Control module 2 circuits

AD290

Installation and Service Manual

Contents

Contents

1   Introduction

1.1   Symbols used

In these instructions, various danger levels are employed to draw the user's attention to particular information. In so doing, we wish to safeguard the user's safety, obviate hazards and guarantee correct operation of the appliance.

> ⚠ **DANGER**
>
> Risk of a dangerous situation causing serious physical injury.

> ⚠ **WARNING**
>
> Risk of a dangerous situation causing slight physical injury.

> ⚠ **CAUTION**
>
> Risk of material damage.

ℹ   Signals important information.

☞ Signals a referral to other instructions or other pages in the instructions.

1.2   Abbreviations

▸ **D**: Direct circuit heated at high temperature
▸ **DHW**: Domestic hot water
▸ **OS**: Outside sensor
▸ **OT**: OpenTherm
▸ **OTC**: Control as a function of the temperature
▸ **RTC**: Room control
▸ **RTC/OTC**: Room control/Control as a function of the temperature
▸ **TS**: Temperature sensor
▸ **WT**: DHW tank

2   Safety instructions and recommendations

2.1   Recommendations

⚠️ **WARNING**

▸ Only qualified professionals are authorised to work on the appliance and the installation.

▸ Before performing any work, first disconnect the device from the power supply.

ℹ️ Keep this document close to the place where the boiler is installed.

3   Technical description

3.1   General description

The Control module can control two central heating circuits. These circuits can be controlled independently of each other.

The following parts must be connected to a unit:

▸ Either a modular programmable thermostat that can control up to two circuits.
▸ Or two thermostats, each controlling one circuit.

ℹ   ▸   The unit is wall mounted.

3.2   Operation

The unit controls the initial boiler temperature based on the circuit with the greatest demand. Other circuits are adjusted by the unit. The unit provides information about the boiler and circuits to the modular programmable thermostat.

3.2.1.   Circuits

3-way valve circuits (V3V)

The module allows the temperature of two circuits to be controlled independently of one another.

3-way valve probes (V3V)

Contact probes are needed for 3-way valve circuits (V3V).

Direct circuit

A contact probe connected to the direct circuit is needed for the proper functioning of the system (integrated probe).

4   Installation

4.1   Package list

The delivery includes:

‣ Wall mounted unit.

