WALL-MOUNTED CONTROL SYSTEM

Electronic control system capable of controlling 2 heating circuits, a DHW circuit and an auxiliary circuit

DIMENSIONS
Length: 320 mm
Height: 260 mm
Depth: 130 mm

POWER SUPPLY
230 V, 50 Hz, 6 A

PROTECTION RATING
IP 21
The DIEMATIC VM iSystem control system comes in the form of a compact wall-mounted box (L 320 mm, H 260 mm, D 130 mm) with low voltage (230 V) and very low voltage (< 24 V) electrical connection zones.

The waterproof ABS box (IP 21) is fitted with a transparent polycarbonate flap, which can be locked (using a screwdriver), that allows the readout of various parameters on the display unit. This box can be mounted on the wall (drilling template attached), on the front of a control cabinet or integrated inside the cabinet. The electrical connections are made from underneath (the holes for the wires are pushed out and the cable glands are provided).

The DIEMATIC VM iSystem control system is delivered without sensors and must therefore be completed with the appropriate accessories for the type of installation concerned (see page 11). As standard, the DIEMATIC VM iSystem control system can be used to control two hydraulic circuits, a DHW circuit and an auxiliary circuit.

Depending on the user’s preferences, each of the 2 hydraulic circuits can be used as:
- A heating circuit fitted with a motorised 3-way valve;
- A direct heating circuit;
- A swimming pool circuit.

The DIEMATIC VM iSystem control system can operate:
- Fully autonomously (see page 3)
- By communicating with other generators (cascade) via the Modbus or OpenTherm protocols (see page 5)

The DIEMATIC VM iSystem control system can be used alone (autonomous) or as part of a network (several VM iSystem control systems interconnected by a bus). It is compatible with DIEMATIC 3, m3 and iSystem control systems and can also be used with any kind of generator equipped with an OpenTherm interface or an ON/OFF (0/1) control.

Each DIEMATIC VM iSystem control system has to be configured according to:
- The type of installation to be created (number and type of generators, number and type of circuits to be managed);
- The type of existing installation as part of an extension (number and type of generators and control systems, number and type of circuits to be added).

The choice of configuration mode is made in the «installer» navigation menu before commissioning the installation.

Each DIEMATIC VM iSystem control system can manage up to 2 circuits with 3-way valve, a DHW circuit and can be fitted with 2 remote controls. It also has an AUX outlet that can be used to:
- Control the load pump on a second DHW circuit;
- Control the DHW loop pump;
- Control a primary pump (connected to the VM);
- Be used as an alarm transfer;
- Be used as an ON/OFF control.
PRESENTATION OF THE DIEMATIC VM iSYSTEM CONTROL SYSTEM

**DIEMATIC VM iSystem AUTONOMOUS CONTROL SYSTEM(S)**

The DIEMATIC VM iSystem control system can be used for the autonomous control:
- Of additional secondary circuits as part of an installation extension;
- Of a boiler with the AUX outlet for ON/OFF (0/1) control;
- Of secondary circuits as part of a sub-station.

In all cases, it should be fitted with an outside sensor (package FM 46). It is possible to interconnect up to 20 DIEMATIC VM iSystem control systems by means of a BUS cable. Each of the control systems can be equipped with 2 remote controls.

### Application scenario

<table>
<thead>
<tr>
<th>Principle</th>
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<tbody>
<tr>
<td>No management of the primary circuit</td>
</tr>
<tr>
<td>Management of a boiler with the AUX outlet for 0/1 control possible</td>
</tr>
<tr>
<td>Management of 2 circuits: direct or with mixing valve (circuits B and C) and 1 DHW circuit</td>
</tr>
<tr>
<td>Requires an outside sensor</td>
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<tr>
<td>Up to 2 remote controls per control system</td>
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</tbody>
</table>

### Operating principle

The DIEMATIC VM iSystem control system manages 1 underfloor heating circuit according to the outside temperature, a low temperature circuit and DHW production.

