, and 65 kA at 480 V
Product name	V	INS	GS	NG125	NH, NJ, NL	NSX/NS	BD, BG, BJ
Embedded metering	–	–	–	–	Micrologic metering adapters		–
Standards and certifications	IEC 60947-3 UL508	IEC 60947-3 UL508	IEC 60947-3	IEC 60947-2	IEC 60947-2 UL508	IEC 60947-2	UL listed, CSA, IEC, CCC, and EAC
Product range	**TeSys Vario**	**Compact INS**	**TeSys GS**	**Acti 9 NG 125**	**PowerPact Multistandard**	**Compact NSXm**	**PowerPact B Multistandard**

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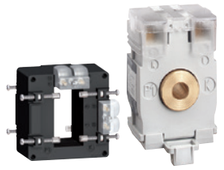
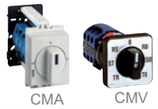
More information on Incoming protection and switching, Please visit our web site www.schneider-electric.com

Related products
Indication and metering

Applications	Current transformers	Basic meters		Basic energy meters	Basic multi-function metering		
	Current sensor: the current value is converted into a 0 to 5 A scale. To be used with ammeter, power meter, energy metering	Display of simple electrical values, volts, or amps Meters for mounting on DIN rails	Display of simple electrical values, volts, or amps Meters for mounting on front panels	Recording and display of energy consumption The meters are mounted on a DIN rail	Simple indication of the current passing through a Compact NSX circuit breaker	Full indication of electrical values and energy metering of a circuit protected by a Compact NSX circuit breaker	Full indication of electrical values and energy metering of a circuit
									
Description	Current transformers	Voltmeter Ammeter	Voltmeter Ammeter	Kilowatt-hour meters	Kilowatt-hour meters	Kilowatt-hour meters	Ammeter	Power meter	Metering & sub-metering Class 0.5S IEC 62053-22 Class 1 IEC 62053-21 Class 2 IEC 62053-23	Metering & sub-metering Class 0.5S IEC 62053-22 Class 0.2S (PM55●●) IEC 62053-22 Class 1/2 IEC 62053-24
Electrical indications	–	I / U	I / U	E			I	I, U, F, P, Q, S, PF, E	I, U, F, P, Q, S, PF, E (Power demand and current demand)	I, U, F, P, Q, S, PF, E (Power demand and current demand)
Characteristics Measurement accuracy	Class 0.5 to 3	Class 1.5	Class 1.5	Class 1			Current: Class 1	Current: Class 1 Voltage: 0.5% Power: Class 2	Class 0.5	Class 0.2S (PM55●●) Class 0.5S
Installation	On conductor (cable, bar, etc.) Double terminal blocks on type D provide alternative cabling possibility	DIN rail 4 x 18 mm (*0.16 X 0.71 in.*) modules	Flush-mounted 72 x 72 mm (*2.84 x 2.84 in.*)/ 96 x 96 mm (*3.78 x 3.78 in.*)	DIN rail 1.2 or 4 x 18 mm (*0.05 or 0.16 x 0.71 in.*) modules			Embedded into circuit breaker, remote LCD display available	Embedded into circuit breaker, remote LCD display available	DIN rail	Flush-mounted 96 mm x 96 mm
Voltage measurement	Maximum rated operational voltage: 720 V AC	VLT: 500 V AC direct or external VT	VLT: 500 V AC direct or external VT	400 V AC direct				690 V AC	50 V to 330 V AC (Ph-N) 80 V to 570 V AC (Ph-Ph) up to 1 MV AC (ext. VT)	20 V L-N/35 V L-L to 277 V L-N/480 V L-L/ 600 V L-L
Current measurement	Ranges from 40/5 A to 6,000/5 A	AMP: 30 A direct or external CT	AMP: external CT	40 to 63 A direct or external CT			0.2 x In...1.2 x In of circuit breaker	0.2 x In...1.2 x In of circuit breaker	External CT	External CT
Communication ports	–	–	–	–			1	1	1	2
I/O	–	–	–	–			–	–	–	4 I/O 6 I/O (PM55●●)
Memory capacity	–	–	–	–			–	–	–	256 KB 1.1 MB (PM55●●)
Product range	**CT**	**iVLT iAMP**	**VLT AMP**	**iEM2000 iEM2010 IEM2000T**	**iME1**	**iEM3000 Series**	**Micrologic A trip unit**	**Micrologic E trip unit**	**PM3200 PM3210 PM3250 PM3255**	**PM5100 PM5300 PM5500**

More information on Indication and metering, Please visit our web site www.schneider-electric.com

Selector switches for ammeter and voltmeter



CMA CMV

- DIN rail/panel mounted 48x48

EcoStruxure™ Power Monitoring Expert 8.2

Power management software EcoStruxure™ Power Monitoring Expert helps maximize system reliability and optimize operational efficiency to increase your profitability

Benefits

Power Monitoring Expert software is a complete, interoperable, and scalable software dedicated to power management that enables you to:

- Improve operational efficiency
- Reduce energy-related costs
- Ensure electrical network reliability and reduce downtime
- Optimize equipment utilization and the cost of operations

Chapter 7

Product reference index

Technical data relating to products listed in this chapter is available on line at www.schneider-electric.com/modicon-m171-m172

Product reference index

Product reference index

Modicon M171/M172 logic controllers for HVAC solutions

www.schneider-electric.com/Machine control solutions

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