2x 🔩

2x   3x   3x

R000480-A
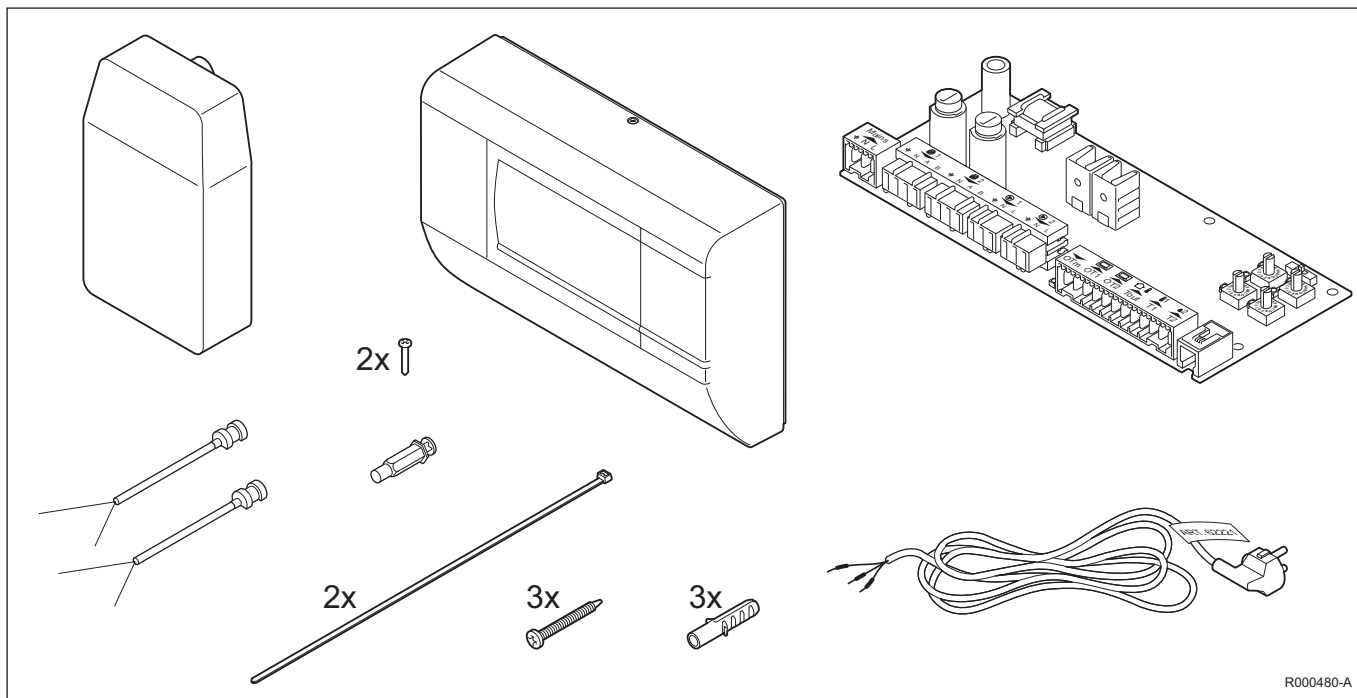
4.2   Application options

R000282-B
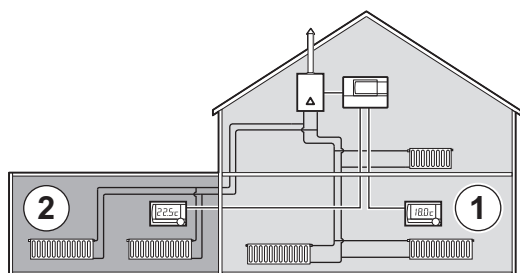
Widely-used applications that require two groups to be controlled:

Most widely used two-circuit applications:

‣ Multi-family house.
‣ Sports club with canteen and changing area.
‣ Office and workshop.
‣ Separate bathroom heating.

The module can also be used in a large variety of configurations:

‣ Radiator circuit.
‣ Floor heating circuits, etc

☞See chapter: "Configurations", page 9.
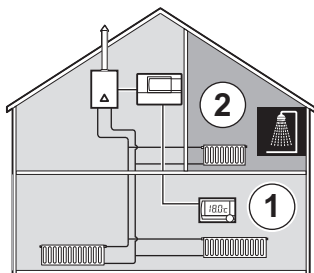
4.3   Configurations

The configurations are intended as examples. You can of course design your own installation in which the examples are combined. In these examples, two symbols are used for the modular programmable thermostat.

R000271-A
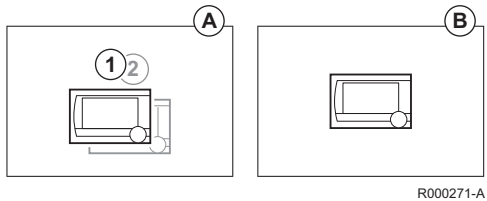
A   Modular programmable thermostat that controls two circuits.

B   Modular programmable thermostat that controls one circuit.

●
i   To control two circuits with a single modular programmable thermostat, software version **19** or higher is needed.

4.3.1.   Two circuits with 3-way valve

The circuits can be controlled independently of one another.

DHW

T005104-B
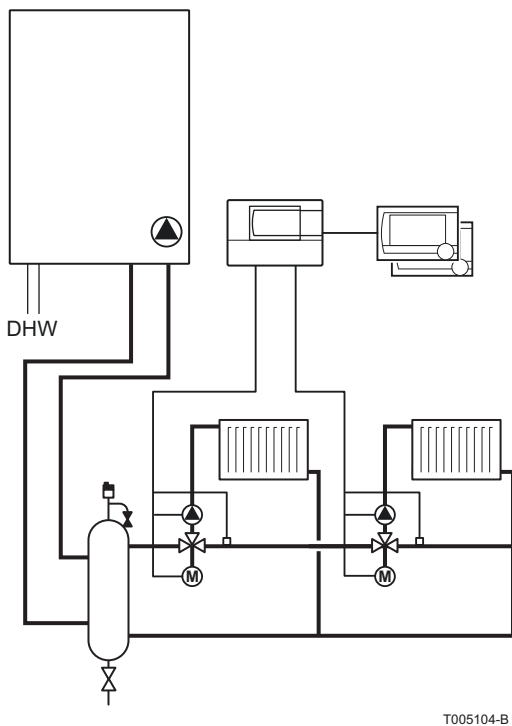
4.3.2. Heating by 3-way valve circuit and direct circuit