The DIEMATIC VM iSystem control system manages the boiler, via the 0/1 control, according to demand. It also manages the 2 heating circuits and the DHW circuit.
PRESENTATION OF THE DIEMATIC VM iSystem CONTROL SYSTEM

DIEMATIC VM iSystem AUTONOMOUS CONTROL SYSTEM(s) (CONTD)

Operating principle

The DIEMATIC VM iSystem control system is used as part of a sub-station. It manages the 2 circuits connected according to the outside temperature in a totally independent manner.

DIEMATIC VM iSystem CONTROL SYSTEMS COMMUNICATING WITH GENERATORS

The DIEMATIC VM iSystem control system can communicate with:
- A boiler or a cascade of boilers equipped with a DIEMATIC 3, m3 or iSystem control system via the Modbus protocol.
- A generator or a cascade of generators equipped with an OpenTherm (OT) interface.

Communication with boilers equipped with DIEMATIC 3, m3, iSystem control system (see page 5)

The DIEMATIC VM iSystem control system can be linked to a boiler equipped with a DIEMATIC 3, m3 or iSystem control panel via a BUS cable.

In a cascade of generators equipped with DIEMATIC 3, m3 or iSystem, the DIEMATIC VM iSystem control system is under the control of the master generator. Depending on the configuration of the installation, it is possible to interconnect up to 20 DIEMATIC VM iSystem control systems by means of a BUS cable.

Communication with boilers equipped with an OpenTherm connection (see page 6)

The DIEMATIC VM iSystem control system can be connected to a generator equipped with the OT (OpenTherm) interface to manage it according to needs and the outside temperature.

When it is used as part of a cascade, each of the boilers should be equipped with an interface (package AD 286 or AD 287) available as an option.
PRESENTATION OF THE DIEMATIC VM iSystem CONTROL SYSTEM

DIEMATIC VM iSystem CONTROL SYSTEMS COMMUNICATING WITH GENERATORS (CONTD)

DIEMATIC VM iSystem alone or as part of a network in a cascade of boilers with DIEMATIC 3, m3 or iSystem control system

Application scenario
- Management of 2 circuits: direct or with mixing valve (circuits B and C) and 1 DHW circuit
- Optional outside sensor
- Networking of 1 to 20 DIEMATIC VM iSystem control systems with 1 to 10 generators equipped with a DIEMATIC
- AUX outlet
- Up to 2 remote controls per control system

Operating principle
The DIEMATIC iSystem control system on the master boiler manages the DIEMATIC VM iSystem control system(s) via the BUS connection. The DIEMATIC VM iSystem control systems used in the installation are linked to each other by a BUS cable and each of them can manage 2 heating circuits with 3-way valve and a DHW circuit (in the second part of the example, the control system manages a swimming pool and a DHW tank).

Operating principle
The DIEMATIC m3 control panel on the master boiler manages the DIEMATIC VM iSystem control system via a BUS cable. The latter manages 2 heating circuits with 3-way valve.
## PRESENTATION OF THE DIEMATIC VM iSystem CONTROL SYSTEM

### DIEMATIC VM iSystem CONTROL SYSTEMS COMMUNICATING WITH GENERATORS (CONTD)

**DIEMATIC VM iSystem alone or as part of a network with a single boiler or a cascade of boilers equipped with an OpenTherm (OT) interface**

### Application scenario | Principle
| • Management of the boiler on ON/OFF or OT according to the outside temperature | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)
| • Management of 2 circuits: direct or with mixing valve (circuits B and C) and 1 DHW circuit | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)
| • Outside sensor required | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)
| • Networking of 1 to 20 OpenTherm VM iSystem control systems with 1 to 10 generators equipped with OpenTherm | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)
| • AUX outlet | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)
| • Up to 2 remote controls per control system | ![Diagram of DIEMATIC VM iSystem control systems communicating with generators](image)

### Operating principle

A network with 2 DIEMATIC VM iSystem control systems is managed in a cascade of boilers, each equipped with an OpenTherm (OT) interface. The first DIEMATIC VM iSystem control system manages the first boiler, a DHW circuit and 2 heating circuits with a 3-way valve. The second control system manages the other boilers through the AD 286 connection interface and 2 heating circuits with 3-way valve.
TECHNICAL SPECIFICATIONS

INFORMATION EXCHANGED BETWEEN DIEMATIC VM iSystem CONTROL SYSTEMS

- Between interconnected DIEMATIC VM iSystem
  The information exchanged between interconnected DIEMATIC VM iSystem control systems is:
  - The outside temperature: a single sensor may be sufficient for all of the control systems;
  - The date and time data.