DHW

T005103-A
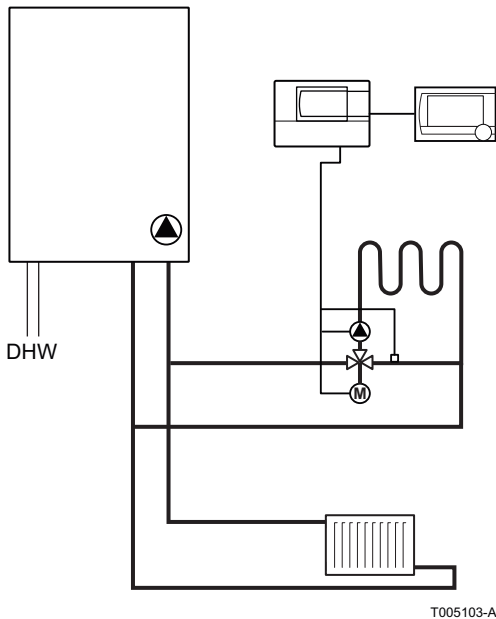
In this example, the **1** and **2** circuits are controlled by the modular programmable thermostat(s).
Circuit 1 has a 3-way valve.
The hydraulic **EA 104** unit (**3** speed pump) and high energy efficiency **EA 145** unit (category **A**) require the configuration wheel **P** on **D** to be adjusted (circuit **1**).

Circuit 2 is direct.
To ensure the proper operation of the installation, the direct circuit must have a contact probe. The **P** configuration wheel (circuit **2**) must then be set to **A**

See chapter:☞ "Configuration wheels for adjusting valves 1 and 2, with status LED - (P)", page 14

4.3.3. Outside sensor(s)

Only the external probe supplied with the AD290 is to be connected to it.

Application options:

‣ External probe connected to the boiler. The value is recorded for the two circuits.
‣ External probe connected to unit. The value is recorded for the two circuits.
‣ External probes connected to the boiler and unit.
   – The boiler outside sensor is for circuit **1**.
   – The module outside sensor is for group **2**.

4.4   Required parts

The following required parts are listed for each required installation.

ℹ   Please contact us for further information.

Required in the installation	Required parts
Type of control	
Control as a function of the temperature - 2 circuits	▸ 1x Outside temperature sensor
	▸ 1x **Modulating clock thermostat**
Adjustment based on room temperature - 2 circuits	▸ 2x **Modulating clock thermostat**
Control as a function of the temperature - 1 circuit	▸ 1x Outside temperature sensor
Room control - 1 circuit	▸ 1x **Modulating clock thermostat**
Circuit type	
3-way valve circuits (V3V)	▸ 1x Contact sensor
	▸ 1x 3-way valve
	▸ 1x Pump
Circuit DHW (Controlled by the boiler)	▸ Integrated boiler components
Direct circuit	▸ 1 contact probe

4.5   Electrical connections
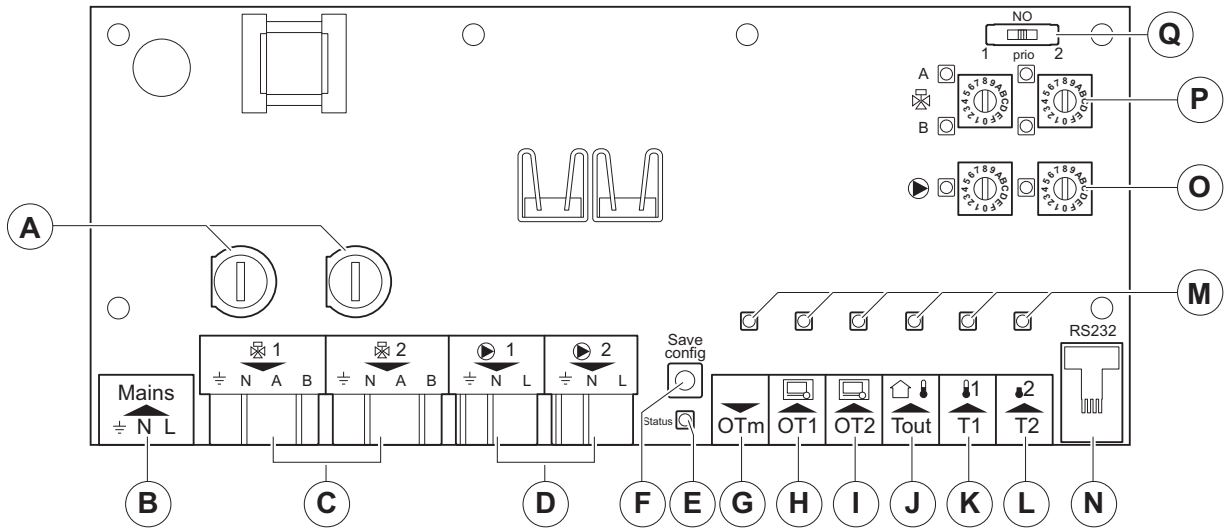
T002652-B

A1	Circuit **1** fuse	**I**	Modular programmable thermostat connection for circuit **2**
A2	Circuit **2** fuse	**J**	External sensor connection
B	230 V main supply	**K**	Connecting the contact probe of circuit **1**
C	3-way valve connections for circuits **1** and **2**	**L**	Connecting the initial probe of circuit **2**
D	Pump connections for circuits **1** and **2**	**M**	Input operating status LED
E	Status LED	**N**	Connection for service purposes: **Recom**

F	Button "Save config"	O	Configuration wheels for adjusting pumps **1** and **2**, with status LED
G	Boiler connection	P	Configuration wheels for adjusting valves **1** and **2**, with status LED
H	Modular programmable thermostat connection for circuit **1**	Q	Priority switch to maintain at position **0**

4.5.1.   3-way valve connections for circuits 1 and 2 - (C)

R000264-A
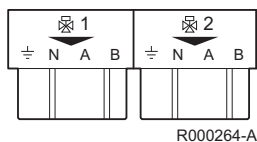
Type of valve	Wire function	Connection to module
Mixing valve	Zero	N
	Opening	A
	Closing	B
	Earth	$\perp$

4.5.2.   Pump connections for circuits 1 and 2 - (D)

R000265-A
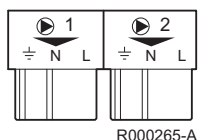
Wire function	Connection to module
Zero	N
Phase on	L
Earth	$\perp$

4.5.3.   Status LED - (E)

R000266-A
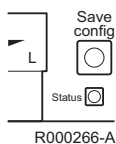
If the status LED is continuously lit, it means that the module is working correctly. A fault message is indicated by a flashing code:

1. The LED is first of all on for 1 second and then off for 0,5 second.
2. The LED then flashes a number of times to display the fault message. ☞ See chapter: "Alarm messages", page 18.
3. The LED then goes off for at least 0,5 second.

i   This pattern repeats every 7 seconds.

4.5.4.   Button 'Save config' - (F)

R000266-A

This button is used to save the selected configuration on the module.

i   The period taken into account can reach one minute.
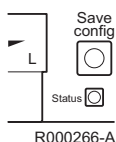
4.5.5.   Boiler connection - (G)

R000280-A

▸ This terminal is used for the boiler.