- Between DIEMATIC VM iSystem and DIEMATIC..., DIEMATIC iSystem control panels
  In addition to the parameters above, the actual thermal needs are communicated at all times to the control system on the primary loop (DIEMATIC... control panel).

- Network
  A network can include up to 20 DIEMATIC VM iSystem control systems and, in this case, command up to 40 hydraulic circuits (heating circuits by motorised 3-way valve, direct circuits, primary circuits for DHW preparation, auxiliary circuits).

INSTALLATION OF DIEMATIC VM iSystem CONTROL SYSTEMS

All interconnected control systems must be installed in the same building. Should this not be the case, the following special provisions must be made:

Length of the BUS
- The length of the BUS must not exceed 1200 m.

Type of cable
- The connection of DIEMATIC VM iSystem control systems must be made with AD 123, AD 124 and DB 119 connecting cables available as options.

Fitting the cable
- If the connecting cable is installed in a pipe or cable way without electrical continuity, it will be necessary to affix the connecting cable to a copper cable with a minimum cross-section of 16 mm² connected to the earth at both ends.

Equipotentiality of the earth terminals
- The earth terminals in the building must be interconnected for reasons of electrical safety and compliance with regulations.

Surge suppressor
- It will be necessary to equip the connecting cable with an RS 485 line lightning conductor at each point of exit from the building.
- It will be necessary to equip the electrical power supply on each control system with a mains lightning conductor. If a telephone transmitter is used, it will be necessary to equip it with a mains lightning conductor and a lightning conductor for the telephone line.
The DIEMATIC VM iSystem control system module is particularly easy to use. Particularly owing to its large conversational display unit, backlight, it establishes a dialogue with the user by means of drop-down menus to guide him in the choice of readouts or settings that he wishes to make. Navigation between the drop-down menus is quite straightforward thanks to a rotary button. The display unit converses in plain text and, at all times, provides information on the time, the day, the various temperatures in the installation, the outside air temperature and the status of the various components in the installation (valves, pumps, etc.). For the sake of simplification, the display unit is able to recognise which circuits are actually connected and ignore those not in use.

The display unit enables 3 levels of navigation:
- A user level: accessible to the end user who can modify certain parameters regarding the temperatures in the various operating modes and the programming for the various comfort periods…
- An installer level: accessible only to the installer. The latter can use this to set the configuration of the various parameters of the installation.
- An After Sales Service level: accessible only to the installer.

Pre-programmed and set (date, day, time) in the factory, DIEMATIC VM iSystem comes ready to operate. Four different weekly programmes are memorised. Each programme can be selected directly from a drop-down menu. If, out of these 4 options, none is suitable, 4th programme can be very easily customised according to the user’s wishes.

Presentation of the DIEMATIC iSystem control panel

- Temperature setting key (heating, DHW, swimming pool)
- Operating mode selection key for heating and DHW, Summer, winter, Auto according to programming, day, night, holidays, manual
- Mode display (comfort, reduced, holidays, manual, Auto)
- Forced load key for DHW production
- Access installer and After Sales Service level
- Display unit backlight in comfort mode
- Graphic bar indicating the current programme for the circuit displayed
  - Black: comfort mode
  - Light: reduced mode
- Day/time display
- Display of the programme selected
- Rotary and push setting button:
  - By turning it, you can scroll down the menu or modify a value
  - By pressing it, you can confirm a selection or value modification

Keys:
- To access the various menus or parameters
- For programming, reset, which vary as selections are made
The DIEMATIC VM iSystem control system manages up to 2 hydraulic circuits (circuit with motorised 3-way valve, direct circuit) and an auxiliary circuit by activating the pumps and, where applicable, the mixing valve(s). Connection of a room temperature sensor enables the auto-adaptability of the heating curve and correction of the room temperature on each circuit. The control system includes:
- Automatic summer/winter switching (setting balance point with anti-clogging function on the pumps; optional forced summer mode with this function.
- An «installation antifreeze» function activated regardless of the operating mode.
- «Anti-legionella» protection for the domestic hot water circuit(s).