Status LED - Boiler	State
Ignited	Connected and active
Flashes 2 times per second	Error
Flashes 4 times per second	Configuration is detected

4.5.6.   Connections for modular programmable thermostats - (H & I)

R000267-A

The modular programmable thermostat can be connected to either terminal.
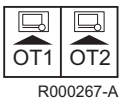
Status LED - Regulation	State
Ignited	Connected and active
Flashes 2 times per second	Error
Flashes 4 times per second	Configuration is detected

4.5.7.   Sensor connections - (J, K & L)

R000268-A

The required sensors can be connected to the connections **J**, **K** and **L**.
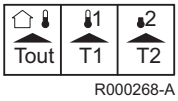
Status LED - Sensor	State
Ignited	Connected and active
Flashes 2 times per second	Error
Flashes 4 times per second	Configuration is detected

R000283-A

Position of the sensor	
Outside sensor	▸ Install the outside sensor on the north or north-west side of the home, away from direct sunlight.
	▸ The sensor must be positioned at least 2,5 metres above ground level.
	▸ Do not install the outside temperature sensor next to a window, door, vent etc.
Initial heating probe	Install the probe onto the 3-way valve circuit.

4.5.8.   Configuration wheels for adjusting pumps 1 and 2, with status LED - (O)

R000269-A
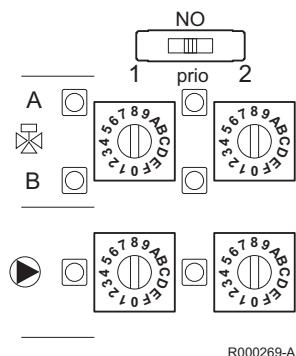
Position	Adjustment range	Parallel operation of boiler
0	Pump post-circulation time: Automatic[1]	Yes
1	Pump post-circulation time: 0 minutes	Yes
2	Pump post-circulation time: 1 minute	Yes
3	Pump post-circulation time: 10 minutes	Yes
4	Continuous	Yes
5	Pump post-circulation time: Automatic	No
6	Pump post-circulation time: 0 minutes	No
7	Pump post-circulation time: 1 minute	No
8	Pump post-circulation time: 10 minutes	No
9	Continuous	No
(1) For optimum use of the residual heat.		

The circuit pump is activated when the circuit has a heat demand. The pump post-circulation time can be set:

Pump post-circulation time	
No post-circulation time	The pump stops as soon as there is no longer heat demand
Continuous	The pump continuously runs
Automatic	The pump post-circulation time depends on the temperature decrease measured by the contact sensor. The post-circulation time is at least 3 minutes and at most 30 minutes.

Status LED - Pump	State
Ignited	Pump on
Off	Pump off

4.5.9.   Configuration wheels for adjusting valves 1 and 2, with status LED - (P)

Position	Adjustment range
0	Close manually (Only for test purposes)
1	Open manually (Only for test purposes)
2	Thermal valve (2 point with 3-way valve)
3	Thermal valve (2 point with 2-way valve)
4	Open/closed valve (2 point with 2-way valve) Opening time: 0 to 30 seconds
5	Open/closed valve (2 point with 2-way valve) Opening time: 30 to 120 seconds
6	Open/closed valve (2 contacts with two-way valve) Opening time: 2 to 4 minutes
7	Do not use
8	Do not use

Position	Adjustment range
9	Do not use
A	Mixing valve (3 point with 3-way valve) Opening time: 0 to 30 seconds
B	Mixing valve (3 point with 3-way valve) Opening time: 30 to 60 seconds
C	Mixing valve (3 point with 3-way valve) Opening time: 1 to 2 minutes
D	Mixing valve (3 point with 3-way valve) Opening time: 2 to 4 minutes (Units EA 104 and EA 145)
E	Not used
F	Not used
	Not used

Status LED A - Valve	Status LED B - Valve	State
Off	Ignited	Closed
Off	Flashing	Closing
Ignited	Ignited	Intermediate phase
Flashing	Off	Opening
Ignited	Off	Open

i   If only one pump is connected to a circuit, an initial probe must be inserted and the **P** configuration wheel must be positioned on **A**.

5   Connection and configuration

5.1   Connection and configuration

R000270-A
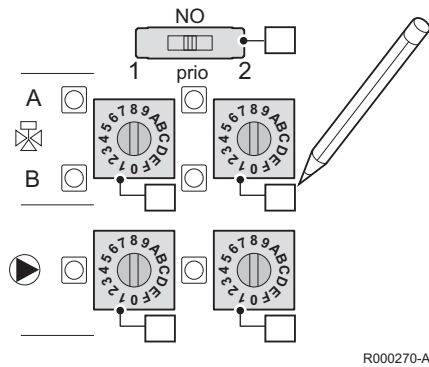
For more information, see chapter: "Electrical connections", page 11.

Proceed as follows:

1. Connect the required sensors.
2. Connect and adjust the pump(s).
3. Connect and adjust the valve(s).
4. Connect the modular programmable thermostat(s).
5. Connect the 230 V supply.
6. Press down for 1,5 seconds on the 'Save config' button to detect (LEDs start blinking) and save the new configuration.
7. Use the status LED to check whether the module is still detecting faults.

ℹ   Note the positions of the switches **O**, **P** and **Q** in the illustration.

5.2   Test function

The module has two test settings. These can be used to test whether the valves and the pumps are functioning correctly. To do this, proceed as follows:

1. Set switch **P** to setting **1** (Close manually)
2. Press button 'Save config':
    The **B** LED for the **1** circuit valve illuminates.
    The pump LED remains off. The pump is not activated.
3. Set switch **P** to setting **0** (Open manually):
4. Press button 'Save config':
    The **A** LED for the **1** circuit valve illuminates.
    The pump LED remains off. The pump is not activated.
5. Repeat the previous steps for circuit **2**.
6. Restore the settings of the switches appropriate to the configuration.
7. Press button 'Save config'.

ℹ   Some thermal valves require 5 minutes to open and close.

5.3   Changing the settings

The 'Save config' button must be used to reboot the unit configuration when adjusting the **O** and **P** configuration wheels.

5.4   Turning on the antifreeze function

The frost protection is activated when a contact sensor measures that the temperature has fallen below 7° C. The circuits are then switched on and the boiler will supply hot water at a temperture of 20° C. This continues until a contact sensor measures that the temperature has risen above 10° C.

5.5   Weekly switch-on function

The pumps and valves are run for a short period once a week to prevent sticking. The function only becomes active if no pumps or valves have been activated in a week.

i   The boiler is not switched on.

6   Alarm messages

6.1   Alarm messages

Error code[1]	Description	Status LED flashing code[2]	Checking / solution
220	A sensor is not recognised.	LED flashes 1 time	▸ Check the connection of the sensor for which the LED is flashing. ▸ Measure the resistance value of the sensor. ☞ For more information, see chapter: "Technical specifications", page 22.
221	Communication fault with the device to be controlled. For example, boiler, cascade controller or previous module.	LED flashes 2 time	▸ Check that the connected device is switched on. ▸ Check the connection.
222	Communication fault with the modular programmable thermostat(s).	LED flashes 2 time	▸ Check that the connected device is switched on. ▸ Check the connection.
223	▸ The setting of switch **O** or **P** does not match the configuration saved in the module. ▸ The configuration has been changed.	LED flashes 4 time	Check the positioning of the configuration wheels, then press the save config button. If the fault persists, repeat the process. ☞ Outlined in: "Connection and configuration", page 16.
224 225	Internal unit fault	LED flashes 5 time	▸ Check the supply voltage. If it is correct, repeat the process. ☞ Outlined in: "Connection and configuration", page 16. ▸ The module attempts to remedy the fault. ▸ Parameters changed with **Recom** are restored to the works settings. If the fault continues after using the 'Save config' button, the module will need to be replaced.
Miscellaneous	Fault in control unit. For example, boiler, cascade controller or previous module.	LED flashes 3 time	Consult the manual of the connected device.
(1) The fault codes are only applicable if an OpenTherm controller is being used (For example, the Modulating clock thermostat).			
(2) ☞ For more information, see chapter: "Status LED - (E)", page 12.			

7   Service connection

7.1   Service connection

The service connection can be used with **Recom**. An interface (accessory) is available for this purpose. Together with the **Recom** PC/Laptop service software, various settings can be imported, changed and exported.