Below are the programming details for heating «comfort» mode in the various programmes:
P1: 6 h to 22 h every day
P2: 4 h to 21 h every day (e.g.: underfloor heating)
P3: 5 h to 8 h and 16 h to 22 h from Monday to Friday, 7 h to 23 h on Saturday and Sunday
P4: 6 h to 8 h then 11 h to 13.30 h then 16 h to 2 h from Monday to Friday, 6 h to 23 h on Saturday and 7 h to 23 h on Sunday

The clock power reserve is 2 years. After 2 years without current, only the time on the clock has to be corrected. All other values, including the programming, are saved in the memory.

Depending on the various options, circuits and corresponding sensors actually connected, the values measured by the control system can be displayed in the «MEASUREMENTS» menu:
- Outside temperature
- Room temperature on circuits B and C
- Water temperature in the DHW tank
- Water temperature in the storage tank
- Water temperature in the swimming pool on circuits B and C
- Water flow temperature on circuits B and C
- Water temperature system flow if multi-generator
- Temperature of the hot water produced by solar power

The DIEMATIC VM iSystem control system has a test programme that can be used:
- To check the correct operation of all components in the installation (remote control, valve(s), pump(s), etc.);
- To read the set point values calculated by the system and factored into operation of the installation;
- To display the status of the logic inputs (other than the sensors);
- To test the interconnections and configurations.

In the event of malfunction, the module flashes and displays an error message and a corresponding code. They are recorded in a historic.
ELECTRICAL CONNECTIONS

All connections are grouped in the lower section of the box in a zone designed for this purpose. The cables are inserted into the box through various push-out inlets (cable glands provided). The electrical connections are made to clearly marked terminal boxes.

Important

The maximum current that can be switched per outlet is $I_{max} = 2Acos_{90} = 0.7 \cdot (450 \text{ W or } 0.5 \text{ HP mechanical motor})$. The inrush current must be lower than 16 A. The sensor wires (very low voltage) and those carrying 230 V must be placed in different cable ways. In all cases, a minimum spacing of 10 cm must be observed.

BUS connections

Below, a representation of the connection terminal box:

**Very low voltage connections**

- Remote control - circuit C
- Remote control - circuit B
- Radio remote control - circuits B and C
- Flow sensor on circuit C
- Flow sensor on circuit B
- System sensor
- Outside temperature sensor
- Remote vocal monitoring module
- OpenTherm

**Low voltage connections: outlet connection**

- Heating pump - circuit C
- Safety contact - circuit C
- 3-way valve - circuit C
- Heating pump - circuit B
- Safety contact - circuit B
- 3-way valve - circuit B
- DHW load pump
- DHW loop pump, burner, HP, wood-fired boiler...

* The safety contacts (CS):
  - A safety contact function, e.g. flow limiters underfloor heating, etc.
CONTROL PANEL DIEMATIC VM iSysteM OPTIONS

**DIEMATIC iSystem CONTROL PANEL OPTIONS**

**Outside temperature sensor** - Package FM 46
Connected to the control panel, it is used to regulate the heating depending on the outside temperature.

**Domestic hot water sensor** - Package AD 212
This is used for regulating the DHW temperature as a priority and programming of domestic hot water production with an independent calorifier. (The TA connector in package is not to be used).

**Outlet sensor downstream of the valve** - Package AD 199
This sensor is required to connect a circuit with mixing valve.

**Simplified remote control with room sensor** - Package FM 52
This is used from the room in which it is installed to change the set point from the DIEMATIC iSystem panel:
- It allows a +2.5/-2.5 deviation of the room T° set point. It is also used to enable the self-adaptability of the heating curve for the circuit concerned (1 remote control per circuit).

**BUS connection cable (length 12 m)** - Package AD 134
The BUS cable is used to make the connection between 2 boilers fitted with the DIEMATIC iSystem control panel in a cascade installation, as well as the connection of a DIEMATIC VM control unit or a telemetering network transmitter.