ℹ️   If **Recom** is used to change a setting, the module will show fault code 223. ☞ See chapter: "Alarm messages", page 18.

7.2   Parameter descriptions

Parameter	Description	Adjustment range	Factory setting
1	Valve setting[1] (Circuit **1**)	▸ Close manually ▸ Open manually ▸ Thermal 2 contacts with 3-way valve ▸ Thermal 2 contacts with two-way valve ▸ 2 contacts with two-way valve (0 to 30 s) ▸ 2 contacts with two-way valve (30 to 120 s) ▸ 2 contacts with two-way valve (120 to 240 s) ▸ 2 contacts with 3-way valve (0 to 30 s)	Close manually
2	Valve setting[1] (Circuit **2**)	▸ 2 contacts with 3-way valve (30 to 120 s) ▸ 2 contacts with 3-way valve (120 to 240 s) ▸ 3 contacts with 3-way valve (0 to 30 s) ▸ 3 contacts with 3-way valve (30 to 60 s) ▸ 3 contacts with 3-way valve (60 to 120 s) ▸ 3 contacts with 3-way valve (120 to 240 s) ▸ No function	
3	Pump setting[1] (Circuit **1**)	▸ Pump post-circulation time: Automatic ☞ See chapter: "Configuration wheels for adjusting pumps 1 and 2, with status LED - (O)", page 14	Automatic
4	Pump setting[1] (Circuit **2**)	▸ Pump post-circulation time: None ▸ Pump post-circulation time: 1 minute ▸ Pump post-circulation time: 10 minute ▸ Pump post-circulation time: Continuous	
5	Priority setting for circuits[1]	▸ Priority: Circuit **1** ▸ Priority: None ▸ Priority: Circuit **2**	None
(1) Can also be adjusted using a configuration wheel.			

Parameter	Description	Adjustment range	Factory setting
6	Connected OpenTherm controllers	▸ None ▸ Connection **1** ▸ **1** and **2** connections ▸ Connection **1** (Controller **1** that operates two circuits) ▸ **1** and **2** connections (Controller **1** that operates two circuits)	None
7	Connected temperature sensors	▸ **Tout**=No - **T1**=No - **T2**=No ▸ **Tout**=Yes - **T1**=No - **T2**=No ▸ **Tout**=Yes - **T1**=Yes - **T2**=No ▸ **Tout**=No - **T1**=Yes - **T2**=No ▸ **Tout**=No - **T1**=No - **T2**=Yes ▸ **Tout**=No - **T1**=Yes - **T2**=Yes ▸ **Tout**=Yes - **T1**=Yes - **T2**=Yes	-
21	Hot water start - The calorifier is heated when the measured hot water temperature falls below the required temperature minus the set value	from 0 to 40°C	5
22	Hot water stop - The calorifier is no longer heated when the measured hot water temperature goes above the required temperature plus the set value	from 0 to 20°C	5
23	Over-temperature (DHW) - The calorifier is heated with a hot water temperature that equals the required temperature plus the set value	from 0 to 30°C	20
24	Over-temperature (Central heating) - The requested central heating temperature is slowly increased up to the set value if: ▸ The temperature has not yet been reached. ▸ The valve is fully open.	from 0 to 20°C	10
28	Requested temperature (DHW) - Standard value	from 30 to 70°C	65
33	Minimum central heating temperature circuit 1	from 0 to 100°C	0
34	Maximum central heating temperature circuit 1	from 0 to 100°C	100
35	Minimum central heating temperature circuit 2	from 0 to 100°C	0
36	Maximum central heating temperature circuit 2	from 0 to 100°C	100

(1) Can also be adjusted using a configuration wheel.

▸ Parameters **1** to **7** can be changed by the user.

▸ Parameters **21** to **36** must only be modified by a qualified professional (Using **Recom**).

8   Problems and solutions

8.1   Problems and solutions

Problem	Solutions
No voltage to the connections for valves **1** and **2** of the module	The electronic circuit only functions when it is powered (Minimum input = 1 W).
The circuit heat demand is low, but the flow temperature remains high	▸ This can be for a long period, for example: ☞ "Two circuits with 3-way valve", page 9. ▸ This can be for a short time (± 1 minute) when the circuit has just been switched on and the boiler is still supplying heat.
The circuit heat demand is high, but the flow temperature remains low	▸ Is the boiler in DHW operation? ▸ Is the boiler indicating a fault? ▸ Is the module indicating a fault? ▸ Has the module been set correctly? ▸ Check the module fuses. ▸ Is the (correct) valve activated? ▸ Is the valve in the correct position? ▸ Is the (correct) pump activated? ▸ Is the circulation pump operating? ▸ Is there adequate flow? ▸ Are the radiator valves open? Use the test function. These can be used to test whether the valves and the pumps are functioning correctly. ☞ See chapter: "Test function", page 16.
There is no heat demand, but even so the pipes and radiators become hot	The frost protection might be activated.
The status LED of the connection to the **1** controller is flashing, while the status LED of the connection to the **2** is not flashing	▸ Controller **1** connection: No OpenTherm controller is connected to this connection. ▸ Controller **2** connection: An OpenTherm controller is connected to this connection.

9   Technical specifications

9.1   Technical specifications

Technical specifications		
General		
Weight	Without wall housing	211 g
	With wall housing	820 g
Wall housing dimensions	l x w x h	187 x 270 x 77 mm
Mounting		Wall mounted
Settings		Using the configuration wheels on the unit or Recom
Read out status and faults		Via LEDs, OpenTherm controller or Recom
Power consumption		< 1 W
Protection class in wall housing		IP20
Ambient conditions		
Storage conditions	Temperature	-25°C – 60°C
	Relative humidity[1]	5 % – 90 %
Operating conditions	Temperature	0°C – 60°C
	Relative humidity[1]	5 % – 90 %
Quality marks and compliance with standards		
OpenTherm		V3.0
RoHS and WEEE		Compliant
Immunity		EN61000-6-2
Emission		EN61000-6-3
Drop test		IEC 68-2-32
EMC		EN50165, 55014, 55022
LVD		EN60730-1 (1999)
(1) No condensation		

Electrical connectors	
Power supply voltage	230 V AC/50 Hz or 115 V AC/60 Hz
Valve 1 and 2 connections - (C)	
Maximum current to be used per valve	1 A
Power supply voltage	Equal to supply voltage of the module
Pump 1 and 2 connections - (D)	
Maximum current to be used per pump	2 A
Minimum pump heat input	1 W
Power supply voltage	Equal to supply voltage of the module
Fuse per circuit	4 AT
Boiler connection (- (G)	
Maximum cable length	50 m (2 x 5 Ω)
Connecting	Connection for low-voltage wires
OpenTherm	OpenTherm V3.0
Controller connections - (H & I)	

Electrical connectors	
Maximum cable length	50 m (2 x 5 Ω)
Connecting	Connection for low-voltage wires
OpenTherm	OpenTherm V3.0 with Smart Power

Bulbs	Outside temperature	Heating flow temperature	Heating flow temperature
Fittings	**Tout - (J)**	**T1 - (K)**	**T2 - (L)**
Maximum cable length	100 m (2 x 10 Ω)	100 m (2 x 10 Ω)	100 m (2 x 10 Ω)
Article no.	S101252	S101527	S101527
Type	NTC	NTC 10 kΩ at 25°C	NTC 10 kΩ at 25°C
Measurement range	-60 – 60°C	-10 – 120°C	-10 – 120°C
Temperature	**Resistance**		
-40°C	4124 Ω	-	-
-20°C	2392 Ω	-	-
-10°C	1684 Ω	-	-
0°C	1149 Ω	-	-
10°C	779 Ω	19691 Ω	19691 Ω
20°C	528 Ω	12474 Ω	12474 Ω
30°C	362 Ω	8080 Ω	8080 Ω
40°C	-	5372 Ω	5372 Ω
50°C	-	3661 Ω	3661 Ω
60°C	-	2535 Ω	2535 Ω
70°C	-	1794 Ω	1794 Ω
80°C	-	1290 Ω	1290 Ω
90°C	-	941 Ω	941 Ω

SP

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