**Sensor for storage tank** - Package AD 250
Includes 1 sensor for a storage tank with a boiler fitted with a DIEMATIC iSystem control panel.

**Radio outside temperature sensor** - Package AD 251
The radio outside temperature sensor can be delivered as optional equipment for systems in which the installation of the external wire connection sensor delivered with DIEMATIC iSystem control panel would be too complex.

**Radio boiler module** - Package AD 252
In the case of the CDR D.iSystem, the data are transmitted by radio waves from the place where the CDR D.iSystem is installed to the transmitter/receiver box (package AD 252) placed close to the boiler.

**CDI D.iSystem interactive remote control** - Package AD 254
**CDR D.iSystem interactive “radio” remote control (without transmitter / receiver radio)** - Package AD 253
These are used to change heating parameters from the DIEMATIC iSystem control panel from the room in which they are installed. In addition, they enable the self-adaptability of the heating regime for the circuit concerned (1 CDI D.iSystem or CDR D.iSystem per circuit).

**Radio boiler module** - Package AD 252
In the case of the CDR D.iSystem, the data are transmitted by radio waves from the place where the CDR D.iSystem is installed to the transmitter/receiver box (package AD 252) placed close to the boiler.

**Sensor for storage tank** - Package AD 250
Includes 1 sensor for a storage tank with a boiler fitted with a DIEMATIC iSystem control panel.
Legend

3 Safety valve 3 bar
4 Pressure gauge
6 Air separator
7 Automatic air vent
8 Manual air vent
9 Isolation valve
10 3-way mixing valve
11 Electronic heating pump
11a Electronic heating pump for direct circuit
11b Electronic heating pump for circuit with mixing valve
13 Flush valve
16 Expansion tank (except MCA 35)
17 Draining valve
18 Heat circuit filling
21 Outside sensor
23 Outlet temperature sensor after mixing valve
24 Primary inlet on the DHW tank exchanger
25 Primary outlet on the DHW tank exchanger
26 Domestic water load pump
27 Non-return valve
28 Domestic cold water inlet
29 Pressure reducer
30 Sealed safety device calibrated to 7 bars (1)
32 (Optional) DHW loop pump
33 DHW temperature sensor
35 Disconnecting cylinder (available as an option – see page 8)
36 Motorised isolating valve
39 Injection pump
44 65°C limiter thermostat with manual reset for underfloor heating
46 3-way-directional valve with motor reversing
50 Disconnector
51 Thermostat valve
61 Thermometer
64 Radiator circuit (gentle heat radiators, for example)
65 Low temperature circuit (underfloor heating, for example)
67 Manual valve
68 Condensates neutralisation system
73 LIMITER THERMOSTAT
75 Pump for sanitary use
77 Primary outlet of the solar exchanger
78 Stop valve with release return valve
80 Primary inlet of solar exchanger
84 Solar circuit pump
85 Safety valve sealed and calibrated to 6 bars
86 Solar expansion tank
88 Solar circuit drainage valve (note: propylene glycol)
109 Thermostatic mixing valve for domestic hot water
112a Collector sensor
112b Solar tank sensor
114 Solar circuit drainage valve (note: propylene glycol)
123 Cascade flow sensor (to connect to the slave boiler)
126 Solar regulator
130 Degasser with manual purge (Airstop)
131 Champs de capteurs
132 Station solaire complète avec régulation Diamat
145 Vanne de commande de la batterie de sécurité
146 Module thermostatique de réglage de la température du circuit retour
(1) mandatory, in compliance with safety directives

Wall-mounted box OpenTherm/Modbus Interface - Package AD 286
Needed to control a boiler cascade equipped with OT controller (1 board per boiler).

OpenTherm/Modbus Interface - Package AD 287
Needed to manage a cascade of boilers equipped with OT controller.
The board should be installed directly in the boiler.

Intermodule connecting cable - length 1.5 m - Package AD 124
This is used for the interconnection of two DIEMATIC VM iSystem wall-mounted control systems.

BUS connecting cable - long. 40 m - Package DB 119
This is intended to replace either the 12 m or the 1 m BUS cable when these turn out to be too short.